TETRA TECH

April 26, 2024

Kenneth S. Fink, MD, MGA, MPH
Director of Health
Hawaii Department of Health (HDOH)
Kinau Hale
1250 Punchbowl Street
Honolulu, Hawaii 96813

Subject: Specialty Laboratory and Field Support for HDOH CAB – Ambient Community Air Monitoring in Response to Wildfire Cleanup Actions – Kula, Maui
Contract No. TO-23141
Final Summary Report

Dear Dr. Fink:

Hawaii Department of Health (HDOH) Clean Air Branch (CAB) tasked Tetra Tech, Inc., under Task Order 23141, to perform ambient community air monitoring in response to debris removal and asbestos abatement operations in Kula, Maui.

Ambient community air monitoring plans were implemented to help protect the overall community, sensitive populations, and receptors on neighboring properties during debris cleanup operations. Activities consisted of air sampling, air monitoring, and reporting. Field activities associated with this task order were conducted from November 8, 2023, to December 29, 2023.

The report provides a summary of these actions and provides analytical summaries and documentation for each property within the scope of work. This report incorporate comments received from HDOH and, as such, all content, technical approaches, and findings of this report have been reviewed and approved by HDOH.

Sincerely,

Chris Burns
Project Manager

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Kula, Maui
Ambient Community Air Monitoring
Final Summary Report

Prepared for

Hawaii Department of Health Clean Air Branch
Kinau Hale
1250 Punchbowl Street
Honolulu, Hawaii 96813

April 26, 2024

Prepared by

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EXECUTIVE SUMMARY

In 2023, wildfires burned more than 1,500 parcels of Maui, with over 2,200 structures damaged or destroyed. The post-wildfire remediation effort has been divided into two projects: Kula and Lahaina. In response to the U.S. Army Corps of Engineers (USACE) debris removal program, the Hawaii Department of Health (HDOH) Clean Air Branch (CAB), initiated an air monitoring and sampling program.

Tetra Tech, Inc. (Tetra Tech) provided ambient community air monitoring and sampling, meteorological recording, and overall reporting for HDOH from November 8, 2023 to December 29, 2023. Over the course of this time frame, air monitoring and sampling took place at three HDOH selected monitoring locations in Kula, Maui (shown on Figure 1). A high-level summary of the data collected indicated the following:

- No asbestos samples returned a value above the laboratory's detection limit,
- Low levels of heavy metals were detected, but all detections were significantly below site screening action levels, and
- Particulate levels were found to exceed the screening levels at times, with exceedances attributed to wood chipping and other non-debris removal/ground disturbance activities.

This report will provide HDOH with more detail regarding the above findings.

AIR MONITORING AND SAMPLING PROGRAM OBJECTIVES

Ash and debris from residential structures burned by fires can contain heavy metals, as discussed in the "Guidance for Conducting Emergency Debris, Waste, and Hazardous Material Removal Actions Pursuant to a State or Local Emergency Proclamation" (California Environmental Protection Agency [CEPA] 2011), "Assessment of Burn Debris – 2007 Wildfires San Bernardino and San Diego Counties, California" (Department of Toxic Substances and Disease Control [DTSC] 2007) and "Assessment of Burned Debris- 2015 Wildfires Lake and Calaveras County, California" (DTSC 2015). The ash and debris also may contain concentrations of lead related to homes built prior 1978 (before lead was banned from household paints in the United States).

Residual materials, such as stucco, roofing, floor tile, linoleum, fireplaces, furnaces, vinyl tiles and mastic, sheetrock and joint compound, cement pipe, exterior home siding, thermal system insulation, and other building materials commonly used in homes built before 1989 may also contain other substances of concern, including asbestos.

Tetra Tech conducted air monitoring and sampling to determine the airborne exposure from contaminants of concern related to debris removal operations and to demonstrate the effectiveness of best management practices and engineering controls utilized. Additionally, because this sampling was conducted during debris removal and asbestos abatement activities, the results offer a quantifiable measurement of exposure to ensure that sensitive populations in the community were not impacted by these activities.

SCOPE OF WORK

Ambient community air monitoring and sampling activities included project planning and coordination and air monitoring and surveillance. All activities were conducted under the oversight and approval of the Hawaii Department of Health (HDOH) Clean Air Branch (CAB) and in accordance with the Specialty Laboratory and Field Support for HDOH – Ambient Community Air Monitoring directive in response to the Wildfire Cleanup Actions, Attachment 1 (CAMSP), dated December 8, 2023, as well as activity-specific work plans. The general scope of work is summarized below:

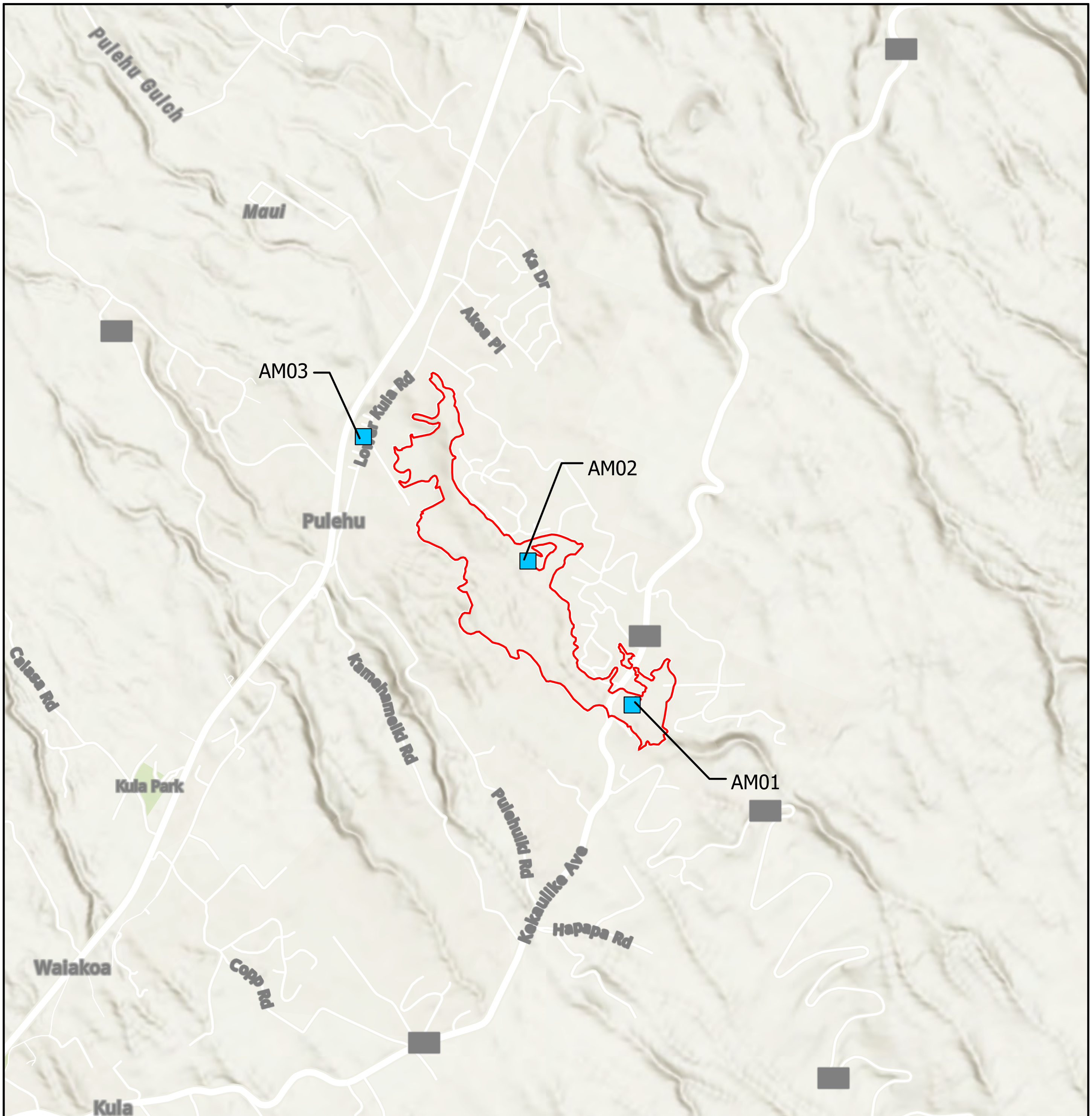
- **Project Planning and Coordination.** This scope of work included project coordination activities such as client communications, subcontractor procurement and coordination and project support, generation of site-specific risk numbers (site-specific action levels [SSALs]), and preparation of the CAMSP. Additionally, Tetra Tech produced a Health and Safety Plan to be followed by staff when working on site.

  Tetra Tech developed, in conjunction with the HDOH CAB, the CAMSP for the Kula fire area. The plan was developed for three (3) locations in Kula determined by the HDOH.

- **Air Monitoring and Surveillance.** The CAMSP was implemented to help protect the overall community, sensitive populations, and receptors on neighboring properties during debris cleanup operations. The air monitoring data and analytical sampling results were evaluated compared to SSALs and provided to HDOH CAB. Activities consisted of meteorological monitoring, air sampling, air monitoring, data verification, and reporting.

OUTSIDE IMPACTS

Over the course of this project, as noted in appropriate weekly reports, some instances of elevated sample results may have been caused by non-debris removal activities. These include instances of weather conditions such as rain, wind, or heavy fog impacting monitoring equipment and, in some instances, private landowner activities taking place nearby sampling locations. Where these factors impacted results, Tetra Tech has provided notes in the reports. Weather data was also collected throughout this project and is included in Appendix B.



Air Monitoring Locations

Kula Fire Perimeter

N

0 0.25 0.5
Miles

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Figure 1
Ambient Community
Air Monitoring Locations

Hawaii DOH
2023 Kula Wildfire

Basemap: ESRI ArcGIS World Street Map

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ACRONYMS AND ABBREVIATIONS

$\mu g/m^3$	Microgram per cubic meter
µm	Micrometer
CAMP	Community Air Monitoring Plan
CAMSP	Community Air Monitoring and Sampling Plan
CAB	Clean Air Branch
CEPA	California Environmental Protection Agency
CFR	Code of Federal Regulations
DSTC	Department of Toxic Substances and Disease Control
EBAM	Environmental beta attenuation mass monitors
F	Fahrenheit
f/cc	Fibers per cubic centimeter
HDOH	Hawaii Department of Health
HV	High volume
ICP/M	Inductively Coupled Plasma/Mass Spectrometry
ISO	International Organization for Standardization
L	Liters
L/min	Liters per minute
MCE	Mixed Cellulose Ester
mg/kg	Milligrams per kilogram
mm	Millimeter
PCM	Phase contrast microscopy
PCMe	Phase contrast microscopy equivalent
PDF	Portable digital format
PII	Personally identifiable information
PLM	Polarized light microscopy
PM	Particulate Matter
$PM_{2.5}$	Diameter less than 2.5-micrometers
PM_{10}	Diameter less than 10-micrometers
PPE	Personal protective equipment
QA/QC	Quality Assurance/Quality Control
s/cc	Structures per cubic centimeter
SOP	Standard Operation Procedure
SOW	Scope of work
SPM	Suspended Particulate Matter
SQL	Structured query language
SSAL	Site-Screening Action Levels
TAT	Turnaround time
Tetra Tech	Tetra Tech, Inc.
TWA	Time weighted average
USACE	U.S. Army Corps of Engineers
U.S. EPA	United States Environmental Protection Agency

1.0 INTRODUCTION

This Ambient Community Air Monitoring Draft Summary report provides results of air sampling and monitoring efforts for Kula, Maui. This section discusses the background, scope of work (SOW) and the report content.

1.1 BACKGROUND

High winds from Hurricane Dora south of Hawaii and dry weather caused wildfires to develop in Lahaina, Upper Kula, Pūlehu/Kihei, and Ka‘anapali on the island of Maui on August 8, 2023. The wildfires affected approximately 1,550 parcels and 2,200 structures.

Tetra Tech was tasked by the HDOH, Clean Air Branch (CAB) to create and implement a Community Air Monitoring and Sampling Plan (CAMSP) for the Kula fire area. Tetra Tech developed this plan in consultation with HDOH CAB.

Ash and debris from residential structures burned by fires can contain heavy metals, as discussed in the “Guidance for Conducting Emergency Debris, Waste, and Hazardous Material Removal Actions Pursuant to a State or Local Emergency Proclamation” (California Environmental Protection Agency [CEPA] 2011), “Assessment of Burn Debris – 2007 Wildfires San Bernardino and San Diego Counties, California” (Department of Toxic Substances and Disease Control [DTSC] 2007) and “Assessment of Burned Debris-2015 Wildfires Lake and Calaveras County, California” (DTSC 2015). The ash and debris also may contain concentrations of lead (for homes built prior 1978 [before lead was banned from household paints in the United States]).

Residual materials, such as stucco, roofing, floor tile, linoleum, fireplaces, furnaces, vinyl tiles and mastic, sheetrock and joint compound, cement pipe, exterior home siding, thermal system insulation, and other building materials commonly used in homes built before 1989 may also contain other substances of concern, including asbestos.

1.2 SCOPE OF WORK

During USACE debris removal and asbestos abatement activities, Tetra Tech conducted air monitoring and sampling to determine the impacts from airborne exposure routes to demonstrate the effectiveness of best management practices and engineering controls used during debris removal and asbestos abatement activities. Air monitoring and sampling data was used to evaluate whether sensitive populations in the community were impacted by these activities.

To accomplish the above objective, Tetra Tech conducted the following field work related to community air monitoring and sampling (weather and site conditions permitting):

- Recorded meteorological data, including temperature, relative humidity, wind direction, wind speed, and current weather conditions.
- Established community air monitoring and sampling stations at locations designated by the CAB.
- Conducted particulate monitoring in accordance with the procedures described in the CAMSP.
- Conducted ambient air sampling for metals and asbestos as applicable.
- Assigned identifiers for all air monitoring and sampling locations according to the following naming conventions:

- MFK-AMXX-MMDDYY (community locations), where AMXX = a four-letter location code assigned for community locations (for example, AM01 = Air Monitoring Location 01), and where MMDDYY = date that sample is collected (for example, 113023 for November 30, 2023).

- Documented all activities, including data, field measurements, and deviations from this CAMSP in a field logbook, on field sheets, or using digital forms.
- Conducted photographic and written documentation in accordance with Tetra Tech SOP No. 024-4, "Recording of Notes in Field Logbook" (Tetra Tech 2023, attached in Appendix A).
- Performed Stage 1 data verification of all analytical laboratory reports.
- Reviewed and verified data for the appropriate quality assurance objectives.
- Reported any results above the Site-Screening Action Levels (SSALs) to HDOH CAB.
- Provided weekly summary reports with results from air monitoring and sampling.

1.3 REPORT CONTENT

This summary report documents air sampling and monitoring related to debris removal and abatement activities in Kula, Maui. This summary report includes text, references, appendices, and attachments necessary to document the complete SOW.

- Section 1 presents the background, SOW, and the report content.
- Section 2 summarizes data management activities conducted throughout the response.
- Section 3 presents environmental site activities including air monitoring and sampling.
- Section 4 provides references.

Appendices provide supporting information prepared for the summary report including meteorological data, particulate and air monitoring summaries, and data verification reports.

Attachments consist of existing documentation or information previously prepared in support of the summary report, documents previously submitted by Tetra Tech in support of the debris removal program, and comprehensive analytical results.

The report provides a summary of Tetra Tech's support and provides analytical summaries and documentation for the three locations within the scope of work. This report has been updated with comments received from HDOH. As such, all content, technical approaches, and findings of the final report have been reviewed and approved by HDOH.

2.0 DATA QUALITY AND MANAGEMENT

Structured and well-defined data management practices provided an important foundation for decision making in the field and maintaining data integrity throughout all elements of reporting. Implementing these practices ensured that collection and generation of data throughout the project were managed and maintained consistently. With consistent and structured data practices, errors that may have been introduced during field collection and processing of data were minimized.

The major elements of data management for the project throughout the debris and asbestos abatement process are presented below.

1. **Data Collection, Transmission and Storage.** Collecting accurate initial data to minimize opportunities for human/user error and avoided the need for transcription or labor-intensive data handling.

   Passing data from its point of origin during the collection phase to an established data repository. Using a variety of methods and technologies for data transmission, each determined by the type of data being transmitted. Using secure repositories was critical to ensure data integrity. Data repositories were selected for their ability to support advanced data analysis and visualization.
2. **Data Quality and Verification.** Employing multiple quality assurance/quality control (QA/QC) procedures and steps to ensure data completeness and accuracy.
3. **Data Analysis, Reporting, and Visualization.** Interpreting data to aid in drawing meaningful conclusions that supported decision-making.
4. **Management of Personally Identifiable Information (PII) Data.** Establishing and implementing internal protocols for protecting PII.

Maintaining data integrity and accuracy was a primary driver for all data management efforts. More information about the four major phases of the project data lifecycle is provided below.

2.1 DATA COLLECTION, TRANSMISSION, AND STORAGE

Data for this project included assessment field notes, monitoring, and sampling information. Monitoring data was downloaded from instruments at the end of each day and peer reviewed and verified for the appropriate QA objectives. Daily time-weighted averages (TWAs) for particulate concentrations were calculated from the logged data from each community particulate monitor and compared to SSALs. Any readings above the SSALs were reported to HDOH CAB the following day.

Field measurements were collected and recorded via monitoring on field data sheets and on digital forms using tablets, as well as direct downloads. Data was evaluated daily as it was collected (particulate monitoring) and received from the laboratory (air sample analytical results) to identify and report any elevated results or screening level exceedances.

All electronic data was stored in a central database (SQL server) that is managed by Tetra Tech. Analytical data was generated by laboratories and provided to Tetra Tech in the form of electronic data deliverables (EDD) and data packages. Analytical data provided by the laboratories was coupled with sampling data collected by field personnel. The data collection forms used for the project included: air sampling, air station check, pump calibration, and field audits.

2.2 DATA QUALITY AND VERIFICATION

The field data collection process includes multi-step quality control process both in the field and off site. Site location, sample volumes, and any information pertaining to each sample are recorded using electronic forms and hard copy field forms. All forms were checked by field staff prior to submission. This data was then submitted into the database where it was checked again and compared to all results received from the lab to ensure all sample results are accounted for and correct.

Air sampling results were received from the off-site analytical laboratories in both electronic data deliverable (EDD) and portable document format (PDF). All reported data underwent data verification procedures and verification quality control under the supervision of a Chemist (Level 1 Data Verification).

Data limitations were noted. Verified analytical data was maintained in an electronic database and compared to project-specific screening levels. Data verification reports are included in Appendix A.

Analytical data verification generally consisted of a completeness check to confirm that all the data that was requested from the laboratory was received and that the lab data complies with specified requirements. Stage 1 verification consisted of a compliance review for sample receipt conditions, the chain of custody, all samples were accounted for, the requested analytical methods were performed, the analytes dates and results were provided, all qualifications are defined, and the lab report contains the units, method detection limits, and reporting limits.

2.3 Data Analysis and Reporting

Any particulate monitoring or air sampling results from community locations that exceeded SSALs were sent to the Operations Division of the HDOH CAB (within 24 hours of collection for particulate monitoring results or within 24 hours of receiving results for air samples). Analytical data was also shared with HDOH following Level 1 verification.

A summary report of particulate monitoring and air sample results was made available to the HDOH CAB on a weekly basis. These reports showed verified data from samples collected two weeks prior. The reporting week schedule was as follows: samples were shipped on Mondays and Thursdays each week, with results received Fridays and Tuesdays. These results then went through Level 1 data verification and were reported to HDOH CAB. Revised reports were submitted if sample results were not received in time or had not yet gone through proper verification.

2.4 Personally Identifiable Information (PII)

Tetra Tech implements and uses administrative and technical safeguards that reasonably and appropriately protect the confidentiality, integrity, and availability of PII that it creates, receives, maintains, or transmits. These safeguards include the following:

- Encryption of PII that Tetra Tech stores and transmits.
- Implementation of strong access controls, including firewalls, and strong passwords
- Use of updated antivirus software
- Adoption of contingency planning policies and procedures, including data backup and disaster recovery plans
- Conduct of periodic security training

At the request of HDOH, information concerning the addresses of the Community Air Monitoring sites were omitted from this report and any other published reports or deliverables prepared by Tetra Tech.

3.0 AIR MONITORING AND SAMPLING ACTIVITIES

This section summarizes air monitoring and sampling activities conducted as described in the CAMSP (Tetra Tech 2023). It addresses air monitoring procedures, air sampling procedures, background air monitoring and sampling, community air monitoring and sampling, and deviations from the sampling plan. Complete analytical results from air sampling are provided as Attachment 2.

3.1 AIR MONITORING PROCEDURES

Ambient air monitoring was conducted using Met One Instruments, Inc., environmental beta attenuation mass monitors (E-BAM) to assess real-time particulate concentrations. E-BAMs continuously logged concentrations of particulate matter (PM) with a diameter less than 2.5-micrometers (µm) ($PM_{2.5}$) and with a diameter less than 10µm (PM_{10}) at 1-minute intervals at each ambient air location.

Field personnel conducted system checks on the air monitoring stations at a frequency of three times per day to ensure equipment was functional and particulate concentrations were not approaching action levels. System checks assessed the physical condition of the equipment, whether the units were collecting data, and briefly current readings to determine whether they are approaching or exceeded the SSALs. Data files from each location were downloaded and reviewed at the end of each day to identify data exceedances, irregularities, or concerns requiring further investigation or correction. E-BAMs are factory-calibrated annually and do not require daily calibration (except for a leak check and a flow audit that were performed before sampling and monthly, in accordance with the manufacturer's procedures).

Meteorological data, including temperature, relative humidity, wind direction, wind speed, and current weather conditions were recorded where air monitoring activities took place. A summary of meteorological data is included in Appendix B.

A summary of the particulate monitoring dataset collected during the debris removal activities, including any exceedances, is included in Appendix C. Dates, 24-hour TWAs, and particulate concentrations are provided for each location. Data files were identified by their respective assigned acronyms (for example, AM-01 for Top Property). There are no laboratory analytical results for particulate monitoring, as 24-hour TWAs for particulates were calculated at each location and compared to the project SSALs. Air monitoring data was captured digitally throughout the monitoring period. Elevated particulate concentrations were communicated directly to the HDOH, as necessary. At all locations, the dataset was reviewed and evaluated the following day. Particulate monitoring occurred at all locations, unless otherwise directed by the HDOH.

3.2 AIR SAMPLING PROCEDURES

Ambient air samples for asbestos and elemental metals were collected at community locations throughout debris removal and asbestos abatement operations. Ambient air samples were collected using high volume air samplers drawing air through filter media at specific calibrated flow rates. The sampling methods are summarized below for asbestos and elemental metals.

Asbestos

Ambient air samples were collected at each air sampling location with a high-flow air pump (SKC QuickTake).

At each community sampling location, samples were collected on a 25-millimeter (mm) open-face 0.45-µm MCE sample cassette with a conductive cowl mounted on a 4- to 5-foot-high cassette tripod stand that is attached to each air pump. The opening faced at a 45-degree angle downward. High-flow air pumps were calibrated at a flow rate of approximately 4-5 liters per minute (L/min). The flow rate of the entire assembled ambient air sampling train was calibrated before sample collection and measured after sample collection using a primary gas flow calibrator, such as a Bios DryCal DC-Lite. The flow rate during the sample period was determined by the average of the two readings. The average daily air monitoring and sampling duration was approximately 24 hours or 1,440 minutes per day at each location. During this sampling time, approximately 6,480 L of air was collected.

To avoid the potential for sample filter over-loading (particularly if visibly dusty conditions were observed during sample periods), Tetra Tech staff performed periodic visual inspections of each filter in the asbestos cowling during each sampling period.

Ambient air asbestos samples were shipped to Eurofins J3 Resources, Inc., laboratory in Houston, Texas for analysis via the International Organization for Standardization (ISO) method 10312:1995I, "Ambient Air – Determination of Asbestos Fibers – Direct Transfer Transmission Electron Microscopy Method." ISO 10312 results were reported as phase contrast microscopy equivalent (PCMe) results in structures per cubic centimeter (s/cc) using counting rules that were considered equivalent to fibers per cubic centimeters (f/cc). PCMe results were compared to project SSALs as data was reported by the laboratory. Calculations were performed for the 95% upper confidence limit of the mean of the data over the project duration intervals. Laboratory turnaround time for these samples were within 72 hours. Analytical results were uploaded to an electronic database and posted online in a secure folder shared with the HDOH CAB following Level 1 data verification.

Elemental Metals

Daily ambient air samples were collected for selected elemental metals at each of the three community locations. Ambient air samples for metals were collected with a Tisch Environmental High Volume Air Sampler and collocated with the particulate monitors and asbestos samplers described above.

Ambient air sampling methods require larger sampling devices and media that can draw significantly more air volume than methods intended for occupational exposure assessments. As a result, air sampling for elemental metals at community locations employed the following air sampling methods:

- U.S. Environmental Protection Agency (EPA) Compendium Method IO-2.1, Sampling of Ambient Air for Total Suspended Particulate Matter (SPM) and PM10 Using High Volume (HV) Sampler

- EPA IO Compendium Method IO-3.5: Compendium of Methods for the Determination of Inorganic Compounds in Ambient Air: Determination of Metals in Ambient Particulate Matter Using Inductively Coupled Plasma/Mass Spectrometry (ICP/M")." EPA/625/R-96/010a

- EPA 40 Code of Federal Regulations (CFR) Part 50, Method for the Determination of Lead in Total Suspended Particulate Matter.

- EPA 40 CFR Part 58, Appendix E: Probe and Monitoring Path Siting Criteria for Ambient Air Quality Monitoring

- Standard Operating Procedures for Lead Monitoring Using a TSP High Volume Sampler

Ambient air samples for elemental metals analysis were shipped to Eastern Research Group laboratories in Morrisville, North Carolina for analysis. Samples were analyzed for the following metals: antimony, arsenic, barium, beryllium, cadmium, chromium, cobalt, copper, lead, manganese, molybdenum, nickel, selenium, thallium, vanadium, and zinc. Air sampling results were reviewed and compared to project SSALs as data were reported by the laboratory and calculations were performed for the 95% upper confidence limit of the mean of the data over the project duration intervals. Air sample laboratory results turnaround times were requested as needed to report results within 7 days. Analytical results were uploaded to an electronic database and posted to a secure, online folder shared with the HDOH CAB following Level 1 data verification.

3.3 BACKGROUND AIR MONITORING AND SAMPLING

Due to the timing of the contract, Tetra Tech was not able to collect background air monitoring data before asbestos abatement and debris removal operations began on November 7, 2023. However, Tetra Tech did continue sampling on Sundays, when USACE crews were not active.

3.4 COMMUNITY AIR MONITORING AND SAMPLING

Ambient community air monitoring and sampling was conducted at three locations preselected by the HDOH in accordance with CAMSP in the Kula, Maui operational area to assess the effectiveness of best management practices and engineering controls used during debris removal activities. All sample locations were selected by the HDOH CAB based on community population density, sensitive receptor groups, prevailing winds, surrounding communities, and power source access. Ambient community air monitoring and air sampling locations were active for 24 hours a day, 7 days a week, in Kula. Figure 1 shows sample locations and their respective sample identification numbers. Exhibit 3-1 lists air monitoring locations and monitoring start and end dates in Kula. Exhibit 3-2 shows sampling locations and sampling start and end dates for Kula.

Exhibit 3-1. Particulate Air Monitoring Dates

Location / ID	Start Date	End Date
Top Property (AM-01)	11/8/2023	12/29/2023
Middle Property (AM-02)	11/8/2023	12/29/2023
Lower Property (AM-03)	11/8/2023	12/29/2023

Exhibit 3-2. Air Sampling Dates

<table>
<tr><th>Analyte(s)</th><th>Location(s) / ID(s)</th><th>Start Date</th><th>End Date</th></tr>
<tr><td>Asbestos</td><td>Top Property (AM-01)
Middle Property (AM-02)
Lower Property (AM-03)</td><td>11/10/2023</td><td>12/29/2023</td></tr>
<tr><td rowspan="2">Elemental Metals</td><td>Top Property (AM-01)
Middle Property (AM-02)</td><td>11/12/2023</td><td>12/29/2023</td></tr>
<tr><td>Lower Property (AM-03)</td><td>11/11/2023</td><td>12/29/2023</td></tr>
</table>

Each community air station included equipment able to (1) monitor air for airborne fine particulate matter concentrations (for particulates with an aerodynamic diameter of not more than 2.5 µm [PM2.5]) and particles with a diameter of 10 µm or less (PM10), and (2) sample air for select elemental metals (including antimony, arsenic, barium, beryllium, cadmium, chromium, cobalt, copper, lead, manganese, molybdenum, nickel, selenium, thallium, vanadium, zinc) and asbestos. Each community air station was also equipped with a weather station to log meteorological data including temperature (°F), relative humidity, current weather conditions, wind direction, and wind speed.

3.5 COMMUNITY AIR MONITORING AND SAMPLING RESULTS

Particulate Monitoring Results

A total of 313 particulate monitoring files were collected from three community locations over the course of 52 days. The particulate air monitoring levels at community locations exceeded the SSALs in 39 instances on 28 different dates from November 8, 2023, to December 29, 2023, during debris removal and asbestos abatement operations. The $PM_{2.5}$ SSAL was exceeded in 35 instances and the PM_{10} screening level was exceeded in four instances. The project SSAL for particulate matter was 35 µg/m^3 based on a 24-hour TWA for $PM_{2.5}$, and 150 µg/m^3 based on a 24-hour TWA for PM_{10}.

Private property owner activities at or near the monitoring locations, which generally included wood chipping and yard work, likely caused 27 instances of the community particulate monitoring results exceeding the project screening level.

Environmental or outside factors such as high winds, haze, or smoke likely comprised five instances of the community particulate monitoring results exceeding the project SSALs.

The USACE debris crew operations may have contributed to two of the community particulate monitoring results exceeding the project SSALs.

On five occasions, Tetra Tech was not able to determine the source of exceedances because exceedances took place outside the operational hours of the USACE debris crew operations. However, Tetra Tech was able to confirm that the USACE debris crew operations were not active at the locations when the community particulate monitoring results exceeded the project SSALs.

All occurrences with particulate levels greater than the SSALs are shown in Appendix C.

Air Sampling Results – Asbestos and Metals

A total of 267 air samples were collected and analyzed, excluding any method-required quality control samples (field or laboratory blanks). Ambient air samples for asbestos and elemental metals were collected at all three locations.

Of the 136 metals samples collected, detections were at low concentrations and all detections were below their respective SSALs.

A total of 144 asbestos samples were analyzed by the laboratory and compared to the SSALs. Of the 144 samples collected, 13 were voided. Ten were voided because of a greater than 10% discrepancy between the pre- and post-calibration flow rate values, as stated in the asbestos sampling standard operating procedures (SOP) included in the CAMSP. One sample was voided due to insufficient sample volume. Two were voided because of equipment failure. All asbestos results were below the SSAL of 0.0034 fibers/cc and less than the analytical sensitivity.

Appendix D provides information on each air sample collected, including sample ID, collection date, sample location, metal sampling results in µg/m^3, and asbestos sampling results in f/cc.

3.6 METEOROLOGICAL MONITORING

Meteorological data was obtained continuously from the community A10-2 weather meter.
The data obtained during meteorological monitoring included:

- Temperature
- Relative humidity

- Wind Direction
- Wind Speed
- Barometric pressure
- Current weather conditions

In general, weather conditions remained consistent throughout the duration of ambient air monitoring activities except for a few instances where high winds and light rain were recorded. In select instances, these factors may have contributed to higher readings, as noted in weekly reports 11/8/2023-11/15/2023, 11/16/2023-11/22/2023, 11/23/2023-11/29/2023, and 12/14/2023-12/20/2023 (found in Attachment 3).

3.7 DEVIATIONS FROM THE WORK PLAN

Deviations from the CAMSP were documented as work proceeded and include the following:

- **Asbestos Sampling:** Ambient air asbestos and elemental metal samples were not obtained for each day of the sampling period. Missing asbestos samples were collected but voided, as described in the previous section.
- **Elemental Metals Sampling:** No metals sampling was conducted on November 15. High winds resulted in the Tisch samplers falling over, requiring reinforcement and re-deployment.
- **Background Air Monitoring and Sampling:** The background air monitoring and sampling proposed in the CAMSP was not completed because asbestos abatement and debris removal operations began before Tetra Tech's contract was active.

None of the deviations represent significant gaps in the air monitoring program.

3.8 WEEKLY REPORTING

All weekly reports submitted to HDOH throughout the duration of this project can be found in Attachment 3. As a result of final QC efforts, select reports have been edited since the last submission date. These revised reports are associated with the reports dated: 11/8/2023-11/15/2023, 11/16/2023-11/22/2023, 11/23/2023-11/29/2023, 11/30/2023-12/6/2023, 12/7/2023-12/13/2023, 12/14/2023-12/20/2023, and 12/21/2023-12/29/2023.

Within these reports, EBAM results that have been edited and notes have been made detailing the change. None of the revisions result in major changes to the original reporting of the USACE operations on air quality. In one instance where a reading was revised and resulted in an exceedance, debris crews were not on site and did not cause the exceedance.

The weekly report dated 12/21/2023-12/29/2023 also incorporated an edit to an asbestos sample collected at Lower Property (AM-03) on 12/21/2023. This edit was a result of a reporting error by the lab. This revision did not result in any major changes to the original reporting of non-detection.

4.0 CONCLUSION

As discussed above, none of the asbestos or heavy metals samples resulted in levels above the SSALs. Particulate levels were found to exceed the screening levels at times, with the main cause of exceedances attributed to wood chipping and other non-debris removal activities. Instances where operations may have contributed to particulate exceedances include two instances on 12/23/2023 and 12/26/2023.

Based on the low levels of asbestos and heavy metals, and the small percentage of particulate exceedances that were attributed to USACE operations, it appears that there were no significant air quality impacts to the surrounding community during the durations of USACE debris crew activities and indicates BMPs/fugitive dust control actions implemented during clean up were appropriate for the activities.

5.0 REFERENCES

California Environmental Protection Agency (CEPA). 2011. "Guidance for Conducting Emergency Debris, Waste, and Hazardous Material Removal Actions Pursuant to a State or Local Emergency Proclamation." October 7.

California Department of Toxic Substances Control (DTSC). 2007. "Assessment of Burn Debris – 2007 Wildfires San Bernardino and San Diego Counties, California" December 27.

DTSC. 2015. "Assessment of Burned Debris- 2015 Wildfires Lake and Calaveras County, California" December 7.

DTSC. 2020. "Community Air Monitoring Plan Guidance" January.

Tetra Tech. 2023. Community Air Monitoring and Sampling Plan (CASMP). December 8. *Included with Appendices.*

United States Environmental Protection Agency (EPA) Office of Air Quality Planning and Standards. 2018. Technical Assistance Document for the Reporting of Daily Air Quality – the Air Quality Index (AQI). September.

APPENDIX A

Data Verification Reports

Stage 1 Data Verification Checklist - Metals

HDOH CAB – Ambient Community Air Sampling – Kula

Task Order No. 23141

Reviewed by:
Talaidh Isaacs 11/27/2023 & Shanna Vasser 11/27/2023
Laboratory: Eastern Research Group – Morrisville, NC
Analysis Date: 11/17/2023-11/18/2023
Report No: 3111547

√ 1. Chain of custody (CoC) documentation is present.

√ 2. Sample receipt condition information is present and acceptable.

√ 3. Laboratory conducting the analysis is identified.

√ 4. All samples submitted to the laboratory are accounted for.

√ 5. Requested analytical methods were performed.

√ 6. Analysis dates are provided.

√ 7. Analyte results are provided.

√ 8. Result qualifiers and definitions are provided.

√ 9. Result units are reported.

NA 10. Requested reporting limits are present.

√ 11. Method detection limits are present.

√ 12. Sample collection date and time are present.

Discrepancies: None

Notes:

10. No reporting limits were included in the data package. Reporting limits were equal to the method detection limits in the EDD.

Stage 1 Data Verification Checklist – Metals

HDOH CAB – Ambient Community Air Sampling – Kula

Task Order No. 23141

Reviewed by:
Talaidh Isaacs 11/29/2023 & Shanna Vasser 11/30/2023
Laboratory: Eastern Research Group – Morrisville, NC
Analysis date: 11/23/2023-11/24/2023
Report No: 3112027

√ 1. Chain of custody (CoC) documentation is present.

√ 2. Sample receipt condition information is present and acceptable.

√ 3. Laboratory conducting the analysis is identified.

√ 4. All samples submitted to the laboratory are accounted for.

√ 5. Requested analytical methods were performed.

√ 6. Analysis dates are provided.

√ 7. Analyte results are provided.

√ 8. Result qualifiers and definitions are provided.

√ 9. Result units are reported.

NA 10. Requested reporting limits are present.

√ 11. Method detection limits are present.

√ 12. Sample collection date and time are present.

Discrepancies: None

Notes:

10. No reporting limits were included in the data package.

Stage 1 Data Verification Checklist – Metals

HDOH CAB – Ambient Community Air Sampling – Kula

Task Order No. 23141

Reviewed by:

Talaidh Isaacs 12/04/2023 & Shanna Vasser 12/07/2023

Laboratory: Eastern Research Group – Morrisville, NC
Analysis date: 11/29/2023 – 11/30/2023
Report No: 3112732

√ 1. Chain of custody (CoC) documentation is present.

√ 2. Sample receipt condition information is present and acceptable.

√ 3. Laboratory conducting the analysis is identified.

√ 4. All samples submitted to the laboratory are accounted for.

√ 5. Requested analytical methods were performed.

√ 6. Analysis dates are provided.

√ 7. Analyte results are provided.

√ 8. Result qualifiers and definitions are provided.

√ 9. Result units are reported.

NA 10. Requested reporting limits are present.

√ 11. Method detection limits are present.

√ 12. Sample collection date and time are present.

Discrepancies:

The laboratory reported the results under the lab sample IDs instead of using the field sample IDs and noted the field sample IDs in the comments section.

Notes:

10. No reporting limits were included in the data package.

Stage 1 Data Verification Checklist – Metals

HDOH CAB – Ambient Community Air Sampling – Kula

Task Order No. 23141

Reviewed by:

Talaidh Isaacs 12/07/2023 & Shanna Vasser 12/08/2023

Laboratory: Eastern Research Group – Morrisville, NC
Analysis date: 11/30/2023 – 12/01/2023
Report No: 3112737

√ 1. Chain of custody (CoC) documentation is present.

√ 2. Sample receipt condition information is present and acceptable.

√ 3. Laboratory conducting the analysis is identified.

√ 4. All samples submitted to the laboratory are accounted for.

√ 5. Requested analytical methods were performed.

√ 6. Analysis dates are provided.

√ 7. Analyte results are provided.

√ 8. Result qualifiers and definitions are provided.

√ 9. Result units are reported.

NA 10. Requested reporting limits are present.

√ 11. Method detection limits are present.

√ 12. Sample collection date and time are present.

Discrepancies:

The laboratory reported the results under the lab sample IDs instead of using the field sample IDs and noted the field sample IDs in the comments section.

Notes:

10. No reporting limits were included in this data package.

Stage 1 Data Verification Checklist – Metals

HDOH CAB – Ambient Community Air Sampling – Kula

Task Order No. 23141

Reviewed by:

Talaidh Isaacs 12/07/2023 & Shanna Vasser 12/08/2023

Laboratory: Eastern Research Group – Morrisville, NC

Analysis date: 12/04/2023 – 12/05/2023

Report No: 3112929

√ 1. Chain of custody (CoC) documentation is present.

√ 2. Sample receipt condition information is present and acceptable.

√ 3. Laboratory conducting the analysis is identified.

√ 4. All samples submitted to the laboratory are accounted for.

√ 5. Requested analytical methods were performed.

√ 6. Analysis dates are provided.

√ 7. Analyte results are provided.

√ 8. Result qualifiers and definitions are provided.

√ 9. Result units are reported.

NA 10. Requested reporting limits are present.

√ 11. Method detection limits are present.

√ 12. Sample collection date and time are present.

Discrepancies:

The laboratory reported the results under the lab sample IDs instead of using the field sample IDs and noted the field sample IDs in the comments section.

Notes:

10. No reporting limits were included in this data package.

Stage 1 Data Verification Checklist – Metals

HDOH CAB – Ambient Community Air Sampling – Kula

Task Order No. 23141

Reviewed by:
Talaidh Isaacs 12/15/2023 & Shanna Vasser 12/15/2023
Laboratory: Eastern Research Group, Inc. – Morrisville, NC
Analysis date: 12/08/2023 – 12/11/2023
Report No: 3120430

√	1.	Chain of custody (CoC) documentation is present.
X	2.	Sample receipt condition information is present and acceptable.
√	3.	Laboratory conducting the analysis is identified.
√	4.	All samples submitted to the laboratory are accounted for.
√	5.	Requested analytical methods were performed.
√	6.	Analysis dates are provided.
√	7.	Analyte results are provided.
√	8.	Result qualifiers and definitions are provided.
√	9.	Result units are reported.
NA	10.	Requested reporting limits are present.
√	11.	Method detection limits are present.
√	12.	Sample collection date and time are present.

Discrepancies: None

Notes:

2. No sample receipt information was presented by the laboratory.

10. No reporting limits were included in this data package.

Stage 1 Data Verification Checklist – Metals

HDOH CAB – Ambient Community Air Sampling – Kula

Task Order No. 23141

Reviewed by:

Talaidh Isaacs 12/15/2023 & Shanna Vasser 12/15/2023

Laboratory: Eastern Research Group, Inc. – Morrisville, NC

Analysis date: 12/11/2023

Report No: 3120629

√ 1. Chain of custody (CoC) documentation is present.

X 2. Sample receipt condition information is present and acceptable.

√ 3. Laboratory conducting the analysis is identified.

√ 4. All samples submitted to the laboratory are accounted for.

√ 5. Requested analytical methods were performed.

√ 6. Analysis dates are provided.

√ 7. Analyte results are provided.

√ 8. Result qualifiers and definitions are provided.

√ 9. Result units are reported.

NA 10. Requested reporting limits are present.

√ 11. Method detection limits are present.

√ 12. Sample collection date and time are present.

Discrepancies: None

Notes:

2. No sample receipt information was presented by the laboratory.

10. No reporting limits were included in this data package.

Stage 1 Data Verification Checklist – Metals

HDOH CAB – Ambient Community Air Sampling – Kula

Task Order No. 23141

Reviewed by:
Talaidh Isaacs 12/22/2023 & Shanna Vasser 12/22/2023
Laboratory: Eastern Research Group – Morrisville, NC
Analysis date: 12/13/2023, 12/14/2023, and 12/15/2023
Report No: 3121111

√	1.	Chain of custody (CoC) documentation is present.
X	2.	Sample receipt condition information is present and acceptable.
√	3.	Laboratory conducting the analysis is identified.
√	4.	All samples submitted to the laboratory are accounted for.
√	5.	Requested analytical methods were performed.
√	6.	Analysis dates are provided.
√	7.	Analyte results are provided.
√	8.	Result qualifiers and definitions are provided.
√	9.	Result units are reported.
NA	10.	Requested reporting limits are present.
√	11.	Method detection limits are present.
√	12.	Sample collection date and time are present.

Discrepancies:

The CoC noted, "No field blanks for 12/07/23 and 12/08/23 samples due to late arrival of new filters."

Notes:

2. No sample receipt information was presented by the laboratory.

10. No reporting limits were included in this data package.

Stage 1 Data Verification Checklist – Metals

HDOH CAB – Ambient Community Air Sampling – Kula

Task Order No. 23141

Reviewed by:
Talaidh Isaacs 12/22/2023 & Shanna Vasser 12/22/2023
Laboratory: Eastern Research Group – Morrisville, NC
Analysis date: 12/19/2023, 12/20/2023, and 12/21/2023
Report No: 3121831

√ 1. Chain of custody (CoC) documentation is present.

X 2. Sample receipt condition information is present and acceptable.

√ 3. Laboratory conducting the analysis is identified.

√ 4. All samples submitted to the laboratory are accounted for.

√ 5. Requested analytical methods were performed.

√ 6. Analysis dates are provided.

√ 7. Analyte results are provided.

√ 8. Result qualifiers and definitions are provided.

√ 9. Result units are reported.

NA 10. Requested reporting limits are present.

√ 11. Method detection limits are present.

√ 12. Sample collection date and time are present.

Discrepancies: None

Notes:

2. No sample receipt information was presented by the laboratory.

10. No reporting limits were included in this data package.

Stage 1 Data Verification Checklist - Metals

HDOH CAB – Ambient Community Air Sampling – Kula

Task Order No. 23141

Reviewed by:

Trinh Vu 12/28/2023 & Shanna Vasser 12/28/2023

Laboratory: Eastern Research Group – Morrisville, NC

Analysis Date: 12/21/2023

Report No: 3122052

√	1.	Chain of custody (CoC) documentation is present.
X	2.	Sample receipt condition information is present and acceptable.
√	3.	Laboratory conducting the analysis is identified.
√	4.	All samples submitted to the laboratory are accounted for.
√	5.	Requested analytical methods were performed.
√	6.	Analysis dates are provided.
√	7.	Analyte results are provided.
√	8.	Result qualifiers and definitions are provided.
√	9.	Result units are reported.
NA	10.	Requested reporting limits are present.
√	11.	Method detection limits are present.
√	12.	Sample collection date and time are present.

Discrepancies: None

Notes:

10. No reporting limits were included in the data package.

Stage 1 Data Verification Checklist - Metals

HDOH CAB – Ambient Community Air Sampling – Kula

Task Order No. 23141

Reviewed by:

Trinh Vu 01/03/2024 & Shanna Vasser 1/3/2024

Laboratory: Eastern Research Group – Morrisville, NC

Analysis Date: 12/27/2023 and 12/28/2023

Report No: 3122607

√	1.	Chain of custody (CoC) documentation is present.
X	2.	Sample receipt condition information is present and acceptable.
√	3.	Laboratory conducting the analysis is identified.
√	4.	All samples submitted to the laboratory are accounted for.
√	5.	Requested analytical methods were performed.
√	6.	Analysis dates are provided.
√	7.	Analyte results are provided.
√	8.	Result qualifiers and definitions are provided.
√	9.	Result units are reported.
NA	10.	Requested reporting limits are present.
√	11.	Method detection limits are present.
√	12.	Sample collection date and time are present.

Discrepancies: None

Notes:

10. No reporting limits were included in the data package.

Stage 1 Data Verification Checklist - Metals

HDOH CAB – Ambient Community Air Sampling – Kula

Task Order No. 23141

Reviewed by:
Trinh Vu 01/08/2024 & Shanna Vasser 1/9/2024
Laboratory: Eastern Research Group – Morrisville, NC
Analysis Date: 01/02/2024 and 01/03/2024
Report No: 3122828

√	1.	Chain of custody (CoC) documentation is present.
X	2.	Sample receipt condition information is present and acceptable.
√	3.	Laboratory conducting the analysis is identified.
√	4.	All samples submitted to the laboratory are accounted for.
√	5.	Requested analytical methods were performed.
√	6.	Analysis dates are provided.
√	7.	Analyte results are provided.
√	8.	Result qualifiers and definitions are provided.
√	9.	Result units are reported.
NA	10.	Requested reporting limits are present.
√	11.	Method detection limits are present.
√	12.	Sample collection date and time are present.

Discrepancies:

1. Samples MFK-AM01-122323-HM and MFK-AM03-122323-HM were swapped on the CoC. The laboratory logged the samples in as they were received and matched them with the correct physical filters and labels.

Notes:

10. No reporting limits were included in the data package.

Stage 1 Data Verification Checklist - Asbestos

HDOH CAB – Ambient Community Air Sampling – Kula

Task Order No. 23141

Reviewed by:

Talaidh Isaacs 11/21/2023 & Shanna Vasser 11/22/2023

Laboratory: Eurofins Built Environment Testing – Houston, TX

Analysis Date: 11/20/2023

Report No: 3454309

√	1.	Chain of custody (CoC) documentation is present.
√	2.	Sample receipt condition information is present and acceptable.
√	3.	Laboratory conducting the analysis is identified.
√	4.	All samples submitted to the laboratory are accounted for.
√	5.	Requested analytical methods were performed.
√	6.	Analysis dates are provided.
√	7.	Analyte results are provided.
X	8.	Result qualifiers and definitions are provided.
√	9.	Result units are reported.
√	10.	Requested reporting limits are present.
NA	11.	Method detection limits are present.
√	12.	Sample collection date and time are present.

Discrepancies: None

Notes: None

Stage 1 Data Verification Checklist – Asbestos

HDOH CAB – Ambient Community Air Sampling – Kula

Task Order No. 23141

Reviewed by:

Talaidh Isaacs 11/28/2023 & Shanna Vasser 11/28/2023

Laboratory: Eurofins Built Environment Testing – Houston, TX

Analysis date: 11/27/2023

Report No: 3458356

√	1.	Chain of custody (CoC) documentation is present.
√	2.	Sample receipt condition information is present and acceptable.
√	3.	Laboratory conducting the analysis is identified.
√	4.	All samples submitted to the laboratory are accounted for.
√	5.	Requested analytical methods were performed.
√	6.	Analysis dates are provided.
√	7.	Analyte results are provided.
X	8.	Result qualifiers and definitions are provided.
√	9.	Result units are reported.
√	10.	Requested reporting limits are present.
NA	11.	Method detection limits are present.
√	12.	Sample collection date and time are present.

Discrepancies: None

Notes: None

Stage 1 Data Verification Checklist – Asbestos

HDOH CAB – Ambient Community Air Sampling – Kula

Task Order No. 23141

Reviewed by:
Talaidh Isaacs 12/07/2023 & Shanna Vasser 12/08/2023
Laboratory: Eurofins Built Environment Testing – Houston, TX
Analysis date: 11/29/2023
Report No: 3461524

√ 1. Chain of custody (CoC) documentation is present.

√ 2. Sample receipt condition information is present and acceptable.

√ 3. Laboratory conducting the analysis is identified.

√ 4. All samples submitted to the laboratory are accounted for.

√ 5. Requested analytical methods were performed.

√ 6. Analysis dates are provided.

√ 7. Analyte results are provided.

√ 8. Result qualifiers and definitions are provided.

√ 9. Result units are reported.

√ 10. Requested reporting limits are present.

NA 11. Method detection limits are present.

√ 12. Sample collection date and time are present.

Discrepancies: None

Notes: None

Stage 1 Data Verification Checklist – Asbestos

HDOH CAB – Ambient Community Air Sampling – Kula

Task Order No. 23141

Reviewed by:
Talaidh Isaacs 12/01/2023 & Shanna Vasser 12/4/2023
Laboratory: Eurofins Built Environment Testing – Houston, TX
Analysis date: 11/30/2023
Report No: 3463023

√ 1. Chain of custody (CoC) documentation is present.

√ 2. Sample receipt condition information is present and acceptable.

√ 3. Laboratory conducting the analysis is identified.

√ 4. All samples submitted to the laboratory are accounted for.

√ 5. Requested analytical methods were performed.

√ 6. Analysis dates are provided.

√ 7. Analyte results are provided.

X 8. Result qualifiers and definitions are provided.

√ 9. Result units are reported.

√ 10. Requested reporting limits are present.

NA 11. Method detection limits are present.

√ 12. Sample collection date and time are present.

Discrepancies: None

Notes: None

Stage 1 Data Verification Checklist – Asbestos

HDOH CAB – Ambient Community Air Sampling – Kula

Task Order No. 23141

Reviewed by:
Talaidh Isaacs 12/07/2023 & Shanna Vasser 12/08/2023
Laboratory: Eurofins Built Environment Testing – Houston, TX
Analysis date: 12/04/2023
Report No: 3465949

√ 1. Chain of custody (CoC) documentation is present.

√ 2. Sample receipt condition information is present and acceptable.

√ 3. Laboratory conducting the analysis is identified.

√ 4. All samples submitted to the laboratory are accounted for.

√ 5. Requested analytical methods were performed.

√ 6. Analysis dates are provided.

√ 7. Analyte results are provided.

√ 8. Result qualifiers and definitions are provided.

√ 9. Result units are reported.

√ 10. Requested reporting limits are present.

NA 11. Method detection limits are present.

√ 12. Sample collection date and time are present.

Discrepancies: None

Notes: None

Stage 1 Data Verification Checklist – Asbestos

HDOH CAB – Ambient Community Air Sampling – Kula

Task Order No. 23141

Reviewed by:
Talaidh Isaacs 12/22/2023 & Shanna Vasser 12/22/2023
Laboratory: Eurofins Built Environment Testing – Houston, TX
Analysis date: 12/04/2023
Report No: 3465949

√	1.	Chain of custody (CoC) documentation is present.
√	2.	Sample receipt condition information is present and acceptable.
√	3.	Laboratory conducting the analysis is identified.
√	4.	All samples submitted to the laboratory are accounted for.
√	5.	Requested analytical methods were performed.
√	6.	Analysis dates are provided.
√	7.	Analyte results are provided.
√	8.	Result qualifiers and definitions are provided.
√	9.	Result units are reported.
√	10.	Requested reporting limits are present.
NA	11.	Method detection limits are present.
√	12.	Sample collection date and time are present.

Discrepancies: None

Notes: None

Stage 1 Data Verification Checklist – Asbestos

HDOH CAB – Ambient Community Air Sampling – Kula

Task Order No. 23141

Reviewed by:

Talaidh Isaacs 12/11/2023 & Shanna Vasser 12/11/2023

Laboratory: Eurofins Built Environment Testing – Houston, TX

Analysis date: 12/07/2023

Report No: 3470571

√	1.	Chain of custody (CoC) documentation is present.
√	2.	Sample receipt condition information is present and acceptable.
√	3.	Laboratory conducting the analysis is identified.
√	4.	All samples submitted to the laboratory are accounted for.
√	5.	Requested analytical methods were performed.
√	6.	Analysis dates are provided.
√	7.	Analyte results are provided.
X	8.	Result qualifiers and definitions are provided.
√	9.	Result units are reported.
√	10.	Requested reporting limits are present.
NA	11.	Method detection limits are present.
√	12.	Sample collection date and time are present.

Discrepancies: None

Notes: None

Stage 1 Data Verification Checklist – Asbestos

HDOH CAB – Ambient Community Air Sampling – Kula

Task Order No. 23141

Reviewed by:

Talaidh Isaacs 12/13/2023 & Shanna Vasser 12/15/2023

Laboratory: Eurofins Built Environment Testing – Houston, TX

Analysis date: 12/11/2023

Report No: 3473235

√ 1. Chain of custody (CoC) documentation is present.

√ 2. Sample receipt condition information is present and acceptable.

√ 3. Laboratory conducting the analysis is identified.

√ 4. All samples submitted to the laboratory are accounted for.

√ 5. Requested analytical methods were performed.

√ 6. Analysis dates are provided.

√ 7. Analyte results are provided.

X 8. Result qualifiers and definitions are provided.

√ 9. Result units are reported.

√ 10. Requested reporting limits are present.

NA 11. Method detection limits are present.

√ 12. Sample collection date and time are present.

Discrepancies:

Samples MFK-AM01-113023-AB, MFK-AM02-113023-AB, MFK-AM02-120123-AB, MFK-AM01-12023-AB, MFK-AM02-120223-AB, MFK-AM03-120323-AB, MFK-FB01-12023-AB, MFK-AM02-120323-AB, and MFK-AM03-120323-AB were listed, but crossed out as void on the CoC; however, no results were present in the laboratory data package because they were never shipped. No action was necessary for this discrepancy.

Notes: None

Stage 1 Data Verification Checklist – Asbestos

HDOH CAB – Ambient Community Air Sampling – Kula

Task Order No. 23141

Reviewed by:
Talaidh Isaacs 12/13/2023 & Shanna Vasser 12/15/2023
Laboratory: Eurofins Built Environment Testing – Houston, TX
Analysis date: 12/12/2023
Report No: 3474752

√ 1. Chain of custody (CoC) documentation is present.

√ 2. Sample receipt condition information is present and acceptable.

√ 3. Laboratory conducting the analysis is identified.

X 4. All samples submitted to the laboratory are accounted for.

√ 5. Requested analytical methods were performed.

√ 6. Analysis dates are provided.

√ 7. Analyte results are provided.

X 8. Result qualifiers and definitions are provided.

√ 9. Result units are reported.

√ 10. Requested reporting limits are present.

NA 11. Method detection limits are present.

√ 12. Sample collection date and time are present.

Discrepancies:

Sample MFK-AM02-111223-AB was listed and crossed off the CoC, and no results were present in the laboratory data package. No action was necessary for this discrepancy.

Notes: None

Stage 1 Data Verification Checklist – Asbestos

HDOH CAB – Ambient Community Air Sampling – Kula

Task Order No. 23141

Reviewed by:

Talaidh Isaacs 12/22/2023 & Shanna Vasser 12/22/2023

Laboratory: Eurofins Built Environment Testing – Houston, TX

Analysis date: 12/14/2023

Report No: 3477431

√ 1. Chain of custody (CoC) documentation is present.

√ 2. Sample receipt condition information is present and acceptable.

√ 3. Laboratory conducting the analysis is identified.

√ 4. All samples submitted to the laboratory are accounted for.

√ 5. Requested analytical methods were performed.

√ 6. Analysis dates are provided.

√ 7. Analyte results are provided.

√ 8. Result qualifiers and definitions are provided.

√ 9. Result units are reported.

√ 10. Requested reporting limits are present.

NA 11. Method detection limits are present.

√ 12. Sample collection date and time are present.

Discrepancies:

Samples MFK-AM01-120423-AB and MFK-AM03-120423-AB are listed and crossed off on the CoC, and no results were present in the laboratory data package. No action was necessary for this discrepancy.

Notes: None

Stage 1 Data Verification Checklist – Asbestos

HDOH CAB – Ambient Community Air Sampling – Kula

Task Order No. 23141

Reviewed by:
Talaidh Isaacs 12/19/2023 & Shanna Vasser 12/20/2023
Laboratory: Eurofins Built Environment Testing – Houston, TX
Analysis date: 12/18/2023
Report No: 3480279

√ 1. Chain of custody (CoC) documentation is present.

√ 2. Sample receipt condition information is present and acceptable.

√ 3. Laboratory conducting the analysis is identified.

X 4. All samples submitted to the laboratory are accounted for.

√ 5. Requested analytical methods were performed.

√ 6. Analysis dates are provided.

√ 7. Analyte results are provided.

NA 8. Result qualifiers and definitions are provided.

√ 9. Result units are reported.

√ 10. Requested reporting limits are present.

NA 11. Method detection limits are present.

√ 12. Sample collection date and time are present.

Discrepancies:

MFK-AM03-120723-AB, MFK-AM03-120823-AB, MFK-AM03-120923-AB, and MFK-AM02-121023-AB were listed and crossed off the CoC, and no results were present in the laboratory data package. No action was necessary for this discrepancy.

Notes: None

Stage 1 Data Verification Checklist – Asbestos

HDOH CAB – Ambient Community Air Sampling – Kula

Task Order No. 23141

Reviewed by:

Trinh Vu 12/27/2023 & Shanna Vasser 12/27/2023

Laboratory: Eurofins Built Environment Testing – Houston, TX

Analysis date: 12/21/2023

Report No: 3484617

√ 1. Chain of custody (CoC) documentation is present.

√ 2. Sample receipt condition information is present and acceptable.

√ 3. Laboratory conducting the analysis is identified.

√ 4. All samples submitted to the laboratory are accounted for.

√ 5. Requested analytical methods were performed.

√ 6. Analysis dates are provided.

√ 7. Analyte results are provided.

NA 8. Result qualifiers and definitions are provided.

√ 9. Result units are reported.

√ 10. Requested reporting limits are present.

NA 11. Method detection limits are present.

√ 12. Sample collection date and time are present.

Discrepancies:

MFK-AM03-121223-AB was listed on the CoC but crossed off and noted that it was void and not sent to the laboratory. No results were present in the laboratory report for this sample because it was not sent. No action was required.

Notes:

The CoC noted, “MFK-AM01-112223-AB corresponds to previously sent FB MFK-FB01-112223-AB.”

Stage 1 Data Verification Checklist – Asbestos

HDOH CAB – Ambient Community Air Sampling – Kula

Task Order No. 23141

Reviewed by:
Trinh Vu 12/28/2023 & Shanna Vasser 12/28/2023
Laboratory: Eurofins Built Environment Testing – Houston, TX
Analysis date: 12/27/2023
Report No: 3488212

√ 1. Chain of custody (CoC) documentation is present.

√ 2. Sample receipt condition information is present and acceptable.

√ 3. Laboratory conducting the analysis is identified.

√ 4. All samples submitted to the laboratory are accounted for.

√ 5. Requested analytical methods were performed.

√ 6. Analysis dates are provided.

√ 7. Analyte results are provided.

NA 8. Result qualifiers and definitions are provided.

√ 9. Result units are reported.

√ 10. Requested reporting limits are present.

NA 11. Method detection limits are present.

√ 12. Sample collection date and time are present.

Discrepancies:

MFK-AM02-121423-AB was listed on the CoC but crossed off and noted that it was void and not shipped to the laboratory. No results were present in the laboratory report for this sample because it was not shipped. No action was required.

Notes: None

Stage 1 Data Verification Checklist – Asbestos

HDOH CAB – Ambient Community Air Sampling – Kula

Task Order No. 23141

Reviewed by:
Trinh Vu 01/03/2024 & Shanna Vasser 1/3/2024
Laboratory: Eurofins Built Environment Testing – Houston, TX
Analysis date: 01/02/2024
Report No: 3492635

√ 1. Chain of custody (CoC) documentation is present.

√ 2. Sample receipt condition information is present and acceptable.

√ 3. Laboratory conducting the analysis is identified.

√ 4. All samples submitted to the laboratory are accounted for.

√ 5. Requested analytical methods were performed.

√ 6. Analysis dates are provided.

√ 7. Analyte results are provided.

NA 8. Result qualifiers and definitions are provided.

√ 9. Result units are reported.

√ 10. Requested reporting limits are present.

NA 11. Method detection limits are present.

√ 12. Sample collection date and time are present.

Discrepancies: None

Notes: None

Stage 1 Data Verification Checklist – Asbestos

HDOH CAB – Ambient Community Air Sampling – Kula

Task Order No. 23141

Reviewed by:

Trinh Vu 01/03/2024 & Shanna Vasser 1/4/2024

Laboratory: Eurofins Built Environment Testing – Houston, TX

Analysis date: 01/03/2024

Report No: 3493379

√	1.	Chain of custody (CoC) documentation is present.
√	2.	Sample receipt condition information is present and acceptable.
√	3.	Laboratory conducting the analysis is identified.
√	4.	All samples submitted to the laboratory are accounted for.
√	5.	Requested analytical methods were performed.
√	6.	Analysis dates are provided.
√	7.	Analyte results are provided.
NA	8.	Result qualifiers and definitions are provided.
√	9.	Result units are reported.
√	10.	Requested reporting limits are present.
NA	11.	Method detection limits are present.
√	12.	Sample collection date and time are present.

Discrepancies:

Total volumes and the analytical method requested for samples MFK-AM01-122423-AB, MFK-AM02-122423-AB, and MFK-AM03-122423-AB are not noted on the CoC. These samples were analyzed for method ISO 10312. No action is required.

Notes: None

Stage 1 Data Verification Checklist – Asbestos

HDOH CAB – Ambient Community Air Sampling – Kula

Task Order No. 23141

Reviewed by:
Trinh Vu 01/11/2024 & Shanna Vasser 1/12/2024
Laboratory: Eurofins Built Environment Testing – Houston, TX
Analysis date: 01/04/2024 and 01/05/2024
Report No: 3495311

√ 1. Chain of custody (CoC) documentation is present.

√ 2. Sample receipt condition information is present and acceptable.

√ 3. Laboratory conducting the analysis is identified.

√ 4. All samples submitted to the laboratory are accounted for.

√ 5. Requested analytical methods were performed.

√ 6. Analysis dates are provided.

√ 7. Analyte results are provided.

NA 8. Result qualifiers and definitions are provided.

√ 9. Result units are reported.

√ 10. Requested reporting limits are present.

NA 11. Method detection limits are present.

√ 12. Sample collection date and time are present.

Discrepancies: None

Notes: None

Stage 1 Data Verification Checklist – Asbestos

HDOH CAB – Ambient Community Air Sampling – Kula

Task Order No. 23141

Reviewed by:
Trinh Vu 01/08/2024 & Shanna Vasser 1/9/2024
Laboratory: Eurofins Built Environment Testing – Houston, TX
Analysis date: 01/04/2024
Report No: 3495358

√	1.	Chain of custody (CoC) documentation is present.
√	2.	Sample receipt condition information is present and acceptable.
√	3.	Laboratory conducting the analysis is identified.
√	4.	All samples submitted to the laboratory are accounted for.
√	5.	Requested analytical methods were performed.
√	6.	Analysis dates are provided.
√	7.	Analyte results are provided.
NA	8.	Result qualifiers and definitions are provided.
√	9.	Result units are reported.
√	10.	Requested reporting limits are present.
NA	11.	Method detection limits are present.
√	12.	Sample collection date and time are present.

Discrepancies: None

Notes: None

Stage 1 Data Verification Checklist - Metals

HDOH CAB – Ambient Community Air Sampling – Kula

Task Order No. 23141

Reviewed by:
Trinh Vu 01/09/2024 & Shanna Vasser 1/10/2024
Laboratory: Eastern Research Group – Morrisville, NC
Analysis Date: 01/04/2024
Report No: 4010214

√	1.	Chain of custody (CoC) documentation is present.
X	2.	Sample receipt condition information is present and acceptable.
√	3.	Laboratory conducting the analysis is identified.
√	4.	All samples submitted to the laboratory are accounted for.
√	5.	Requested analytical methods were performed.
√	6.	Analysis dates are provided.
√	7.	Analyte results are provided.
√	8.	Result qualifiers and definitions are provided.
√	9.	Result units are reported.
NA	10.	Requested reporting limits are present.
√	11.	Method detection limits are present.
√	12.	Sample collection date and time are present.

Discrepancies: None

Notes:

10. No reporting limits were included in the data package.

APPENDIX B

Meteorological Data Summary

Maui Wildfire - Kula
Meteorlogical Data

Date	Station ID	Weather Station Name	Wind Direction (angle)	Wind Speed (mph)	Temperature (°F)	Rel Humidity (%)	Baro Pressure (mBar)	Conditions
11/8/2023	AM-01	Top Property	SSW	3.3	71	75	675.3	Fair
11/8/2023	AM-02	Middle Property	SW	3.1	74	66	687.2	Fair
11/8/2023	AM-03	Lower Property	S	3.1	70	74	697.8	Fair
11/9/2023	AM-01	Top Property	SSE	4.5	67	67	676.6	Fair
11/9/2023	AM-02	Middle Property	SSE	2.4	67	67	688.4	Fair
11/9/2023	AM-03	Lower Property	SE	3.8	68	69	698.8	Fair
11/10/2023	AM-01	Top Property	SSE	4.4	67	73	676.7	Fair
11/10/2023	AM-02	Middle Property	SSE	2.1	68	70	688.6	Fair
11/10/2023	AM-03	Lower Property	SE	3.5	69	70	699.0	Fair
11/11/2023	AM-01	Top Property	S	3.5	69	68	675.7	Fair/Windy
11/11/2023	AM-02	Middle Property	SSE	2.0	68	73	688.0	Fair/Windy
11/11/2023	AM-03	Lower Property	SSE	2.9	69	72	698.4	Fair/Windy
11/12/2023	AM-01	Top Property	SSE	4.6	67	72	675.9	Fair/Windy
11/12/2023	AM-02	Middle Property	SSE	2.3	67	70	687.8	Fair/Windy
11/12/2023	AM-03	Lower Property	SE	3.5	68	71	698.1	Fair/Windy
11/13/2023	AM-01	Top Property	SSE	4.1	67	72	677.2	Fair
11/13/2023	AM-02	Middle Property	SSE	2.4	68	70	689.0	Fair
11/13/2023	AM-03	Lower Property	SSE	3.2	69	69	699.5	Fair
11/14/2023	AM-01	Top Property	E	6.1	67	73	677.9	Cloudy
11/14/2023	AM-02	Middle Property	ENE	5.9	67	73	689.7	Cloudy
11/14/2023	AM-03	Lower Property	ENE	8.0	67	75	700.1	Cloudy
11/15/2023	AM-01	Top Property	SSE	4.5	65	73	677.8	Cloudy
11/15/2023	AM-02	Middle Property	SSE	2.6	65	70	689.7	Cloudy
11/15/2023	AM-03	Lower Property	SE	3.9	66	70	700.1	Cloudy
11/16/2023	AM-01	Top Property	SSE	3.9	64	78	678.3	Cloudy
11/16/2023	AM-02	Middle Property	SSE	2.1	65	74	690.2	Cloudy
11/16/2023	AM-03	Lower Property	SSE	3.2	65	73	700.7	Cloudy
11/17/2023	AM-01	Top Property	SSE	4.6	64	74	677.9	Fair/Windy
11/17/2023	AM-02	Middle Property	SSE	2.3	65	72	689.9	Fair/Windy
11/17/2023	AM-03	Lower Property	SE	3.5	66	71	700.3	Fair/Windy
11/18/2023	AM-01	Top Property	SSE	5.0	63	66	676.6	Fair
11/18/2023	AM-02	Middle Property	SSE	2.4	64	64	688.6	Fair
11/18/2023	AM-03	Lower Property	SSE	3.6	65	65	699.0	Fair
11/19/2023	AM-01	Top Property	SSE	5.5	65	74	675.9	Fair
11/19/2023	AM-02	Middle Property	SSE	3.2	66	72	687.9	Fair
11/19/2023	AM-03	Lower Property	S	5.5	66	75	698.2	Fair
11/20/2023	AM-01	Top Property	SE	3.9	65	76	676.2	Light Rain
11/20/2023	AM-02	Middle Property	SE	1.9	65	76	688.1	Light Rain
11/20/2023	AM-03	Lower Property	SE	2.7	65	77	698.5	Light Rain
11/21/2023	AM-01	Top Property	SSE	3.7	67	82	676.5	Cloudy
11/21/2023	AM-02	Middle Property	SSE	2.0	67	83	688.4	Cloudy
11/21/2023	AM-03	Lower Property	SE	3.0	68	83	698.8	Cloudy
11/22/2023	AM-01	Top Property	SSE	3.8	67	84	677.1	Cloudy

Maui Wildfire - Kula
Meteorlogical Data

11/22/2023	AM-02	Middle Property	SSE	1.9	68	82	689.0	Cloudy
11/22/2023	AM-03	Lower Property	SSE	2.9	68	84	699.4	Cloudy
11/23/2023	AM-01	Top Property	SE	3.9	67	81	676.3	Fair
11/23/2023	AM-02	Middle Property	SSE	1.9	68	78	688.1	Fair
11/23/2023	AM-03	Lower Property	SSE	2.9	69	78	698.5	Fair
11/24/2023	AM-01	Top Property	SSE	4.2	66	75	675.4	Fair
11/24/2023	AM-02	Middle Property	SSE	2.1	66	74	687.3	Fair
11/24/2023	AM-03	Lower Property	SE	3.3	67	75	697.6	Fair
11/25/2023	AM-01	Top Property	SSE	4.3	67	72	676.4	Fair
11/25/2023	AM-02	Middle Property	SSE	2.1	67	71	688.3	Fair
11/25/2023	AM-03	Lower Property	SE	3.3	68	73	698.6	Fair
11/26/2023	AM-01	Top Property	SSE	4.0	65	80	676.9	Partly Cloudy
11/26/2023	AM-02	Middle Property	SSE	2.2	66	77	688.8	Partly Cloudy
11/26/2023	AM-03	Lower Property	SE	3.2	66	78	699.2	Partly Cloudy
11/27/2023	AM-01	Top Property	SSE	3.1	65	85	674.7	Partly Cloudy
11/27/2023	AM-02	Middle Property	S	1.8	66	83	686.7	Partly Cloudy
11/27/2023	AM-03	Lower Property	SSE	2.7	67	83	697.0	Partly Cloudy
11/28/2023	AM-01	Top Property	SE	4.0	64	85	674.0	Partly Cloudy
11/28/2023	AM-02	Middle Property	SSE	1.9	64	83	685.9	Partly Cloudy
11/28/2023	AM-03	Lower Property	SE	3.1	65	83	696.2	Partly Cloudy
11/29/2023	AM-01	Top Property	SE	4.0	65	88	673.3	Partly Cloudy
11/29/2023	AM-02	Middle Property	SE	1.8	66	88	685.2	Partly Cloudy
11/29/2023	AM-03	Lower Property	SE	2.4	66	88	695.5	Partly Cloudy
11/30/2023	AM-01	Top Property	ESE	6.3	67	77	676.1	Cloudy
11/30/2023	AM-02	Middle Property	ESE	2.1	67	79	688.0	Cloudy
11/30/2023	AM-03	Lower Property	E	3.2	68	81	698.3	Cloudy
12/1/2023	AM-01	Top Property	SE	3.8	69	72	676.3	Fair/Cloudy
12/1/2023	AM-02	Middle Property	SE	1.9	69	73	688.2	Fair/Cloudy
12/1/2023	AM-03	Lower Property	SE	2.6	70	74	698.5	Fair/Cloudy
12/2/2023	AM-01	Top Property	SSE	3.5	69	70	675.8	Fair
12/2/2023	AM-02	Middle Property	SSE	1.9	70	70	687.7	Fair
12/2/2023	AM-03	Lower Property	SSE	2.7	70	74	698.0	Fair
12/3/2023	AM-01	Top Property	SE	4.0	66	80	676.6	Fair/Cloudy
12/3/2023	AM-02	Middle Property	SSE	2.1	67	79	688.6	Fair/Cloudy
12/3/2023	AM-03	Lower Property	SE	3.2	67	80	698.9	Fair/Cloudy
12/4/2023	AM-01	Top Property	SE	4.1	66	81	677.1	Fair
12/4/2023	AM-02	Middle Property	SE	2.0	66	79	689.1	Fair
12/4/2023	AM-03	Lower Property	SE	3.0	67	81	699.4	Fair
12/5/2023	AM-01	Top Property	SSE	4.2	66	75	676.9	Fair/Windy
12/5/2023	AM-02	Middle Property	SSE	2.2	66	74	688.9	Fair/Windy
12/5/2023	AM-03	Lower Property	SE	3.3	67	77	699.3	Fair/Windy
12/6/2023	AM-01	Top Property	SSE	4.1	66	77	676.9	Fair
12/6/2023	AM-02	Middle Property	SSE	2.2	66	75	688.9	Fair
12/6/2023	AM-03	Lower Property	SE	3.4	67	76	699.3	Fair
12/7/2023	AM-01	Top Property	SSE	4.0	66	79	676.0	Fair/Cloudy
12/7/2023	AM-02	Middle Property	S	1.9	67	75	688.0	Fair/Cloudy
12/7/2023	AM-03	Lower Property	SSE	2.8	68	75	698.4	Fair/Cloudy

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Meteorlogical Data

12/8/2023	AM-01	Top Property	SSE	4.7	62	73	675.2	Fair
12/8/2023	AM-02	Middle Property	SE	2.0	64	70	686.9	Fair
12/8/2023	AM-03	Lower Property	SE	3.0	65	71	697.3	Fair
12/9/2023	AM-01	Top Property	SE	5.1	62	58	675.6	Fair
12/9/2023	AM-02	Middle Property	SE	2.4	64	58	686.8	Fair
12/9/2023	AM-03	Lower Property	SE	3.5	65	62	697.2	Fair
12/10/2023	AM-01	Top Property	SSE	4.7	66	63	677.1	Fair/Cloudy
12/10/2023	AM-02	Middle Property	SE	2.3	67	64	688.2	Fair/Cloudy
12/10/2023	AM-03	Lower Property	SE	3.4	68	67	698.5	Fair/Cloudy
12/11/2023	AM-01	Top Property	SSE	3.9	67	83	678.3	Fair
12/11/2023	AM-02	Middle Property	S	1.8	69	80	689.5	Fair
12/11/2023	AM-03	Lower Property	S	2.9	71	81	699.8	Fair
12/12/2023	AM-01	Top Property	SSE	4.7	64	69	677.7	Fair/Cloudy
12/12/2023	AM-02	Middle Property	SSE	2.3	66	68	688.9	Fair/Cloudy
12/12/2023	AM-03	Lower Property	SE	3.5	68	72	699.3	Fair/Cloudy
12/13/2023	AM-01	Top Property	SE	4.3	63	75	677.3	Fair/Cloudy
12/13/2023	AM-02	Middle Property	SE	2.6	65	73	688.6	Fair/Cloudy
12/13/2023	AM-03	Lower Property	ESE	3.2	66	75	699.0	Fair/Cloudy
12/14/2023	AM-01	Top Property	NE	9.0	60	81	676.9	Cloudy
12/14/2023	AM-02	Middle Property	NE	8.1	62	81	688.4	Cloudy
12/14/2023	AM-03	Lower Property	NE	7.1	63	83	698.9	Cloudy
12/15/2023	AM-01	Top Property	SE	4.3	57	75	677.5	Partly Cloudy
12/15/2023	AM-02	Middle Property	ESE	2.9	59	72	688.9	Partly Cloudy
12/15/2023	AM-03	Lower Property	ESE	4.5	61	70	699.4	Partly Cloudy
12/16/2023	AM-01	Top Property	SE	4.7	58	73	676.5	Cloudy
12/16/2023	AM-02	Middle Property	ESE	2.3	60	71	687.8	Cloudy
12/16/2023	AM-03	Lower Property	E	3.5	62	71	698.3	Cloudy
12/17/2023	AM-01	Top Property	SE	4.7	59	77	676.0	Cloudy
12/17/2023	AM-02	Middle Property	SE	2.3	61	75	687.3	Cloudy
12/17/2023	AM-03	Lower Property	SE	3.5	67	75	698.6	Cloudy
12/18/2023	AM-01	Top Property	SE	4.1	60	77	676.4	Partly Cloudy
12/18/2023	AM-02	Middle Property	SE	2.1	62	75	687.7	Partly Cloudy
12/18/2023	AM-03	Lower Property	SE	3.2	64	76	698.2	Partly Cloudy
12/19/2023	AM-01	Top Property	SSE	3.3	62	81	677.5	Partly Cloudy
12/19/2023	AM-02	Middle Property	SSE	1.8	65	78	688.8	Partly Cloudy
12/19/2023	AM-03	Lower Property	SE	2.9	66	78	699.2	Partly Cloudy
12/20/2023	AM-01	Top Property	SSE	2.9	62	84	677.4	Cloudy
12/20/2023	AM-02	Middle Property	SE	2.4	66	75	688.3	Cloudy
12/20/2023	AM-03	Lower Property	SE	2.1	65	82	699.0	Cloudy
12/21/2023	AM-01	Top Property	SSE	3.3	62	83	677.3	Partly Cloudy
12/21/2023	AM-02	Middle Property	SSE	1.6	65	80	688.6	Partly Cloudy
12/21/2023	AM-03	Lower Property	SSE	2.5	66	81	699.0	Partly Cloudy
12/22/2023	AM-01	Top Property	SSE	3.5	63	75	678.0	Fair/Cloudy
12/22/2023	AM-02	Middle Property	SSE	1.8	65	75	689.2	Fair/Cloudy
12/22/2023	AM-03	Lower Property	SE	2.7	66	76	699.6	Fair/Cloudy
12/23/2023	AM-01	Top Property	SSE	3.7	62	84	678.8	Partly Cloudy
12/23/2023	AM-02	Middle Property	SSE	1.9	65	81	690.1	Partly Cloudy

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12/23/2023	AM-03	Lower Property	SSE	2.8	66	81	700.5	Partly Cloudy
12/24/2023	AM-01	Top Property	SE	4.1	60	78	679.5	Fair
12/24/2023	AM-02	Middle Property	SE	2.1	63	76	690.8	Fair
12/24/2023	AM-03	Lower Property	SE	3.2	64	78	701.3	Fair
12/25/2023	AM-01	Top Property	SSE	4.2	60	80	679.3	Light Rain
12/25/2023	AM-02	Middle Property	SSE	1.9	62	79	690.6	Light Rain
12/25/2023	AM-03	Lower Property	SE	2.9	64	80	701.1	Light Rain
12/26/2023	AM-01	Top Property	SSE	4.3	62	84	679.4	Light Rain
12/26/2023	AM-02	Middle Property	SE	1.9	64	82	690.6	Light Rain
12/26/2023	AM-03	Lower Property	SE	2.6	67	82	701.1	Light Rain
12/27/2023	AM-01	Top Property	SE	4.2	61	88	679.1	Cloudy
12/27/2023	AM-02	Middle Property	SE	1.7	65	84	690.4	Cloudy
12/27/2023	AM-03	Lower Property	SE	2.5	67	82	700.9	Cloudy
12/28/2023	AM-01	Top Property	SE	4.3	63	62	679.3	Light Rain
12/28/2023	AM-02	Middle Property	SE	2.7	65	64	690.6	Light Rain
12/28/2023	AM-03	Lower Property	ESE	3.1	66	70	701.1	Light Rain
12/29/2023	AM-01	Top Property	SE	4.3	61	79	679.9	Cloudy
12/29/2023	AM-02	Middle Property	SE	2.1	63	76	691.3	Cloudy
12/29/2023	AM-03	Lower Property	SE	3.2	64	78	701.7	Cloudy

Notes:

°F - Fahrenheit
mBar - millibar
mph - miles per hour
*** Conditions for each day taken from Weather Underground (www.wunderground.com)**

APPENDIX C

Particulate Air Monitoring Summary and Exceedances

Community Air Monitoring Results
2023 Maui Wildfire, Kula
PARTICULATES

Site Screening Action Levels			PM2.5 = 35			PM10 = 150			Notes
Date	Location	Location ID	Instrument ID	Parameter	24 Hr. TWA	Instrument ID	Parameter	24 Hr. TWA	
11/8/2023	Top Property	AM-01	C13048	PM2.5	7.3	C13056	PM10	13	
11/8/2023	Middle Property	AM-02	B17761	PM2.5	8.5	C13050	PM10	12	
11/8/2023	Lower Property	AM-03	C12757	PM2.5	4.9	C13051	PM10	15	
11/9/2023	Top Property	AM-01	C13048	PM2.5	7.9	C13056	PM10	13	
11/9/2023	Middle Property	AM-02	B17761	PM2.5	6.3	C13050	PM10	10	
11/9/2023	Lower Property	AM-03	C12757	PM2.5	5.8	C13051	PM10	13	
11/10/2023	Top Property	AM-01	C13048	PM2.5	8.0	C13056	PM10	11	
11/10/2023	Middle Property	AM-02	B17761	PM2.5	7.2	C13050	PM10	11	
11/10/2023	Lower Property	AM-03	C12757	PM2.5	6.1	C13051	PM10	11	
11/11/2023	Top Property	AM-01	C13048	PM2.5	6.8	C13056	PM10	7.9	
11/11/2023	Middle Property	AM-02	B17761	PM2.5	5.2	C13050	PM10	7.1	
11/11/2023	Lower Property	AM-03	C12757	PM2.5	5.7	C13051	PM10	8.5	
11/12/2023	Top Property	AM-01	C13048	PM2.5	5.7	C13056	PM10	21	
11/12/2023	Middle Property	AM-02	B17761	PM2.5	6.1	C13050	PM10	7.7	
11/12/2023	Lower Property	AM-03	C12757	PM2.5	5.1	C13051	PM10	9.7	
11/13/2023	Top Property	AM-01	C13048	PM2.5	6.9	C13056	PM10	17	
11/13/2023	Middle Property	AM-02	B17761	PM2.5	4.9	C13050	PM10	11	
11/13/2023	Lower Property	AM-03	C12757	PM2.5	5.3	C13051	PM10	13	
11/14/2023	Top Property	AM-01	C13048	PM2.5	6.7	C13056	PM10	**170**	High winds and property owner spreading woodchips. Wood chipper active on property.
11/14/2023	Middle Property	AM-02	B17761	PM2.5	14	C13050	PM10	12	
11/14/2023	Lower Property	AM-03	C12757	PM2.5	5.8	C13051	PM10	13	
11/15/2023	Top Property	AM-01	C13048	PM2.5	**36**	C13056	PM10	24	High winds and property owner spreading woodchips. Wood chipper active on property.
11/15/2023	Middle Property	AM-02	B17761	PM2.5	19	C13050	PM10	6.7	
11/15/2023	Lower Property	AM-03	C12757	PM2.5	4.8	C13051	PM10	8.3	
11/16/2023	Top Property	AM-01	C13048	PM2.5	33	C13056	PM10	32	
11/16/2023	Middle Property	AM-02	B17761	PM2.5	11	C13050	PM10	8.3	
11/16/2023	Lower Property	AM-03	C12757	PM2.5	5.3	C13051	PM10	7.9	
11/17/2023	Top Property	AM-01	C13048	PM2.5	**38**	C13056	PM10	32	High winds and property owner spreading woodchips. Wood chipper active on property.
11/17/2023	Middle Property	AM-02	B17761	PM2.5	15	C13050	PM10	12	
11/17/2023	Lower Property	AM-03	C12757	PM2.5	5.8	C13051	PM10	11	
11/18/2023	Top Property	AM-01	C13048	PM2.5	**42**	C13056	PM10	33	High winds and property owner spreading woodchips. Wood chipper active on property.
11/18/2023	Middle Property	AM-02	B17761	PM2.5	14	C13050	PM10	7.8	
11/18/2023	Lower Property	AM-03	C12757	PM2.5	6.2	C13051	PM10	11	
11/19/2023	Top Property	AM-01	C13048	PM2.5	**72**	C13056	PM10	107	High winds and property owner spreading woodchips. Wood chipper active on property.
11/19/2023	Middle Property	AM-02	B17761	PM2.5	18	C13050	PM10	15	
11/19/2023	Lower Property	AM-03	C12757	PM2.5	6.5	C13051	PM10	9.2	
11/20/2023	Top Property	AM-01	C13048	PM2.5	**46**	C13056	PM10	28	High winds and property owner spreading woodchips. Wood chipper active on property.
11/20/2023	Middle Property	AM-02	B17761	PM2.5	16	C13050	PM10	6.7	
11/20/2023	Lower Property	AM-03	C12757	PM2.5	9.2	C13051	PM10	6.0	
11/21/2023	Top Property	AM-01	C13048	PM2.5	**58**	C13056	PM10	130	High winds and property owner spreading woodchips. Wood chipper active on property.
11/21/2023	Middle Property	AM-02	B17761	PM2.5	18	C13050	PM10	5.6	
11/21/2023	Lower Property	AM-03	C12757	PM2.5	6.3	C13051	PM10	7.0	
11/22/2023	Top Property	AM-01	C13048	PM2.5	30	C13056	PM10	73	
11/22/2023	Middle Property	AM-02	B17761	PM2.5	9.2	C13050	PM10	6.0	
11/22/2023	Lower Property	AM-03	C12757	PM2.5	6.7	C13051	PM10	7.0	
11/23/2023	Top Property	AM-01	C13048	PM2.5	**35**	C13056	PM10	22	High winds and property owner spreading woodchips. Wood chipper active on property.
11/23/2023	Middle Property	AM-02	B17761	PM2.5	17	C13050	PM10	6.7	
11/23/2023	Lower Property	AM-03	C12757	PM2.5	6.3	C13051	PM10	9.0	
11/24/2023	Top Property	AM-01	C13048	PM2.5	28	C13056	PM10	25	
11/24/2023	Middle Property	AM-02	B17761	PM2.5	13	C13050	PM10	6.8	
11/24/2023	Lower Property	AM-03	C12757	PM2.5	7.7	C13051	PM10	8.7	
11/25/2023	Top Property	AM-01	C13048	PM2.5	31	C13056	PM10	23	
11/25/2023	Middle Property	AM-02	B17761	PM2.5	22	C13050	PM10	7.6	
11/25/2023	Lower Property	AM-03	C12757	PM2.5	8.6	C13051	PM10	9.8	
11/26/2023	Top Property	AM-01	C13048	PM2.5	32	C13056	PM10	24	
11/26/2023	Middle Property	AM-02	B17761	PM2.5	20	C13050	PM10	9.1	
11/26/2023	Lower Property	AM-03	C12757	PM2.5	6.7	C13051	PM10	7.4	
11/27/2023	Top Property	AM-01	C13048	PM2.5	34	C13056	PM10	29	
11/27/2023	Middle Property	AM-02	B17761	PM2.5	22	C13050	PM10	5.3	
11/27/2023	Lower Property	AM-03	C12757	PM2.5	5.5	C13051	PM10	8.1	

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11/28/2023	Top Property	AM-01	C13048	PM2.5	**43**	C13056	PM10	34	No debris removal occurring within eyesight of the property. Property owners wood chipping, stump pulling, chain sawing, Skid Steer and mini excavator working on the property in burned dusty area roughly 50-200 ft from station 1.
11/28/2023	Middle Property	AM-02	B17761	PM2.5	11	C13050	PM10	5.4	
11/28/2023	Lower Property	AM-03	C12757	PM2.5	6.8	C13051	PM10	6.8	
11/29/2023	Top Property	AM-01	C13048	PM2.5	**88**	C13056	PM10	**190**	Property owner working on property occurring at 0800; Skid Steer and mini excavator removing burned wood and stirring up dry undersoil/dust. 1357 Wood chipping activities downwind of EBAM.
11/29/2023	Middle Property	AM-02	B17761	PM2.5	24	C13050	PM10	4.3	
11/29/2023	Lower Property	AM-03	C12757	PM2.5	6.1	C13051	PM10	6.5	
11/30/2023	Top Property	AM-01	C13048	PM2.5	**100**	C13056	PM10	**160**	Property owner is working with Skid Steer spreading wood chips. Started at 0900 till 1600.
11/30/2023	Middle Property	AM-02	B17761	PM2.5	27	C13050	PM10	4.5	
11/30/2023	Lower Property	AM-03	C12757	PM2.5	5.1	C13051	PM10	4.2	
12/1/2023	Top Property	AM-01	C13048	PM2.5	**69**	C13056	PM10	73	Property owner wood chipping, tree felling, using skid steer and mini excavator NW of stations, visible dust present. Debris crew removing burned vehicle with Skid steer approx. 200m to the north although this did not appear to impact the readings.
12/1/2023	Middle Property	AM-02	B17761	PM2.5	20	C13050	PM10	6.6	
12/1/2023	Lower Property	AM-03	C12757	PM2.5	7.2	C13051	PM10	12	
12/2/2023	Top Property	AM-01	C13048	PM2.5	20	C13056	PM10	9.7	
12/2/2023	Middle Property	AM-02	B17761	PM2.5	15	C13050	PM10	7.2	
12/2/2023	Lower Property	AM-03	C12757	PM2.5	7.0	C13051	PM10	9.6	
12/3/2023	Top Property	AM-01	C13048	PM2.5	27	C13056	PM10	19	
12/3/2023	Middle Property	AM-02	B17761	PM2.5	26	C13050	PM10	5.8	
12/3/2023	Lower Property	AM-03	C12757	PM2.5	5.7	C13051	PM10	7.2	
12/4/2023	Top Property	AM-01	C13048	PM2.5	27	C13056	PM10	18	
12/4/2023	Middle Property	AM-02	B17761	PM2.5	21	C13050	PM10	8.5	
12/4/2023	Lower Property	AM-03	C12757	PM2.5	6.5	C13051	PM10	7.0	
12/5/2023	Top Property	AM-01	C13048	PM2.5	**43**	C13056	PM10	41	Property owner wood chipping, tree felling, using skid steer and mini excavator NW of stations, visible dust present. No debris removal occurring within eyesight of the property.
12/5/2023	Middle Property	AM-02	B17761	PM2.5	21	C13050	PM10	6.7	
12/5/2023	Lower Property	AM-03	C12757	PM2.5	5.6	C13051	PM10	8.8	
12/6/2023	Top Property	AM-01	C13048	PM2.5	30	C13056	PM10	21	
12/6/2023	Middle Property	AM-02	B17761	PM2.5	13	C13050	PM10	6.7	
12/6/2023	Lower Property	AM-03	C12757	PM2.5	6.1	C13051	PM10	9.8	
12/7/2023	Top Property	AM-01	C13048	PM2.5	**36**	C13056	PM10	13	Property owner spreading woodchips and actively using woodchipper on property. Dust from activities observed blowing into EBAM station. USACE debris activity observed north of the property, but no dust observed from activities.
12/7/2023	Middle Property	AM-02	B17761	PM2.5	26	C13050	PM10	7.8	
12/7/2023	Lower Property	AM-03	C12757	PM2.5	6.2	C13051	PM10	9.0	
12/8/2023	Top Property	AM-01	C13048	PM2.5	34	C13056	PM10	23	
12/8/2023	Middle Property	AM-02	B17761	PM2.5	20	C13050	PM10	5.8	
12/8/2023	Lower Property	AM-03	C12757	PM2.5	7.3	C13051	PM10	8.7	
12/9/2023	Top Property	AM-01	C13048	PM2.5	**41**	C13056	PM10	21	USACE debris activities were active within 0.25 miles to the north and west of the station location. Dust was not observed as a result of USACE activities. The property owner's irrigation system was active when the exceedance occurred, between 08:00-10:00, and is likely the cause.
12/9/2023	Middle Property	AM-02	B17761	PM2.5	30	C13050	PM10	6.4	
12/9/2023	Lower Property	AM-03	C12757	PM2.5	5.4	C13051	PM10	7.2	
12/10/2023	Top Property	AM-01	C13048	PM2.5	20	C13056	PM10	23	
12/10/2023	Middle Property	AM-02	B17761	PM2.5	11	C13050	PM10	7.1	
12/10/2023	Lower Property	AM-03	C12757	PM2.5	8.4	C13051	PM10	7.9	
12/11/2023	Top Property	AM-01	C13048	PM2.5	29	C13056	PM10	15	
12/11/2023	Middle Property	AM-02	B17761	PM2.5	16	C13050	PM10	7.4	
12/11/2023	Lower Property	AM-03	C12757	PM2.5	7.2	C13051	PM10	8.7	
12/12/2023	Top Property	AM-01	C13048	PM2.5	**40**	C13056	PM10	18	USACE debris activities were observed about 0.25 miles west of the station between the hours of 07:00-13:00. No visible dust was being produced by USACE activities during that time. Consistent high readings took place after the debris crew left site. Private work on the property was not observed during the day, although the field team did note that more woodchips appeared to have been spread along the property by the following morning.
12/12/2023	Middle Property	AM-02	B17761	PM2.5	16	C13050	PM10	7.1	
12/12/2023	Lower Property	AM-03	C12757	PM2.5	7.3	C13051	PM10	7.5	

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12/13/2023	Top Property	AM-01	C13048	PM2.5	**37**	C13056	PM10	34	USACE debris crew working approximately 0.25 miles west of the station. Crew was using water over debris and no visible dust was observed. The property owner started working on the property in the morning when the elevated readings occurred.
12/13/2023	Middle Property	AM-02	B17761	PM2.5	32	C13050	PM10	6.9	
12/13/2023	Lower Property	AM-03	C12757	PM2.5	6.3	C13051	PM10	9.3	
12/14/2023	Top Property	AM-01	C13048	PM2.5	**76**	C13056	PM10	**190**	USACE debris crew working approx.. 0.25 miles west of the station. Crew was using water over debris and there was no visible dust as a result of debris operations. Heavy sustained winds were present throughout the day that were picking up dust/ash from the nearby burned areas. The property owner started brush clearing and woodchipping on the property in the morning and tree cutting when the exceedances occurred.
12/14/2023	Middle Property	AM-02	B17761	PM2.5	***35****	C13050	PM10	8.0	
12/14/2023	Lower Property	AM-03	C12757	PM2.5	4.8	C13051	PM10	8.7	
12/15/2023	Top Property	AM-01	C13048	PM2.5	**42**	C13056	PM10	31	Hazy conditions were observed around 08:00 potentially contributing to the exceedance which took place at 8:00-09:00. USACE work was being conducted about 0.25 miles west of the property. No heavy equipment moving or producing dust. No work being conducted by property owner. Wood chipping occurring approximately 0.3 miles to the north of the property, and west near the USACE crew.
12/15/2023	Middle Property	AM-02	B17761	PM2.5	**66**	C13050	PM10	7.5	Property Owner was observed spreading woodchips around the east end of the property. No USACE activities being conducted near the property. The exceedances occurred in the early morning and late evening, outside of USACE crew activities.
12/15/2023	Lower Property	AM-03	C12757	PM2.5	5.2	C13051	PM10	9.7	
12/16/2023	Top Property	AM-01	C13048	PM2.5	**44**	C13056	PM10	38	Smoke was observed coming from a nearby resident’s chimney and is noted as a possible cause of higher readings overnight. USACE crew conducting woodchipping and tree felling activities to the south of the property. USACE crew conducting erosion control activities to the west of the property. Operations were approximately 300 meters from the sampling site and may have contributed to this exceedance. High winds were also observed as a factor.
12/16/2023	Middle Property	AM-02	B17761	PM2.5	**44**	C13050	PM10	11	The exceedances took place in the early morning and late evening. The smell of smoke was noted in the surrounding area, potentially causing the high readings.
12/16/2023	Lower Property	AM-03	C12757	PM2.5	6.3	C13051	PM10	7.9	
12/17/2023	Top Property	AM-01	C13048	PM2.5	**45**	C13056	PM10	34	No USACE crew activities being conducted near property. No activity from the property owners to explain the exceedance. The smell of smoke was noted in the surrounding area, potentially causing the high readings.
12/17/2023	Middle Property	AM-02	B17761	PM2.5	**66**	C13050	PM10	7.6	Property owner observed spreading woodchips to the east of the monitoring stations. No USACE crew activities being conducted near property.
12/17/2023	Lower Property	AM-03	C12757	PM2.5	5.6	C13051	PM10	6.8	
12/18/2023	Top Property	AM-01	C13048	PM2.5	**41**	C13056	PM10	36	Truck was observed dumping woodchips off at the property for the property owner. The smell of smoke was observed most of the day. Property owner had multiple vehicles located at the property. No USACE crew activities taken place except setting up the crane, which no visible dust was observed.
12/18/2023	Middle Property	AM-02	B17761	PM2.5	21	C13050	PM10	5.1	
12/18/2023	Lower Property	AM-03	C12757	PM2.5	6.1	C13051	PM10	6.2	
12/19/2023	Top Property	AM-01	C13048	PM2.5	29	C13056	PM10	20	
12/19/2023	Middle Property	AM-02	B17761	PM2.5	22	C13050	PM10	4.7	
12/19/2023	Lower Property	AM-03	C12757	PM2.5	4.6	C13051	PM10	6.3	
12/20/2023	Top Property	AM-01	C13048	PM2.5	**36**	C13056	PM10	26	USACE crew working approximately 0.25 miles to the west of the property; crew was using water and there was no visible dust. Heavy vehicle traffic by the property owner and property owner's private contractors. Noticeable dust observed by heavy traffic from property owner activities.
12/20/2023	Middle Property	AM-02	B17761	PM2.5	15	C13050	PM10	4.0	
12/20/2023	Lower Property	AM-03	C12757	PM2.5	5.1	C13051	PM10	6.1	
12/21/2023	Top Property	AM-01	C13048	PM2.5	24	C13056	PM10	21	
12/21/2023	Middle Property	AM-02	B17761	PM2.5	33	C13050	PM10	5.6	
12/21/2023	Lower Property	AM-03	C12757	PM2.5	5.8	C13051	PM10	9.4	
12/22/2023	Top Property	AM-01	C13048	PM2.5	34	C13056	PM10	37	
12/22/2023	Middle Property	AM-02	B17761	PM2.5	22	C13050	PM10	5.0	
12/22/2023	Lower Property	AM-03	C12757	PM2.5	5.3	C13051	PM10	9.3	
12/23/2023	Top Property	AM-01	C13048	PM2.5	**47**	C13056	PM10	40	USACE crew working approx. 0.25 mile west of the station. Crew cutting down trees. USACE activities may have contributed to the exceedance occurring during the time block of 08:00-10:00. All other exceedances took place during non-operation time periods (early morning or late evening)
12/23/2023	Middle Property	AM-02	B17761	PM2.5	**39**	C13050	PM10	7.2	No USACE crew working at site this day. Exceedance does not appear related to any USACE crew activities. The exceedances took place in the early morning hours and evening.

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12/23/2023	Lower Property	AM-03	C12757	PM2.5	6.0	C13051	PM10	9.3	
12/24/2023	Top Property	AM-01	C13048	PM2.5	**45**	C13056	PM10	34	Time off for holiday. USACE crews were not working. Exceedances not caused by USACE crew activities.
12/24/2023	Middle Property	AM-02	B17761	PM2.5	31	C13050	PM10	6.0	
12/24/2023	Lower Property	AM-03	C12757	PM2.5	5.3	C13051	PM10	8.9	
12/25/2023	Top Property	AM-01	C13048	PM2.5	**43**	C13056	PM10	33	Time off for holiday. USACE crews were not working. Exceedances not caused by USACE crew activities.
12/25/2023	Middle Property	AM-02	B17761	PM2.5	**40**	C13050	PM10	5.7	Time off for holiday. USACE crews were not working. Exceedances not caused by USACE crew activities.
12/25/2023	Lower Property	AM-03	C12757	PM2.5	6	C13051	PM10	6.1	
12/26/2023	Top Property	AM-01	C13048	PM2.5	**64**	C13056	PM10	93	USACE crew working approximately 0.25 miles west of the station. Crew cutting down trees. USACE activities may have been a factor in spike which occurred between 08:00-10:00. All other exceedances took place outside of active operations (early morning or late evening)
12/26/2023	Middle Property	AM-02	B17761	PM2.5	13	C13050	PM10	4.0	
12/26/2023	Lower Property	AM-03	C12757	PM2.5	6.2	C13051	PM10	4.4	
12/27/2023	Top Property	AM-01	C13048	PM2.5	30	C13056	PM10	137	
12/27/2023	Middle Property	AM-02	B17761	PM2.5	***35****	C13050	PM10	5.5	
12/27/2023	Lower Property	AM-03	C12757	PM2.5	6.4	C13051	PM10	7.6	
12/28/2023	Top Property	AM-01	C13048	PM2.5	**53**	C13056	PM10	41	Property owners adjacent to the station were observed doing work in their yard, laying mulch, manicuring and racking
12/28/2023	Middle Property	AM-02	B17761	PM2.5	**60**	C13050	PM10	8.4	Property owner adjacent to the property observed using heavy machinery to do yard work and tree trimming. Larger piles of woodchips on property observed at site. Placement took place after observation hours.
12/28/2023	Lower Property	AM-03	C12757	PM2.5	8.7	C13051	PM10	12	
12/29/2023	Top Property	AM-01	C13048	PM2.5	**40**	C13056	PM10	29	No USACE crew working at location. Exceedance not related to debris ops. Likely related to property owner activities.
12/29/2023	Middle Property	AM-02	B17761	PM2.5	**43**	C13050	PM10	6.8	Exceedances occurred in early morning and evening hours. No USACE crew working at location. Exceedance not related to debris ops. Likely related to property owner activities.
12/29/2023	Lower Property	AM-03	C12757	PM2.5	6.7	C13051	PM10	5.8	

Notes:
***** = The middle Property PM2.5 24hr TWA on 12/14 is rounded up from 34.5 and not considered a true exceedance.
***** = The middle Property PM2.5 24hr TWA on 12/27 is rounded up from 34.51 and not considered a true exceedance.
See attached Table 1 concerning particulate exceedances and explanations.
Results are based on 24 hour TWA calculation
24 hour TWA calculation is presented in two significant figures
$\mu g/m^3$ = micrograms per cubic meter
Indicates screening level exceedance

APPENDIX D

Air Sampling Analytical Data Summary

Date	SampleID	PCM (Fibers/cc) SSAL: 0.0034	Location	Location ID	Total_Time	Volume (L)	Flow rate (L/min)	Report
11/10/2023	MFK-AM01-111023-AB	<0.00129	Top Property	AM-01	442	2261.714	5.117	3454309
11/10/2023	MFK-AM02-111023-AB	<0.00101	Middle Property	AM-02	633	2885.531	4.5585	3454309
11/10/2023	MFK-AM03-111023-AB	<0.00088	Lower Property	AM-03	667.8	3312.221	4.9594	3454309
11/11/2023	MFK-AM01-111123-AB	<0.00052	Top Property	AM-01	1440	5658.48	3.9295	3454309
11/11/2023	MFK-AM02-111123-AB	<0.00057	Middle Property	AM-02	1450	5148.37	3.5506	3454309
11/11/2023	MFK-AM03-111123-AB	<0.00044	Lower Property	AM-03	1440	6677.049	4.7221	3454309
11/12/2023	MFK-AM01-111223-AB	<0.00057	Top Property	AM-01	1443	5121.496	3.5492	3454309
11/12/2023	MFK-AM02-111223-AB	<0.00062	Middle Property	AM-02	1440	4696.992	3.2618	3454309
11/12/2023	MFK-AM03-111223-AB	<0.00057	Lower Property	AM-03	1440	5134.032	3.5653	3454309
11/13/2023	MFK-AM01-111323-AB	<0.00039	Top Property	AM-01	1450	7394.855	5.0999	3458356
11/13/2023	MFK-AM02-111323-AB	<0.00038	Middle Property	AM-02	1453	7670.678	5.2792	3458356
11/13/2023	MFK-AM03-111323-AB	<0.00064	Lower Property	AM-03	1440	4540.176	3.1529	3458356
11/14/2023	MFK-AM01-111423-AB	<0.00040	Top Property	AM-01	1459	7307.402	5.0085	3458356
11/14/2023	MFK-AM02-111423-AB	<0.00035	Middle Property	AM-02	1450	8400.285	5.7858	3458356
11/14/2023	MFK-AM03-111423-AB	<0.00057	Lower Property	AM-03	1450	5086.31	3.5078	3458356
11/15/2023	MFK-AM01-111523-AB	<0.00040	Top Property	AM-01	1440	7228.224	5.0196	3458356
11/15/2023	MFK-AM02-111523-AB	<0.00040	Middle Property	AM-02	1440	7311.168	5.0772	3458356
11/15/2023	MFK-AM03-111523-AB	<0.00045	Lower Property	AM-03	1440	6445.728	4.4762	3458356
11/16/2023	MFK-AM01-111623-AB	<0.00038	Top Property	AM-01	1440	7674.048	5.3292	3458356
11/16/2023	MFK-AM02-111623-AB	<0.00059	Middle Property	AM-02	1440	4944.096	3.4334	3458356
11/16/2023	MFK-AM03-111623-AB	<0.00046	Lower Property	AM-03	1440	6285.168	4.3647	3458356
11/17/2023	MFK-AM02-111723-AB	<0.00058	Middle Property	AM-02	1505	5061.466	3.3631	3458356
11/17/2023	MFK-AM01-111723-AB	<0.00037	Top Property	AM-01	1491	7855.781	5.2688	3458356
11/17/2023	MFK-AM03-111723-AB	<0.00041	Lower Property	AM-03	1552	7055.702	4.5462	3458356
11/18/2023	MFK-AM01-111823-AB	<0.00037	Top Property	AM-01	1446	7808.4	5.400	3461524
11/18/2023	MFK-AM02-111823-AB	<0.00040	Middle Property	AM-02	1440	7230.672	5.0213	3461524
11/18/2023	MFK-AM03-111823-AB	<0.00041	Lower Property	AM-03	1440	7132.752	4.9533	3461524
11/19/2023	MFK-AM01-111923-AB	<0.00038	Top Property	AM-01	1441	7660.644	5.3162	3461524
11/19/2023	MFK-AM02-111923-AB	<0.00038	Middle Property	AM-02	1459	7576.003	5.1926	3461524
11/19/2023	MFK-AM03-111923-AB	<0.00038	Lower Property	AM-03	1444	7655.727	5.30175	3461524
11/20/2023	MFK-AM01-112023-AB	<0.00038	Top Property	AM-01	1440	7645.248	5.3092	3463023
11/20/2023	MFK-AM02-112023-AB	<0.00040	Middle Property	AM-02	1439	7373.436	5.124	3463023
11/20/2023	MFK-AM03-112023-AB	<0.00039	Lower Property	AM-03	1441	7528.505	5.2245	3463023
11/21/2023	MFK-AM01-112123-AB	<0.00042	Top Property	AM-01	1440	6935.184	4.8161	3463023
11/21/2023	MFK-AM02-112123-AB	<0.00043	Middle Property	AM-02	1452	6804.508	4.6863	3463023
11/21/2023	MFK-AM03-112123-AB	<0.00040	Lower Property	AM-03	1440	7344	5.100	3463023
11/22/2023	MFK-AM02-112223-AB	<0.00044	Middle Property	AM-02	1444	6692.074	4.6344	3463023
11/22/2023	MFK-AM03-112223-AB	<0.00055	Lower Property	AM-03	1440	5331.024	3.7021	3463023
11/22/2023	MFK-AM01-112223-AB	<0.00136	Top Property	AM-01	416	2146.56	5.16	3484617
11/23/2023	MFK-AM01-112323-AB	<0.00038	Top Property	AM-01	1462	7639.827	5.2256	3463023
11/23/2023	MFK-AM02-112323-AB	<0.00040	Middle Property	AM-02	1440	7247.664	5.0331	3463023
11/23/2023	MFK-AM03-112323-AB	<0.00038	Lower Property	AM-03	1440	7587.504	5.2691	3463023
11/24/2023	MFK-AM01-112423-AB	<0.00039	Top Property	AM-01	1444	7574.791	5.2457	3465949
11/24/2023	MFK-AM02-112423-AB	<0.00041	Middle Property	AM-02	1442	7041.571	4.8832	3465949
11/24/2023	MFK-AM03-112423-AB	<0.00045	Lower Property	AM-03	1321	6431.553	4.8687	3465949
11/25/2023	MFK-AM01-112523-AB	<0.00038	Top Property	AM-01	1440	7754.256	5.3849	3465949
11/25/2023	MFK-AM02-112523-AB	<0.00047	Middle Property	AM-02	1440	6246.288	4.3377	3465949
11/25/2023	MFK-AM03-112523-AB	<0.00047	Lower Property	AM-03	1440	6210.72	4.313	3465949
11/26/2023	MFK-AM01-112623-AB	<0.00040	Top Property	AM-01	1440	7351.344	5.1051	3465949
11/26/2023	MFK-AM02-112623-AB	<0.00051	Middle Property	AM-02	1440	5769.072	4.0063	3465949
11/26/2023	MFK-AM03-112623-AB	<0.00057	Lower Property	AM-03	1370	5143.177	3.7541	3465949
11/27/2023	MFK-AM01-112723-AB	<0.00054	Top Property	AM-01	1109	5400.941	4.8701	3470571
11/27/2023	MFK-AM02-112723-AB	<0.00050	Middle Property	AM-02	1248	5889.811	4.719	3470571
11/28/2023	MFK-AM01-112823-AB	<0.00061	Top Property	AM-01	951	4811.299	5.0592	3470571
11/28/2023	MFK-AM02-112823-AB	<0.00050	Middle Property	AM-02	1261	5823.046	4.6178	3470571
11/28/2023	MFK-AM03-112823-AB	<0.00043	Lower Property	AM-03	1440	6850.368	4.7572	3470571
11/29/2023	MFK-AM01-112923-AB	<0.00043	Top Property	AM-01	1305	6711.485	5.1429	3470571
11/29/2023	MFK-AM02-112923-AB	<0.00046	Middle Property	AM-02	1439	6355.2	4.4164	3470571
11/29/2023	MFK-AM03-112923-AB	<0.00056	Lower Property	AM-03	1217	5176.51	4.2535	3470571
11/30/2023	MFK-AM03-113023-AB	<0.00053	Lower Property	AM-03	1234	5543.868	4.4926	3473235
11/30/2023	MFK-AM01-113023-AB	<0.00129	Top Property	AM-01	467	2263.269	4.8464	3474752
12/1/2023	MFK-AM01-120123-AB	<0.00046	Top Property	AM-01	1297	6318.465	4.8716	3473235
12/1/2023	MFK-AM03-120123-AB	<0.00049	Lower Property	AM-03	1050	5932.815	5.6503	3473235
12/2/2023	MFK-AM02-120223-AB	<0.00122	Middle Property	AM-02	457	2388.282	5.226	3474752
12/2/2023	MFK-AM03-120223-AB	<0.00132	Lower Property	AM-03	434	2207.715	5.0869	3474752
12/3/2023	MFK-AM01-120323-AB	<0.00052	Top Property	AM-01	1246	5629.303	4.5179	3473235
12/3/2023	MFK-AM02-120323-AB	<0.00138	Middle Property	AM-02	420	2106.972	5.0166	3474752
12/4/2023	MFK-AM02-120423-AB	<0.00055	Middle Property	AM-02	1007	5268.423	5.2318	3477431
12/5/2023	MFK-AM01-120523-AB	<0.00051	Top Property	AM-01	1114	5733.535	5.1468	3477431
12/5/2023	MFK-AM02-120523-AB	<0.00048	Middle Property	AM-02	1118	6103.497	5.4593	3477431
12/5/2023	MFK-AM03-120523-AB	<0.00076	Lower Property	AM-03	684	3834.436	5.6059	3477431
12/6/2023	MFK-AM01-120623-AB	<0.00049	Top Property	AM-01	1134	6006.458	5.2967	3477431
12/6/2023	MFK-AM02-120623-AB	<0.00036	Middle Property	AM-02	1443	8143.715	5.6436	3477431
12/6/2023	MFK-AM03-120623-AB	<0.00036	Lower Property	AM-03	1436	8117.277	5.6527	3477431
12/7/2023	MFK-AM01-120723-AB	<0.00050	Top Property	AM-01	1057	5847.007	5.5317	3480279
12/7/2023	MFK-AM02-120723-AB	<0.00047	Middle Property	AM-02	1206	6252.266	5.1843	3480279
12/8/2023	MFK-AM01-120823-AB	<0.00048	Top Property	AM-01	438	6110.793	5.403	3480279
12/8/2023	MFK-AM02-120823-AB	<0.00118	Middle Property	AM-02	348	2468.729	5.2193	3480279
12/9/2023	MFK-AM01-120923-AB	<0.00092	Top Property	AM-01	603	3184.383	5.2809	3480279
12/9/2023	MFK-AM02-120923-AB	<0.00089	Middle Property	AM-02	562	3293.601	5.8605	3480279
12/10/2023	MFK-AM01-121023-AB	<0.00050	Top Property	AM-01	1114	5841.036	5.2433	3480279
12/10/2023	MFK-AM03-121023-AB	<0.00050	Lower Property	AM-03	1044	5832.724	5.5869	3480279
12/11/2023	MFK-AM01-121123-AB	<0.00107	Top Property	AM-01	527	2727.594	5.1757	3484617
12/11/2023	MFK-AM02-121123-AB	<0.00049	Middle Property	AM-02	1102	6013.504	5.4569	3484617
12/11/2023	MFK-AM03-121123-AB	<0.00086	Lower Property	AM-03	575	3395.72	5.9056	3484617
12/12/2023	MFK-AM01-121223-AB	<0.00119	Top Property	AM-01	469	2441.473	5.2313	3484617
12/12/2023	MFK-AM02-121223-AB	<0.00112	Middle Property	AM-02	476	2607.576	5.6355	3484617
12/13/2023	MFK-AM01-121323-AB	<0.00068	Top Property	AM-01	818	4279.203	5.2313	3484617
12/13/2023	MFK-AM02-121323-AB	<0.00052	Middle Property	AM-02	993	5596.052	5.6355	3484617
12/13/2023	MFK-AM03-121323-AB	<0.00043	Lower Property	AM-03	1218	6722.751	5.5195	3484617
12/14/2023	MFK-AM01-121423-AB	<0.00040	Top Property	AM-01	1344	7225.747	5.3763	3488212
12/14/2023	MFK-AM03-121423-AB	<0.00072	Lower Property	AM-03	719	4049.983	5.6328	3488212
12/15/2023	MFK-AM01-121523-AB	<0.00040	Top Property	AM-01	1317	7316.594	5.5555	3488212
12/15/2023	MFK-AM02-121523-AB	<0.00039	Middle Property	AM-02	1324	7445.514	5.6235	3488212
12/15/2023	MFK-AM03-121523-AB	<0.00050	Lower Property	AM-03	1048	5853.24	5.5852	3488212
12/16/2023	MFK-AM01-121623-AB	<0.00036	Top Property	AM-01	1440	8105.184	5.6286	3488212
12/16/2023	MFK-AM02-121623-AB	<0.00095	Middle Property	AM-02	479	2783.804	5.8117	3488212
12/16/2023	MFK-AM03-121623-AB	<0.00071	Lower Property	AM-03	763	4136.605	5.4215	3488212
12/17/2023	MFK-AM01-121723-AB	<0.00040	Top Property	AM-01	1341	7339.695	5.4733	3488212
12/17/2023	MFK-AM02-121723-AB	<0.00132	Middle Property	AM-02	410	2207.932	5.3853	3488212
12/17/2023	MFK-AM03-121723-AB	<0.00036	Lower Property	AM-03	1441	8032.999	5.5746	3488212
12/18/2023	MFK-AM01-121823-AB	<0.00040	Top Property	AM-01	1419	7331.264	5.1665	3492635
12/18/2023	MFK-AM02-121823-AB	<0.00077	Middle Property	AM-02	669	3776.906	5.6456	3492635
12/18/2023	MFK-AM03-121823-AB	<0.00087	Lower Property	AM-03	589	3356.77	5.6991	3492635
12/19/2023	MFK-AM01-121923-AB	<0.00037	Top Property	AM-01	1453	7927.423	5.4559	3492635
12/19/2023	MFK-AM02-121923-AB	<0.00045	Middle Property	AM-02	1425	6446.633	5.7151	3492635
12/19/2023	MFK-AM03-121923-AB	<0.00053	Lower Property	AM-03	986	5509.867	5.5881	3492635
12/20/2023	MFK-AM01-122023-AB	<0.00037	Top Property	AM-01	1460	7875.824	5.3944	3492635
12/20/2023	MFK-AM02-122023-AB	<0.00074	Middle Property	AM-02	695	3924.248	5.6464	3492635
12/20/2023	MFK-AM03-122023-AB	<0.00067	Lower Property	AM-03	778	4328.274	5.5633	3492635
12/21/2023	MFK-AM01-122123-AB	<0.00039	Top Property	AM-01	1411	7533.188	5.3389	3493379
12/21/2023	MFK-AM02-122123-AB	<0.00074	Middle Property	AM-02	710	3921.046	5.5226	3493379
12/21/2023	MFK-AM03-122123-AB	<0.00075	Lower Property	AM-03	690	3884.217	5.6293	3493379
12/22/2023	MFK-AM01-122223-AB	<0.00037	Top Property	AM-01	1446	7931.31	5.485	3493379
12/22/2023	MFK-AM02-122223-AB	<0.00048	Middle Property	AM-02	1069	6086.993	5.6941	3493379
12/22/2023	MFK-AM03-122223-AB	<0.00049	Lower Property	AM-03	1051	5918.076	5.6309	3493379
12/23/2023	MFK-AM01-122323-AB	<0.00037	Top Property	AM-01	1415	7980.742	5.6401	3493379
12/23/2023	MFK-AM02-122323-AB	<0.00044	Middle Property	AM-02	1198	6675.376	5.5721	3493379
12/23/2023	MFK-AM03-122323-AB	<0.00046	Lower Property	AM-03	1147	6335.225	5.5233	3493379
12/24/2023	MFK-AM01-122423-AB	<0.00039	Top Property	AM-01	1370	7501.983	5.4759	3493379
12/24/2023	MFK-AM02-122423-AB	<0.00105	Middle Property	AM-02	489	2776.689	5.6783	3493379
12/24/2023	MFK-AM03-122423-AB	<0.00097	Lower Property	AM-03	532	2997.767	5.6349	3493379
12/27/2023	MFK-AM01-122723-AB	<0.00042	Top Property	AM-01	1246	6989.499	5.6096	3495358
12/27/2023	MFK-AM02-122723-AB	<0.00037	Middle Property	AM-02	1415	7907.303	5.5882	3495358

12/27/2023	MFK-AM03-122723-AB	<0.00030	Lower Property	AM-03	1925	9694.414	5.61995	3495358
12/28/2023	MFK-AM01-122823-AB	<0.00045	Top Property	AM-01	1159	6446.938	5.5625	3495311
12/28/2023	MFK-AM02-122823-AB	<0.00065	Middle Property	AM-02	787	4502.584	5.7212	3495311
12/28/2023	MFK-AM03-122823-AB	<0.00038	Lower Property	AM-03	1463	7776.869	5.3157	3495311
12/29/2023	MFK-AM01-122923-AB	<0.00119	Top Property	AM-01	451	2448.073	5.4281	3495311
12/29/2023	MFK-AM02-122923-AB	<0.00045	Middle Property	AM-02	1207	6461.735	5.3536	3495311
12/29/2023	MFK-AM03-122923-AB	<0.00267	Lower Property	AM-03	190	1094.381	5.7599	3495311

Notes:

[1] **Fiber count sample result via Phase Contrast Microscopy**

[2] **Confirmed asbestos sample result via Transmission Electron Microscopy**

Fibers/cc - Fibers per cubic centimeter
SSAL - Site Screening Action Level
L - Liters

Results compared to community screening levels as identified in Community Air Monitoring and Sampling Plan (Tetra Tech 2023).
Summary excluded quality control samples (field blanks and lot blanks) or void samples that could not be analyzed by the laboratory.
No asbestos samples at Lower Property (AM-03) on 11/27 due to pump found powered down. Flow rate out of range for calibration
Asbestos samples voided at the Top Property (AM-01) on 12/2 and 12/4 due to the sampling pump providing a fluctuating air flow through the filter and not maintaining initial volume flow rate within 10% throughout the sampling period.
Asbestos sample voided at the Middle Property (AM-02) on 11/30 due to insufficient sample volume (L)
Asbestos sample voided at the Middle Property (AM-02) on 12/1 and 12/10 due to the sampling pump providing a fluctuating air flow through the filter and not maintaining initial volume flow rate within 10% throughout the sampling period
Asbestos samples voided at the Lower Property (AM-03) on 12/3 , 12/4, 12/7, 12/8, 12/9, and 12/12 due to the sampling pump providing a fluctuating air flow through the filter and not maintaining initial volume flow rate within 10% throughout the sampling period
Asbestos sampling was voided at the Middle Property (AM-02) on 12/14 due to equipment failure
Asbestos samples not deployed on Dec 24 and 25 due to the Christmas Holiday, resulting in no asbestos samples for the 25 or 26.

Community Air Sample Results
2023 Maui Wildfires - Kula
METALS

		Antimony	Arsenic	Barium	Beryllium	Cadmium	Chromium	Cobalt	Copper	Lead	Manganese	Molybdenum	Nickel	Selenium	Thallium	Vanadium	Zinc				
Site Screening Action Level		1.4	0.18	2.4	0.1	0.048	24	0.029	480	1.5	0.24	9.6	0.048	96	48	0.48	2400				
Date	SampleID	(µg/m³)																Location	Location ID	Run Time (min)	Report
11/11/2023	MFK-AM-03-111123-HM	0.000123	0.000170	0.00756	0.0000224	ND	0.00227	0.000447	0.027	0.00039	0.0242	0.000867	0.00109	0.000237	0.00000156	0.00243	ND	Lower Property	AM-03	1444.2	3111547
11/12/2023	MFK-AM-01-111223-HM	0.00012	0.000211	0.00802	0.0000259	ND	0.00263	0.000517	0.0199	0.000480	0.0275	0.000848	0.00126	0.000264	0.00000228	0.00287	ND	Top Property	AM-01	1440	3111547
11/12/2023	MFK-AM-02-111223-HM	0.0000881	0.000262	0.00923	0.0000277	ND	0.00268	0.000543	0.0109	0.000379	0.0293	0.000571	0.00204	0.000256	0.00000246	0.00294	ND	Middle Property	AM-02	1440	3111547
11/12/2023	MFK-AM-03-111223-HM	0.0000881	0.00022	0.00873	0.0000259	ND	0.00240	0.000565	0.0171	0.000345	0.0301	0.000648	0.00110	0.000243	0.00000244	0.00292	ND	Lower Property	AM-03	1440	3111547
11/13/2023	MFK-AM-01-111323-HM	0.0000832	0.000457	0.0180	0.0000656	ND	0.00355	0.00124	0.0201	0.000804	0.0675	0.00102	0.00178	0.000642	0.00000408	0.00545	ND	Top Property	AM-01	1440	3112027
11/13/2023	MFK-AM-02-111323-HM	0.0000794	0.000478	0.0143	0.0000474	ND	0.00309	0.00102	0.0151	0.000512	0.0539	0.000720	0.00179	0.000560	0.00000354	0.0046	ND	Middle Property	AM-02	1440	3112027
11/13/2023	MFK-AM-03-111323-HM	0.000104	0.000332	0.0151	0.0000465	ND	0.00336	0.000896	0.0311	0.000563	0.0464	0.00100	0.00148	0.000527	0.00000341	0.00395	ND	Lower Property	AM-03	1440	3112027
11/14/2023	MFK-AM-01-111423-HM	0.000111	0.000361	0.0174	0.0000497	ND	0.00326	0.000899	0.0514	0.00234	0.0528	0.000965	0.00173	0.000514	0.00000344	0.00447	ND	Top Property	AM-01	1440	3112027
11/14/2023	MFK-AM-02-111423-HM	0.0000876	0.000349	0.0137	0.0000433	ND	0.00259	0.000644	0.0188	0.000635	0.0362	0.000695	0.00119	0.000390	0.00000244	0.00339	ND	Middle Property	AM-02	1444	3112027
11/14/2023	MFK-AM-03-111423-HM	0.000107	0.000238	0.0135	0.0000393	ND	0.00222	0.000560	0.0363	0.000443	0.0354	0.00120	0.00106	0.000333	0.00000312	0.00252	ND	Lower Property	AM-03	1440	3112027
11/16/2023	MFK-AM-01-111623-HM	0.0000768	0.000176	0.00789	0.0000289	ND	0.00171	0.000453	0.0128	0.000353	0.0243	0.00071	0.000661	0.000302	0.00000170	0.00205	ND	Top Property	AM-01	1440	3112732
11/16/2023	MFK-AM-02-111623-HM	0.0000617	0.000249	0.00797	0.0000318	ND	0.00169	0.000442	0.0121	0.000312	0.0238	0.000660	0.000668	0.000277	0.00000173	0.00208	ND	Middle Property	AM-02	1440	3112732
11/16/2023	MFK-AM-03-111623-HM	0.000109	0.000129	0.00756	0.0000253	ND	0.00172	0.000451	0.0159	0.000302	0.0201	0.000787	0.000674	0.000235	0.00000148	0.00165	ND	Lower Property	AM-03	1440	3112732
11/17/2023	MFK-AM-01-111723-HM	0.0000747	0.000165	0.0059	0.0000193	ND	ND	0.000312	0.0170	0.000518	0.0169	0.000722	ND	0.000214	0.00000147	0.00144	ND	Top Property	AM-01	1440	3112732
11/17/2023	MFK-AM-02-111723-HM	0.0000673	0.000842	0.0113	0.0000332	ND	0.00199	0.000466	0.0138	0.000565	0.0286	0.000685	0.000762	0.000318	0.00000224	0.00253	ND	Middle Property	AM-02	1503	3112732
11/17/2023	MFK-AM-03-111723-HM	0.0000994	0.00014	0.00694	0.0000212	ND	ND	0.000319	0.0159	0.000358	0.0171	0.000918	0.000647	0.000223	0.00000172	0.00139	ND	Lower Property	AM-03	1473.6	3112732
11/18/2023	MFK-AM-01-111823-HM	0.0000990	0.000352	0.00625	0.0000195	ND	0.00181	0.000320	0.0177	0.000883	0.0171	0.000603	0.000691	0.000253	0.00000336	0.00154	ND	Top Property	AM-01	1440	3112732
11/18/2023	MFK-AM-02-111823-HM	0.0000846	0.000354	0.00844	0.0000270	ND	0.00166	0.000388	0.00995	0.000434	0.0219	0.000547	0.000696	0.000299	0.00000393	0.00205	ND	Middle Property	AM-02	1440	3112732
11/18/2023	MFK-AM-03-111823-HM	0.000129	0.000171	0.00659	0.0000194	ND	ND	0.000303	0.0145	0.000468	0.0159	0.000972	ND	0.000224	0.00000393	0.00137	ND	Lower Property	AM-03	1440	3112732
11/19/2023	MFK-AM-01-111923-HM	0.0000678	0.000177	0.00459	0.0000138	ND	0.00152	0.000217	0.0131	0.000374	0.0131	0.000649	ND	0.000191	0.00000321	0.00122	ND	Top Property	AM-01	1440	3112732
11/19/2023	MFK-AM-02-111923-HM	0.0000678	0.000874	0.0214	0.0000845	ND	0.00309	0.000927	0.0137	0.000932	0.0598	0.000798	0.00169	0.000637	0.00000613	0.00628	ND	Middle Property	AM-02	1440	3112732
11/19/2023	MFK-AM-03-111923-HM	0.000113	0.000620	0.00872	0.0000141	ND	ND	0.000228	0.0194	0.000376	0.0113	0.00130	ND	0.000199	0.00000371	0.00105	ND	Lower Property	AM-03	1440	3112732
11/20/2023	MFK-AM-01-112023-HM	0.000101	0.000156	0.00478	0.0000126	ND	ND	0.000220	0.0223	0.000469	0.0106	0.000893	ND	0.000175	0.00000140	0.000993	ND	Top Property	AM-01	1440	3112737
11/20/2023	MFK-AM-02-112023-HM	0.000138	0.000319	0.00760	0.0000263	0.000103	0.00198	0.000314	0.0161	0.000532	0.0187	0.000954	0.000716	0.000257	0.00000192	0.00191	ND	Middle Property	AM-02	1440	3112737
11/20/2023	MFK-AM-03-112023-HM	0.000132	0.0000874	0.00518	0.0000130	ND	ND	0.000236	0.0276	ND	0.00940	0.000945	ND	0.000152	0.00000141	0.000761	ND	Lower Property	AM-03	1440	3112737
11/21/2023	MFK-AM-01-112123-HM	0.0000665	0.000130	0.00243	0.00000442	ND	ND	0.0000827	0.0189	ND	0.00337	0.00109	ND	0.0000788	0.000000422	0.000336	ND	Top Property	AM-01	1440	3112737
11/21/2023	MFK-AM-02-112123-HM	0.0000734	0.000156	0.00339	0.00000687	ND	ND	0.000107	0.0179	ND	0.00455	0.00106	ND	0.000100	0.000000533	0.000473	ND	Middle Property	AM-02	1440	3112737
11/21/2023	MFK-AM-03-112123-HM	0.0000652	0.0000869	0.00296	0.00000579	ND	ND	0.0000968	0.0388	ND	0.00365	0.00130	ND	0.000103	ND	0.000334	ND	Lower Property	AM-03	1440	3112737
11/22/2023	MFK-AM-01-112223-HM	0.0000846	0.000308	0.00623	0.0000179	ND	0.00192	0.000314	0.0238	0.000443	0.0138	0.00139	0.000985	0.000217	0.000000925	0.00200	ND	Top Property	AM-01	1440	3112737
11/22/2023	MFK-AM-02-112223-HM	0.0000637	0.000239	0.00487	0.0000149	ND	0.00189	0.00028	0.0171	0.000335	0.0121	0.00109	0.00102	0.000197	0.000000838	0.00216	ND	Middle Property	AM-02	1440	3112737
11/22/2023	MFK-AM-03-112223-HM	0.0000998	0.000148	0.00465	0.0000131	ND	0.00161	0.000275	0.0280	0.000257	0.0110	0.000934	0.00117	0.000171	0.00000080	0.00223	ND	Lower Property	AM-03	1440	3112737
11/23/2023	MFK-AM-01-112323-HM	0.0000869	0.000155	0.00374	0.00000838	ND	0.00156	0.000163	0.0174	0.000232	0.00706	0.00125	0.00104	0.000144	0.00000067	0.00189	ND	Top Property	AM-01	1440	3112737
11/23/2023	MFK-AM-02-112323-HM	0.0000803	0.000174	0.00400	0.0000105	ND	0.00144	0.000182	0.0129	ND	0.00814	0.00101	0.00094	0.000192	0.00000146	0.00188	ND	Middle Property	AM-02	1440	3112737
11/23/2023	MFK-AM-03-112323-HM	0.0000883	0.000123	0.00459	0.00000908	ND	ND	0.000205	0.0418	ND	0.00782	0.00138	0.00095	0.000153	0.000000776	0.0018	ND	Lower Property	AM-03	1440	3112737
11/24/2023	MFK-AM-01-112423-HM	0.0000530	0.000122	0.00433	0.0000102	ND	0.00171	0.000185	0.0226	0.000423	0.00861	0.00128	0.00339	0.000133	0.000000804	0.00144	ND	Top Property	AM-01	1440	3112929
11/24/2023	MFK-AM-02-112423-HM	0.0000525	0.000130	0.00472	0.0000109	ND	0.00169	0.000290	0.0117	ND	0.00958	0.000865	0.000717	0.000144	0.000000916	0.00152	ND	Middle Property	AM-02	1440	3112929
11/24/2023	MFK-AM-03-112423-HM	0.0000584	0.000105	0.00419	0.00000925	ND	0.00186	0.000178	0.0297	ND	0.00804	0.00111	0.000843	0.000147	0.000000745	0.00148	ND	Lower Property	AM-03	1440	3112929
11/25/2023	MFK-AM-01-112523-HM	0.0000515	0.000114	0.0044	0.0000103	ND	0.00181	0.000194	0.0210	0.000369	0.00957	0.00114	0.00107	0.000152	0.000000896	0.00168	ND	Top Property	AM-01	1440	3112929
11/25/2023	MFK-AM-02-112523-HM	0.0000669	0.000153	0.00567	0.0000136	ND	ND	0.000225	0.0129	0.000228	0.0119	0.000813	0.000951	0.000175	0.000000933	0.00204	ND	Middle Property	AM-02	1440	3112929
11/25/2023	MFK-AM-03-112523-HM	0.0000643	0.000125	0.00553	0.0000128	ND	0.00186	0.000208	0.0255	0.000249	0.0108	0.000981	0.000963	0.000181	0.000000872	0.00200	ND	Lower Property	AM-03	1440	3112929
11/26/2023	MFK-AM-01-112623-HM	0.0000636	0.000115	0.00474	0.0000101	ND	0.00170	0.000197	0.0200	0.000288	0.00973	0.00115	0.000655	0.000157	0.000000829	0.00111	ND	Top Property	AM-01	1440	3112929
11/26/2023	MFK-AM-02-112623-HM	0.0000706	0.000219	0.00777	0.0000165	ND	0.00203	0.000276	0.0152	0.000266	0.0158	0.000967	0.000786	0.000192	0.00000139	0.00172	ND	Middle Property	AM-02	1440	3112929
11/26/2023	MFK-AM-03-112623-HM	0.0000738	0.0001	0.00454	0.0000122	ND	ND	0.000202	0.0332	ND	0.00987	0.000975	ND	0.000164	0.000000915	0.00123	ND	Lower Property	AM-03	1440	3112929
11/27/2023	MFK-AM-01-112723-HM	0.0000770	0.000772	0.0359	0.000187	ND	0.00566	0.0022	0.0224	0.00118	0.151	0.00119	0.00292	0.00112	0.00000891	0.0149	ND	Top Property	AM-01	1440	3120430
11/27/2023	MFK-AM-02-112723-HM	0.0000571	0.000457	0.00709	0.0000213	ND	0.00186	0.000347	0.0221	0.000294	0.0201	0.00137	0.000939	0.0002	0.00000154	0.00274	ND	Middle Property	AM-02	1440	3120430
11/27/2023	MFK-AM-03-112723-HM	0.0000715	0.000103	0.00519	0.0000133	ND	0.00196	0.000232	0.0395	ND	0.0118	0.00139	0.00100	0.000152	0.000000945	0.00221	ND	Lower Property	AM-03	1440.6	3120430
11/28/2023	MFK-AM-01-112823-HM	0.0000518	0.000377	0.0203	0.0000795	ND	0.00358	0.00112	0.0176	0.00062	0.0807	0.000896	0.00161	0.000469	0.00000452	0.00712	ND	Top Property	AM-01	1441.2	3120430
11/28/2023	MFK-AM-02-112823-HM	0.0000483	0.000169	0.00413	0.0000113	ND	0.0017	0.000176	0.0132	ND	0.00944	0.000960	ND	0.000115	0.000000868	0.00120	ND	Middle Property	AM-02	1440	3120430
11/28/2023	MFK-AM-03-112823-HM	0.0000727	0.0000950	0.00624	0.0000148	ND	0.00187	0.00022	0.0275	0.000457	0.0129	0.00105	ND	0.000132	0.00000103	0.00127	ND	Lower Property	AM-03	1440	3120430
11/29/2023	MFK-AM-01-112923-HM	0.0000435	0.000143	0.00582	0.0000195	ND	0.00193	0.000296	0.0195	0.000313	0.0198	0.00113	ND	0.000176	0.00000141	0.00177	ND	Top Property	AM-01	1441.8	3120430
11/29/2023	MFK-AM-02-112923-HM	0.0000488	0.000107	0.00320	0.00000394	ND	ND	0.0000699	0.0162	ND	0.00302	0.00115	ND	0.0000881	0.000000522	0.000319	ND	Middle Property	AM-02	1441.2	3120430
11/29/2023	MFK-AM-03-112923-HM	0.0000878	0.0000858	0.00418	0.00000633	ND	ND	0.0000929	0.0382	ND	0.00478	0.0012	ND	0.000123	0.000000673	0.000496	ND	Lower Property	AM-03	1422	3120430
11/30/2023	MFK-AM-01-113023-HM	0.0000439	0.000124	0.00377	0.0000142	ND	ND	0.000209	0.0207	0.000264	0.0133	0.000876	0.00087	0.000161	0.000000967	0.00136	ND	Top Property	AM-01	1356	3120629
11/30/2023	MFK-AM-02-113023-HM	ND	0.000151	0.00217	0.00000544	ND	ND	0.0000869	0.0134	ND	0.00400	0.000937	0.000700	0.000106	0.000000462	0.000582	ND	Middle Property	AM-02	1347.6	3120629
11/30/2023	MFK-AM-03-113023-HM	0.0000499	0.000124	0.0023	ND	ND	ND	0.0000532	0.0401	ND	0.00187	0.00130	0.000814	0.0000849	ND	0.000324	ND	Lower Property	AM-03	1352.4	3120629
12/1/2023	MFK-AM-01-120123-HM	ND	0.000143	0.00455	0.0000166	ND	0.00189	0.000244	0.0147	0.000393	0.0160	0.000730	0.000883	0.000146	0.00000108	0.00185	ND	Top Property	AM-01	1440.6	3120629
12/1/2023	MFK-AM-02-120123-HM	0.0000390	0.000102	0.00209	0.00000358	ND	0.00167	0.000108	0.0120	ND	0.00275	0.000835	0.000831	0.0000721	0.000000494	0.000878	ND	Middle Property	AM-02	1440	3120629
12/1/2023	MFK-AM-03-120123-HM	0.0000576	0.0000833	0.00253	0.00000337	ND	ND	0.0000600	0.0283	ND	0.00244	0.00109	ND	0.0000840	ND	0.000970	ND	Lower Property	AM-03	1440	3120629
12/2/2023	MFK-AM-01-120223-HM	ND	0.0000771	0.00265	0.00000589	ND	ND	0.0000953	0.0178	ND	0.00480	0.000962	0.00113	0.0000985	0.000000458	0.000531	ND	Top Property	AM-01	1440	3120629
12/2/2023	MFK-AM-02-120223-HM	ND	0.000104	0.00197	0.00000349	ND	ND	0.0000634	0.0182	ND	0.00265	0.00114	ND	0.0000912	ND	0.000441	ND	Middle Property	AM-02	1443.6	3120629
12/2/2023	MFK-AM-03-120223-HM	0.0000802	0.0000814	0.00311	0.00000399	ND	ND	0.0000758	0.0394	ND	0.00311	0.00123	ND	0.000146	ND	0.000634	ND	Lower Property	AM-03	1427.4	3120629
12/3/2023	MFK-AM-01-120323-HM	0.0000384	0.000118	0.00556	0.0000170	ND	0.00187	0.000277	0.0186	0.000300	0.0190	0.000877	0.000650	0.000221	0.00000137	0.00185	ND	Top Property	AM-01	1440	3120629
12/3/2023	MFK-AM-02-120323-HM	0.0000517	0.0000999	0.00280	0.00000444	ND	ND	0.0000810	0.0171	ND	0.00365	0.000866	ND	0.000123	0.000000630	0.000672	ND	Middle Property	AM-02	1440	3120629
12/3/2023	MFK-AM-03-120323-HM	0.0000558	0.0000799	0.00288	0.00000439	ND	0.00191	0.0000855	0.0343	ND	0.00384	0.00117	0.000713	0.000135	0.000000627	0.000704	ND	Lower Property	AM-03	1443	3120629
12/4/2023	MFK-AM-01-120423-HM	0.0000524	0.000208	0.00954	0.0000381	ND	0.00245	0.000474	0.0184	0.000417	0.0329	0.000975	0.000915	0.000268	0.00000204	0.00337	ND	Top Property	AM-01	1351.8	3121111
12/4/2023	MFK-AM-02-120423-HM	0.0000779	0.000176	0.00344	0.00000625	ND	ND	0.000117	0.0185	ND	0.00513	0.000890	ND	0.000104	0.000000619	0.000660	ND	Middle Property	AM-02	1399.2	3121111
12/4/2023	MFK-AM-03-120423-HM	0.0000734	0.000114	0.00393	0.00000722	ND	ND	0.000111	0.0331	ND	0.00587	0.00105	ND	0.000115	0.000000576	0.000688	ND	Lower Property	AM-03	1443	3121111
12/5/2023	MFK-AM-01-120523-HM	0.0000469	0.000212	0.0119	0.0000514	ND	0.00287	0.000689	0.02	0.000539	0.0493	0.000702	0.000973	0.000305	0.00000261	0.00423	ND	Top Property	AM-01	1440	3121111
12/5/2023	MFK-AM-02-120523-HM	0.0000570	0.000137	0.00416	0.00000921	ND	0.00172	0.000157	0.0139	0.000298	0.00807	0.000615	ND	0.000120	0.000000672	0.000807	ND	Middle Property	AM-02	1385.4	3121111
12/5/2023	MFK-AM-03-120523-HM	0.0000723	0.0000999	0.00572	0.0000121	ND	ND	0.000171	0.0505	0.000563	0.00964	0.00120	ND	0.000127	0.000000706	0.000887	ND	Lower Property	AM-03	1400.4	3121111
12/6/2023	MFK-AM-01-120623-HM	0.0000603	0.000345	0.0161	0.0000706	ND	0.00362	0.00105	0.0212	0.000857	0.0692	0.000715	0.00168	0.000438	0.00000381	0.00653	ND	Top Property	AM-01	1440	3121111
12/6/2023	MFK-AM-02-120623-HM	0.0000558	0.000188	0.00574	0.0000181	ND	0.00216	0.000343	0.0149	0.000879	0.0188	0.000652	0.00122	0.000183	0.00000118	0.00194	ND	Middle Property	AM-02	1428.6	3121111
12/6/2023	MFK-AM-03-120623-HM	0.0000719	0.000151	0.00685	0.0000196	ND	0.00253	0.000334	0.0301	0.000418	0.0174	0.000892	0.00126	0.000178	0.00000103	0.00186	ND	Lower Property	AM-03	1440	3121111
12/7/2023	MFK-AM-01-120723-HM	0.0000502	0.000160	0.00661	0.0000252	ND	0.00229	0.000391	0.0265	0.000804	0.0234	0.000845	0.000996	0.000239	0.00000154	0.00247	ND	Top Property	AM-01	1440	3121332
12/7/2023	MFK-AM-02-120723-HM	0.0000469	0.000121	0.00385	0.0000109	ND	0.00185	0.000187	0.0352	0.000871	0.00912	0.000939	0.000737	0.000186	0.000000703	0.00126	ND	Middle Property	AM-02	1440	3121332
12/7/2023	MFK-AM-03-120723-HM	0.0000784	0.000147	0.00734	0.0000211	ND	0.00234	0.00029	0.0629	0.000618	0.0166	0.00165	0.000936	0.000207	0.00000126	0.00179	ND	Lower Property	AM-03	1441.2	3121332
12/8/2023	MFK-AM-01-120823-HM	0.0000440	0.000119	0.00540	0.0000175	ND	0.00206	0.000260	0.0148	0.000454	0.0160	0.000740	0.000792	0.000193	0.00000114	0.00153	ND	Top Property	AM-01	1441.8	3121332
12/8/2023	MFK-AM-02-120823-HM	0.0000722	0.000194	0.00541	0.0000131	ND	0.00183	0.000189	0.0155	0.000337	0.0106	0.000720	0.000878	0.000157	0.000000926	0.00118	ND	Middle Property	AM-02	1428	3121332
12/8/2023	MFK-AM-03-120823-HM	0.0000839	0.000101	0.00762	0.0000182	ND	0.00210	0.000237	0.0348	0.000343	0.0151	0.00105	ND	0.000162	0.00000143	0.00136	ND	Lower Property	AM-03	1443.6	3121332
12/9/2023	MFK-AM-01-120923-HM	0.0000404	0.000204	0.00501	0.0000154	ND	0.00202	0.000238	0.0168	0.000429	0.0143	0.000763	0.000631	0.000146	0.000000993	0.00140	ND	Top Property	AM-01	1440	3121332
12/9/2023	MFK-AM-02-120923-HM	0.0000532	0.000385	0.00635	0.0000202	ND	0.00207	0.000288	0.0159	0.000440	0.0166	0.000721	0.000649	0.000146	0.00000117	0.00168	ND	Middle Property	AM-02	1440	3121332
12/9/2023	MFK-AM-03-120923-HM	0.0000890	0.000239	0.0112	0.0000343	ND	0.00288	0.000429	0.0345	0.000686	0.0281	0.000978	0.000803	0.000178	0.00000192	0.00214	ND	Lower Property	AM-03	1440	3121332
12/10/2023	MFK-AM-01-121023-HM	0.0000546	0.000143	0.00517	0.0000186	ND	0.00197	0.000293	0.0227	0.000697	0.0166	0.000723	ND	0.000137	0.00000110	0.00148	ND	Top Property	AM-01	1434	3121332
12/10/2023	MFK-AM-02-121023-HM	0.0000710	0.000150	0.00724	0.0000180	ND	0.00201	0.000288	0.0127	0.000344	0.0166	0.000692	0.000732	0.000138	0.00000105	0.00151	ND	Middle Property	AM-02	1420.2	3121332
12/10/2023	MFK-AM-03-121023-HM	0.0000885	0.000124	0.00717	0.0000195	ND	0.00221	0.000282	0.0274	0.000366	0.0165	0.000819	ND	0.000141	0.00000103	0.00134	ND	Lower Property	AM-03	1425.6	3121332
12/11/2023	MFK-AM-01-121123-HM	0.0000624	0.000204	0.00538	0.0000190	ND	0.00214	0.000268	0.0157	0.000471	0.0163	0.000721	0.000820	0.000193	0.00000127	0.00200	ND	Top Property	AM-01	1411.2	3121831
12/11/2023	MFK-AM-02-121123-HM	0.0000913	0.000360	0.0113	0.0000263	ND	0.00224	0.000374	0.0167	0.000400	0.0252	0.00101	0.000947	0.000247	0.00000179	0.00269	ND	Middle Property	AM-02	1417.8	3121831
12/11/2023	MFK-AM-03-121123-HM	0.000131	0.000105	0.00599	0.0000144	ND	0.00220	0.000222	0.0593	0.000358	0.0119	0.00160	ND	0.000197	0.000000924	0.00177	ND	Lower Property	AM-03	1408.2	3121831
12/12/2023	MFK-AM-01-121223-HM	0.0000606	0.000564	0.00759	0.0000320	ND	0.00242	0.000437	0.0146	0.000527	0.0276	0.000813	0.00114	0.000235	0.00000162	0.00284	ND	Top Property	AM-01	1434.6	3121831
12/12/2023	MFK-AM-02-121223-HM	0.0000597	0.000326	0.00709	0.0000257	0.000191	0.00208	0.000361	0.0161	0.000423	0.0196	0.000987	0.000887	0.000197	0.00000139	0.00242	ND	Middle Property	AM-02	1441.2	3121831
12/12/2023	MFK-AM-03-121223-HM	0.0000915	0.000166	0.00793	0.0000262	ND	0.00212	0.000353	0.0374	0.000576	0.0211	0.000908	0.000881	0.000179	0.00000138	0.00210	ND	Lower Property	AM-03	1437	3121831
12/13/2023	MFK-AM-01-121323-HM	0.0000688	0.000318	0.0103	0.0000448	ND	0.00260	0.000636	0.0181	0.000625	0.0388	0.000994	0.00122	0.000253	0.00000218	0.00357	ND	Top Property	AM-01	1434.6	3121831
12/13/2023	MFK-AM-02-121323-HM	0.0000454	0.000254	0.00708	0.0000268	ND	0.00219	0.000421	0.0238	0.000519	0.0235	0.00121	0.000920	0.000194	0.00000132	0.00252	ND	Middle Property	AM-02	1441.2	3121831
12/13/2023	MFK-AM-03-121323-HM	0.0000871	0.000163	0.0103	0.0000340	ND	0.00262	0.000472	0.0418	0.000464	0.0301	0.00114	0.00102	0.000208	0.00000180	0.00255	ND	Lower Property	AM-03	1437	3121831
12/14/2023	MFK-AM-01-121423-HM	ND	0.000158	0.00417	0.0000164	ND	0.00181	0.000216	0.0141	0.000769	0.0140	0.000630	ND	0.000109	0.00000188	0.00126	ND	Top Property	AM-01	1549.2	3122052
12/14/2023	MFK-AM-02-121423-HM	ND	0.0000912	0.00348	0.0000111	ND	0.00162	0.000140	0.0109	0.000435	0.00795	0.000560	0.000623	0.0000965	0.00000191	0.000756	ND	Middle Property	AM-02	1534.8	3122052

Community Air Sample Results
2023 Maui Wildfires - Kula
METALS

		Antimony	Arsenic	Barium	Beryllium	Cadmium	Chromium	Cobalt	Copper	Lead	Manganese	Molybdenum	Nickel	Selenium	Thallium	Vanadium	Zinc				
Site Screening Action Level		**1.4**	**0.18**	**2.4**	**0.1**	**0.048**	**24**	**0.029**	**480**	**1.5**	**0.24**	**9.6**	**0.048**	**96**	**48**	**0.48**	**2400**				
Date	**SampleID**	**(µg/m³)**																**Location**	**Location ID**	**Run Time (min)**	**Report**
12/14/2023	MFK-AM-03-121423-HM	0.0000462	0.000142	0.00548	0.0000171	ND	0.00214	0.000203	0.0176	0.000488	0.0142	0.000565	0.000761	0.000130	0.00000265	0.000942	ND	Lower Property	AM-03	1522.8	3122052
12/15/2023	MFK-AM-01-121523-HM	ND	0.0000956	0.00282	0.00000639	ND	0.00180	0.000121	0.0165	0.000460	0.00548	0.000880	ND	0.000117	0.00000157	0.000492	ND	Top Property	AM-01	1314	3122052
12/15/2023	MFK-AM-02-121523-HM	ND	0.000100	0.00308	0.00000691	ND	0.00185	0.000117	0.0100	0.000296	0.00537	0.000698	ND	0.000127	0.00000162	0.000522	ND	Middle Property	AM-02	1322.4	3122052
12/15/2023	MFK-AM-03-121523-HM	0.0000633	0.000105	0.00478	0.0000119	ND	0.00214	0.000177	0.0272	0.000435	0.00978	0.000798	0.000940	0.000127	0.00000190	0.000683	ND	Lower Property	AM-03	1323	3122052
12/16/2023	MFK-AM-01-121623-HM	0.0000604	0.000098	0.00403	0.00000826	ND	0.00165	0.000158	0.0166	0.000305	0.00803	0.00105	0.000713	0.000105	0.00000121	0.000712	ND	Top Property	AM-01	1436.4	3122052
12/16/2023	MFK-AM-02-121623-HM	0.0000588	0.0000969	0.00393	0.00000857	ND	0.00167	0.000169	0.0137	0.000290	0.00742	0.000855	ND	0.0000989	0.00000132	0.000665	ND	Middle Property	AM-02	1432.2	3122052
12/16/2023	MFK-AM-03-121623-HM	0.0000535	0.0000708	0.00434	0.00000989	ND	0.00197	0.000142	0.0366	0.000403	0.00825	0.000935	ND	0.0000987	0.00000154	0.000604	ND	Lower Property	AM-03	1441.2	3122052
12/17/2023	MFK-AM-01-121723-HM	0.0000496	0.0000803	0.00397	0.00000861	ND	0.00164	0.000140	0.0199	0.000442	0.00742	0.000976	ND	0.000107	0.00000419	0.000714	ND	Top Property	AM-01	1440	3122052
12/17/2023	MFK-AM-02-121723-HM	0.0000631	0.0000900	0.00377	0.00000921	ND	0.00167	0.000141	0.0168	0.000289	0.00714	0.000893	ND	0.000103	0.00000462	0.000655	ND	Middle Property	AM-02	1441.2	3122052
12/17/2023	MFK-AM-03-121723-HM	ND	0.0000661	0.00362	0.00000964	ND	ND	0.000142	0.0218	0.000350	0.00796	0.000802	ND	0.0000804	0.00000377	0.000545	ND	Lower Property	AM-03	1440	3122052
12/18/2023	MFK-AM-01-121823-HM	0.0000709	0.000156	0.00376	0.00000765	ND	ND	0.000118	0.0191	0.000313	0.00615	0.00106	ND	0.0000676	0.00000116	0.000543	ND	Top Property	AM-01	1417.8	3122607
12/18/2023	MFK-AM-02-121823-HM	0.0000642	0.000216	0.00378	0.00000747	ND	0.00181	0.000116	0.0162	ND	0.00588	0.000991	ND	0.0000741	0.00000111	0.000558	ND	Middle Property	AM-02	1416.6	3122607
12/18/2023	MFK-AM-03-121823-HM	0.0000650	0.000171	0.00362	0.00000772	ND	0.00235	0.000149	0.0244	ND	0.00546	0.00129	ND	0.0000622	0.000000896	0.000441	ND	Lower Property	AM-03	1409.4	3122607
12/19/2023	MFK-AM-01-121923-HM	0.0000598	0.000208	0.00522	0.0000156	ND	0.00195	0.000249	0.0200	0.000312	0.0135	0.00111	ND	0.000137	0.00000111	0.00126	ND	Top Property	AM-01	1411.2	3122607
12/19/2023	MFK-AM-02-121923-HM	0.0000613	0.000167	0.00528	0.0000156	ND	0.00182	0.000216	0.0242	0.00036	0.0115	0.00123	ND	0.000134	0.000000953	0.00111	ND	Middle Property	AM-02	1455	3122607
12/19/2023	MFK-AM-03-121923-HM	0.0000801	0.000151	0.00568	0.0000145	ND	0.00197	0.000201	0.0359	0.000623	0.0112	0.00126	0.000771	0.000139	0.00000091	0.000937	ND	Lower Property	AM-03	1491.6	3122607
12/20/2023	MFK-AM-01-122023-HM	0.000104	0.000303	0.00605	0.0000189	ND	ND	0.000300	0.0250	0.000423	0.0167	0.000771	ND	0.000173	0.00000128	0.00153	ND	Top Property	AM-01	1328.4	3122607
12/20/2023	MFK-AM-02-122023-HM	0.0000535	0.000139	0.00540	0.0000184	ND	0.00177	0.000275	0.0155	0.000347	0.0146	0.000974	0.00067	0.000183	0.00000104	0.00140	ND	Middle Property	AM-02	1418.4	3122607
12/20/2023	MFK-AM-03-122023-HM	0.000130	0.000111	0.0065	0.0000178	ND	ND	0.000249	0.0179	0.000212	0.0141	0.000702	ND	0.000171	0.00000104	0.00134	ND	Lower Property	AM-03	1390.8	3122607
12/21/2023	MFK-AM-01-122123-HM	0.0000962	0.000155	0.00516	0.0000151	ND	0.00184	0.000242	0.0188	0.000287	0.0138	0.000795	0.000721	0.000151	0.0000017	0.00153	ND	Top Property	AM-01	1399.2	3122828
12/21/2023	MFK-AM-02-122123-HM	0.000103	0.000158	0.00545	0.0000139	ND	ND	0.000219	0.0137	ND	0.0128	0.000927	ND	0.000159	0.00000162	0.00141	ND	Middle Property	AM-02	1440	3122828
12/21/2023	MFK-AM-03-122123-HM	0.000149	0.000155	0.00635	0.0000144	ND	ND	0.000218	0.0169	0.000243	0.0126	0.000738	ND	0.000159	0.00000151	0.00127	ND	Lower Property	AM-03	1440	3122828
12/22/2023	MFK-AM-01-122223-HM	0.000101	0.000168	0.00671	0.0000172	ND	ND	0.000277	0.0283	0.000512	0.0158	0.000803	ND	0.000186	0.00000167	0.00151	ND	Top Property	AM-01	1440.6	3122828
12/22/2023	MFK-AM-02-122223-HM	0.0000718	0.000159	0.00664	0.0000165	ND	ND	0.000251	0.0115	0.000282	0.0157	0.000801	ND	0.000168	0.00000164	0.00140	ND	Middle Property	AM-02	1433.4	3122828
12/22/2023	MFK-AM-03-122223-HM	0.000122	0.000134	0.00698	0.0000164	ND	ND	0.000252	0.0153	0.000276	0.0154	0.000707	ND	0.000166	0.00000156	0.00133	ND	Lower Property	AM-03	1438.2	3122828
12/23/2023	MFK-AM-01-122323-HM	0.0000834	0.000149	0.00499	0.0000128	ND	ND	0.000254	0.0196	0.000301	0.0136	0.000602	ND	0.000135	0.00000102	0.00138	ND	Top Property	AM-01	1439.4	3122828
12/23/2023	MFK-AM-02-122323-HM	0.0000970	0.000225	0.00519	0.0000138	ND	ND	0.000261	0.0120	ND	0.0142	0.000806	ND	0.000135	0.00000102	0.00140	ND	Middle Property	AM-02	1433.4	3122828
12/23/2023	MFK-AM-03-122323-HM	0.000112	0.000119	0.00524	0.0000143	ND	ND	0.000250	0.0157	0.000215	0.0138	0.000724	ND	0.000126	0.000000926	0.00127	ND	Lower Property	AM-03	1455.6	3122828
12/24/2023	MFK-AM-01-122423-HM	0.000117	0.000144	0.00554	0.0000136	ND	ND	0.000268	0.0181	0.000258	0.0141	0.000594	ND	0.000153	0.00000126	0.00141	ND	Top Property	AM-01	1372.2	3122828
12/24/2023	MFK-AM-02-122423-HM	0.000112	0.000209	0.00729	0.0000177	ND	ND	0.000313	0.00925	0.000299	0.0183	0.000609	0.000687	0.000176	0.00000146	0.00186	ND	Middle Property	AM-02	1376.4	3122828
12/24/2023	MFK-AM-03-122423-HM	0.000129	0.000135	0.00577	0.0000136	ND	ND	0.000241	0.0124	0.000296	0.0137	0.000652	0.000618	0.000163	0.00000128	0.00146	ND	Lower Property	AM-03	1357.2	3122828
12/27/2023	MFK-AM-01-122723-HM	0.0000662	0.0000606	0.00312	0.00000616	ND	ND	0.0000886	0.0184	ND	0.00559	0.000614	ND	0.0000336	0.000000598	0.000477	ND	Top Property	AM-01	1428	4010214
12/27/2023	MFK-AM-02-122723-HM	0.000126	0.000198	0.00572	0.0000134	ND	ND	0.000177	0.0250	ND	0.0111	0.00144	ND	0.0000744	0.00000115	0.00101	ND	Middle Property	AM-02	1428	4010214
12/27/2023	MFK-AM-03-122723-HM	0.000168	0.000139	0.00764	0.0000182	ND	ND	0.000205	0.0410	ND	0.0140	0.00246	ND	0.0000963	0.00000129	0.00112	ND	Lower Property	AM-03	1445.4	4010214
12/28/2023	MFK-AM-01-122823-HM	0.0000587	0.0000749	0.00269	0.00000613	ND	ND	0.000086	0.0175	ND	0.00525	0.000584	ND	0.0000917	0.000000694	0.000637	ND	Top Property	AM-01	1441.2	4010214
12/28/2023	MFK-AM-02-122823-HM	0.0000586	0.0000820	0.00347	0.00000848	ND	ND	0.000102	0.0100	ND	0.00663	0.000626	ND	0.000113	0.000000809	0.000771	ND	Middle Property	AM-02	1441.2	4010214
12/28/2023	MFK-AM-03-122823-HM	0.0000902	0.000109	0.00611	0.0000177	ND	ND	0.000187	0.0194	0.000574	0.0147	0.000705	ND	0.000143	0.00000140	0.00108	ND	Lower Property	AM-03	1449	4010214
12/29/2023	MFK-AM-01-122923-HM	0.0000919	0.0000788	0.00522	0.0000128	ND	ND	0.000192	0.0211	0.000343	0.0111	0.000678	ND	0.000112	0.000000929	0.000939	ND	Top Property	AM-01	1167.6	4010214
12/29/2023	MFK-AM-02-122923-HM	0.0000744	0.000107	0.00477	0.0000110	ND	ND	0.000154	0.0141	0.000286	0.0102	0.000696	ND	0.000105	0.000000790	0.000863	ND	Middle Property	AM-02	1216.8	4010214
12/29/2023	MFK-AM-03-122923-HM	0.0000939	0.0000616	0.00496	0.0000129	ND	ND	0.000147	0.0124	ND	0.0105	0.000728	ND	0.0000899	0.000000804	0.000748	ND	Lower Property	AM-03	1206.6	4010214

Notes:
Metals sampling began at location ID (AM-03) on 11/11
No metals sampling tookplace on 11/15 due to high winds knocking over the Tisch samplers the day prior. Equipment was repositioned and secured on 11/15
Metals sampling was not deployed on the 24, and 25 due to the Christmas Holiday resulting in no Metals samples for the 25, or 26.
Summary excluded quality control samples (field blanks and lot blanks) or void samples that could not be analyzed by the laboratory.
Results compared to community screening levels as identified in Community Air Monitoring and Sampling Plan (Tetra Tech 2023).
ND = Not detected at or above the laboratory reporting or method detection limit
µg/m³ - microgram per cubic meter

ATTACHMENTS

TETRA TECH

Chris Burns
Project Manager

December 8, 2023

Ms. Marianne Fuji Rossio
Hawaii Department of Health (HDOH)
Clean Air Branch
Kinau Hale
1250 Punchbowl Street
Honolulu, Hawaii 96813

Subject: **Community Air Monitoring and Sampling Plan Rev 0 – Specialty Laboratory and Field Support for HDOH CAB – Ambient Community Air Monitoring in Response to Wildfire Cleanup Actions – Kula, Maui**

Task Order 23141

Dear Ms. Marianne Fuji Rossio:

Tetra Tech, Inc. (Tetra Tech) is submitting the enclosed Community Air Monitoring and Sampling Plan (CAMSP) for ambient community air monitoring in response to debris removal and asbestos abatement operations in Kula, Maui. This plan summarizes ambient community air monitoring and sampling conducted during debris removal and asbestos abatements activities. If you have any questions regarding this plan, please call me at (570) 417-1280.

Sincerely,

Chris Burns
Incident Commander

Enclosure

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COMMUNITY AIR MONITORING AND SAMPLING PLAN
SPECIALTY LABORATORY AND FIELD SUPPORT FOR HDOH – AMBIENT COMMUNITY AIR MONITORING IN RESPONSE TO WILDFIRE CLEANUP ACTIVITIES – KULA, MAUI

REVISION 0

Prepared for

Hawaii Department of Health
Clean Air Branch
Kinau Hale
1250 Punchbowl Street
Honolulu, Hawaii 96813

Submitted by

Tetra Tech, Inc.
737 Bishop St., Suite 2000
Honolulu, HI 96813-3201

Contract No. TO-23141

December 8, 2023

Prepared By

Chris Burns
Incident Commander

CONTENTS

1.0 INTRODUCTION

The Hawaii Department of Health (HDOH) Clean Air Branch (CAB) has contracted Tetra Tech, Inc. (Tetra Tech) to perform on-site and community air monitoring and sampling during debris removal and asbestos abatements activities in Kula for the "Specialty Laboratory and Field Support for HDOH – Ambient Community Air Monitoring in Response to Wildfire Cleanup Actions" project.

The primary potential hazards that may be associated with debris removal and asbestos abatement activities related to the 2023 Fires include asbestos-containing materials (ACM), heavy metals, and fugitive dusts. This Community Air Monitoring and Sampling Plan (CAMSP) describes the design, setup, and operation of air monitoring systems and sampling procedures that Tetra Tech will be implement during removal activities conducted by the U.S. Army Corps of Engineers (Army Corps). The removal activities consist of removing burned debris, including stucco, roofing, floor tile, linoleum, fireplaces, furnaces, vinyl tiles and mastic, sheetrock and joint compound, cement pipe, exterior home siding, thermal system insulation, concrete, white goods, vehicles, vegetation, construction debris, metal debris, electronic waste, and household hazardous chemicals.

Tetra Tech will perform air monitoring and sampling to document the levels of particulates (dust) in the ambient air at specific areas in Kula to represent where sensitive or active populations are found in the surrounding communities. Locations have been proposed and decided on by the HDOH CAB. Tetra Tech will collect particulate monitoring data and air samples from locations in the community; these will be analyzed for select metals and asbestos.

Ambient air sampling will be performed on a daily basis during debris removal and asbestos abatements in Kula. In the event that debris removal and/or asbestos abatement activities have not commenced, background air monitoring and sampling collection for these parameters will be attempted to establish baseline levels for air contaminants prior to initiation of debris removal and asbestos abatement activities. Tetra Tech will also monitor and log the meteorological data at one or more of the community locations using the meteorological datalogging capabilities of E-BAM equipment. Data from the meteorological station will be collected daily.

This CAMSP presents site background information in Section 2.0, contains a project description in Section 3.0, describes project objectives and data use in Section 4.0, presents the proposed field investigation and sampling activities in Section 5.0, and describes quality assurance and quality control (QA/QC) procedures in Section 6.0. References cited in this CAMSP are listed in Section 7.0. Tetra

Tech's Standard Operating Procedures (SOPs) to be used during the assessment are included as Appendix A. Where Tetra Tech SOPs are insufficient, U.S. Environmental Protection Agency Emergency Response Team (U.S. EPA ERT) SOPs will be followed and are included in Attachment 1. Analytical methods that will be used are included in Attachment 2.

2.0 SITE BACKGROUND

High winds from Hurricane Dora south of Hawai'i and dry weather caused wildfires to develop in Lāhainā, Upper Kula, Pūlehu/Kihei, and Ka'anapali on the island of Maui on August 8, 2023. The wildfires affected approximately 1,550 parcels and 2,200 structures.

Tetra Tech has been tasked by the HDOH, Clean Air Branch (CAB) to create and implement a CAMSP for the Kula fire area. Tetra Tech developed this in consultation with HDOH CAB and Maui County.

Ash and debris from residential structures burned by fires can contain heavy metals, as discussed in the "Guidance for Conducting Emergency Debris, Waste, and Hazardous Material Removal Actions Pursuant to a State or Local Emergency Proclamation" (California Environmental Protection Agency [CEPA] 2011), "Assessment of Burn Debris – 2007 Wildfires San Bernardino and San Diego Counties, California" (Department of Toxic Substances and Disease Control [DTSC] 2007) and "Assessment of Burned Debris- 2015 Wildfires Lake and Calaveras County, California" (DTSC 2015).The ash and debris also may contain concentrations of lead (for homes built prior 1978 (that is, before lead was banned from household paints in the United States).

Residual materials, such as stucco, roofing, floor tile, linoleum, fireplaces, furnaces, vinyl tiles and mastic, sheetrock and joint compound, cement pipe, exterior home siding, thermal system insulation, and other building materials commonly used in homes built before 1984 may also contain other substances of concern, including asbestos.

3.0 PROJECT DESCRIPTION

This project consists of conducting air monitoring and sampling throughout the debris removal and asbestos abatement activities at three community locations in the Kula area. Site activities are tentatively scheduled to commence the week of November 6, 2023, and continue for a minimum of 14 days, unless otherwise requested by the HDOH CAB.

Air monitoring and sampling will be conducted to demonstrate the effectiveness of best management practices and engineering controls used during debris removal and asbestos abatement activities and ensure that sensitive populations in the community are not impacted by these activities. The air monitoring data and analytical sampling results will be used to determine if improvements to engineering controls are needed and to determine the nature and extent of particulates and other hazards that could migrate beyond the perimeter of active debris removal and asbestos abatements work areas. These data and results will also be provided to HDOH CAB.

Tetra Tech will conduct air monitoring and sampling in accordance with the "Specialty Laboratory and Field Support for DOH – Ambient Community Air Monitoring in Response to Wildfire Cleanup Actions" project in the area of Kula, Maui. Air monitoring and sampling will be conducted at three community sites identified by the HDOH CAB. Project screening levels are presented in Table 1 and are also discussed in Section 5.4.

3.1 COMMUNITY LOCATIONS

Community air monitoring and air sampling station locations have been selected by the HDOH CAB based on community population density, sensitive receptor groups, prevailing winds, surrounding communities, and power source access. These locations are located at the top, middle, and bottom of the Kula area and are labeled AM01, AM02, and AM03 respectively.

Community air monitoring and air sampling locations will be active for 24 hours a day in Kula, and the addition and removal of stations will require approval from the HDOH CAB. Sample locations and their respective sample identification numbers are shown on Figure 1.

One station containing co-located air monitoring equipment and air sampling equipment will be placed at each approved location. Equipment siting at approved community locations will be determined with input from community location owners or representatives and will also consider location security and safety.

Each community air station will include equipment able to monitor air for airborne fine particulate matter concentrations (for particulates with an aerodynamic diameter of not more than 2.5 µm [$PM_{2.5}$]), particles with a diameter of 10 µm or less (PM_{10}), and sample air for select elemental metals (including antimony, arsenic, barium, beryllium, cadmium, chromium, cobalt, copper, lead, manganese, molybdenum, nickel, selenium, thallium, vanadium, zinc) and asbestos. Each community station will also log meteorological data including temperature (°F), relative humidity, current weather conditions, wind direction, and wind speed. Particulate monitoring and metals and asbestos sampling will be conducted 24 hours a day. All community air sampling will be implemented as directed by HDOH CAB and in accordance with the guidelines described in the January 2020 California Environmental Protection Agency (CalEPA) Department of Toxic Substances Control (DTSC) Community Air Monitoring Plan (CAMP) Guidance. Following the guidelines contained in the DTSC CAMP Guidance, Tetra Tech calculated risk-based community Site-Screening Action Levels (SSALs) for this project, which are presented in this plan as community screening levels. The screening levels are presented in Table 1. Appendix B contains the methodology used by Tetra Tech to calculate this project's SSALs.

Monitoring and sampling data from community locations will be reviewed as data become available. Any exceedances of the designated screening levels (Table 1) will be reported to the HDOH CAB. Following review, data from community locations may be further distributed as directed by HDOH CAB.

4.0 PROJECT OBJECTIVES AND DATA USE

The objective of air monitoring and sampling is to provide quantitative feedback on the potential impacts to nearby sensitive receptors in the community during debris removal and asbestos abatements operations. As such, data will be reported to the HDOH CAB and any stakeholders identified and approved by the CAB on a weekly basis. Weekly reports will include air monitoring and air sampling results from the previous week (to allow for laboratory sample analysis, and the review of analytical results). Data collected week one will be reported by the lab on week two. This data will then go through Level I data verification and be reported out two weeks from sample collection. A reporting week will be defined as Wednesday through Tuesday. Results will be compared to project SSALs and any exceedances will be clearly highlighted. Detailed results will be provided for all community locations.

Results above SSALs (Table 1) will be provided to HDOH CAB for review and used to inform decisions as appropriate. The HDOH may consider additional area-specific screening levels based on data review or input from local officials. SSALs are presented in Table 1 and discussed in Section 5.4.

5.0 PROPOSED FIELD INVESTIGATION

This section describes the scope of work and details the monitoring and sampling activities, including methods, screening levels, and reporting to be conducted during the debris removal and asbestos abatements.

5.1 SCOPE OF WORK

During debris removal and asbestos abatement activities, weather and site conditions permitting, Tetra Tech will conduct the following field work related to community air monitoring and sampling:

- Record meteorological data, including temperature, relative humidity, wind direction, wind speed, and current weather conditions.
- If scheduling allows, attempt to collect background air monitoring and sampling data before the USACE initiates debris removal and asbestos abatement.
- Establish community air monitoring and sampling stations at locations designated by the CAB.
- Conduct particulate monitoring in accordance the procedures described in this plan.
- Assign identifiers for all air monitoring and sampling locations according to the following naming conventions:
    - MFK-AMXX-MMDDYY (community locations), where AMXX = a four-letter location code assigned for community locations (for example, AM01 = Air Monitoring Location 01), and where MMDDYY = date that sample is collected (for example, 113023 for November 30, 2023).
- Review and verify data for the appropriate quality assurance objectives.
- Conduct ambient air sampling for metals and asbestos as applicable. Sample identifiers will coincide with air monitoring locations, with the addition of sample type identifier at the end of the ID (-HM for heavy metals and -AB for asbestos).
- Document all activities, including data, field measurements, and deviations from this CAMSP in a field logbook, on field sheets, or using digital forms.
- Conduct photographic and written documentation in accordance with Tetra Tech SOP No. 024-4, "Recording of Notes in Field Logbook" (Tetra Tech 2022, attached in Appendix A).
- Perform Stage 1 data verification of all analytical laboratory reports.
- Report any results above the SSALs designated for each location type (on-site and off-site) to HDOH CAB.
- Provide weekly summary reports with results from air monitoring and sampling.
- Provide a summary report on all project air data.

5.2 METEOROLOGICAL MONITORING

Meteorological data will be obtained continuously from a community A10-2 (or equivalent) weather meter. The data obtained will include:

- Temperature (°F)
- Relative humidity
- Wind direction
- Wind speed

- Current weather conditions (such as partly cloudy or raining)

5.3 PARTICULATE MONITORING

Particulate monitoring will be conducted daily throughout debris removal and asbestos abatement efforts at community locations. This section contains general particulate monitoring procedures followed by additional details for particulate monitoring specific to each type of air location.

To conduct particulate monitoring, Tetra Tech will use Met One Instruments, Inc., environmental beta attenuation mass monitors (E-BAM) to allow for comparison to the National Ambient Air Quality Standards (NAAQS). E-BAMs are factory-calibrated annually and do not require daily calibration, except for a leak check and a flow audit that should be performed before sampling according to the manufacturer's procedures.

Tetra Tech personnel will conduct periodic system checks of air monitoring equipment at a frequency of at least three times per day to ensure equipment is functional. System checks will consist of assessing the physical condition of the equipment, assessing the equipment to ensure it is collecting data, and briefly assessing the current readings to determine whether they are approaching or have exceeded the SSALs contained in Table 1.

Air monitoring data will be recorded on all air monitoring devices and downloaded onto a computer at the end of each day to be reviewed. Any noted data irregularities or equipment problems will be identified, investigated, and addressed. At the end of each working day, data will be reviewed for accuracy before being compiled in a central database. Air monitoring results will be reported to the HDOH CAB according to the procedures described in Section 6.2.

Gas-powered generators will not be used to power the air monitoring devices. Instead, emission-free power sources such as shore power, tandem batteries, or other green power sources will be used. Air monitoring devices will be sited within the breathing zone (4 to 5 feet above ground level), where possible. If these devices must be positioned outside of the breathing zone, justification for this deviance and the actual placement of the equipment will be noted in field logs.

At selected community locations, particulate monitoring will consist of $PM_{2.5}$ and PM_{10} data collected for 24 hours per day. Daily time weighted averages (TWAs) of community $PM_{2.5}$ and PM_{10} particulate data will be compared to the project screening levels of 35 $\mu g/m^3$ and 150 $\mu g/m^3$ respectively, as shown in Table 1.

5.4 PARTICULATE SCREENING LEVELS

Potential inhalation exposure hazards due to fugitive emissions from debris removal and asbestos abatement activities are expected to be low because removal contractors are required to employ administrative and engineering controls to minimize fugitive emissions (barricades, warning signs, dust suppression measures, and other mitigative actions). It is possible, however, that removal activities could generate low levels of particulates (dust) that could migrate off site.

If a project screening level is exceeded at any community location, the HDOH CAB will be notified according to the procedures described in Section 6.2. Particulate monitoring screening levels will be used as indicators for excessive off-site migration of particulates at removal locations.

5.5 AIR SAMPLING

Tetra Tech will collect ambient air samples at community locations throughout debris removal and asbestos abatement operations. Ambient air samples will be collected using high volume air samplers drawing air through filter media at specific (that is, calibrated) flow rates and for defined sample periods. Community air sampling and monitoring activities are anticipated to last for a minimum of 14 days; however, the HDOH CAB may decide to expand, reduce, or stop air monitoring and sampling based on data received and planned operations. Ambient air samples for asbestos and elemental metals will be collected at all community locations. The sampling methods are presented below.

Asbestos

Tetra Tech will collect ambient air samples for asbestos at each community locations each day using a QuickTake 30 or similar. Each sample is anticipated to capture 24 hours. Actual sample volumes will vary, depending on the exact duration of the sampling periods and actual sample pump flow rates used. However, Tetra Tech will ensure that an adequate sample volume is collected for each sample sent for analysis, in accordance with the methodology attached to this CAMSP. Sampling flow rates will be determined and documented by pre- and post- calibrating each sampling pump using a primary calibration standard.

The ambient air sampling units at each on-site location will consist of high flow air pumps, such as SKC QuickTake or similar, operated at a flow rate of 4-5 liters per minute (L/min). Higher flow rates are required to collect the additional sample volume necessary to meet the more conservative community screening levels contained in Table 1, which will assess ambient air quality with consideration of potential sensitive receptors. The total daily ambient air sampling time at on-site locations is expected to be approximately 24 hours or 1,440 minutes, during which Tetra Tech will collect approximately 6,480 liters of air through the sample filter media.

At each community sampling location, samples will be collected on a 25-mm open-face 0.45-µm MCE sample cassette with a conductive cowl mounted on a 4- to 5-foot-high cassette tripod stand that is attached to each air pump, with the opening facing at a 45-degree angle downward. The flow rate of the entire assembled ambient air sampling train will be calibrated before sample collection and measured after sample collection using a primary gas flow calibrator, such as a Bios DryCal DC-Lite or similar, capable of calibrating pumps from 1 to 10 L/min. The flow rate during the sample period will be determined by the average of the two readings. Calibration and sampling will be conducted in accordance with Tetra Tech SOPs 064-1, "Calibration of Air Sampling Pump" and 073-2, "Air Quality Monitoring" (Appendix A) and U.S. EPA ERT SOP No. 2008, "General Air Monitoring and Sampling Guidelines" (Attachment 1).

To avoid the potential for sample filter over-loading (particularly if visibly dusty conditions are observed during sample periods), Tetra Tech staff will perform periodic visual inspections of each filter in the asbestos cowling during each sampling period. If visible loading is observed on a filter, Tetra Tech will replace the sample cassette with a new one, and the analytical results from all cassettes from that overall sampling period will be used to determine the asbestos concentration for that workday.

Community air samples for asbestos will be submitted to a Tetra Tech-procured laboratory for analysis via the International Organization for Standardization (ISO) method 10312:1995I, "Ambient Air – Determination of Asbestos Fibers – Direct Transfer Transmission Electron Microscopy Method." Subcontracted laboratories will analyze 10 grid openings. If additional grid openings need to be viewed to meet project detection levels and sensitivity levels, Tetra Tech will authorize up to 10 additional grid openings. If additional grid openings are required, HDOH CAB will be consulted. ISO 10312 results will be reported in phase contrast microscopy equivalent (PCMe) results in structures per cubic centimeter (s/cc) using counting rules that will be considered equivalent to fibers per cubic centimeters (f/cc). PCMe results will be compared to the SSALs referenced in Table 1. If results are above these screening levels, Tetra Tech will authorize up to 10 additional grid openings on the PCMe to improve statistical confidence in actual asbestos fibers for the result. Initial asbestos air sample results will be requested with a turnaround (TAT) time of 72-hours. Additional grid openings will be requested for the laboratory's standard turnaround time; expedited TAT may be requested if approved by the HDOH CAB. The results of on-site ambient air sampling for asbestos will be evaluated against the SSALs identified in Table 1. Sampling requirements are presented in Table 3.

Elemental Metals

Tetra Tech will collect ambient air samples for select elemental metals daily at each of the three community locations identified by the HDOH CAB. Ambient air samples for metals will be collected with a Tisch Environmental High Volume Air Sampler, or equivalent, and collocated with the real-time particulate monitors described in Section 5.3 and asbestos samplers described above. The objective of ambient air sampling for metals at community locations is to assess ambient air quality with considerations for potential sensitive receptors.

Ambient air sampling methods require larger sampling devices and media that can draw significantly more air volume than methods intended for occupational exposure assessments. As a result, air sampling for elemental metals at community locations will employ the following air sampling methods:

- U.S. EPA Compendium Method IO-2.1, Sampling of Ambient Air for Total Suspended Particulate Matter (SPM) and PM10 Using High Volume (HV) Sampler
- U.S. EPA IO Compendium Method IO-3.5: Compendium of Methods for the Determination of Inorganic Compounds in Ambient Air: Determination of Metals in Ambient Particulate Matter Using Inductively Coupled Plasma/Mass Spectrometry (ICP/M").” EPA/625/R-96/010a
- U.S. EPA 40 Code of Federal Regulations (CFR) Part 50, Method for the Determination of Lead in Total Suspended Particulate Matter.
- U.S. EPA 40 CFR Part 58, Appendix E: Probe and Monitoring Path Siting Criteria for Ambient Air Quality Monitoring
- Standard Operating Procedures for Lead Monitoring Using a TSP High Volume Sampler

Results will be requested with a TAT appropriate to meet reporting deadlines described in Section 6.2. Results will be reported for the following metals: antimony, arsenic, barium, beryllium, cadmium, chromium, cobalt, copper, lead, manganese, molybdenum, nickel, selenium, thallium, vanadium, and zinc. The results of community air sampling for elemental metals will be evaluated against the SSALs identified in Table 1 and by calculating the 95% upper confidence limit of the mean of the data over the project duration intervals. Exceedances over the SSALs will be investigated for potential causes. Sampling requirements are presented in Table 3.

5.6 BACKGROUND AIR MONITORING AND SAMPLING

Prior to initiating debris removal and asbestos abatement, Tetra Tech will attempt to conduct background air monitoring and ambient air sampling, assuming debris removal or asbestos abatement activities have not commenced prior to sampling. Background locations would consist of particulate monitoring for

$PM_{2.5}$ and PM_{10}, and ambient air sampling for asbestos and elemental metals. Background data collected would help determine whether debris removal and asbestos abatement operations are impacting air quality and would follow the procedures described for the community locations in the rest of Section 5. Locations for background monitoring and sampling would be selected with the same criteria as they would be during debris removal and asbestos abatement operations. Background air monitoring and sampling would continue for up to five days, depending on the debris removal operations schedule.

5.7 SAMPLE HANDLING

Sampling locations will be noted on field sheets or digital forms. The collected samples will be labeled, packaged, and shipped under chain-of-custody in accordance with approved sampling methods and with the procedures outlined in Tetra Tech SOP No. 019-8, "Packing and Shipping Samples."

6.0 QUALITY ASSURANCE AND QUALITY CONTROL PROCEDURES

This section describes the QA/QC procedures for air monitoring and air sampling. Specifically, this section addresses field QC procedures, data evaluation and management, and reporting requirements.

6.1 FIELD QUALITY CONTROL

Field QC measures will consist of proper equipment calibration; and adherence to instrument manufacturer user manuals, published and peer-reviewed sampling methods, and Tetra Tech SOPs for air monitoring, sampling, and documenting activities on field sheets and digital forms. Table 4 describes the equipment QC measures and specifications related to equipment calibration.

Field QA/QC measures will follow the direction provided in the approved sampling methods. The Tetra Tech field team manager will be responsible for ensuring that sample quality and integrity are maintained, and that sample label and documentation procedures are in accordance with each SOP.

6.2 DATA EVALUATION, MANAGEMENT, AND REPORTING

Tetra Tech will use direct-reading instruments with data logging capability for particulate monitoring. Monitoring data will be downloaded from instruments at the end of each day and peer reviewed and verified for the appropriate QA objectives. Daily TWAs will be calculated from the logged data from each community particulate monitor and any readings above the SSALs will be reported to HDOH CAB the following day.

Tetra Tech will record field measurements collected via monitoring on field data sheets or on digital forms using tablets, as well as direct downloads. Data will be evaluated daily as it is collected (particulate monitoring) and received from the laboratory (air sample analytical results) to identify and report any elevated results or screening level exceedances. All electronic data will be stored in a central database (SQL server) that is managed by Tetra Tech.

Air sampling results will be received from the off-site analytical laboratories as a portable document format (PDF) file and as an electronic data deliverable (EDD). Analytical data will be maintained in an electronic database and compared to the SSALs. At the request of the HDOH CAB, Level 1 data verification will be completed on analytical data. Sample results will be reviewed by an industrial hygienist and will be available for reporting according to the schedule described below. Following data validation, data will also be uploaded and available via a shared site folder to review by HDOH.

Any particulate monitoring or air sampling results from community locations that exceed site-specific screening levels will be sent to the Operations Division of the HDOH CAB within 24 hours of collection for particulate monitoring results or within 24 hours of receiving results for air samples. A summary report of particulate monitoring and air sample results will be made available to the HDOH CAB on a weekly basis. These reports will show verified data results from samples collected two weeks prior. A reporting week schedule is as follows: samples will be shipped on Mondays and Thursdays each week, with results received Fridays and Tuesdays. These results will then go through Level 1 data verification and be reported to HDOH CAB. Revised reports may need to be submitted if sample results were not received in time, especially in the case of asbestos air samples that needed additional PCMe analysis. Following the conclusion of the project, a final summary report will be provided to HDOH.

REFERENCES

California Environmental Protection Agency (CEPA). 2011. "Guidance for Conducting Emergency Debris, Waste, and Hazardous Material Removal Actions Pursuant to a State or Local Emergency Proclamation." October 7.

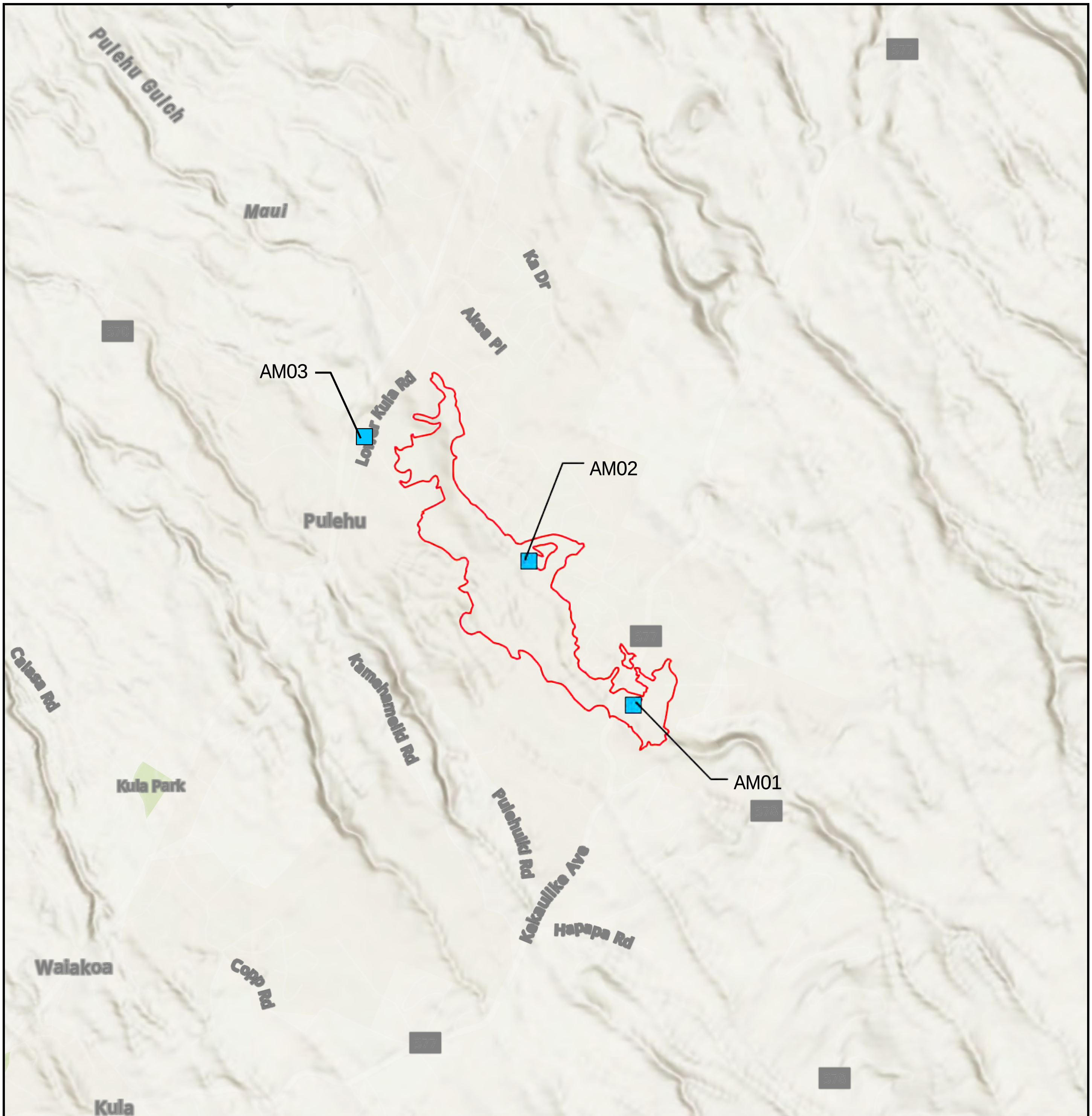
California Department of Toxic Substances Control (DTSC). 2007. "Assessment of Burn Debris – 2007 Wildfires San Bernardino and San Diego Counties, California" December 27.

DTSC. 2015. "Assessment of Burned Debris- 2015 Wildfires Lake and Calaveras County, California" December 7.

DTSC. 2020. "Community Air Monitoring Plan Guidance" January.

United States Environmental Protection Agency (U.S. EPA) Office of Air Quality Planning and Standards. 2018. Technical Assistance Document for the Reporting of Daily Air Quality – the Air Quality Index (AQI). September.

FIGURES



Air Monitoring Locations

Kula Fire Perimeter

0 0.25 0.5
Miles

TETRA TECH

Figure 1
Ambient Community
Air Monitoring Locations

Hawaii DOH
2023 Kula Wildfire

Basemap: ESRI ArcGIS World Street Map

TABLES

TABLE 1

COMMUNITY SITE-SPECIFIC AIR SCREENING LEVELS

Contaminant or Hazard	Selected SSAL[3]	Regulatory/ Guidance Value Used to Derive SSAL[12]
Particulate Matter ($PM_{2.5}$)	35 $\mu g/m^3$	NAAQS
Particulate Matter (PM_{10})	150 $\mu g/m^3$	NAAQS
Antimony CAS RN 7440-36-0	1.4 $\mu g/m^3$	ATSDR MRL (chronic; non-carc)
Arsenic CAS RN 7440-38-2	0.18 $\mu g/m^3$	IRIS (carc)
Barium CAS RN 7440-39-3	2.4 $\mu g/m^3$	EPA RSL table (HEAST; non-carc)
Beryllium CAS RN 7440-41-7	0.10 $\mu g/m^3$	IRIS (non-carc)
Cadmium CAS RN 7440-43-9	0.048 $\mu g/m^3$	ATSDR MRL (chronic; non-carc)
Chromium CAS RN 7440-47-3	24 $\mu g/m^3$	CrIII for total chromium; ATSDR MRL (intermediate, non-carc)
Cobalt CAS RN 7440-48-4	0.029 $\mu g/m^3$	EPA PPRTV (non-carc)
Copper CAS RN 7440-50-8	480 $\mu g/m^3$	NIOSH REL/ 10x safety factor; Professional judgment
Lead CAS RN 7439-92-1	1.5 $\mu g/m^3$	Hawaii Administrative Rules §11-59-4 (calendar quarter)
Manganese CAS RN 7439-96-5	0.24 $\mu g/m^3$	IRIS (non-carc)
Molybdenum CAS RN 7439-98-7	9.6 $\mu g/m^3$	ATSDR MRL (chronic; non-carc)
Nickel CAS RN 7440-20-0	0.048 $\mu g/m^3$	ATSDR (Aug. 2023) MRL (Chronic; non-carc)
Selenium CAS RN 7782-49-2	96 $\mu g/m^3$	OEHHA Chronic REL (non-carc)
Thallium CAS RN 7440-28-0	48 $\mu g/m^3$	NIOSH REL/ 10x safety factor; Professional judgment
Vanadium CAS RN 114-62-1	0.48 $\mu g/m^3$	ATSDR MRL (chronic; non-carc)
Zinc CAS RN 7440-66-6	2400 $\mu g/m^3$	NIOSH REL/ 10x safety factor; Professional judgment
Asbestos	0.0034 f/cc	IRIS (carc)

Notes:

[1]: Guidance values were used to calculate SSALs based on risk calculations outlined in Appendix B

[2]: Exposure Assumptions for risk screening values:

Exposure frequency = 156 days per year i.e., six months, six days per week project duration.)
Exposure time = 10 hours/day
Lifetime (for carcinogenic risk screening calculations): 70 years

[3]: Analytical method recommendation for metals: High volume, ICP/MS. Sampling Method EPA IO-2.1 and analytical method EPA IO-3.5

ATSDR - Agency for Toxic Substances and Disease Registry
Carc - risk screening level based on carcinogenic effects
CAS RN - Chemical Abstracts Service Registry Number

EPA PPRTV – Environmental Protection Agency Provisional Peer-Reviewed Toxicity Values
FAA methods from Hawaii Analytical Laboratory, LLC
f/cc – fibers per cubic centimeter
IRIS - Integrated Risk Information System
ISO 10312 - Determination of asbestos fibers- Direct transfer transmission electron microscopy method
MRL - Minimal Risk Level
NAAQS - National Ambient Air Quality Standards
NIOSH - National Institute for Occupational Safety and Health
Non-carc - Risk screening level based on noncarcinogenic effects
OEHHA - Office of Environmental Health Hazard Assessment
REL - Reference Exposure Level
SSAL - Site Screening Action Level
μg/m3 - micrograms per cubic meter

TABLE 2

PROJECT-SPECIFIC PARTICULATE MONITORING

Location Type	Monitoring Fraction / Frequency	Monitoring Device	Data Review	Screening Level - Reference	Alarm & Excursion Reporting	Alarm or Screening Level Excursion – Potential Outcomes
Community	$PM_{2.5}$ / Working Hours	Particulate Monitor (E-BAM)	Daily, between operational periods	35 µg/m^3 - NAAQS 24-hour average	HDOH CAB within 24 hours	Data will be reported to HDOH CAB and used at the discretion of HDOH CAB
Community	PM_{10} / Working Hours	Particulate Monitor (E-BAM)	Daily, between operational periods	150 µg/m^3 - NAAQS 24-hour average	HDOH CAB within 24 hours	Data will be reported to HDOH CAB and used at the discretion of HDOH CAB

Notes:

The National Ambient Air Quality Standard (NAAQS) for $PM_{2.5}$ is based on a 24-hour average.
E-BAM: Environmental Beta Attenuation Mass Monitor
HDOH CAB: Hawaii Department of Health (Clean Air Branch)
µg/m$^{3:}$ micrograms per cubic meter
PM: particulate matter

TABLE 3

SAMPLING REQUIREMENTS WORKSHEET

Parameter and Method	Parameter and Method	Volume and Container	Number of Investigative Samples	Number of Quality Control (QC) Samples					Total Number of Investigative and QC Samples	Total Number of Sample Containers
				Matrix Spike / Matrix Spike Duplicate (MS/MSD)	Field Duplicate or Split	Equipment Blank	Field Blank	Trip Blank		
Community Elemental Metals[1] (minus mercury and silver)	Elemental Metals[1] (Minus mercury and silver) / Metals analysis in accordance with EPA Compendium Methods IO-3.4 or IO-3.5, or equivalent.	1600 cubic meters 8x10 quartz filters	TBD	1 every 20	NA	1 / lot	1 / day	NA	TBD	TBD
Community Asbestos High-Flow	Asbestos / ISO 10312	6,480 liters of air / 25-mm 0.45-µm MCE cassette with cowl	TBD	NA	NA	1 / lot	1 / day	NA	TBD	TBD

[1]Elemental metals include: antimony, arsenic, barium, beryllium, cadmium, chromium, cobalt, copper, lead, manganese, molybdenum, nickel, selenium, thallium, vanadium, zinc
QC: quality control
mm: millimeter
µm: micrometer
TBD: to be determined
MS/MSD: matrix spike/matrix spike duplicate
NA: not applicable

TABLE 4

EQUIPMENT CALIBRATION REQUIREMENTS

Instrument	Parameters to Measure	Frequency of Calibration	Calibration gas/concentration
E-BAM	Particulates	Leak test and flow audit before sampling; factory calibration annually	Not applicable (NA) (annual factory calibration)
QuickTake 30 high-flow pump	Asbestos	Twice Daily (Pre- and Post-Sampling)	NA
Tisch	Elemental Metals	Upon installation, after routine maintenance, once every 3 months, after 360 sampling hours	NA

APPENDIX A

Tetra Tech SOPs

SOP APPROVAL FORM

TETRA TECH, INC.

ENVIRONMENTAL STANDARD OPERATING PROCEDURE

PACKAGING AND SHIPPING SAMPLES

SOP NO. 019

REVISION NO. 7

Last Reviewed: November 2014

Quality Assurance Approved	November 24, 2014 Date

1.0 BACKGROUND

In any sampling program, the integrity of a sample must be ensured from its point of collection to its final disposition. This standard operating procedure (SOP) describes procedures for packaging and shipping samples. Steps in the procedures should be followed to ensure sample integrity and to protect the welfare of persons involved in shipping and receiving samples.

1.1 PURPOSE

This SOP establishes the requirements and procedures for packaging and shipping samples. It has been prepared in accordance with the U.S. Environmental Protection Agency (EPA) "Contract Laboratory Program Guidance for Field Samplers." Procedures described in this SOP should be followed for all routine sample packaging and shipping. If procedures are to be modified for particular contract- or laboratory-specific requirements, modified procedures should be clearly described in site-specific plans such as work plans, field sampling plans (FSPs), or quality assurance project plans (QAPPs). Deviations from the procedures in this SOP must be documented in a field logbook. This SOP assumes that samples are already in the appropriate sample jars and that the sample jars are labeled.

This SOP does not cover the packaging and shipment of Dangerous Goods or Hazardous Materials. The shipment of Dangerous Goods (by air) and Hazardous Materials (by ground) requires specialized training. If you have NOT received this training in the last two years, you are NOT qualified to package or ship these materials and may be personally liable for any damages or fines. Contact one of Tetra Tech's shipping experts for assistance. Instructions to access the training course, shipping experts and health and safety (H&S) contacts, and general information on packaging and shipping hazardous substances and dangerous goods can be obtained by checking the links provided in Section 1.4 (References).

1.2 SCOPE

This SOP applies to packaging and shipping of environmental and nonhazardous samples. This SOP does not address shipping dangerous goods or hazardous materials.

1.3 DEFINITIONS

Airbill: An airbill is a shipping form (such as a FedEx shipping form) acquired from the commercial shipper and is used to document shipment of the samples from the sampler to the designated analytical laboratory (see Figure 1).

Custody-of-Custody form: A chain-of-custody form is used to document the transfer of custody of samples from the field to the designated analytical laboratory (see Figure 2). The chain-of-custody form is critical to the chain-of-custody process and is used to identify the samples in each shipping container to be shipped or delivered to the laboratory for chemical or physical (geotechnical) analysis (see Figure 3).

Custody seal: A custody seal is a tape-like seal and is used to indicate that samples are intact and have not been disturbed during shipping or transport after the samples have been released from the sampler to the shipper (see Figure 4). The custody seal is part of the chain-of-custody process and is used to prevent tampering with samples after they have been packaged for shipping (see Figure 5).

Environmental samples: Environmental samples include drinking water, most groundwater and surface water, soil, sediment, treated municipal and industrial wastewater effluent, indoor and ambient air, nonhazardous bulk materials, soil gas, dust, asbestos, and biological specimens. Environmental samples typically contain low concentrations of contaminants and, when handled, require only limited precautionary procedures.

Field Blank: A field blank is any blank sample that is packaged and shipped from the field. Each field blank is assigned its own unique sample number. Field blanks include trip blanks, rinse blanks, and equipment blanks, all intended to assess potential cross-contamination. For example, a trip blank checks for contamination during sample handling, storage, and shipment from the field to the laboratory.

Nonhazardous samples: Nonhazardous samples are those samples that do not meet the definition of a hazardous sample and **do not** need to be packaged and shipped in accordance with the International Air Travel Association's (IATA's) "Dangerous Goods Regulations" (DGR) or U.S. Department of Transportation's (U.S. DOT's) "Hazardous Materials Regulations" (HMR) defined in Title 49 Code of Federal Regulations (CFR).

The following definitions are provided to further distinguish environmental and nonhazardous samples from dangerous good and hazardous samples:

Dangerous goods: Dangerous goods are articles or substances that can pose a significant risk to health, safety, or property when transported by air; they are classified as defined in Section 3 of the DGR (IATA 2014).

Hazardous samples: Hazardous samples include dangerous goods and hazardous substances. Hazardous samples shipped by air should be packaged and labeled in accordance with procedures specified by the DGR; ground shipments should be packaged and labeled in accordance with the HMR.

Hazardous substance: A hazardous substance is any material, including its mixtures and solutions, that is listed in 49 CFR 172.101 and its quantity, in one package, equals or exceeds the reportable quantity (RQ) listed in Table 1 to Appendix A of 49 CFR 172.101.

1.4 REFERENCES

General Awareness, H&S contacts, and course training information" click here. (Tetra Tech, Inc., EMI Operating Unit. Intranet) Available on-line at: https://int.tetratech.com/sites/EMI/hs/Pages/Dangerous-Goods-Shipping.aspx

International Air Transport Association (IATA). 2014. "Dangerous Goods Regulations. 2014." For sale at: http://www.iata.org/publications/Pages/standards-manuals.aspx. Updated annually, with new edition available late in year.

U.S. Environmental Protection Agency (EPA). 40 CFR, 763 Subpart F, Asbestos Hazards Emergency Response Act (AHERA).

EPA. 2011. "Contract Laboratory Program Guidance for Field Samplers." EPA 540-R-09-03. Available on-line at: http://www.epa.gov/oerrpage/superfund/programs/clp/download/sampler/CLPSamp-01-2011.pdf. January.

1.5 REQUIREMENTS AND RESOURCES

The procedures for packaging and shipping samples require the following:

- Coolers (insulated ice chest) or other shipping containers appropriate to sample type
- Ice
- Bubble wrap or similar cushioning material
- Chain-of-custody forms and seals
- Airbills
- Resealable plastic bags for sample jars and ice
- Tape (strapping and clear)
- Large plastic garbage bags for lining the cooler
- Temperature blank sample bottle filled with distilled water can be included in the cooler if appropriate to sample type

- Trip blank samples used to check for volatile contamination during sample handling in the field and shipment from field to laboratory should be included in the cooler if volatile organic compounds are requested for analysis. Also see Field Blank under definitions.

2.0 PROCEDURES

The following procedures apply to packaging and shipping nonhazardous and environmental samples.

2.1 PACKAGING SAMPLES

After they have been appropriately containerized and labeled, environmental samples should be packaged as described in this section. This section covers procedures for packing samples for delivery by commercial carrier (air or ground) and hand delivery of environmental samples (by employee or courier), as well as shipping asbestos and air quality samples. Note that these instructions are general; samplers also should be aware of client-specific requirements concerning the placement of custody seals or other packaging provisions.

2.1.1 Packaging Samples for Delivery by Commercial Carrier (Air or Ground)

Samples shipped by commercial carriers should be packed for shipment using the following procedures and in compliance with all carrier requirements:

Preparing the sample:

1. Allow a small amount of headspace in all bottles, or as instructed by the laboratory (except volatile organic compound [VOC] containers with a septum seal) to compensate for any changes in pressure and temperature during transfer.
2. Be sure the lids on all bottles are tight (will not leak). Lids maybe taped or sealed with custody seals as added protection or as required.
3. Place sample containers in resealable plastic bags.

Preparing the cooler:

1. Secure and tape the drain plug of the cooler with fiber or duct tape.
2. It is recommended that the cooler be lined with a large plastic garbage bag before samples, ice, and absorbent packing material are placed in the cooler.
3. Wrap the sample containers in bubble wrap or line the cooler (bottom and sides) with a cushioning material to prevent breakage of bottles or jars during shipment.
4. Add a sufficient quantity of ice to the cooler to cool samples to 4 °C ($\pm$ 2 °C). Ice should be double bagged in resealable plastic bags to prevent the melted ice from leaking out. If required, include one temperature blank (a sample bottle filled with distilled water) per cooler.

5. For volatile organic analysis (VOA) samples only, include one trip blank for VOA analysis per shipment matrix in each cooler.
6. Fill all remaining space between the bottles or jars with bubble wrap.
7. Securely fasten the top of the large garbage bag with tape (preferably plastic electrical tape).
8. If more than one cooler is being shipped, mark each cooler as "1 of 2," "2 of 2," and so forth.
9. Place the chain-of-custody forms (see Figure 2) into a resealable plastic bag, and tape the bag to the inner side of the cooler lid (see Figure 3). If you are shipping more than one cooler, copy the chain-of-custody form so that there is one copy of all forms in each cooler. The samples listed on the chain-of-custody form must match exactly with the contents of the cooler. Tape any instructions for returning the cooler to the inside of the lid.
10. Close the lid of the cooler and tape it shut by wrapping strapping tape around both ends and hinges of the cooler at least once.
11. Place two signed custody seals (see Figure 4) on opposite sides of the cooler, ensuring that each one covers the cooler lid and side of the cooler (see Figure 5; note that in contrast to the figure, the seals should be placed on the opposite sides of the cooler and offset from each other, rather than directly across from each other as shown in Figure 5). Place clear plastic tape over the custody seals so that the cooler cannot be opened without breaking the seal.
12. Shipping containers must be marked "THIS END UP." Arrow labels, which indicate the proper upward position of the container, may also be affixed to the container (see Figures 3 and 5). A label containing the name, phone number, and address of the shipper should be placed on the outside of the container (Federal Express [FedEx] label) (see Figure 1).
13. Ship samples overnight using a commercial carrier such as FedEx.

2.1.2 Hand Delivery of Environmental Samples (by Employee or Courier)

Samples hand-delivered to the laboratory should be packed for shipment using the following procedures:

Preparing the sample:

1. Bottles can be filled completely with sample (required for VOC containers with a septum seal).
2. Be sure the lids on all bottles are tight (will not leak).

Preparing the cooler:

1. Secure and tape the drain plug of the cooler with fiber or duct tape.
2. Wrap the sample containers in bubble wrap and/or line the cooler (bottom and sides).
3. Add a sufficient quantity of ice to the cooler to cool samples to 4 °C. Ice should be double bagged in resealable plastic bags to prevent the melted ice from leaking out. If required, include one temperature blank (a sample bottle filled with distilled water) per cooler.
4. For VOA samples only, include one trip blank for VOA analysis per shipment matrix in each cooler.
5. If more than one cooler is being shipped, mark each cooler as "1 of 2," "2 of 2,"and so forth.

6. Place chain-of-custody form (see Figure 2) in a resealable plastic bag and tape to the inside of the cooler lid, close the lid, seal with custody seals, and transfer the cooler to the courier (see Figure 3). Alternatively, when samples will be delivered directly to the laboratory, close the cooler and hand-deliver it with the chain-of-custody form. The samples listed on the chain-of-custody form must match exactly with the contents of the cooler.
7. Include any instructions for returning the cooler to the inside of the lid.
8. Place two signed custody seals (see Figure 4) on opposite sides of the cooler, ensuring that each one covers the cooler lid and side of the cooler (see Figure 5, note that the seals should be placed on the opposite sides of the cooler and offset from each other, rather than directly across from each other as shown in Figure 5). Place clear plastic tape over the custody seals so that the cooler cannot be opened without breaking the seal.
9. Shipping containers must be marked "THIS END UP," and arrow labels, which indicate the proper upward position of the container should be affixed to the container (see Figures 3 and 5).

2.1.3 Shipping Asbestos Samples

Asbestos samples shipped by commercial carriers should be packed for shipment using the following procedures and in compliance with all carrier requirements:

1.` Place each asbestos sample in a small resealable plastic bag. Place the bags of asbestos samples in a large resealable plastic bag.
2. Select a rigid shipping container (FedEx box) and pack the cassettes upright in a noncontaminating, nonfibrous medium such as a bubble pack to prevent excessive movement during shipping.
3. Avoid using expanded polystyrene because of its static charge potential. Also avoid using particle-based packaging materials because of possible contamination.
4. Affix custody seals to the top of the cassettes or outer sample bag so that the bags cannot be opened without breaking the seal.
5. Insert the chain-of-custody form in the box. Include a shipping bill and a detailed listing of samples shipped, their descriptions and all identifying numbers or marks, sampling data, shipper's name, and contact information.
6. Ship bulk samples in a separate container from air samples. Bulk samples and air samples delivered to the analytical laboratory in the same container will be rejected.
7. For each sample set, designate which are the ambient samples, which are the abatement area samples, which are the field blanks, and which is the sealed blank if sequential analysis is to be performed.
8. Hand-carry samples to the laboratory in an upright position if possible; otherwise, choose that mode of transportation least likely to jar the samples in transit.
9. Address the package to the laboratory sample coordinator by name when known and alert him or her of the package description, shipment mode, and anticipated arrival as part of the chain-of-custody and sample tracking procedures. This information will also help the laboratory schedule timely analysis for the samples when they are received.

2.1.4 Shipping Air Samples

Packaging and shipping requirements for air samples vary depending on the media used to collect the samples and the analyses required. Sampling media typically include Summa canisters and Tedlar bags for whole air samples, filters for metals and particulate matter, and sorbent tubes for organic contaminants. This section of the SOP provides general guidelines for packaging and shipping air samples collected using these media. The project FSP or QAPP should also be reviewed for any additional project-specific requirements or instructions.

Summa Canister Samples

1. Close the canister valve by tightening the knob clockwise or flipping the toggle switch. Replace the brass cap on the canister inlet.
2. If a flow controller was used to collect the air sample over a specified time interval, the flow controller should be removed before replacing the brass cap.
3. Fill out the sample tag on the canister with the sample number and the date and time of collection. Include the identification number of the flow controller on the sample tag if one was used. Make sure the information on the sample tag matches the chain-of-custody form.
4. Complete the chain-of-custody form. In addition to the information normally included, the form should include the following data: sample start and stop dates and times; initial and final Summa canister vacuum readings; Summa canister identification number; and flow controller identification number.
5. Package the Summa canister (and flow controller) in its original shipping box with the original packaging material. Tape the box shut and apply custody seals if required. Note: Summa canisters should never be packaged with ice.
6. Summa canister shipments typically include several canisters, and may include more than one shipping box. The chain-of-custody form for the shipment should be sealed within one of the shipping boxes.
7. Ship the samples by a method that will meet the holding time. Summa canister samples should be analyzed within 30 days of sample collection.

Tedlar Bag Samples

1. Close the Tedlar bag by tightening the valve clockwise.
2. Fill out the label on the bag with the sample number and the date and time of sample collection. Make sure the information on the label matches the chain-of-custody form.
3. Complete the chain-of-custody form.
4. Package the Tedlar bag in a shipping box with appropriate packing material. Multiple bags can be packaged in the same box. Tape the box shut and apply custody seals if required. Note: Tedlar bag samples should not be cooled or packaged with ice.
5. Tedlar bag shipments may include more than one shipping box. The chain-of-custody form for the shipment should be sealed within one of the shipping boxes.

6. Ship the samples using priority overnight delivery. Tedlar bag samples should be analyzed within 3 days of sample collection.

Filter Cassette Samples

1. Disconnect the filter cassette from the air sampling pump and replace the plastic caps on the inlet and outlet openings.
2. Attach a label to the sample that includes the sample number and the date and time of sample collection. Make sure the information on the label matches the chain-of-custody form.
3. Complete the chain-of-custody form. In addition to the information normally included, the form should include the following data: sample start and stop dates and times; initial and final air flow rates (or average flow rate); volume of air sampled; and sampling pump identification number.
4. Package the filter cassettes in a shipping box (such as a FedEx box). Use an appropriate packing material (such as bubble wrap) to separate the samples and prevent damage.
5. Place the chain-of-custody form within the box, seal the box, and apply custody seals if required. Filter cassette samples typically do not need to be cooled, but check the FSP or QAPP for project-specific requirements.
6. Ship the samples by a method that will meet the holding time.

Sorbent Tube Samples

1. Disconnect the sample tube from the air sampling pump and seal both ends of the tube with plastic caps.
2. Complete a sample label that includes the sample number and the date and time of sample collection. Make sure the information on the label matches the chain-of-custody form.
3. If the tube is small and the label cannot be attached to the tube, the tube can be placed in a small sealable plastic bag and the label can be attached to the bag or placed inside the bag with the tube.
4. Complete the chain-of-custody form. In addition to the information normally included, the form should include the following data: sample start and stop dates and times; initial and final air flow rates (or average flow rate); volume of air sampled; and sampling pump identification number.
5. Packaging requirements for the sample tubes will depend on the analysis required, and the sampler should check the FSP or QAPP for project-specific requirements (for example, tubes may need to be wrapped in aluminum foil to prevent exposure to light). Packaging containers and methods include (1) shipping boxes (as described under filter cassette samples), (2) small sample coolers filled with double-bagged ice, and (3) small sample coolers filled with blue ice.
6. Place the chain-of-custody form within the box or container, seal the box or container, and apply a custody seal if required.
7. If coolers are used for shipping, tape instructions for returning the cooler to the inside of the lid.
8. Ship the samples by a method that will meet the holding time.

Polyurethane Foam (PUF) Tube Samples

1. Disconnect the PUF tube from the air sampling pump and wrap the tube in aluminum foil.
2. Attach a label to the wrapped sample tube that includes the sample number and the date and time of sample collection. Make sure the information on the label matches the chain-of-custody form.
3. Wrap the PUF tube in bubble wrap and place the tube in a glass shipping jar.
4. Complete the chain-of-custody form. In addition to the information normally included, the form should include the following data: sample start and stop dates and times; initial and final air flow rates (or average flow rate); volume of air sampled; and sampling pump identification number.
5. Package the PUF tube jars in a cooler that is filled with double-bagged ice. Use bubble wrap or other cushioning material to separate the samples and prevent breakage.
6. Place the chain-of-custody form within the cooler, seal the cooler, and apply a custody seal if required.
7. If coolers are used for shipping, tape instructions for returning the cooler to the inside of the lid.
8. Ship the samples by a method that will meet the holding time. Samples collected in PUF tubes typically must be extracted within 7 days of collection.

2.2 SHIPPING DOCUMENTATION FOR SAMPLES

Airbills, chain-of-custody forms, and custody seals must be completed for each shipment of nonhazardous environmental samples. Figures 1, 2, and 4 provide examples of these forms and instructions for completing them.

Field staff collecting samples should also review their field work plans to confirm what documentation must be completed during each sampling event, including client-specific requirements. For example, some EPA programs have a specific requirement to use Scribe software, an environmental data management system, to create sample documentation, electronically input information into Traffic Report or chain-of-custody forms, and enter other data.

- The Scribe software can be accessed from the EPA Environmental Response Team (ERT) at the following address: http://www.ertsupport.org/scribe_home.htm
- The ERT User Manual for Scribe, reference, and training materials can be accessed from the Scribe Support Web site at the following address: http://www.epaosc.org/scribe

Note that some laboratories must routinely return sample shipping coolers within 14 calendar days after the shipment has been received. Therefore, the sampler should also include instructions for returning the cooler with each shipment, when possible. The sampler (not the laboratory) is responsible for paying for return of the cooler and should include shipping airbills bearing the sampler's shipping account number, as well as a return address to allow for return of the cooler (see Figure 1). Samplers should use the least expensive option possible for returning coolers.

2.3 SHIPMENT DELIVERY AND NOTIFICATION

A member of the field sampling team must contact the laboratory to confirm it accepts deliveries on any given day, especially Saturdays. In addition, samplers should ensure the laboratory has been notified in advance of the pending shipment and notify any additional parties as required. The sampler needs to know the laboratory's contact name, address, and telephone number and be aware of the laboratory's requirements for receiving samples.

The sampler needs to know the shipping company's name, address, and telephone number (see Figure 1). In addition, samplers should be aware of the sample holding times, shipping company's hours of operation, shipping schedule, and pick-up and drop-off requirements to avoid delays in analytical testing.

Priority Overnight Delivery

Priority overnight delivery is typically the best method for shipment. Delays caused by longer shipment times may cause the sample temperature to rise above the acceptable range of 4° C ($\pm$ 2 ° C) and technical holding may expire, which in turn may compromise sample integrity and require recollection of samples for analysis. If sample delivery procedures are to be modified for particular contract- or laboratory-specific requirements, the procedures should be clearly described in site-specific plans such as work plans, FSPs, or QAPPs.

Saturday Delivery

If planning to ship samples for Saturday delivery, the laboratory must be contacted in advance to confirm it will accept deliveries on Saturdays or arrange for them to be accepted. In addition, samplers should ensure the laboratory has been notified in advance of the pending shipment and notify any additional parties as required.

2.4 HEALTH AND SAFETY CONSIDERATIONS

In addition to the procedures outlined in this SOP, all field staff must be aware of and follow the health and safety practices that result from the Activity Hazard Analyses (AHA) for the project. The AHAs include critical safety procedures, required controls, and minimum personal protective equipment (PPE) necessary to address potential hazards. The hazards specific to project tasks must be identified and controlled to the extent practicable and communicated to all project personnel via the approved, project-specific Health and Safety Plan (HASP).

3.0 POTENTIAL PROBLEMS

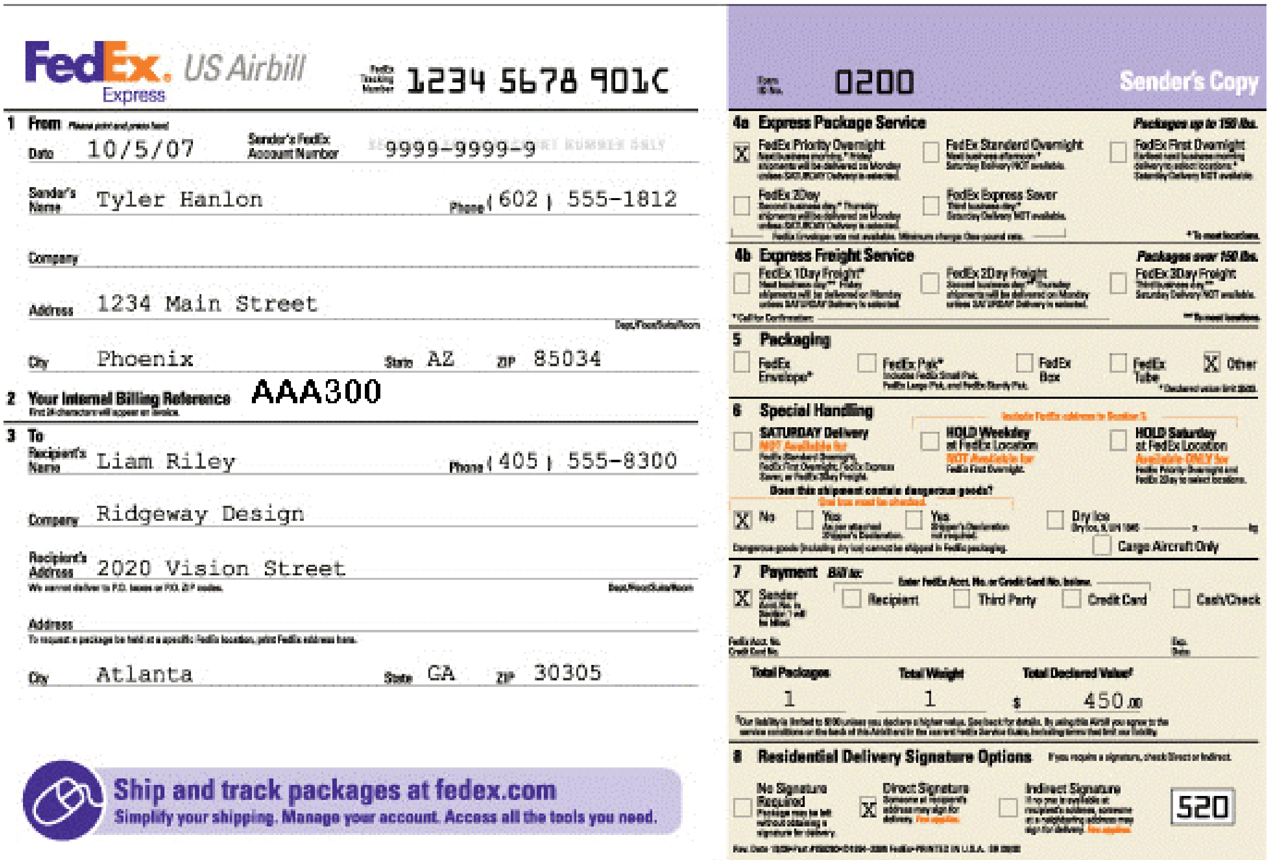
The following potential problems may occur during sample shipment:

- Leaking package. If a package leaks, the carrier may open the package and return the package. Special care should be taken during sample packaging to minimize potential leaks.
- Improper labeling and marking of package. If mistakes are made in labeling and marking the package, the carrier will most likely notice the mistakes and return the package to the shipper, thus delaying sample shipment. A good practice is to have labels, forms, and container markings double checked by a member of the field team.
- Bulk samples and air samples delivered to the analytical laboratory in the same container. If samples are combined in this way, they will be rejected. Always ship bulk samples in separate containers from air samples.
- Issues in packing asbestos samples. When asbestos samples are shipped, avoid using expanded polystyrene because of its static charge potential. Also avoid using particle-based packaging materials with asbestos samples because of possible contamination.
- Improper, misspelled, or missing information on the shipper's declaration. The carrier will most likely notice these errors as well and return the package to the shipper. A good practice is to have another field tram member double check this information.
- Missed drop off time or wrong location. Missing the drop off time or having the wrong location identified for drop off will delay delivery to the laboratory and may cause technical holding times to expire. Establish the time requirements in advance of completing the field effort and be sure and provide some contingency time for potential delays such as traffic or checking and redoing paperwork.
- Incorrectly packaging samples for analysis at multiple laboratories. For example, inorganic samples may be shipped to one laboratory for analysis, while organic samples may need to be shipped to another laboratory. All field staff should be aware which samples are to be shipped to which laboratory they package samples for multiple types of analysis.
- Holidays or weather-related delays. Be aware of holidays and weather forecasts that could cause delays in delivery. Delays caused by longer shipping times may cause technical holding times to expire, which in turn may compromise sample integrity or require recollection of samples for analysis.
- Not noting field variances in field log book. Field variances should be noted in the field log book and the project manager notified. Common field variances include:
  - Less sample volume collected than planned. Notify appropriate staff and the laboratory to ensure there is an adequate amount for analysis.

- Sample collected into incorrect jar because of broken or missing bottle-ware. Notify appropriate laboratory staff to ensure there is no confusion regarding the analysis of the sample.

FIGURE 1

EXAMPLE OF A FEDEX US AIRBILL FOR LOW LEVEL ENVIRONMENTAL SAMPLES


FedEx Express US Airbill
FedEx Tracking Number 1234 5678 901C
Form I.D. No. 0200
Sender's Copy

1 From
Date 10/5/07
Sender's FedEx Account Number 9999-9999-9
Sender's Name Tyler Hanlon
Phone (602) 555-1812
Company
Address 1234 Main Street
City Phoenix State AZ ZIP 85034

2 Your Internal Billing Reference AAA300

3 To
Recipient's Name Liam Riley
Phone (405) 555-8300
Company Ridgeway Design
Recipient's Address 2020 Vision Street
Address
City Atlanta State GA ZIP 30305

Ship and track packages at fedex.com
Simplify your shipping. Manage your account. Access all the tools you need.

4a Express Package Service
X FedEx Priority Overnight
FedEx Standard Overnight
FedEx First Overnight
FedEx 2Day
FedEx Express Saver

4b Express Freight Service
FedEx 1Day Freight
FedEx 2Day Freight
FedEx 3Day Freight

5 Packaging
FedEx Envelope
FedEx Pak
FedEx Box
FedEx Tube
X Other

6 Special Handling
SATURDAY Delivery
HOLD Weekday at FedEx Location
HOLD Saturday at FedEx Location
Does this shipment contain dangerous goods?
X No
Yes
Yes
Dry Ice
Cargo Aircraft Only

7 Payment Bill to:
X Sender
Recipient
Third Party
Credit Card
Cash/Check
Total Packages 1
Total Weight 1
Total Declared Value $ 450.00

8 Residential Delivery Signature Options
No Signature Required
X Direct Signature
Indirect Signature
520

Filling Out the FedEx US Airbill

- The sender *must complete* the following fields on the pre-printed airbill:
  - Section 1: Date
  - Section 1: Sender's FedEx Account Number
  - Section 1: Sender's Name, Company, Address, and Phone Number
  - Section 2: Internal Billing Reference (Project Number)
  - Section 3: Recipient's Name, Company, Address, and Phone Number
  - Section 4: Express Package or Freight Services (Priority Overnight)
  - Section 5: Packaging (usually "Other," your own packaging)
  - Section 6: Special Handling (Saturday delivery if prearranged with receiving laboratory; "No" dangerous goods contained in shipment)
  - Section 7: Payment ("Bill to Sender")
  - Section 7: Total Number of Packages
  - Section 7: Total Weight (completed by FedEx employee)
  - Section 8: Delivery Signature Options ("No Signature Required")

FIGURE 2

EXAMPLE OF A CHAIN-OF-CUSTODY FORM (WHITE COPY)

Tetra Tech EM Inc.
Oakland Office
1999 Harrison Street, Suite 500
Oakland, CA 94612
510.302.6300 Phone
510.433.0830 Fax

Chain of Custody Record No. 9814 13G175 Page 1 of 1

Project name: Concord PARNI	TtEMI technical contact: Sara Woolley	Field samplers: Sandy Jack, Rebecca Johnson
Project (CTO) number: 1036 A59029	TtEMI project manager: Steve DellHomme	Field samplers' signatures:
Lab PO#: 13OAK27	Lab: EMAX	

Preservative Added: NONE, NONE, NONE

	Sample ID	Point ID/Depth	Date	Time	Matrix	MS / MSD	40 ml VOA	1 liter Amber	500 ml Poly	Sleeve	Glass Jar 8 oz	250 ml Poly	Encore	VOA	SVOA	Pest	Metals	TPH Purgeables	TPH Extractables	PCB
1	029SRESSØ1		7/22/13	1240	Soil						2				X		X		X	X
2	029SRESSØ2		7/22/13	1245							2				X		X		X	X
3	029C3DSSØ1		7/24/13	1200							1				X		X		X	
4	029C3DSSØ2			1215							1				X		X		X	
5	029C3DSSØ3			1230							1				X		X		X	
6	029C3DSSØ4			1245							1				X		X		X	

	Name (print)	Company Name	Date	Time
Relinquished by:	Rebecca Johnson	TtEMI	7/26/13	1630
Received by:	Cecilia Chavez	EMAX	7/30/13	09:30
Relinquished by:				
Received by:				
Relinquished by:				
Received by:				

Turnaround time/remarks: Standard TAT Temp – 2.0°C
Prioritize: SVOCs, TPH-e on 029C3DSS01 → Ø4 then metals

1002

Fed Ex #: 8612 4667 7215

WHITE-Laboratory Copy YELLOW-Sample Tracker PINK-File Copy

Completing a Sample Chain-of-Custody Form

After samples have been collected, they will be maintained under chain-of-custody procedures. These procedures are used to document the transfer of custody of the samples from the field to the designated analytical laboratory. The same chain-of-custody procedures will be used for the transfer of samples from one laboratory to another, if required.

The field sampling personnel will complete a Chain-of-Custody and Request for Analysis (CC/RA) Form (Figure 1, Chain of Custody Record) for each separate container of samples to be shipped or delivered to the laboratory for chemical or physical (geotechnical) analysis. Information contained on the triplicate, carbonless form will include:

1. Project identification (ID) (for example, contract and task order number);
2. Project Contract Task Order (CTO) number;
3. Laboratory Project Order (PO) number;
4. Tetra Tech Technical Contact;
5. Tetra Tech Project Manager
6. Laboratory name;
7. Field sampler names;
8. Field sampler signature;
9. Sample ID;
10. Point ID and Depth (Do **NOT** include this information on the laboratory copy of the chain-of-custody (top white copy);
11. Date and time of sampling;
12. Sample matrix type;
13. Sample preservation method; note “NONE” if no preservatives;
14. Number and types of sample containers and container capacity;
15. Sample hazards (if any);
16. Requested analysis;
17. Requested sample turnaround time or any special remarks;
18. Page __ of __;
19. Method of shipment;
20. Carrier/waybill number (if any);
21. Signature, name, and company of the person relinquishing the samples and the person receiving the samples when custody is transferred;
22. Date and time of sample custody transfer;

23. Condition of samples when they are received by the laboratory.

The sample collector will cross out any blank space on the CC/RA Form below the last sample number listed on the part of the form where samples are listed.

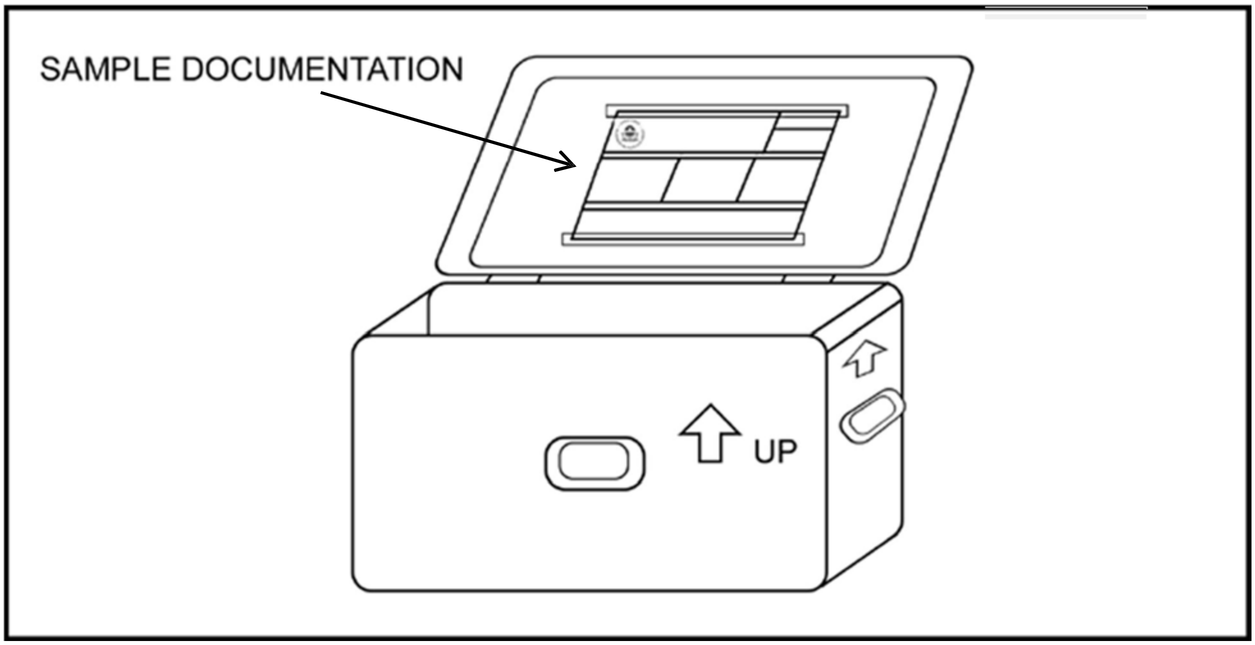
The sampling personnel whose signature appears on the CC/RA Form is responsible for the custody of a sample from time the sample is collected until the custody of the sample is transferred to a designated laboratory, a courier, or to another Tetra Tech employee for transporting a sample to the designated laboratory. A sample is considered to be in custody when the custodian: (1) has direct possession of it; (2) has plain view of it; or (3) has securely locked it in a restricted access area.

Custody is transferred when both parties to the transfer complete the portion of the CC/RA Form under "Relinquished by" and "Received by" or a sample is left at a FedEx facility pending shipment. Signatures, printed names, company names, and date and time of custody transfer are required. When custody is transferred, the Tetra Tech sampling personnel who relinquished the samples will retain the third sheet (pink copy) of the CC/RA Form. When the samples are shipped by a common carrier, a Bill of Lading supplied by the carrier will be used to document the sample custody, and its identification number will be entered on the CC/RA Form. Receipts of Bills of Lading will be retained as part of the permanent documentation in the Tetra Tech project file.

FIGURE 3

EXAMPLE OF A SAMPLE COOLER WITH ATTACHED DOCUMENTATION

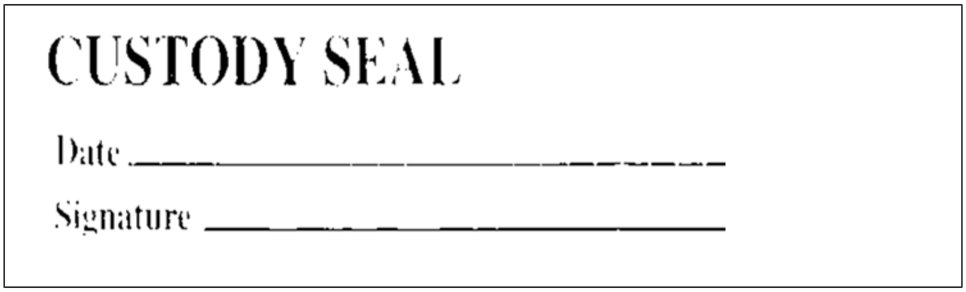
Place the necessary paperwork (chain-of-custody form, cooler return instructions, and associated paperwork) in the shipping cooler or acceptable container. All paperwork must be placed in a plastic bag or pouch and then secured to the underside of the shipping container lid.



Source: U.S. Environmental Protection Agency. 2011.

FIGURE 4

EXAMPLE OF A CUSTODY SEAL

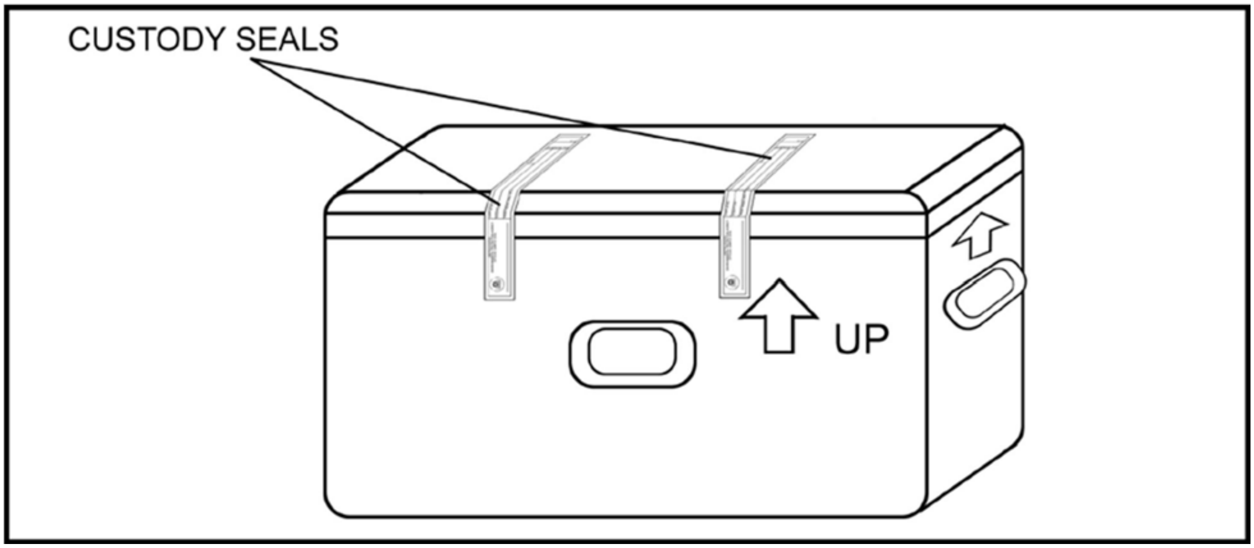

CUSTODY SEAL

Date ______________________________

Signature ___________________________

FIGURE 5

EXAMPLE OF SHIPPING COOLER WITH CUSTODY SEALS



Source: U.S. Environmental Protection Agency. 2011.

Please note that the two seals typically are affixed *to opposite sides of the cooler and offset from each other*, although the offset is not depicted on the EPA figure above.

SOP APPROVAL FORM

TETRA TECH, INC.

ENVIRONMENTAL STANDARD OPERATING PROCEDURE

RECORDING NOTES IN FIELD LOGBOOKS

SOP NO. 024

REVISION NO. 2

Last Reviewed: November 2014

Carla J Buriks	November 24, 2014
Quality Assurance Approved	Date

1.0 BACKGROUND

Complete and accurate field documentation is critical to a successful project and the field log book is an important tool to support field documentation needs. The field logbook should include detailed records of all field activities, document interviews with people, and record observations of conditions at a site. Entries should be described in a level of detail to allow personnel to reconstruct, after the fact, activities and events that occurred during their field assignments. Furthermore, entries should be limited to facts. Avoid speculation related to field events and do not record hearsay or unfounded information that may be presented by other parties during field activities. For example, do not record theories regarding the presence or absence of contamination when you are collecting field screening data or speculation regarding the reasons for a property owner's refusal to grant access for sampling.

Field logbooks are considered accountable documents in enforcement proceedings and may be subject to review. Therefore, the entries in the logbook must be accurate and detailed, but should not contain speculative information that could conflict with information presented in subsequent project deliverables and correspondence. Also be aware that the field logbooks for a site may be a primary source of information for depositions and other legal proceedings that may occur months or years after field work is complete and long after our memories have faded. The accuracy, neatness, and completeness of field logbooks are essential for recreating a meaningful account of events.

1.1 PURPOSE

The purpose of this standard operating procedure (SOP) is to provide guidance to ensure that field logbook documentation collected during field activities meets all requirements for its later use. Among other things, field logbooks may be used for:

- Identifying, locating, labeling, and tracking samples
- Recording site activities and the whereabouts of field personnel throughout the day
- Documenting any deviations from the project approach, work plans, quality assurance project plans, health and safety plans, sampling plans, and any changes in project personnel
- Recording arrival and departure times for field personnel each morning and evening and weather conditions each day
- Describing photographs taken during the project.

In addition, the data recorded in the field logbook may later assist in the interpretation of analytical results. A complete and accurate logbook also aids in maintaining quality control, because it can verify adherence to project scope and requirements.

1.2 SCOPE

This SOP establishes the general requirements and procedures for documenting site activities in the field logbook.

1.3 DEFINITIONS

None.

1.4 REFERENCES

Compton, R.R. 1985. *Geology in the Field*. John Wiley and Sons. New York, NY.

1.5 REQUIREMENTS AND RESOURCES

The following items are required for field notation:

- Field logbooks
- Ballpoint pens or Sharpies with permanent waterproof ink
- 6-inch ruler (optional)

Field logbooks should be bound (sewn) with water-resistant and acid-proof covers, and each page should have preprinted lines, numbered pages, and a single column. They should be approximately 7 1/2 by 4 1/2 inches or 8 1/2 by 11 inches in size. Loose-leaf sheets are not acceptable for use as field notes.* If notes are written on loose paper, they must be transcribed as soon as possible into a bound field logbook by the same person who recorded the notes originally. **Note: Data collection logs and field forms used to record field measurements and data are acceptable as loose-leaf sheets maintained in a three-ring binder with numbered pages.*

Ideally, distribution of logbooks should be controlled by a designated person in each office. This person assigns a document control number to each logbook, and records the assignment of each logbook distributed (name of person, date distributed, and project number). The purpose of this procedure is to ensure the integrity of the logbook before its use in the field, and to document each logbook assigned to a project. In the event that more than one logbook is assigned to a project, this process will ensure that all logbooks are accounted for at project closeout.

2.0 PROCEDURES

The following subsections provide general guidelines and formatting requirements for field logbooks, and detailed procedures for completing field logbooks.

2.1 GENERAL GUIDELINES

- A separate field logbook must be maintained for each project. If a site consists of multiple subsites (or operable units), designate a separate field logbook for each subsite. Similarly, if multiple activities are occurring simultaneously requiring more than one task leader (well installation, private well sampling, or geophysical survey.), each task leader should maintain a separate field logbook to ensure that each activity is documented in sufficient detail.
- At larger sites, a general field log may be kept at the site trailer or designated field office to track site visitors, document daily safety meetings, and record overall site issues or occurrences.
- Data from multiple subsites may be entered into one logbook that contains only one type of information for special tasks, such as periodic well water-level measurements.
- All logbooks must be bound and contain consecutively numbered pages.
- No pages can be removed from the logbook for any purpose.
- All information must be entered using permanent, waterproof ink. Do not use pens with "wet ink," because the ink may wash out if the paper gets wet. Pencils are not permissible for field notes because information can be erased. The entries should be written dark enough so that the logbook can be easily photocopied.
- Be sure that all entries are legible. Use print rather than cursive and keep the logbook pages free of dirt and moisture to the extent possible.
- Do not enter information in the logbook that is not related to the project. The language used in the logbook should be factual and objective. Avoid speculation that could conflict with information presented in subsequent project deliverables and correspondence (see Section 1.0 above).
- Use military time, unless otherwise specified by the client.
- Include site sketches, as appropriate.
- Begin a new page for each day's notes.
- Include the date at the top of each page.
- At the end of a day, draw a single diagonal line through any unused lines on the page, and sign at the bottom of the page. Note and implement any client specific requirements (for example, some U.S. Environmental Protection Agency (EPA) programs require each logbook page to be signed).

- Write notes on every line of the logbook. Do not skip any pages or parts of pages unless a day's activity ends in the middle of a page.
- If a line is left blank for some reason, cross out (with a single line) and initial to prevent unauthorized entries.
- Cross out (with a single line) and initial any edits to the logbook entries. Edits should only be made if the initial entry is illegible or erroneous. Do not make corrections for grammar or style.

2.2 LOGBOOK FORMAT

The layout and organization of each field logbook should be consistent and generally follow the format guidelines presented below. Some clients or contracts may have specific formatting guidelines that differ somewhat from this SOP; review client requirements at the start of the project to help ensure any client-specific guidelines are integrated.

2.2.1 Logbook Cover

Write the following information on the front cover of each logbook using a Sharpie or similar type permanent ink marker:

- Logbook document control number (assigned by issuer)
- "Book # of #" (determined by the project manager if there is more than one logbook for the project)
- Contract and task order numbers
- Name of the site and site location (city and state)
- Name of subsite (or operable unit), if applicable
- Type of activity (if logbook is for specific activity, such as well installation or indoor air sampling)
- Beginning and ending dates of activities entered into the logbook

2.2.2 Inside Cover or First Page

Spaces are usually provided on the inside front cover (or the opening page in some logbooks) for the company name, address, contact names, and telephone numbers. If preprinted spaces for this information are not provided in the logbook, write the information on the first available page. Information to be included on the inside front cover or first page includes:

- Tetra Tech project manager and site manager and phone numbers
- Tetra Tech office address

- Client contact and phone number
- Site safety officer and phone number
- Emergency contact phone number (911, if applicable, or nearest hospital)
- Subcontractor contacts and phone numbers
- Site property owner or property manager contact information

2.3 ENTERING INFORMATION IN THE LOGBOOK

The following lists provide guidance on the type of information to be included in a typical field logbook. This guidance is general and is not intended to be all-inclusive. Certain projects or clients may specify logbook requirements that are beyond the elements presented in this SOP.

General Daily Entries:

- Document what time field personnel depart the Tetra Tech office and arrive at the hotel or site. If permitted by the client to charge travel time for site work, document what time personnel leave and arrive at the hotel each day. (This information may be needed at remote sites where hotel accommodations are not near the site.)
- Indicate when all subcontractors arrive and depart the site.
- Note weather conditions.
- Include the date at the top of each page.
- Document that a site safety meeting was held and include the basic contents of the meeting.
- List the level of protection to be used for health and safety.
- Summarize the day's planned activities.
- Summarize which activities each field team member will be doing.

Field Activity Entries:

- Refer to field data collection forms for details about field data collection activities (for example time, date, depth of samples, field measurements). If separate field sampling sheets are not used, see section below regarding logbook entries for sampling activities.
- Refer to well purge forms, well construction logs, and other activity-specific forms as applicable rather than including this type of information in the field logbook. These other forms allow the information to be more accessible at a later date.
- List any air monitoring instrumentation used, with readings and locations.
- Refer to instrument field logs for equipment calibration information.
- Summarize pertinent conversations with site visitors (agency representatives, property owners, client contacts, and local citizens).
- Summarize any problems or deviations from the quality assurance project plan (QAPP) or field sampling plan.
- Document the activities and whereabouts of each team member. (As indicated in Section 2.1, multiple logbooks may be required to ensure sufficient detail for contemporaneous activities).
- Indicate when utility clearances are completed, including which companies participated.
- Indicate when verbal access to a property is obtained.
- Include names, addresses, and phone numbers of any pertinent site contacts, property owners, and any other relevant personnel.
- Document when lunch breaks or other work stoppages occur.
- Include approximate scale for all diagrams. If a scale is not available, write "not to scale" on the diagram. Indicate the north direction on all maps and cross-sections, and label features on each diagram.

Sampling Activity Entries: The following information should typically be on a sample collection log and referenced in the log book. If the project does not use sample sheets as a result of project-specific requirements, this information should be included in the logbook.

- Location description
- Names of samplers
- Collection time
- Designation of sample as a grab or composite sample
- Type of sample (water, sediment, soil gas, or other medium)
- On-site measurement data (pH, temperature, and specific conductivity)

- Field observations (odors, colors, weather)
- Preliminary sample description
- Type of preservative used.
- Instrument readings, if applicable

Closing Daily Entries:

- Describe decontamination procedures (personnel and equipment).
- Describe handling and disposition of any investigation-derived wastes.
- Summarize which planned activities were completed and which ones were not.
- Note the times that personnel depart site for the day.
- Summarize any activities conducted after departing the site (paperwork, sample packaging, etc.). This may be required to document billable time incurred after field activities were completed for the day.

Photographic Log Entries:

- For digital photographs, indicate in the text that photographs were taken and the location where the photographs can be found (for example, in the project file).
- Camera and serial #
- Photographer
- Date and time of photograph
- Sequential number of the photograph and the film roll number or disposable camera used (if applicable)
- Direction of photograph
- Description of photograph

2.4 LOGBOOK STORAGE

Custody of logbooks must be maintained at all times. During field activities, field personnel must keep the logbooks in a secure place (locked car, trailer, or field office) when the logbook is not in personal possession. When the field work is over, the logbook should be included in the project file, which should be in a secured file cabinet. The logbook may be referenced in preparing subsequent reports and may also be scanned for inclusion as an appendix to a report. However, it is advisable to obtain direction directly from the client before including the logbook as a report appendix, because its inclusion may not be appropriate in all cases.

2.5 HEALTH AND SAFETY CONSIDERATIONS

In addition to the procedures outlined in this SOP, all field staff must be aware of and follow the health and safety practices that result from the Activity Hazard Analyses (AHAs) for a project. The AHAs include critical safety procedures, required controls, and minimum personal protective equipment (PPE) necessary to address potential hazards. The hazards specific to project tasks must be identified and controlled to the extent practicable and communicated to all project personnel via the approved, project-specific Health and Safety Plan (HASP).

SOP APPROVAL FORM

TETRA TECH EM INC.

ENVIRONMENTAL STANDARD OPERATING PROCEDURE

CALIBRATION OF AIR SAMPLING PUMP

SOP NO. 064

REVISION NO. 0

Last Reviewed: November 1999

	May 24, 1993
Quality Assurance Approved	Date

1.0 BACKGROUND

Several instruments are available to calibrate low air flow rate. The soap bubble meter method is one example. An air sampling pump and bubble meter calibrator are used to calibrate sample collecting devices including filters, impingers, sampling tubes, and color detector tubes. It is important to note that if a sampling pump uses a variable area flow meter (rotameter) for flow rate indication, the calibrated flow rate often must be adjusted for the actual air pressure and temperature during sampling. A formula for determining the corrected flow rate is provided.

1.1 PURPOSE

This standard operating procedure (SOP) establishes the requirements and procedures for calibrating a rotameter sampler using an SKC® digital calibrator (calibrator).

1.2 SCOPE

This SOP provides instruction on calibration of a rotameter sampler by comparing a known airflow through the rotameter sampler and through the SKC® soap bubble meter calibrator.

1.3 DEFINITIONS

None

1.4 REFERENCES

SKC Inc. "Universal Flow Sample Pump Model 224-PCXR7 Operating Instructions." Form #3764-REV 706.

SKC Inc. "Electronic Calibrator Model 712 Operating Instructions." Form #3792-Rev 8 11.

1.5 REQUIREMENTS AND RESOURCES

To calibrate an air sampling pump the following equipment is needed:

- Air sampling pump
- SKC® digital calibrator (soap bubble meter)
- Soap solution
- Temperature and pressure gauge

2.0 PROCEDURES

The following procedures are used to calibrate an sampling pump with an SKC® digital calibrator:

1. The air sampling pump calibration should be checked at the beginning, middle, and end of the sampling event to determine the original loss in calibration.

2. Place the glass bubble meter in the digital calibrator (Figure 1). In general, if the flow rate is 2 liters/minute (L/min) or greater, slide the glass bubble meter to its lowest position on the stand. For flow rates of 500 milliliters (mL) or less, slide the glass bubble meter to its highest position on the stand. For intermediate flow rates, a bubble meter position between the extremes may be best.

3. Through the lower gas inlet tube, fill the liquid chamber with soap solution to a level just below the inner glass tubing.

4. Attach the flexible tubing to the upper gas inlet tube. Make this connection with the shortest tubing length possible, and avoid kinks and bends for the most accurate measurements.

5. Test the sampler battery pack for full charge by turning the sampler on using the ON/OFF switch (Figure 1). Press the START/HOLD key then the Flow and Battery Check key. Adjust the flow to 2 L/min using the flow adjustment control. The display should indicate “battery OK” in the upper left-hand corner.

6. While in the battery test mode, connect the flexible tubing to the filter housing intake. Set the sampler to the desired flow rate using the flow adjustment control.

7. Moisten the entire inner surface of the gas bubble meter with the soap solution. To do this, draw bubbles upward by squeezing the latex bulb until the bubbles travel the entire length of the bubble meter without breaking.

8. Press the ON/RESET button on the digital calibrator to turn on the instrument. Wait until a “0” is displayed, indicating the instrument is ready. There should be no bubbles in the area of the sensor block when the instrument is first turned on or when reset is pushed.

9. Squeeze the latex bulb gently to generate soap film bubbles. While the bubbles are being timed through the sensor block, the bulb should not be touched or erroneous flow rates may result. When bubbles pass through the lower sensor in the sensor block, the “TIMING IN PROGRESS” symbol (“ + “) should be displayed.

10. For flow rates above 2 L/min the auto-bubbler clamp should be used. After the bubble meter has been moistened place the clamp on the large part of the latex bulb with the open end up. With the gas flowing, lightly tighten the clamp until the bubbles begin to form. Adjust the clamp so that the bubbles are going through the tube one at a time. When adjusted properly, hands off operation is possible and will continue for a period of time. When the bubbles stop forming, tighten the clamp.

11. After the bubble passes the upper sensor in the sensor block, the display will read out the gas flow rate. The gas flow rates measured by the digital calibrator should be within 0.7 L/min of the flow rate on the sampler.

12. Repeat the determination at least twice more and average the three results.

13. Measure the air temperature.

14. Record the following data on a calibration sheet:

- Flow rate
- Pressure of air sampled
- Air temperature
- Atmospheric pressure
- Serial number of the pump
- Pump number
- Date and name of sampler

15. The expression for the corrected flow rate is:

$$Q_1 = Q_2(P_C T_S / P_S T_C)^{0.5}$$

where

Q_1 = Corrected flow rate (L/min)

Q_2 = Calibrator flow rate (L/min)

P_C = Atmospheric pressure (kiloPascals or other pressure units)

P_S = Pressure of air sampled (same units as P_C)

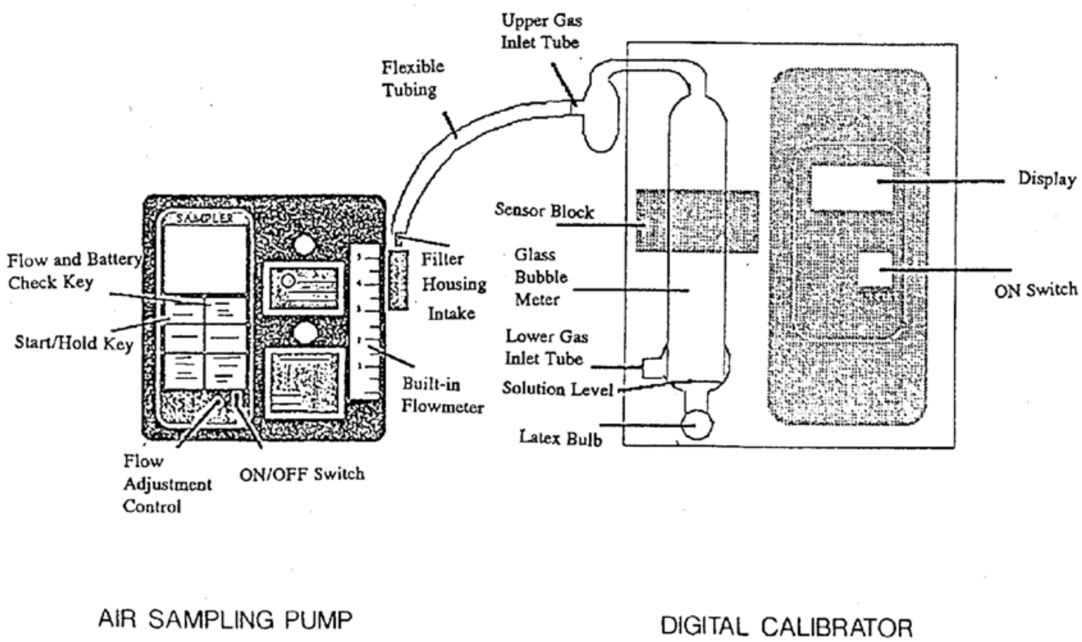
T_C = Temperature during calibration of sampling pump (Kelvin: EC + 273.16)

T_S = Temperature of air sampled (Kelvin: EC + 273.16)

The corrected flow rate is important to determine when sampling at high elevations or when temperatures are very low. The formula provided will help to determine the correct flow rate under such conditions.

FIGURE 1

AIR SAMPLING PUMP CALIBRATION APPARATUS



SOP APPROVAL FORM

ENVIRONMENTAL STANDARD OPERATING PROCEDURE

Developed for CalRecycle - Camp Fire Incident

High-Volume Ambient Air Sampling for Total Suspended Particulates and Metals Using Volumetric Flow Control

REVISION NO. 0

Last Reviewed: Not applicable (Revision No. 0)

1.0 BACKGROUND

High-volume ambient air sampling for particulate matter is typically conducted to characterize the air that the public is breathing in a relatively large area. It can be conducted routinely to define air quality characteristics or can be conducted in association with large-scale removal/remediation projects, to monitor whether remedial activities impair air quality. Samples are typically submitted for laboratory analysis for particulate matter and lead. However, samples collected using these techniques can also be analyzed for other metals. The metals of concern are generally selected based on an understanding of site conditions and history.

The U.S. Environmental Protection Agency (EPA) developed National Ambient Air Quality Standards (NAAQS) (40 Code of Federal Regulations [CFR] Part 50) that provide federal reference methods (FRM) for measuring total suspended particulates (TSP) and lead in ambient air. This standard operating procedure (SOP) focuses on sampling TSP and metals in compliance with the NAAQS regulation using a volumetric flow controlled (VFC) TSP particulate sampler. The NAAQS regulations do not provide procedures for sampling other metals other than lead; however, laboratories may analyze samples collected in accordance with this SOP for a variety of metals.

1.1 PURPOSE

High-volume ambient air sampling is conducted to characterize the chemical and physical characteristics of air in a relatively large area.

1.2 SCOPE

This SOP describes procedures for conducting high-volume ambient air sampling for TSP using volumetric flow control equipment. Samples collected using this methodology can be analyzed for TSP and metals.

1.3 DEFINITIONS

Calibration orifice: Factory-calibrated instrument with adjustable orifice that applies varied amount of flow restriction to pump. Used to collect calibration pressure readings that are compared with a factory-provided calibration curve to ensure there are no leaks or defects in the sampling apparatus.

Dickson Flow Recorder: Instrument used to passively record the pump flow rate. A paper disc that is designed to record time and flow rate is inserted into the instrument. The paper disc rotates as time passes. A pressure-driven recording arm moves with changes in pressure in the pump. A marker at the end of this arm records pressure changes over time.

Volumetric Flow Controller: Factory-designed and calibrated means of controlling flow rate. Air pulled by the pump is forced through an engineered opening; the size of this opening is engineered to provide appropriate flow rates for total suspended particulate sampling. The pump is run at full power, and flow rate is not adjusted during sampling.

Lapse Timer: A timer used to accurately measure how long the pump runs during sampling events. It is wired in series with the pump, so that the lapse timer only receives power and records time when the pump is running.

Mechanical Timer: Timer that controls power distribution to other components of the high-volume air sampler. Tracks time on a weekly basis. Provides constant power to Dickson Flow Recorder so that instances with no pump power are recorded. Provides power to pump and lapse timer when switched on. On/Off pins can be installed on the mechanical timer to automatically start and stop sampling runs at desired times.

Filter Holder: Physical component of the high-volume air sampler that provides a mesh base for mounting the filter and connects to the volumetric flow controller.

Filter Holder Plate: Metal plate used to hold sample filter in place during sampling runs. Provides seal to ensure air passes through the filter.

Slack-Tube Water Manometer: Instrument used for measuring pressure differential across the filter. Consists of a flexible tube filled with water with a scale to measure inches of water.

1.4 REFERENCES

"Reference Method for the Determination of Suspended Particulate Matter in the Atmosphere (High-Volume Method)." 40 CFR 50, Appendix B. 2016.

"Reference Method for the Determination of Lead in Suspended Particulate Matter Collected from Ambient Air." 40 CFR 50, Appendix G. 2016.

U.S. Environmental Protection Agency (EPA). 1994. "Quality Assurance Handbook for Air Pollution Measurement Systems. Volume I – A Field Guide to Environmental Quality Assurance." EPA 600/R-94/038a.

EPA. 1999. "Sampling of Ambient Air for Total Suspended Particulate Matter and PM_{10} Using High

Volume Sampler." Compendium of Methods for the Determination of Inorganic Compounds in Ambient Air. Compendium Method IO-2.1. EPA/625/R-96/010a.

EPA. 2013. "Quality Assurance Handbook for Air Pollution Measurement Systems. Volume II – Ambient Air Quality Monitoring Program." EPA 454/B-13-003.

Tisch Environmental, Inc. (Tisch) "Operations Manual – TE-5170V Volumetric Flow Controlled Total Suspended Particulate High Volume Air Sampler." Accessed On-Line: https://tisch-env.com/wp-content/uploads/2015/08/TE-5170V-Manual.pdf.

1.5 REQUIREMENTS AND RESOURCES

High-volume ambient air sampling for TSP requires the use of one or more of the following types of equipment:

- High Volume Pump: Tisch Model TE-5170V; 110 Volts; 60 Hertz
- Volumetric Flow Controller (VFC): Tisch Model TE-10557TSP
- Filter Holder: Tisch Model TE-5003V
- Removable Filter Holder Plate: Tisch Model TE-5018
- Lapse Timer: Tisch Model TE-5012
- Mechanical Timer: Tisch Model TE-5007
- Dickson Flow Recorder: Tisch Model TE-5009
- Dickson Flow Recorder Discs: Tisch Model TE-106
- Calibration Orifice and Orifice Plate: Tisch Model TE-5028
- Tygon (or similar) tubing
- Quick connect port assembly
- Slack-Tube Water Manometer: Tisch Model TE-5030
- Outdoor Shelter
- 8-inch by 10-inch quartz or glass fiber sample filters

In addition, the following equipment is also needed for various methods:

- Nitrile Gloves
- Logbook
- Tweezers or similar to aid in lifting sample filters
- Health and safety equipment

2.0 HIGH-VOLUME AMBIENT AIR SAMPLING PROCEDURES

This SOP presents procedures for conducting high-volume ambient air sampling for TSP and metals using a VFC TSP particulate sampler.

A single sample filter is used for TSP and metals analysis. It is necessary for the filter to remain entirely intact for accurate TSP analysis, as the analysis is weight-based. A small subsection of the filter is analyzed for metals content. Based on the design of the sampling apparatus, the entire filter exposed to air should have a similar distribution of particulate matter and metals. TSP sampling is not selective based on particle size. If a particular particle size is of interest (such as smaller than 10 microns, PM_{10}), a different high-volume sampling apparatus must be used. This SOP describes the procedure for TSP and metals sampling only.

High-volume ambient air samples are composite samples by nature. Analytical results are reported on a volumetric basis, as are relevant screening standards. As a result, it is important to collect accurate data for calculating the flow rate and total volume of air for each sampling event. Volumetric calculations are based on in-field measurements of pressure differential, time, and ambient weather conditions.

2.1 SAMPLER ASSEMBLY

High volume air samplers typically arrive at the investigation area disassembled to prevent damage in transit to the unsecured parts (the pump assembly) or fragile components (flow recorder and timers). Therefore, the high-volume ambient air sampler may need to be assembled on site. The following paragraphs describe installing or attaching the (1) filter holder, VFC, and pump (VFC pump assembly), (2) Dickson flow recorder, (3) mechanical and lapse timer, and (4) tubing connecting the filter holder to quick connect port assembly, and (5) recording key information. A figure of the completed assembly is provided at the end of this SOP.

Install the filter holder onto the VFC and blower motor assembly (tubing, power cord, and pressure tap on side of filter holder to the right), ensuring the gasket is in place. Lower the filter holder, VFC, and blower motor down through the top support pan on shelter. Connect the clear tubing from the bulkhead fitting to the pressure tap on the right side of the filter holder. Next, connect the black tubing from the blower motor to the pressure tap located underneath the Dickson flow recorder. Open the gabled roof lid box.

To assemble the gabled roof, begin by securing the front catch to the shelter using two pan head screws with stop nuts. The nuts should be tightened to prevent potential leaks but should be hand tight as the front catch may need to be adjusted following the initial assembly. Secure the roof back catch to the back of the shelter using a pan head screw with stop nut. Next, secure the rear lid hasp inside of the lid with the slot angled up using two pan head screws with stop nuts; hand tighten to allow for adjustments following initial assembly. Attach the lid to the shelter by placing the lid hinge plates on the outside of the shelter. Hinges should align with the four threaded holes predrilled into the back of the shelter. Prior to attaching the lid, the four pan head screws located in these predrilled holes should be removed and then resecured to attach the lid hinges to the shelter. Tighten screws completely. Upon closure, the lid slots should lower over the front and rear catch. Adjust the catch, as necessary, and tighten the roof back hasp and front catch completely. Attach the chain and "S" hook assembly to the side of the shelter with a pan head screw; the lid can now be secured in an open or closed position with the "S" hook.

Connect the cord on the right-hand side of the mechanical timer to the Dickson flow recorder. The right-hand cord is powered regardless of whether the mechanical timer is turned on. Connect the cord on the left-hand side of the mechanical timer to the ETI cord set on the elapse timer. Then, connect the cord from the VFC pump assembly to the other portion of the ETI cord. Turn the manual power switch located below the 7-day timer wheel on and off to ensure the sampler is operational. Install "on" and "off" pins on the mechanical timer at the desired sample times. Rotate the wheel clockwise to trigger the operation of the sampler once the "on" switch is engaged. Continue rotating the wheel clockwise until the sampler is triggered off by the "off" switch. The unit is now functional as a volumetric VFC TSP particulate sampler. Record the model and serial numbers when applicable in a logbook, field data sheets, or electronic form. The VFC device may contain a number associated with the flow of air called the "G-Factor." Record this number to determine the flow rate for that unit.

2.2 SAMPLING PROCEDURE

The following sample procedures discusses (1) testing the high-volume ambient air sampler for leaks and whether the VFC motor assembly is within the manufacturer's operation limits, (2) initializing sampling, and (3) collecting the sample and recording data after the sample run is complete.

2.2.1 Calibration and Leak Testing

Calibration and leak testing are conducted by comparing the difference if pressure from the calibration orifice to the VFC pump. Certified VFC pumps undergo manufacture's laboratory testing to establish the ideal pressure that is induced by the pumps based on the amount of air allowed into the sampling system. Using temperature, pressure, and the calibration curve (measured by the manufacturer), the sampler can determine if there are any leaks in the system by following the procedures below.

2.2.1.1 Calibration and Leak Test Setup

Install the calibration orifice plate onto the filter holder by overlapping the wingnuts attached to the filter holder onto the calibration orifice plate. Hand tighten the calibration orifice (cylindrical in shape) onto the orifice plate. Ensure the barbed fitting is facing toward the front of the outdoor shelter. Fully open the cylindrical calibration orifice by turning the top knob counter-clockwise. Install the black tube onto the barbed fitting and leave for later use.

Install Tygon tubing that contains a male quick-connect fitting on one end to the female quick-connect inlet located on the exterior of the outdoor shelter. Leave the end with no fitting for later use.

Arrange the slack-tube water manometer on the front door side of the outdoor shelter. Unscrew the barbed fittings on top of the manometer so the manometer is opened to the atmosphere. Ensure the fluid levels on each side of the manometer are equal. If they are unequal, attempt to induce movement in the manometer tube's fluid. Squeeze tubes in an attempt to eliminate air bubbles and debris. The manometer cannot be used until the fluid levels equilibrate.

2.2.1.2 Perform Calibration and Leak Testing

Calibration and leak testing is performed by measuring the pressure induced on a manometer by slowly decreasing airflow into the VFC pump assembly through the use of the calibration orifice. The pressure is measured at two points: (1) calibration orifice, and (2) VFC pump assembly, as described in the steps below. A total of seven calibration runs are required to evaluate whether the system is performing per manufacturer's specification or if there is a leak in the system. The pump must be operational at least five minutes before starting the calibration and leak test and at least two minutes once the calibration orifice is installed and fully opened to establish run time conditions.

1. Calibration Orifice — Attach the black tube previously installed on the calibration orifice to either barbed fitting on the manometer. Ensure that the calibration orifice is open (top knob turned completely counter-clockwise). **If the calibration orifice is not completely open, fluid could be sucked from the manometer into the VFC pump assembly, damaging the pump.** Turn on the pump using the manual switch on the mechanical timer. Record the pressure difference on each side of the manometer in a log book. The pressure reading is the lowest portion of the bubble on each side of the manometer, as indicated by the embedded tape measure. Add the values from each side of the manometer to calculate the pressure difference for the calibration run. Detach the black tubing from the manometer and continue with step 2. The pump should remain operational throughout calibration testing.

2. VFC pump assembly — Attach the Tygon tubing previously installed to the pressure port (located on the outside of the outdoor shelter) to either barbed fitting on the manometer. Record the pressure difference from each side of the manometer in the logbook using methods described in step 1. Add the values from each side of the manometer to determine the VFC pump assembly

pressure for the calibration run. Leave the Tygon tubing attached from the VFC pump assembly to the manometer and proceed to step 3.

3. With the Tygon tubing still attached to the VFC pump assembly, turn the knob clockwise on the calibration orifice slightly. Closely watch the fluid level on the side of the manometer where fluid has been displaced upwards. The knob should be turned so that the fluid in the manometer rises by approximately 0.5 inch. **The fluid level should increase by no less than 0.3 inch and no more than 1.0 inch.** Adjust the calibration orifice knob until the pressure is within this range.
4. Repeat steps 1 through 3, sequentially closing the calibration orifice, until a total of seven calibration runs have been completed. On the seventh calibration run, step 3 may be omitted. Turn off the pump using the manual switch on the mechanical timer. Disassemble the black tubing on the calibration orifice, calibration orifice, and the calibration plate from the filter holder. Leave the Tygon tubing attached to the pressure port for use when installing a new filter (Section 2.2.2). Check calibrations using methods described in Section 2.3.

2.2.2 Sample Initiation

Sample initiation consists of (1) installing a new sample filter, (2) setting the mechanical timer, (3) installing a Dickenson flow chart to record pump pressure, and (4) recording information from the lapse timer.

2.2.2.1 Sample Filter Installation

Record the reference number of the sample filter in the logbook. The reference number is typically written on the manila envelope that houses the filter and on the sample filter itself. Clean the filter holder, filter holder plate, and surrounding area with a damp paper towel to remove any debris before a new filter is installed. Allow the filter holder and filter holder plate to dry before installing the filter to avoid wetting filter.

Don a new pair of nitrile gloves. Place the filter holder plate on top of the filter holder. Leave the wingnuts untightened. Have a second individual wearing gloves hold the filter holder plate with one side lifted. Gently remove the wax paper envelope containing the sample filter from the manila envelope. Position the wax paper envelope to install the sample filter below the filter holder plate. **Ensure that the reference number of the sample filter is facing down.** Gently remove the sample filter from the wax paper envelope, being careful not to damage the filter. Place the filter holder plate over the sample filter, ensuring that the filter plate covers all sides of the sample filter. Ensure the wingnuts can be slid in place and then hand-tighten.

Record the initial lapse timer reading for the sample filter in the logbook. Prepare to record the initial pressure by positioning the manometer on the front of the outdoor housing. Attach the Tygon tubing still attached from the calibration steps to the manometer. Turn on the pump using the manual switch on the mechanical timer. Record the pressure differential from both sides of the manometer as indicated in Section 2.2.1.2. Turn off the pump using the manual switch on the mechanical timer.

2.2.2.2 Mechanical Timer

Check to make sure that the hand on the mechanical timer is pointing to the current time. If the time is incorrect, rotate the metal faceplate of the timer clockwise until the correct time is indicated. If On-Off pins have been installed, check to make sure that they are positioned to start and stop sample runs at midnight on the desired sample date, resulting in a total sample time of approximately 24 hours. Make sure the On-Off pins are securely fastened to the timer faceplate.

If On-Off pins have not been installed, install them. Make sure to differentiate between “On” and “Off” pins, as their physical design limits them to switch the pump on and off. To install, loosen the metal screw in the pin to allow it to slide onto the mechanical timer faceplate. Position the pins to start and stop pump runs at midnight. Firmly tighten pin screws to ensure they are fastened securely enough to trigger the pump power switch. If samples will be collected on multiple days per week, install all necessary On-Off pins so that the pump power cycle can be fully automated. Test pin operation by manually rotating the mechanical timer faceplate in a clockwise direction a full 360 degrees. When On pins pass the time hand, the pump should power on, and when “Off” pins pass the time hand, the pump should power off. Once you have ensured the pins are operational, make sure to rotate the timer faceplate so that the time hand indicates the current time. Close the mechanical timer and fasten the lid shut to prevent weather-related damage.

2.2.2.3 Dickson Flow Chart

Install a new flow chart in the Dickson Flow Recorder. Label the flow chart with the name of the sample that will be collected during the next sampling run. Place the flow chart in the Dickson Flow Recorder, positioned so that the hole in the center of the flow chart is directly over the screw head in the center of the Dickson Flow Recorder. Press the flow chart firmly into place, ensuring that the paper bar in the center of the flow chart is fully seated in the slot in the screw head. If a marker tip has not been installed on the pressure recording arm, install the marker tip by sliding it onto the pressure recording arm until it is fully seated. Use the metal lever to lower the pressure recording arm of the Dickson Flow Recorder so that the marker tip rests firmly on the flow chart.

Check the time indicated by the position where the marker tip rests on the flow chart. If the time does not match the current time, use a flathead screwdriver to rotate the screw head in the center of the Dickson Flow Recorder so that the marker tip rests at the current time. Once all calibration measurements have been completed, make sure a Tygon tube is installed, connecting the nozzle on the bottom of the Dickson Flow Recorder to the nozzle on the face of the pump. This connection allows pressure to reach the Dickson Flow Recorder when the pump is running. Close the door of the Dickson Flow Recorder and securely fasten it to prevent weather-related damage.

2.2.2.4 Time Lapse Reading

Record the initial timer reading after calibration has been completed and before the pump is turned on to measure the initial pressure. This reading will be used in conjunction with the final timer reading (collected after sample run has finished) to calculate the total time that the pump runs, which is in turn used to calculate the volume of air that flowed through the filter during sampling.

2.2.3 Sample Collection

If a sample has been collected, it is necessary to retrieve the sample and relevant data before a new filter can be installed. Sample collection involves removing the old Dickson Flow Chart and installing a new one, warming up the pump, recording final pressure and lapse timer readings, and collecting the filter, as described below.

2.2.3.1 Collect Dickson Flow Chart

After a sampling run has been completed, the first step in the sample collection process should be to collect the Dickson Flow Chart and check the chart for any anomalies in pump operation. To collect the Dickson Flow Chart, open the Dickson Flow Recorder and use the metal lever to lift the pressure recording arm from the chart. Remove the chart and inspect it. The chart should indicate a steady flow rate during the sampling run, with an approximate duration of 24±1 hours.
If any anomalies are noted in the chart, such as multiple starts and stops or wide swings in flow rate, the sample will likely need to be discarded. The sampling apparatus should then be inspected for potential causes of power loss or inconsistent pump operation.

If the flow chart indicates a successful sampling run, the chart should be saved as a part of site files. Detach the Tygon tubing connecting the Dickson Flow Recorder to the pump (disconnect it from the nozzle on the pump) so that flows are not collected during calibration procedures.

2.2.3.2 Perform Pump Warmup

The pump must be warmed up prior before final pressure and calibration readings are collected so that sampling conditions are replicated as closely as possible. The pump-VFC system must be detached from the filter holder to prevent drawing air through the filter outside of the designated sampling window.

Detach the pump-VFC system by unscrewing the nut fastening the VFC to the filter holder. Unplug the pump from the lapse timer and plug it directly into the mechanical timer outlet. Lay the pump on its side so that there are no obstructions to flow through the pump and turn the pump on using the manual power switch on the mechanical timer. Record the pump warmup start time in the logbook.

Allow the pump to run for at least 5 minutes (10 minutes if the temperature is less than 50 degrees Fahrenheit). Once the pump warmup has been completed, turn off the pump using the manual switch on the mechanical timer. Record the pump warmup stop time in the logbook. Unplug the pump from the mechanical timer and plug it back into the ETI cord set, once again providing power to the lapse timer. Reattach the pump-VFC system to the filter holder, making sure to include the rubber gasket.

2.2.3.3 Record Final Pressure and Timer Readings for Completed Sample

The sampling period begins from midnight to midnight therefore the pump requires a warmup period in order to replicate operation conditions during sample collection. Once the warmup period is met the final pressure and timer readings may be recorded.

Once the sampling apparatus is fully reassembled, position the slack tube water manometer on the front of the sampler housing to allow easy reading. Attach Tygon tubing to the quick-connect port on the side of the filter housing. Connect the other end of the Tygon tubing to either side of the slack-tube manometer. Make sure that the water levels on both sides of the manometer are equal to provide accurate readings. Turn on the pump using the manual power switch on the mechanical timer. Record the pressure difference on each side of the manometer in the logbook. Turn the pump off using the manual power switch on the mechanical timer. Record the final timer reading from the lapse timer in the logbook. Compare the final lapse timer reading to the initial lapse timer reading to make sure that the sample run time was 24±1 hours.

2.2.3.4 Collect Completed Sample Filter

Lift the roof of the sampler housing and secure it in an open position by attaching the chain on the side to the metal pin on the back of the sampler housing. Don new nitrile gloves. Gently remove the wax paper filter envelope from the manila filter envelope. Have the individual who will not collect the filter hold the wax envelope. Fully loosen the wingnuts holding the filter holder plate in place and slide them to allow for removal of the plate. Carefully lift the filter holder plate, taking care to determine whether the filter is attached to the filter holder plate. If the filter is attached to the filter holder plate, use tweezers or fingers to gently remove the filter from the filter holder plate. If the filter is not attached to the filter holder plate, set the filter holder plate to the side. Use tweezers to gently lift the filter from the filter holder. **Use care,**

as filters are extremely fragile. Once the filter is free of any restrictions, fold it length-wise, ensuring that the filter number is facing out and that the side of the filter with particulate matter is on the inside of the fold (not facing out). Gently place the folded filter into the wax paper envelope, with the filter number at the open end of the envelope. Place the wax paper envelope inside the manila sample envelope. Proceed with sample initiation and calibration steps for the next sample, as described in Section 2.2.1 and 2.2.2.

2.3 PERFORMING CALIBRATION CHECK AND FINAL FLOW CALCULATIONS

The method of checking whether the pump is operating within the manufacturers' calibration limits is typically provided in a Microsoft Excel spreadsheet by the manufacturer of the VFC pump assembly. The same spreadsheet is generally used to determine if the VFC pump assembly is within the calibration range or if there are leaks and to calculate the pump flow. Different manufacturers provide proprietary spreadsheets; therefore, the basic principles are discussed below instead of a step-by-step procedure for filling out the spreadsheet.

1. Input calibration orifice-specific information, including orifice serial number, standard flow rate (Qstd) slope, Qstd intercept, and calibration date.

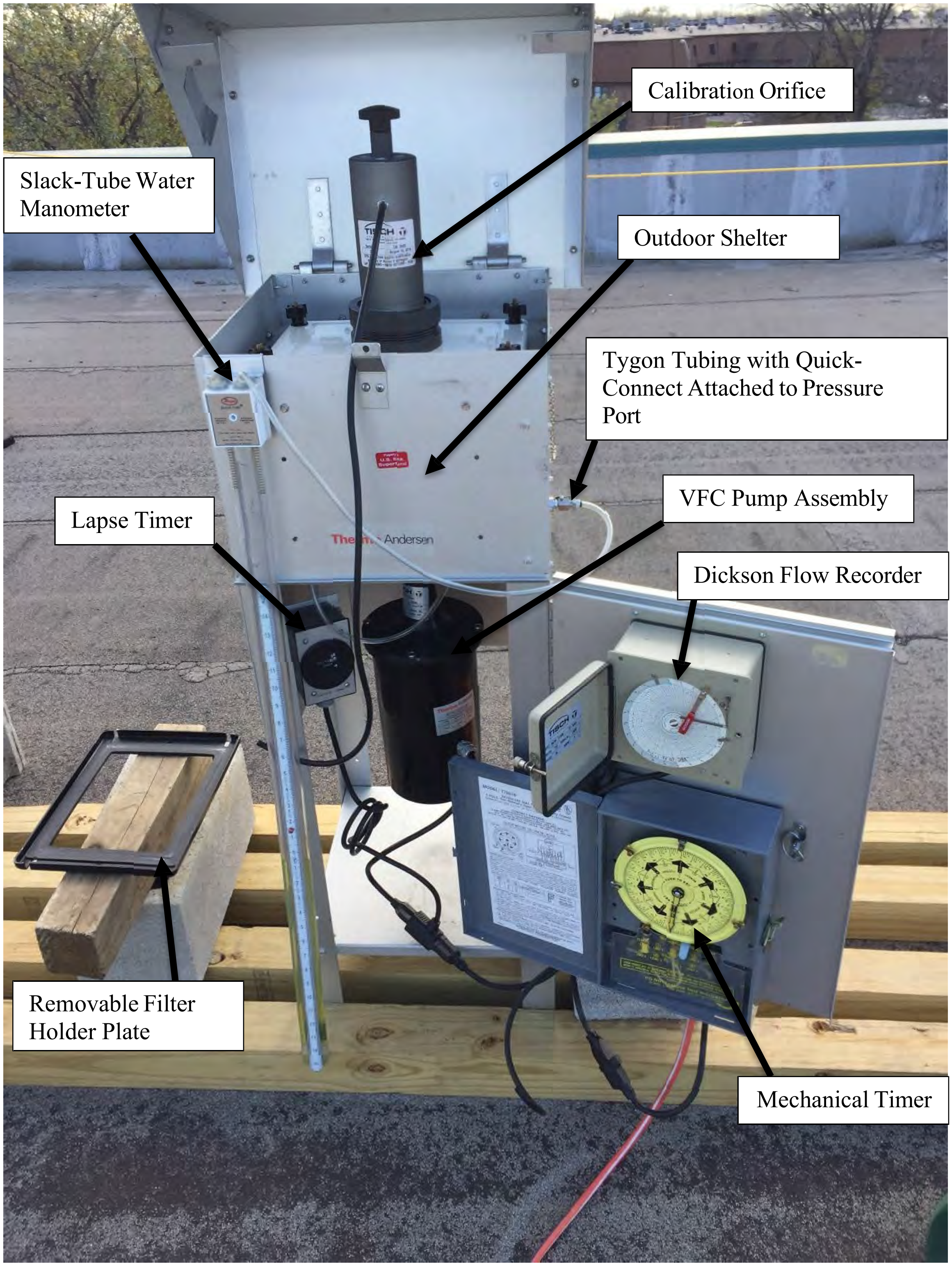
2. Enter ambient weather conditions experienced during the calibration/leak check and sample period. Ambient conditions should correspond to the time of calibration readings or an average temperature and barometric pressure during the sampling period. A nearby National Oceanic and Atmospheric Administration (NOAA) or credible weather station should be used as the source for temperature and pressure.

3. Enter calibration pressure readings into the correct columns. The values entered should be the sum of both side of the manometer. Seven readings were recorded during the calibration/leak check in case there were user errors or other anomalies in the readings. However only five points are used in case user errors caused non-linear readings.

4. Check the percent difference between the calibration orifice and the VFC pump assembly. Enter ambient weather conditions into the spreadsheet.

5. Calculate flow rate and total air volume sampled by inputting start and end flow rates and total time elapsed into the spreadsheet. Both values will be reported to the laboratory that performs the analysis. Flow rates should be between approximately 1.13 to 1.7 cubic meters per minute (m^3/min).

FIGURE 1
HIGH-VOLUME AMBIENT AIR SAMPLING USING VOLUMETRIC FLOW CONTROL (CALIBRATION/LEAK TESTING SETUP)



SOP APPROVAL FORM

TETRA TECH EM INC.

ENVIRONMENTAL STANDARD OPERATING PROCEDURE

AIR QUALITY MONITORING

SOP NO. 073

REVISION NO. 1

Last Reviewed: November 1999

RRiesing

Quality Assurance Approved

May 26, 1993

Date

1.0 BACKGROUND

Air quality monitoring is performed to evaluate materials in the air from the site. Particulates, volatile organic compounds (VOC), and semivolatile organic compounds (SVOC) in the air can present potential health risks around the site. This standard operating procedure (SOP) establishes the requirements and procedures for air quality monitoring. This section discusses the purpose and scope of the SOP and lists the requirements and resources needed to monitor air quality. Section 2 outlines the procedures to use when collecting air quality samples using different types of instruments.

1.1 PURPOSE

This SOP establishes the requirements and procedures for monitoring air quality.

1.2 SCOPE

This SOP provides only a broad overview of recommendations for monitoring air quality. This SOP is to be used in conjunction with U.S. Environmental Protection Agency (EPA) guidance on air quality monitoring and the instruction manuals included with the sampling equipment.

This SOP also provides general information on air sampling techniques and equipment, sample locations, criteria for initiating sampling, and analytical procedures for airborne particulates, volatile organic compounds (VOC), and semivolatile organic compounds (SVOC).

Those using this SOP should be familiar with EPA analytical methods 608, TO-1, TO-2, TO-3, TO-4, TO-10, and TO-14.

1.3 DEFINITIONS

None

1.4 REFERENCES

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1.5 REQUIREMENTS AND RESOURCES

Depending on the type of air quality sampling to be conducted, some or all of the following equipment will be required:

- A General Metal Works Model PS-1 High Volume Sampler® is needed to collect samples of airborne particulates and SVOCs.
- A Spectrex Model PAS-3000 Personal Air Sampler® with a carbon molecular sieve (CMS) cartridge or a Tenax gas chromatograph (GC) adsorbent cartridge may be used to collect samples of VOCs.
- A SUMMA® canister may be used to collect samples of VOCs.
- A Gelman GN® filter is needed to collect samples of asbestos fibers.

2.0 PROCEDURES

This section discusses the procedures to use when collecting various types of air quality samples. This section also discusses procedures for identifying sampling locations, criteria for initiating sampling, analytical procedures for air sample analysis, and quality control (QC) procedures.

2.1 SAMPLING TECHNIQUES AND INSTRUMENTATION

This section presents information on sampling techniques and equipment used for sampling airborne particulates, SVOCs, VOCs, and asbestos. More detailed information about each instrument, including instrument calibration procedures, can be found in the instrument operating manuals, which are maintained with each instrument.

2.1.1 Particulates and Semivolatile Organic Compounds

A General Metal Works Model PS-1 High Volume Sampler® (PS-1 sampler) is used to collect samples of airborne particulates and SVOCs, including pesticides and polychlorinated biphenyls (PCB). This sampling technique uses a battery-driven pump to draw air through a filter and a polyurethane foam (PUF) plug cartridge. Contaminants in the air adhere to the filter and the PUF plug cartridge. The filter and cartridge are then submitted to an analytical laboratory where they are analyzed for the contaminants of concern.

The pump uses a bypass blower motor equipped with an independent cooling fan to sample at rates of up to 280 liters per minute. Power is provided by two rechargeable 12-volt batteries connected in series to provide a 24-volt power source. In this configuration, the pump can operate at full power for more than 4 hours. The PS-1 sampler equipment is housed in an 18.75- by 18.75- by 52.5-inch anodized aluminum shelter. In the upper portion of the shelter, a dual-chambered sampling module contains both the filter and the PUF plug cartridge.

Sampled air first moves through the upper portion of the sampling module. Incoming air passes through a 4-inch-diameter Teflon® filter that collects airborne particulates. The PS-1 sampler's range of operational flow rates and housing design favor the collection of particulates with diameters between 0.1 and 100 microns. A collection efficiency of 99 percent can be obtained for particulates with a 0.3-micron diameter.

After passing through the filter, air enters the lower portion of the PS-1 sampler where it passes through a 3-inch-long, cylindrical glass cartridge containing the PUF plug cartridge. The PUF plug cartridge adsorbs SVOCs, pesticides, and PCBs. The sampling efficiencies of the PUF plug cartridge for various compounds are provided in EPA analytical method TO-4.

Airborne particulates also can be sampled using two other types of instruments: a total suspended particulate meter and a PM-10 sampler. These instruments can be used to capture particulates less than 10 microns in diameter. Both of these samplers use a battery-driven pump to draw air through a filter to capture the particulates. The filter is submitted to an analytical laboratory where it is weighed to determine particulate levels.

2.1.2 Volatile Organic Compounds and Asbestos

A Spectrex Model PAS-3000 Personal Air sampler® (PAS-3000 sampler) can be used to sample VOCs and asbestos. The PAS-3000 sampler draws air through an asbestos filter and a CMS cartridge or a Tenax GC cartridge. The PAS-3000 sampler operates using a series of eight 1.25-volt rechargeable nickel-cadmium batteries connected in series. The maximum flow rate through the PAS-3000 sampler is 500 milliliters per minute. The PAS-3000 sampler can operate continuously for 6 to 10 hours before its batteries need to be replaced or recharged.

Air is first drawn through a filter that captures asbestos fibers. Asbestos fibers are collected using a 25-millimeter-diameter Gelman GN® filter. This filter is made from mixed cellulose esters and has a pore size of 0.8 micron.

Air is then drawn through the CMS cartridge or Tenax GC cartridge. The CMS cartridge used in the PAS-3000 sampler is a Model 300 Supelco Carbotrap. This stainless-steel cartridge is filled with three specialized adsorbents: Carbotrap C, Carbotrap, and Carbosieve S-III®. Glass wool plugs separate the adsorbent materials and are packed into the ends of the cartridge. The CMS cartridge is specifically designed to efficiently adsorb and desorb all VOCs listed in EPA analytical methods TO-1, TO-2, and TO-3, whether present individually or in complex mixtures.

A Tenax GC cartridge also can be used in the PAS-3000 sampler. Tenax GC is an adsorbent that traps VOCs. A stainless-steel tube is filled with the Tenax material, and air is then drawn through the tube.

Another method that can be used to sample VOCs is the SUMMA canister. This sampling technique collects samples by drawing air into an evacuated stainless-steel canister that has been specially treated to eliminate active adsorption sites. If desired, a pump and mass flow controller may be used to fill the canister slowly over an extended period.

2.2 SAMPLING LOCATIONS

To estimate the impact of contamination on air quality, air sampling should be conducted both upwind and downwind of the suspected contamination source. Upwind and downwind sample locations must be selected through an evaluation of the predominant wind direction in the area to be sampled. The predominant wind direction must be determined by analyzing data from nearby wind monitoring stations. Because the predominant wind direction can vary on a seasonal basis, both the annual and seasonal characteristics of the wind must be considered.

Wind monitoring stations are often located at airports or at other stations maintained by the National Weather Service. If an established wind monitoring station cannot be located near the site to be sampled, a temporary wind monitoring station should be established at the site.

Wind monitoring also should be conducted during air sampling. While air sampling is being conducted, winds that blow from the suspected contaminant source into the selected downwind sector must occur frequently. These winds must typically persist for several hours during the sampling event to allow a multi-hour sampling run to be completed.

Because wind direction may vary considerably during a period of several hours, it is generally preferable to use at least three or four downwind air monitoring sites simultaneously. These monitoring sites should be located a sufficient distance apart so that the sample collected from at least one site will be representative of the true air quality, even if a slight shift from the optimal wind direction occurs.

Air quality samplers should be located in unobstructed areas at least 2 meters from any obstacle to air flow. The exhaust hose of each sampler should be stretched out downwind of the sampler's intake port to prevent any recycling of air.

2.3 CRITERIA FOR INITIATING SAMPLING

The decision to initiate sampling should be made only after carefully analyzing meteorological conditions. The meteorological conditions that are required before initiating sampling include the following:

- Winds from a selected direction sector that will produce net transport from the waste site toward the downwind air quality monitors and a forecast that these winds will persist throughout the sampling event
- Atmospheric stabilities in the neutral to stable range; moderately unstable conditions also acceptable for summer sampling events
- No precipitation

Air quality samples can be collected as discrete grab samples. However, samples are generally collected continuously over a period of several hours, and a minimum sampling time of 2 hours is usually desirable. The exact duration of the sampling will be based on the meteorological conditions, the requirements of the sampling equipment, and the individual project objectives.

2.4 EXPERIMENTAL PROCEDURE AND ANALYSIS

This section details the protocols and procedures for collecting, handling, and analyzing air quality samples. A sampling event can range from collecting a single grab sample to continuous sampling over a 24-hour period depending on meteorological conditions, instrument performance, and project objectives. After sampling is completed, the filters and cartridges from the samplers will be collected. All samples will be placed in clean containers, sealed from contact with outside air, and clearly labeled with their sample location and the date and time that sampling was conducted. The samples will then be sent to an analytical laboratory for analysis using the chain-of-custody procedures.

2.4.1 Particulate and Semivolatile Organic Compounds

The PS-1 sampler will be operated at a rate of approximately 280 liters per minute. Air flow will be measured using a magnehelic gage. The flow rate will be checked before, during, and after each sampling event. The PS-1 sampler will be calibrated before each sampling event using a manometer, calibrator, and the manufacturer’s published calibration curve. The manufacturer’s calibrator attaches directly to the top of the filter holder. The procedures followed during calibration will be as specified in the manufacturer’s operating manual. A copy of the manual will be stored with the sampler.

As the PS-1 sampler is set up for sampling, a preweighed Teflon® filter and PUF plug cartridge will be loaded into the upper portion of the sampling module following the clean handling procedures outlined in EPA analytical method TO-4. When all the samplers to be used at a site have been deployed and a sampling event is imminent, the Teflon® filters and PUF plug cartridges for each sampler will be brought to the field and installed in each PS-1 sampler.

The air sample flow rate through the PS-1 sampler will be calibrated after the first few minutes of operation. The calibration will be conducted using the calibrator provided with the sampler in accordance with the manufacturer’s operating manual. After calibration is completed, the serial number of the sampler, the start date and time for sampling, and all relevant calibration data will be promptly recorded in a field logbook.

After the sampling event, the end date and time will be recorded in the field logbook for each sampler. The Teflon® filter will then be removed from each sampler using stainless-steel tweezers. The Teflon® filters will then be placed in clean petri dishes, sealed with white plastic tape, and clearly labeled. The PUF plug cartridges will be similarly removed, placed in clean glass bottles (either amber or foil covered to exclude light) and clearly labeled.

In the laboratory, the Teflon® filters will be carefully weighed to measure particulate levels on the filter. PCBs and pesticides will be removed from the PUF plug cartridges using Soxhlet extraction in accordance with EPA analytical method TO-4. The extracts will be analyzed using GC with electron capture detection (ECD) following the procedures outlined in EPA analytical method TO-4.

2.4.2 Volatile Organic Compounds and Asbestos

Before being used to collect samples, the PAS-3000 sampler will be calibrated in the laboratory using a soap film flow meter following the manufacturer's operating manual. A copy of the manufacturer's calibration specifications and calibration results for each project will be maintained in a laboratory logbook.

After a sampling event is scheduled, the necessary PAS-3000 samplers will be deployed in the field. Each CMS cartridge will be transported to the field in a screwtop glass storage container. Asbestos filters will be transported to the field in sealed plastic bags. The clean handling procedures outlined in EPA analytical method TO-4 will be followed for all sampling equipment.

The CMS cartridges and asbestos filters will be installed in the PAS-3000 samplers just before the beginning of a sampling event. After each PAS-3000 sampler is turned on, the serial number of the sampler and the date and time will be recorded in the field logbook.

After the samples have been collected, the PAS-3000 samplers will be turned off and the end dates and times will be recorded in the field logbook. The CMS cartridges will then be removed from the samplers, recapped, and placed in screwtop glass storage containers for transport to the laboratory. The asbestos filters will be resealed in plastic bags for transport to the laboratory.

The CMS cartridges will be analyzed using the procedures outlined in EPA analytical method TO-2 for thermal desorption GC/ECD and flame ionization detectors (FID). The asbestos filters will be analyzed using phase contrast microscopy (PCM) in accordance with federal Occupational Safety and Health Administration standards for asbestos monitoring. The laboratory analyst will document compliance with these standards in the laboratory logbook.

If Tenax GC cartridges are used, they will be collected and analyzed following the same procedures used for the CMS cartridges. If samples are collected in SUMMA® canisters, the air sample will be withdrawn from the canister in the laboratory and will be analyzed directly, using GC/ECD and GC/FID in accordance with EPA analytical method TO-14. No filters or cartridges are used with Summa canisters.

2.5 QUALITY CONTROL PROCEDURES

For every 10 air quality samples collected using each type of sampler, an additional sample should be collected and submitted for analysis as a field blank. These field blank samples are used to verify the detection limits of the sampler and to check for the presence of cross contamination. Field blank sample results should be presented along with the results for actual air quality samples. In addition, 10 percent of all samples taken should be duplicate samples. The results of these samples are used to measure the precision of the sample analysis.

APPENDIX B

Community SSAL Methodology

To:	Matt Soltis Tetra Tech
From:	Karren Wood Tetra Tech
Date:	November 10, 2023
Subject:	Community Site Screening Action Level (SSAL) Calculations for Metals and Asbestos

The following paragraphs present the methodology used by Tetra Tech to calculate risk-based community Site Screening Action Levels (SSALs) for ambient community air monitoring, planned in response to debris operations as a result of the Maui wildfires. This methodology is based on the Community Air Monitoring Plan (CAMP) guidance (CalEPA DTSC, 2020). Community SSALs were calculated for the airborne chemicals of concern (COCs) listed in Table 1 using the most recent toxicity criteria available and project-specific exposure assumptions. The SSALs represent a conservative estimate of the analyte concentrations in air that off-site populations, including sensitive receptors such as children and the elderly, can be safely exposed to over the duration of on-site work activities.

Ambient air community SSALs for COCs listed in Table 1 were calculated using standard United States Environmental Protection Agency (USEPA) risk-assessment methodology, exposure assumptions, and toxicological data preferentially from USEPA sources.

Equations for Calculating SSALs

Cancer and noncancer health effects are considered separately for carcinogens and noncarcinogens, respectively. As presented in the 2020 CAMP Guidance, the SSAL for each COC is "back-calculated" from a target cancer risk or noncancer hazard in accordance with USEPA inhalation risk assessment methodology, as described below.

Cancer-Based SSAL

A cancer-based SSAL ($SSAL_C$) was calculated for each carcinogenic COCs using the following equation:

$$SSAL_C = TR \times \frac{1}{IUR} \times \frac{AT_C}{ET \times EF \times ED}$$

Where,

- $SSAL_C$ = cancer-based screening action limit for COC in air (micrograms per cubic meter [µg/m^3] for metals or fibers per cubic centimeter [f/cc] for asbestos)
- TR = target inhalation cancer risk (unitless)

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- IUR = inhalation unit risk (per μg/m^3 for metals; per f/cc for asbestos)
- AT_C = averaging time for carcinogenic effects (hours)
- ET = exposure time (hours/day)
- EF = exposure frequency (days/year)
- ED = exposure duration (year)

A target excess risk level of one in a million (1×10^{-6}) was used as the point of departure for developing the $SSAL_C$, as recommended by USEPA. Note that cancer risks that are less than 1×10^{-6} are considered *de minimis* by any regulatory agency. The IUR values and exposure assumptions are discussed in separate sections below.

Noncancer-Based SSAL

A noncancer-based SSAL ($SSAL_{NC}$) was calculated for each noncarcinogenic COCs in using the following equation:

$$SSAL_{NC} = THQ \times REL \times \frac{AT_{NC}}{ET \times EF \times ED}$$

Where,

- $SSAL_{NC}$ = noncancer-based screening action limit of COC in air (μg/m^3 for metals; f/cc for asbestos)
- THQ = target inhalation noncancer hazard quotient (unitless)
- REL = inhalation reference exposure level or reference concentration (μg/m^3 for metals; f/cc for asbestos)
- AT_{NC} = averaging time for non-carcinogenic effects (hours)
- ET = exposure time (hours/day)
- EF = exposure frequency (days/year)
- ED = exposure duration (year)

A target noncancer hazard quotient (HQ) of 1 was used to develop the $SSAL_{NC}$, as recommended by USEPA. An HQ is a numerical indicator of exceedance of an acceptable threshold for noncarcinogenic effects. An HQ equal to or less than 1 indicates that no adverse noncarcinogenic health effects are expected to occur for a select COC. The REL values and exposure assumptions are discussed in separate sections below.

<u>Toxicity Values used in the SSAL Calculations</u>

There are different toxicity databases that regulatory agencies rely on for the purposes of quantifying the toxicity of chemicals in the environment. The sources of the carcinogenic toxicity values (IURs) and noncarcinogenic toxicity values (RELs or reference concentrations [RfC]) used in the SSAL calculations in priority order are as follows:

- USEPA Integrated Risk Information System (IRIS) (USEPA, 2023a)
- USEPA Provisional Peer-Reviewed Toxicity Values (PPRTVs) (USEPA, 2023b)
- Agency for Toxic Substances and Disease Registry (ATSDR) (ATSDR, 2023)

- California Office of Environmental Health Hazard Assessment (OEHHA) or California Environmental Protection Agency (CalEPA) Department of Toxic Substances Control (DTSC) (OEHHA, 2023)
- USEPA Health Effects Assessment Summary Tables (HEAST) (USEPA, 2023c)

Carcinogenic Effects

Potential carcinogenic effects resulting from human inhalation exposure to constituents are estimated quantitatively using IURs, which represent the theoretical increased risk per exposure concentration. Of the COCs for which SSALs were calculated, only six (asbestos, arsenic, beryllium, cadmium, cobalt, lead, and nickel) have been assessed as potentially having carcinogenic effects via the inhalation pathway. The sources for the chemical specific IURs used in the $SSAL_C$ calculations are presented in Table 1.

Noncarcinogenic Effects

Potential noncarcinogenic effects resulting from human inhalation exposure to constituents are estimated quantitatively using RELs (or RfCs), which represent estimates of the daily maximum level of exposure to human populations (including sensitive subpopulations) that are likely to be without an appreciable risk of deleterious effects (USEPA, 1989). Except for particulate matter, all COCs listed in Table 1 have been assessed as potentially having noncarcinogenic effects via the inhalation pathway.

Most noncancer toxicity values are developed for long-term or chronic exposures. Chronic RELs are designed to address continuous exposures for one year or longer up to a lifetime (ATSDR, 2023). However, noncancer toxicity values for short-term or acute exposures have been developed for some chemicals. For example, for shorter exposure periods, ATSDR has acute (1 to 14 day duration) and intermediate (15 to 364 day duration – akin to subchronic) Minimal Risk Levels (MRLs). When available, noncancer toxicity values for acute exposure are generally an order of magnitude or higher than chronic toxicity values. That is, a higher level of exposure for a short duration may not lead to adverse health effects. While the duration of the site activities for this project may lead to short term, or acute, exposure circumstances, chronic RELs were conservatively applied over acute or subchronic toxicity values in order to be protective of sensitive subpopulations. The sources for the chemical specific RELs/RfCs used in the $SSAL_{NC}$ calculations are presented in Table 1.

There were uncertainties associated with the RELs for select COCs. The following substitutions were conservatively applied:

- For lead, there is an OEHHA IUR, but there is no established noncancer toxicity REL. There is a Hawaii-specific Ambient Air Quality Standard (AAQS) for lead (per Hawaii Administrative Rule §11-59-4), which is 1.5 μg/m^3 averaged over a calendar quarter (that is, 3 months) (Hawaii Administrative Rules, 2001). The AAQS is lower than the SSALc calculated with the IUR. Therefore, the AAQS was used as the SSAL for lead.
- Copper, thallium, and zinc RELs were not available from IRIS, ATSDR, or OEHHA,. Therefore, National Institute for Occupational Safety and Health (NIOSH) Recommended Exposure Limits with applied safety factors of 10 were conservatively applied (NIOSH, 2023).

Exposure Assumptions

Exposure assumptions were applied in the SSAL calculations based on project specific activities. The project is assumed to be comprised of 10-hour workdays for 6 days per week over a time period of 6 months (assumed to be a conservative estimate). The AT is the amount of time over which the exposure is averaged and is equal to the project duration for noncancer effects and 70 years, or assumed lifetime, for cancer effects.

The exposure parameters are summarized in the table that follows:

Exposure Parameter	$SSAL_C$	$SSAL_{NC}$
ET (hours)	10	10
EF (days per year)(1)	156	156
ED (years)	0.5	0.5
AT (hours)(2)	613,200	3,754

1 – EF for days worked in 6 months is calculated as follows:
EF = 6/7 (6 days/week work schedule) * 365 days/2 (total number of days in 6 months)

2 – AT is calculated as follows:
AT (cancer) = 70 years (lifetime) * 365 days per year * 24 hours per day
AT (noncancer) = 156 days (project duration) * 24 hours per day

Summary and Recommendations

The selected SSALs were calculated as described above and are presented in Table 1. SSALs were calculated for both cancer and noncancer endpoints, as applicable. The lower (more conservative) of the two values was selected as the recommended SSAL for each COC. Note that in some cases, the $SSAL_C$ was greater than the $SSAL_{NC}$. In these cases, due to the short term duration of the project (6 months), the predicted cancer risk from short-term exposure was less significant than potential noncancer health effects.

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ATTACHMENT 1

U.S. EPA ERT SOPs

STANDARD OPERATING PROCEDURE APPROVAL AND CHANGE FORM

Scientific, Engineering, Response and Analytical Services
2890 Woodbridge Avenue Building 209 Annex
Edison New Jersey 08837-3679

STANDARD OPERATING PROCEDURE

Title: Operation of the DryCal DC-Lite Primary Flow Calibrator

Approval Date: 12/17/2015

Effective Date: 12/17/2015 SERAS SOP Number: 2130, Rev 0.0

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The top row of this table shows the most recent changes to the controlled document. For previous revision history information, archived versions of this document are maintained by the SERAS QA/QC Officer on the SERAS local area network (LAN).

History	Effective Date
New SOP	12/17/15

OPERATION OF DRYCAL DC-LITE PRIMARY FLOW CALIBRATOR

CONTENTS

CONTENTS (Cont'd)

NEW SOP: SOP #2130, Rev. 0.0, 12/17/15, US EPA Contract EP-W-09-031

1.0 SCOPE AND APPLICATION

This standard operating procedure (SOP) describes the start-up, operation and routine use of the Bios International Corporation DryCal® DC-Lite Primary Flow Calibrator. The procedures and figures contained in this SOP are taken from the *DryCal® DC-Lite Manual* (2004) with the written consent (11/19/2015) of Bios International Corporation and Mesa Labs.

The DryCal DC-Lite is a field portable primary flow calibrator that is used for industrial hygiene, environmental and laboratory measurement applications. The DryCal DC-Lite is a National Institute of Standards and Technology (NIST) primary calibration standard that uses dry piston technology and infrared sensors to obtain volumetric flow rates. The DryCal DC-Lite can be used to measure gas flow for either a vacuum flow source or a pressure flow source. Applications include precise calibration of secondary standard calibration equipment, such as rotameters, and industrial hygiene and environmental air sampling pumps. Rapid calibrations are accomplished without the use of a soap solution thus reducing the uncertainty associated with other flow meters or rotameters.

A Quality Assurance Project Plan (QAPP) in Uniform Federal Policy (UFP) format describing the project objectives must be prepared prior to deploying for a sampling event. The sampler needs to ensure that the methods used are adequate to satisfy the data quality objectives listed in the QAPP for a particular site.

The procedures in this SOP may be varied or changed as required, dependent on site conditions, equipment limitations or other procedural limitations. In all instances, the procedures employed must be documented on a Field Change Form and attached to the QAPP. These changes must be documented in the final deliverable.

2.0 METHOD SUMMARY

The DryCal DC-Lite is a primary flow standard. The time required for a graphite composite piston to traverse a known distance within a glass flow cell is precisely measured, and an internal computer calculates the flow. The time the piston takes to move the known distance and implied volume yields the volumetric flow as:

$$q = \frac{V}{t} = rrr^{2} h/t$$

Where

q = volumetric flow rate
v = measurement volume
t = measurement time
r = radius
h = measurement path length

When a flow reading begins, an internal valve closes, diverting gas into the glass flow cell for measurement. The piston rises at the rate of gas flow between two collimated light beams at a known distance apart. After a suitable acceleration period, the rate of piston travel between the beams is timed. As the piston passes the second beam, the flow reading ends, the valve opens, the gas is released, and the piston drops. The volumetric flow measurement, based upon the parameters of length and time, is instantly displayed on the LCD in milliliters per minute (ml/minute) or liters per minute (LPM).

3.0 SAMPLE PRESERVATION, CONTAINERS, HANDLING, AND STORAGE

- Air samples require no preservation or special handling.
- DryCal DC-Lite calibrators can remain on charge until needed without causing damage to the battery.
- If the calibrator is stored for long periods of time the battery should be charged at least once every three months.
- Always store calibrators in a clean, dry environment and recharge the unit prior to use after long-term storage.

4.0 INTERFERENCES AND POTENTIAL PROBLEMS

- Flow reading error sources include:
  - When the DryCal DC-Lite is used with pump models that pulsate (small shifts in flow rate during pulsation) the readings are affected accordingly.
  - Closure of the calibrator valve at the beginning of each flow reading results in a small pressure spike in the flow stream that can impact flow rate reading.
- Air containing cigarette smoke, excessive dust, or other particulates interferes will readings.
- Potential safety problems are presented in *Section 11.0 Health and Safety*.

5.0 EQUIPMENT/APPARATUS

The following equipment is provided for the operation and transport of the DryCal DC-Lite Primary Flow Calibrator:

- DryCal DC-Lite Flow Calibrator

Model	Optimum Flow Range (±1%)	Extended Flow Range
L	10 ml/min–500 ml/min	1 ml/min–500 ml/min
ML	50 ml/min–2 L/min	5 ml/min–5 L/min
M	100 ml/min–7 L/min	10 ml/min–12 L/min
MH	200 ml/min–20 L/min	20 ml/min–20 L/min
H	500 ml/min–30 L/min	50 ml/min–30 L/min

- Single-Station Battery Charger
- Tubing Kit
- Leak-test Accessory
- Additional High Flow Tubing with ML, M, MH, and H models
- Certificate of Calibration
- Instruction Manual

6.0 REAGENTS

This section is not applicable to this SOP.

7.0 PROCEDURES

7.1 Air Flow Train Setup

7.1.1 Isolation

An isolation device is recommended to smooth the pulsation input and calibrator valve pressure spikes. To smooth flow, install a 25 millimeter (mm), 0.8 micrometer (µm) filter cassette in the flow train to create a suitable backpressure as needed.

7.1.2 Particulate Filter

The DryCal DC-Lite includes either a 5µmor 30µm inlet filter inside the inlet fitting depending on model. However, air containing cigarette smoke, excessive dust, or other particulates should be additionally pre-filtered by installing a 25mm, 0.8µmfilter cassette in the flow train on the inlet side as necessary.

7.2 Panel Buttons

7.3 Power ON

1. Press the **ON** button to turn the calibrator on.
2. An initializing screen will be displayed first showing the computer revision number and then the standard flow display screen.

Note: A Reset button is located on the lower back panel. If pressed, this button will quickly reset the unit to the initializing screen.

Note: The DC-Lite has an "energy saving" 5 minute inactivity shut-off feature.

7.4 Disable 5 Minute Shut Off

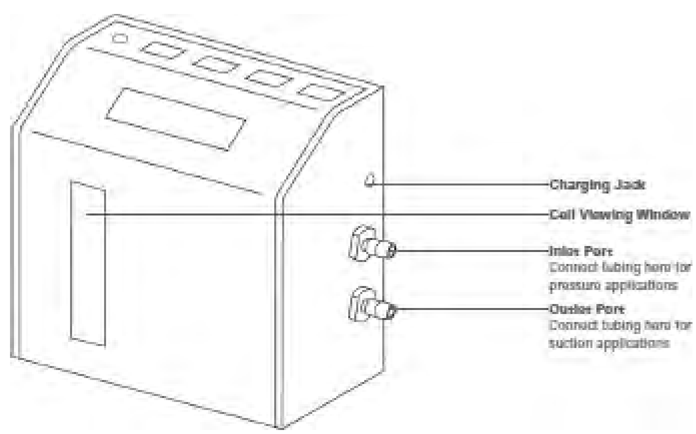
1. Press and hold the **Read** button, then press the **On** button or the **Reset** button if the unit is on.
2. The display will read, "Auto-Off Disabled" until the **Read** button is released.
3. To **Re-enable**, push the **Reset** button.

7.5 Take Readings

7.5.1 Single Flow Reading

1. Connect tubing between the calibrator and the flow source with both instruments **ON**.

Note: The calibrator connecting air flow ports are located on the right side of the unit. The lower port is for suction (outlet) and the upper port is for pressure (inlet).



Note: For industrial hygiene or environmental applications, the sampling medium should also be connected in-line.

2. Press the **READ** button **once** to obtain a single flow measurement display on the LCD.
3. A reading begins when the valve clicks shut, the green LEDs light, and the piston rises within the flow cell.
4. Continue the procedure to obtain the required number of flow readings.

Note: All successive readings in an averaging sequence will be used to calculate the average flow. The unit will automatically clear the average after ten readings and begin a new averaging sequence.

7.5.2 Auto Mode Reading

1. Press and **hold** the READ button until a reading starts then release.
2. To stop the continuous read session, press the **STOP** button once.

The display will indicate the current flow reading (FLOW), the average flow value (AVERAGE) and the number of readings in the average (NUMBER IN AVERAGE) with a maximum of 10 readings as the average flow rate.

Note: The number of readings in an averaging sequence can be reset to (00) at any time by pressing and holding the Stop button for 2 full seconds.

7.6 Printing

7.6.1 Print Setup

1. Turn the calibrator on before connecting the printer cable to avoid "Nexus Control."
2. Turn the flow source on and connect the tubing to either the inlet or outlet port of the calibrator.
3. Connect the printer cable to the parallel port on the back of the calibrator and turn the printer on.

7.6.2 Print Mode Selection

The PRINT button will toggle between three print settings OFF, 10 or ALL with the default setting OFF.

1. To engage the printer, press the **PRINT** button once for the print "10" setting allowing the printer to print 10 readings and stop.
2. Press the **PRINT** button 2 times for the print "ALL" position allowing the printer to print continuously.
3. After the printer setting selection has been made, press the **READ** button as appropriate for single or auto mode selection to initiate the flow measurement process.

7.7 Stop and Reset

1. To stop a flow reading at any time, press and release **Stop** button.
2. To reset, press and hold the **Stop** button for two full seconds.

Note: During a reset, the display is cleared and the number of readings in an averaging sequence is reset to zero.

3. For a **Hard Reset** when the calibrator does not respond to push-button commands, press the white recessed button on lower right side of the back panel near the parallel printer port.

Note: The Hard Reset button resets the unit back to the initializing screen and the printer setting will revert to the Off position.

8.0 CALCULATIONS

The DryCal DC-Lite Primary Flow Calibrator is a direct reading instrument requiring no calculations.

9.0 QUALITY ASSURANCE/QUALITY CONTROL

9.1 General QA/QC Procedures

- All data must be documented on field data sheets or in site logbooks.
- The instrument must be operated according to this SOP and the operating instructions supplied by the manufacturer, unless otherwise specified in the QAPP.
- Records will be maintained, documenting the field level of personnel's competency in performing method and handling equipment

9.2 Annual Calibration

The DryCal DC-Lite must be calibrated annually by an accredited vendor.

10.0 DATA VALIDATION

The operator will ensure that the DryCal® DC-Lite Primary Flow Calibrator was operated in accordance with this SOP within instrument specifications and all operational checks have been completed and are within the criteria specified in the site-specific UFP-QAPP. The SERAS Task Leader is responsible for completing the UFP-QAPP verification checklist for each project.

Records will be maintained, documenting the level of personnel's competency in performing method and handling equipment.

11.0 HEALTH AND SAFETY

When working with potential hazardous materials, follow U.S. EPA, Occupational Safety and Health Administration (OSHA) and corporate health and safety procedures.

Safety concerns specific to the operation of the DryCal DC-Lite include:

- The DC-Lite is not rated intrinsically safe and is not for use with explosive gases or for use in explosive environments.
- The DC-Lite is not designed for pressurization above 0.35 bar (5 PSI) or gas flows above the rated specifications of the flow cell in use. Consult *Appendix A: Specifications* for acceptable gas flow ranges.
- For battery maintenance issues consult *Appendix B: Maintenance*.
- Use only with clean laboratory air or other inert, non-corrosive gasses only.

12.0 REFERENCES

Bios International Corporation. 2004. *DryCal® DC-Lite Manual.*

13.0 APPENDICES

A - Specifications
B - Maintenance

APPENDIX A
Specifications
SOP #2130
December 2015

(Source: Bios International Corporation. 2004. *DryCal® DC-Lite Manual)*

Product Specifications

Size: 5" x 5" x 2.75" / 127 mm x 127 mm x 70 mm

Weight: 42 oz. / 1200 g

Flow Ranges/ Air Flow Accuracy:

Model	*Optimum Flow Range (1%)*	*Extended Flow Range**
L	15-500 ml/min. 1 ml/min	500 ml/min
ML	50 ml/min.- 2 L/min.	1 ml/min - 5 L/min
M	100 ml/min.-7 L/min.	10 ml/min - 12 L/min
MH	200 ml/min.-17 L/min	10 ml/min - 20 L/min
H	500 ml/min. - 30 L/min.**	30 ml/min - 30 L/min

Specifications based on averaged readings: lower limit is based on self-tested max. leakage.

**Contact BIOS for application assistance. ** 1.25% accuracy 17-30L/min*

Battery System: 6V rechargeable, sealed lead acid, 6-8 hours typical operation

AC Battery Charger/ Power Adapter: Wall- mounted, single station charger. Input: 100 to 120 VAC, 60 Hz., Output: 12 VDC (Optional; Input: 200 to 240 VAC, 50 Hz., Output 12 VDC)

Operating Modes: Single cycle, 10-readings, or auto-mode.

Temperature Range: 0-55 °C

Humidity Range: 0-70% non-condensing

Printer Port: Standard parallel (IBM Centronics, compatible with most printers)

Note: Not compatible with printers that require Microsoft® Windows™

Warranty: 2 Year

Note: The recertification program offered by BIOS is elective and is not included as a warranty item.

All specifications are subject to change. Please contact BIOS or visit our web site at: www.biosint.com, for the most current information.

APPENDIX B
Maintenance
SOP #2130
December 2015

(Source: Bios International Corporation. 2004. *DryCal® DC-Lite Manual)*

The Battery System

The DryCal® DC-Lite is powered by an internal lead-acid battery. The battery will power the instrument for 6-8 hours of continuous use and has a typical service life of approximately 3-5 years. The DC-Lite provides a convenient 5 minute automatic shut-off feature for extended battery life. Use of a printer does not affect the battery life.

The DC-Lite can be charged and/or powered by the BIOS single-station charger when plugged into a standard 115V AC power source outlet (220V AC optional). Please read all setup and charging instructions indicated in this manual before using equipment.

Charging the Battery

Before using your DryCal® DC-Lite, be sure that the battery system has been fully charged to ensure that unit will perform to specification and maintain proper operation for the required time period.

The DC-Lite is equipped with a smart battery indicator that provides battery charge indication at three levels. When the battery indicator on the display is empty the unit will continue to operate for a short period of time before shutting itself off.

To Charge the DC-Lite:

1. Connect only the appropriate BIOS 12VDC charger, provided with the DC-Lite flow meter, into a standard wall outlet.

2. Insert the charger barrel plug into the charging jack located on the right side of the DC-Lite housing above the inlet and outlet air bosses. A green "CHARGE" LED will illuminate while the unit is charging. Full charge takes 8 to 12 hours, and the DryCal® can charge while being used.

2. To view the actual charging status during the charging period, disconnect the battery charger and wait 3-5 minutes. When the indicator is solid black the battery is fully charged.

- The unit may be charged for an indefinite time period without causing battery damage.

Battery Maintenance & Storage

Lead-acid batteries will not exhibit the "memory effect" common to nickel-cadmium batteries. A lead acid battery may be charged for an indefinite time period without damage.

Long-Term Storage:

Long-term storage without charging can damage the battery pack, therefore if the DC-Lite cannot be left charging continuously, it should be charged at least every three months.

GENERAL AIR SAMPLING GUIDELINES

CONTENTS

CONTENTS (Cont'd)

1.0 SCOPE AND APPLICATION

This Standard Operating Procedure (SOP) provides guidance in developing and implementing sampling plans to assess the impact of hazardous waste sites on ambient air. It presents the United States Environmental Protection Agency/Environmental Response Team's (U.S. EPA/ERT's) approach to air sampling and monitoring and identifies equipment requirements. It is not within the scope of this SOP to provide a generic air sampling plan. Experience, objectives, site characteristics, and chemical characteristics will dictate sampling strategy. This SOP does not address indoor air sampling.

Two basic approaches can be used to assess ambient air (also referred to as air pathway assessments): modeling and measurements. The modeling approach initially estimates or measures the overall site emission rate(s) and pattern(s). These data are input into an appropriate air dispersion model, which predicts either the maximum or average air concentrations at selected locations or distances during the time period of concern. This overall modeling strategy is presented in the first three volumes of the Air Superfund National Technical Guidance Series on Air Pathway Assessments[1,2,3]. Specific applications of this strategy are presented in several additional Air Superfund Technical Guidance documents[4].

The measurement approach involves actually measuring the air impact at selected locations during specific time periods. These measurements can be used to document actual air impacts during specific time intervals (i.e., during cleanup operations) or to extrapolate the probable "worst case" concentrations at that and similar locations over a longer time period than was sampled.

This SOP addresses issues associated with this second assessment strategy. This SOP also discusses the U.S. EPA/ERT's monitoring instruments, air sampling kits, and approach to air sampling and monitoring at hazardous waste sites.

These are standard (i.e., typically applicable) operating procedures which may be varied or changed as required, depending on site conditions, equipment limitations, or limitations imposed by the procedure. In all instances, the ultimate procedures employed should be documented and associated with the final report.

Mention of trade names or commercial products does not constitute U.S. EPA endorsement or recommendation for use.

2.0 METHOD SUMMARY

Air monitoring is defined as the use of direct-reading instruments and other screening or monitoring equipment and techniques that provide instantaneous (real-time) data on the levels of airborne contaminants. The U.S. EPA/ERT maintains numerous monitors for real-time measurements. Examples of air monitoring equipment are hand-held photoionization detectors (PID), flame ionization detectors (FID), oxygen/combustible gas detectors, and remote optical sensors.

Air sampling is defined as those sampling and analytical techniques that require either off- or on-site laboratory analysis and therefore do not provide immediate results. Typically, air sampling occurs after use of real-time air monitoring equipment has narrowed the number of possible contaminants and has provided some qualitative measurement of contaminant concentration. Air sampling techniques are used to more accurately detect, identify and quantify specific chemical compounds relative to the majority of air monitoring technologies.

In the Superfund Removal Program, On-Scene Coordinators (OSCs) may request the U.S. EPA/ERT to conduct air monitoring and sampling during the following situations: emergency responses, site assessments, and removal activities. Each of these activities has a related air monitoring/sampling objective that is used to determine the potential hazards to workers and/or the community.

- Emergency Response

  Emergency responses are immediate responses to a release or threatened release of hazardous substances presenting an imminent danger to public health, welfare, or the environment (i.e., chemical spills, fires, or chemical process failures resulting in a controlled release of hazardous substances). Generally these situations require rapid on-site investigation and response. A major part of this investigation consists of assessing the air impact of these releases.

- Removal Site Assessment

  Removal site assessments (referred to as site assessments) are defined as any of several activities undertaken to determine the extent of contamination at a site and which help to formulate the appropriate response to a release or threatened release of hazardous substances. These activities may include a site inspection, multimedia sampling, and other data collection.

- Removal Actions

  Removal actions clean up or remove hazardous substances released into the environment. Removal actions include any activity conducted to abate, prevent, minimize, stabilize, or eliminate a threat to public health or welfare, or to the environment.

Personal risk from airborne contaminants can be determined by comparing the results of on-site monitoring and sampling to health-based action levels such as the American Conference of Governmental Industrial Hygienists (ACGIH) Threshold Limit Values (TLVs) and the Occupational Safety and Health Administration (OSHA) Permissible Exposure Limits (PELs). Residential risk can be determined by comparing the results of off-site monitoring or sampling to health-based action levels such as those developed by the Agency for Toxic Substance and Disease Registry (ATSDR).

The extent to which valid inferences can be drawn from air monitoring/sampling depends on the degree to which the monitoring/sampling effort conforms to the objectives of the event. Meeting the project's objectives requires thorough planning of the monitoring/sampling activities, and implementation of the most appropriate monitoring/sampling and analytical procedures. These issues will be discussed in this SOP.

3.0 SAMPLE PRESERVATION, CONTAINERS, HANDLING, AND STORAGE

Preservation, containers, handling and storage for air samples are discussed in the specific SOPs for the technique selected. In addition, the analytical method (i.e., U.S. EPA, National Institute for Occupational Safety and Health [NIOSH], and OSHA Methods) may be consulted for storage temperature, holding times and packaging requirements. After sample collection, the sampling media (i.e., cassettes or tubes) are immediately sealed. The samples are then placed into suitable containers (i.e., whirl bags, resealable bags or culture tubes) which are then placed into a shipping container.

Use bubble wrap or Styrofoam peanuts when packing air samples for shipment. DO NOT USE VERMICULITE.

4.0 INTERFERENCES AND POTENTIAL PROBLEMS

Upwind sources can contribute to sample concentration. Natural sources, such as biological waste, can produce hydrogen sulfide and methane which may contribute to the overall contaminant level. Extraneous anthropogenic contaminants (i.e., burning of fossil fuels; emissions from vehicular traffic, especially diesel; and volatile compounds) from petrochemical facilities; effluvium from smoke stacks) may also contribute. Air sampling stations should be strategically placed to identify contributing sources.

Photoreactivity or reaction of the parameters of concern may occur with nonrelated compounds [i.e., nitrogen compounds and polyaromatic hydrocarbons (PAHs)]. Some sorbent media/samples should not be exposed to light during or after sampling due to photochemical effects (i.e., PAHs).

Various environmental factors, including humidity, temperature and pressure, also impact the air sampling methodology, collection efficiency and detection limit. Since the determination of air contaminants is specifically dependent on the collection parameters and efficiencies, the collection procedure is an integral part of the analytical method.

Detection limits depend on the contaminants being investigated and the particular site situation. It is important to know why the data are needed and how the data will be used. Care should be taken to ensure the detection limits are adequate for the intended use of the final results.

Some equipment may be sensitive to humidity and temperature extremes.

5.0 EQUIPMENT/APPARATUS

5.1 Direct Reading Instruments (Air Monitoring Instruments)

There are two general types of direct reading instruments: portable screening devices and specialized analytical instruments. Generally all these techniques involve acquiring, for a specific location or area, continuous or sequential direct air concentrations in either a real-time or semi-real-time mode. None of these instruments acquires true time-weighted average concentrations. In addition, these instruments are not capable of acquiring simultaneous concentration readings at multiple locations, although several are able to sequentially analyze samples taken remotely from different locations. The document, "Guide to Portable Instruments for Assessing Airborne Pollutants Arising from Hazardous Waste Sites[5]," provides additional information about air sampling and monitoring. The hazard levels for airborne contaminants vary. See the ACGIH TLVs and the OSHA PELs for safe working levels. Common screening devices and analytical instruments are described in Appendix A.

5.2 Air Sampling Equipment and Media/Devices

The U.S. EPA/ERT uses the following analytical methods for sampling: *NIOSH Manual of Analytical Methods*[6], *American Society for Testing and Materials (ASTM) Methods*[7], *U.S. EPA Compendium of Methods for the Determination of Toxic Organic Compounds in Ambient Air*[8,9], and *OSHA Methods*[10].

Additional air sampling references include *Industrial Hygiene and Toxicology* (3rd Ed.)[11] and *Air Sampling Instruments for Evaluation of Atmospheric Contaminants*[12]. These methods typically specify equipment requirements for sampling. Since air sampling is such a diverse technology, no single method or reference is best for all applications. Common sampling equipment and media/devices are described in Appendix B.

5.3 Tools/Material and Equipment List

In addition to equipment and materials identified in Appendices A and B, the following equipment and materials may be required to conduct air sampling and monitoring at hazardous waste sites:

- Camera
- Site logbook
- Clipboard
- Chain of custody records
- Custody seals
- Air sampling worksheets
- Sample labels
- Small screwdriver set
- Aluminum foil
- Extension cords
- Glass cracker
- Multiple plug outlet
- Whirl bags or culture tubes
- Teflon tape
- Calibration devices
- Tygon and/or Teflon tubing
- Surgical gloves
- Lint-free gloves
- Ice
- Sample container

Use the following additional equipment when decontaminating glassware on site:

- Protective equipment (i.e., gloves, splash goggles, etc.)
- Appropriate solvent(s)
- Spray bottles
- Liquinox (soap)
- Paper towels
- Distilled/deionized water
- Five-gallon buckets
- Scrub brushes and bottle brushes

6.0 REAGENTS

Impinger sampling involves using reagents contained in a glass vial to absorb contaminants of concern (for example, NIOSH Method 3500 for formaldehyde uses 1% sodium bisulfite solution). Impinger solutions vary and are method-dependent.

Reagents such as acetone and hexane are required to decontaminate glassware and some air sampling equipment. Decontamination solutions are specified in ERT/REAC SOP #2006, Sampling Equipment Decontamination.

7.0 PROCEDURES

7.1 Air Monitoring Design

7.1.1 Initial Surveys

In general, the initial survey is considered to be a relatively rapid screening process for collecting preliminary data at hazardous waste sites. However, initial surveys may require many hours to complete and may consist of more than one entry.

Some information is generally known about the site; therefore, real-time instrumentation for specific compounds (i.e., detector tubes and electrochemical sensors) can be used to identify hot spots. Sufficient data should be obtained with real-time instruments during the initial entry to screen the site for various contaminants. When warranted, intrinsically safe or explosion-proof instruments should be used. An organic vapor analyzer (OVA) is typically used during this survey. These gross measurements may be used on a preliminary basis to (1) determine levels

of personal protection, (2) establish site work zones, and (3) map candidate areas for more thorough qualitative and quantitative studies involving air sampling.

In some situations, the information obtained may be sufficient to preclude additional monitoring. Materials detected during the initial survey may call for a more comprehensive evaluation of hazards and analyses for specific compounds. Since site activities and weather conditions change, a continuous program to monitor the ambient atmosphere must be established.

7.1.2 Off-Site Monitoring

Typically, perimeter monitoring with the same instruments employed for on-site monitoring is utilized to determine site boundaries. Because air is a dynamic matrix, physical boundaries like property lines and fences do not necessarily delineate the site boundary or area influenced by a release. Whenever possible, atmospheric hazards in the areas adjacent to the on-site zone should be monitored with direct-reading instruments. Monitoring at the fenceline or at varying locations off site provides useful information regarding pollutant migration. Three to four locations downwind of the source (i.e., plume) at breathing-zone height provide a basic fingerprint of the plume. Negative instrument readings off site should not be interpreted as the complete absence of airborne toxic substances; rather, they should be considered another piece of information to assist in the preliminary evaluation. The interpretation of negative readings is instrument-dependent. The lack of instrument readings off site should not be interpreted as the complete absence of all airborne toxic substances; rather, it is possible that the particular compound or class of compounds to which the monitoring instrument responds is not present or that the concentration of the compound(s) is below the instrument's detection limit.

7.2 Air Sampling Design

7.2.1 Sampling Plan Design

The goal of air sampling is to accurately assess the impact of a contaminant source(s) on ambient air quality. This impact is expressed in terms of overall average and/or maximum air concentrations for the time period of concern and may be affected by the transport and release of pollutants from both on- and off-site sources. The location of these sources must be taken into account as they impact the selection of sampling locations. Unlike soil and groundwater concentrations, air concentrations at points of interest can easily vary by orders of magnitude over the period of concern. This variability plays a major role in designing an air sampling plan.

Downwind air concentration is determined by the amount of material being released from the site into the air (the emission rate) and by the degree that the contamination is diluted as it is transported. Local meteorology and topography govern downwind dilution. Contaminant emission rates can also be heavily influenced by on-site meteorology and on-site activities. All of these concerns must be incorporated into an air sampling plan.
A sampling strategy can be simple or complex, depending on the sampling program objectives. Programs involving characterization of the pollutant contribution from a single point source tend to be simple, whereas sampling programs investigating fate and transport characteristics of components from diverse sources require a more complex sampling strategy. In addition, resource constraints may affect the complexity of the sampling design.

An optimal sampling strategy accounts for the following site parameters:

- Location of stationary as well as mobile sources
- Analytes of concern
- Analytical detection limit to be achieved
- Rate of release and transport of pollutants from sources
- Availability of space and utilities for operating sampling equipment
- Meteorological monitoring data
- Meteorological conditions in which sampling is to be conducted

The sampling strategy typically requires that the concentration of contaminants at the source or area of concern as well as background contributions be quantified. It is important to establish background levels of contaminants in order to develop a reference point from which to evaluate the source data. Field blanks and lot blanks, as well as various other types of QA/QC samples, can be utilized to determine other sources. The impact of extraneous sources on sampling results can frequently be accounted for by placing samplers upwind, downwind and crosswind from the subject source. The analytical data from these different sampling locations may be compared to determine statistical differences.

7.2.2 Sampling Objectives

The objectives of the sampling must be determined prior to developing the sampling plan. Does the sampling plan verify adequate levels of protection for on-site personnel, or address potential off-site impacts associated with the site or with site activities? In addition, the assumptions associated with the sampling program must be defined. These assumptions include whether the sampling is to take place under "typical," "worst case", or "one-time" conditions. If the conditions present at the time of sampling are different from those assumed during the development of the sampling plan, then quality of the data collected may be affected. The following definitions have been established:

- Typical: routine daily sampling or routine scheduled sampling at pre-established locations.

- Worst case: sampling conducted under the worst meteorological and/or site conditions which would result in elevated ambient concentrations.

- One-time: only one chance is given to collect a sample without regard to time or conditions. Qualitative data acquired under these conditions are usually applicable only to the time period during which the data were collected and may not provide accurate information to be used in estimating the magnitude of an air impact during other periods or over a long time interval.

The sampling objectives also dictate the detection limits. Sampling methods for airborne contaminants will depend upon the nature and state (solid, liquid or gas) of the contaminant. Gases and vapors may be collected in aqueous media or adsorbents, in molecular sieves, or in suitable containers. Particulates are collected by filters or impactors. The volume of sample to be collected is dependent upon an estimate of the contaminant concentration in the air, the sensitivity of the analytical method, and the standard or desired detection limit. A sufficient amount of sample must be collected to achieve the desired detection limit without interference from other contaminants. In addition, the selected method must be able to detect the target compound(s).

7.2.3 Location and Number of Individual Sampling Points

Choose the number and location of sampling points according to the variability, or sensitivity, of the sampling and analytical methods being utilized, the variability of contaminant concentration over time at the site, the level of precision required and cost limitations. In addition, determine the number of locations and placement of samplers by considering the nature of the response, local terrain, meteorological conditions, location of the site (with respect to other conflicting background sources), size of the site, and the number, size, and relative proximity of separate on-site emission sources and upwind sources. The following are several considerations for sampler placement:

- Location of potential on-site emission sources, as identified from the review of site background information or from preliminary on-site inspections.

- Location of potential off-site emission sources upwind of the sampling location(s). Review local wind patterns to determine the location of off-site sources relative to wind direction.

- Topographic features that affect the dispersion and transport of airborne toxic constituents. Avoid natural obstructions when choosing air sampling station locations, and account for channelization around those obstructions.

- Large water bodies, which affect atmospheric stability and the dispersion of air contaminants.

- Roadways (dirt or paved), which may generate dust that could mask site contaminants.

- Vegetation, such as trees and shrubs, which stabilizes soil and retards subsurface contaminants from becoming airborne. It also affects air flow and scrubs some contaminants from the air. Sometimes thick vegetation can make an otherwise ideal air monitoring location inaccessible.

Consider the duration of sampling activities when choosing the location and number of samples to be collected. For example, if the sampling period is limited to a few hours, one or two upwind and several downwind samples would typically be adequate, especially around major emission sources.

A short-term monitoring program ranges from several days to a few weeks and generally includes gathering data for site assessments, removal actions, and source determination data (for further modeling). Activities involved in a short-term sampling strategy must make the most of the limited possibilities for data collection. Consider moving upwind/downwind locations daily based on National Oceanic and Atmospheric Administration (NOAA) weather forecasts. Weather monitoring becomes critical where complex terrain and local meteorological effects frequently change wind direction. Often, a number of alternatives can fulfill the same objective.

Prevailing winds running the length of a valley usually require a minimum number of sampler locations; however, a complex valley may require more sampler locations to account for the wide variety of winds. Ocean/lake effects may require a radical plan to collect enough samples to reach a low detection limit. Two sets of samplers may be placed next to each other: one set would be activated during the sea breeze while the other set is turned off, and vice versa when there is no sea breeze. After the sampling event, the respective upwind and downwind samples would be combined. Another alternative for sampling near a large body of water may be to use automatic, wind-vector-operated samplers, which turn the sampler on only when the wind comes from a specified vector. At sites located on hillsides, wind will move down a valley and produce an upward fetch at the same time. Sampling locations may have to ring the site to measure the wind's impact.

Off-site sources may affect on-site monitoring. In this case, on-site meteorological data, concurrent with sampling data, is essential to interpreting the acquired data. Also, additional upwind sampling sites may be needed to fully characterize ambient background contaminant levels. Multiple off-site sources may require several monitoring locations, but if the sources are at a sufficient distance, only one monitoring location is needed.

Topography and weather are not the only factors in sampler location; the sampling sites must be secure from vandals and mishap. Secure all sampling locations to maintain chain of custody, and to prevent tampering with samples or loss of sampling units. High-volume sampling methods often require the use of 110 VAC electric power. When portable generators are used, the power quality may affect sampler operation. Also, be aware that the generators themselves could be a potential pollution source if their placement is not carefully considered.

Air quality dispersion models can be used to place samplers. The models incorporate source information, surrounding topography, and meteorological data to predict the general distance and directions of maximum ambient concentrations. Modeling results should be used to select sampling locations in areas of maximum pollutant concentrations.

7.2.4 Time, Duration and Frequency of Sampling Events

After choosing appropriate sampling or monitoring locations, determine the sampling frequency and the number of samples to be collected. The time of day, duration and frequency of sampling events is governed by:

- The effects of site activities and meteorology on emission rates
- The diurnal effect of the meteorology on downwind dispersion
- The time period(s) of concern as defined by the objective
- The variability in the impact from other non-site-related sources
- If defined, the degree of confidence needed for either the mean or maximum downwind concentrations observed
- The precision requirements for single measurements
- Cost and other logistical considerations

The duration of the removal action and the number of hours per day that site work is conducted determine the time, duration, and frequency of samples. Short-term sampling programs may require daily sampling, while long-term programs may require 24-hour sampling every sixth or twelfth day. If the site will be undergoing removal activities 24 hours a day, continuous air sampling may be warranted. However, if the site activities will be conducted for only eight hours a day, and there are no emissions likely to occur during the remaining 16 hours, then sampling would be appropriate prior to the start of daily activities, would continue during operations, and end at the conclusion of the daily activities. An off-peak sample collection can ensure that emissions are not persisting after the conclusion of daily cleanup activities. For some sites, emissions are still a factor several hours after daily site activities have been completed. Because of the typically decreased downwind dispersion in the evening, higher downwind concentrations than were present during daytime site activities may be detected. For sites where this is possible, the sampling duration needs to be lengthened accordingly.

Sampling duration and flow rate dictate the volume of air collected, and to a major degree, the detection limit. The analytical method selected will provide a reference to flow rate and volume. Flow rates are limited to the capacity of the pumps being employed and the contact time required by the collection media.

The duration or period of air sampling is commonly divided into two categories (1) samples collected over a brief time period are referred to as "instantaneous" or "grab" samples and are usually collected in less than five minutes and (2) average or integrated samples are collected over a significantly longer period of time. Integrated samples provide an average concentration over the entire sampling period. Integrated samples are not suited to determining cyclical releases of contaminants because periodic or cyclical events are averaged out by the proportionally long sampling duration.

Air quality dispersion models can predict the maximum air contaminant concentration expected from a source. The meteorological and site conditions expected to cause the highest concentration are known as worst-case conditions and can be identified by analyzing the modeling results. Depending upon the objective, one may sample when the model predicts worst-case conditions will exist.

7.2.5 Meteorological and Physical/Chemical Considerations

A meteorological monitoring program is an integral part of site monitoring activities. Meteorological data, which define local terrain impacts on air flow paths, are needed to interpret air concentration data. Meteorological data may be available from an existing station located near the site (i.e., at a local airport), otherwise a station should be set up at the site. This data will document the degree that samples actually were downwind and verify whether other worst-case assumptions were met. Meteorological parameters to be monitored are, at a minimum, wind speed, wind direction, and sigma theta (which is the horizontal wind direction standard deviation and an indicator of atmospheric stability). The remaining parameters primarily affect the amount of a contaminant available in the air.

- Wind Speed

  When the contaminant of concern is a particulate, wind speed is critical in determining whether the particulate will become airborne, the quantity of the particulate that becomes airborne, and the distance the particulate will travel from the source. Wind speed also contributes to the volatilization of contaminants from liquid sources.

- Wind Direction

Wind direction highly influences the path of airborne contaminants. In addition, variations in wind direction increase the dispersion of pollutants from a given source.

- Atmospheric Stability

  Atmospheric stability refers to the degree to which the atmosphere tends to dampen vertical and horizontal motion. Stable atmospheric conditions (i.e., evenings) result in low dispersion, and unstable atmospheric conditions (i.e., hot sunny days) result in higher dispersion.

- Temperature

  Higher temperatures increase the rate of volatilization of organic and some inorganic compounds and affect the initial rise of gaseous or vapor contaminants. Therefore, worst-case emission of volatiles and semivolatiles occurs at the hottest time of day, or on the hottest day.

- Humidity

  High humidity affects water-soluble chemicals and particulates. Humid conditions may dictate the sampling media used to collect the air sample, or limit the volume of air sampled and thereby increase the detection limit.

- Atmospheric Pressure

  Migration of landfill gases through the landfill surface and through surrounding soils are governed by changes in atmospheric pressure. Atmospheric pressure will influence upward migration of gaseous contaminants from shallow aquifers into the basements of overlying structures.

  In many cases, the transport and dispersion of air pollutants is complicated by local meteorology. Normal diurnal variations (i.e., temperature inversions) affect dispersion of airborne contaminants. Terrain features can enhance or create air inversions and can also influence the path and speed of air flow, complicating transport and dispersion patterns.

  The chemical characteristics of a contaminant (i.e., molecular weight, physical state, vapor pressure, aerodynamic size, temperature, reactive compounds, and photodegradation) affects its behavior and can influence the method used to sample and analyze it.

8.0 CALCULATIONS

Volume is obtained by multiplying the sample time in minutes by the flow rate. Sample volume should be indicated on the chain of custody record. Adjustments for temperature and pressure differences may be required.

Results are usually provided in parts per million (ppm), parts per billion (ppb), milligrams per cubic meter

(mg/m^3) or micrograms per cubic meter ($\mu g/m^3$).

Refer to the analytical method or regulatory guidelines for other applicable calculations.

9.0 QUALITY ASSURANCE/QUALITY CONTROL

The manufacturer's instructions should be reviewed prior to instrument use. Instruments must be utilized in accordance with manufacturer's instructions. Equipment checkout and calibration activities must occur prior to and after monitoring and sampling and must be documented.

9.1 QA/QC Samples

QA/QC samples provide information on the variability and usability of environmental sample results. Various QA/QC samples may be collected to detect error. QA/QC samples are submitted with the field samples for analysis to aid in identifying the origin of analytical discrepancies; then a determination can be made as to how the analytical results should be used. Collocated samples, background samples, field blanks, and lot blanks are the most commonly collected QA/QC field samples. Performance evaluation (PE) samples and matrix spikes provide additional measures of data QA/QC control. QA/QC results may suggest the need for modifying sample collection, preparation, handling, or analytical procedures if the resultant data do not meet site-specific QA or data quality objectives. Refer to ERT/REAC SOP #2005, Quality Assurance/Quality Control Samples, for further details, and suggested frequencies for submittal of QA/QC samples.

9.2 Sample Documentation

All sample and monitoring activities should be documented legibly, in ink. Any corrections or revisions should be made by lining through the incorrect entry and by initialing the error. All samples must be recorded on an Air Sampling Worksheet. A chain of custody record must be maintained from the time a sample is taken to the final deposition of the sample. Custody seals demonstrate that a sample container has not been opened or tampered with during transport or storage of samples. Refer to ERT/REAC SOP #2002, Sample Documentation, for further information.

10.0 DATA VALIDATION

Results for QA/QC samples should be evaluated for contamination. This information should be utilized to qualify the environmental sample results accordingly with data quality objectives.

11.0 HEALTH AND SAFETY

Personal protection equipment (PPE) requirements identified in federal and/or state regulations and 29 Code of Federal Regulations (CFR) 1910.120 for hazardous waste site work must be followed.

The majority of physical precautions involved in air sampling are related to the contaminant sampled. Attention should be given when sampling in potentially explosive, flammable or acidic atmospheres. On rare occasions, the collection media may be hazardous; for example, in the instance where an acidic or basic solution is utilized in an impinger.

When working with potentially hazardous materials, follow U.S. EPA, OSHA and corporate health and safety procedures.

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APPENDIX A
Portable Screening Devices and Specialized Analytical Instruments
SOP #2008
November 1994

PORTABLE SCREENING DEVICES

Where possible, a datalogger should be used to minimize the length of time required for site personnel to be in a potentially contaminated area. Datalogger cable is available from manufacturers for linear output instruments and some nonlinear output instruments. U.S. EPA ERT/REAC has output cables for organic vapor analyzers (i.e., HNU and OVA), toxic gas analyzers (i.e., monitox) and real-time aerosol monitors (i.e., RAM and miniram).

- Total Hydrocarbon Analyzers

  Total hydrocarbon analyzers used to detect a variety of volatile organic compounds (VOCs) at hazardous waste sites principally employ either a photoionization detector (PID) or a flame ionization detector (FID). Compounds are ionized by a flame or an ultraviolet lamp. PIDs depend on the ionization potential of the compounds. PIDs are sensitive to aromatic and olefinic (unsaturated) compounds such as benzene, toluene, styrene, xylenes, and acetylene. Greater selectivity is possible by using low-voltage lamps. The ionization potential of individual compounds can be found in the NIOSH Pocket Guide to Chemical Hazards. These instruments are not compound-specific and are typically used as screening instruments. FIDs are sensitive to volatile organic vapor compounds such as methane, propanol, benzene and toluene. They respond poorly to organic compounds lacking hydrocarbon characteristics.

- Oxygen and Combustible Gas Indicators

  Combustible Gas Indicators (CGIs) provide efficient and reliable methods to test for potentially explosive atmospheres. CGI meters measure the concentration of a flammable vapor or gas in air and present these measurements as a percentage of the lower explosive limit (LEL). The measurements are temperature-dependent. The property of the calibration gas determines sensitivity. LELs for individual compounds can be found in the NIOSH Pocket Guide to Chemical Hazards. If readings approach or exceed 10% of the LEL, extreme caution should be exercised in continuing the investigation. If readings approach or exceed 25% LEL, personnel should be withdrawn immediately.

  CGIs typically house an electrochemical sensor to determine the oxygen concentration in ambient air. Normally, air contains approximately 20.9% oxygen by volume. Oxygen measurements are of particular importance for work in enclosed spaces, low-lying areas, or in the vicinity of accidents that have produced heavier-than-air vapors which could displace ambient air. The meters are calibrated for sea level and may indicate a false negative (i.e, O_2 content) at higher altitudes. Since the air has been displaced by other substances, these oxygen-deficient areas are also prime locations for taking additional organic vapor and combustible gas measurements. Oxygen-enriched atmospheres increase the potential for fires by their ability to contribute to combustion or to chemically react with flammable compounds and promote auto-ignition.

- Toxic Atmosphere Analyzers

  The toxic atmosphere analyzer is a compound-specific instrument, designed and calibrated to identify and quantify a specific compound or class of compounds in either gaseous or vapor form. Cross-sensitivity to air pollutants not of interest may be lead to erroneous results.

  U.S. EPA/ERT has the following toxic atmosphere analyzers: carbon monoxide, phosgene, nitrous oxide, hydrogen cyanide, sulfur dioxide, hydrogen sulfide, and chlorine gas.

- Aerosol/Particulate Monitors

  A Real-Time Aerosol/Particulate Monitor (RAM) displays readings for total particulates. The instrument employs a pulse light emitting diode which generates a narrow band emission in conjunction with a photovoltaic cell to detect light scattered from particulates.

  The U.S. EPA/ERT uses the RAM when the contaminant of concern is associated with particulates, and when responding to fires involving hazardous materials, to identify plume levels. The instrument is very useful in determining the presence of a plume when it is not visible. The U.S. EPA/ERT typically uses RAMs on tripods to obtain particulate concentrations at the breathing zone level. Personal dataloggers are used with the RAMs to document minimum, average and maximum concentrations. This provides real-time data without requiring those in personal protective equipment to be constantly present in the plume.

- Chemical Detector Tubes (Colorimetric Tubes)

  A chemical detector tube is a hollow, tube-shaped, glass body containing one or more layers of chemically impregnated inert material. To use, the fused ends are broken off and a manufacturer-specified volume of air is drawn through the tube with a pump to achieve a given detection limit. The chemicals contained within the packing material undergo a chemical reaction with the airborne pollutant present, producing a color change during the intake of each pump stroke. The concentration of a pollutant is indicated by the length of discoloration on a calibrated scale printed on the detector tube.

- Radiation Meters

  Radiation meters determine the presence and level of radiation. The meters use a gas or solid ion detection media which becomes ionized when radiation is present. The meters are normally calibrated to one probe. Meters that detect alpha, beta, and gamma radiation are available.

- Gold Film (Hydrogen Sulfide and Mercury Vapor) Monitors

  Hydrogen sulfide (H_2S) and Mercury (Hg) monitors operate on the principle that electric resistivity increases across a gold film as a function of H_2S and Hg concentration. The monitors provide rapid and relatively low detection limits for H_2S and Hg in air. After extensive sampling periods or high concentrations of H_2S and Hg, the gold film must be heated to remove contamination and return the monitor to its original sensitivity.

- Infrared Detectors

  Infrared detectors such as the Miniature Infrared Analyzer (MIRAN) use infrared (IR) absorption as a function of specific compounds. MIRAN instruments apply to situations where the contaminants are identified but concentrations are not. MIRAN instruments generally require AC power.

SPECIALIZED ANALYTICAL INSTRUMENTS

The continuous monitors described above provide qualitative measurement of air contaminants. Quantitative measurements in the field can be obtained using more sophisticated instruments, such as portable Gas Chromatographs, to analyze grab samples.

- Direct Air Sampling Portable Gas Chromatographs (GCs)

  Portable GCs use gas chromatography to identify and quantify compounds. The time it takes for a compound to move through a chromatographic column is a function of that specific compound or group of compounds. A trained technician with knowledge of the range of expected concentrations of compounds can utilize a portable GC in the field to analyze grab samples. GCs generally require AC power and shelter to operate. This method is limited by its reliance on a short-term grab sample to be representative of the air quality at a site.

- Remote Optical Sensing

  This technique, also referred to as long-path or open-path monitoring, involves transmitting either an infrared or ultraviolet light beam across a long open path and measuring the absorbance at specific wavelengths. The technique is capable of analyzing any preselected organic or inorganic volatile compound that can be resolved from compounds naturally occurring in ambient air. Current projected removal applications include perimeter monitoring during site cleanups and measurement of emission source strengths during site assessments.

- TAGA Direct Air Sampling Mass Spectrometer/Mass Spectrometer

  The Trace Atmospheric Gas Analyzer (TAGA), which is operated by the U.S. EPA/ERT, is capable of real-time detection of preselected organic compounds at low parts-per-billion concentrations. The instrument has been successfully used by the U.S. EPA/ERT for isolating individual emission plumes and tracking those plumes back to their sources.

APPENDIX B
Air Sampling Equipment and Media/Devices
SOP #2008
November 1994

AIR SAMPLING EQUIPMENT

- High-Volume, Total Suspended Particulate (TSP) Samplers

  High-volume TSP samplers collect all suspended particles by drawing air across an 8- by 10-inch glass-quartz filter. The sample rate is adjusted to 40 cubic feet per minute (CFM), or 1134 liters per minute (L/min), and it is held constant by a flow controller over the sample period. The mass of TSPs can be determined by weighing the filter before and after sampling. The composition of the filter varies according to the analytical method and the detection limit required.

- PM-10 Samplers

  PM-10 samplers collect particulates with a diameter of 10 microns or less from ambient air. Particulates of this size represent the respirable fraction, and thus are of special significance. PM-10 samplers can be high-volume or low-volume. The high-volume sampler operates in the same manner as the TSP sampler at a constant flow rate of 40 CFM; it draws the sample through a special impactor head which collects particulates of 10 microns or less. The particulate is collected on an 8- by 10-inch filter. The low-volume sampler operates at a rate of approximately 17 L/min. The flow must remain constant through the impactor head to maintain the 10-micron cut-off point. The low-volume PM-10 collects the sample on 37-mm Teflon® filters.

- High-Volume PS-1 Samplers

  High-volume PS-1 samplers draw a sample through polyurethane foam (PUF) or a combination foam and XAD-2 resin plug, and a glass quartz filter at a rate of 5-10 CFM (144 to 282 L/min). This system is excellent for measuring low concentrations of semivolatiles, PCBs, pesticides, or chlorinated dioxins in ambient air.

- Area Sampling Pumps

  These pumps provide flow-rate ranges of 2-20 L/min and have a telescopic sampling mast with the sampling train. Because of the higher volume, this pump is suitable for sampling low concentrations of airborne contaminants (i.e., asbestos sampling). These pumps are also used for metals, pesticides and PAH sampling which require large sample volumes.

- Personal Sampling Pumps

  Personal sampling pumps are reliable portable sampling devices that draw air samples through a number of sampling media including resin tubes, impingers, and filters. Flow rates are usually adjustable from 0.1 to 4 L/min (or 0.01 to .75 L/min with a restrictive orifice) and can remain constant for up to 8 hours on one battery charge or continuously with an AC charger/converter.

- Canister Samplers

  Evacuated canister sampling systems use the pressure differential between the evacuated canister and ambient pressure to bleed air into the canister. The sample is bled into the canister at a constant rate over the sampling period using a critical orifice, a mechanically compensated regulator, or a mass flow control device until the canister is near atmospheric pressure.

Pressure canister sampling systems use a pump to push air into the canister. To maintain a higher, more controlled flow, the pump typically controls the pressure differential across a critical orifice at the inlet of the canister, resulting in a pressurized canister at the completion of sampling.

AIR SAMPLING MEDIA/DEVICES

If possible, before employing a specific sampling method, consult the laboratory that will conduct the analyses. Many of the methods can be modified to provide better results or a wider range of results.

- Summa Canisters

  Summa canisters are highly polished passivated stainless steel cylinders. The Summa polishing process brings chrome and nickel to the surface of the canisters, which results in an inert surface. This surface restricts adsorption or reactions that occur on the canister's inner surface after collection. At the site, the canister is either placed in a sampler to control sample collection rate, or opened to collect a grab sample. Samples can be collected by allowing air to bleed into or be pumped into the canister. U.S. EPA/ERT uses 6-liter Summa canisters for VOC and permanent gas analysis.

- Passive Dosimeters

  Passive dosimeters are clip-on vapor monitors (samplers) in which the diffused contaminants are absorbed on specially prepared active surfaces. Industrial hygienists commonly use dosimeters to obtain time-weighted averages or concentrations of chemical vapors, as they can trap over 130 organic compounds. Selective dosimeters have also been developed for a number of chemicals including formaldehyde, ethylene oxide, hydrogen sulfide, mercury vapor, nitrogen dioxide, sulfur dioxide, and ozone. Dosimeters must be sent to a laboratory for analysis.

- Polyurethane Foam (PUF)

  PUF is a sorbent used with a glass filter for the collection of semivolatile organic compounds such as pesticides, PCBs, chlorinated dioxins and furans, and PAHs. Fewer artifacts (chemical changes that occur to collected compounds) are produced than with some other solid sorbents. PUF is used with the PS-1 sampler and U.S. EPA Method TO13. PUF can also be used with personal sampling pumps when sampling for PAHs using the Lewis/McCloud method. Breakthrough of the more volatile PCBs and PAHs may occur when using PUF.

- Sampling Bags (Tedlar)

  Sampling bags, like canisters, transport air samples to the laboratory for analysis. Samples are generally pumped into the bags, but sometimes a lung system is used, in which a pump creates a vacuum around the bag in a vacuum box. Then the sample flows from a source into the bag. This method is used for VOCs, fixed gases (CO_2 , O_2 and N_2) and methane.

- Impingers

  An impinger allows an air sample to be bubbled through a solution, which collects a specific contaminant by either chemical reaction or absorption. For long sampling periods, the impinger may need to be kept in an ice bath to prevent the solution from evaporating during sampling. The sample is drawn through the impinger by using a sampling pump or more elaborate sampling trains with multiple impingers.

- Sorbent Tubes/Cartridges

A variety of sampling media are available in sorbent tubes, which are used primarily for industrial hygiene. A few examples are carbon cartridges, carbon molecular sieves, Tenax tubes and tube containing the XAD-2 polymer. Depending upon the sorbent material, tubes can be analyzed using either a solvent extraction or thermal desorption. The former technique uses standard laboratory equipment and allows for multiple analyses of the same sample. The latter technique requires special, but readily available, laboratory equipment and allows only one analysis per sample. In addition, thermal desorption typically allows for lower detection limits by two or more orders of magnitude. Whenever sorbent tubes are being used for thermal desorption, they should be certified as "clean" by the laboratory doing the analysis.

Thermally Desorbed Media

During thermal desorption, high-temperature gas streams are used to remove the compounds collected on a sorbent medium. The gas stream is injected and often cryofocused into an analytical instrument, such as a GC, for compound analysis:

- Tenax Tubes

  Tenax tubes are made from commercially available polymer (p-phenylene oxide) packed in glass or stainless steel tubes through which air samples are drawn or sometimes pumped. These tubes are used in U.S. EPA Method TO1 and VOST for volatile nonpolar organic , some polar organic, and some of the more volatile semivolatile organics. Tenax is not appropriate for many of the highly volatile organics (with vapor pressure greater than approximately 200 mm Hg).

- Carbonized Polymers

  The carbonized molecular sieve (CMS), a carbonized polymer, is a commercially available, carbon sorbent packed in stainless-steel sampling tubes through which air samples are drawn or sometimes pumped. These are used in U.S. EPA Method TO2 for highly volatile nonpolar compounds which have low-breakthrough volumes on other sorbents. When high-thermal desorption temperatures are used with CMS, more variability in analysis may occur than with other sorbents.

- Mixed Sorbent Tubes

  Sorbent tubes can contain two type of sorbents. Combining the advantages of each sorbent into one tube increases the possible types of compounds to be sampled. The combination of two sorbents can also reduce the chance that highly volatile compounds will break through the sorbent media. An example of a mixed sorbent tube is the combination of Tenax and charcoal with a carbonized molecular sieve. A potential problem with mixed sorbent tubes is the breakthrough of a compound from an earlier sorbent to a later sorbent from which it cannot be desorbed.

Solvent-Extracted Media

Solvent-extracted media use the principle of chemical extraction to remove compounds collected on a sorbent media. The chemical solvent is injected into an instrument, such as a GC, for analysis of compounds. Examples of solvent-extracted media follow:

- Chemically Treated Silica Gel

Silica gel is a sorbent which can be treated with various chemicals. The chemically treated silica gel can then be used to sample for specific compounds in air. Examples include the DNPH-coated silica gel cartridge used with U.S. EPA Method TO11.

- XAD-2 Polymers

  XAD-2 polymers usually are placed in tubes, custom-packed sandwich-style with polyurethane foam, and prepared for use with U.S. EPA Method TO13 or the semi-VOST method. The polymers are used for the collection of semivolatile polar and nonpolar organic compounds. The compounds collected on the XAD-2 polymer are chemically extracted for analysis.

- Charcoal Cartridges

  Charcoal cartridges, consisting of primary and backup sections, trap compounds by adsorption. Ambient air is drawn through them so that the backup section verifies that breakthrough of the analytes on the first section did not occur, and the sample collection was therefore quantitative. Quantitative sample collection is evident by the presence of target chemicals on the first charcoal section and the absence on the second section. Next, the adsorbed compounds must be eluted, usually with a solvent extraction, and analyzed by GC with a detector, such as a Mass Spectrometer (MS).

- Tenax Tubes

  Cartridges are used in OSHA and NIOSH methods in a manner similar to charcoal cartridges but typically for less volatile compounds.

- Particulate Filters

  Particulate filters are used by having a sampling pump pass air through them. The filter collects the particulates present in the air and is then analyzed for particulate mass or chemical or radiological composition. Particulate filters are made from different materials which are described below.

- Mixed Cellulose Ester (MCE)

  MCE is manufactured from mixed esters of cellulose which are a blend of nitro-cellulose and cellulose acetate. MCE filters are used often for particulate sampling.

- Glass Fiber

  Glass fiber is manufactured from glass fibers without a binder. Particulate filters with glass fiber provide high flow rates, wet strength, and high, solid holding capacity. Generally, the filters are used for gravimetric analysis of particulates.

- Polyvinyl Chloride

  Particulate filters with polyvinyl chloride are resistant to concentrated acids and alkalis. Their low moisture pickup and light tare weight make them ideal for gravimetric analysis.

- Teflon

  Teflon is manufactured from polytetrafluorethylene (PTFE). Particulate filters with Teflon are easy to handle and exceptionally durable. Teflon filters are used for metal collection.

- Silver

  Particulate filters manufactured from pure silver have high collection efficiency and uniform pore size. These filters are used for mercury collection and analysis.

- Cellulose

  Particulate filters with cellulose contain less than 0.01% ash. These filters are used to collect particulates.

CONTENTS

CONTENTS (cont)

1.0 SCOPE AND APPLICATION

Asbestos has been used in many commercial products including building materials such as flooring tiles and sheet goods, paints and coatings, insulation, and roofing asphalts. These products and others may be found at hazardous waste sites hanging on overhead pipes, contained in drums, abandoned in piles, or as part of a structure. Asbestos tailing piles from mining operations can also be a source of ambient asbestos fibers. Asbestos is a known carcinogen and requires air sampling to assess airborne exposure to human health. This Standard Operating Procedure (SOP) provides procedures for asbestos air sampling by drawing a known volume of air through a mixed cellulose ester (MCE) filter. The filter is then sent to a laboratory for analysis. The U.S. Environmental Protection Agency/Environmental Response Team (U.S. EPA/ERT) uses one of four analytical methods for determining asbestos in air. These include: U.S. EPA's Environmental Asbestos Assessment Manual, Superfund Method for the Determination of Asbestos in Ambient Air for Transmission Electron Microscopy (TEM)(1); U.S. EPA's Modified Yamate Method for TEM(2); National Institute for Occupational Safety and Health (NIOSH) Method 7402 (direct method only) for TEM; and NIOSH Method 7400 for Phase Contrast Microscopy (PCM)(3). Each method has specific sampling and analytical requirements (i.e., sample volume and flow rate) for determining asbestos in air.

The U.S. EPA/ERT typically follows procedures outlined in the TEM methods for determining mineralogical types of asbestos in air and for distinguishing asbestos from non-asbestos minerals. The Phase Contrast Microscopy (PCM) method is used by U.S. EPA/ERT as a screening tool since it is less costly than TEM. PCM cannot distinguish asbestos from non-asbestos fibers, therefore the TEM method may be necessary to confirm analytical results. For example, if an action level for the presence of fibers has been set and PCM analysis indicates that the action level has been exceeded, then TEM analysis can be used to quantify and identify asbestos structures through examination of their morphology crystal structures (through electron diffraction), and elemental composition (through energy dispersive X-ray analysis). In this instance samples should be collected for both analyses in side by side sampling trains (some laboratories are able to perform PCM and TEM analysis from the same filter). The Superfund method is designed specifically to provide results suitable for supporting risk assessments at Superfund sites, it is applicable to a wide range of ambient air situations at hazardous waste sites. U.S. EPA's Modified Yamate Method for TEM is also used for ambient air sampling due to high volume requirements. The PCM and TEM NIOSH analytical methods require lower sample volumes and are typically used indoors; however, ERT will increase the volume requirement for outdoor application.

Other Regulations pertaining to asbestos have been promulgated by U.S. EPA and OSHA. U.S. EPA's National Emission Standards for Hazardous Air Pollutants (NESHAP) regulates asbestos-containing waste materials. NESHAP establishes management practices and standards for the handling of asbestos and emissions from waste disposal operations (40 CFR Part 61, Subparts A and M). U.S. EPA's 40 CFR 763 (July 1, 1987)(4) and its addendum 40 CFR 763 (October 30, 1987)(4) provide comprehensive rules for the asbestos abatement industry. State and local regulations on these issues vary and may be more stringent than federal requirements. The OSHA regulations in 29 CFR 1910.1001 and 29 CFR 1926.58 specify work practices and safety equipment such as respiratory protection and protective clothing when handling asbestos. The OSHA standard for an 8-hour, time-weighted average (TWA) is 0.2 fibers/cubic centimeters of air. This standard pertains to fibers with a length-to-width ratio of 3 to 1 with a fiber length >5 µm(5,6). An action level of 0.1 fiber/cc (one-half the OSHA standard) is the level U.S. EPA has established in which employers must initiate such activities as air monitoring, employee training, and medical surveillance(5,6).

These are standard (i.e., typically applicable) operating procedures which may be varied or changed as required, dependent upon site conditions, equipment limitations or limitations imposed by the procedure. In all instances, the ultimate procedures employed should be documented and associated with the final report.

Mention of trade names or commercial products does not constitute U.S. EPA endorsement or recommendation for use.

2.0 METHOD SUMMARY

Prior to sampling, the site should be characterized by identifying on-site as well as off-site sources of airborne asbestos. The array of sampling locations and the schedule for sample collection is critical to the success of an investigation. Generally, sampling strategies to characterize a single point source are fairly straightforward, while multiple point sources and area sources increase the complexity of the sampling strategy. It is not within the scope of this SOP to provide a generic asbestos air sampling plan. Experience, objectives, and site characteristics will dictate the sampling strategy.

During a site investigation, sampling stations should be arranged to distinguish spatial trends in airborne asbestos concentrations. Sampling schedules should be fashioned to establish temporal trends. The sampling strategy typically requires that the concentration of asbestos at the source (worst case) or area of concern (downwind), crosswind, as well as background (upwind) contributions be quantified. See Table 1 (Appendix A) for U.S. EPA/ERT recommended sampling set up for ambient air. Indoor asbestos sampling requires a different type of strategy which is identified in Table 2 (Appendix A). It is important to establish background levels of contaminants in order to develop a reference point from which to evaluate the source data. Field blanks and lot blanks can be utilized to determine other sources.

Much information can be derived from each analytical method previously mentioned. Each analytical method has specific sampling requirements and produce results which may or may not be applicable to a specific sampling effort. The site sampling objectives should be carefully identified so as to select the most appropriate analytical method. Additionally, some preparation (i.e., lot blanks results) prior to site sampling may be required, these requirements are specified in the analytical methods.

3.0 SAMPLE PRESERVATION, CONTAINERS, HANDLING, AND STORAGE

3.1 Sample Preservation

No preservation is required for asbestos samples.

3.2 Sample Handling, Container and Storage Procedures

1. Place a sample label on the cassette indicating a unique sampling number. Do not put sampling cassettes in shirt or coat pockets as the filter can pick up fibers. The original cassette box is used to hold the samples.

2. Wrap the cassette individually in a plastic sample bag. Each bag should be marked indicating sample identification number, total volume, and date.

3. The wrapped sampling cassettes should be placed upright in a rigid container so that the cassette cap is on top and cassette base is on bottom. Use enough packing material to prevent jostling or damage. Do not use vermiculite as packing material for samples. If possible, hand carry to lab.

4. Provide appropriate documentation with samples (i.e., chain of custody and requested analytical methodology).

4.0 INTERFERENCES AND POTENTIAL PROBLEMS

Flow rates exceeding 16 liters/minute (L/min) which could result in filter destruction due to (a) failure of its physical support under force from the increased pressure drop; (b) leakage of air around the filter mount so that the filter is bypassed, or (c) damage to the asbestos structures due to increased impact velocities.

4.1 U.S. EPA's Superfund Method

4.1.1 Direct-transfer TEM Specimen Preparation Methods

Direct-Transfer TEM specimen preparation methods have the following significant interferences:

- The achievable detection limit is restricted by the particulate density on the filter, which in turn is controlled by the sampled air volume and the total suspended particulate concentration in the atmosphere being sampled.
- The precision of the result is dependent on the uniformity of the deposit of asbestos structures on the sample collection filter.
- Air samples must be collected so that they have particulate and fiber loadings within narrow ranges. If too high a particulate loading occurs on the filter, it is not possible to prepare satisfactory TEM specimens by a direct-transfer method. If too high a fiber loading occurs on the filter, even if satisfactory TEM specimens can be prepared, accurate fiber counting will not be possible.

4.1.2 Indirect TEM Specimen Preparation Methods

Indirect TEM specimen preparation methods have the following interferences:

- The size distribution of asbestos structures is modified.
- There is increased opportunity for fiber loss or introduction of extraneous contamination.
- When sample collection filters are ashed, any fiber contamination in the filter medium is concentrated on the TEM specimen grid.

It can be argued that direct methods yield an under-estimate of the asbestos structure concentration because many of the asbestos fibers present are concealed by other particulate material with which they are associated. Conversely, indirect methods can be considered to yield an over-estimate because some types of complex asbestos structures disintegrate during the preparation, resulting in an increase in the numbers of structures counted.

4.2 U.S. EPA's Modified Yamate Method for TEM

High concentrations of background dust interfere with fiber identification.

4.3 NIOSH Method for TEM

Other amphibole particles that have aspect ratios greater than 3:1 and elemental compositions similar to the asbestos minerals may interfere in the TEM analysis. Some non-amphibole minerals may give electron diffraction patterns similar to amphiboles. High concentrations of background dust interfere with fiber identification.

4.4 NIOSH Method for PCM

PCM cannot distinguish asbestos from non-asbestos fibers; therefore, all particles meeting the counting criteria are counted as total asbestos fibers. Fiber less than 0.25 um in length will not be detected by this method. High levels of non-fibrous dust particles may obscure fibers in the field of view and increase the detection limit.

5.0 EQUIPMENT/MATERIALS

5.1 Sampling Pump

The constant flow or critical orifice controlled sampling pump should be capable of a flow-rate and pumping time sufficient to achieve the desired volume of air sampled.

The lower flow personal sampling pumps generally provide a flow rate of 20 cubic centimeters/minute (cc/min) to 4 L/min. These pumps are usually battery powered. High flow pumps are utilized when flow rates between 2 L/min to 20 L/min are required. High flow pumps are used for short sampling periods so as to obtain the desired sample volume. High flow pumps usually run on AC power and can be plugged into a nearby outlet. If an outlet is not available then a generator should be obtained. The generator should be positioned downwind from the sampling pump. Additional voltage may be required if more than one pump is plugged into the same generator. Several electrical extension cords may be required if sampling locations are remote.

The recommended volume for the Superfund method (Phase I) requires approximately 20 hours to collect. Such pumps typically draw 6 amps at full power so that 2 lead/acid batteries should provide sufficient power to collect a full sample. The use of line voltage, where available, eliminates the difficulties associated with transporting stored electrical energy.

A stand should be used to hold the filter cassette at the desired height for sampling and the filter cassette shall be isolated from the vibrations of the pump.

5.2 Filter Cassette

The cassettes are purchased with the required filters in position, or can be assembled in a laminar flow hood or clean area. When the filters are in position, a shrink cellulose band or adhesive tape should be applied to cassette joints to prevent air leakage.

5.2.1 TEM Cassette Requirements

Commercially available field monitors, comprising 25 mm diameter three-piece cassettes, with conductive extension cowls shall be used for sample collection. The cassette must be new and not previously used. The cassette shall be loaded with an MCE filter of pore size 0.45 µm, and supplied from a lot number which has been qualified as low background for asbestos determination. The cowls should be constructed of electrically conducting material to minimize electrostatic effects. The filter shall be backed by a 5 µm pore size MCE filter (Figure 1, Appendix B).

5.2.2 PCM Cassette Requirements

NIOSH Method 7400, PCM involves using a 0.8 to 1.2 µm mixed cellulose ester membrane, 25 mm diameter, 50 mm conductive cowl on cassette (Figure 2, Appendix B). Some labs are able to perform PCM and TEM analysis on the same filter; however, this should be discussed with the laboratory prior to sampling.

5.3 Other Equipment

- Inert tubing with glass cyclone and hose barb
- Whirlbags (plastic bags) for cassettes
- Tools - small screw drivers
- Container - to keep samples upright
- Generator or electrical outlet (may not be required)
- Extension cords (may not be required)
- Multiple plug outlet
- Sample labels
- Air data sheets
- Chain of Custody records

6.0 REAGENTS

Reagents are not required for the preservation of asbestos samples.

7.0 PROCEDURES

7.1 Air Volumes and Flow Rates

Sampling volumes are determined on the basis of how many fibers need to be collected for reliable measurements. Therefore, one must estimate how many airborne fibers may be in the sampling location.

Since the concentration of airborne aerosol contaminants will have some effect on the sample, the following is a suggested criterion to assist in selecting a flow rate based on real-time aerosol monitor (RAM) readings in milligrams/cubic meter (mg/m^3).

	Concentration	Flow Rate
• Low RAM readings:	<6.0 mg/m^3	11-15 L/min
• Medium RAM readings	>6.0 mg/m^3	7.5 L/min
• High RAM readings:	>10. mg/m^3	2.5 L/min

In practice, pumps that are available for environmental sampling at remote locations operate under a maximum load of approximately 12 L/min.

7.1.1 U.S. EPA's Superfund Method

The Superfund Method incorporates an indirect preparation procedure to provide flexibility in the amount of deposit that be can be tolerated on the sample filter and to allow for the selective concentration of asbestos prior to analysis. To minimize contributions to background contamination from asbestos present in the plastic matrices of membrane filters while allowing for sufficient quantities of asbestos to be collected, this method also requires the collection of a larger volume of air per unit area of filter than has traditionally been collected for asbestos analysis. Due to the need to collect large volumes of air, higher sampling flow rates are recommended in this method than have generally been employed for asbestos sampling in the past. As an alternative, samples may be collected over longer time intervals. However, this restricts the flexibility required to allow samples to be collected while uniform meteorological conditions prevail.

The sampling rate and the period of sampling should be selected to yield as high a sampled volume as possible, which will minimize the influence of filter contamination. Wherever possible, a volume of 15 cubic meters (15,000 L) shall be sampled for those samples intended for analysis only by the indirect TEM preparation method (Phase 1 samples). For those samples to be prepared by both the indirect and the direct specimen preparation methods (Phase 2 samples), the volumes must be adjusted so as to provide a suitably-loaded filter for the direct TEM preparation method. One option is to collect filters at several loadings to bracket the estimated optimum loading for a particular site. Such filters can be screened in the laboratory so that only those filters closest to optimal loading are analyzed. It has been found that the volume cannot normally exceed 5 cubic meters (5000 L) in an urban or agricultural area, and 10 cubic meters (10,000 L) in a rural area for samples collected on a 25 mm filter and prepared by a direct-transfer technique.

An upper limit to the range of acceptable flow rates for this method is 15 L/min. At many locations, wind patterns exhibit strong diurnal variations. Therefore, intermittent sampling (sampling over a fixed time interval repeated over several days) may be necessary to accumulate 20 hours of sampling time over constant wind conditions. Other sampling objectives also may necessitate intermittent sampling. The objective is to design a sampling schedule so that samples are collected under uniform conditions throughout the sampling interval. This method provides for such options. Air volumes collected on Phase I samples are maximized (<16 L/min). Air volumes collected on Phase 2 samples are limited to provide optimum loading for filters to be prepared by a direct-transfer procedure.

7.1.2 U.S. EPA's Modified Yamate Method for TEM

U.S. EPA's TEM method requires a minimum volume of 560 L and a maximum volume of 3,800 L in order to obtain an analytical sensitivity of 0.005 structures/cc. The optimal volume for TEM is 1200 L to 1800 L. These volumes are determined using a 200 mesh EM grid opening with a 25-mm filter cassette. Changes in volume would be necessary if a 37-mm filter cassette is used since the effective area of a 25 mm (385 sq mm) and 37 mm (855 sq m) differ.

7.1.3 NIOSH Method for TEM and PCM

The minimum recommended volume for TEM and PCM is 400 L at 0.1 fiber/cc. Sampling time is adjusted to obtain optimum fiber loading on the filter. A sampling rate of 1 to 4 L/min for eight hours (700 to 2800 L) is appropriate in non-dusty atmospheres containing 0.1 fiber/cc. Dusty atmospheres i.e., areas with high levels of asbestos, require smaller sample volumes (<400 L) to obtain countable samples.

In such cases, take short, consecutive samples and average the results over the total collection time. For documenting episodic exposures, use high flow rates (7 to 16 L/min) over shorter sampling times. In relatively clean atmospheres where targeted fiber concentrations are much less than 0.1 fiber/cc, use larger sample volumes (3,000 to 10,000 L) to achieve quantifiable loadings. Take care, however, not to overload the filter with background dust. If > 50% of the filter surface is covered with particles, the filter may be too overloaded to count and will bias the measured fiber concentration. Do not exceed 0.5 mg total dust loading on the filter.

7.2 Calibration Procedures

In order to determine if a sampling pump is measuring the flow rate or volume of air correctly, it is necessary to calibrate the instrument. Sampling pumps should be calibrated immediately before and after each use. Preliminary calibration should be conducted using a primary calibrator such as a soap bubble type calibrator, (e.g., a Buck Calibrator, Gilibrator, or equivalent primary calibrator) with a representative filter cassette installed between the pump and the calibrator. The representative sampling cassette can be reused for calibrating other pumps that will be used for asbestos sampling. The same cassette lot used for sampling should also be used for the calibration. A sticker should be affixed to the outside of the extension cowl marked "Calibration Cassette."

A rotameter can be used provided it has been recently pre-calibrated with a primary calibrator.

Three separate constant flow calibration readings should be obtained both before sampling and after sampling. Should the flow rate change by more than 5% during the sampling period, the average of the pre- and post-calibration rates will be used to calculate the total sample volume. The sampling pump used shall provide a non-fluctuating air-flow through the filter, and shall maintain the initial volume flow-rate to within " 10% throughout the sampling period. The mean value of these flow-rate measurements shall be used to calculate the total air volume sampled. A constant flow or critical orifice controlled pump meets these requirements. If at any time the measurement indicates that the flow-rate has decreased by more than 30%, the sampling shall be terminated. Flexible tubing is used to connect the filter cassette to the sampling pump Sampling pumps can be calibrated prior to coming on-site so that time is saved when performing on-site calibration.

7.2.1 Calibrating a Personal Sampling Pump with an Electronic Calibrator

1. See manufacturer's manual for operational instructions.

2. Set up the calibration train as shown in (Figure 3, Appendix B) using a sampling pump, electronic calibrator, and a representative filter cassette. The same lot sampling cassette used for sampling should also be used for calibrating.

3. To set up the calibration train, attach one end of the PVC tubing (approx. 2 foot) to the cassette base; attach the other end of the tubing to the inlet plug on the pump. Another piece of tubing is attached from the cassette cap to the electronic calibrator.

4. Turn the electronic calibrator and sampling pump on. Create a bubble at the bottom of the flow chamber by pressing the bubble initiate button. The bubble should rise to the top of the flow chamber. After the bubble runs its course, the flow rate is shown on the LED display.

5. Turn the flow adjust screw or knob on the pump until the desired flow rate is attained.

6. Perform the calibration three times until the desired flow rate of " 5% is attained.

7.2.2 Calibrating a Rotameter with an Electronic Calibrator

1. See manufacturer's manual for operational instructions.

2. Set up the calibration train as shown in (Figure 4, Appendix B) using a sampling pump, rotameter, and electronic calibrator.

3. Assemble the base of the flow meter with the screw provided and tighten in place. The flow meter should be mounted within 6^{o} vertical.

4. Turn the electronic calibrator and sampling pump on.

5. Create a bubble at the bottom of the flow chamber by pressing the bubble initiate button. The bubble should rise to the top of the flow chamber. After the bubble runs its course, the flow rate is shown on the LED display.

6. Turn the flow adjust screw or knob on the pump until the desired flow rate is attained.

7. Record the electronic calibrator flow rate reading and the corresponding rotameter reading. Indicate these values on the rotameter (sticker). The rotameter should be able to work within the desired flow range. Readings can also be calibrated for 10 cm^3 increments for Low Flow rotameters, 500 cm^3 increments for medium flow rotameters and 1 liter increments for high flow rotameters.

8. Perform the calibration three times until the desired flow rate of " 5% is attained. Once on site, a secondary calibrator, i.e., rotameter may be used to calibrate sampling pumps.

7.2.3 Calibrating a Personal Sampling Pump with a Rotameter

1. See manufacturer's manual for Rotameter's Operational Instructions.

2. Set up the calibration train as shown in (Figure 5, Appendix B) using a rotameter, sampling pump, and a representative sampling cassette.

3. To set up the calibration train, attach one end of the PVC tubing (approx. 2 ft) to the cassette base; attach the other end of the tubing to the inlet plug on the pump. Another piece of tubing is attached from the cassette cap to the rotameter.

4. Assemble the base of the flow meter with the screw provided and tighten in place. The flow meter should be mounted within 6^{o} vertical.

5. Turn the sampling pump on.

6. Turn the flow adjust screw (or knob) on the personal sampling pump until the float ball on the rotameter is lined up with the pre-calibrated flow rate value. A sticker on the rotameter should indicate this value.

7. A verification of calibration is generally performed on-site in the clean zone immediately prior to the sampling.

7.3. Meteorology

It is recommended that a meteorological station be established. If possible, sample after two to three days of dry weather and when the wind conditions are at 10 mph or greater. Record wind speed, wind direction, temperature, and pressure in a field logbook. Wind direction is particularly important when monitoring for asbestos downwind from a fixed source.

7.4 Ambient Sampling Procedures

7.4.1 Pre-site Sampling Preparation

1. Determine the extent of the sampling effort, the sampling methods to be employed, and the types and amounts of equipment and supplies needed.

2. Obtain necessary sampling equipment and ensure it is in working order and fully charged (if necessary).

3. Perform a general site survey prior to site entry in accordance with the site specific Health and Safety plan.

4. Once on-site the calibration is performed in the clean zone. The calibration procedures are listed in Section 7.2.

5. After calibrating the sampling pump, mobilize to the sampling location.

7.4.2 Site Sampling

1. To set up the sampling train, attach the air intake hose to the cassette base. Remove the cassette cap (Figure 6 and 7, Appendix B). The cassette should be positioned downward, perpendicular to the wind

2. If AC or DC electricity is required then turn it on. If used, the generator should be placed 10 ft. downwind from the sampling pump.

3. Record the following in a field logbook: date, time, location, sample identification number, pump number, flow rate, and cumulative time.

4. Turn the pump on. Should intermittent sampling be required, sampling filters must be covered between active periods of sampling. To cover the sample filter: turn the cassette to face upward, place the cassette cap on the cassette, remove the inlet plug from the cassette cap, attach a rotameter to the inlet opening of the cassette cap to measure the flow rate, turn off the sampling pump, place the inlet plug into the inlet opening on the cassette cap. To resume sampling: remove the inlet plug, turn on the sampling pump, attach a rotameter to measure the flow rate, remove the cassette cap, replace the inlet plug in the cassette cap and invert the cassette, face downward and perpendicular to the wind.

5. Check the pump at sampling midpoint if sampling is longer than 4 hours. The generators may need to be regased depending on tank size. If a filter darkens in appearance or if loose dust is seen in the filter, a second sample should be started.

6. At the end of the sampling period, orient the cassette up, turn the pump off.

7. Check the flow rate as shown in Section 7.2.3. When sampling open-faced, the sampling cap should be replaced before post calibrating. Use the same cassette used for sampling for post calibration (increase dust/fiber loading may have altered the flow rate.

8. Record the post flow rate.

9. Record the cumulative time or run.

10. Remove the tubing from the sampling cassette. Still holding the cassette upright, replace the inlet plug on the cassette cap and the outlet plug on the cassette base.

7.4.3. Post Site Sampling

1. Follow handling procedures in Section 3.2 steps 1-4.

2. Obtain an electronic or hard copy of meteorological data which occurred during the sampling event. Record weather: wind speed, ambient temperature, wind direction, and precipitation. Obtaining weather data several days prior to the sampling event can also be useful.

7.5 Indoor Sampling Procedures

PCM analysis is used for indoor air samples. When analysis shows total fiber count above the OSHA action level 0.1 f/cc then TEM (U.S. EPA's Modified Yamate Method) is used to identify asbestos from non-asbestos fibers.

Sampling pumps should be placed four to five feet above ground level away from obstructions that may influence air flow. The pump can be placed on a table or counter. Refer to Table 2 (Appendix A) for a summary of indoor sampling locations and rationale for selection.

Indoor sampling utilizes high flow rates to increased sample volumes (2000 L for PCM and 2800 to 4200 L for TEM) in order to obtain lower detection limits below the standard, (i.e., 0.01 f/cc or lower [PCM] and 0.005 structures/cc or lower [TEM]).

7.5.1 Aggressive Sampling Procedures

Sampling equipment at fixed locations may fail to detect the presence of asbestos fibers. Due to limited air movement, many fibers may settle out of the air onto the floor and other surfaces and may not be captured on the filter. In the past, an 8-hour sampling period was recommended to cover various air circulation conditions. A quicker and more effective way to capture asbestos fibers is to circulate the air artificially so that the fibers remain airborne during sampling. The result from this sampling option typifies worst case condition. This is referred to as aggressive air sampling for asbestos. Refer to Table

2 for sample station locations.

1. Before starting the sampling pumps, direct forced air (such as a 1-horsepower leaf blower or large fan) against walls, ceilings, floors, ledges, and other surfaces in the room to initially dislodge fibers from surfaces. This should take at least 5 minutes per 1000 sq. ft. of floor.

2. Place a 20-inch fan in the center of the room. (Use one fan per 10,000 cubic feet of room space.) Place the fan on slow speed and point it toward the ceiling.

3. Follow procedures in Section 7.4.1 and 7.4.2 (Turn off the pump and then the fan(s) when sampling is complete.).

4. Follow handling procedures in Section 3.2 steps 1-4.

8.0 CALCULATIONS

The sample volume is calculated from the average flow rate of the pump multiplied by the number of minutes the pump was running (volume = flow rate X time in minutes). The sample volume should be submitted to the laboratory and identified on the chain of custody for each sample (zero for lot, field and trip blanks).

The concentration result is calculated using the sample volume and the numbers of asbestos structures reported after the application of the cluster and matrix counting criteria.

9.0 QUALITY ASSURANCE/QUALITY CONTROL

Follow all QA/QC requirements from the laboratories as well as the analytical methods.

9.1 TEM Requirements

1. Examine lot blanks to determine the background asbestos structure concentration.

2. Examine field blanks to determine whether there is contamination by extraneous asbestos structures during specimen preparation.

3. Examine of laboratory blanks to determine if contamination is being introduced during critical phases of the laboratory program.

4. To determine if the laboratory can satisfactorily analyze samples of known asbestos structure concentrations, reference filters shall be examined. Reference filters should be maintained as part of the laboratory's Quality Assurance program.

5. To minimize subjective effects, some specimens should be recounted by a different microscopist.

6. Asbestos laboratories shall be accredited by the National Voluntary Laboratory

Accreditation Program.

7. At this time, performance evaluation samples for asbestos in air are not available for Removal Program Activities.

9.2 PCM Requirements

1. Examine reference slides of known concentration to determine the analyst's ability to satisfactorily count fibers. Reference slides should be maintained as part of the laboratory's quality assurance program.

2. Examine field blanks to determine if there is contamination by extraneous structures during sample handling.

3. Some samples should be relabeled then submitted for counting by the same analyst to determine possible bias by the analyst.

4. Participation in a proficiency testing program such as the AIHA-NIOSH proficiency analytical testing (PAT) program.

10.0 DATA VALIDATION

Results of quality control samples will be evaluated for contamination. This information will be utilized to qualify the environmental sample results accordingly with the project's data quality objectives.

11.0 HEALTH AND SAFETY

When working with potentially hazardous materials, follow U.S. EPA, OSHA, and corporate health and safety procedures. More specifically, when entering an unknown situation involving asbestos, a powered air purifying respirator (PAPR) (full face-piece) is necessary in conjunction with HEPA filter cartridges. See applicable regulations for action level, PEL, TLV, etc. If previous sampling indicates asbestos concentrations are below personal health and safety levels, then Level D personal protection is adequate.

12.0 REFERENCES

1. Environmental Asbestos Assessment Manual, Superfund Method for the Determination of Asbestos in Ambient Air, Part 1: Method, EPA/540/2-90/005a, May 1990, and Part 2: Technical Background Document, EPA/540/2-90/005b, May 1990.

2. Methodology for the Measurement of Airborne Asbestos by Electron Microscopy, EPA's Report No. 68-02-3266, 1984, G. Yamate, S.C. Agarwal, and R. D. Gibbons.

3. National Institute for Occupational Safety and Health. NIOSH Manual of Analytical Method. Third Edition. 1987.

4. U.S. Environmental Protection Agency. Code of Federal Regulations 40 CFR 763. July 1, 1987. Code of Federal Regulations 40 CFR 763 Addendum. October 30, 1987.

5. U.S. Environmental Protection Agency. Asbestos-Containing Materials in Schools; Final Rule and Notice. 52 FR 41826.

6. Occupational Safety and Health Administration. Code of Federal Regulations 29 CFR 1910.1001. Washington, D.C. 1987.

APPENDIX A
Tables
SOP #2015
November 1994

TABLE 1.

SAMPLE STATIONS FOR OUTDOOR SAMPLING

Sample Station Location	Sample Numbers	Rationale
Upwind/Background[1]	Collect a minimum of two simultaneous upwind/background samples 30^{o} apart from the prevailing windlines.	Establishes background fiber levels.
Downwind	Deploy a minimum of 3 sampling stations in a 180 degree arc downwind from the source.	Indicates if asbestos is leaving the site.
Site Representative and/or Worst Case	Obtain one site representative sample which shows average condition on-site or obtain worst case sample (optional).	Verify and continually confirm and document selection of proper levels of worker protection.

(1) More than one background station may be required if the asbestos originates from different sources.

TABLE 2

SAMPLE STATIONS FOR INDOOR SAMPLING

Sample Station Location	Sample Numbers	Rationale
Indoor Sampling	If a work site is a single room, disperse 5 samplers throughout the room. If the work site contains up to 5 rooms, place at least one sampler in each room. If the work site contains more than 5 rooms, select a representative sample of the rooms.	Establishes representative samples from a homogeneous area.
Upwind/Background	If outside sources are suspected, deploy a minimum of two simultaneous upwind/background samples 30^{o} apart from the prevailing windlines.	Establish whether indoor asbestos concentrations are coming from an outside source.
Worst Case	Obtain one worst case sample, i.e., aggressive sampling (optional).	Verify and continually confirm and document selection of proper levels of worker protection.

APPENDIX B
Figures
SOP #2015
November 1994

FIGURE 1. Transmission Electron Microscopy Filter Cassette

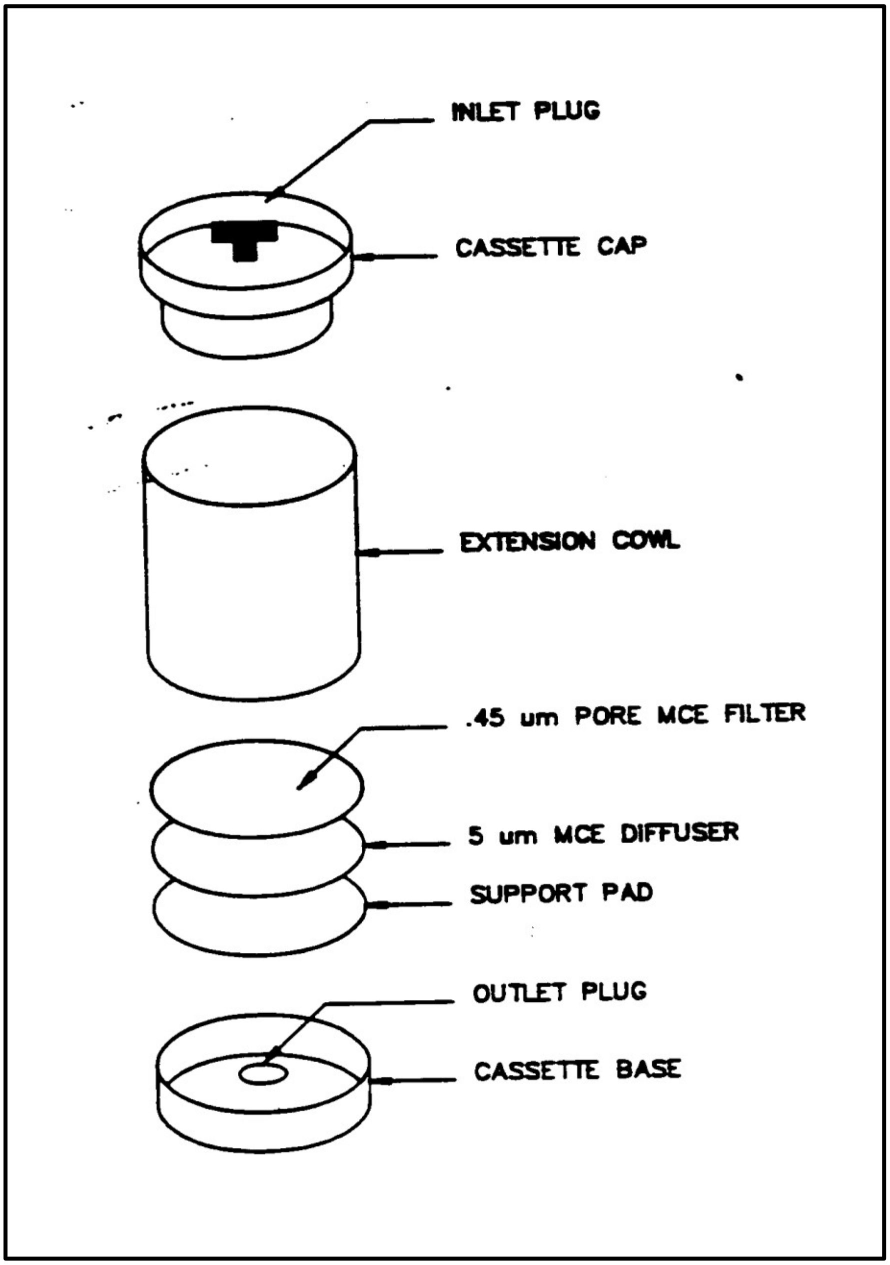


FIGURE 2. Phase Contrast Microscopy Filter Cassette

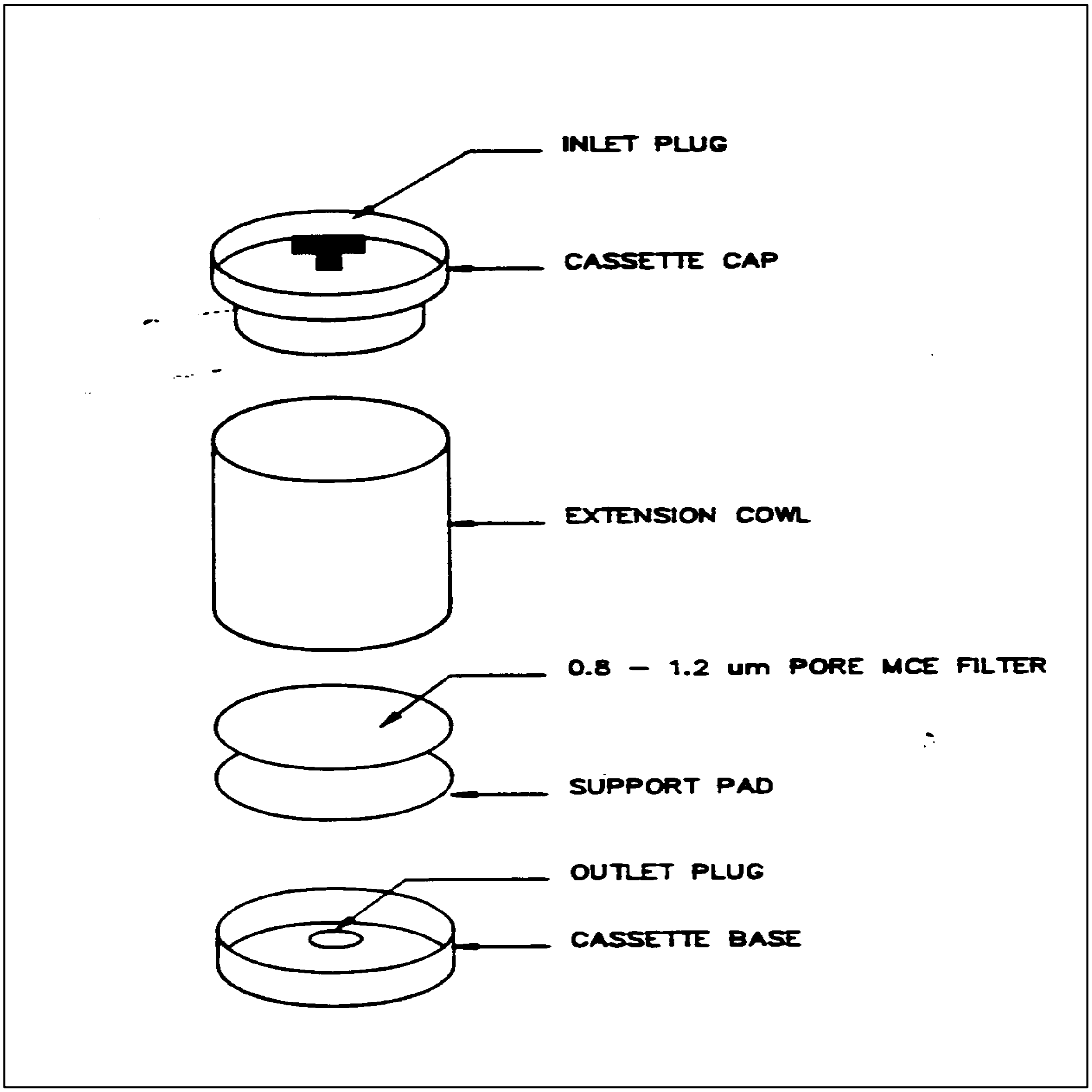


FIGURE 3. Calibrating a Personal Sampling Pump with a Bubble Meter

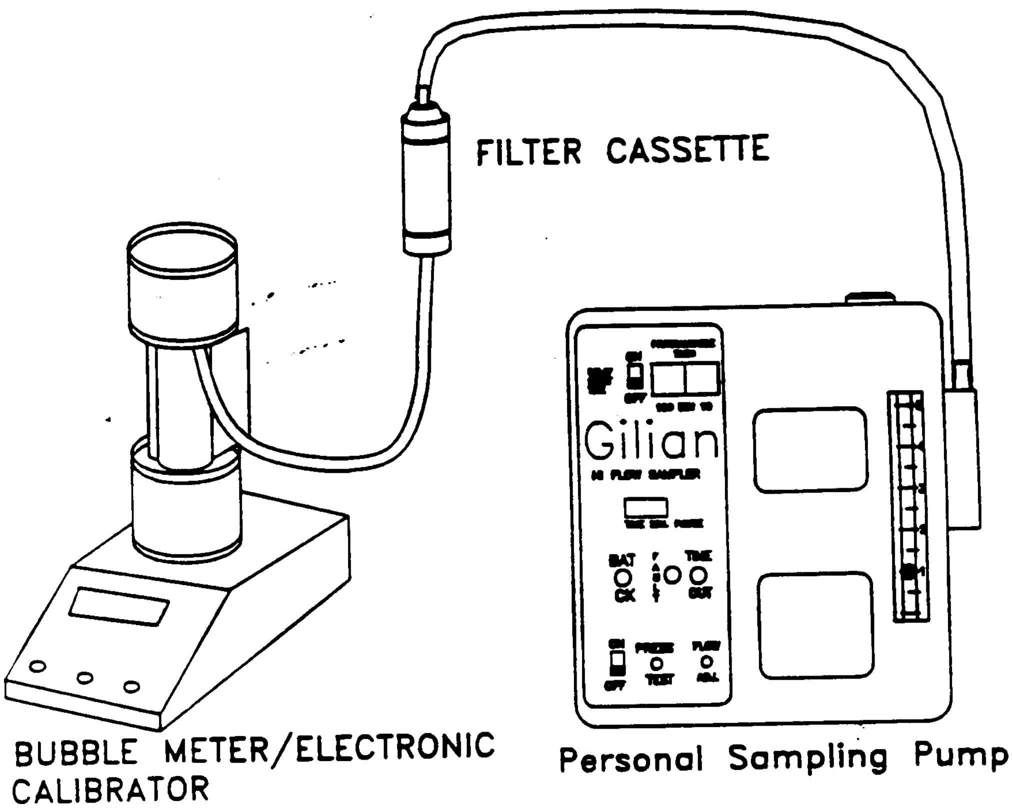


FIGURE 4. Calibrating a Rotameter with a Bubble Meter

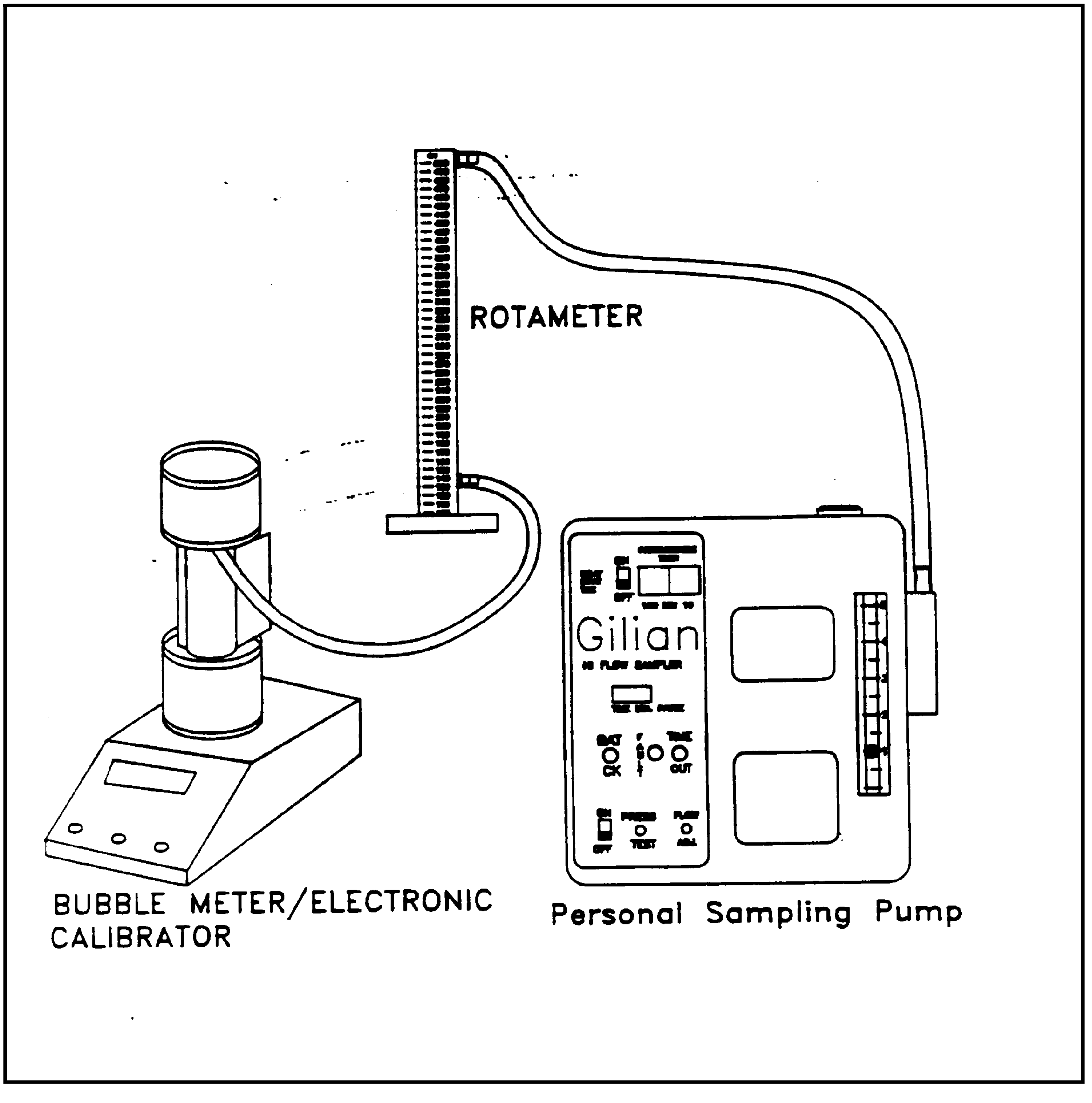


FIGURE 5. Calibrating a Sampling Pump with a Rotameter

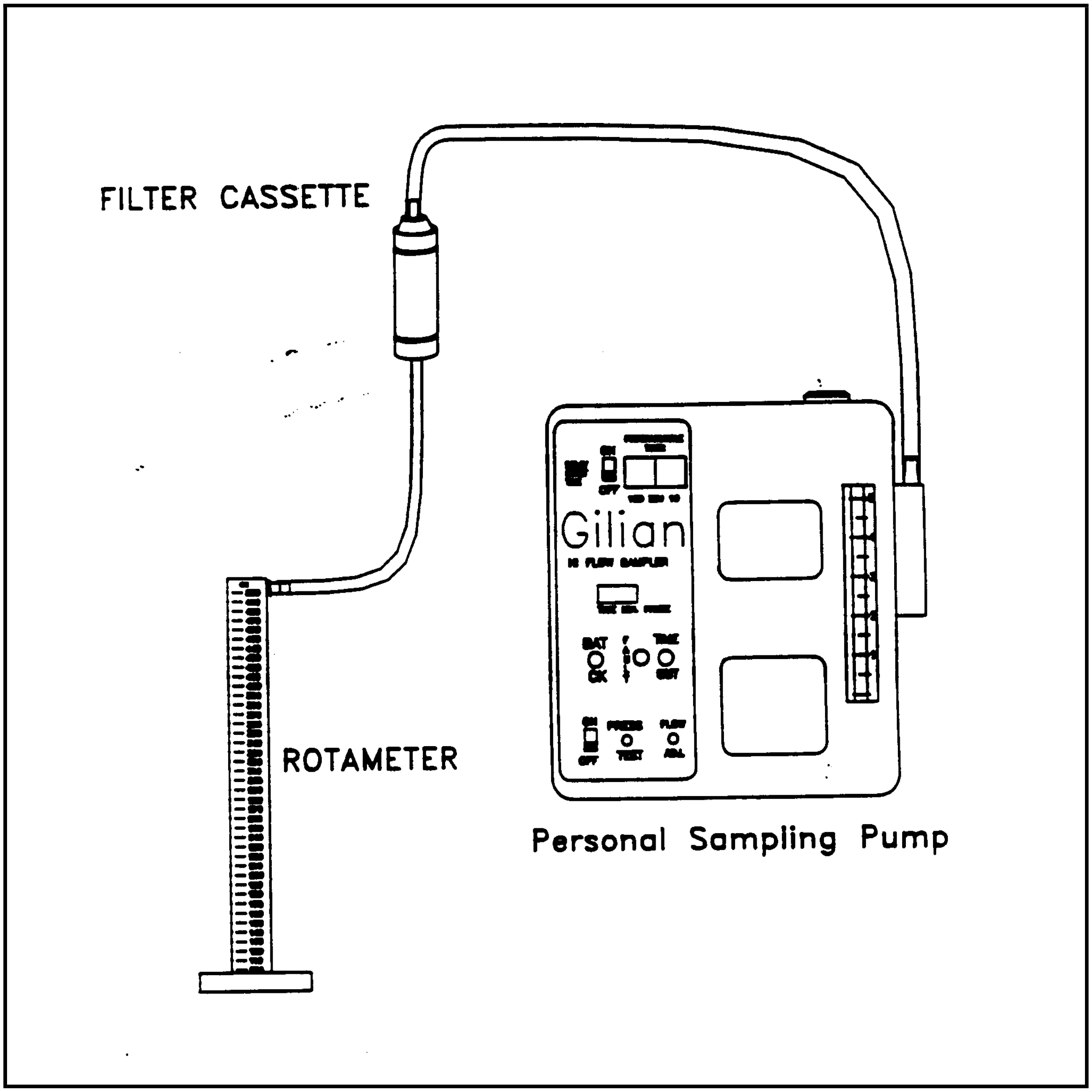


FIGURE 6. Personal Sampling Train for Asbestos

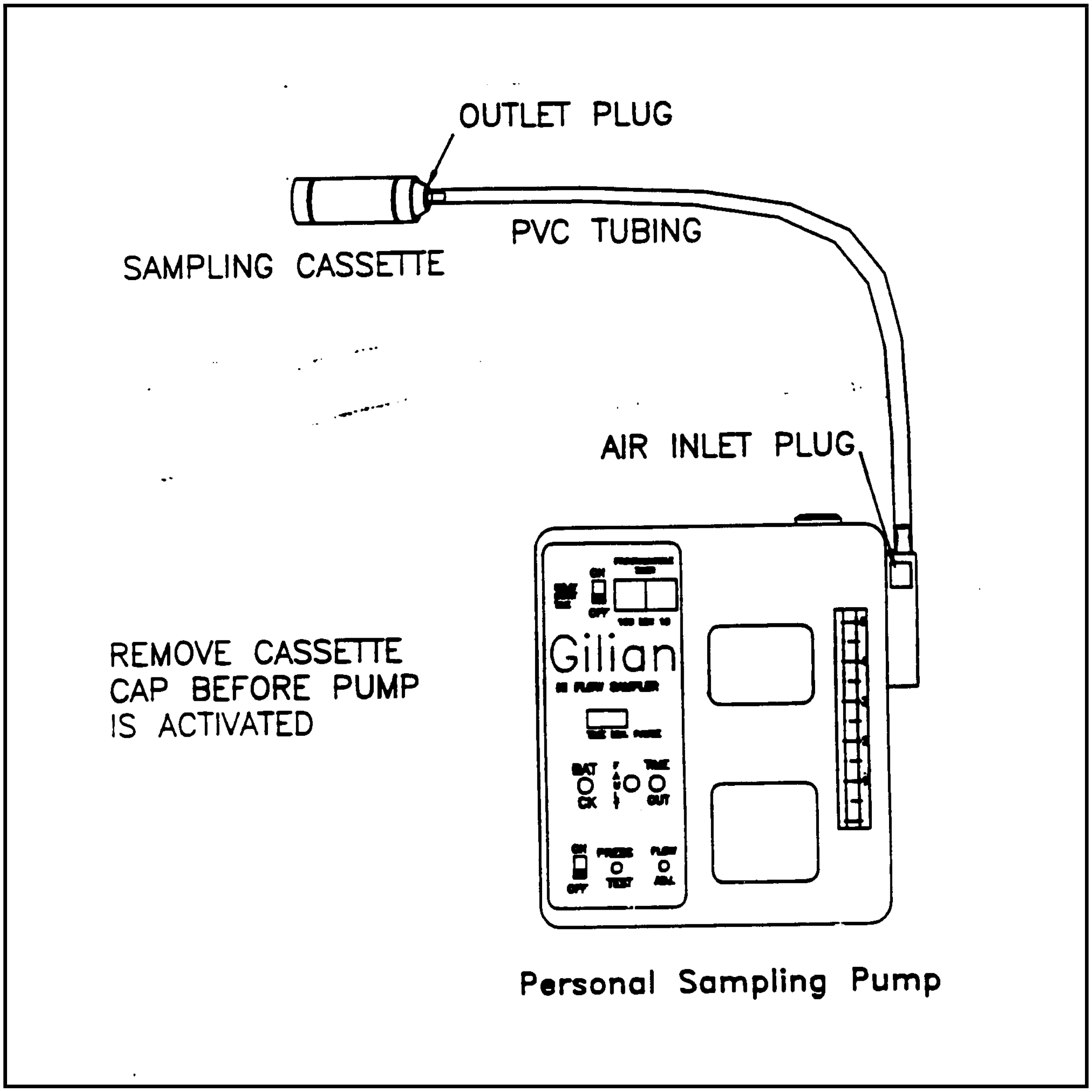
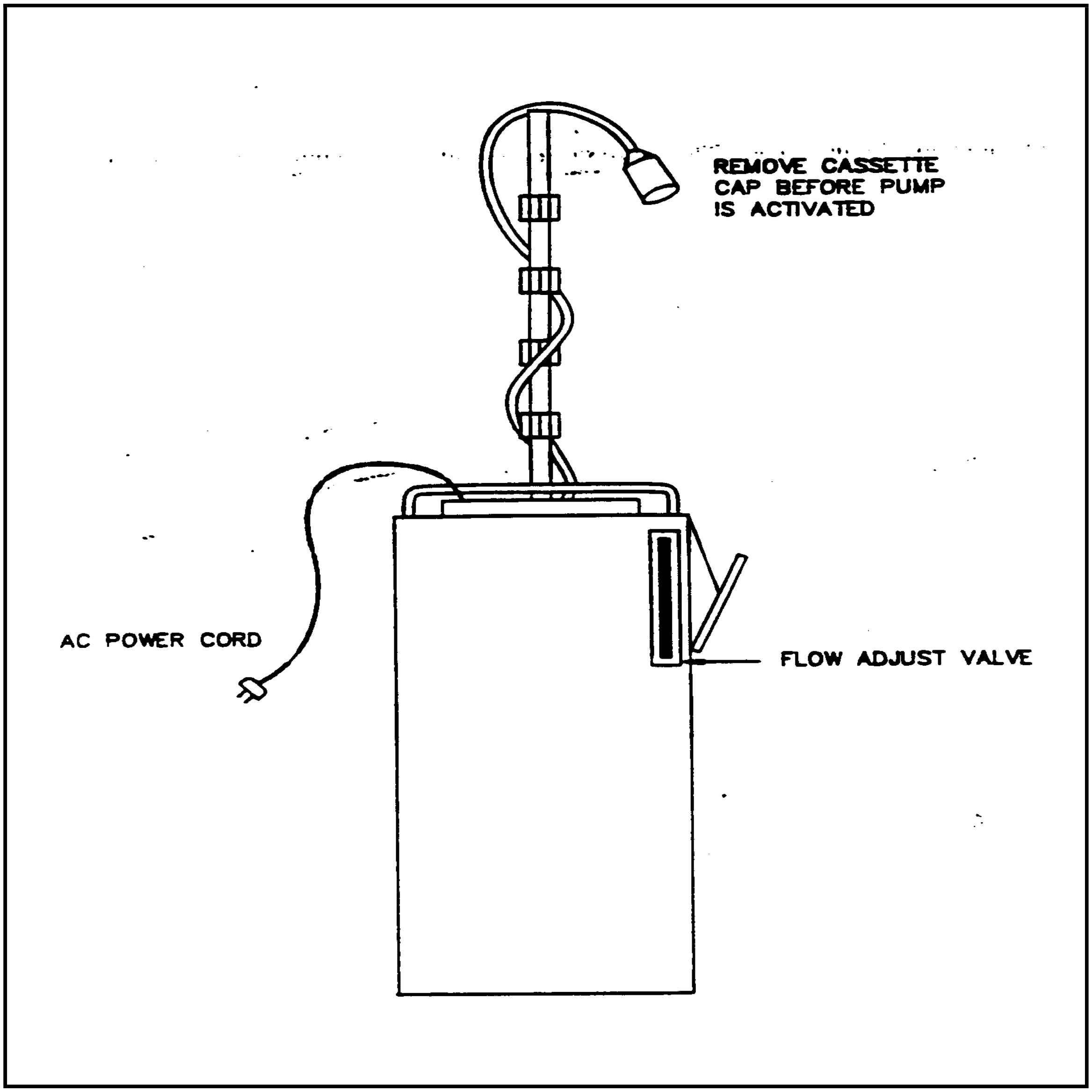


FIGURE 7. High Flow Sampling Train for Asbestos



RETRIEVING METEOROLOGICAL INFORMATION

CONTENTS

SUPERCEDES: SOP #2048; Revision 0.0; 08/11/92; U.S. EPA Contract EP-W-09-031.

1.0 SCOPE AND APPLICATION

The objective of this Standard Operating Procedure (SOP) is to define the protocol for retrieving meteorological information to be used as inputs to categorize on-site field conditions in "real-time."

This SOP is applicable to all field activities which involve the collection of environmental data or which include activities that expose workers to climate related stresses.

This SOP is not intended to cover all possible meteorological data retrieval venues, but to describe several of those which are readily available to ERT/SERAS personnel.

These are standard (i.e., typically applicable) operating procedures, which may be varied or changed as required, dependent upon site conditions, equipment limitations or limitations imposed by the procedure. In all instances, the ultimate procedures employed should be documented and associated with the final report.

Mention of trade names or commercial products does not constitute U.S. Environmental Protection Agency (U.S. EPA) endorsement or recommendation for use.

2.0 METHOD SUMMARY

There are several sources of meteorological data available. In practice, more than one source should be accessed to ensure (a degree of) reliability in the data. Sources of meteorological data include:

- On-Site Meteorological Data Acquisition Systems (OMDAS)
- National Weather Service (NWS) and Other Governmental Services
- Airports
- Neighboring Industrial Facilities
- Public Bulletin Boards

Prior to site activities, field personnel are expected to contact and to be familiar with the avenues of obtaining meteorological information. A more detailed description is provided in Section 7.0 of this SOP.

3.0 SAMPLE PRESERVATION, CONTAINERS, HANDLING, AND STORAGE

This section is not applicable to this SOP.

4.0 INTERFERENCES AND POTENTIAL PROBLEMS

There is no chemical interferences for this procedure; however, the instrumentation is fragile and there is a chance of breakage.

5.0 EQUIPMENT/APPARATUS

Necessary equipment for the OMDAS is discussed in ERT/SERAS SOP #2120, Remote Meteorological Station. Computers connected to phone modems are required to access public bulletin boards.

6.0 REAGENTS

This section is not applicable to this SOP.

7.0 PROCEDURE

This section discusses the methods of retrieving meteorological data. This SOP does not list all of the methods of meteorological data retrieval, but it does provide sufficient information to obtain data from various sources. These information sources should be checked prior to the site operations.

An excellent source of meteorological data is provided by an OMDAS. An OMDAS provides the site personnel with easy access to meteorological information and informs site workers of local conditions when the site environment differs from surrounding areas. In addition to on-site measurements, meteorological conditions should be obtained by an outside, reliable source. These sources may include:

- National Weather Service (NWS)
- National Climatic Data Center (NCDC)
- Accu-Weather's Accu-Access
- Weather-Brief
- Major City/Airport Data
- Neighboring Industrial Facilities

7.1 National Weather Service

The local NWS offices are listed in the "Blue Pages" (Government Agencies) in the phone book. If they are not listed separately, the number can be found under the Department of Commerce. The NWS headquarters is in Kansas City and can be reached at 1510 East Bannister Road, Building, 1 Kansas City, MO 64131 (816-926-7993). They will provide telephone numbers for other local or regional NWS offices.

Typical data which should be obtained includes surface temperature, barometric pressure, wind speed and wind direction. At times it may be necessary to obtain upper air information which includes ceiling height, cloud cover, and upper level wind speed and direction. The NWS also has access to radar data which may provide useful information.

7.2 National Climatic Data Center

The NCDC, in Asheville NC, offers historical meteorological data. The hourly data is provided in one year segments, and is similar to that provided by the NWS (barring the radar). The data is encoded differently than that from the NWS, but a separate file including their format is provided. See the SERAS meteorologists for more information.

7.3 Accu-Weather's Accu-Data/Weather-Brief

ERT/SERAS currently subscribes to a communication software link to Weather-Brief, Inc. The link attaches users to a direct access or menu driven bulletin board that provides several types of meteorological data, including: hourly observations, short-range forecasts, long-range forecasts, radar information, and satellite data. To access data for a specific location, the user must provide a three-letter station identifier. The hourly observation data (preferred for modeling) is updated continuously. Seventy-two hours of archived hourly data is available. Other software links are available. One such software, Accu-Weather's Accu-Data may be subscribed to on a bi-annual basis.

7.4 Major City/Airport Weather (Weather-Brief)

Current weather conditions, as well as forecast information can be accessed by dialing 1-800-WX-BRIEF. Identify yourself as a U.S. EPA contractor and tell the operator the city(ies)/area(s) for which you want information.

7.5 Neighboring Industrial Facilities

Some facilities have their own OMDAS which are checked monthly for statistical errors. These sites offer good data for dispersion models which may require a meteorological history. To receive copies of their weather data, interested parties should contact the plant's facility manager or the local air management agency. Many facility managers will provide copies of the data at no charge. Local air management agencies may be able to provide information regarding the quality of meteorological data available at facilities within their district. See the SERAS meteorologists for more information.

7.6 Data Storage

Preservation, handling and storage of the OMDAS data is discussed in ERT/SERAS SOP #2120, Remote Meteorological Station. Meteorological data obtained during, or for, field activities should be stored on magnetic media which is labeled to include:

- Name of site
- Date(s) data were collected
- Specific information collected

A copy of this information should be provided to the SERAS meteorological and modeling staff for future use.

8.0 CALCULATIONS

The OMDAS is a direct reading device which provides wind flow parameters (such as wind speed, wind direction and temperature). Specific OMDAS calibration and calculations are available in ERT/SERAS SOP #2120, Remote Meteorological Station.

9.0 QUALITY ASSURANCE/QUALITY CONTROL

Before beginning site activities, Task Leaders are responsible for accessing the meteorological service closest to the planned site. In addition, Task Leaders should familiarize themselves with the proper use and acquisition of data from the OMDAS. Periodic checks should be made every two hours with the local weather service to ensure instrument reliability and worker safety.

In addition, the following general quality assurance procedures apply:

1. All data must be documented on field data sheets or within site logbooks.

2. All instrumentation must be operated in accordance with operating instructions as supplied by the manufacturer, unless otherwise specified in the work plan. Equipment checkout and calibration activities must occur prior to sampling/operation and they must be documented.

10.0 DATA VALIDATION

Data validation is made possible by checks through several sources. See the SERAS meteorologists for further information and assistance.

11.0 HEALTH AND SAFETY

Physical hazards of the OMDAS may be avoided by securing the cables from the probes and the antenna with a velcro tie as described in ERT/SERAS SOP #2120, Remote Meteorological Station.

When working with potential hazardous materials, follow U.S. EPA, OSHA and corporate health and safety procedures.

12.0 REFERENCES

This section is not applicable to this SOP.

OPERATION OF E-BAM PARTICULATE MASS MONITOR

CONTENTS

CONTENTS (cont'd)

The policies and procedures established in this document are intended solely for the guidance of OLEM employees of the U.S. Environmental Protection Agency (EPA). They are not intended and cannot be relied upon to create any rights, substantive or procedural, enforceable by any party in litigation with the United States. EPA reserves the right to act at variance with these policies and procedures, and to change them at any time without public notice. EPA strongly encourages all readers to verify the validity of the information contained in this document by consulting the most recent Code of Federal Regulations (CFR) and updated guidance documents.

Mention of trade names or commercial products does not constitute U.S. Environmental Protection Agency (U.S. EPA) endorsement or recommendation for use.

1.0 SCOPE AND APPLICATION

This standard operating procedure (SOP) describes the start-up, check out, operation, calibration, and routine use of the portable Met One Instruments, Inc. E-BAM real-time particulate mass monitor. The procedures and figures contained in this SOP are taken from the copyrighted the *E-BAM PARTICULATE MONITOR OPERATION MANUAL E-BAM-9800 REV L* (2008). Some material is excerpted without change from this manual. This SOP will be used for educational and training purposes only.

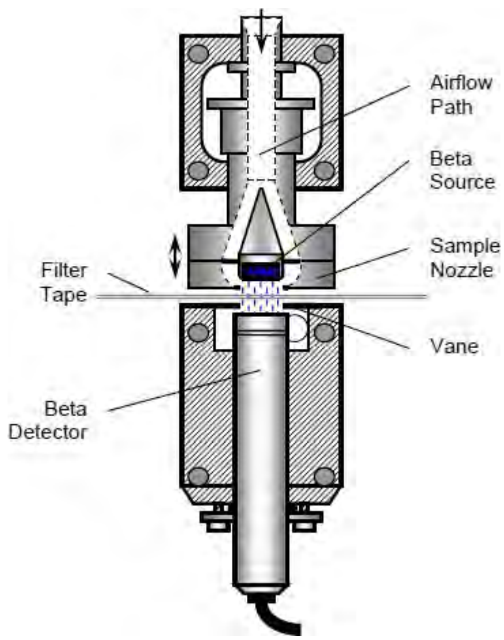
The E-BAM particulate mass monitor automatically measures and records airborne particulate matter less than (<) 10 microns (PM_{10}) or particulate matter less than or equal (≤) to 2.5 microns ($PM_{2.5}$) particulate concentration levels using the principle of beta particle attenuation without the need for filter removal and laboratory analysis. This method provides real-time determination of concentration in units of milligrams particulate per cubic meter of air (mg/m^3). The E-BAM is designed as a simple, compact, and self-contained beta gauge for portable applications where rapid deployment and short interval real-time measurements are required. Refer to the E-BAM User's Manual for detailed operating procedures.

A Quality Assurance Project Plan (QAPP) in Uniform Federal Policy (UFP) format describing the project objectives must be prepared prior to deploying for a sampling event. The sampler needs to ensure that the methods used are adequate to satisfy the data quality objectives listed in the UFP-QAPP for a particular site.

The procedures in this SOP may be varied or changed as required, dependent on site conditions, equipment limitations or other procedural limitations. In all instances, the procedures employed must be documented on a Field Change Form and attached to the UFP-QAPP. These changes must be documented in the final deliverable.

2.0 METHOD SUMMARY

Beta attenuation is defined as the decrease in the number of beta particles due to absorption by the traversed medium. A small Carbon14 (^{14}C) source emits a constant 60 microcurie (µCi) signal of low to medium energy electrons known as beta particles. The beta particles are detected by a scintillation detector and counter positioned near the source. A filter tape is placed between the source and detector and a beta particle count is performed. A vacuum pump pulls a measured amount of air through the filter tape where the particulate is deposited. A second count is then performed across the filter tape with the deposited particulate. The second count will be less than the first count due to the absorption of beta particles by the deposited particulate. The degree of attenuation of the beta signal is used to determine the mass concentration of particulate matter on the filter tape. The mass concentration is divided by the sampled air volume to calculate the ambient air volumetric particulate concentration. Appendix A contains the E-Bam instrument specifications. The sample and measurement system is illustrated in the figure below.



3.0 SAMPLE PRESERVATION, CONTAINERS, HANDLING, AND STORAGE

This section is not applicable to this SOP.

4.0 INTERFERENCES AND POTENTIAL PROBLEMS

Relative humidity and moisture may interfere with the particle mass measurement. An out-of-range humidity condition overwhelms the E-BAM's humidity lowering smart heater technology and allows moisture to accumulate on the sample filter, producing inaccurate concentration determinations. The instrument must be operated in a 0 to 90 percent (%) relative humidity, non-condensing environment. Only personnel trained in the use of this analyzer are authorized to take measurements and process results.

When using the E-BAM to measure particulates containing radioactive materials, caution should be used, as the unit is likely to under-measure the particulate concentration. Appendix B contains the Met One Technical Bulletin on sampling for radioactive particulate with the E-Bam.

5.0 EQUIPMENT/APPARATUS

The following equipment is required for the operation of the E-BAM particulate mass monitor:

- Base unit and enclosure
- Mounting tripod and cross-arm
- Sample inlet tube

- PM_{10} or $PM_{2.5}$ size selective inlets
- Temperature sensor
- Relative humidity sensor
- Wind sensor (optional)
- Sensor connector cables
- Power supply unit
- Spare parts and accessories kit
- User's Manual
- Pelican storage and transport cases

6.0 REAGENTS

This section is not applicable to this SOP.

7.0 PROCEDURES

7.1 Site Selection

7.1.1 Inlet Height

- The inlet should be located between 2 and 15 meters (m) above ground-level.
- If the inlet is located on or through a rooftop, the total height should be no more than 15 meters from the ground level.
- If the E-BAM inlet is the highest point on a building, then lightning rods must be installed to prevent destruction of the unit during electrical storms.

7.1.2 Inlet Radius Clearance

- The inlet must have a 1-m radius free of any objects that may influence airflow characteristics, including the inlets of other instruments.
- The inlet must be at least 20 m from the drip line of any overhanging trees.
- There must be at least a 270 degree (°) arc of unrestricted airflow around the inlet.
- If installed near a PM_{10} Hi-Volume sampler, the distance between the inlet of the E-BAM and the Hi-Volume sampler must be no less than 2 m.
- The E-BAM inlet must be located away from obstructions such as short walls, fences, and penthouses, so that the inlet is unobstructed for 2 m in all directions.
- If located beside a major obstruction, e.g. a building, the distance between the E-BAM and the obstruction must be equal to twice the height of the obstruction.

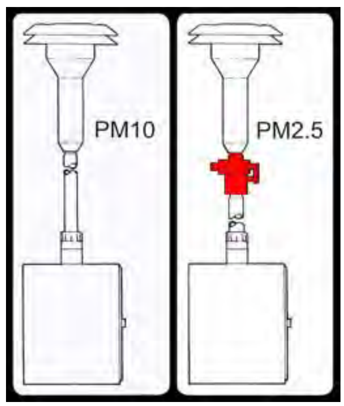
7.2 Assembly

1. Remove the three stainless steel detent pins from the tripod base by pulling the rings.
2. Unfold the three tripod legs and reinsert the three pins so that each pin secures a leg in the open position making sure the erected tripod is rigid and stable.

3. Lift up the E-BAM enclosure with the aerosol inlet oriented upwards.
4. Slide the slot on the back of the cabinet down over the tab of the tripod.
5. Bolt the cabinet to the tripod with the provided ¼ inch nut and bolt.
6. Remove plastic end caps from the inlet adaptor tube and push it into the E-BAM inlet. Tube must pass through two O-rings by pushing and twisting the tube into the enclosure until it stops.

NOTE: Use supplied longer adapter tube and not the BX-305 or unit may fail leak test.

7. Hand-tighten the large black compression fitting at the top of the E-BAM enclosure.
8. Place the sampling head PM_{10} or PM_{10} equipped with sharp cut cyclone for $PM_{2.5}$ onto the inlet adaptor tube as shown below.



9. Push and twist the sampling head down all the way until it stops. The head must pass through two O-rings. The O-rings are factory lubricated but with frequent removal/replacement of parts they will need to be re-lubricated with silicon grease. (See Appendix C – Maintenance for detailed instructions on Service and Replacement of O-rings)

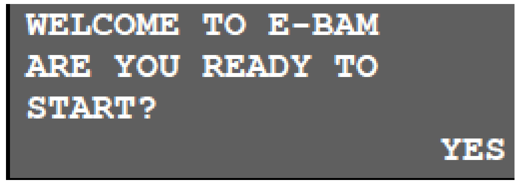
10. Install the cross arm on the pipe at the top of the tripod and tighten.
11. Clip the temperature sensor onto one arm of the tripod. Under the E-BAM's enclosure visually inspect all of the receptacles and without forcing, align and screw in end of the signal cable into the 5-pin receptacle.
    NOTE: Pay special attention when inserting the connector as pins may bend or brake.

12. Attach the power supply to the 4-pin direct current (DC) power input plug at the bottom of the enclosure.

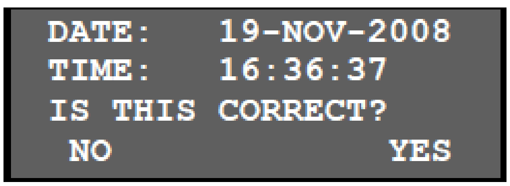
7.3 Startup

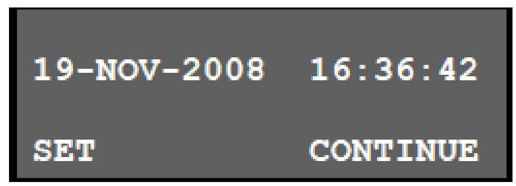
7.3.1 Power-up Settings Verification and Automatic Self-Test

1. Power-up the E-BAM by plugging the power supply into 110 volt alternating current (VAC) source or switching on alternate 12 volt direct current (VDC) power source.
2. At power-up, the unit will show the firmware revision and unit serial number for a moment and display the welcome screen.

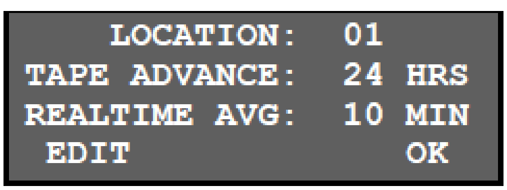


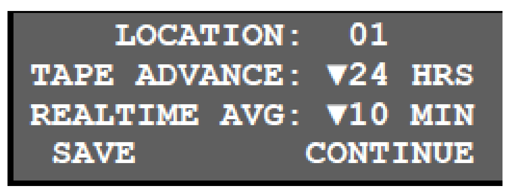
3. Press the soft key below **YES** on the User Interface.
4. Clock Screen is displayed.
5. If time and date are correct, press the **YES** key.
6. If time and date are incorrect, press **NO.** The display will show the Time/Date Set Screen.
7. Use arrow keys to change the values and press **SET** or press **CONTINUE** to make no changes.



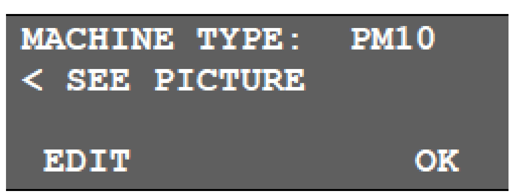


8. After the time is verified, unit will display the Averaging Period Screen.
9. Press **OK** if settings are correct.
10. If the settings require changing, press the **EDIT** key to enter Edit Mode.
11. Select the parameter to be changed with the ◄► keys and modify the settings with the ▲▼ keys.
12. Press **SAVE** or press **CONTINUE** to exit Edit Mode without making changes.





13. After settings are verified, the E-BAM will display the Machine Type Screen which identifies the type of inlet installed, either a $PM_{2.5}$ or PM_{10}.
14. Press **EDIT** to change the setting with the arrow keys, or press **OK** to go on without changes.



15. After the MACHINE TYPE is set or verified, the E-BAM will raise the nozzle and check to see if the stainless steel shipping shim is installed under the nozzle.
16. If the shim is still in place the unit will display the message “PLEASE REMOVE NOZZLE PACKING MATERIAL”.

NOTE: The shim is attached to the unit with a tether chain, and is used for the zero portion of the span membrane test. The shim should be installed any time the E-BAM is shipped or transported in order to prevent nozzle damage.

17. After the nozzle shim has been removed, the E-BAM will check for filter tape roll installation.
18. If tape is installed, the unit will go on to the power status screen.
19. If no tape is detected, the unit will prompt to install a new roll.

```
CHECKING FOR
LOADED TAPE.

PLEASE WAIT...
```

```
PLEASE LOAD TAPE!
E-BAM WILL NOT
OPERATE WITHOUT
TAPE!          CONTINUE
```

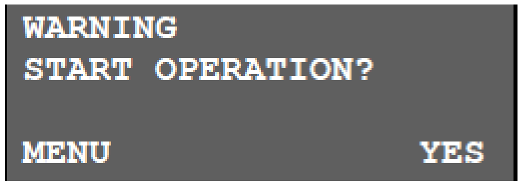
20. Install a roll of filter tape as described in Section 7.7.5 *Filter Tape Loading*.
21. After filter tape is installed, press **CONTINUE** and the unit will again try to detect the tape.
22. If tape is detected, the unit will go on to display the power status screen.

```
BATTERY: 14.3 VOLTS
ESTIMATED OPERATION
TIME FOR 100 AMP-HRS
IS 33 HRS.   CONTINUE
```

23. Press **CONTINUE** to proceed and unit will begin the self-test process and display “SELF TEST RUNNING…”.
24. If the self-test finishes without errors, the screen will display that the unit is functioning properly.
25. Press **CONTINUE** to go on to the start operation screen as shown below.

```
SELF TEST COMPLETE:
E-BAM FUNCTIONING
PROPERLY.
             CONTINUE
```

26. Press **MENU** to enter the main E-BAM menu system.



7.3.2 Warm-up Period

The unit must warm up for at least one hour before optimum accuracy is obtained. This applies any time the unit is powered up or after being off for more than a few minutes.

7.4 Field Leak Check and Flow Audit

NOTE: Prior to sampling, a leak check, and a flow audit must be performed.

NOTE: Field leak checks and flow audits can be performed during the warm-up period.

7.4.1 Leak Check

1. Press **MENU/SELECT** on the USER Interface and highlight **FIELD CALIBRATION/PUMP TEST.**
2. Select **LEAK CHECK**.
3. Remove the sampling head and replace with a leak test valve (Met One part No.: BX-305).
4. Close leak test valve.
5. The flow rate on the display should drop to under 1.5 liters per minute (LPM).
6. If flow drops to less than 1.5 LPM, leak check passes.
7. Open and remove valve and replace sampling head.
8. If leak check fails, refer to the *E-BAM PARTICULATE MONITOR OPERATION MANUAL* for information on troubleshooting leaks.

7.4.2 Flow Audit

1. Attach the flow standard to the E-BAM inlet.
2. Let the E-BAM pull through the standard for 1 minute until stabilized and then check the flow rate.
3. Flow reading must be within 4% of the flow standard reading and must be within 5% of 16.67 LPM.
4. If the readings do not agree with the standard, then a flow calibration must be performed as detailed in Section 7.7.5 *Filter Tape Loading*.

7.5 Calibration

1. Press **MENU/SELECT**, highlight **FIELD CALIBRATION,** and press **MENU/SELECT** again.

2. From the Field Calibration Screen, highlight and select **FLOW**.
3. The FLOW display will show three parameters; flow set point (FLOW SP), E-BAM flow rate (E-BAM), and the reference flow rate (REF).
4. The flow set point is selectable with three points, 14.0, 16.7, and 17.5 LPM. The 16.7 LPM set point is used as a reference point between the Low (14.0LPM) and the high (17.5LPM) flow and should not be adjusted at any given time.
5. Remove sampling cap and place the reference flow audit device on the inlet tube.
6. Wait for 5 minutes for the flow to equilibrate.
7. Compare reference flow to the E-BAM flow.
8. If the flows are within 2% go to step 13.
9. If not, highlight **REF**: and enter audit device flow rate and press **CALIBRATE**.
10. Highlight **FLOW SP**: and select one of the other two selectable flow rates.
11. The E- Bam will automatically turn the pump and regulate to the flow set-point.
12. Wait for 5 minutes for the flow to equilibrate.
13. Highlight **REF**: and enter audit device flow rate and press **CALIBRATE**.
14. Perform steps 10 - 12 with the remaining selectable flow set-point.
15. Remove the flow audit device and replace sampling cap.
16. The E-BAM flow rate is now calibrated and ready for sampling.

7.6 Reference Membrane Span Test

The reference membrane test is used to audit the E-BAM beta particle measurement system by simulating a particulate load with a polyester foil. The membrane test should be conducted prior to initial sampling and at monthly intervals during a sampling event. The test is accomplished using two calibration plates that represent ZERO and SPAN factory calibration points. The set of calibration plates are unique to each E-BAM and have the same serial number as the E-BAM.

NOTE: Make sure the proper membrane test plates are used.

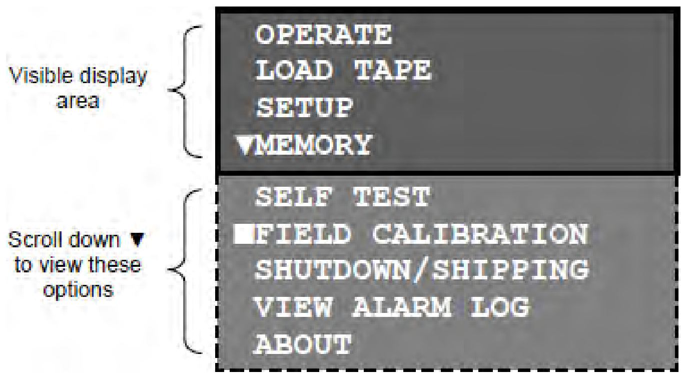
1. Scroll to the **MEMBRANE TEST** line.
2. Press the **MENU/SELECT** to enter the membrane test menu.
3. Press **START** and unit will advance the filter tape and begin a 4-minute blank zero count.
4. At completion of zero count, the unit will raise the nozzle and prompt “INSERT ZERO MEMBRANE” which is the shim used to protect the nozzle during shipment connected to the unit with a chain.
5. Insert the zero membrane on top of the filter tape so that the tab protrudes through the transport plate and triggers the photo sensor to lower nozzle and begin a 4-minute count with the zero membrane in place.
6. After the zero count, the unit will prompt “REMOVE ZERO MEMBRANE!”
7. Remove membrane to start a 4-minute blank span count.
8. After span count, unit will prompt “INSERT SPAN MEMBRANE” located in a pouch inside door. Handle the span membrane very carefully to avoid damaging the fragile film.
9. Insert the span membrane above the filter tape. The unit will perform the final 4-minute span count and display the results.

This is a pass/fail test in which the E-BAM will compare the measured mass of the span membrane to the expected mass for that exact foil which has been programmed into the E-BAM memory. If the measured and expected values are within 5%, the test will pass. If the values are outside of 5%, a failure will be generated. If the test fails, the most common causes are a failing or dirty beta detector, or a dirty or damaged span membrane. Appendix C contains the E-Bam troubleshooting guide.

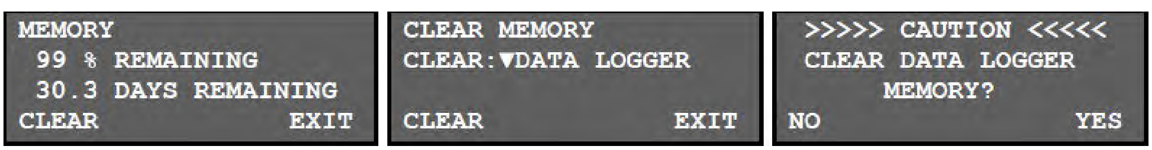
7.7 Operation

7.7.1 Clear Memory

1. From the User Interface, press **MENU/SELECT**.
2. Use the ▲▼ arrow keys to select the desired menu option.
3. Press the **MENU/SELECT** again to enter the selected sub-menu.



4. Select **MEMORY** menu option to display remaining memory available in the digital data system.



5. To erase the memory, press the **CLEAR** key.
6. Use the arrow keys to select either the **DATA LOGGER** or **ALARM LOG** to be cleared.
7. Press the **CLEAR** key again.
8. Unit will show a **CAUTION** screen.

CAUTION: Once the data log or the error log is cleared, the erased data can never be recovered.

9. To erase the selected log, press the **YES** key.

7.7.2 Initiate Sampling

1. From the User Interface, press **MENU/SELECT**.
2. Select OPERATE menu option to start new sample period.
3. "WARNING: START OPERATION?" message is displayed.
4. Press the **YES** key to start a new sample.

NOTE: If unit is already sampling, this option will simply exit the main menu and display the main sampling screen.

7.7.3 Data Retrieval

7.7.3.1 Downloading Data Using HyperTerminal

1. Connect the RS-232 port on the bottom of the E-BAM to your computer or laptop Com1 serial port or Universal Serial Bus (USB) adapter using the E-BAM serial cable.
2. Open HyperTerminal.
3. Program will ask you to type a name for the connection.
4. Type "E-BAM" or another name of your choice and click **OK**.
5. "Connect To" window will open.
6. Select COM1 or other serial port if used from the drop-down menu in the "Connect using:" field.
7. Click **OK**.
8. "COM1 Properties" window will open.
9. Set the following values in the drop-down menus, and click **Apply** and **OK**.

Bits per second:	**9600 (or set to match E-BAM baud setting)**
Data bits:	**8**
Parity:	**None**
Stop bits:	**1**
Flow control:	**None**

10. The main HyperTerminal connection window should now be open.
11. Press the **ENTER** key three times.
12. E-BAM should respond with an asterisk (*) command prompt indicating that the terminal program has established communication with the unit.
13. Once communication is established, retrieve the desired files from the E-BAM using the appropriate data retrieval commands shown in the next section.
14. HyperTerminal will only display 100 lines of data in the window. To capture larger files, such as, All Data, first select **Transfer > Capture Text** from the drop-down menu.
15. Select a location for the file and click the **Start** button.
16. Click **Stop** button in the same drop-down menu to stop the text capture when finished.

7.7.3.2 Data Retrieval Commands

After a serial connection between the computer terminal program and the E-BAM is established, access to the E-BAM data files is accomplished by sending the following commands through serial port with keyboard strokes or ASCII characters.

Command	Function
2	Prints **all records** in the Data Log file.
3	Prints all **new records** in the Data Log file since the last data download.
4	Prints the **last record** in the Data Log file only.
5	Prints all records in the Data Log file in 24 hour daily format.
c	Clears all records in the Data Log file.
d	Set date.
t	Set time.
? or h	Identifies unit type and firmware type. Example: "E-BAM 3613-01 R1.50"

The following table defines the data parameters as they appear in the header of the data reports:

Field	Description
Time	Time and data stamp of the data record.
ConcRT	Real-time average concentration in mg/m3.
ConcHr	Last hourly concentration in mg/m3.
Flow (l/m)	Average air flow for the data logging period in liters per minute.
WS (m/s)	Average wind speed for the data logging period in meters per second.
WD (Deg)	Average wind direction for data logging period in degrees.
AT (C)	Average ambient temperature for the data logging period in °C.
RHx (%)	Average external RH for the data logging period in %.
BV (V)	Average battery or input voltage for the data logging period in volts.
FT (C)	Average filter temperature for the data logging period in °C.
Alarm	Error code. 0 = no errors. See Section 8.1 for error descriptions.
Type	E-BAM machine type: 0 = PM2.5, 1 = PM10.

7.7.4 Shut-Down

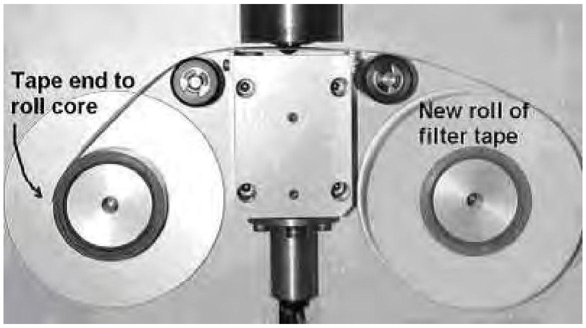
1. From the User Interface, press **MENU/SELECT**.
2. Select **SHUTDOWN/SHIPPING** menu option to prepare the E-BAM for shutdown or transport.
3. Nozzle will rise, and "PLEASE INSERT NOZZLE PACKING MATERIAL" message will display.
4. Insert the empty zero membrane shim under the nozzle with the tab extending through the slot.
5. Nozzle will be lowered and "OK TO TURN OFF E-BAM" message will display.
6. Unplug power cord.

7.7.5 Filter Tape Loading

1. From the User Interface, press **MENU/SELECT.**
2. Use the ▲▼ arrow keys to select **LOAD TAPE** option.
3. Press the **MENU/SELECT** again to enter **LOAD TAPE** sub-menu.
4. Nozzle will raise and prompt to load the tape.
5. If you are replacing a used roll of tape, remove the old roll and thoroughly clean the nozzle and vane.
6. An empty core tube must be installed on the left take-up reel hub.

NOTE: Never fasten the filter tape directly to the aluminum hub.

7. Load the new roll of filter tape onto the right supply reel, and route the tape through the nozzle area as shown below.
8. Attach the loose end of the filter tape to the empty core tube with tape.
9. Rotate the tape roll to remove excess slack and install the plastic spool covers tightly.



8.0 CALCULATIONS

The E-BAM Particle Mass Monitor is a direct reading instrument requiring no calculations. The readings are displayed or logged in units of mg/m^3 and encompass the range -0.005 to 65.530 mg/m^3 for ambient air. Accuracy is specified by manufacturer at ± 10% of indicated value for hourly measurements with a 1 microgram per cubic meter (µg/m^3) resolution.

9.0 QUALITY ASSURANCE/QUALITY CONTROL

Specific Quality Assurance/Quality Control (QA/QC) activities that apply to the implementation of these procedures will be listed in the UFP-QAPP prepared for the applicable sampling event. The following general QA procedures will also apply:

1. All data must be documented on field data sheets or in site logbooks.

2. The instrument must be operated according to the operating instructions supplied by the manufacturer, unless otherwise specified in the work plan. Instrument calibration (Section 7.5) and

Reference Membrane Span Test (Section 7.6) activities must occur prior to operation and must be documented.

3. Records must be maintained, documenting the training of the operators that use instrumentation and equipment for the collection of environmental information.

10.0 DATA VALIDATION

This section is not applicable to this SOP; however, the analyst will ensure that the monitor is operated in accordance with this SOP, and all operational checks have been completed and are within the criteria specified. Data verification/completeness checks must be conducted to ensure project-specific quality objectives have been met as defined in the corresponding UFP-QAPP. The Environmental Response Team (ERT) contractor's Task Leader (TL) is responsible for completing the UFP-QAPP verification checklist for each project.

11.0 HEALTH AND SAFETY

Based on Occupational Safety and Health Administration (OSHA) requirements, a site-specific health and safety plan (HASP) must be prepared for response operations under the Hazardous Waste Operations and Emergency Response (HAZWOPER) standard, 29 CFR 1910.120. Field personnel working for EPA's ERT should consult the Emergency Responder Health and Safety Manual currently located at https://response.epa.gov/_HealthSafetyManual/manual-index.htm for the development of the HASP, required personal protective equipment (PPE) and respiratory protection.

The analyst should consult all appropriate safety data sheets (SDS) prior to running an analysis for the first time.

12.0 REFERENCES

Met One Instruments, Inc. 2008. *E-BAM PARTICULATE MONITOR OPERATION MANUAL E-BAM-9800 REV L.*

13.0 APPENDICES

A - Specifications
B – Sampling Radioactive Particulate with E-BAM
C - Maintenance
D -Troubleshooting

APPENDIX A
Specifications
SOP: ERT-PROC-2079-20
June 2020

(Source: Met One Instruments, Inc. 2008. *E-BAM PARTICULATE MONITOR OPERATION MANUAL E-BAM-9800 REV L)*

PARAMETER	SPECIFICATION
Measurement Principle:	Particulate Concentration by Beta Attenuation.
U.S. EPA Designations:	Designed to meet Class III monitoring criteria. Not an EPA-designated Federal Equivalent Method (FEM).
Measurement Range:	-0.005 to 65.530 mg/m^3 (-5 to 65,530 μg/m^3) 16 bit digital range.
Accuracy:	± 10% of indicated value for hourly measurements.
Data Resolution:	1 μg/m^3
Lower Detection Limit:† (2ó, 1 hour measurement)	Less than 6.0 μg/m^3
Lower Detection Limit:† (2ó, 24 hour average)	Less than 1.2 μg/m^3
Sample Time:	Continuous air sampling with variable filter change periods.
Measurement Cycles:	Automatic hourly concentration measurements, with user selectable 1, 5, 10, 15, 30, or 60 minute quasi-real-time average output.
Flow Rate:	16.7 liters per minute (LPM). Adjustable up to 17.5 LPM. Actual or Standardized flow modes.
Flow Accuracy:	±2% of set-point typical.
Pump Type:	Internal DC dual-diaphragm pump standard. 4000 hour rated.
Filter Tape:	Continuous glass fiber filter, 30mm x 21m roll.
Span Check:	Manual 800μg (typical) span foil included.
Beta Source:	Carbon-14, 60 μCi ±15 μCi (< 2.22 X 10^{6}Beq), Half-Life 5730 years.
Beta Detector Type:	Photomultiplier tube with patented scintillator assembly.
Operating Temp. Range:	-25 to +50°C intermittent. -25 to +40°C continuous.
Ambient Humidity Range:	0 to 90% Relative Humidity, non-condensing.
Humidity Control:	Automatic 15 Watt inlet heater module.
Approvals:	CE, NRC, ISO-9001
User Interface:	Menu-driven interface with 4x20 character VFD display and dynamic keypad.
Analog Voltage Output:	0-1, 0-2.5, or 0-5 volt DC output equals 0-1000 μg/m3. Selectable to represent the hourly or real-time concentration.
Serial Interface:	RS-232 serial port for PC, datalogger, or modem communications; or VIPER.
Alarm Contact Closures:	Normally closed contact closure relay output. 0.5A @ 100Volt DC max.
Compatible Software:	CometTM (included), Air PlusTM, terminal programs such as HyperTerminal®.
Error Reporting:	Available through serial port, display, and relay output.

PARAMETER	SPECIFICATION
Memory:	4369 records (182 days @ 1 record per hour. 3 days @ 1 record per minute).
Power Supply:	12 to 16 Volt DC input. 4.1 amps @12 VDC (50 Watts) max continuous draw.
Weight:	13.2 kg (29 lbs) E-BAM only. 23 kg (50 lbs) with tripod, PM10, 9250, power supply.
Unit Dimensions:	41cm high x 36cm wide x 20cm deep. (16” x 14” x 8”).

mg/m^3 = milligrams per cubic meter
$\mu g/m^3$ = micrograms per cubic meter
µCi = micro Curie
% = percent
m = meter
mm = millimeter
kg = kilogram
lb = pound
cm = centimeter
°C = degrees Celsius

† The hourly detection limit is defined as twice the standard deviation of the hourly zero noise of the instrument. The 24-hour detection limit is defined as the hourly detection limit divided by the square root of 24 (approximately 4.9).

APPENDIX B
Sampling Radioactive Particulate with E-BAM
SOP: ERT-PROC-2079-20
June 2020

Met One Technical Bulletin
Revised: February 3, 2014 By: Dennis Hart

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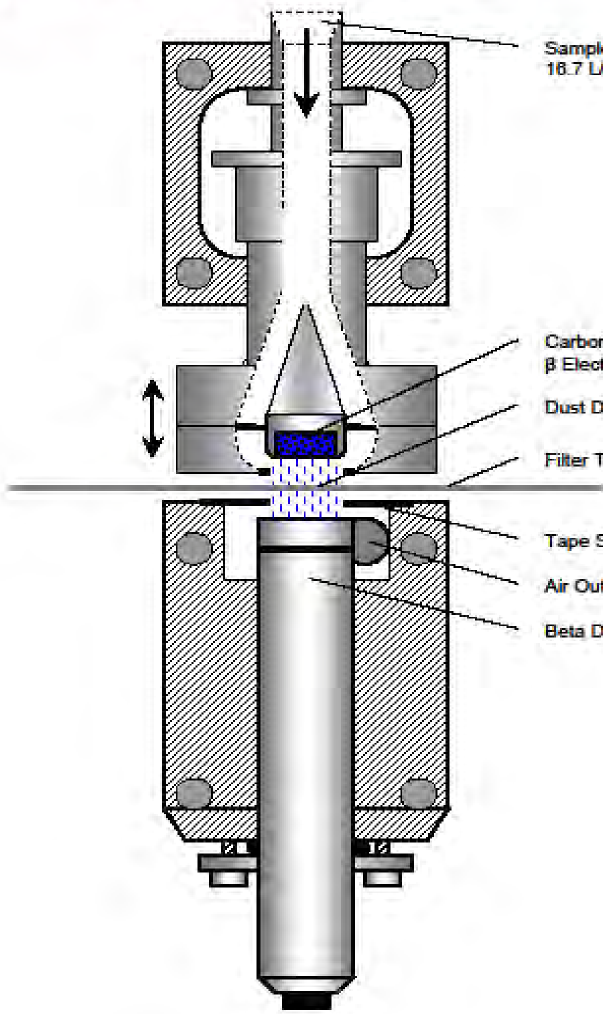
Sampling Radioactive Particulate with E-BAM

The E-BAM particulate monitor simultaneously collects particulate onto the filter and measures the resulting mass with a beta source and a detector located inside the flow path.



The beta source emits electrons through the filter tape and into the detector. The detector window is plated with a reflective layer of aluminum over a plastic scintillator which converts the beta electrons into photons. The detector is a photomultiplier tube arranged as a high speed photon counter. The beta-induced photons are simply counted as current pulses over fixed time intervals.

A certain proportion of the beta are absorbed by the mass of the clean filter tape. As particulate mass accumulates on the filter spot over time, the beta count rate reduces in a manner consistent with a variation of Beer's Law.

There could be some significant technical considerations involved if the sampled particulate contains any kind of radioactive material:

- The BAM scintillator and detector can technically also count photons caused by alpha or gamma radiation. Although alpha and gamma have higher energy levels than carbon 14 beta electrons, the BAM electronics do not perform any kind of pulse height measurement or alpha signal rejection. All current pulses above the noise threshold are counted with equal weight.
- If the particulate spot contains a significant amount of radioactive material, the count rate of the measurement may theoretically increase (or decrease less than it should) as particulate accumulates. If anything, this would cause some amount of negative bias (reading lower than it should) in the particulate concentration measurement of the BAM.
- In normal monitoring situations, possible low levels of alpha particles from trace amounts of radon in the dust is the only consideration. The BAM filter tape and detector window generally limit the penetration of alpha from radon on the tape. Any alpha that do penetrate into the detector are at such a low rate as to fall within the normal noise band of the measurement. There is no strong evidence that low level alpha emitters such as radon, lead, potassium cause statistical effects on BAM data, but the effects caused by strong alpha or gamma emitters has not been studied.
- The beta attenuation method only works because the cross-sectional density constant (μ) in the equation is consistent within a small percentage (less than 3%) for all elements and compounds commonly found in ambient particulate (aluminum and iron oxides, silica, carbon, nitrates, sulfates, etc.). Heavy elements like uranium are outside of the normal density range, so there may be some additional amount of measurement bias caused by this if a significant proportion of the total particulate contains heavy elements.
- Due to the turn in the flow path around the beta source, the E-BAM tends to slightly under-measure PM_{10} particulate (up to 20% worst case) when the particulate contains a large portion of particles above about 7 microns in size. This under-measurement effect could easily be mistaken for radiation effects.
- Met One is not equipped to accept service returns of instruments that have been exposed to hazardous, toxic, or radioactive particulate!

Conclusion: Using a Met One BAM or E-BAM to measure particulate containing radioactive materials is likely to cause some unknown percentage of under-measurement in the particulate concentration data.

APPENDIX C
Maintenance
SOP: ERT-PROC-2079-20
June 2020

(Source: Met One Instruments, Inc. 2008. *E-BAM PARTICULATE MONITOR OPERATION MANUAL E-BAM-9800 REV L)*

Routine Maintenance:

Frequency	Action	Performed By
As Needed	Replace the filter tape	Operator
Monthly	Leak check	Operator
2 Months	Nozzle and tape vane cleaning	Operator
Monthly	Flow audit (and calibration if needed) including ambient temperature and pressure	Operator
2 Months	Clean PM_{10} inlet particle trap	Operator
2 Months	Clean $PM_{2.5}$ cyclone particle trap	Operator
Monthly	Check error log	Operator
Monthly	Download digital data log	Operator
Monthly	Set the E-BAM clock	Operator
Annually	Span membrane test	Operator
2 Months	Clean the inside of the sample nozzle with compressed air	Operator
2 Months	Check pump capacity	Operator
12 Months	Replace internal DC vacuum pump (or as needed)	Operator

Pump Testing Procedure using a BX-305:

1) Remove the inlet head(s).
2) Place the BX-305 over the inlet tube on the top of the E-BAM.
3) Go to the PUMP TEST screen which is found by going MAIN MENU>FIELD CALIBRATION>PUMP TEST. There are two modes of operation in the PUMP TEST screen, LEAK TEST and PUMP TEST. For this test select PUMP TEST as the mode.
4) Turn the valve on the BX-305 to half off (roughly the 2 o'clock position). This will force the pump to ramp up until it is fully on.
5) Wait until the flow stabilizes, as this indicates that the pump is fully on.
6) Adjust the valve on the BX-305 to bring the flow value between 14.0-15.0 LPM. Make small adjustments and wait 10 seconds for the value on the screen to change.
7) Once you are within the 14.0-15.0 LPM range, allow the flow to stabilize.
8) Compare the pressure reading to the acceptable pressure readings shown in the Table below. If the pressure reading is greater than or equal to the value in the corresponding column it is time to replace the pump.

FLOW RATE LPM	Pump Condition/Pressure Reading		
	Good	OK	Replace
14.0	390.5	406.1	429.5
14.1	391.6	407.3	430.8
14.2	393.8	409.6	433.2
14.3	395.0	410.8	434.5
14.4	396.5	412.3	436.1
14.5	398.5	414.5	438.4
14.6	399.5	415.5	439.5
14.7	401.1	417.2	441.3
14.8	403.2	419.3	443.5
14.9	404.5	420.7	445.0
15.0	406.0	422.2	446.6

Pump Replacement:

1) Turn off the power to the E-BAM.
2) Open the cabinet door and remove the two 8-32 Philips head screws holding the pump cover plate on.
3) Carefully pull the pump cover plate away from the enclosure.
4) Disconnect the door switch at the connector and set the cover aside.
5) Disconnect the pump power connector from the printed circuit board at J17 and note connector orientation to assure proper re-connection.
6) Remove the two 4-40 Philips head screws on the plastic cover in front of the inlet tube.
7) Slide the upper sealing collar on the inlet tube upward, and the lower collar upward.

NOTE: There are no threads on the collars and they should move with a slight twist and a firm push.

8) Take out the inlet tube and unplug the heater connector from its harness.
9) Remove the three 6-32 Philips head screws holding the pump mount to the front of the transport panel.
10) Carefully remove the four 3/8 inch tubes from the pump ports, being sure to mark the tubes so they go back in the same ports during reassembly.
11) Set the pump/bracket assembly on a flat, stable surface.
12) Completely remove the hose clamp from around the pump and set aside.
13) Turn the pump and bracket assembly upside-down and locate the two 6-32 Philips head screws in the middle of the bracket, one on each side of the mounting plate. Loosen those two screws enough to allow the pump to slide toward the fan. The pump should now be separate from the bracket.
14) Making sure the pump wires are on top, install the new pump by holding the bracket over the top of the upside-down pump and sliding the two 6-32 square nuts into the slots on the bottom of the pump, making sure that the square nuts are fully in the slots. Tighten those two screws.

NOTE: Pump wires should be on the top when the pump is in its normal orientation.

15) Reattach the hose clamp around the pump and tighten it in its original position.
16) Re-install the pump/bracket assembly in the reverse order as above.
17) Make sure the pump wire clears the fan blade before replacing the pump cover.

Fixing a leak:

If the E-BAM fails the leak check at a flow rate less than 1.5 LPM, there is a problem with the integrity of the flow system. Below is a list of solutions starting with the most common problems:

Nozzle/Vane build-up:

Over time filter material can build up on the nozzle or on the vane under the filter paper. It is recommended that these areas be cleaned every 2 months or more frequently as needed.

Nozzle Cleaning Procedure:

During normal operation the nozzle of the E-BAM can have a build-up of filter material on the sealing surface. Build up can also occur on the vane which is the crosshatch piece under the filter paper. Both of must be cleaned periodically.

1) The nozzle needs to be lifted from the filter paper and the paper removed from the nozzle area.
2) In the main menu enter the LOAD TAPE screen. The nozzle will automatically open.
3) Remove the filter paper from the nozzle area.
4) Using a cotton applicator with a small amount of isopropyl alcohol gently clean the lip of the nozzle.

WARNING: The beta detection circuitry is very sensitive; if any isopropyl alcohol falls thru the lower vane into the detector it can be permanently damaged. Use caution when cleaning with the isopropyl alcohol to prevent any dripping.

5) After the nozzle has been cleaned, the vane needs to be cleaned. The vane sits directly under the nozzle and supports the filter tape during sampling. Gently rub the same cotton applicator across the four crosspiece sections of the vane and around the circumference of the vane.
6) Replace the filter paper and the E-BAM is ready for operation.
7) Retest according to the leak check procedure.
8) If the leak is above 1.5 LPM go to the Sharp Cut Cyclone (SCC) cleaning procedure.

Sharp Cut Cyclone Cleaning Procedure:

1) Remove the SCC and retest.
2) If the E-BAM passes, the leak was in the SCC.
3) Clean the SCC and replace the O-rings as needed.
4) If the E-BAM fails go to the Inlet Tube Assembly Cleaning Procedure.

Inlet Tube Assembly Cleaning Procedure:

1) Plug the top of the Nozzle Assembly.
2) If the flow stays below 1.5 LPM, the leak is in the Inlet Tube Assembly.
3) Check the O-rings for wear and replace as necessary.
4) Remove the inlet tube from the top of the E-BAM and follow the steps below to check the O-

rings.

5) Tighten all fittings and re-assemble. Recheck the flow and tighten and replace until the unit passes.

Service and Replacement procedures of O-rings:

NOTE: This applies to all factory installed O-rings located in the flow path of the E-BAM air sampler. Frequent assembly and disassembly of the unit will cause all flexible rubber gaskets to degrade with use and time. A close inspection of the inlet connections will determine their condition and appropriate remedy. As long as there is no brittleness or visible cracks in the O-rings a light coat of silicone vacuum grease should be applied using a blunt plastic or wooden pick as use of metal tools could score or nick the metal surfaces and channels where O-rings are seated. Resist the temptation to apply to much grease; it is the O-ring that makes the seal not the grease. Excess must be wiped off with lint free paper or laboratory tissue. An excessive amount of grease may dissolve in the O-ring or unnecessarily accumulate dirt and debris which in turn could score the inner assemblies creating leakage channels.

If replacement of the O-ring is necessary remove all grease and dust from the metal channel before inserting the new O-ring. Be sure the new O-ring is properly aligned and fully seated before it can be lubricated with silicone grease.

1) Unscrew pipe coupling from inlet adapter/seal.
2) Check O-rings inside of the inlet adapter/seal for wear.
3) Replace O-rings if necessary.
4) Screw pipe coupling back onto the inlet adapter/seal.

NOTE: If the above steps cannot successfully locate a leak, call the Met One Service Department for a Return Authorization.

APPENDIX D
Troubleshooting
SOP: ERT-PROC-2079-20
June 2020

(Source: Met One Instruments, Inc. 2008. *E-BAM PARTICULATE MONITOR OPERATION MANUAL E-BAM-9800 REV L)*

The following table describes each of the error and alarm types which can be generated by the E-BAM, along with the conditions which cause the alarms. Most of these alarms indicate critical parameters which must be working correctly for instrument operation.

Alarm/Error Message	Alarm Description
POWER OUTAGE	This alarm message indicates that the E-BAM power has been cycled off and then back on. This can mean that there was a power failure or that someone simply unplugged the unit to turn it off. The E-BAM alarm display will show an OFF time indicating how long the power was off, and an ON time indicating how long the power was on before the power failure. A second type of power alarm can be shown on the display as a COP RESET. This means "Computer Operating Properly", and will only occur when the E-BAM firmware is flash updated by the user. This is normal and does not indicate a failure.
INTERNAL HARDWARE	This alarm indicates that there was an internal SPI bus failure, preventing the CPU from communicating with the I/O board for 10 seconds or more. The time and date of the error will be displayed. The E-BAM will stop operation until internal communication is restored. If these errors occur regularly you will need to contact the Met One Service Department.
NOZZLE FAILED UP or NOZZLE FAILED DOWN	This alarm indicates that the E-BAM attempted to move the nozzle gear motor up or down for 20 seconds, but did not sense the nozzle motor reaching the up or down position. The motor has a single-slot encoder disk on its shaft which triggers a separate photo sensor when the motor is in the up or down position. This alarm could mean that the motor has failed, or that the photo sensors have failed or are out of alignment. The E-BAM will stop operation until the nozzle is functional. The time and date of the error will be displayed.
SHIPPING DEVICE INSERTED	This alarm indicates that the zero membrane shim (also called the nozzle shipping shim) is inserted under the nozzle. The alarm will be generated if the shim is left in place during the startup process, or if it is detected when the E-BAM attempts to start an operation cycle. The unit senses the shim with a photo sensor which is triggered by the tab on the shim which extends through the transport plate when it is inserted. The E-BAM cannot operate with the shim in place.
TAPE BROKE	This alarm indicates that the tape is broken or has run out. The E-BAM has a motor which drives the left (take up) reel. The right (supply) reel has a clutch and an encoder. If the E-BAM drives the take up reel motor for 20 seconds but senses no corresponding rotation of the supply reel, the error is generated and the E-BAM will not operate. The time and date of the error will be displayed.
BETA COUNT FAILED	This alarm indicates that the beta count signal was less than the minimum of 40,000 counts in a 1 minute period, during either a self-test or during normal operation. This can indicate that the beta detector window is dirty or obstructed, or that the detector has failed. The E-BAM will not operate until the count rate is above the threshold. The display will show the actual count total, and the time and date of the error. If the error cannot be fixed by cleaning the detector window, you will need to contact the Met One Service Department.

Alarm/Error Message	Alarm Description
PRESSURE SENSOR FAILED	This alarm indicates that the internal barometric pressure sensors did not pass the static or dynamic criteria during the self-test process. The alarm is generated if the ambient and the filter pressure sensors are not within 2 percent (%) of each other with the pump off, or if they are within 5% of each other with the pump on. The alarm display will show the INLET (ambient) pressure and the FILTER pressure, as well as the time and date of the error. Frequent alarms of this type generally indicate that one of the two digital pressure sensors inside the unit has failed. Contact the Met One Service Department.
FLOW FAIL or FLOW OUT OF REGULATION	This alarm indicates that the flow system failed one of two criteria during operation. The regulation alarm will be generated if the E-BAM flow is more than 0.4 liters per minute LPM out of regulation for more than 5 minutes. If the 5 minute rolling average of the flow (checked once per minute) is less than 5.0 LPM or greater the 19.6 LPM, the failure alarm will be generated and the E-BAM will stop operating and attempt to auto restart. The alarm display will show the actual flow rate and the time and date of the error.
MEMBRANE FAILED	This alarm indicates that the E-BAM failed the manual span membrane test. This occurs if the mass measurement of the span foil does not match the expected value within 5%. The time and date of the error will be displayed. Press the down arrow key to view the measured span mass from the test. This can be compared to the known mass of the foil. Also shown is a zero reading which is not used. The Z and S values are also available in the error log download file. This alarm can indicate that the membrane is dirty or damaged, that the beta detector window is dirty or damaged, or that the detector tube is failing.
LOW BATTERY	This alarm indicates that the DC input voltage dropped below 10.0 volts, which is the minimum operating voltage for the unit. The E-BAM will stop operation and will not restart until the voltage is back above the user-selected restart threshold. The time and date of the error will be displayed, along with the actual voltage.
HIGH TAPE DELTA-PRES	This alarm indicates that the pressure drop across the filter tape has exceeded the maximum allowable limit, due to heavy particulate loading on the filter tape during normal operation. The E-BAM will stop sampling, advance the filter tape to a fresh spot, and then resume sampling. The alarm display will show both the measured DELTA-P pressure drop, and the LIMIT value in millimeters of mercury (mmHg). The time and date of the alarm will be displayed. The alarm can also be generated if the pressure drop exceeds a lower max limit while the ambient temperature is above 38 degrees C. If these alarms occur frequently, set the TAPE ADVANCE to a
HIGH DELTA TEMPERATURE	This alarm indicates that the delta temperature (filter temperature minus ambient temperature) of the unit exceeded the allowable set point by more than 1 degree Celsius while the unit was sampling and RH control was enabled. The E-BAM will turn the heater off. The alarm display will show the measured DELTA-T value and the set LIMIT value. The time and date of the alarm will be displayed. This alarm is generally ignored.

Alarm/Error Message	Alarm Description
PUMP OVER TEMP	This alarm indicates that the internal DC pump was turned off because the ambient temperature exceeded 48 degrees Celsius while the unit was sampling with the pump protection feature enabled. The E-BAM will not resume sampling until the temperature drops below 45 degrees. The display will show the ambient temperature and the time and date of the error. This feature can be used to prevent the pump from wearing out early due to high temperature operation, but is almost always just disabled in the SETUP menu.
SENSOR FAILURE	This alarm indicates that one of the sensors in the unit is not responding, or is measuring a value outside of its specified range. The display will show the time and date of the alarm, the type of sensor which has failed, and the faulty measurement from the sensor. The E-BAM will not operate until the sensor is operational. The most common sensor failures occur if the ambient temperature sensor is disconnected from the E-BAM, or if the filter RH sensor or one of the digital pressure sensors fail. The error can also occur if the SETUP menu has been set to expect an ambient RH sensor which is not connected. If the error occurs even though the indicated sensor is connected correctly, you will need to contact the Met One Service Department.

ATTACHMENT 2

Analytical Methods

EPA/625/R-96/010a

Compendium of Methods for the Determination of Inorganic Compounds in Ambient Air

Compendium Method IO-2.1

SAMPLING OF AMBIENT AIR FOR TOTAL SUSPENDED PARTICULATE MATTER (SPM) AND PM_{10} USING HIGH VOLUME (HV) SAMPLER

Center for Environmental Research Information
Office of Research and Development
U.S. Environmental Protection Agency
Cincinnati, OH 45268

June 1999

Method IO-2.1

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This Method is the result of the efforts of many individuals. Gratitude goes to each person involved in the preparation and review of this methodology.

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Method IO-2.1
Sampling of Ambient Air for Total Suspended Particulate Matter (SPM) and PM_{10} Using High Volume (HV) Sampler

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Chapter IO-2
Integrated Sampling of Suspended Particulate Matter (SPM)

Method IO-2.1
SAMPLING OF AMBIENT AIR FOR TOTAL SUSPENDED PARTICULATE MATTER (SPM) AND PM_{10} USING HIGH VOLUME (HV) SAMPLER

1. Scope

1.1 Suspended particulate matter (SPM) in air generally is a complex, multi-phase system of all airborne solid and low vapor pressure liquid particles having aerodynamic particle sizes from below 0.01-100 µm and larger. Historically, SPM measurement has concentrated on total suspended particulates (TSP), with no preference to size selection.

1.2 The U. S. Environmental Protection Agency (EPA) reference method for TSP is codified at 40 CFR 50, Appendix B. This method uses a high-volume sampler to collect particles with aerodynamic diameters of approximately 100 µm or less. The high-volume samples 40-60 ft^3/min of air with the sampling rate held constant over the sampling period. The high-volume design causes the TSP to be deposited uniformly across the surface of a filter located downstream of the sampler inlet. The TSP high-volume can be used to determine the average ambient TSP concentration over the sampling period, and the collected material subsequently can be analyzed to determine the identity and quantity of inorganic metals present in the TSP.

1.3 Research on the health effects of TSP in ambient air has focused increasingly on particles that can be inhaled into the respiratory system, i.e., particles of aerodynamic diameter less than 10 µm. The health community generally recognizes that these particles may cause significant adverse health effects. Recent studies involving particle transport and transformation strongly suggest that atmospheric particles commonly occur in two distinct modes: the fine (<2.5 µm) mode and the coarse (2.5-10.0 µm) mode. The fine or accumulation mode (also termed the respirable particulate matter) is attributed to growth of particles from the gas phase and subsequent agglomeration, while the coarse mode is made of mechanically abraded or ground particles. Particles that have grown from the gas phase (either because of condensation, transformation, or combustion) occur initially as very fine nuclei--0.05 µm. These particles tend to grow rapidly to accumulation mode particles around 0.5 µm which are relatively stable in the air. Because of their initially gaseous origin, particle sizes in this range include inorganic ions such as sulfate, nitrate, ammonia, combustion-form carbon, organic aerosols, metals, and other combustion products. Coarse particles, on the other hand, are produced mainly by mechanical forces such as crushing and abrasion. Coarse particles, therefore, normally consist of finely divided minerals such as oxides of aluminum, silicon, iron, calcium, and potassium. Coarse particles of soil or dust mostly result from entrainment by the motion of air or from other mechanical action within their area. Since the size of these particles is normally > 2.5 µm, their retention time in the air parcel is shorter than the fine particle fraction.

1.4 On July 1, 1987, the U. S. Environmental Protection Agency (EPA) promulgated a new size-specific air quality standard for ambient particulate matter. This new primary standard applies only to particles with aerodynamic diameters #10 micrometers (PM_{10}) and replaces the original standard for TSP. To measure concentrations of these particles, the EPA also promulgated a new federal reference method (FRM). This method is based on the separation and removal of non-PM_{10} particles from an air sample, followed by filtration and gravimetric analysis of PM_{10} mass on the filter substrate.

1.5 The new primary standard (adopted to protect human health) limits PM_{10} concentrations to 150 µg/std. m^3 averaged over a 24-h period. These smaller particles are able to reach the lower regions of the human respiratory tract and, therefore, are responsible for most of the adverse health effects associated with suspended particulate pollution. The secondary standard, used to assess the impact of pollution on public welfare, has also been established at 150 µg/std. m^3.

1.6 Ambient air SPM measurements are used (among other purposes) to determine whether defined geographical areas are in attainment or non-attainment with the national ambient air quality standards (NAAQS) for PM_{10}. These measurements are obtained by the States in their State and local air monitoring station (SLAMS) networks as required under 40 CFR Part 58. Further, Appendix C of Part 58 requires that the ambient air monitoring methods used in these EPA-required SLAMS networks must be methods that have been designated by the EPA as either reference or equivalent methods.

1.7 Monitoring methods for particulate matter are designated by the EPA as reference or equivalent methods under the provisions of 40 CFR Part 53, which was amended in 1987 to add specific requirements for PM_{10} methods. Part 53 sets forth functional specifications and other requirements that reference and equivalent methods for each criteria pollutant must meet and explicit test procedures by which candidate methods or samplers are to be tested against those specifications. General requirements and provisions for reference and equivalent methods are also given in Part 53, as are the requirements for submitting an application to the EPA for a reference or equivalent method determination.

1.8 Several methods are available for measuring SPM in ambient air. As mentioned earlier, the most commonly used device is the high-volume sampler, which consists essentially of a blower and a filter, and which is usually operated in a standard shelter to collect a 24-h sample. The sample is weighed to determine concentration and may be analyzed chemically. The high volume sampler is considered a reliable instrument for measuring the mass concentration of TSP in ambient air. When EPA first regulated TSP, the NAAQS was stated in terms of SPM captured on a filter with aerodynamic particle size of <100 µm as defined by the TSP sampler; therefore, the TSP sampler was used as the reference method.

1.9 Under Part 53 requirements, reference methods for PM_{10} must be shown to use the measurement principle and meet other specifications set forth in 40 CFR 50, Appendix J. They must also include a PM_{10} sampler that meets the requirements specified in Subpart D of 40 CFR 53. Appendix J specifies a measurement principle based on extracting an air sample from the atmosphere with a powered sampler that incorporates the inertial separation of PM_{10} size range particles followed by the collection of PM_{10} particles on a filter over a 24 h period. The average PM_{10} concentration for the sample period is determined by dividing the net weight gain of the filter over the sample period by the total volume of air sampled, corrected to EPA's standard temperature (25EC) and standard pressure (760 mm Hg). Other specifications for flow rate control and measurement, flow rate measurement device calibration, filter media characteristics and performance, filter conditioning before and after sampling, filter weighing, sampler operation, and correction of sample volume to EPA reference temperature and pressure are prescribed in Appendix J. In addition, sampler performance requirements in Subpart D of Part 53 include sampling effectiveness (the accuracy of the PM_{10} particle size separation capability) at each of the three wind speeds and at "50% cutpoint" (the primary measure of 10-µm particle size separation). Field tests for sampling precision and flow rate stability are also specified. In spite of the instrumental nature of the sampler, this method is basically a manual procedure, and all designated reference methods for PM_{10} are therefore defined as manual methods.

1.10 This document describes the procedures for sampling SPM in ambient air for both TSP and PM_{10} based upon active sampling using a high volume air sampler. The ambient particles are collected on quartz fiber filters. The sampler collects TSP or PM_{10} ambient particles depending upon the type of inlet selected.

2. Applicable Documents

2.1 ASTM Documents

- D4096 *Application of the High Volume Sample Method for Collection and Mass Determination of Airborne Particulate Matter*.
- D1356 *Definition of Terms Related to Atmospheric Sampling and Analysis.*
- D1357 *Practice for Planning the Sampling of the Ambient Atmosphere.*
- D2986 *Method for Evaluation of Air Assay Media by the Monodisperse DOP (Dioctyl Phthalate) Smoke Test.*

2.2 Other Documents

- U. S. Environmental Protection Agency, *Quality Assurance Handbook for Air Pollution Measurement Systems*, *Volume I: A Field Guide for Environmental Quality Assurance*, EPA/600/R-94/038a.
- U. S. Environmental Protection Agency, *Quality Assurance Handbook for Air Pollution Measurement Systems*, *Volume II: Ambient Air Specific Methods (Interim Edition)*, EPA/600/R-94/038b.
- *Reference Method for the Determination of Particulate Matter in the Atmosphere*, 40 CFR 50, Appendix J.
- *Reference Method for the Determination of Suspended Particulates in the Atmosphere (High Volume Method)*, 40 CFR 50, Appendix B.
- *Reference Method for the Determination of Lead in Suspended Particulate Matter Collected from Ambient Air*, 40 CRF 50, Appendix G.
- *Reference Method for this Determination of Suspended Particulates in the Atmosphere (PM_{10} Method)*, 40 CFR 50, Appendix J.

3. Summary of Method

3.1 The sampling of a large volume of atmosphere, 1,600-2,400 m^3 (57,000-86,000 ft^3), with a high-volume blower, typically at a rate of 1.13-1.70 m^3/min (40-60 ft^3/min), is described in this method. The calibration and operation of typical equipment used in this sampling is also described.

3.2 Air is drawn into the sampler and through a glass fiber or quartz filter by means of a blower, so that particulate material collects on the filter surface. Without a 10 µm size-selective inlet, particles of 100 µm size and less enter the sampling inlet and are collected on the downstream filter. The collection efficiencies for particles larger than 20 µm decreases with increasing particle size, and it varies widely with the angle of the wind with respect to the roof ridge of the sampler shelter. When glass fiber filters are used, particles 100-0.1 µm or less in diameters are ordinarily collected. With a size-select inlet, particles 10 µm diameter or less are collected on the quartz filter.

3.3 The upper limit of mass loading is determined by plugging the filter medium with sample material, which causes a significant decrease in flow rate. For very dusty atmospheres, shorter sampling periods will be necessary.

3.4 The volume of air sampled is determined by a flow-rate indicator. The instrument flow-rate indicator is calibrated against a reference orifice meter. The latter is a working standard which, in turn, has been calibrated against a master flow meter certified by the National Institute of Standards and Technology (NIST).

3.5 Airborne particulate matter retained on the filter may be examined or analyzed chemically by a variety of methods (ICP, ICP/MS, AA, GFAA, and NAA) as delineated in Inorganic Compendium Methods IO-3.2 through IO-3.7.

4. Significance

4.1 The area of toxic air pollutants has been the subject of interest and concern for many years. Recently the use of receptor models has resolved the elemental composition of atmospheric aerosol into components related to emission sources. The assessment of human health impacts resulting in major decisions on control actions by federal, state and local governments is based on these data. Accurate measures of toxic air pollutants at trace levels is essential to proper assessments.

4.2 The high volume sampler is commonly used to collect the airborne particulate component of the atmosphere. A variety of options available for the sampler provides broad versatility and allows the user to develop information about the size and quantity of airborne particulate material and, using subsequent chemical analytical techniques, information about the chemical properties of the particulate matter. The advent of inductively coupled plasma spectroscopy has improved the speed and performance of metals analysis in many applications.

5. Definitions

[Note: Definitions used in this document are consistent with those used in ASTM Methods. All pertinent abbreviations and symbols are defined within this document at point of use.]

5.1 High-Volume Air Sampler (HV). A device for sampling large volumes of an atmosphere for collecting the contained particulate matter by filtration. Consists of a high-capacity blower, a filter to collect suspended particles, and a means for measuring the flow rate.

5.2 Working Flow-Rate Standard. A flow-rate measuring device, such as a standard orifice meter, that has been calibrated against a master flow-rate standard. The working flow-rate standard is used to calibrate a flow measuring or flow rate indicating instrument.

5.3 Master Flow-Rate Standard. A flow-rate measuring device, such as a standard orifice meter, that has been calibrated against a primary standard.

5.4 Primary Flow-Rate Standard. A device or means of measuring flow rate based on direct primary observations such as time and physical dimensions.

5.5 Spirometer. A displacement gasometer consisting of an inverted bell resting upon or sealed by liquid (or other means) and capable of showing the amount of gas added to or withdrawn from the bell by the displacement (rise or fall) of the bell.

5.6 Absolute Filter. A filter or filter medium of ultra-high collection efficiency for very small particles (submicrometer size) so that essentially all particles of interest or of concern are collected. Commonly, the efficiency is 99.95% or higher for a standard aerosol of 0.3 µm diameter.

5.7 Calibration. The process of comparing a standard or instrument with one of greater accuracy (small uncertainty) to obtain quantitative estimates of the actual values of the standard being calibrated, the deviation of the actual value from a nominal value, or the difference between the value indicated by an instrument and the actual value.

5.8 Differential Pressure Meter. Any flow measuring device that operates by restricting air flow and measuring the pressure drop across the restriction.

5.9 Emissions. The total of substances discharged into the air from a stack, vent, or other discrete source.

5.10 Flowmeter. An instrument for measuring the rate of flow of a fluid moving through a pipe or duct system. The instrument is calibrated to give volume or mass rate of flow.

5.11 Impaction. A forcible contact of particles of matter. A term often used synonymously with impingement.

5.12 Impactor. A sampling device that employs the principle of impaction (impingement).

5.13 Impingement. The act of bringing matter forcibly in contact. As used in air sampling, refers to a process for the collection of particulate matter in which the gas being sampled is directed forcibly against a surface.

5.14 Inhalable Particles. Particles with aerodynamic diameters of <10 µm that are capable of being inhaled into the human lung.

5.15 Interference. An undesired positive or negative output caused by a substance other than the one being measured.

5.16 Mass Flowmeter. Device that measures the mass flow rate of air passing a point, usually using the rate of cooling or heat transfer from a heated probe.

5.17 Matter. The substance of which a physical object is composed.

5.18 Orifice Meter. A flowmeter, employing as the measure of flow rate the difference between the pressures measured on the upstream and downstream sides of the orifice (that is, the pressure differential across the orifice) in the conveying pipe or duct.

5.19 Aerodynamic Diameter (a.d.). The diameter of a unit density sphere having the same terminal settling velocity as the particle in question. Operationally, the size of a particle as measured by an inertial device.

5.20 Particle. A small discrete mass of solid or liquid matter.

5.21 Particulate. Solids of liquids existing in the form of separate particles.

5.22 Precision. The degree of mutual agreement between individual measurements, namely repeatability and reproducibility.

5.23 Pressure Gage. The difference in pressure existing within a system and that of the atmosphere. Zero gage pressure is equal to atmospheric pressure.

5.24 Rotameter. A device, based on the principle of Stoke's law, for measuring rate of fluid flow. It consists of a tapered vertical tube having a circular cross section, and containing a flow that is free to move in a vertical path to a height dependent upon the rate of fluid flow upward through the tube.

5.25 Sampling. A process consisting of the withdrawal or isolation of a fractional part of a whole. In air or gas analysis, the separation of a portion of an ambient atmosphere with or without the simultaneous isolation of selected components.

5.26 Standard. A concept that has been established by authority, custom, or agreement to serve as a model or rule in the measurement of quantity of the establishment of a practice or procedure.

5.27 Traceability to NIST. Documented procedure by which a standard is related to a more reliable standard verified by the National Institute of Standards Technology (NIST).

5.28 Uncertainty. An allowance assigned to a measured value to take into account two major components of error: The systematic error and the random error attributed to the imprecision of the measurement process.

6. Apparatus Description

6.1 General Description

6.1.1 The essential features of a typical non size-specific TSP high-volume sampler are shown in Figure 1. The high volume sampler is a compact unit consisting of a protective housing; an electric motor driven; a high-speed, high-volume blower; a filter holder capable of supporting a 203 x 254-mm (8 in. by 10 in.) filter; and a flow-controller for controlling the air-flow rate through the instrument at 40-60 ft^3/min.

6.1.2 In operation, this traditional TSP sample draws ambient air into the sampler through the air inlet gap between the cover and the sampler housing walls (see Figure 2). The air inlet is uniform on all sides of the sampler to provide an effective particle capture air velocity between 20-35 cm/sec. at the recommended flow rate between 40-60 ft^3/min. The gable roof design of the sampler allows the sampled air to be evenly distributed over the surface of a downstream filter, where TSP is collected.

6.1.3 For PM_{10} measurement, the traditional gable roof of the TSP sampler is replaced with an impactor design size-select inlet, as illustrated in Figure 3. For the impaction design, an air sample enters a symmetrical (therefore wind-direction insensitive) hood and is deflected upward into a buffer chamber. The buffer chamber is evacuated at a rate of 68 m^3/h (40 cfm) through multiple circular nozzles. Particles are accelerated as they pass through the nozzles to an impaction chamber (see Figure 4). Because of their momentum, particles having diameters larger than the inlet's 10-µm cut design impact the surface of the impaction chamber. Smaller particles rise through the impaction chamber at speeds slow enough to minimize reentrainment of the impacted particles and then pass through multiple vent tubes to the high-volume sampler's filter where they are collected.

6.1.4 The second size-select design for PM_{10} measurement is the cyclone inlet, as illustrated in Figure 5. The omnidirectional cyclone used for fractionation in this inlet allows particles to enter from all angles of approach. An angular velocity component is imparted to the sample air stream and the particles contained in it by a series of evenly spaced vanes. Larger particle removal occurs in an inner collection tube. This tube incorporates a "perfect absorber," which is an oil-coated surface to eliminate particle bounce and reentrainment. The sample flow (with the unremoved smaller particles) then enters an intermediate tube, where the trajectory is altered to an upward direction. An additional turn is then made to alter the flow to a downward trajectory to allow the remaining particles (i.e., PM_{10} fraction) to deposit on a filter for subsequent analysis. As with the impaction inlet, control of air velocities in the cyclonic inlet is critical to maintain the correct particle size cutpoint. Maintaining the correct design volumetric flow rate through the inlet is important. This design flow rate is specified by the manufacturer in the instruction manual. For example, a popular cyclonic impaction inlet has a design flow rate of 1.13 m^3/min.

6.2 Filter Medium

6.2.1 Selecting a filtration substrate for time-integrated SPM monitoring must be made with some knowledge of the expected characteristics and a pre-determined analytical protocol. For any given standard test method, the appropriate medium will normally be specified.

6.2.2 Of the various types of filters listed in Table 1 of Chapter IO-2 Overview, four general types of filter material have been used to capture SPM. They include cellulose fiber, quartz/glass fiber, mixed fiber and membrane filter types. Selecting a filter depends upon variables such as background metal content, artifact formation, and affinity for moisture. The basic characteristics of the types of filter material used in air monitoring are outlined in Table 1, while useful filter properties are identified in Table 2. Several characteristics are important in selection of filter media. They are:

- **Particle Sampling Efficiency.** Filters should remove more than 99% of SPM from the air drawn through them, regardless of particle size or flow rate.
- **Mechanical Stability.** Filters should be strong enough to minimize leaks and wear during handling.
- **Chemical Stability.** Filters should not chemically react with the trapped SPM.
- **Temperature Stability.** Filters should retain their porosity and structure during sampling.
- **Blank Correction.** Filters should not contain high concentrations of target compound analytes.

6.2.3 Quartz fiber filters are the most commonly used filters for SPM sampling for determining mass loading. Typical characteristics of quartz fiber filters are (1) a fiber content of high purity quartz, (2) a binder of below 5% (zero for binderless types), (3) a thickness of approximately 0.5 mm, (4) a surface with no pinholes, and (5) an allowance of no more than 0.05% of smoke particles to pass through the filter at a pressure of 100 mm of water with a flow rate of 8.53 m/min (28 ft/min), as determined by a DOP smoke test (see ASTM Method D2986).

6.2.4 Quartz fiber filters are made from finely spun glass fiber by combining the fiber with an organic binder and compressing this material in a paper machine. These filters are increasingly used in air sampling. These filters have the ability to withstand high temperatures (up to 540EC). They are further typified by high-collection efficiency. In some cases, the organic binder may interfere with subsequent analysis, so the filter is flash-fired to remove the binder material. This action causes some loss in tensile strength and usually requires that a backing material be used during sampling. The quartz filters are nonhydroscopic, thus allowing them to be used in areas where humidity is high. Because they are glass, they are the filter choice for most corrosive atmospheres. All the filters in this category are fragile and must be handled with care. Quartz fiber filters, because of the high silicate content, are extremely difficult to ash by chemicals or heat.

Therefore, extraction procedures are performed on these filters to remove the sample for subsequent chemical analysis. For this reason, flash-fired quartz filters are the major atmospheric sampling filters.

6.3 Flow Control System

The high-volume sampler employs two basic types of flow control systems. One is a mass-flow-control (MFC) system; the other is a volumetric-flow-control (VFC) system. Because the calibration and standard operating procedures differ considerably between these two types of flow-control systems, this method presents procedures that are control-system-specific. PM_{10} inlets can be used with either the MFC and VFC systems.

6.3.1 Mass-flow-control (MFC) system. The flow rate in a MFC system is actively sensed and controlled at a predetermined set point. Air is pulled through the filter into the intake of a blower and subsequently exits the sampler through an exit orifice, which facilitates measurement of the flow with a manometer or pressure recorder. The flow rate is controlled by an electronic mass-flow controller, which uses a flow sensor installed below the filter holder to monitor the mass flow rate and related electronic circuitry to control the speed of the motor accordingly to provide a constant sampling rate. The controlled flow rate can be changed by an adjustment knob on the flow controller.

6.3.2 Volumetric-flow-control (VFC) system. A VFC system maintains a constant volumetric flow rate through the inlet, rather than a constant mass flow rate as in the MFC system. In a popular commercial VFC system, a choked-flow venturi is operated such that the air attains sonic velocity in the throat of the device. In this "choked" mode, the flow rate is unaffected by downstream conditions, such as motor speed or exit pressure and is a predictable function of upstream conditions, such as the stagnation pressure ratio and temperature. Thus, the volumetric flow is controlled without any moving parts or electronic components. In this type of flow control system, no means is provided for adjusting the controlled flow rate. The controlled flow rate is set by the manufacturer through engineering design of the venturi.

7. Calibration

7.1 Introduction

[Note: All sampling equipment must be properly calibrated. Calibration is the relationship between an instrumental output and the input of a known reference standard. The objective of this section is to provide technically sound flow-rate calibration procedures for the MFC and VFC HV samplers.]

[Note: Consistency of temperature and barometric pressure is required. All temperatures should be expressed in kelvin (K = EC + 273). All barometric pressures should be expressed in mm Hg. Avoid calibrating an HV sampler using one set of units and then performing sample calculations using another set.]

7.1.1 HV sampler inlet. Two types of size-selective inlets available are impaction and cyclonic for monitoring inhalable particles (<10 µm). The particle size discrimination characteristics of both the impaction and cyclonic type inlets depend critically on maintaining certain air velocities within the inlet; a change in velocity will result in a change in the nominal particle size collected. For this reason, the flow rate through the inlet must be maintained at a constant value that is as close as possible to the inlet's design flow rate. The design flow rate for a given sampler is specified in the sampler's instruction manual. The manual may also provide tolerance limits (or upper and lower limits) within which the sampler flow must be maintained. If the tolerance is not specified by the manufacturer, it should be assumed to be ±10%.

7.1.1.1 The symmetrical design of the impaction inlet (see Figure 4) ensures wind-direction insensitivity. Ambient air that is drawn into the inlet is evacuated from the buffer chamber through nine acceleration nozzles into the first impaction chamber, where initial particle separation occurs. The air is then accelerated through an additional 16 jets into a second impaction chamber. The acceleration jets have critical diameters calculated by the manufacturer to provide the necessary changes in velocity to effect correct particle size fractionation within the impaction chambers. The air flow finally exits the inlet through nine vent tubes onto a sample filter. Because air velocities are critical to maintain the correct particle size cutpoint within the inlet, maintaining the correct design flow rate through the inlet is important. This design flow rate is specified by the manufacturer in the instruction manual. For example, the design flow rate for one popular impaction inlet is 1.13 m^3/min.

7.1.1.2 The omnidirectional cyclone inlet (see Figure 5) used for fractionation allows particles to enter from all angles of approach. A angular velocity component is imparted to the sample air stream and the particles contained in it by a series of evenly spaced vanes. Larger particle removal occurs in an inner collection tube. This tube incorporates a "perfect absorber," an oil-coated surface to eliminate particle bounce and reentrainment. The sample flow (with the unremoved smaller particles) then enters an intermediate tube, where the trajectory is altered to an upward direction. An additional turn is then made to alter the flow to a downward trajectory to allow the remaining particles (i.e., PM_{10} fraction) ultimately to deposit on a filter for subsequent analysis. As with the impaction inlet, control of air velocities in the cyclonic inlet is critical to maintain the correct particle size cutpoint. Maintaining the correct design volumetric flow rate through the inlet is important. This design flow rate is specified by the manufacturer in the instruction manual. For example, as in the case of the impaction inlet, a popular cyclonic inlet also has a design flow rate of 1.13 m^3/min.

7.1.2 Total suspended particulate (TSP). As illustrated in Figure 2, particles of less than 100 µm are collected at a flow rate of 1.13-1.70 m^3/min (40-60 ft^3/min) using the conventional high-volume sampler, without size selection.

7.2 Summary of Calibration Procedures

[Note: During calibration, a closure plate perforated with a number of circular orifices is connected to the inlet of the sampler. The pressure drop across this orifice plate provides a measure of instrument air flow rate at any time. This pressure drop may be indicated by a rotameter, manometer, or other pressure-responsive device traceable to an NIST certified standard.]

7.2.1 A simple and sufficiently accurate method of calibrating is to compare the sampler meter with an orifice meter (working standard) that has been calibrated against a primary or master standard such as a Roots meter.

7.2.2 The preferable primary standard is a Roots meter of sufficient capacity to allow an accurate time-volume reading, which would be at least 30 s.

7.2.3 A positive displacement pump or blower may be used as a master flow-rate standard. In this case, the delivery rate of the master standard must be known accurately and the equipment must be in sound mechanical condition (no bypass leakage).

7.3 Certification of an Orifice Transfer Standard

[Note: The following certification procedure is applicable to an orifice transfer standard such as those that have been used previously in the calibration of both the traditional HV sampler and the PM_{10} samplers. Two common types of orifice devices are available: one equipped with a set of fixed resistance plates (e.g., a reference flow [Ref] device or a top-hat orifice) and one with an externally variable resistance valve. The

series of plates normally provided by the orifice manufacturer include an 18-, 13-, 10-, 7-, and 5-hole plate. Unfortunately, the 5-hole plate provides too low a flow rate to be useful for HV calibration, and other plates may produce flow rates substantially outside the design flow-rate range of the commercially available HV inlets. One may opt to fabricate or procure a different series of resistance ranges or use the variable-resistance type orifice device.]

7.3.1 Orifice Calibration Procedure.

7.3.1.1 Assemble the following equipment (see Figure 6):

- Orifice transfer standard (i.e., top-hat orifice, variable orifice, or ReF device) to be calibrated.
- Water or oil manometer with a 0-400 mm (0-16") range and minimum scale divisions of 1 mm (0.1"). This manometer should be permanently associated with the orifice transfer standard.
- Variable voltage transformer, a set of resistance plates, or available flow orifice (see Figure 7).
- Calibrated positive displacement, standard volume meter (such as a Roots Meter®) traceable to National Institute of Standards and Technology (NIST).

  [Note: As they are sold, standard volume meters may not be traceable to NIST. Traceability can be established directly through NIST or indirectly through the meter manufacturer's repair department. Periodic recertification is not normally required under clean service conditions unless the meter has been damaged and must be repaired. In general, damage will be indicated by a substantial (e.g., 50%) increase in the pressure drop across the meter. The meter's traceability certificate should contain a graph of the pressure drop as a function of flow rate.]

- High-volume air mover (e.g., a blower motor from a HV sampler).
- Accurate stopwatch.
- Mercury manometer, with a 0-200 mm (0-8") range and minimum scale divisions of 1 mm (0.1").
- Thermometer, capable of accurately measuring temperatures over the range of 0-50EC (273-323 K) to the nearest ±1EC and referenced to an NIST or ASTM thermometer within ±2EC at least annually.
- Barometer, capable of accurately measuring ambient barometric pressure over the range of 500-800 mm Hg (66-106 kPa) to the nearest mm Hg and reference within ±5 mm Hg of a barometer of known accuracy at least annually.
- Orifice transfer standard certification worksheet (see Figure 8).

7.3.1.2 Record on the orifice transfer standard certification worksheet the standard volume meter's serial number; orifice transfer standard's type, model, and serial number; the person performing the certification; and the date.

7.3.1.3 Observe the barometric pressure and record it as Pa. Read the ambient temperature in the vicinity of the standard volume meter and record it as Ta (K = EC + 273).

7.3.1.4 Connect the orifice transfer standard to the inlet of the standard volume meter. Connect the mercury manometer to measure the pressure at the inlet of the standard volume meter. Connect the orifice (water or oil) manometer to the pressure tap on the orifice transfer standard. Connect a high-volume air mover to the outlet side of the standard volume meter. Make sure that all gaskets are present and are in good condition.

7.3.1.5 Check that the standard volume meter table is level and adjust its legs if necessary.

7.3.1.6 Check for leaks by temporarily clamping both manometer lines (to avoid fluid loss) and blocking the orifice with a large-diameter rubber stopper, wide duct tape, or other suitable means. Start the high-volume air mover and note any change in the standard volume meter's reading. The reading should remain constant. If the reading changes, locate any leaks by listening for a whistling sound and/or retightening all connections, making sure that all gaskets are properly installed.

[*Note: Avoid running the sampler for longer than 30 s at a time with the orifice blocked. This precaution will reduce the chance that the motor will be overheated due to the lack of cooling air. Such overheating can shorten the motor's lifetime; it can raise temperatures to the point of defeating the electrical insulation which could result in fire or electric shock to the user.*]

7.3.1.7 After satisfactorily completing the leak check, turn off the high-volume air sampler, unblock the orifice, and unclamp both manometer lines. Zero the water and mercury manometers by sliding their scales so that their zero lines are even with the bottom of the meniscuses.

7.3.1.8 Turn on the high-volume air sampler. Adjust the variable voltage transformer to achieve an appropriate flow rate (i.e., within the approximate range of 0.9-1.3 m^3/min (32-46 ft^3/min)). If necessary, use fixed resistance plates or the variable resistance valve to achieve the appropriate flow rate (see Figure 7). The use of fixed resistance plates is discouraged (but not prohibited) because the leak check must be repeated each time that a plate is installed.

7.3.1.9 After setting a flow rate, allow the system to run for at least 1 min to attain a constant motor speed. Observe the standard volume meter dial reading and simultaneously start the stopwatch. Error in reading the meter dial can be minimized by starting and stopping the stopwatch on whole number dial readings (e.g., 4091.00).

7.3.1.10 Record the initial volume that the meter dial indicated when the stopwatch was started. Maintain this constant flow rate until at least 3 m^3 of air have passed through the standard volume meter. Record the standard volume meter's inlet pressure manometer reading as)Hg and the orifice manometer reading as)H_2O. If)H_2O changes significantly during the run, abort the run and start again.

7.3.1.11 When at least 3 m^3 of air have passed through the system, note the standard volume meter reading and simultaneously stop the stopwatch. Record the final volume that the meter dial was indicating when the stopwatch was stopped. Record the elapsed time (Time) indicated on the stopwatch.

7.3.1.12 Calculate the volume measured by the standard volume meter (Vol.) using the following equation:

) Vol. = Final Volume - Initial Volume

7.3.1.13 Correct this volume to ambient atmosphere pressure.

Va =) Vol. (Pa -) Hg)/Pa

where:

Va = actual volume at ambient barometric pressure, m^3.
) Vol. = actual volume measured by the standard volume meter, m^3.
Pa = ambient barometric pressure during calibration, mm Hg.
) Hg = differential pressure at inlet to volume meter, mm Hg.

7.3.1.14 Calculate the actual volumetric flow rate (m^3/min).

Qa = Va/) Time

where:

Qa = actual volumetric flow rate through the orifice, m^3/min.
) time = elapsed time, min.

7.3.1.15 Repeat Sections 7.3.1.8 through 7.3.1.14 for at least four additional flow rates within the approximate range of 0.9-1.3 m^3/min (32-46 ft^3/min). At least five evenly distributed different flow rates are required, and at least three flow rates must be in the specified inlet flow-rate interval (1.02-1.24 m^3/min [36-44 ft^3/min]). Better calibration precision may be obtained by running additional flow rates or repeating the flow rates.

7.3.1.16 For each flow, compute $[() H_2O)(Ta/Pa)]^{½}$, and plot these values against the corresponding values of Qa. Draw the orifice transfer standard's certification curve. For the model $[() H_2O)(Ta/Pa]^{1/2}$ = m (Qa) + b, calculate the linear least squares regression's slope (m), intercept (b), and correlation coefficient (r) of the certification relationship. Plot the regression line on the same graph as the calibration data, as illustrated in Figure 9. A certification graph should be readable to 0.02 m^3/min.

7.3.1.17 If any calibration point does not fall within ±2% of the line, rerun the point, recalculate, and replot.

7.3.1.18 For subsequent use of the orifice transfer standard, calculate Qa from the calibration relationship as:

$$Qa(orifice) = \{[() H_2O)(Ta/Pa)]^{½} - b\} \{1/m\}$$

where:

Qa(orifice) = actual volumetric flow rate as indicated by the orifice transfer standard, m^3/min
) H_2O = pressure drop across the orifice, mm H_2O.
Ta = ambient temperature during use, K (K = EC + 273).
b = intercept of the orifice calibration relationship.
m = slope of the orifice calibration relationship.

7.3.2 Orifice Transfer Standard Calibration Frequency. Upon receipt and at l-yr intervals, the calibration of the orifice transfer standard should be certified with a standard volume meter (such as a Roots Meter®) traceable to NIST. An orifice transfer standard should be visually inspected for signs of damage before each use and should be recalibrated if the inspection reveals any nicks or dents.

7.4 Procedure for a Mass-Flow-Controlled (MFC) High Volume Sampler

The MFC sampler calibration procedure presented in this section relates known flow rates to the pressure in the exit orifice plenum. The known flow rates are determined by an orifice transfer standard that has been certified according to the procedure presented in Section 7.3.1. The exit orifice plenum is the area within the motor housing (below the motor unit) that contains the air flow just before it is exhausted to the atmosphere through the exit orifice. This exit orifice plenum pressure should be measured with a 25-cm (10") water or oil manometer. Also, each sampler should have its own dedicated manometer, which can be conveniently mounted to the side of the sampler housing. Other types of pressure measurement devices may be used provided they have comparable accuracy. The 4" continuous pressure (flow) recorders of the type often supplied with high volume PM_{10} samplers are generally not sufficiently accurate and are not recommended for quantitative sampler pressure or flow measurements. These flow recorders should be used only for nonquantitative determination that the flow was approximately constant and uninterrupted over the sample period. The flow recorder may be connected in parallel with the manometer or other pressure measuring device, using a tee or "y" tubing connection. For this MFC calibration procedure, the following conditions are assumed:

- The high volume PM_{10} sampler is equipped with a mass flow controller to control its sample flow rate.
- The sampler flow rate is measured by measuring the exit orifice plenum pressure, using a water or oil manometer [or, if necessary, a continuous-flow recording device using square-root-scale chart paper].
- The transfer standard for the flow-rate calibration is an orifice device equipped with either a series of resistance plates or an integral variable-resistance valve. The pressure drop across the orifice is measured by an associated water or oil manometer.

[Note: Because flow recorders are still widely used for quantitative flow measurements, the calibration procedure includes specific instructions for quantitatively calibrating a flow recorder. These flow recorder instructions are enclosed in brackets [ ] and should be used only when a manometer or other pressure measurement device cannot be used.]

7.4.1 Calibration Equipment.

7.4.1.1 Orifice transfer standard with calibration traceable to NIST (see Section 7.3).

7.4.1.2 An associated water or oil manometer, with a 0-400 mm (0-16") range and an minimum scale division of 2 mm (0.1")

[Note: Digital manometers may also be used in place of water or oil manometers, especially in cold/frigate climates. Ensure the battery in the manometer is new before use.]

7.4.1.3 A water or oil manometer, with a 0-400 mm (0-16") range and a minimum scale division of 2 mm (0.1") for measurement of the sampler exit orifice plenum pressure. This manometer should be associated with the sampler.

[*Note: Manometers used for field calibration may be subject to damage or malfunction and should thus be checked frequently.*]

7.4.1.4 Thermometer, capable of accurately measuring temperature over the range of 0-50EC (273-323 K) to the nearest ±1 EC and referenced to an NIST or ASTM thermometer within ±2 EC at least annually.

7.4.1.5 A portable aneroid barometer (e.g., a climber's or engineer's altimeter) capable of accurately measuring ambient barometric pressure over the range of 500-800 mm Hg (66-106 kPa) to the nearest mm Hg and referenced within ±5 mm Hg of a barometer of known accuracy at least annually.

7.4.1.6 Miscellaneous handtools, calibration data sheets or station log book, and 51 mm (2") duct tape.

7.4.2 Multipoint Flow-Rate Calibration. The procedure presented here is basic and generic, given the assumptions listed in Section 7.4. More detailed calibration procedures, variations, or alternative procedures may be presented in the manufacturer's instruction manual. The manual should be reviewed carefully and the various calibration variations or alternative procedures should be evaluated. In-house equipment and personnel, procedural simplicity and uniformity, and subsequent data applications should be considered in establishing the specific, detailed calibration procedure to be implemented.

[Note: Do not attempt to calibrate the MFC sampler under windy conditions. Short-term wind velocity fluctuations will produce variable pressure readings by the orifice transfer standard's manometer. The calibration will be less precise because of pressure variations.]

7.4.2.1 Set up the calibration system as recommended by the manufacturer. A typical MFC PM_{10} sampler calibration configuration is illustrated in Figure 10. MFC samplers are calibrated without a filter or filter cassette installed.

7.4.2.2 Disconnect the motor from the flow controller and plug it directly into a stable line voltage source (i.e., the sampler's on-off timer, if so equipped, or other source of the line voltage).

7.4.2.3 Install the orifice transfer standard and its adapter faceplate on the sampler. Check all gaskets and replace any questionable ones.

[Note: Tighten the faceplate nuts evenly on alternate corners to properly align and seat the gaskets. The nuts should be only hand-tightened because too much compression can damage the sealing gasket.]

7.4.2.4 Select the first calibration flow rate and install the appropriate resistance plate or adjust the variable orifice valve. At least four flow rates are required to define the calibration relationship. For resistance plate orifices, make sure that the orifice and resistance plate gaskets are in place and the orifice is not cross-threaded on the faceplate.

7.4.2.5 To leak check, block the orifice with a large-diameter rubber stopper, wide duct tape, or other suitable means. Seal the pressure port with a rubber cap or similar device. Turn on the sampler. Gently rock the orifice transfer standard and listen for a whistling sound that would indicate a leak in the system. A leak-free system will not produce an upscale response in the sampler's exit orifice manometer or flow recorder. Leaks are usually caused either by a damaged or missing gasket between the orifice transfer standard and the faceplate or by cross-threading of the orifice transfer standard on the faceplate. All leaks must be eliminated before proceeding with the calibration. When the system is determined to be leak-free, turn off the sampler and unblock the orifice.

[Note: Avoid running the sampler for longer than 30 s at a time with the orifice blocked. This precaution will reduce the chance that the motor will be overheated due to the lack of cooling air. Such overheating can shorten the motor's lifetime and can raise temperatures to the point of defeating the electrical insulation, which could result in fire or electric shock to the user.]

7.4.2.6 Inspect the connecting tubing of both manometers for crimps or cracks. Open the manometer valves (if present) and blow gently through the tubing, watching for the free flow of the fluid.
Adjust the manometers' sliding scales so that their zero lines are at the bottom of the meniscuses. Connect the orifice transfer standard manometer to the orifice transfer standard. Connect the sampler's exit orifice manometer [and the continuous-flow recorder, if used] to the exit orifice plenum port. Ensure that one side of each manometer is open to atmospheric pressure. Make sure that the tubing fits snugly on the pressure ports and on the manometer.

7.4.2.7 If a continuous flow recorder is to be used quantitatively in lieu of a manometer, record the site location, sampler S/N, date, and the operator's initials on the blank side of a clean recorder chart. Make sure the chart has a square-root scale. Open the front door of the sampler and install the clean recorder chart.

7.4.2.8 Read and record the following parameters on the HV data sheet. An example calibration data sheet for the MFC sampler is illustrated in Figure 11.

- Date, location, and operator's signature.
- Sampler S/N and model.
- Ambient Pa, mm Hg.
- Ambient temperature (Ta), K (K = EC + 273).
- Orifice S/N and calibration relationship.

[Note: Consistency of temperature and barometric pressure units is required. All temperatures should be expressed in kelvin (K = EC + 273). Also, all barometric pressures should be expressed in mm Hg. Avoid calibrating a sampler using one set of units and then performing sampler calculations using another set.]

[Note: Ideally, the temperature of the air in the exit orifice plenum should be measured because it will be somewhat higher than ambient temperature. However, an adequate approximation of this temperature may be obtained by adding 30 K to the ambient temperature. This addition is incorporated in the calculations given in Section 7.4.3.]

7.4.2.9 Turn on the sampler and allow it to warm up to operating temperature (3-5 min). Then read and record the orifice transfer standard's manometer deflection,) H_2O (in. H_2O), and the corresponding sampler's manometer deflection,) Pex [or flow recorder chart reading, I].

[Note: The sampler inlet may be partially lowered over the orifice transfer standard to act as a draft shield (if a shield is not otherwise provided). Use a block to provide at least 2" of clearance at the bottom for air flow and for the manometer tubing.]

7.4.2.10 Install the other resistance plates or adjust the variable orifice value to obtain each of the other calibration flow rates and repeat Section 7.4.2.9 for each. At least four calibration flow rates are required.

7.4.2.11 Plot the calibration data on a sheet of graph paper as specified in Section 7.4.3.4.

[Note: The data should be plotted in the field as the calibration is occurring, rather than afterwards back at the laboratory.]

Repeat Section 7.4.2.9 for any data that are questionable on the plot.

[Note: Running additional calibration points at differing flow rates or repeating the calibration points at the same flow rates is encouraged to improve the precision of the calibration.]

7.4.2.12 Turn off the sampler and remove the orifice transfer standard.

7.4.2.13 Reconnect the sampler motor to the flow controller.

7.4.2.14 Perform the calibration calculations presented in the following section. The data generated will be used to set the mass flow controller (see Section 7.4.4) to a value that will result in optimal volumetric flow based on the seasonal average temperature and barometric pressure at the monitoring site.

7.4.3 Calibration Calculations. Gather all calibration data, including the orifice calibration information and the sampler calibration data sheet (and, if used, the flow recorder chart, which should graphically display the various calibration flow rates).

[Note: These calculations should be done at the time of the calibration, rather than later. This approach will allow additional calibration points to be taken if questions arise about the data that have already been obtained.]

7.4.3.1 Verify that the orifice transfer standard calibration relationship is current and traceable to an acceptable primary standard.

7.4.3.2 Calculate and record Qa for each calibration point from the orifice calibration information using the following equation.

$$Qa(orifice) = \{\Delta H_2O(Ta/Pa)]^{1/2} - b\} \{1/m\} \text{ where:}$$

Qa(orifice) = actual volumetric flow rate as indicated by the transfer standard orifice, m^3/min
ΔH_2O = pressure drop across the orifice, in. H_2O.
Ta = ambient temperature during use, K (K = °C + 273).
Pa = ambient barometric pressure during use, mm Hg.
b = intercept of the orifice calibration relationship.
m = slope of the orifice calibration relationship.

7.4.3.3 Calculate and record the quantity for each calibration point as:

$$\Delta Pext = [\Delta Pex(Ta+30)/Pa]^{1/2}$$

where:

ΔPext = transformed manometer reading.
ΔPex = sampler manometer reading, in. H_2O Ta = ambient temperature, K (K = °C +273).
Pa = ambient barometric pressure, mm Hg.

[If a continuous-flow recorder is used quantitatively, calculate and record the quantity [It] as follows:

$$[It] = I[Ta+ 30)/Pa]^{1/2}$$

where:

[It] = transformed flow recorder chart reading.
I = flow recorder chart reading, arbitrary units on square root scale.

[Note: If recorder charts with linear scales are used, substitute $(I)^{1/2}$ for I in the above equation.]

7.4.3.4 On a sheet of graph paper, plot the calculated Qa(orifice) flow rates on the x-axis and the transformed sampler manometer response, Δ Pext [or the transformed flow recorder reading, It], on the y-axis.

Because determining the sampler's average operational flow rate (Qa) during a sample period depends on the ambient average temperature and pressure, using a graphic plot of the calibration relationship is not recommended for subsequent data reduction. This plot is used only to visually assess the calibration points to see if any should be rerun. Plot the regression line on the same graph paper as the calibration data. For the regression model y = mx + b, let y +2 Δ Pext and x = Qa(Orifice) so that the model is given by:

$$\Delta Pext = m[Qa(orifice)] + b$$

For the flow recorder, the model is:

$$It = m[Qa(orifice)] + b]$$

Using a programmable calculator or a calculation data form, determine the linear regression slop (m), intercept (b), and correlation coefficient (r) and record them on the data sheet. A five-point calibration should yield a regression equation with a correlation coefficient of $r > 0.990$, with no point deviating more than ±0.04 m^3/min from the value predicted by the regression equation. Plot the regression line on the same graph paper that has the individual calibration points.

7.4.3.5 For subsequent sample periods, the sampler's average actual operational flow rate, $\overline{Qa}$, is calculated from the calibration slope and intercept using the equation.

$$\overline{Qa} = \{)\ \overline{Pex}(Tav+30)/Pav]^{1/2} - b\}\ \{1/m\}$$

where:

$\overline{Qa}$ = the sampler's average actual flow rate, m^3/min.
$)\ \overline{Pex}$ = average of initial and final sampler manometer readings ($)\ Pex_i$ + $)\ Pex_f$), mm Hg.
Tav = average ambient temperature for the sample period, K(K=EC+273).
Pav = average ambient pressure for the sampling period, mm Hg.
b = intercept of the sampler calibration relationship.
m = slope of the sampler calibration relationship.

[For the flow controller,

$$\overline{Qa} = \{\overline{I}(Tav + 30)/Pav]^{1/2} - b\}\ \{1/m\}$$

where:

$\overline{I}$ = average flow recorder reading for the sample period.]

[Note: *If recorder charts with linear scales are used, substitute $(I)^{1/2}$ for (I) in the above equation.]*

7.4.4 Mass Flow Controller Adjustment Procedure. The controlled flow rate of an MFC sampler is adjustable and must be set to the proper design flow rate. The constant mass flow maintained by the MFC causes the actual volumetric flow rate through the inlet to fluctuate as the ambient temperature and barometric pressure change at the monitoring site. Normally, the range of these fluctuations is within the allowable tolerance limits for the inlet. However, the flow-rate set point of the mass flow controller must be correctly adjusted so that the deviations are "centered" with respect to the seasonal average temperature and barometric pressure at the site, not the temperature and pressure prevailing at the time of setting. The correct seasonal volumetric setpoint flow rate (SFR) at Ta and Pa has had the same mass flow rate as the inlet design volumetric flow rate at Ts and Ps.

[Note: The correct SFR may differ from day to day and may be somewhat higher or lower than the inlet design flow rate on any particular day.]

7.4.4.1 Determine the seasonal average temperature (Ts) and seasonal average pressure (Ps) at the site and record them on the calibration data sheet. (Determination of the number of "seasons," i.e., the number of different seasonal average temperatures needed for the year, is left to the discretion of the operator.)

7.4.4.2 Calculate SFR and record on the calibration data sheet:

$$SFR = (1.13)\,(Ps/Pa)(Ta/Ts)$$

where:

SFR = set-point actual volumetric flow rate for adjustment of the mass flow controller, based on seasonal average temperature and average pressure at site, m^3/min.
1.13 = inlet design flow rate (as specified by the manufacturer), m^3/min.
Ps, Pa = seasonal average and current ambient barometric pressure at the site, respectively, mm Hg.
Ts, Ta = seasonal average and current ambient temperature, respectively, K (K = EC + 273).

7.4.4.3 Calculate and record on the sampler's calibration data sheet the sampler set-point manometer reading [or flow recorder reading] that corresponds to the SFR calculated in Section 7.4.4.2.

$$SSP = [Pa/(Ta + 30)][m(SFR) + b]^2$$

where:

SSP = sampler set-point manometer reading, in H_2O.
Pa = ambient barometric pressure, mm Hg.
Ta = ambient temperature, K (K = EC + 273).
m = slope of the sampler's calibration relationship.
SFR = set-point flow rate from 7.4.4.2, m^3/min.
b = intercept of the sampler's calibration relationship.
[For the flow recorder,

$$SSP = [m(SFR) + b]\,[Pa/(Ta+30)]^{1/2}]$$

7.4.4.4 Visually check to make sure the motor is connected to the mass flow controller and the manometer is properly connected.

7.4.4.5 Install a clean filter (in a filter cassette) in the sampler according to the manufacturer's instructions. [If the continuous flow recorder is used quantitatively, install a clean chart and verify that the recorder is zeroed (i.e., the pen rests on the innermost circle of the chart).]

7.4.4.6 Turn on the sampler and allow it to warm up to operating temperature (3-5 min).

7.4.4.7 Following the manufacturer's instructions, adjust the mass flow controller until the manometer reading [or flow recorder response] indicates the sampler set point (SSP) as calculated in Section 7.4.4.3.

7.4.4.8 Verify that the flow controller will maintain this flow rate for at least 10 min. Turn off the sampler.

7.4.4.9 The sampler can now be prepared for the next sample run day.

7.5 Procedure for a Volumetric-Flow-Controlled (VFC) Sampler

The VFC sampler calibration procedure presented in this section relates known flow rates (Qa, as determined by an orifice transfer standard) to the ratio of the stagnation pressure to the ambient barometric pressure (Pl/Pa). The stagnation pressure (Pl) is the air pressure inside the sampler in the area just under the filter. VFC samplers have a stagnation pressure tap or port through which the stagnation pressure can be measured. A VFC sampler may also have an exit orifice below the motor similar to those in MFC samplers. In this case, the sampler flow rate can be measured and calibrated using the exit orifice plenum pressure generally described in Section 7.4. However, using the stagnation pressure generally provides a more accurate indication of sampler flow rate. Additionally, a continuous-flow recorder may be connected to the exit orifice pressure tap for nonquantitative determination that the flow rate was constant and uninterrupted over the sample period.

The stagnation pressure should be measured with a 0-1000 mm (0-36") oil, water, or digital manometer. Also, each sampler should have its own dedicated manometer, which can be conveniently mounted to the side of the sampler housing. Other types of pressure measurement instruments may be used provided they have comparable accuracy. However, the 4" continuous pressure (i.e., flow) recorders often supplied with HV samplers are generally not sufficiently accurate and are **not recommended** for quantitative sampler pressure or flow rate measurements.

The VFC sampler's flow control system is a choke-flow venturi. This system must be precisely sized for a given average annual temperature and pressure because no means is provided for the user to adjust the operational flow rate. Therefore, the purchasing agency should notify the manufacturer of the **operational** location of the sampler; differences in temperature and pressure between the shipping address and the monitoring site may result in an incorrect operational flow rate. As with the MFC sampler, both the ambient temperature and barometric pressure readings must be determined or estimated during the sampling period for the subsequent calculation of total sampler volume in standard volume units.

For this VFC calibration procedure, the following conditions are assumed:

- The VFC sampler uses a choked-flow venturi to control the actual volumetric flow rate.
- The sampler flow rate is measured by measuring the stagnation pressure ratio, and the sampler is not equipped with a continuous flow recorder.
- The sampler inlet is designed to operate at a constant actual volumetric flow rate of 1.13 m^3/min.
- The transfer standard for the flow-rate calibration is an orifice device equipped with either a series of resistance plates or an integral variable-resistance valve. The pressure drop across the orifice is measured by an associated water or oil manometer.
- The sampler will be calibrated in actual volumetric flow-rate units (Qa), and the orifice transfer standard is also calibrated in Qa, as specified in Section 7.3.

7.5.1 Calibration Equipment.

7.5.1.1 Orifice transfer standard with proper calibration traceable to NIST (see Section 7.3).

7.5.1.2 An associated water, oil, or digital manometer, with a 0-400 mm (0-16") range and minimum scale divisions of 2 mm (0.1").

7.5.1.3 An oil, water, or digital manometer, with a 0-1000 mm (0-36") range and minimum scale divisions of 2 mm (0.1") or other pressure measurement device for measurement of the sampler stagnation pressure. Ideally, this manometer (or other pressure instrument) should be associated with the sampler.

[Note: Manometers used for field calibration may be subject to damage or malfunction and should thus be checked frequently.]

7.5.1.4 Thermometer, capable of accurately measuring temperature over the range of 0-50EC (273-323 K) to the nearest ±1EC and referenced to an NIST or ASTM thermometer within ±2EC at least annually.

7.5.1.5 A portable, aneroid barometer (e.g., a climber's or engineer's altimeter) capable of accurately measuring ambient barometric pressure over the range of 500-800 mm Hg to the nearest mm Hg and referenced within ±5 mm Hg to a barometer of known accuracy at least annually.

7.5.1.6 Calibration data sheets or the station log book and 51 mm (2")-wide duct tape.

7.5.1.7 A clean filter.

7.5.2 Multipoint Flow-Rate Calibration Procedure - VFC Sampler. The procedure presented here is basic and intended to be generic, given the assumptions listed in Section 7.5. More detailed calibration procedures, variations, or alternative procedures may be presented in the manufacturer's instruction manual. The manual should be reviewed carefully and that the various calibration variations or alternative procedures be evaluated. In-house equipment and personnel, procedural simplicity and uniformity, and subsequent data applications should be considered in establishing the specific, detailed calibration procedure to be implemented.

[Note: The calibration of some VFC samplers may be affected by changes in line voltage, particularly if the line voltage is below normal (normal is about 115 V). For this reason, VFC samplers should always be calibrated at the monitoring site. Further, if the line voltage at the site is low and likely to fluctuate significantly, a line voltage booster or regulator may be advisable. Also, be sure that replacement blower motors are of the correct type.]

[Note: Do not attempt to calibrate the VFC sampler under windy conditions. Short-term velocity fluctuations will produce variable pressure readings by the orifice transfer standard's manometer. The calibration will be less precise because of the pressure variations.]

7.5.2.1 Set up the calibration system as recommended by the manufacturer. A typical VFC sampler calibration configuration is illustrated in Figure 12. The VFC sampler manufacturer may specify that the sampler be calibrated with a filter installed, which generally precludes calibration flow rates higher than normal operating flow rate. Additional calibration flow rates obtained without a filter may be appropriate, as discussed in Section 7.5.2.8.

7.5.2.2 Install the orifice transfer standard and its adapter faceplate on the sampler. First inspect all gaskets and seals and replace any doubtful ones.

[Note: Tighten the faceplate nuts evenly on alternate corners to properly align and uniformly seat the gaskets. The nuts should be hand-tightened only; too much compression can damage the sealing gasket.]

7.5.2.3 Select a calibration flow rate and install the appropriate resistance plate (or no plate) or adjust the variable resistance valve. At least four flow rates are required to define the calibration relationship. At least three flow rates should be within the acceptable flow-rate range (i.e., 1.02-1.24 m^3/min) for the sampler inlet. For resistance plate orifices, make sure the orifice and resistance plate gaskets are in place and the orifice is not cross-threaded on the faceplate.

7.5.2.4 Leak check the system by blocking the orifice with a large-diameter rubber stopper, wide duct tape, or other suitable means. Seal the pressure port with a rubber cap or similar device. Turn on the sampler. Gently rock the orifice transfer standard and listen for a whistling sound that would indicate a leak in the system. Leaks are usually caused either by a damaged or missing gasket between the orifice transfer standard and the faceplate or by crossthreading of the orifice transfer standard on the faceplate. All leaks must be eliminated before proceeding with the calibration. When the system is determined to be leak-free, turn off the sampler and unblock the orifice.

[Note: Avoid running the sampler for longer than 30 s at a time with the orifice blocked. This precaution will reduce the chance that the motor will be overheated due to the lack of cooling air. Such overheating can shorten the motor's lifetime. It can raise temperatures to the point of defeating the electrical insulation, which could result in fire or electric shock to the user.]

7.5.2.5 Inspect the connecting tubing of the manometers for crimps or cracks. Open the manometer valves (if present) and blow gently through the tubing, watching for the free flow of the fluid. Adjust the manometers' sliding scales so that their zero lines are at the bottom of the meniscuses. Connect the transfer standard manometer to the transfer standard and the sampler stagnation pressure manometer (or other pressure instrument) to the stagnation pressure port. Ensure that one side of each manometer is open to atmospheric pressure. Make sure the tubing fits snugly on the pressure ports and on the manometers.

7.5.2.6 Read and record the following parameters on the VFC Sampler Data Sheet. An example calibration data sheet for the VFC sampler is illustrated in Figure 13.

- Date, location, and operator's signature.
- Sampler S/N and model.
- Ambient barometric pressure (Pa), mm Hg.
- Ambient temperature (Ta), EC and K (K = EC + 273).
- Orifice S/N and calibration relationship.

[Note: Consistency of temperature and barometric pressure units is required. All temperatures should be expressed in kelvin (K = EC + 273). Also, all barometric pressures should be expressed in mm Hg. Avoid calibrating a HV sampler using one set of units and then performing sampler calculations using another set.]

7.5.2.7 Turn on the sampler and allow it to warm to operating temperature (3-5 min). Read and record the orifice transfer standard's manometer reading, H_2O, and the corresponding sampler relative stagnation pressure manometer reading, Pstg, on the data sheet. (Relative stagnation pressure is a negative pressure [i.e., a vacuum] relative to atmospheric pressure as measured by a manometer with one leg open to the atmosphere.) Be sure to convert the manometer reading to mm Hg using the following equation before recording the reading on the calibration data sheet:

$$\text{mm Hg} = 25.4\ (\text{in. } H_2O/13.6)$$

[Note: The sampler inlet may be partially lowered over the orifice transfer standard to act as a draft shield (if a shield is not otherwise provided). Use a block to provide at least 2" of clearance at the bottom of air flow and for the manometer tubing).]

7.5.2.8 Install the other resistance plates or adjust the variable orifice value to obtain each of the other calibration flow rates and repeat Section 7.5.2.7 for each. At least four calibration flow rates are required with at least three in the acceptable flow-rate range. Difficulties may be encountered in obtaining flow rates in the acceptable range. Even with modified resistance plates (or with no plates) installed, it may be impossible to obtain three acceptable flow rates with a filter mounted on the sampler. Lower flow rate calibration points may be used by extrapolation into the acceptable range without a filter installed in the sampler. If additional calibration points are obtained without a filter, they should be examined carefully to make sure they are consistent with the calibration points obtained with a filter (i.e., they fall on a smooth curve through all the calibration points).

7.5.2.9 Plot the calibration data on a sheet of graph paper as specified in Section 7.5.3.5 of the next section. Repeat Section 7.5.2.7 for any data that are questionable on the plot. Running additional calibration points at differing flow rates or repeating the calibration points at the same flow rates is encouraged to improve the precision of the calibration.

[Note: The data should be plotted in the field as the calibration is occurring, rather than afterwards back at the laboratory.]

7.5.2.10 Turn off the sampler and remove the orifice transfer standard.

7.5.2.11 Install a clean filter on the sampler in the normal sampling mode (use a filter cassette if one is normally used). Turn on the sampler and allow it to warm up to operating temperature.

7.5.2.12 Read the relative stagnation pressure as in Section 7.5.2.7 and record it on the data sheet in the row for the operational flow rate.

7.5.2.13 Perform the calibration calculations presented in the following sections.

7.5.3 Calibration Calculations. Gather together all the calibration data, including the orifice transfer standard's calibration information and the sampler calibration data sheet.

[<u>Note</u>: These calculations should be done at the time of the calibration, rather than later. This approach will allow additional calibration points to be taken if questions arise about the data that have already been obtained.]

7.5.3.1 Verify that the orifice transfer standard calibration relationship is current and traceable to an acceptable primary standard.

7.5.3.2 Calculate the record Qa(orifice) for each calibration point from the orifice calibration information and the equation.

$$Qa(orifice) - \{[)\ H_2O(T_a/Pa)]^{½} - b\}\ \{l/m\}$$

where:

Qa(orifice) = actual volumetric flow rate as indicated by the transfer standard orifice, m^3/min.
) H_2O = pressure drop across the orifice, in. H_2O.
Ta = ambient temperature during use, K (K = EC + 273).
Pa = ambient barometric pressure during use, mm Hg.
b = intercept of the orifice transfer standard's calibration relationship.
m = slope of the orifice transfer standard's calibration relationship.

7.5.3.3 Calculate and record the value of the absolute stagnation pressure ratio, [Pl], for each calibration point:

$$[Pl] = Pa -)\ Pstg$$

where:

[Pl] = absolute stagnation pressure, mm Hg.
Pa = ambient barometric pressure, mm Hg.
) Pstg = relative stagnation pressure, mm Hg.

7.5.3.4 Calculate and record the stagnation pressure ratio:

$$\text{Stagnation pressure ratio} = Pl/Pa$$

7.5.3.5 On a sheet of graph paper, plot the calculated orifice transfer standard's flow rates, Qa(orifice), on the x-axis vs. the corresponding stagnation pressure ratios, Pl/Pa, on the y-axis. Draw a smooth curve through the plotted data. If necessary, extrapolate the curve to include the acceptable flow-rate range.

7.5.3.6 If the sampler manufacturer has provided a factory calibration table (i.e., the lookup table) for the sampler, compare Qa(orifice) for several points on the calibration plot with Qa(sampler) determined from the factory calibration. Calculate the percentage difference between Qa(orifice) and Qa(sampler) using the following equation.

$$\%\ \text{Difference} = \frac{Qa(\text{sampler}) - Qa(\text{orifice})}{Qa(\text{orifice})} \times [100]$$

If the agreement is within a few (i.e., 2 or 4) percent, the factory calibration is validated and may be used for subsequent sample periods. Proceed to Section 7.5.5.

7.5.3.7 If the agreement is not within a few percentage points, recheck the accuracy of the orifice transfer standard and recheck the calibration procedure. Look for leaks, manometer reading errors, incorrect temperature or pressure data, or miscalculations. Also check for abnormally low line voltage at the site (it should be at least 110 V ac), for the correct blower motor, and for the presence of a gasket between the motor and the choked-flow venturi. A factory calibration is not likely to be substantially incorrect, and any discrepancy of more than a few percent is probably due to some problem with the sampler or with the calibration procedure. However, if no errors or problems with the sampler or with the calibration can be found, or if no factory calibration is provided by the manufacturer, proceed as described in Section 7.5.4.

7.5.4 Generation of Calibration Relationship - VFC Sampler.

7.5.4.1 For each calibration point, calculate and record the quantity,

$$[Pl/Pa)Ta]^{1/2}$$

where:

Pl/Pa = stagnation pressure ratio from the equation in Section 7.5.3.
Ta = ambient temperature during sampler calibration, K (K = EC + 273).

7.5.4.2 For the general linear regression model, y = mx + b, let y = $[(Pl/Pa)Ta]^{1/2}$ and let x = Qa(orifice), such that the model is given by:

$$[(Pl/Pa)Ta]^{1/2} = m[Qa(\text{orifice})] + b$$

Calculate the linear regression slope (m), intercept (b), and correlation coefficient (r).

[Note: Inspect the plotted calibration curve to determine whether any of the calibration points that are substantially outside of the acceptable flow-rate range need to be eliminated so that they do not result in an inappropriate linear regression line.]

7.5.4.3 For subsequent sample periods, the sampler's average actual operating flow rate, Qa, is calculated from the calibration slope and intercept using the following equation.

$$\overline{Qa}(\text{sampler}) = \{[\overline{P1}/Pav)Tav]^{1/2} - b\}\ \{l/m\}$$

where:

$\overline{Qa}$(sampler) = the sampler's average actual flow rate, m^3/min.
$\overline{P1}$/Pav = average stagnation pressure ratio for the sampling period.
Tav = average ambient temperature for the sampling period, K (K = EC + 273).
b = intercept of the sampler calibration relationship.
m = slope of the sampler calibration relationship.

[Note: The average value for Pl should be calculated from stagnation pressure measurements taken before and after the sampling period. Pav should be estimated from barometric pressure for the sampling period. See also Section 9.4 for additional information.]

7.5.4.4 If a calibration (Lookup) table is desired, evaluate the above equation for various appropriate values of Pl/Pa and Ta and list the corresponding values of Qa(sampler) in tabular form.

7.5.5 Single-Point Operational Flowrate Ventilation. This procedure compares the VFC sampler's normal operating flow rate to the design flow rate of the inlet (e.g., 1.13 m^3/min).

7.5.5.1 Determine the value of Pl/Pa for the operational flow rate obtained with only the filter cassette installed (see Section 7.5.2.11 and Section 7.5.2.12).

7.5.5.2 Determine the new sampler flow rate, Qa(sampler) from the lookup table that corresponds to this value of Pl/Pa. Use the manufacturer's calibration table if it has been validated in 7.5.3.6; otherwise, use the equation in Section 7.5.4.3.

7.5.5.3 Compare Qa(sampler) with the inlet design flow rate (e.g., 1.13 m^3/min) using the following equation:

$$\text{Design flow rate\% difference} = \frac{\text{Qa(sampler)} - 1.13}{1.13} \times 100$$

This design flow rate percentage difference must be less than the allowable flow rate tolerance (i.e., ±10, if not otherwise specified by the manufacturer). However, this value should be well within ±7 to allow for some variation with ambient temperature. If this value is not within ±7, recheck the calibration procedure and data for errors. Check the sampler for leaks, bad motor brushes, missing gaskets, incorrect motor type, or abnormally low line voltage. Because the VFC flow rate is not adjustable, the VFC manufacturer must be consulted to resolve cases of substantially incorrect VFC flow rates.

7.6 Sampler Calibration Frequency

To ensure accurate measurement calibrate HV samplers upon installation and recalibrate as follows:

7.6.1 At least quarterly or annually (see 40 CFR 58, Appendix A for a description of the quality assurance requirements);

7.6.2 After any repairs that might affect sampler calibration (e.g., replacing the motor);

7.6.3 After relocation of the sampler to a different site;

7.6.4 If the results of a field flow-check exceed quality control limits (e.g., greater than ±7% from the sampler's indicated flow rate); or

7.6.5 Whenever a field flow-check or performance audit indicates that the sampler is out (or nearly out) of the acceptable flow-rate range.

[Note: Multipoint flow-rate calibrations should be distinguished from single-point, quality control flow checks (see Section 13). The latter are done more frequently than calibrations and are intended to check if the sampler flow rate, Qa(sampler), or the calibration relationship has changed significantly since the last calibration.]

8. Filters

8.1 Pre-weighing of Filters

8.1.1 Filters ready for field use have been pre-weighed in the laboratory, under prescribed climate control conditions of temperature and relative humidity, using Inorganic Compendium Method IO-3.1, *Selection, Extraction and Preparation of Filter Material*.

8.1.2 Within Method IO-3.1, the user is provided guidance on proper selection of filter material in order to meet project specific data quality objectives (DQOs), how to visually inspect a new lot of filters for consistency and identification of defects, and initial weighing of the filters so a net concentration of particulate matter can be calculated after sampling.

8.1.3 The user should follow the procedures outlined within Method IO-3.1 as part of meeting the program's standard operating procedures (SOPs) and quality control (QC) requirements.

8.2 Filter Handling

8.2.1 Filter material may be brittle and subject to shearing and breakage. Laboratory and field personnel must be aware of these characteristics and handle sample filters with care.

8.2.2 For convenience, filters can be packed in groups of 50 or less in their original containers or in a box of comparable size. The filters should be separated by a sheet of 8 ½ x 11" tracing paper. Filter inventory can be controlled by stacking the filters in numerical order so that the operator will use the proper filter first. One side of the shipping box can be cut away to allow the operator to remove the filter easily without damaging the corners.

8.2.3 A filter identification number must be assigned to each filter. Because of difficulty in seeing the "up" side (i.e., the side with the slightly rougher texture) of the filter, consistency in labeling these filters will allow the operator easy access to the filter ID number for documentation and cross-referencing laboratory data forms. This consistency will also eliminate confusion in loading the filter cassettes for subsequent sampling. If the filter ID number is embossed by the operating agency, gentle pressure must be used to avoid filter damage, and extreme care must be taken to avoid duplication or missed numbers.

8.2.4 If samples are to be mailed, the field operator should be supplied with reinforced envelopes and manila folders for protection of the exposed filters during their return to the analytical laboratory. These manila folders may be printed to serve as sample data sheets.

8.3 Visual Filter Inspection

All filters must be visually inspected for defects, and defective filters must be rejected if any are found. Batches of filters containing numerous defects should be returned to the supplier.
The following are specific defects to look for:

- **Pinhole** - a small hole appearing as a distinct and obvious bright point of light when examined over a light table or screen, or as a dark spot when viewed over a black surface.
- **Loose material** - any extra loose material or dirt particles on the filter that must be brushed off before the filter is weighed.
- **Discoloration** - any obvious visible discoloration that might be evidence of a contaminant.
- **Filter nonuniformity** - any obvious visible nonuniformity in the appearance of the filter when viewed over a light table or black surface that might indicate gradations in porosity across the face of the filter.
- **Other** - a filter with any imperfection not described above, such as irregular surfaces or other results of poor workmanship.

9. Sampling Procedure

[Note: This section describes routine operation of a monitoring site using an HV sampler and covers an array of topics, ranging from initial site selection to final data documentation. The procedures herein are intended to serve as guidelines for developing a monitoring program that will accurately reflect trends in local or regional air quality. The effectiveness of the monitoring program depends on responsible day-to-day operation of the monitoring site. The operators who conduct sampling activities offer a uniqueperspective on the sampler's performance, and their awareness and attention to detail will salvage data that may otherwise be lost. Note, however, that "routine" does not mean "unimportant." The site operator provides cohesiveness in a sampling program.]

9.1 Summary

9.1.1 The PM_{10} sampler can be used in a number of ways. Procedure variations may include the kind of filter medium, the surface area of the filter, prescreening to exclude particles up to a given size, and the manner of placing and exposing the filter during the test. The procedure most commonly used will be described here.

9.1.2 Calibrate the sampler as described in the Section 7. Do not make any change or adjustment on the sampler flow indicator after calibrating. Remove the calibrating orifice. The filters may be packed into a box with sheets of glassine between the filters, or they may be individually packed in self-sealing plastic bags for transportation to the field.

9.1.3 Mount the filter sheet in the filter holder taking care not to lose any of the fiber. Clamp it in place by means provided. Seal into place easier by facing the smooth side into the housing if there is a difference in texture. If the filter holder is separate from the sampler, mount the holder on the intake port, making sure that the coupling gasket is in place and that it is tight.

9.1.4 Place the sampler in the position and location called for in the test, which is with the filter face up, in a horizontal plane, and inside a housing. The dimensions and clearances specified are intended to provide uniformity in sampling practice.

9.1.5 Start the sampler motor and record the time and date. Read the flow-rate indicator and record this reading and the corresponding flow rate as read from the calibration curve. Note also the temperature and barometric pressure. An electric clock should be connected to the same line as the motor so as to detect any loss of test time due to power interruption. A continuous record of the sampling flow rate and sampling time can be obtained by the use of a continuous pressure (or flow rate) recorder.

9.1.6 Allow the sample to run for the specified length of time, which is commonly 24 h, ±1 h. During this period several readings of flow rate, temperatures, barometric pressure, and time should be taken if this is feasible. A final set of reading is taken at the end of the test period. If only initial and final readings are made, assume that change of readings is linear over the period of test. Intermediate readings will improve the accuracy of volume measurement.

9.1.7 At the end of the sampling period, record all final readings. Remove the filter from the mount very carefully so as not to lose any of the fiber material or collected particulate matter. Fold the filter in half upon itself with the collected material enclosed within. Place the folded filter in a clean tight envelope and mark it for identification. In some applications it may be desirable to place the used filter in a tight metal container to prevent any loss or damage to the filter.

9.1.8 In the laboratory remove the filter from its container. Tap the container and knock any loose fiber or particulate matter onto the inside surface of the folded filter. Examine the inside surface and, with a pair of tweezers, remove any accidental objects such as insects.

9.2 Siting Requirements

9.2.1 As with any type of air monitoring study in which sample data are used to draw conclusions about a general population, the validity of the conclusions depends on the representativeness of the sample data. Therefore, the primary goal of a monitoring project is to select a site or sites where the collected particulate mass is representative of the monitored area.

9.2.2 Basic siting criteria for the placement of high-volume sampler (either TSP or PM_{10}) are documented in Table 3. This list is not a complete listing of siting requirements; instead, an outline to be used by the operating agency to determine a sampler's optimum location. Complete siting criteria are presented in 40 CFR 58, Appendix E.

9.2.3 Additional factors not specified in the Code of Federal Regulations (CFR) must be considered in determining where the sampler will be deployed. These factors include accessibility under all weather conditions, availability of adequate electricity, and security of the monitoring personnel and equipment. The sampler must be situated where the operator can reach it safely despite adverse weather conditions. If the sampler is located on a rooftop, care should be taken that the operator's personal safety is not jeopardized by a slippery roof surface during inclement weather. Consideration also should be given to the fact that routine operation (i.e., calibrations, filter installation and recovery, flow checks, and audits) involves transporting supplies and equipment to and from the monitoring site.

9.2.4 To ensure that adequate power is available, consult the manufacturer's instruction manual for the sampler's minimum voltage and power requirements. Lack of a stable power source can result in the loss of many samples because of power interruptions.

9.2.5 The security of the sampler itself depends mostly on its location. Rooftop sites with locked access and ground-level sites with fences are common. In all cases, the security of the operating personnel as well as the sampler should be considered.

9.3 Sampler Installation Procedures

9.3.1 On receipt of a high-volume sampler (TSP or PM_{10}) from the manufacturer, visually inspect it and account for all components. Compare the equipment delivered with the enclosed packing slip. Notify the manufacturer immediately of any missing or damaged equipment.

9.3.2 Perform a laboratory check to determine if the sampler is operational. Turn on the sampler and observe the vacuum motor performance and shift the recorder response (if so equipped).

9.3.3 Carefully transport the sampler to the field site. If possible, install the sampler in the center of the site platform. This practice will ensure easy access to the sampler's inlet during maintenance procedures and will reduce inlet damage if the sampler should topple over.

9.3.4 Following manufacturer's instructions, carefully assemble the base and inlet of the sampler. The sampler must be bolted down to a secure mounting surface.

9.3.5 Check all tubing and power cords for crimps, cracks, or breaks.

9.3.6 Plug the power cord into a line voltage outlet. If possible, this outlet should be protected by a ground fault interrupter (GFI) for the operator's safety. The use of waterproof interlocking electrical connectors is also recommended to ensure operator safety and to avoid shorts or power interruptions. Do not allow any electrical connections to be submerged during periods of inclement weather.

9.3.7 Turn on the sampler and make sure that it is still working properly. Investigate and correct any malfunctions before proceeding. Operate the sampler for approximately 30 min to ensure that the motor brushes are properly seated and that the motor is operating at full performance.

9.3.8 Perform a multipoint flow-rate calibration, as described in Section 7.

9.4 Sampling Operations

9.4.1 General.

9.4.1.1 Operational procedures will vary according to the sampler model and options (e.g., the types of flow-rate controller and timer) selected for use in the monitoring program. Consult the instrument manual before putting the sampler into operation. Significant differences exist in the field operation of the two types of flow-controlling systems and, hence, in the determination of operational flow rates. The following assumptions are made in this section:

- The flow rate through a sampler that is equipped with a mass-flow controller is indicated by the exit orifice plenum pressure. This pressure is measured with a manometer (or a flow recorder).
- The flow rate through a sampler that is equipped with a volumetric-flow controller is indicated by the stagnation pressure. This pressure is measured with a manometer.
- The sampler has been calibrated according to procedure presented in Section 7.

9.4.1.2 The sampler has been calibrated according to procedures presented in Section 7.

9.4.1.3 The average actual flow rate for MFC samplers is calculated by determining the following:

- The average of the initial and final manometer readings of the exit orifice plenum pressure (or the average flow recorder reading).
- The average ambient temperature (Tav).
- The average ambient barometric pressure (Pav) during the sampling period.

These values are then applied to the sampler's calibration relationship. The 4" pressure flow recorders often supplied with HV samplers generally are not sufficiently accurate and are *not recommended* for quantitative sampler pressure or flow rate measurements. These flow recorders should be used only for nonquantitative determination that the flow was approximately constant and uninterrupted over the sampling period. The flow recorder may be connected in parallel with the manometer or other pressure measuring device using a tee or "Y" tubing connector.

[Note: Because flow recorders are still widely used for quantitative flow rate measurements, the procedures in this section include specific instructions for the use of a flow recorder. These flow recorder instructions are enclosed in brackets.]

9.4.1.4 The average actual flow rate for VFC samplers is calculated by determining the following:

- The average of the initial and final relative stagnation pressures (Pstg).
- The average ambient temperature (Tav).
- The average barometric pressure (Pav) during the sampling period and then by applying these values to the calibration relationship.

*[Note: Consistency of temperature and barometric pressure units is required. All temperatures should be expressed in kelvin (K = EC + 273). Also, all barometric pressures should be expressed in either mm Hg or kPa (**but don't mix the two units**). Avoid calibrating a PM_{10} sampler using one set of units and then performing sample calculations using another set.]*

9.4.2 Presampling Filter Preparation Procedures.

9.4.2.1 Most high-volume samplers (TSP or PM_{10}) have been designed to accept filter cassettes. Loading these cassettes in the laboratory will minimize damage; however, if extreme care is exercised, they can be loaded at the site when ambient conditions permit. Wear protective gloves when handling filters to avoid contaminating the filters with body oils and moisture. Keep the filters in protective folders or boxes. Never bend or fold unexposed filters. The analytical laboratory (and/or filter manufacturer) will give each filter an ID number. Because it is extremely difficult to see the "up" side of a quartz filter (i.e., the side with the slightly rougher texture), the filters should be consistently labeled on one side. When a filter that has been labeled on its "down" side is folded for transport to the laboratory, its sample number will be readily accessible for documentation on laboratory log sheets upon arrival at the laboratory.

9.4.2.2 Following the manufacturer's instructions, carefully load the pre-weighted filter in the filter cassette. The filter should be centered on the wire screen so that the gasket will form an airtight seal on the outer edge of the filter when the faceplate is in place. Poorly aligned filters show uneven white borders after exposure. Care should be taken to ensure that the filter cassette is not excessively tightened, as the filer may stick or the gasket may be permanently damaged. Check that the gasket is in good condition and has not deteriorated.

9.4.3 Sampling Procedures--MFC Sampler.

9.4.3.1 Filter Installation Procedure.

9.4.3.1.1 Following the manufacturer's instructions, loosen the nuts that secure the inlet to the base and gently tilt back the inlet to allow access to the filter support screen.

9.4.3.1.2 Examine the filter support screen. If the screen appears dirty, wipe it clean. If the filter cassette is equipped with a protective cover, remove it and place the loaded cassette in position on the sampler support screen. Tighten the thumb nuts to hold the filter cassette securely. Check that the gasket is in good condition and has not deteriorated.

Caution: Tighten the thumb nuts evenly on alternate corners to properly align and seat the gasket. The nuts should be only hand-tightened because too much compression can damage the sealing gasket.

9.4.3.1.3 If an inlet is being used, lower the sample inlet. Inspect the sample inlet to make sure that it is resting on the filter cassette and not on the sampler's frame. Secure the sample inlet to the sampler base.

9.4.3.1.4 Open the front door of the sample and examine the flow recorder. Remove any moisture inside by wiping it with a clean cloth. Record the sampler S/N, filter ID number, site location, and sampling data on the back of a clean chart and install the chart in the flow recorder.

[Note: Charts used for PM_{10} samplers normally have square-root-function scales; however, linear-function scales may be used. If charts with linear-function scales are used, Equations in Section 7.4.3.3 and Section 7.4.3.5 will have to be modified from their current form by replacing I with $(I)^{½}$]

[Note: While installing the chart, do not bend the pen arm beyond its limits of travel. Raise the pen head by pushing on the very top of the pen air (or by using the pen lift). Be sure that the chart tab is centered on the slotted drive to ensure full 360E rotation in 24 h. Make sure that the chart edges are properly located beneath the retainers. Lower the pen arm and tap the recorder face lightly to make certain that the pen is free.]

[Note: During periods of inclement weather, the chart tends to stick to the recorder face. Two charts can be installed simultaneously to enable the sample (top, annotated) chart to rotate freely.]

9.4.3.1.5 Using a coin or slotted screwdriver, advance the chart and check to see that the pen rests on zero--the smallest circle diameter. If necessary, adjust the zero set screw while gently tapping on the side of the flow recorder. If a chart with a linear function scale is used, some positive zero offset may be desirable to allow for normal variation in the zero readings.

9.4.3.1.6 Turn on the sampler and allow it to equilibrate to operating temperature (3-5 min).

9.4.3.1.7 While the sampler is equilibrating, record the following parameters on the MFC Sampler Field Data Sheet (see Figure 14):

- Site Location.
- Sample date.
- Filter ID number.
- Sampler model and S/N.
- Operator's initials.

9.4.3.1.8 Inspect the manometer for crimps or cracks in its connecting tubing. Open the valves and blow gently through the tubing of the manometer while watching for the free flow of the fluid. Adjust the manometer's sliding scale so that its zero line is at the bottom of the meniscuses.

9.4.3.1.9 Measure the initial exit orifice plenum pressure (Pex) using an oil or water manometer, with a 0-200-mm (0-8") range and a minimum scale division of 1 mm (0.1"). Record the initial Pex on the MFC Sampler Field Data Sheet. If Pex is substantially different than for previous samples or otherwise appears abnormal, carry out a Quality Control (QC) flow check as described in Section 13.1.

9.4.3.1.10 Verify that the flow recorder (if used) is operational and that the pen is inking. Note the flow recorder reading. If it is substantially different than for previous samples or otherwise appears abnormal, carry out a QC flow-check as described in Section 13.1.

9.4.3.1.11 Turn the sampler off.

9.4.3.1.12 Check the time indicated by the time-set pointer on the flow recorder. If it is in error, rotate the chart clockwise by inserting a screwdriver or coin in the slotted drive in the center of the chart face until the correct time is indicated.

9.4.3.1.13 Reset the elapsed time meter to 0000 min and the sampler timer for the next run day. Close the sampler door, taking care not to crimp the vacuum tubing or any power cords. The sampler is now ready to sample ambient air.

9.4.3.2 Filter Recovery Procedure. As soon as possible after sampling, the operator should return to the monitoring site to retrieve the exposed filter. Particle loss or filter damage will result if the filter is left in the sampler for extended periods.

9.4.3.2.1 Turn on the sampler and allow it to equilibrate to operating temperature (3-5 min).

9.4.3.2.2 Measure the final Pex and record it on the MFC Sampler Field Data Sheet.

9.4.3.2.3 Turn off the sampler.

9.4.3.2.4 Open the door of the sampler, remove the flow recorder chart, and examine the recorder trace. If the trace indicates extensive flow fluctuations, investigate and correct before the next sampling day.

9.4.3.2.5 Record the following parameters on the MFC Sampler Field Data Sheet:

- Elapsed time of the sampling period, min.
- Average recorder response, arbitrary units.
- Average ambient temperature for the run day (Tav), K (K = EC + 273).
- Average ambient barometric pressure for the run day (Pav), mm Hg or kPa.

[Note: Tav and Pav readings may be recorded or estimated on site or may be obtained from a nearby U.S. National Weather Service Forecast Office or airport weather station. Barometric pressure readings obtained from remote sources must be at station pressure (not corrected to sea level), and they may have to be corrected for differences between the evaluation are not available, seasonal average temperature (Ts) and barometric pressure (Ps) may be substituted for Tav and Pav, respectively. Care must be taken, however, that the actual conditions at the site can be reasonably represented by such averages. Therefore, seasonal values may represent actual values within 20EC and 40 mm Hg.]

The calculations presented in this section assume that the sampler has been calibrated in terms of actual temperature and barometric pressure and that the substitution of seasonal values is used only to determine the sampler's operational flow rate during a sample period. Although additional calculations to convert the sampler's calibration curve to seasonal can be made, the error represented by this method is negligible.

9.4.3.2.6 Calculate and record the average actual flow rate (as determined by the sampler's calibration relationship) on the MFC Sampler Field Data Sheet and on the back of the chart. Attach the chart to the data sheet.

$$Qa = \{[)\ \overline{\overline{Pex}}(Tav + 30)/Pa]^{1/2} - b\}\ \{l/m\}$$

or for the flow recorder,

$$\overline{\overline{Qa}} = \{[\ \overline{I}\,(Tav + 30)/Pa]^{1/2} - b\}\ \{1/m\}$$

where:

$\overline{\overline{Qa}}$ = average sampler flow rate, actual m^3/min.
Pex = average exit orifice plenum pressure, mm Hg.
I = average flow recorder response, arbitrary units.
Tav = average ambient temperature for the run day, K.
Pav = average ambient pressure for the run day, mm Hg.
b = intercept of the MFC sampler calibration relationship.
m = slope of the MFC sampler calibration relationship.

[Note: If charts with linear-function scales are used, substitute $(I)^{1/2}$ for I.]

9.4.3.2.7 Observe conditions around the monitoring site; note any activities that may affect filter particle loading (e.g., paving, mowing, fire) and record this information on the MFC Sampler Field Data Sheet.

9.4.3.2.8 Raise the sampler inlet and remove the filter cassette. Replace the cassette protective cover (if so equipped). To avoid particle loss, be careful to keep the cassette as level as possible.

9.4.3.2.9 The sampler may now be readied for the next run day.

9.4.3.2.10 Keeping the filter cassette level, carefully transport it, the data sheet, and the flow recorder chart to the laboratory sample custodian.

9.4.4 Sampling Procedures--VFC Sampler.

9.4.4.1 Filter Installation Procedure.

9.4.4.1.1 Following the manufacturer's instructions, loosen the nuts that secure the inlet to the base and gently tilt back the inlet to allow access to the filter support screen.

9.4.4.1.2 Examine the filter support screen. If the screen appears dirty, wipe it clean. If the filter cassette is equipped with a protective cover, remove it and place the loaded cassette in position on the sampler support screen. Tighten the thumb nuts sufficiently to hold the filter cassette securely. Check that the gasket is in good condition and has not deteriorated.

Caution: Tighten the thumb nuts evenly on alternate corners to properly align and seat the gasket. The nuts should be only hand-tightened because too much compression can damage the sealing gasket.

9.4.4.1.3 If an inlet is used, lower the sample inlet and secure it to the sampler base. For impaction inlets, inspect the sample inlet to make sure that it is resting on the filter cassette and not on the sampler's frame. Secure the sampler inlet to the sampler base.

9.4.4.1.4 Record the following parameters on the VFC Sampler Field Data Sheet (see Figure 15):
- Site location.
- Sample date.
- Filter ID number.
- Sampler model and S/N.
- Operator's initials.

9.4.4.1.5 Turn on the sampler and allow it to reach a stable operating temperature (3-5 min).

9.4.4.1.6 Bring an oil or water manometer to the side of the sampler. This manometer should have a range of 0-400 mm (0-16") and a minimum scale division of 1 mm (0.1").

[Note: Be sure to convert the manometer reading to mm Hg using the following equation before recording the reading on the VFC Sampler Field Data Sheet.]

$$\text{mm Hg} = (25.4)\ (\text{in. } H_2O/13.6)$$

Inspect the manometer for crimps or cracks in its connecting tubing. Open the valves and blow gently through the tubing of the manometer, while watching for the free flow of the fluid.
Adjust the manometer's sliding scale so that its zero line is at the bottom of the meniscuses.

9.4.4.1.7 Remove the vacuum cap from the stagnation pressure port located on the side of the sampler base. Using the connecting tubing, attach one side of the manometer to the port. Leave the other side of the manometer open to atmospheric pressure. Make sure the tubing snugly fits the port and the manometer.

9.4.4.1.8 Measure the initial relative stagnation pressure () Pstg) and record this reading on the VFC Sampler Field Data Sheet.

9.4.4.1.9 Turn off the sampler, disconnect the manometer, and replace the vacuum cap on the stagnation pressure port.

9.4.4.1.10 Reset the elapsed-time meter to 0000 min and the sampler timer for the next run day. The sampler is now ready to sample ambient air.

9.4.4.2 Filter Recovery Procedure. As soon as possible after sampling, the operator should return to the monitoring site to retrieve the exposed filter. Particle loss or filter damage will result if the filter is left in the sampler for extended periods.

9.4.4.2.1 Turn on the sampler and allow it to warm up to operating temperature (3-5 min).

9.4.4.2.2 While the sampler is equilibrating, record the following parameters on the VFC Sampler Field Data Sheet:
- Elapsed time of the sampling period, min.
- Average ambient temperature for the run day (Tav), EC and K.
- Average ambient barometric pressure for the run day (Pav), mm Hg.

[Note: Tav and Pav readings may be recorded or estimated on site or may be obtained from a nearby U.S. National Weather Service Forecast Office, National Weather Service (NWS) station, or an airport weather station. Barometric pressure readings obtained from remote sources must be at station pressure (not corrected to sea level), and they may have to be corrected for differences between the elevation of the monitoring site and that of the airport. If Tav and Pav readings are not available, seasonal average temperature (Ts) and barometric pressure (Ps) can be substituted. Care must be taken, however, that the actual conditions at the site can be reasonably represented by such averages. Therefore, seasonal values may represent actual values within 20EC and 40 mm Hg.]

9.4.4.2.3 Inspect the manometer for crimps or cracks in its connecting tubing. Open the valves and blow gently through the tubing of the manometer, while watching for the free flow of the fluid. Adjust the manometer sliding scale so that its zero line is at the bottom of the meniscuses.

9.4.4.2.4 Remove the vacuum cap from the stagnation pressure port located on the side of the sampler base. Using the connecting tubing, attached one side of the manometer to the port. Make sure that the tubing snugly fits the port and the manometer. Leave the other side open to atmospheric pressure.

9.4.4.2.5 Record the final Pstg on the VFC Sampler Field Data Sheet. Turn off the sampler and replace the vacuum cap.

[Note: Be sure to convert the manometer reading to mm Hg using the following equation before recording the reading on the Sampler Field Data Sheet.]

$$\text{mm Hg} = 25.4\ (\text{in. } H_2O/13.6)$$

9.4.4.2.6 Calculate the average relative stagnation pressure ($\overline{)Pstg}$) and record it on the data sheet.

9.4.4.2.7 Calculate the average absolute stagnation pressure ($\overline{P1}$) for the sample run day and record it on the data sheet.

$$\overline{P1} = Pav - \overline{)Pstg}$$

where:

$\overline{P1}$ = average absolute stagnation pressure, mm Hg.
Pav = average ambient barometric pressure for the run day (not the retrieval day), mm Hg.
)Pstg = average stagnation pressure drop, mm Hg.

9.4.4.2.8 Calculate and record the average stagnation pressure ratio:

$$\text{Average stagnation pressure ratio} = P1/Pav$$

where:

Pl = average absolute stagnation pressure, mm Hg.
Pav = average ambient barometric pressure on the sample run day, mm Hg.

9.4.4.2.9 Using the manufacturer's lookup table (or an alternate calibration relationship as described in Section 7.5.4), locate the column and row corresponding to $\overline{P1}$/Pav and the Tav value for the sample run day. Read and record the indicated $\overline{Qa}$ value.

9.4.4.2.10 Observe conditions around the monitoring site; note any activities that may affect filter particle loading (paving, mowing, fire) and record this information on the VFC Sampler Field Data Sheet.

9.4.4.2.11 Raise the sampler inlet and remove the filter cassette. Replace the cassette protective cover (if so equipped). To avoid particle loss, be careful to keep the cassette as level as possible.

9.4.4.2.12 The sampler may now be readied for the next sampling period.

9.4.4.2.13 Keeping the filter cassette level, carefully transport it and the Sampler Field Data Sheet to the laboratory sample custodian.

9.4.5 Post-Sampling Filter Handling Procedures. If a sample will not be analyzed immediately, the sample custodian should store the filter within a protective covering. Because filter cassettes often prove too expensive and unwieldy for storage purposes, the use of a manila folder and a protective envelope of comparable size to that of the filter is recommended. Laboratory personnel should adhere to the following procedure:

9.4.5.1 Following the manufacturer's instructions, remove the top frame of the filter cassette.

9.4.5.2 Conduct a secondary check of a sample's validity as presented in "Laboratory Validation Criteria" (see Section 9.5).

9.4.5.3 Carefully slip a manila folder underneath the edge of the exposed filter. The filter may stick in the cassette because of overcompression of the filter cassette gasket. Be extremely careful to avoid damage to the brittle quartz filter.

9.4.5.4 Center the filter on the folder. If the filter must be touched, do not touch or jar the deposit. Fold the manila folder lengthwise at the middle with the exposed side of the filter in. If the collected sample is not centered on the filter (i.e., the unexposed border is not uniform around the filter), fold it so that only deposit touches deposit. **Do not <u>crease</u> the folder**--the sample filter may tear. If the filter shears or breaks, ensure that all pieces of the filter are included within the folder.

9.4.5.5 Insert the folder into the protective envelope.

9.4.5.6 Deliver the filter in its protective folder and envelope, accompanied by the completed data sheet, to the analytical laboratory.

9.5 Sample Validation and Documentation

9.5.1 Field Validation Criteria. After each sampling period, calculate the percentage difference between Qa and the design flow rate (1.13 m^3/min) using the following formula:

$$\% \text{ Difference} = 100 \, \frac{\overline{Qa} - 1.13}{1.13}$$

Record this value on a control chart for the field validation of the sampler's actual volumetric flow rate as is shown in Figure 16.

- Decreases in flow rate during sampling (due to mechanical problems) of more than 10% from the initial set point result in sample invalidation. Recalibrate the sampler. A sample flow rate may also fluctuate due to heavy filter loading. If a high concentration is suspected, the operator should indicate this on the field data sheet. The laboratory supervisor will make the final decision regarding the sample's validity.
- Changes in flow-rate calibration of more than 10%, as determined by a field QC flow-rate check (see Section 13), will invalidate all samples collected back to the last calibration or valid flow check. Recalibrate the sample.

9.5.2 Laboratory Validation Criteria.

9.5.2.1 Upon receiving the filter from the field, check the filter for signs of air leakage by observing the border around the filter. If the border is clear, then the gasket on the sampler is still usuable. However, if particulate matter is on the border, then air leakage has occurred and the gasket on the sampler should be changed. Leakage may result from a worn or improperly installed faceplate gasket. A gasket generally deteriorates slowly. The sample custodian should be able to decide well in advance (by the increased fuzziness of the sample outline) when to change the gasket before total gasket failure results. If signs of leakage are observed, void the sample, determine the cause, and instruct the operator to take corrective actions before starting another sampling period.

9.5.2.2 Check the exposed filter for physical damage that may have occurred during or after sampling. Physical damage after sampling would not invalidate the sample if all pieces of the filter were put in the folder; however, complete losses of loose particulate after sampling (e.g., loss when folding the filter) would void the sample. Mark such samples as "void" on the HV data sheet.

9.5.2.3 Check the appearance of the particles. Any changes from normal color may indicate new emission sources or construction activity in the area. Note any change on the data sheet.

9.5.2.4 The filters should be weighed according to the procedures described in Inorganic Compendium Method IO-3.1, Section 5, *Gravimetric Analysis*.

9.5.3 Data Documentation. Recordkeeping is a critical part of the QA program. Careful documentation of sampling data will salvage samples that may otherwise be lost. The sheer repetition of recording data may result in errors; however, this cross-referencing between data sheets, log books, and (for those samplers so equipped) the continuous-flowrecorder charts will allow the operator to pinpoint discrepancies that may result in a sample's invalidation.

[Note: The use of log books at monitoring sites is highly encouraged.]

9.5.3.1 Presampling Documentation and Inspection. The following information should be recorded on the Sampler Field Data Sheet (SFDS), sampler recorder chart (RC), flow-rate control chart (CC), and in the site log book (LB):

- Site Location.
- Sample Date.
- Filter ID number.
- Sample model and S/N.
- Operator's initials.

9.5.3.2 Post-Sampling Documentation and Inspection. Upon receipt of exposed filters from the field, the sample custodian should adhere to the following procedures.

9.5.3.2.1 Examine the field data sheet. Determine whether all data needed to verify sample validity and to calculate mass concentration are provided (e.g., average flow rate, ambient temperature, barometric pressure, and elapsed time). Void the sample if data are missing or unobtainable from a field operator or if a sampler malfunction is evident.

9.5.3.2.2 If the exposed filter was packaged for shipment, remove the filter from its protective envelope and examine the shipping envelope. If sample material has been dislodged from a filter, recover as much as possible by brushing it from the envelope onto the deposit on the filter with a soft camel's-hair brush.

9.5.3.2.3 Match the filter ID number with the correct laboratory data/coding form on which the original balance ID number, filter ID number, filter tare weight, and other information are inscribed. The sample custodian should group filters according to their recorded balance ID numbers. Initial separation of filters by balance ID number will decrease the probability of a balance error that could result from the use of different balances for tare and gross weights.

9.5.3.2.4 Remove the filter from the protective manila folder. Should the filter be retained in its filter cassette, loosen the nuts on the top and remove the filter. Overtightening the nuts may cause the filter to adhere to the cassette gasket. Gently remove it by the extreme corners to avoid damage. Inspect the filters for any damage that may have occurred during sampling. Conduct a secondary check of a sample's validity (as presented in Section 9.4). If insects are embedded in the sample deposit, remove them with Teflon®-tipped tweezers and disturb as little of the sample deposit as possible. If more than 10 insects are observed, refer the sample to the supervisor for a decision on acceptance or rejection of the filter for analysis.

9.5.3.2.5 Place defect-free filters in protective envelopes and forward them to the laboratory for weighing and analysis. File the data sheets for subsequent mass concentration calculations.

9.5.3.2.6 Place defective filters, with the type of defect(s) listed, in separate clean envelopes. Label the envelopes and submit them to the laboratory supervisor for final approval of filter validity.

10. Interferences

10.1 Large extraneous objects, such as insects, may be swept into the filter.

10.2 Liquid aerosols, such as oil mists and fog droplets, are retained by the filter. If the amount of liquid so collected is sizeable, the filter can become wet and its function may be impaired.

10.3 Any gaseous or vaporous constituent of the atmosphere under test that is reactive with or absorbed on the filter will be retained.

10.4 As the filter becomes loaded with collected matter, the sampling rate is reduced. If a significant drop in flow rate occurs, the average of the initial and final flow rate will not give an accurate estimate of total flow during the sampling period. The magnitude of such errors will depend on the amount of reduction of airflow rate and on the variation of the mass concentration of dust with time during the 24-h sampling period. As an approximate guideline, any sample should be suspect if the final flow rate is less than one-half the initial rate.

10.5 Power failure or voltage change during the test period will lead to an error, depending on the extent and time duration of such failure.

10.6 The passive loading of the filter left in place for any time prior to or following a sampling period can introduce an error. The timely installation and removal of the filter is advisable, or a sampler with shutters may be used.

10.7 If two or more samplers are used at a given location, they should be placed at least 2 meters apart so that one sampler will not affect the results of an adjacent sampler.

10.8 Recent wind tunnel studies have shown significant possible sampling errors as a function of sampler orientation in atmospheres containing high relative concentrations of large particles.

10.9 Metal dusts from motors, especially copper, may significantly contaminant samples under some conditions.

10.10 Under some conditions, atmospheric SO_2 and NO_x may interfere. Artifact formation errors are caused by the retention of sulfur dioxide in the form of sulfate particulate on alkaline filters. Experiments involving a variety of filters indicate that sulfate loading errors of 0.3-3.0 $\mu g/m^3$ can be expected with the use of common glass fiber filters under normal sampling conditions and that larger sulfate errors are possible under extreme sampling conditions. A neutral or low-alkalinity filter medium will eliminate excessive artifact formation.

10.11 Guidelines to help prevent post-sampling particle loss are presented in Section 8.

11. Calculations, Validations, and Reporting of TSP and PM_{10} Data

11.1 Basic Information Used for Calculations

11.1.1 The design flow rate is specified as an actual volumetric flow rate (Qa), measured at existing conditions of temperature (Ta) and pressure (Pa). The sampler's operational flow rate should be very close to the design flow rate. All samplers have some means for measuring the operational flow rate, and that flow rate measurement system must be calibrated periodically with a certified flow rate transfer standard. Usually, measurements (or estimates) of ambient temperature and barometric pressure are required to get an accurate indication of the operational flow rate. To determine the average sampler flow rate over a sample period, use the average temperature (Tav) and average barometric pressure (Pav) over the sample period. However, if average temperature and pressure values (or reasonable estimates) cannot be obtained for each sample period, seasonal average temperature (Ts) and barometric pressure (Ps) for the site may be substituted.

[Note: Tav and Pav readings may be recorded on site or estimated from data obtained from a nearby U.S. National Weather Service Forecast Office, NWS station, or local airport weather station. Barometric pressure readings obtained from airports or other sources must be at station pressure (i.e., not corrected to sea level), and they may have to be corrected for differences between the elevation of the monitoring site and that of the airport. If individual Tav and Pav readings cannot be obtained for each sample period and seasonal averages for the site are routinely substituted, care must be taken to ensure that the actual temperature and barometric pressure at the site are reasonably represented by such averages. Therefore, seasonal average temperature and pressure values (Ts and Ps) for the site by should be used only when these values are within 20 K and 40 mm Hg (5 kPa) of the actual average temperature and barometric pressure (Tav and Pav) for the sample period.]

11.1.2 The calculations presented in this section assume that the sampler has been calibrated in actual volumetric flow rate units (Qa) and that individual average temperature and barometric pressure values are used for each sample period. If seasonal average temperature and pressure values for the site are to be used, Ts may be substituted for Tav, and Ps may be substituted for.

11.1.3 The true or actual flow rate through the sampler inlet must be known and controlled. A common source or error in a monitoring program is confusion of various air volume flow-rate measurement units. Although the sampler's operational flow rate must be monitored in terms of actual volume flow rate units (Qa), sampler flow rates can be corrected to standard volume flow rate units (Qstd) at EPA standard conditions of temperature (25EC) and pressure (760 mmHg).

- Qa: Actual volumetric air flow rates, measured and expressed at existing conditions of temperature and pressure and denoted by Qa (Qactual). Typical units are L/min and m^3/min. Inlet design flow rates for PM_{10} samplers are always given in actual volumetric flow rate units.
- Qstd: Airflow rates that have been corrected to equivalent standard volume flow rates at EPA standard conditions of temperature and pressure (25EC or 298 K and 760 mm Hg or 101 kPa) and denoted by Qstd (Qstandard). Typical units are std. L/min, and std. m^3/min. Standard volume flow-rate units are often used by engineers and scientists because they are equivalent to mass flow units.

11.1.4 The Qa and Qstd measurement units must not be confused or interchanged. The flow-rate units can be converted as follows, provided the existing temperature and pressure (or in some cases the average temperature and pressure over a sampling period) are known:

$\overline{Qstd}$ = $\overline{Qa}$(Pa/Pstd)(Tstd/Ta)
Qstd = (Pav/Pstd)(Tstd/Tav)
Qa = Qstd(Pstd/Pa)(Ta/Tstd)

where:

Qstd = standard volume flow rate, std m^3/min.
Qa = actual volume flow rate, actual m^3/min.
Pa = ambient barometric pressure, mm Hg.
Pstd = EPA standard barometric pressure, 760 mm Hg.
Tstd = EPA standard temperature, 298 K.
Ta = standard temperature, K (K = EC + 273).
Qstd = average standard volume flow rate for the sample period, std. m^3/min.
$\overline{Qa}$ = average actual volume flow rate for the sample period, m^3/min.
Pav = average ambient barometric pressure during the sample period, mm Hg.
Tav = average ambient temperature during the sample period, K.

Inorganic Compendium Method IO-2.4 provides guidance on calculating sample volume corrected to EPA standard temperature and pressure.

11.2 Flow-Rate Calculations. Because flow control methods (and hence, calibration procedures) vary among different sampler models, the calculations necessary to determine the average actual flow rate during a sample run will also differ. The following general procedures are recommended for calculating the average ambient flow rate of the sampler. In this section, it is assumed that the samplers have been calibrated according to procedures outlined in Section 7.

[Note: Consistency in units is required. Adoption of uniform designations of K for temperature and mm Hg (or kPa) for pressure is recommended in all calculations.]

11.2.1 MFC Sampler.

11.2.1.1 The average actual flow rate for sample period is calculated by determining:

- The average of the initial and final manometer readings ()Pex) [or the average flow recorder trace];
- The average ambient temperature (Tav); and
- The average ambient barometric pressure (Pav) during the sampling period and applying these values to the calibration relationship.

11.2.1.2 Each sampler's flow measurement system should be calibrated periodically, and the calibration should be described by a mathematical expression (e.g., a least-squares linear regression equation) that indicates the slope and intercept of the calibration relationship. Following the procedure in Section 7, this expression is in the form of:

$$\overline{Qa} = \{[\overline{Pex}(Tav + 30)/Pav)]^{1/2} - b\}\ \{1/m\}$$

where:

$\overline{Qa}$ = the sampler's average actual flow rate for the sample period, m^3/min.
$\overline{Pex}$ = average of initial and final sampler manometer readings, () Pex_i +) Pex_f)/2, in. H_2O.
Tav = average barometric pressure for the sample period, K (K = EC + 273).
Pav = average barometric pressure for the sample period, mm Hg.
b = intercept of the sampler calibration relationship.
m = slope of the sampler calibration relationship.

For the flow recorder,

$$\overline{Qa} = \{[\bar{I}(Tav+30)/Pav]^{1/2} - b\}\ \{1/m\}$$

where:
$\bar{I}$ = average flow recorder reading for the sample period.

11.2.1.3 The average actual flow rate is then corrected to EPA-standard conditions, calculated as:

$$\overline{Qstd} = \overline{Qa}(Pav/Pstd)(Tstd/Tav)$$

where:
$\overline{Qstd}$ = average sampler flow rate corrected to EPA-standard volume flow rate units, std. m^3/min.
$\overline{Qa}$ = average actual sampler flow rate for the sample period, m^3/min.
Pstd = standard barometric pressure, 760 mm Hg.
Tstd = standard temperature, 288 K.

11.2.2 VFC Sampler.

11.2.2.1 The average actual flow rate for the sample period is calculated by determining the ratio of the average absolute stagnation pressure of the average ambient barometric pressure ($\overline{P1}$/Pav) and the ambient average temperature (Tav) for the sampler period.

11.2.2.2 Calculate the value of Pl in mm Hg:

$$\overline{P1} = Pav - \overline{)Pstg}$$

where:
Pl = average absolute stagnation pressure for the sample period, mm Hg .
Pav = average barometric pressure for the sample period, mm Hg.
)Pstg = average of initial and final relative stagnation pressure readings, mm Hg.

[Note: Be sure to convert a water manometer reading to mm Hg using the following equation before recording the reading on the data sheet:]

$$mmHg = 25.4\ ()\ H_2O/13.6)$$

11.2.2.3 Calculate and record the value of the average stagnation pressure ratio.

$$\text{Average stagnation pressure ratio} = (\overline{P1}/Pav)$$

11.2.2.4 Use the manufacturer's lookup table (or alternate calibration relationship; see Section 7) to determine Qa from the average stagnation pressure ratio ($\overline{P1}/Pav$) and Tav for the sample period. The value of $\overline{Qa}$ is the average volumetric flow rate for the sampler period.

11.2.2.5 The average actual flow rate is then corrected to EPA-standard conditions using the following equation:

$$\overline{Qstd} = \overline{Qa}(Pav/Pstd)(Tstd/Tav)$$

where:

$\overline{Qstd}$ = average sampler flow rate corrected to EPA-standard volume flow rate units, std. m^3/min.
$\overline{Qa}$ = average actual sampler flow rate for the sample period, m^3/min.
Pstd = standard barometric pressure, 760 mm Hg.
Tstd = standard temperature, 298 K.

11.3 The total standard volume of air sampled is calculated by the following equation:

$$Vstd = (\overline{Qstd})(t)$$

where:

Vstd = total volume of air sampled in standard volume units, std m^3.
$\overline{Qstd}$ = average sampler flow rate corrected to EPA-standard conditions, std m^3/min.
t = total elapsed sampling time, min.

11.4 Percent Difference

11.4.1 After each sampling period, calculate the percentage difference between Qa and the design flow rate (1.13 m^3/min) using the following formula:

$$\% \text{ Difference} = 100 \, \frac{Qa - 1.13}{1.13}$$

Record this value on a control chart for the field validation of the sampler's actual volumetric flow rate as is shown in Figure 14.

11.4.2 The following criteria should be used as the basis for determining a sample's validity:

- Decreases in flow rate during sampling (due to mechanical problems) of more than 10% from the initial set point cause sample invalidation. A sample flow rate may also fluctuate due to heavy filter loading. If a high concentration is suspected, the operator should indicate it on the field data sheet. The laboratory supervisor will make the final decision regarding the sample's validity.
- Changes in flow-rate calibration of more than 10%, as determined by a field QC flow-rate check, will invalidate all samples collected back to the last calibration or valid flow check.

12. Records

12.1 MFC Sampler

Record the following parameters on the MFC Sampler Field Data Sheet (see Figure 14):

- Final Pex.
- Elapsed time of the sampling period, min.
- Average record response, arbitrary units.
- Tav for the run day K (K = EC + 273).
- Pav for the run day, mm Hg.

12.2 VFC Sampler

Record the following parameters on the VFC Sampler Field Data Sheet (see Figure 15):

- Site location.
- Sample date.
- Filter ID number.
- Sampler model and S/N
- Operator's initials.
- Initial Relative Stagnation Pressure (Pstg).
- Elapsed time of the sampling period, min.
- Tav for the run day Tav, EC and K.
- Pav for the run day Pav, mm Hg.
- Pstg, mm Hg.
- Relative Stagnation Pressure.
- Absolute Stagnation Pressure.
- Qa value (from chart generated in Section 7.5.4.).

12.3 Tav and Pav readings may be recorded or estimated on site or may be obtained from a nearby U.S. National Weather Service Forecast Office or airport weather station. Barometric pressure readings obtained from remote sources must be at station pressure (not corrected to sea level); they may have to be corrected for differences between elevation of the monitoring site and that of the airport. If Tav and Pav readings are not available, seasonal average temperature (Ts) and barometric pressure (Ps) may be substituted for Tav and Pav, respectively. Care must be taken, however, that the actual conditions at the site can be reasonably represented by such averages. Therefore, seasonal values should represent actual values within 20EC and 40 mm Hg.

12.4 Observe conditions around the monitoring site; note any activities that may affect filter particle loading (paving, mowing, fire) and record this information on the VFC Sampler Field Data Sheet.
Document any factors that may cause a sample's invalidation on the sample data sheet. Forward the data sheet and the filter to the laboratory supervisor, who will make the final decision regarding the sample's validity.

12.5 Record the percentage difference between Qa and the design flow rate on Figure 16.
12.6 Recordkeeping is a critical part of the QA program. Careful documentation of sampling data will salvage samples that may otherwise be lost. The sheer repetition of recording data may result in errors;

however, this cross-referencing between data sheets, log books, and (for those samplers so equipped) the continuous-flow-recorder charts will allow the operator to pinpoint discrepancies that may result in a sample's invalidation.

[<u>Note</u>: The use of log books at monitoring sites is highly encouraged. The following information should be recorded on the Sampler Field Data Sheet (SFDS), sampler recorder chart (RC), in the site log book (LB), and on the flow-rate control chart (CC).]

12.6.1 The following information should be recorded by the operator who starts the sample. (The designation in parentheses indicates where the data must be inscribed):

- Site designation and locations (SFDS)(RC)(LB). This information should be recorded in the log book only once, at the initiation of a monitoring program.
- Sampler model and S/N (SFDS)(RC)(LB). This information needs to be recorded in the log book only at the commencement of monitoring, unless there is more than one sampler or a new sampler has been deployed.
- Filter ID number (SFDS)(RC)(LB).
- Sample date (SFDS)(RC)(LB).
- Initial Pex for MFC or initial) Pstg for VFC (SFDS)(LB).
- Unusual conditions that may affect the results (e.g., subjective evaluation of pollution that day, construction activity, weather conditions) (SFDS)(LB).
- Operator's initials (SFDS).
- Signature (LB).

12.6.2 The following information should be recorded by the operator who removes the samples.

- Elapsed time of the sample run (SFDS)(RC)(LB).
- Final) Pex [or mean I] for MFC or final) Pstg, $\overline{P1}$, and $\overline{P1}$/Pav for VFC (DS)(LB)[RC].
- The calculated standard average flow rate (Qstd) in std m^3/min (SFDS)(LB).
- The percentage difference between the actual and design flow rates (CC).
- Average ambient temperature and barometric pressure on the sample run day (SFDS)(LB).
- Seasonal average temperature and pressure, if needed (SFDS/LB). This information needs to be recorded in the logbook once, at the change of each season.
- Existing conditions that may affect the results (SFDS)(LB).
- Explanations for voided or questionable samples (SFDS)(LB).
- Operator's initials (SFDS).
- Signature (LB).

13. Field QC Procedure

For HV samplers, a field-calibration check of the operational flow rate is recommended at least once per month. The purpose of this check is to track the sampler's calibration stability. A control chart (e.g., Figure 14) that contains the percentage difference between a sampler's indicated and measured flow rates should be maintained. This chart is a quick reference of instrument flow-rate drift problems and is useful for tracking the performance of the sampler. Either the sampler log book or a data sheet must be used to document flow-check information. This information includes, but is not limited to, instrument and transfer standard model and serial numbers, ambient temperature and pressure conditions, and collected flow-check data.

In this section, the following is assumed:

- The flow rate through sampler that is equipped with a mass-flow controller is indicated by the exit orifice plenum pressure. This pressure is measured with a manometer [or a flow recorder].
- The flow rate through a sampler that is equipped with a volumetric flow controller is indicated by the stagnation pressure. This pressure is measured with a manometer.
- The acceptable flow-rate fluctuation range is 10% of the design flow rate.
- The transfer standard will be an orifice device equipped with a water or oil manometer.
- The orifice transfer standard's calibration relationship is in terms of the actual volumetric flow rate (Qa).

13.1 QC Flow-Check Procedure--MFC Sampler. The indicated flow rate [Qa (sampler)] for MFC samplers is calculated by determining:

- The manometer reading of the exit orifice plenum pressure [or the flow recorder reading],
- The ambient temperature (Ta), and
- The barometric pressure (Pa) during the flow check.

These values are then applied to the sampler's calibration relationship. The 4" pressure (flow) recorders of the type often supplied with high-volume PM_{10} samplers are generally not sufficiently accurate and are not recommended for quantitative sampler pressure or flow measurements. The flow recorder may be connected in parallel with the manometer or other pressure measuring device, using a tee or "Y" tubing connector. An alternate QC flow-check procedure may be presented in the manufacturer's instruction manual. The manual should be reviewed and the various methods evaluated. Inhouse equipment and procedural simplicity should be considered in determining which method to use.

[Note: Do not attempt to conduct a flow check of samplers under windy conditions. Short-term wind velocity fluctuations will produce variable pressure readings by the orifice transfer standard's manometer. The flow check will be less precise because of the pressure variations.]

13.1.1 Collect the following equipment and transport it to the monitoring station:

[Note: An independent person should perform the QC flow check, with an outside observer present.]

- A water, oil, or digital manometer with a 0-200 mm (0-8") range and a minimum scale division of 1 mm (0.1") for measuring the sampler's exit orifice plenum pressure. This manometer should be the same as is used routinely for sampler flow rate measurements.
- An orifice transfer standard and its calibration relationship (different from initial orifice standard).
- An associated water or oil manometer with a 0- to 400-mm (0- to 16") range and a minimum scale division of 1 mm (0.1") for measuring the orifice transfer standard.
- A thermometer capable of accurately measuring temperature 0-50EC (273-323 K) to the nearest ±1EC and referenced to an NIST or ASTM thermometer within ±2EC at least annually.
- A portable aneroid barometer (e.g., a climber's or engineer's altimeter) capable of accurately measuring ambient pressure 500-800 mm Hg (66-106 kPa) to the nearest millimeter Hg and referenced within ±5 mm Hg of a barometer of known accuracy at least annually.
- The sampler's calibration information.
- Spare recorder charts and a clean flow-check filter.
- MFC Sampler Flow-Check Data Sheet or site log book.

13.1.2 Record the site location, sampler S/N, and date on the back of a clean chart and install it in the flow recorder. While installing the chart, do not bend the pen arm beyond its limits of travel. Raise the pen head by pushing on the very top of the pen arm (or by using the pen lift) and simultaneously insert the chart.

13.1.3 Lower the pen arm and tap the recorder face lightly to make certain that the pen can move freely.

13.1.4 Using a coin or slotted screwdriver, advance the chart and check to see that the pen head rests on zero (i.e., that smallest diameter circle). If necessary, adjust the zeroset screw while gently tapping on the side of the recorder. A quarter turn of the set screw usually results in large offsets; adjust the set screw carefully.

13.1.5 Set up the flow-check system as previously illustrated in Figure 10. MFC samplers are normally flow-checked with a filter in line (i.e., between the orifice transfer standard and the motor). Install a clean filter in the sampler. Place the filter directly upon the sampler's filter screen. Do not use a filter cassette. A flow-check filter should never be used for subsequent sampling because particles larger than 10 Fm can be collected on the filter while the inlet is raised. The sample mass will be biased as a result of using a filter for both a flow check and subsequent sampling.

13.1.6 Install the orifice transfer standard and its faceplate on the sampler. Do not restrict the flow rate through the orifice (i.e., by using fixed resistance plates or closing the variable-resistance valve). *Caution: Tighten the faceplate nuts on alternate corners first to eliminate leaks and to ensure even tightening. The nuts should be hand-tightened; too much compression can damage the sealing gasket.* Make sure the orifice transfer standard gasket is in place and the orifice transfer standard is not cross-threaded on the faceplate.

13.1.7 Connect the orifice manometer to the pressure port of the orifice transfer standard and the sampler manometer to the sampler's exit orifice plenum. Inspect the manometers' connecting tubings for crimps and cracks. Open the manometer valves and blow gently through the tubings. Watch for the free flow of fluid. Adjust the manometers' scales so that their zero lines are at the bottom of the meniscuses. Make sure that the connecting tubing snugly fits the manometer and the pressure port.

13.1.8 Turn on the sampler and allow it to warm up to operating temperature (3-5 min).

[Note: The sampler inlet may be partially lowered over the orifice transfer standard to act as a draft shield (if a shield is not otherwise provided). Use a block to provide at least 2" of clearance at the bottom for air flow and for the manometer tubing.]

13.1.9 Read and record the following parameters on the MFC Sampler Flow-Check Data Sheet:

- Sampler location and date.
- Sampler model and S/N.
- Ambient temperature (Ta), EC and K.
- Ambient barometric pressure (Pa), mm Hg.
- Unusual weather conditions.
- Orifice transfer standard S/N and calibration relationship.
- Operator's signature.

13.1.10 Observe the) H_2O across the orifice by reading the manometer deflection. Record the manometer deflection on the MFC Sampler Flow-Check Data Sheet (see Figure 11).

13.1.11 Measure the exit orifice plenum pressure () Pex) by reading the manometer deflection. Record the manometer deflection on the MFC Sampler Flow-Check Data Sheet.

13.1.12 Using a coin or small screwdriver, advance the recorder chart to read the sampler's corresponding response (I) and record on the data sheet. A gentle tap on the recorder face is often necessary to ensure that the pen is not sticking to the chart.

13.1.13 Turn off the sampler and remove the orifice transfer standard, but not the filter. Turn on the sampler and repeat Section 13.1.11 [or Section 13.1.12] to check the flow rate under normal operating conditions. Turn off the sampler and remove the filter.

13.1.14 Calculate and record Qa(orifice) at actual conditions using the following equation:

$$Qa(orifice) = \{[()\ H_2O)(Ta/Pa)]^{1/2} - b\}\ \{1/m\}$$

where:

Qa(orifice) = actual volumetric flow rate as indicated by the orifice transfer standard, m^3/min
) H_2O = pressure drop across the orifice, in. H_2O.
Ta = ambient temperature, K.
Pa = ambient barometric pressure, mm Hg.
b = intercept of the orifice calibration relationship.
m = slope of the orifice calibration relationship.

13.1.15 Calculate and record the corresponding sampler flow rate at actual conditions using the following equation:

$$Qa(sampler) = \{)\ Pex\ (Ta + 30)/Pa]^{1/2} - b\}\ \{1/m\}$$

or use the following if a flow recorder is being used to measure the exit orifice plenum pressure:

$$Qa(sampler) = \{I(Ta + 30)/Pa]^{1/2} - b\}\ \{1/m\}$$

where:

Qa(sampler) = sampler flow rate, actual m^3/min.
) Pex = exit orifice plenum pressure, in. H_2O.
Ta = ambient temperature during the flow check, K (K = EC + 273).
Pa = ambient barometric pressure during the flow check, mm Hg.
b = intercept of the MFC sampler calibration relationship.
m = slope of the MFC sampler calibration relationship.

[Note: If charts with linear-function scales are used, substitute $(I)^{1/2}$ for I.]

13.1.16 Using this information and the formulas provided on the MFC Sampler Flow-Check Data Sheet, calculate the QC check percentage differences.

$$QC\&check\ \%\ difference\ ' \ \frac{[Qa(sampler)\ \&\ Qa(orifice)]}{Qa(orifice)}\ [100]$$

where:

Qa(sampler) is measured with the orifice transfer standard being installed.

Record this value on the MFC Sampler Flow-Check Data Sheet and plot on the QC control chart. If the sampler flow rate is within 93-107% (±7% difference) of the calculated Qa(orifice) flow rate (in actual volumetric units), the sampler calibration is acceptable. If these limits are exceeded, investigate and correct any malfunction. Recalibrate the sampler before sampling is resumed. Differences exceeding ±10% may result in the invalidation of all data collected subsequent to the last calibration or valid flow check. Before invalidating any data, double-check the orifice transfer standard's calibration and all calculations.

13.1.17 Calculate the corrected sampler flow rate, Qa(corr. sampler), using the following equation:

$$\text{Qa(corr. sampler} = [\text{Qa(sampler)}]\,\frac{[(100 - \%\ \text{difference})]}{100}$$

where:
Qa(sampler) is measured without the orifice transfer standard being installed and where the QC-check percentage difference was obtained from the equation above.

[Note: Take care to use the correct sign (i.e., positive or negative) for the percent difference.]

13.1.18 Calculate and record on the MFC Sampler Flow-Check Data Sheet the percentage difference between the inlet's design flow rate and the corrected sampler flow rate as:

$$\text{Design flow rate \% difference} = \frac{[\text{Qa(corr. sampler)} - 1.13]}{1.13)}[100]$$

[Note: The author assumes in this section that the inlet is designed to operate at a flow rate of 1.13 actual m^3/min. If the design flow rate percentage difference is less than or equal to ±7%, the sampler calibration is acceptable. If the difference is greater than ±7%, investigate potential error sources and correct any malfunction. Recalibrate the sampler before sampling is resumed. Differences exceeding ±10% may invalidate all data collected subsequent to the last calibration or valid flow check. Before invalidating any data, double-check the sampler's calibration, the orifice transfer standard's certification, and all calculations.]

[Note: Deviations from the design flow rate may be caused in part by deviations in the site temperature and pressure from the seasonal average conditions. Recalculate the optimum set-point flow rate (SFR) according to Section 7.4.4 to determine if the flow controller should be adjusted.]

13.1.19 Set up the sampler for the next sampling period according to the operating procedure in Section 9.4.

13.2 QC Flow-Check Procedure--VFC Sampler

The indicated flow rate (Qa (sampler)) for VFC samplers is calculated by determining:

- The relative stagnation pressure (Pstg),
- The ambient temperature (Ta), and
- The barometric pressure (Pa) during the flow check.

These values are then applied to the sampler's calibration relationship. An alternative QC flow-check procedure may be presented in the manufacturer's instruction manual. The manual should be reviewed and the various methods evaluated. Inhouse equipment and procedural simplicity should be considered in determining which method to use.

[Note: Do not attempt to conduct a flow check of samplers under windy conditions. Short-term wind velocity fluctuations will provide variable pressure readings by the orifice transfer standard's manometer.]

The flow check will be less precise because of the pressure variations.

13.2.1 Collect the following equipment and transport it to the monitoring station:

- An orifice transfer standard and its calibration relationship in actual volumetric flow units (Qa).
- An associated oil, water, or digital manometer, with a 0-400 mm (0-16") range and minimum scale divisions of 1 mm (0.1").
- An oil, water, or digital manometer, with a 0-400 mm (0-16") range and minimum scale divisions of 1 mm (0.1") or other pressure measurement device for measurement of the sampler stagnation pressure. Ideally, this manometer (or other pressure measurement device) should be associated with the sampler.

[Note: Manometers used for QC flow-checks may be subject to damage or malfunction and thus should be checked frequently.]

- A thermometer capable of accurately measuring temperature from 0E-50EC (273-323 K) to the nearest ±1EC and referenced to an NIST or ASTM thermometer within 2EC at least annually. To calculate the orifice flow rates, convert EC to K.
- A portable aneroid barometer (e.g., a climber or engineer's altimeter) capable of accurately measuring ambient barometric pressure over the range of 500-800 mm Hg to the nearest millimeter Hg and referenced within 5 mm Hg of a barometer of known accuracy at least annually.
- The sampler's calibration relationship (i.e., lookup table or alternative calibration relationship).
- A clean flow-check filter loaded into a filter cassette.
- A VFC Sampler Flow-Check Data Sheet (see Figure 13) or a site log book.

13.2.2 Set up the flow-check system as previously illustrated in Figure 12. VFC samplers are normally flow-checked with a loaded filter cassette in line (i.e., between the orifice transfer standard and the motor). The orifice transfer standard should be installed without fixed resistance plates or with the adjustable resistance value fully open. A flow-check filter should never be used for subsequent sampling because particles larger than 10 Fm can be collected on the filter while the inlet is raised. The sample mass will be biased as a result of using a filter for both a flow check and subsequent sampling.
Caution: *Tighten the faceplate nuts on alternate corners first to eliminate leaks and to ensure even tightening. The fittings should be hand-tightened; too much compressing can damage the sealing gasket.* Make sure the orifice gasket is in place and the orifice transfer standard is not cross-threaded on the faceplate.

13.2.3 Turn on the sampler and allow the sampler to warm up to operating temperature (3-5 min).

[Note: The sampler inlet may be partially lowered over the orifice transfer standard to act as a draft shield (if a shield is not otherwise provided). Use a block to provide at least 2" of clearance at the bottom for air flow and for the manometer tubing.]

13.2.4 Read and record the following parameters on the VFC Sampler Flow-Check Data Sheet (see Figure 13):

- Sampler location and date.
- Sampler S/N and model.
- Ambient temperature (Ta), EC and K.
- Ambient barometric pressure (Pa), mm Hg.
- Unusual weather conditions.
- Orifice transfer standard S/N and calibration relationship.
- Operator's signature.

13.2.5 Inspect the manometers for crimps or cracks in the connecting tubing. Open the valves and blow gently through the tubing, watching for the free flow of the fluid.
Adjust the manometers' sliding scales so that the zero lines are at the bottom of the meniscuses.

13.2.6 Connect the orifice manometer to the orifice transfer standard and the sampler manometer to the sampler stagnation pressure port located on the side of the sampler base. Ensure that one side of each manometer is open to atmospheric pressure. Be sure that the connecting tubing snugly fits the pressure ports and the manometers.

13.2.7 Read the pressure drop as indicated by the orifice manometer () H_2O) and record the value on the VFC Sampler Flow-Check Data Sheet. Read the stagnation pressure drop and record it as) Pstg (mm Hg) on the data sheet.

[Note: Be sure to convert the manometer reading to mm Hg using the following equation before recording the reading on the data sheet.]

$$\text{mm Hg} = 25.4(\text{in. } H_2O/13.6)$$

13.2.8 Turn off the sampler and remove the orifice transfer standard.

13.2.9 With only a loaded filter cassette in line, turn on the sampler and allow it to warm up to operating temperature.

13.2.10 Read and record the stagnation pressure drop () Pstg) for the normal operating flow rate. Turn off the sampler. Replace the vacuum cap on the stagnation pressure port.

13.2.11 Calculate and record Qa(orifice) flow rate for the flow-check point, as in the equation, reproduced below:

$$Qa(\text{orifice}) = \{[() H_2O)(Ta/Pa)]^{1/2} - b\} [l/m]$$

where:

Qa(orifice) = actual volumetric flow rate as indicated by the transfer standard orifice, m^3/min.
) H_2O = pressure drop across the orifice, in. H_2O.
Ta = ambient temperature, K (K = EC +273).
Pa = ambient barometric pressure, mm Hg.
b = intercept of the orifice calibration relationship.
m = slope of the orifice calibration relationship.

13.2.12 Calculate and record the value of Pl (mm Hg) for the measurements, with and without the orifice installed, according to the following equation:

$$Pl = [Pa-) Pstg]$$

where:

Pl = stagnation pressure, mm Hg.
Pa = ambient barometric pressure, mm Hg.
) Pstg = stagnation pressure drop, mm Hg.

13.2.13 Calculate and record the stagnation pressure ratio for the measurements, with and without the orifice installed, according to the following equation:

$$\text{Stagnation pressure ratio} = Pl/Pa$$

where:

Pl = stagnation pressure, mm Hg.
Pa = ambient barometric pressure, mm Hg.

13.2.14 Refer to the instrument manufacturer's lookup table (or alternative calibration relationship as described in Section 7.5.4) and determine the Qa(sampler) flow rates (m^3/min) for the measurements with and without the orifice installed as indicated for the ratio of Pl/Pa and ambient temperature in EC. Record these values on the VFC sampler flow check data sheet.

13.2.15 Using Qa(orifice) and Qa(sampler) for the measurements with the orifice installed, calculate the QC-check percentage difference as:

$$\text{QC-check \% difference} = \frac{[\text{Qa(sampler)} - \text{Qa(orifice)}]}{\text{Qa(orifice)}}[100]$$

Record this value on the VFC Sampler Flow-Check Data Sheet and plot it on the control chart for QC flow checks. If the QC-check percentage difference is less than or equal to ±7%, the sampler calibration is acceptable. Those differences exceeding ±7% will require recalibration. Differences exceeding ±10% may invalidate all data collected subsequent to the last calibration or valid flow check. Before invalidating any data, double-check the sampler's calibration, the orifice transfer standard's certification, and all calibrations.

13.2.16 Using this percentage difference and Qa (sampler) from the measurements without the orifice installed (i.e., for the normal operating flow rate), calculate the corrected sampler flow rate as:

$$\text{Qa(corr. sampler} = [\text{Qa(sampler)}]\frac{[(100 - \text{\% difference})]}{100}$$

Record Qa (corr. sampler) on the VFC Sampler Flow-Check Data Sheet.

13.2.17 Determine the design flow rate percentage difference between the PM_{10} sampler inlet design flow rate (e.g., 1.13 m^3/min) and Qa (corr. sampler) as:

$$\text{QC-check \% difference} = \frac{[\text{Qa(sampler)} - \text{Qa(orifice)}]}{\text{Qa(orifice)}}[100]$$

Record this design flow rate percentage difference on the VFC Sampler Flow-Check Data Sheet and plot it on the control chart for the field validation of flow rates. When plotting this value, use a different symbol than is normally used for plotting values that are obtained during sampling periods. If the design flow rate percentage difference is less than or equal to ±7%, the sampler calibration is acceptable. Those differences exceeding ±7% will require recalibration. Differences exceeding ±10% may invalidate all data obtained subsequent to the last calibration or valid flow check. Before invalidating any data, double-check the sampler's calibration, the orifice transfer standard's certification, and all calculations.

14. Maintenance

Maintenance is defined as a program of positive actions aimed toward preventing failure of monitoring and analytical systems. The overall objective of a routine preventive maintenance program is to increase measurement system reliability and provide more complete data acquisition. The general maintenance procedures for HV samplers are outlined in this section. For more complete information on a particular sampler or on laboratory equipment maintenance, refer to the manufacturer's instruction manual for the individual instrument. Maintenance activities for the HV sampler are summarized in Table 4. Records should be maintained for the maintenance schedule of each HV sampler. Files should reflect the history of maintenance, including all replacement parts, suppliers, costs, expenditures, and in inventory of on-hand spare equipment for each sampler. Check sheets should be used to record preventive and/or corrective maintenance activities and the subsequent sampler calibration curve.

14.1 Maintenance Procedures

The HV sampler is comprised of two basic components: the inlet and the flow control system. Because of the differences between sampler models, refer to the manufacturer's instruction manual for specific maintenance guidelines and necessary supplies.

14.2 Recommended Maintenance Schedules

14.2.1 MFC Base. The MFC base is equipped with the following items:

14.2.1.1 Connecting tubing and power lines, which must be checked for crimps, cracks, or obstructions on sample recovery days. Fittings should be inspected periodically for cross-threading and tightness.

14.2.1.2 A filter screen, which should be inspected on sample recovery days for any impacted deposits.

14.2.1.3 Filter cassette gaskets, which need to be inspected each time a cassette is loaded. A worn cassette gasket is characterized on exposed filters by a gradual blending of the boundary between the collected particulate and the filter border.

14.2.1.4 Motor and housing gaskets, which should be checked at 3-month intervals and replaced as necessary.

14.2.1.5 Blower motor brushes, which should be replaced before they become worn to the point that damage may occur. Although motor brushes usually require replacement after 600-1,000 hours of operation, the optimum replacement interval must be determined by experience. A pumice stone can be used against the motor's contacts to ensure high conductivity. Change the brushes according to manufacturer's instructions and perform the operator's field-calibration check as presented in Section 13. If the sampler's indicated flow rate exceeds the manufacturer-specified design-flow-rate range, adjust the sampler before the next run day.

To achieve the best performance, new brushes should be properly seated on the motor's commutator before full voltage is applied to them. After the brushes have been changed, operate the sampler at 50-75% of normal line voltage for approximately 30 min. The motor should return to full performance after an additional 30-45 min at normal line voltage.

[Note: The motors that are used for HV samplers are higher-current versions of the motors that have been used for HV total suspended particulate samplers. The brushes for the two types of motors are different. Make sure that the correct replacement brushes are used for the maintenance of HV samplers. If a motor needs to be replaced, be sure to use the higher-current versions that are needed for HV sampling. When lower-current motors are installed in HV samplers, the flow rate has been found to vary with changes in the line voltage.]

14.2.1.6 A flow controller should be replaced if the flow recorder indicates no flow, low flow, excessive flow, or erratic flow. Minor adjustments can be made to alter sampling flow rates; however, the controller generally cannot be repaired in the field.

[Note: A flow recorder requires very little maintenance, but does deteriorate with age. Difficulty in zeroing the recorder and/or significant differences (i.e., greater than 0.3 m^3/min) in average flow rates obtained from consecutive sampling periods usually indicate a faulty recorder. The recorder pens should be replaced every 30 recording days. In dry climates, a more frequent replacement schedule may be required.]

14.2.2 VFC Base. The VFC base is equipped with the following items:

14.2.2.1 Power lines, which must be checked for crimps or cracks on sample recovery days. Fittings should be inspected periodically for cross-threading and tightness.

14.2.2.2 A filter screen at the throat of the choked-flow venturi, which should be inspected on sample recovery days for any impacted deposits.

14.2.2.3 Filter cassette gaskets, which should be checked each time a filter is installed. A worn casket gasket is characterized on exposed filters by a gradual blending of the boundary between the collected particulates and the filter border.

14.2.2.4 Motor and housing gaskets, which should be checked at 3-month intervals and replaced as necessary.

14.2.2.5 Blower motor brushes, which should be replaced before they become worn to the point that damage may occur. Although motor brushes usually require replacement after 600-1,000 hours of operation, the optimum replacement interval must be determined by experience. A pumice stone can be used against the motor's contacts to ensure high conductivity. Change the brushes according to manufacturer's instructions, and perform the operator's field-calibration check as presented in Section 13. If the sampler's indicated flow rate exceeds the manufacturer-specified design flow-rate range, recalibrate the sampler before the next run day.

To achieve the best performance, new brushes should be seated properly on the motor's commutator before full voltage is applied to them. After the brushes have been changed, operate the sampler at 50-75% of normal line voltage for approximately 30 min. The motor should return to full performance after an additional 30-45 min at normal line voltage.
Caution: Motors that are used for HV PM_{10} samplers are higher-current versions of the motors that have been used for HV total suspended particulate samplers. The brushes for the two types of motor are different. Make sure that the correct replacement brushes are used for the maintenance of HV PM_{10} samplers.

14.2.2.6 If a motor needs to be replaced, be sure to use the higher-current versions that are needed for HV PM_{10} sampling. When lower-current motors are installed in HV PM_{10} samplers, the flow rate has been found to vary with changes in the line voltage.

14.3 Refurbishment of HV Samplers

If operated in the field for extended periods, HV PM_{10} samplers may require major repairs or complete refurbishment. If so, refer to the manufacturer's instrument manual before work is undertaken. A sampler that has undergone major repairs or refurbishment must be leak-checked and calibrated prior to sample collection.

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TABLE 1. EXAMPLE OF BASIC CHARACTERISTICS OF SOME COMMON FILTER MATERIAL

QUARTZ FIBER FILTER (Glass Spun with Organic Binder)
! Whatman QMA Filter ! Maximum temperature of up to 540EC ! High Collection Efficiency ! Non-hydroscopic ! Good for Corrosive Atmospheres ! Fragile ! Lowest background metals content
CELLULOSE FIBER FILTER (Cellulose Pulp)
! Whatman # 41/MSA "s" ! Low Ash ! Maximum Temperature of 150EC ! High Affinity for Water ! Enhanced Artifact Formation for $SO_4^{=}$ and NO_3 ! Good for X-Ray/Neutron Activation Analysis ! Low Metal Content
MEMBRANE FILTER (Dry Gel of Cellulose Esters)
! Whatman #41 ! Fragile, Therefore Requires Support Pad ! High Pressure Drop ! Low Residue when Ashed

TABLE 2. EXAMPLE OF SUMMARY OF USEFUL FILTER PROPERTIES

Filter and Filter Composition	Density mg/cm^2	pH	Filter Efficiency %
Teflon® (Membrane) $(CF_2)_n$(2µm Pore Size)	0.5	Neutral	99.95
Cellulose (Whatman 41) $(C_6H_{10}O_5)_n$	8.7	Neutral (Reacts with HNO_3)	58% at 0.3 µm
Glass Fiber (Whatman GF/C)	5.16	Basic pH - 9	99.0
"Quartz" Gelman Microquartz	6.51	pH - 7	98.5
Polycarbonate (Nuclepore) $C_{15}H_{14}+CO_3$ (0.3µm Pore Size	0.8	Neutral	93.9
Cellulose Acetate/Nitrate Millipore $(C_9H_{13}O_7)_n$(1.21 µm Pore Size)	5.0	Neutral (Reacts with HNO_3)	99.6

TABLE 3. EXAMPLE OF MINIMUM SAMPLER SITING CRITERIA

<table>
<tr><th rowspan="2">Scale</th><th rowspan="2">Height above ground, meters</th><th colspan="2">Distance from supporting structure, meters</th><th rowspan="2">Other spacing criteria</th></tr>
<tr><th>Vertical</th><th>Horizontal[a]</th></tr>
<tr><td>Micro</td><td>2 to 7</td><td>>2</td><td>>2</td><td rowspan="2">1. Should be >20 meters from trees.
2. Distance from sampler to obstacle, such buildings, must be twice the height and the obstacle protrudes above the sampler.
3. Must have unrestricted airflow 270 degrees around the sampler inlet.
4. No furnace or incineration flues should be nearby.[b]
5. Spacing from roads varies with traffic (see 40 CFR 58, Appendix E).
6. Sampler inlet is at least 2 m but not greater than 4 m from any collocated PM_{10} sampler. (See 40 CFR 58, Appendix E.)</td></tr>
<tr><td>Middle, neighbor-hood, urban, and regional scale</td><td>2 to 15</td><td>>2</td><td>>2</td></tr>
</table>

[a]When inlet is located on rooftop, this separation distance is in reference to walls, parapets, or penthouses located on the roof.
[b]Distance depends on the height of furnace or incineration flues, type of fuel or waste burned, and quality of fuel (sulfur, ash, or lead content). This is to avoid undue influences from minor pollutant sources.

TABLE 4. EXAMPLE OF ROUTINE MAINTENANCE ACTIVITIES FOR SAMPLERS

Equipment	Frequency and/or method	Acceptance limits	Action if requirements are not met
Sampler inlet	Dismantle and clean at manufacturer-specified internals	No obvious particulate deposits or damage	Clean, replace damaged equipment before sampling
Sampler base			
Power lines	Check for crimps or cracks	No obvious damage	Replace as necessary
Filter screen and throat	Visually check on sample-recovery days	No obvious deposits; clean with wire brush	Clean
Gaskets	At 3-mo intervals, inspect all gaskets in the sampler	No leaks; no compression damage evident	Replace as necessary
Brushes	Replace after 600-1,000 h of operation	Stable flow rate	Replace as necessary
Motor	Replace if needed	Correct model must be used	Obtain correct model
Flow controller	Check when flowrate changes are evident	Stable flow rate throughout sample run	Replace or repair if possible
Recording device	Inspection with experiencing difficulty in zeroing, or when large changes in flow rates occur	Recorder stays zeroed; chart advances; pen inks	Replace or repair if possible
Tubing, fittings	Visually inspect on sample-recovery days	No crimps, cracks, or obstructions; no crossthreading	Replace as necessary.

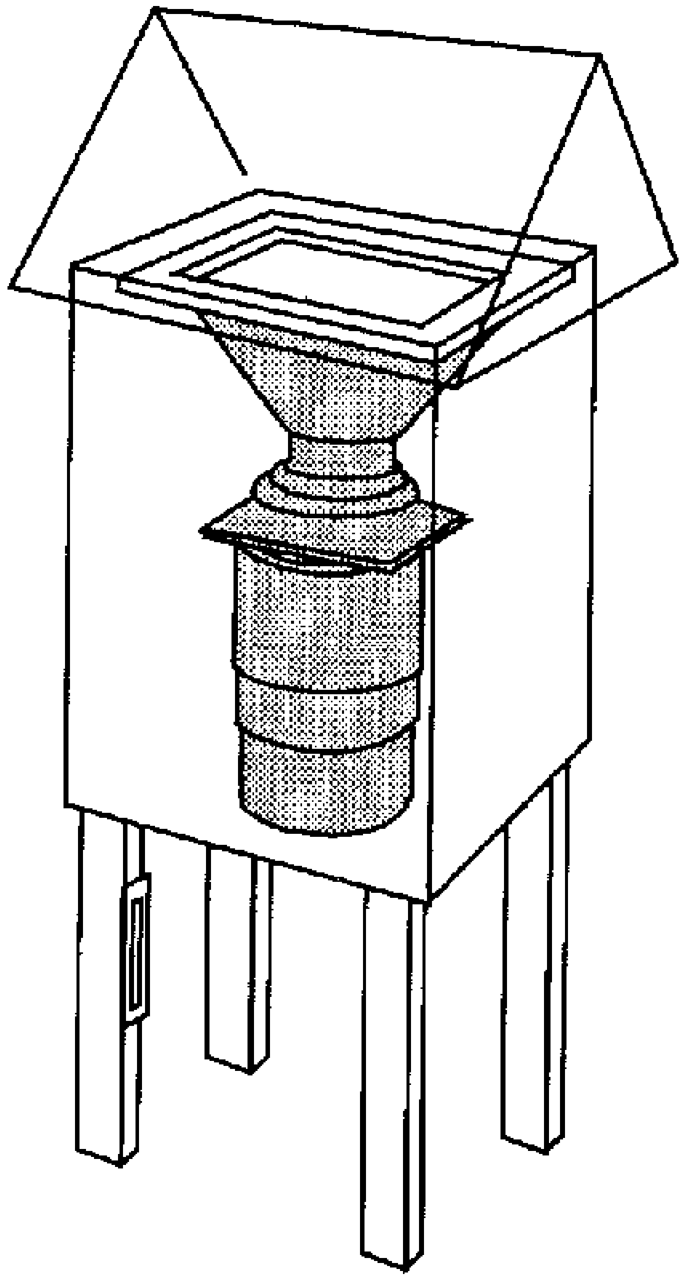

Figure 1. High-volume sampler with shelter.

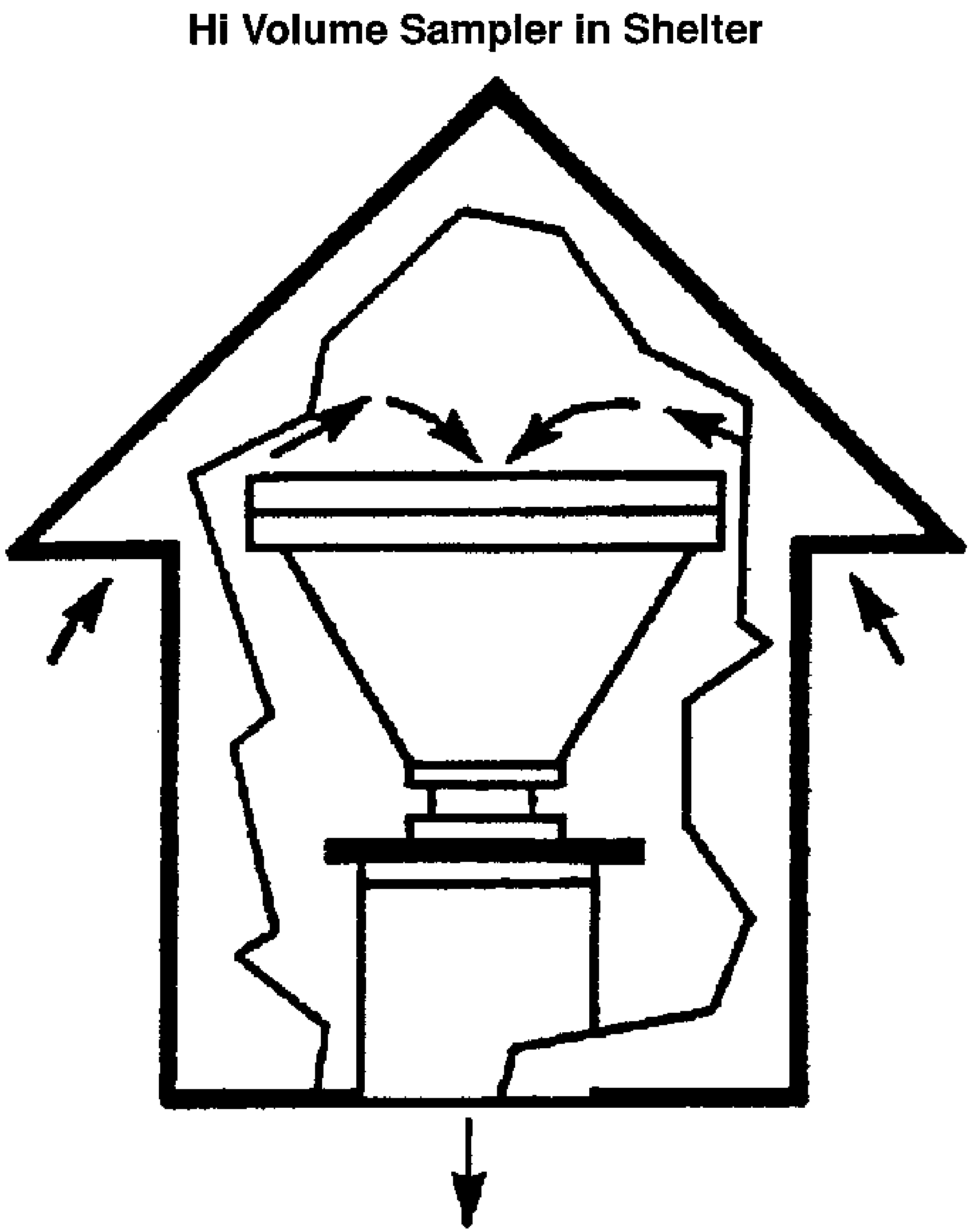

Figure 2. Inlet to EPA approved high volume sampler.

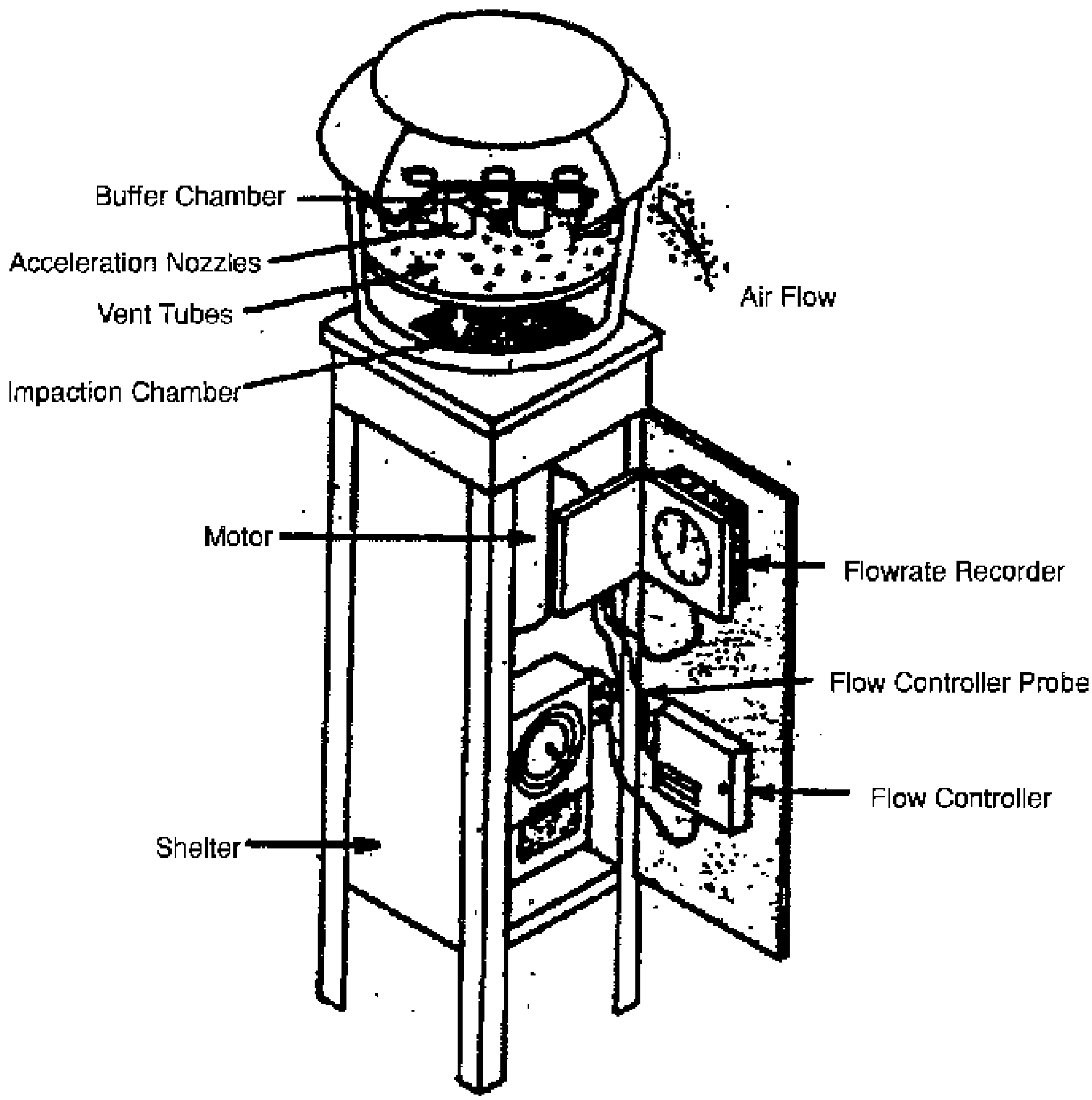

Figure 3. High-volume sampler with mass flow controller and impactor design size select inlet.

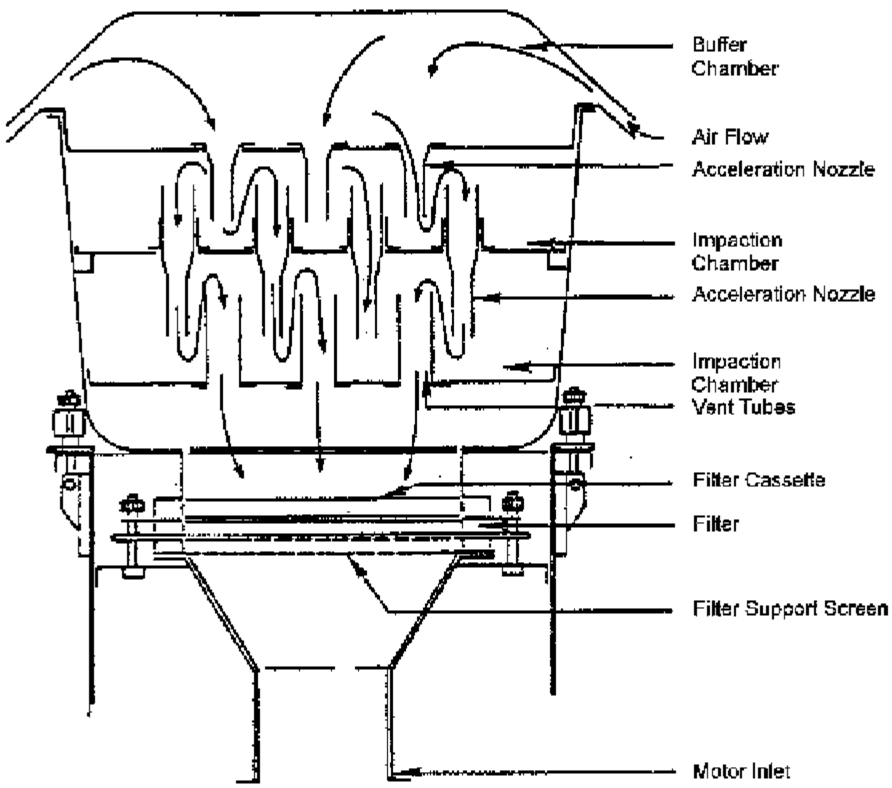

Figure 4. Schematic diagram of an impaction inlet for size select sampling for particulate matter.

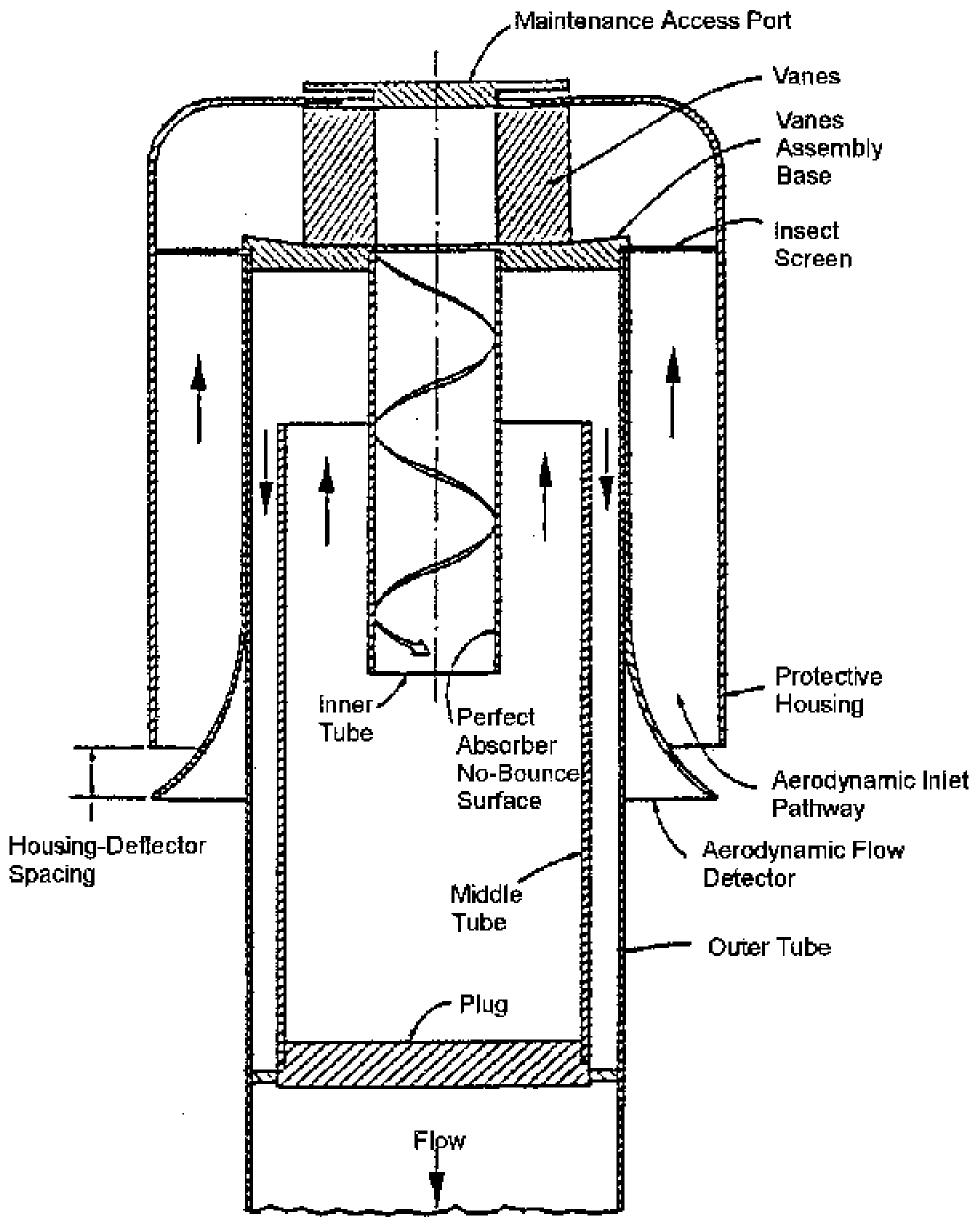

Figure 5. Schematic diagram of a cyclonic inlet for size select sampling for particulate matter.

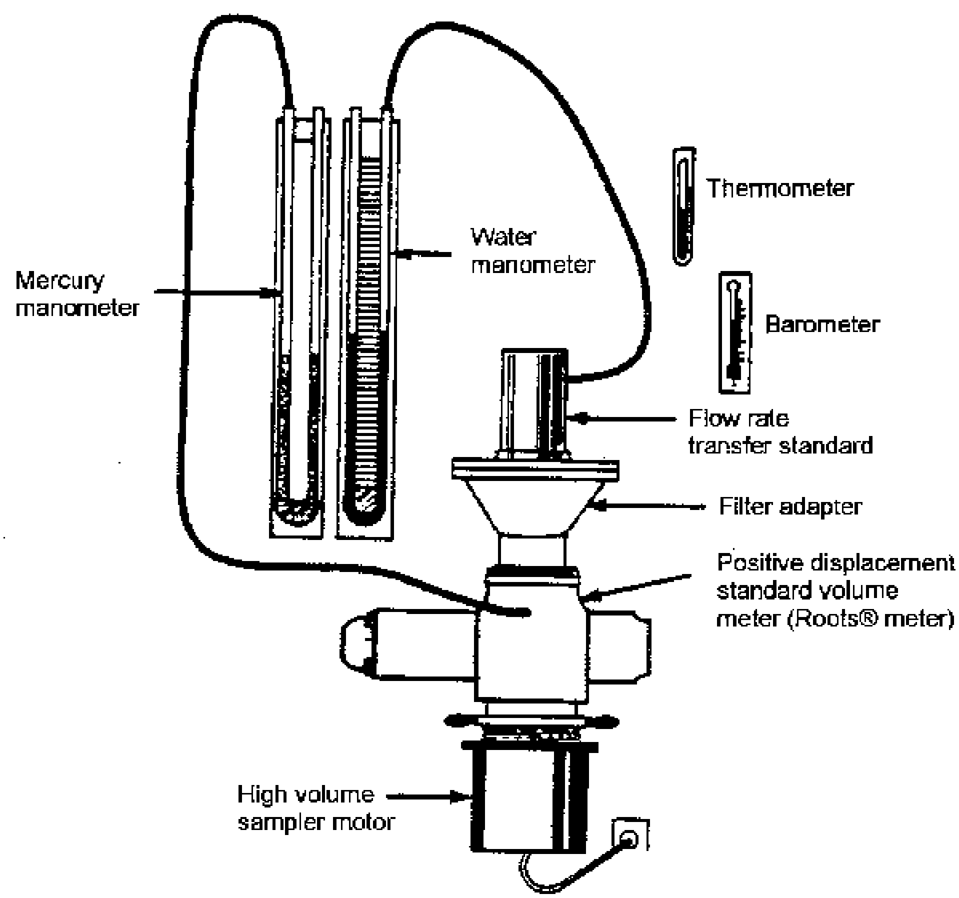

Figure 6. Flow rate transfer standard calibration setup.

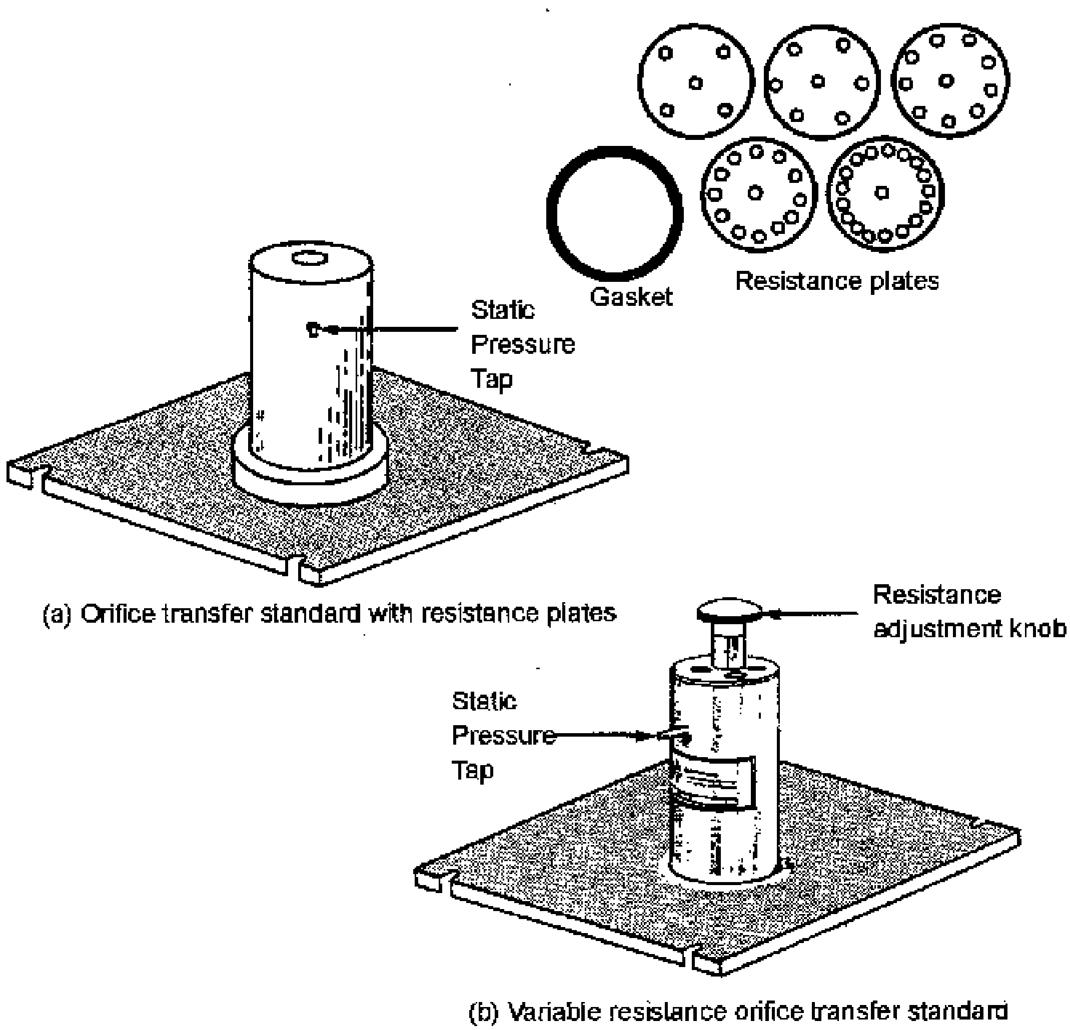

Figure 7. Typical orifice-type flow rate transfer standards.

ORIFICE TRANSFER STANDARD CERTIFICATION WORKSHEET

Date:	Roots meter S/N:	Ta:	K
Operator:	Orifice S/N:	Pa:	mm Hg

Plate or Volts AC	Initial Volume	Final Volume	Δ Vol.	ΔTime (min)	ΔHg (mm)	ΔH_2O (in.)

DATA TABULATION

Vstd	(x-axis) Qstd	(y-axis) $[\Delta H_2O\ (Pa/Ta)]^{1/2}$*	Va	(x-axis) Qa	(y-axis) $[\Delta H_2O\ (Ta/Pa)]^{1/2}$
	m =			m =	
	b =			b =	
	r =			r =	

CALCULATIONS

Vstd = Δ Vol [(Pa − ΔHg)/760] (298/Ta)*
Qstd = Vstd/ΔTime*
y = mx + b

Va = ΔVol [(Pa − ΔHg)/Pa]
Qa = Va/ΔTime
y = mx + b

For subsequent flow rate calculations:

Qstd = $\{[\Delta H_2O\ (Pa/Ta)]^{1/2} - b\}\ \{1/m\}$*

Qa = $\{[\Delta H_2O\ (Ta/Pa)]^{1/2} - b\}\ \{1/m\}$

*NOTE: For PM10 monitoring, a calibration curve corrected to standard conditions is optional.

Figure 8. Example orifice transfer standard certification worksheet.

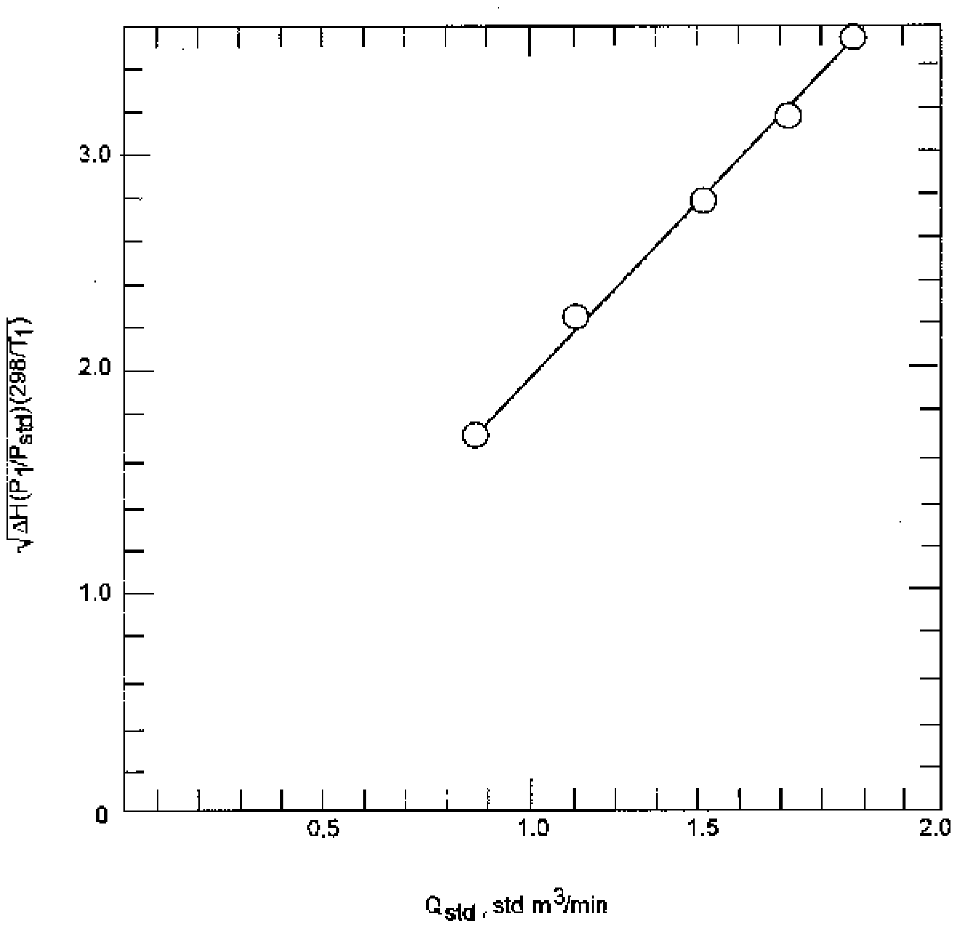

Figure 9. Typical calibration curve for a flow rate transfer standard.

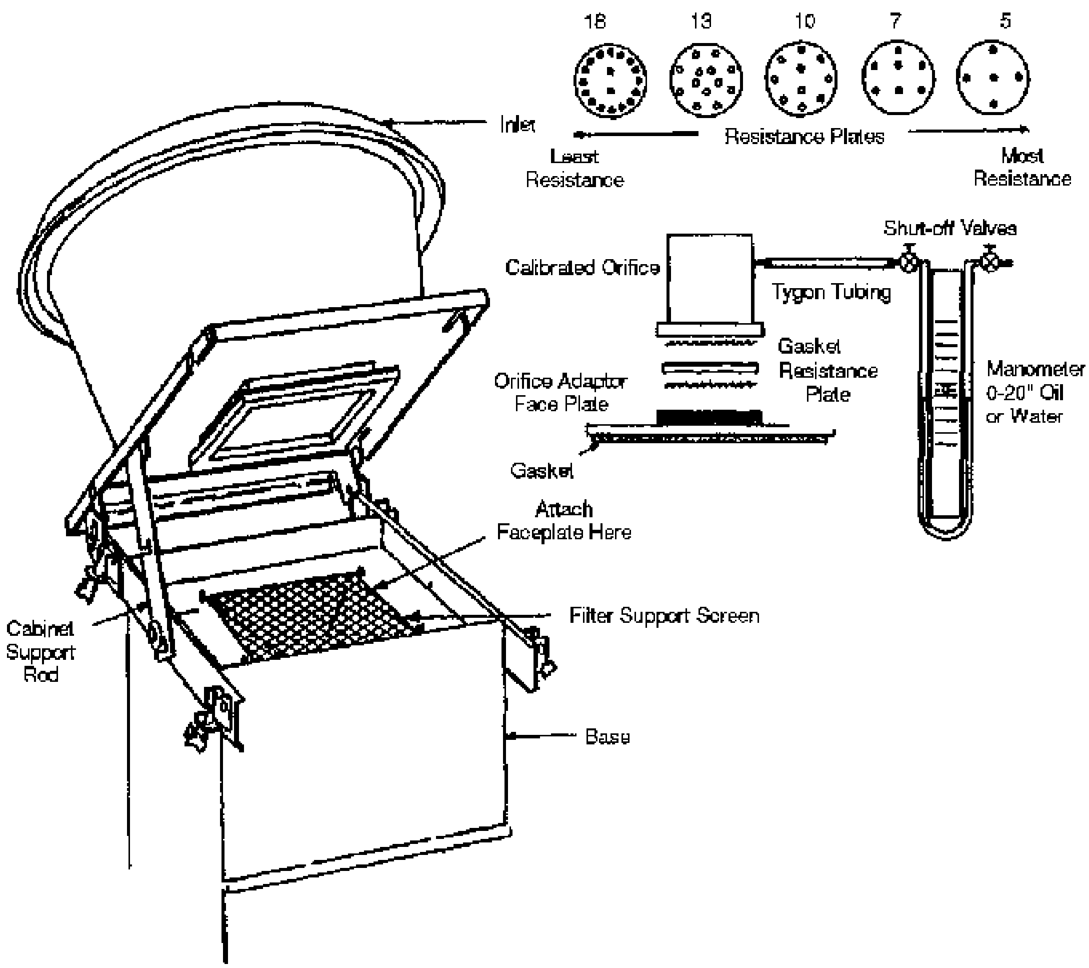

Figure 10. Typical calibration set-up for a mass flow controller (MFC).

MFC SAMPLER CALIBRATION DATA SHEET

Station Location __________ Date ________ Time ________

Sampler Model __________ S/N __________ Operator __________

Pa _____ mm Hg, Ta _____ °C _____ K, Unusual conditions: __________

Ps* _____ mm Hg, Ts* _____ °C _____ K, (*seasonal average Ta and Pa)

Orifice S/N __________ Orifice Calibration Date __________

Orifice calibration relationship: m = ________ b = ________ r = ________

Plate Number	Total ΔH_2O (in.)	X-Axis = Qa (orifice) flow rate[a] (m^3/min)	Sampler ΔPex (in. H_2O) [or I for flow recorders]	Y-Axis = Sampler ΔPext[b] [or It for flow recorders][c]

[a] $Qa = \{[(\Delta H_2O)(Ta/Pa)]^{1/2} - b\}\{1/m\}$
[b] $\Delta Pext = \{\Delta Pex(Ta + 30)/Pa)\}^{1/2}$
[c] $It = [I][(Ta + 30)/Pa]^{1/2}$ if a flow recorder is used

Sampler Calibration Relationship (Qa on x-axis; ΔPext or [It] on y-axis):
$\Delta Pext = m[Qa\,(Orifice)] + b$ or $It = m[Qa(Orifice)] + b$

m = ________ b = ________ r = ________

For subsequent calculation of sampler flow rate:
$\overline{Qa} = \{[\text{mean } \Delta Pex\,(Tav + 30)/Pav]^{1/2} - b\}\{1/m\}$
or $\overline{Qa} = \{\text{mean } I[(Tav + 30)/Pav]^{1/2} - b\}\{1/m\}$

Set point flow rate (SFR) __________
SFR = 1.13 (Ps/Pa) (Ta/Ts)

Sampler set point (SSP) __________
$SSP = [Pa/(Ta + 30)][m(SFR) + b]^2$
or $SSP = [Pa/(Ta + 30)]^{1/2}[m(SFR) + b]$ for flow recorders

Figure 11. Example MFC sampler calibration data sheet.

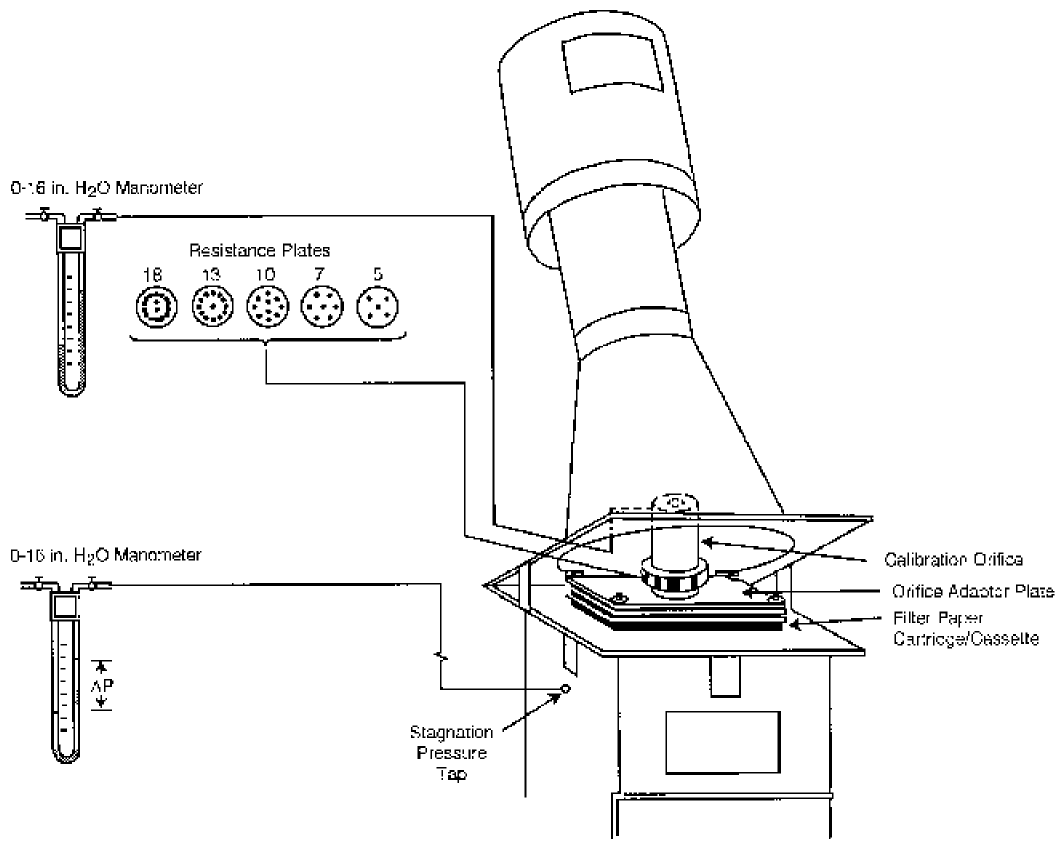

Figure 12. Calibration of a typical volumetric flow controller (VFC).

VFC SAMPLER CALIBRATION DATA SHEET

Station Location ____________ Date ________ Time ________

Sampler Model ________ S/N ________ Operator ________

Pa ______ mm Hg, Ta ______ °C ______ K, Unusual Conditions ________

Orifice S/N ____________, Orifice Calibration Date ________

Orifice Calibration Relationship: m = ______ b = ______ r = ______

Plate No.	ΔH_2O (in.)	ΔPsig (mm Hg)[a]	P1=Pa−ΔPsig (mm Hg)	P1/Pa (mm Hg)	Qa (orifice) flow rate[b] (m^3/min)	Qa (orifice) / $[Ta]^{1/2}$
Operational Flow Rate						

[a] mm Hg = 25.4 (in. H_2O/13.6)

[b] Qa (orifice) = $1/m \{[(\Delta H_2O)(Ta/Pa)]^{1/2} - b\}$

[c] % Difference = $\left[\frac{Qa\ (sampler) - Qa\ (orifice)}{Qa\ (orifice)}\right][100]$

Qa (Orifice)	Qa (sampler) (Lookup Table)	% Difference[c]

Sampler Calibration Relationship

- ☐ Lookup Table Validated (i.e., % difference ≤ 4)
- ☐ New calibration relationship:

$(X = \frac{Qa\ (orifice)}{[Ta]^{1/2}}, Y = (P1/Pa)$

m = ______ b = ______ r = ______

For subsequent calculation of sampler flow rate:

$Qa = \{[P1/Pa - b][Ta]^{1/2}\} \{1/m\}$

Operational Flow Rate ________ m^3/min

Figure 13. Example VFC sampler calibration data sheet.

MFC SAMPLER FIELD DATA SHEET

Station
Location ______________ Date ______________ SAROAD# ______________

Sampler Model ______________ S/N ______________

Filter ID No. ______________ Pav ______________ mm Hg. Tav ______________ °C ______________ K

Sampler Manometer Readings | **Flow Recorder Readings**

Initial ΔPex ______________ in. H_2O Mean I ______________

Final ΔPex ______________ in. H_2O

Mean ΔPex ______________ in. H_2O

Sampler Calibration Relationship: m = ______________ b = ______________ r = ______________

$\overline{Qa}$ ______________ m^3/min Elapsed Time ______________ min

$\overline{Qa}$ = {[mean ΔPex (Tav + 30)/Pav]$^{1/2}$ − b} {1/m}
$\overline{Qa}$ = {mean I [(Tav + 30)/Pav]$^{1/2}$ − b} {1/m} for flow recorders

Operator ______________

Comments: ______________

____

____

____

Laboratory Calculations:

$\overline{Qstd}$ ______________ std m^3/min
$\overline{Qstd}$ = $\overline{Qa}$ (Pav/Pstd) (Tstd/Tav)

Vstd ______________ std m^3
Vstd = ($\overline{Qstd}$) (elapsed time)

Gross weight (Wg) ______________ g
Tare weight (Wt) ______________ g
Net Weight (Wn) ______________ g
PM10 Concentration ______________ μg/std m^3
PM10 Concentration = (Wn) (10^6)/Vstd

Figure 14. Example MFC sampler field data sheet.

VFC SAMPLER FIELD DATA SHEET

Station Location ____________ Date ________ SAROAD# ________

Sampler Model ____________ S/N ____________

Filter ID No. ________ Pav ________ mm Hg, Tav ________ °C ________ K

Relative Stagnation Pressure Readings

Initial ΔPstg ____________ mm Hg

Final ΔPstg ____________ mm Hg

Average ΔPstg = ____________ mm Hg

Absolute Stagnation Pressure

$\overline{P1}$ = ____________ mm Hg

$\overline{P1}$ = Pav − Average ΔPstg

Average Stagnation Pressure Ratio ($\overline{P1}$/Pav) ____________

Average Flowrate ($\overline{Qa}$)* ____________ m^3/min

*Obtained from manufacturer's lookup table (or from alternate calibration relationship)

Elapsed Time ____________ min

Operator ____________

Comments: ____________

____

____

____

Laboratory Calculations:

$\overline{Qstd}$ ____________ Std m^3/min

$\overline{Qstd}$ = $\overline{Qa}$ (Pav/Pstd) (Tstd/Tav)

Vstd ____________ std m^3

Vstd = ($\overline{Qstd}$) (Elapsed Time)

Gross Weight (Wg) ____________ g

Tare Weight (Wt) ____________ g

Net Weight (Wn) ____________ g

PM10 Concentration ____________ μg/std m^3

PM10 Concentration = (Wn) (10^6)/Vstd

Figure 15. Example VFC sampler field data sheet.

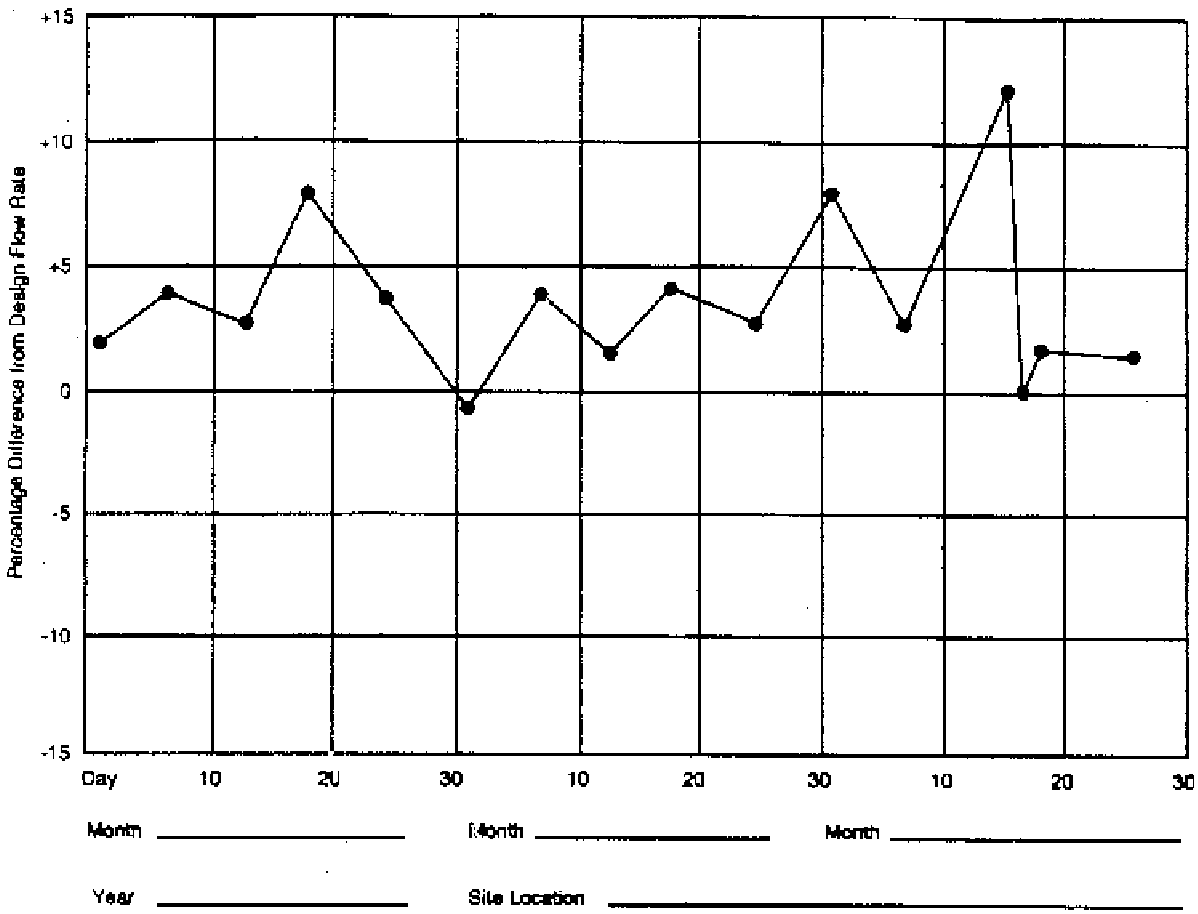

Figure 16. Field data control chart.

EPA/625/R-96/010a

Compendium of Methods for the Determination of Inorganic Compounds in Ambient Air

Compendium Method IO-3.5

DETERMINATION OF METALS IN AMBIENT PARTICULATE MATTER USING INDUCTIVELY COUPLED PLASMA/ MASS SPECTROMETRY (ICP/MS)

Center for Environmental Research Information
Office of Research and Development
U.S. Environmental Protection Agency
Cincinnati, OH 45268

June 1999

Method IO-3.5

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This Compendium has been subjected to the Agency's peer and administrative review, and it has been approved for publication as an EPA document. Mention of trade names or commercial products does not constitute endorsement or recommendation for use.

Method IO-3.5
Determination of Metals in Ambient Particulate Matter Using Inductively Coupled Plasma/Mass Spectrometry (ICP/MS)

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Chapter IO-3
Chemical Species Analysis of Filter-Collected SPM

Method IO-3.5
DETERMINATION OF METALS IN AMBIENT PARTICULATE MATTER USING INDUCTIVELY COUPLED PLASMA/MASS SPECTROMETRY

1. Scope

1.1 Suspended particulate matter (SPM) in air generally is a complex multi-phase system of all airborne solid and low vapor pressure liquified particles having aerodynamic particles sizes from below 0.01-100 µm and larger. Historically, SPM measurement has concentrated on total suspended particulates (TSP), with no preference to size selection.

1.2 On July 1, 1987, the U. S. Environmental Protection Agency (EPA) promulgated a new size-specific air quality standard for ambient particulate matter. This new primary standard applies only to particles with aerodynamic diameters $\leq$ 10 Fm (PM_{10}) and replaces the original standard for TSP. To measure concentrations of these particles, the EPA also promulgated a new federal reference method (FRM). This method is based on the separation and removal of non-PM_{10} particles from an air sample, followed by filtration and gravimetric analysis of PM_{10} mass on the filter substrate.

1.3 The new primary standard (adopted to protect human health) limits PM_{10} concentrations to 150 µg/std m^3, averaged over a 24-h period. These smaller particles are able to reach the lower regions of the human respiratory tract and, therefore, are responsible for most of the adverse health effects associated with suspended particulate pollution. The secondary standard, used to assess the impact of pollution on public welfare, has also been established at 150 µg/std. m^3.

1.4 Ambient air SPM measurements are used (among other purposes) to determine whether defined geographical areas are in attainment or non-attainment with the national ambient air quality standards (NAAQS) for PM_{10}. These measurements are obtained by the states in their state local air monitoring station (SLAMS) networks as required under 40 CFR Part 58. Further, Appendix C of Part 58 requires that the ambient air monitoring methods used in these EPA-required SLAMS networks must be methods that have been designated by EPA as either reference or equivalent methods.

1.5 The procedure for analyzing the elemental metal components in ambient air particulate matter collected on high volume filter material is described in this method. The high volume filter material may be associated with either the TSP or PM_{10} sampler, as delineated in Inorganic Compendium Method IO-2.1.

1.6 Filters are numbered, pre-weighted, field deployed and sampled, returned to the laboratory, extracted using microwave or hot acid, then analyzed by inductively coupled plasma/mass spectrometry (ICP/MS). The extraction procedure is accomplished by following Inorganic Compendium Method IO-3.1. Those metals and their associated method detection limit (MDL) applicable to this technology are listed in Table 1.

1.7 This method should be used by analysts experienced in the use of ICP/MS, the interpretation of spectral and matrix interferences and procedures for their correction. A minimum of 6-months' experience with commercial instrumentation is required.

2. Applicable Documents

2.1 ASTM Standards

- D1356 *Definition of Terms Related to Atmospheric Sampling and Analysis.*
- D1357 *Planning the Sampling of the Ambient Atmosphere.*
- D4096 *Application of the High Volume Sample Method for Collection and Mass Determination of Airborne Particle Matter.*

2.2 Other Documents

- U. S. Environmental Protection Agency,*Quality Assurance Handbook for Air Pollution Measurement Systems, Volume I: A Field Guide for Environmental Quality Assurance*, EPA-600/R-94-038a.
- U. S. Environmental Protection Agency,*Quality Assurance Handbook for Air Pollution Measurement Systems, Volume II: Ambient Air Specific Methods (Interim Edition),* EPA-600/R-94/038b.
- Reference Method for the Determination of Particulate Matter in the Atmosphere, *Code of Federal Regulations*. 40 CFR 50, Appendix J.
- Reference Method for the Determination of Suspended Particulates in the Atmosphere (High Volume Method), *Code of Federal Regulations*. 40 CFR 50, Appendix B.
- Reference Method for the Determination of Lead in Suspended Particulate Matter Collected from Ambient Air, *Federal Register* 43 (194): 46258-46261.
- U. S. EPA Project Summary Document (1).
- U. S. EPA Laboratory Standard Operating Procedures (2).
- Scientific Publications of Ambient Air Studies (3-14).

3. Summary of Method

3.1 The method describes the multi-element determination of trace elements by ICP/MS. Sample material in solution is introduced by pneumatic nebulization into a radiofrequency plasma where energy transfer processes cause desolvation, atomization, and ionization.

3.2 The ions are extracted from the plasma through a differentially pumped vacuum interface and separated on the basis of their mass-to-charge ratio by a quadrupole mass spectrometer having a minimum resolution capability of 1 amu peak width at 5% peak height.

3.3 The ions transmitted through the quadruple are registered by a continuous dynode electron multiplier or Faraday detector and the ion information processed by a data handling system.

3.4 Interferences relating to the technique (see Section 5) must be recognized and corrected for. Such corrections must include compensation for isobaric elemental interferences and interferences from polyatomic ions derived from the plasma gas, air, reagents, or sample matrix. Instrumental drift as well as suppressions or enhancements of instrument response caused by the sample matrix must be corrected for by internal standardization.

4. Definitions

[Note: Definitions used in this document are consistent with ASTM methods. All pertinent abbreviations and symbols are defined within this document at point of use.]

4.1 Instrument Detection Limit (IDL). The concentration equivalent of the analyte signal, which is equal to three times the standard deviation of the blank signal at the selected analytical mass(es).

4.2 Method Detection Limit (MDL). The minimum concentration of an analyte that can be identified, measured and reported with 99% confidence that the analyte concentration is greater than zero. MDLs are intended as a guide to instrumental limits typical of a system optimized for multi-element determinations and employing commercial instrumentation and pneumatic nebulization sample introduction. However, actual MDLs and linear working ranges will be dependent on the sample matrix, instrumentation and selected operating conditions.

4.3 Linear Dynamic Range (LDR). The concentration range over which the analytical working curve remains linear.

4.4 Laboratory Reagent Blank (LRB) (Preparation Blank). An aliquot of reagent water that is treated exactly as a sample including exposure to all labware, equipment, solvents, reagents, and internal standards that are used with other samples. The LRB is used to determine if method analytes or other interferences are present in the laboratory environment, the reagents or apparatus.

4.5 Calibration Blank. A volume of ASTM Type I water acidified with the same acid matrix as is present in the calibration standards.

4.6 Internal Standard. Pure analyte(s) added to a solution in known amount(s) and used to measure the relative responses of other method analytes that are components of the same solution. The internal standard must be an analyte that is not a sample component.

4.7 Stock Standards Solutions. A concentrated solution containing one or more analytes prepared in the laboratory using assayed reference compounds or purchased from a reputable commercial source.

4.8 Calibration Standard (CAL). A solution prepared from the stock standard solution(s) which is used to calibrate the instrument response with respect to analyte concentration.

4.9 Tuning Solution. A solution used to determine acceptable instrument performance prior to calibration and sample analyses.

4.10 Quality Control Sample (QCS). A solution containing known concentrations of method analytes which is used to fortify an aliquot of LRB matrix. The QCS is obtained from a source external to the laboratory and is used to check laboratory performance.

4.11 Nebulizer. A device creating a fine spray of sample solution to be carried into the plasma for measurement. Its performance is critical for good analysis.

4.12 Mass Spectrometer (MS). For a quadrupole mass spectrometer, an analytical system which consist of parallel set of four rod electrodes mounted in a square configuration. By coupling composite pairs of rods together and applying radio frequency (RF) and direct current (DC) potentials between the pairs of rods, ions (generated from the ion source of reaction of chemical compound with a high intense beam of electrons) moving through the field, based upon their trajectories, can be separated according to their atomic mass units (amu) and subsequently detected by an electron multiplier detector.

4.13 MS-SCAN. The MS is programmed to SCAN all ions repeatedly over a specified mass range.

4.14 MS-SIM. The MS is programmed to scan a selected number of ions repeatedly [i.e., selected ion monitoring (SIM) mode].

5. Interferences

[Note: Several interference sources may cause inaccuracies in the determination of trace elements by ICP/MS.]

5.1 Isobaric Elemental Interferences

Isobaric elemental interferences are caused by isotopes of different elements that form single- or double-charged ions of the same nominal mass-to-charge ratio and cannot be resolved by mass spectrometer in use. All elements determined by this method have, at a minimum, one isotope free of isobaric elemental interference. Of the analytical isotopes recommended for use with this method, only molybdenum-98 (ruthenium) and selenium-82 (krypton) have isobaric elemental interferences. If alternative analytical isotopes having higher natural abundance are selected to achieve greater sensitivity, an isobaric interference may occur. All data obtained under such conditions must be corrected by measuring the signal from another isotope of the interfering element and subtracting the appropriate signal ratio from the isotope of interest. A record of this correction process should be included with the report of the data. These corrections will only be as accurate as the accuracy of the isotope ratio used in the elemental equation for data calculations. Relevant isotope ratios and instrument bias factors should be established prior to the application of any corrections.

5.2 Abundance Sensitivity

Abundance sensitivity is a property defining the degree to which the wings of a mass peak contribute to adjacent masses. The abundance sensitivity is affected by ion energy and quadruple operating pressure. Wing overlap interferences may result when a small ion peak is being measured adjacent to a large one. The potential for these interferences should be recognized and the spectrometer resolution adjusted to minimize them.

5.3 Isobaric Polyatomic Ion Interferences

Isobaric polyatomic ion interferences are caused by ions consisting of more than one atom that have the same nominal mass-to-charge ratio as the isotope of interest and that cannot be resolved by the mass spectrometer in use. These ions are commonly formed in the plasma or interface system from support gases or sample components. Most of the common interferences have been identified and are listed in Table 2, together with the method elements affected. Such interferences must be recognized, and when they cannot be avoided by the selection of alternative analytical isotopes, appropriate corrections must be made to the data. Equations for the correction of data should be established at the time of the analytical run sequence as the polyatomic ion interferences will be highly dependent on the sample matrix and chosen instrument conditions.

5.4 Physical Interferences

Physical interferences are associated with the physical processes that govern the transport of sample into the plasma, sample conversion processes in the plasma, and the transmission of ions through the plasma-mass spectrometer interface. These interferences may result in differences between instrument responses for the sample and the calibration standards. Physical interferences may occur in the transfer of solution to the nebulizer (e.g., viscosity effects), at the point of aerosol formation and transport to the plasma (e.g., surface tension), or during excitation and ionization processes within the plasma itself. High levels of dissolved solids in the sample may contribute deposits of material on the extraction and/or skimmer cones reducing the effective diameter of the orifices and therefore ion transmission. Internal standardization may be effectively used to compensate for many physical interference effects. Internal standards ideally should have similar analytical behavior to the elements being determined.

5.5 Memory Interferences

Memory interferences result when isotopes of elements in a previous sample contribute to the signals measured in a new sample. Memory effects can result from sample deposition on the sampler and skimmer cones and from the buildup of sample material in the plasma torch and spray chamber. The site where these effects occur is dependent on the element and can be minimized by flushing the system with a rinse blank between samples (see Section 8.6.3). The possibility of memory interferences should be recognized within an analytical run and suitable rinse times should be used to reduce them. The rinse times necessary for a particular element should be estimated prior to analysis. This estimate may be calculated by aspirating a standard containing elements corresponding to 10 times the upper end of the linear range for a normal sample analysis period, followed by analysis of the rinse blank at designated intervals. The length of time required to reduce analyte signals to within a factor of 10 of the method detection limit, should be noted. Memory interferences may also be assessed within an analytical run by using a minimum of three replicate integrations for data acquisition. If the integrated signal values drop consecutively, the analyst should be alerted to the possibility of a memory effect and should examine the analyte concentration in the previous sample to identify if this was high. If a memory interference is suspected, the sample should be reanalyzed after a long rinse period.

6. Safety

6.1 The toxicity or carcinogenicity of reagents used in this method have not been fully established. Each chemical should be regarded as a potential health hazard, and exposure to these compounds should be as low as reasonably achievable. Each laboratory is responsible for maintaining a current awareness file of OSHA regulations regarding the safe handling of the chemicals specified in this method. A reference file of material data handling sheets should also be available to all personnel involved in the chemical analyses.

6.2 Analytical plasma sources emit radiofrequency radiation in addition to intense UV radiation. Suitable precautions should be taken to protect personnel from such hazards.

7. Apparatus and Equipment

7.1 Inductively Coupled Plasma/Mass Spectrometer (ICP/MS)

7.1.1 ICP/MS Instrument. Capable of scanning the mass 5-250 amu with a minimum resolution capability of 1 amu peak width at 5% peak height. Instrument may be fitted with a conventional or extended dynamic range detection system.

7.1.2 Argon Gas Supply (high-purity grade, 99.99%). Best source.

7.1.3 A Variable-Speed Peristaltic Pump. Required for solution delivery to the nebulizer.

7.1.4 A Mass-Flow Controller. One mass flow controller is required on the nebulizer gas supply. A water-cooled spray chamber may reduce some types of interferences (e.g., from polyatomic oxide species).

7.1.5 Operating Conditions. Because of the diversity of instrument hardware, no detailed instrument operating conditions are provided. The analyst is advised to follow the recommended operating conditions provided by the manufacturer. The analyst must verify that the instrument configuration and operating conditions satisfy the analytical requirements and maintain quality control data verifying instrument performance and analytical results. Instrument operating conditions used to generate precision and recovery data for this method (Section 14) are included in Table 3.

7.1.6 Electron Multiplier Detector. If an electron multiplier detector is being used, precautions should be taken, where necessary, to prevent exposure to high ion flux. Otherwise, changes in instrument response or damage to the multiplier may result. Samples having high concentrations of elements beyond the linear range of the instrument and with isotopes falling within scanning windows should be diluted prior to analysis.

7.2 Labware

To determine trace level elements, contamination and loss are of prime consideration. Potential contamination sources include improperly cleaned laboratory apparatus and general contamination within the laboratory environment from dust, etc. A clean laboratory work area designated for trace element sample handling must be used. Sample containers can introduce positive and negative errors in the determination of trace elements by (1) contributing contaminants through surface desorption or leaching and (2) depleting element concentrations through adsorption processes. All reusable labware (glass, quartz, polyethylene, Teflon®, etc.), including the sample container, should be cleaned prior to use. Labware may be soaked overnight and thoroughly washed with laboratory-grade detergent and water, rinsed with water, and soaked for 4 h in a mixture of dilute nitric and hydrochloric acid (1+2+9). It should then be rinsed with ASTM type I water and oven-dried.

[Note: Do not use chromic acid to clean glassware.]

7.2.1 Glassware. Volumetric flasks, graduated cylinders, funnels and centrifuge tubes.

7.2.2 Assorted Calibrated Pipettes. Dust sources.

7.2.3 Conical Phillips Beakers, 350-mL with 50-mm Watch Glasses. Griffin beakers, 350-mL with 75-mm watch glasses.

7.2.4 Storage Bottles. Narrow mouth bottles, Teflon® FEP (fluorinated ethylene propylene) with Tefzel ETFE (ethylene tetrafluorethylene) screw closure, 125-mL and 250-mL capacities.

7.3 Sample Processing Equipment

7.3.1 Air Displacement Pipetter. Digital pipet system capable of delivering volumes from 10 to 2,500 µL with an assortment of high quality disposable pipet tips.

7.3.2 Balance. Analytical, capable of accurately weighing to 0.1 mg.

7.3.3 Hot Plate. (Corning PC100 or equivalent).

7.3.4 Centrifuge. Steel cabinet with guard bowl, electric timer and brake.

7.3.5 Drying Oven. Gravity convection oven with thermostatic control capable of maintaining 105EC ± 5EC.

8. Reagents and Consumable Materials

8.1 Reagents

[<u>Note</u>: Owing to the high sensitivity of ICP/MS, high-purity reagents should be used whenever possible. All acids used for this method must be of ultra high-purity grade. Suitable acids are available from a number of manufacturers or may be prepared by sub-boiling distillation. Nitric acid is preferred for ICP/MS to minimize polyatomic ion interferences. Several polyatomic ion interferences result when hydrochloric acid is used (see Table 2). However, hydrochloric acid is required to maintain stability in solutions containing antimony and silver. When hydrochloric acid is used, corrections for the chloride polyatomic ion interferences must be applied to all data. As discussed in Method I0-3.1, a mixture of 3% HNO_3 / 8% HCl is the best extraction matrix for total extraction of metals from quartz filters.]

8.1.1 Nitric Acid, Concentrated (sp.gr. 1.41). Best source.
8.1.2 Nitric Acid (1+1). Add 500 mL conc. nitric acid to 400 mL of ASTM type I water and dilute to 1 L.
8.1.3 Nitric Acid (1+9). Add 100 mL conc. nitric acid to 400 mL of ASTM type I water and dilute to 1 L.
8.1.4 Hydrochloric Acid, Concentrated (sp.gr. 1.19). Best source.
8.1.5 Hydrochloric Acid (1+1). Add 500 mL conc. hydrochloric acid to 400 mL of ASTM type I water and dilute to 1 L.
8.1.6 Hydrochloric Acid (1+4). Add 200 mL conc. hydrochloric acid to 400 mL of ASTM type I water and dilute to 1 L.
8.1.7 Ammonium Hydroxide, Concentrated (sp.gr. 0.902). Best source.
8.1.8 Tartaric Acid (CASRN 87-69-4). Best source.

8.2 Water

For all sample preparation and dilutions, ASTM type I water (ASTM D1193) is required. Suitable water may be prepared by passing distilled water through a mixed bed of anion and cation exchange resins.

8.3 Standard Stock Solutions

Standard stock solutions may be purchased from a reputable commercial source or prepared from ultra high-purity grade chemicals or metals (99.99 - 99.999% pure). All salts should be dried for 1 h at 105EC, unless otherwise specified. Stock solutions should be stored in Teflon® bottles. Use the following procedures for preparing standard stock solutions:

<u>Caution</u>: Many metal salts are extremely toxic if inhaled or swallowed. Wash hands thoroughly after handling.

[<u>Note</u>: Some metals, particularly those that form surface oxides, require cleaning prior to being weighed, which requires pickling the surface of the metal in acid. An amount in excess of the desired weight should be pickled repeatedly, rinsed with water, dried, and weighed until the desired weight is achieved.]

8.3.1 Aluminum Solution, Stock. 1 mL = 1,000 µg Al: Pickle aluminum metal in warm (1+1) HCl to an exact weight of 0.100 g. Dissolve in 10 mL conc. HCl and 2 mL conc. nitric acid, heat to dissolve. Continue heating until volume is reduced to 4 mL. Cool and add 4 mL ASTM type I water. Heat until the volume is reduced to 2 mL. Cool and dilute to 100 mL with ASTM type I water.

8.3.2 Antimony Solution, Stock. 1 mL = 1,000 µg Sb: Dissolve 0.100 g antimony powder in 2 mL (1+1) nitric acid and 0.5 mL conc. hydrochloric acid, heat to dissolve. Cool and add 20 mL ASTM type I water and 0.15 g tartaric acid. Warm the solution to dissolve the white precipitate. Cool and dilute to 100 mL with ASTM type I water.

8.3.3 Arsenic Solution, Stock. 1 mL = 1,000 µg As: Dissolve 0.1320 g As_2O_3 in a mixture of 50 mL ASTM type I water and 1 mL conc. ammonium hydroxide. Heat gently to dissolve. Cool and acidify the solution with 2 mL conc. nitric acid. Dilute to 100 mL with ASTM type I water.

8.3.4 Barium Solution, Stock. 1 mL = 1,000 µg Ba: Dissolve 0.1437 g $BaCO_3$ in a solution mixture of 10 mL ASTM type I water and 2 mL conc. nitric acid. Heat and stir to dissolve and degassing. Dilute to 100 mL with ASTM type I water.

8.3.5 Beryllium Solution, Stock. 1 mL = 1,000 µg Be: Dissolve 1.965 g $BeSO_4$@$4H_2O$ (DO NOT DRY) in 50 mL ASTM Type I water. Add 1 mL conc. nitric acid. Dilute to 100 mL with ASTM type I water.

8.3.6 Bismuth Solution, Stock. 1 mL = 1,000 µg Bi: Dissolve 0.1115 g Bi_2O_3 in 5 mL conc. nitric acid. Heat to dissolve. Cool and dilute to 100 mL with ASTM type I water.

8.3.7 Cadmium Solution, Stock. 1 mL = 1,000 µg Cd: Pickle cadmium metal in (1+9) nitric acid to an exact weight of 0.100 g. Dissolve in 5 mL (1+1) nitric acid, heating to dissolve. Cool and dilute to 100 mL wit ASTM type I water.

8.3.8 Chromium Solution, Stock. 1 mL = 1,000 µg Cr: Dissolve 0.1923 g CrO_3 in a solution mixture of 10 mL ASTM type I water and 1 mL conc. nitric acid. Dilute to 100 mL with ASTM type I water.

8.3.9 Cobalt Solution, Stock. 1 mL = 1,000 µg Co: Pickle cobalt metal in (1+9) nitric acid to an exact weight of 0.100 g. Dissolve in 5 mL (1+1) nitric acid, heating to dissolve. Cool and dilute to 100 mL with ASTM type I water.

8.3.10 Copper Solution, Stock. 1 mL = 1,000 µg Cu: Pickle copper metal in (1+9) nitric acid to an exact weight of 0.100 g. Dissolve in 5 mL (1+1) nitric acid, heating to dissolve. Cool and dilute to 100 mL with ASTM type I water.

8.3.11 Indium Solution, Stock. 1 mL = 1,000 µg In: Pickle indium metal in (1+1) nitric acid to an exact weight of 0.100 g. Dissolve in 10 mL (1+1) nitric acid, heating to dissolve. Cool and dilute to 100 mL with ASTM type I water.

8.3.12 Lead Solution, Stock. 1 mL = 1,000 µg Pb: Dissolve 0.1599 g $PbNO_3$ in 5 mL (1+1) nitric acid. Dilute to 100 mL with ASTM type I water.

8.3.13 Magnesium Solution, Stock. 1 mL = 1,000 µg Mg: dissolve 0.1658 g MgO in 10 mL (1+1) nitric acid, heating to dissolve. Cool and dilute to 100 mL with ASTM type I water.

8.3.14 Manganese Solution, Stock. 1 mL = 1,000 µg Mn: Pickle manganese flake in (1+9) nitric acid to an exact weight of 0.100 g. Dissolve in 5 mL (1+1) nitric acid, heating to effect solution. Cool and dilute to 100 mL with ASTM type I water.

8.3.15 Molybdenum Solution, Stock. 1 mL = 100 µg Mo: Dissolve 0.1500 g MoO_3 in a solution mixture of 10 mL ASTM type I water and 1 mL conc. ammonium hydroxide, heating to dissolve and 1 mL conc. ammonium hydroxide, heating to effect solution. Cool and dilute to 100 mL with ASTM type I water.

8.3.16 Nickel Solution, Stock. 1 mL = 1,000 µg Ni: Dissolve 0.100 g nickel powder in 5 mL conc. nitric acid, heating to dissolve. Cool and dilute to 100 mL with ASTM type I water.

8.3.17 Scandium Solution, Stock. 1 mL = 1,000 µg Sc: Dissolve 0.1534 g sc_2O_3 in 5 mL (1+1) nitric acid, heating to dissolve. Cool and dilute to 100 mL ASTM type I water.

8.3.18 Selenium Solution, Stock. 1 mL = 1,000 µg Se: Dissolve 0.1405 g SeO_2 in 20 mL ASTM type I water. Dilute to 100 mL with ASTM type I water.

8.3.19 Silver Solution, Stock. 1 mL = 100 µg Ag: Dissolve 0.100 g silver metal in 5 mL (1+1) nitric acid, heating to dissolve. Cool and dilute to 100 mL with ASTM type I water. Store in dark container.

8.3.20 Terbium Solution, Stock. 1 mL = 1,000 µg Tb: Dissolve 0.1176 g Tb_4O_7 in 5 mL conc. nitric acid, heating to dissolve. Cool and dilute to 100 mL with ASTM type I water.

8.3.21 Thallium Solution, Stock. 1 mL = 1,000 µg T1: Dissolve 0.1303 g $TlNO_3$ in a solution mixture of 10 mL ASTM type I water and 1 mL conc. nitric acid. Dilute to 100 mL with ASTM type I water.

8.3.22 Thorium Solution, Stock. 1 mL = 1,000 µg Th: Dissolve 0.2380 g $Th(NO_3)_4$@$4H_2O$ (DO NOT DRY) in 20 mL ASTM type I water. Dilute to 100 mL with ASTM type I water.

8.3.23 Uranium Solution, Stock. 1 mL = 1,000 µg U: Dissolve 0.2110 g $UO_2(NO_3)_2$@$6H_2O$ (DO NOT DRY) in 20 mL ASTM type I water and dilute to 100 mL with ASTM type I water.

8.3.24 Vanadium Solution, Stock. 1 mL = 1,000 µg V: Pickle vanadium metal in (1+9) nitric acid to an exact weight of 0.100 g. Dissolve in 5 mL (1+1) nitric acid, heating to dissolve. Cool and dilute to 100 mL with ASTM type I water.

8.3.25 Yttrium Solution, Stock. 1 mL = 1,000 µg Y: Dissolve 0.1270 g Y_2O_3 in 5 mL (1+1) nitric acid, heating to dissolve. Cool and dilute to 100 mL with ASTM type I water.

8.3.26 Zinc Solution, Stock. 1 mL = 1,000 µg Zn: Pickle zinc metal in (1+9) nitric acid to an exact weight of 0.100 g. Dissolve in 5 mL (1+1) nitric acid, heating to effect solution. Cool and dilute to 100 mL with ASTM type I water.

8.4 Multi-Element Stock Standard Solutions

Care must be taken in the preparation of multi-element stock standards so that the elements are compatible and stable. Originating element stocks should be checked for impurities that might influence the accuracy of the standard. Freshly prepared standards should be transferred to acid-cleaned, not previously used FEP fluorocarbon bottles for storage and monitored periodically for stability. Suggested element combinations are:

Standard Solution A		Standard Solution B
Aluminum	Manganese	Barium
Antimony	Molybdenum	Silver
Arsenic	Nickel	
Beryllium	Selenium	
Cadmium	Thallium	
Chromium	Thorium	
Cobalt	Uranium	
Copper	Vanadium	
Lead	Zinc	

Multi-element stock standard solutions A and B (1 mL = 10 µg) may be prepared by diluting 1 mL of each single element stock in the combination list to 100 mL with ASTM type I water containing 1% (v/v) nitric acid.

Fresh multi-element calibration standards should be prepared every 2 weeks, or as needed. Dilute each of the stock multi-element standard solutions A and B to levels appropriate to the operating range of the instrument using ASTM type I water containing 1% (v/v) nitric acid. The element concentrations in the standards should be sufficiently high to produce good measurement precision and to accurately define the slope of the response curve. Concentrations of 200 µg/L are suggested. If the direct addition procedure and internal standards (see Section 8.5) to the calibration standards are being used, store in Teflon® bottles. Calibration standards should be verified initially using a quality control sample (see Section 8.8).

8.5 Internal Standards Stock Solution, 1 mL = 100 µg

Dilute 10 mL of scandium, yttrium, indium, terbium and bismuth stock standards (Section 8.3) to 100 mL with ASTM type I water and store in Teflon® bottle. Use this solution concentrate to add to blanks, calibration standards, and samples or dilute by an appropriate amount using 1% (v/v) nitric acid, if the internal standards are being added by peristaltic pump.

8.6 Blanks

Three types of blanks are required for this method. A calibration blank establishes the analytical calibration curve. The laboratory reagent blank assesses possible contamination from the sample preparation procedure and spectral background. The rinse blank flushes the instrument between samples to reduce memory interferences.

8.6.1 Calibration blank consists of 1% (v/v) nitric acid in ASTM type I water. If the direct addition procedure is being used, add internal standards.

8.6.2 Laboratory reagent blank (LRB) must contain all the reagents in the same volumes as used in processing the samples. The LRB must be carried through the entire sample digestion and preparation scheme. If the direct addition procedure is being used, add internal standards to the solution after preparation is complete.

8.6.3 Rinse blank consists of 2% (v/v) nitric acid in ASTM type I water.

8.7 Tuning Solution

This solution is used for instrument tuning and mass calibration prior to analysis. The solution is prepared by mixing beryllium, magnesium, cobalt, indium and lead stock solutions (see Section 8.3) in 1% (v/v) nitric acid to produce a concentration of 100 µg/L of each element. Internal standards are not added to this solution.

8.8 Quality Control Sample (QCS)

The QCS should be obtained from a source outside the laboratory. Dilute an appropriate aliquot of analytes (concentrations not to exceed 1,000 µg/L) in 1% (v/v) nitric acid. If the direct addition procedure is being used, add internal standards after dilution, mix, and store in a Teflon® bottle.

8.9 Laboratory Fortified Blank (LFB)

To an aliquot of LFB, add aliquots from multi-element stock standards A and B (see Section 8.4) to produce the LFB with a final concentration of 100 µg/L for each analyte. The LFB must be carried through the entire sample digestion and preparation scheme. If the direct addition procedure is being used, add internal standards to this solution after preparation.

9. Sample Receipt in the Laboratory

9.1 The sample should be received from the extraction laboratory as documented in Inorganic Compendium Method IO-3.1.

9.2 No additional preservation is needed at this time. Sample is ready for ICP/MS analysis. However, the samples contain hydrochloric acid, and the calibration standards do not. Correction for interferences for chloride must be made (see Section 13.4).

10. Calibration and Standardization

10.1 Calibration

[Note: Demonstration and documentation of acceptable initial calibration is required before samples are analyzed and periodically throughout sample analysis as dictated by results of continuing calibration checks. After initial calibration is successful, a calibration check is required at the beginning and end of each period during which analyses are performed and at requisite intervals.]

10.1.1 Allow a period of not less than 30 min for instrument warm up. During this process, conduct mass calibration and resolution checks using the tuning solution. Resolution at low mass is indicated by magnesium isotopes 24, 25, and 26. Resolution at high mass is indicated by lead isotopes 206, 207, and 208. For good performance, adjust spectrometer resolution to produce a peak width of approximately 0.75 amu at 5% peak height. Adjust mass calibration if it has shifted by more than 0.1 amu from unit mass.

10.1.2 Instrument stability must be demonstrated by running the tuning solution (see Section 8.7) a minimum of five times with resulting relative standard deviations of absolute signals for all analytes of less than 5%.

10.1.3 Prior to initial calibration, set up proper instrument software routines for quantitative analysis. The instrument must be calibrated for the analytes to be determined using the calibration blank (see Section 8.6.1) and calibration standards A and B (see Section 8.4) prepared at one or more concentration levels. A minimum of three replicate integrations are required for data acquisition. Use the average of the integrations for instrument calibration and data reporting.

10.1.4 The rinse blank should be used to flush the system between solution changes for blanks, standards, and samples. Allow sufficient rinse time to remove traces of the previous sample or a minimum of 1 min. Solutions should be aspirated for 30 s prior to the acquisition of data to establish equilibrium.

10.2 Internal Standardization

10.2.1 Internal standardization must be used in all analyses to correct for instrument drift and physical interferences. A list of acceptable internal standards is provided in Table 4.

10.2.2 For full mass range scans, a minimum of three internal standards must be used. Procedures described in this method for general application detail five internal standards: scandium, yttrium, indium, terbium, and bismuth. These standards were used to generate the precision and recovery data attached to this method. Internal standards must be present in all samples, standards, and blanks at identical levels.

10.2.3 This may be achieved by directly adding an aliquot of the internal standards to the CAL standard, blank, or sample solution or alternatively by mixing with the solution prior to nebulization using a second channel of the peristaltic pump and a mixing coil. The concentration of the internal standard should be sufficiently high to obtain a precise measurement of the isotope used for data correction and to minimize the possibility of correction errors if the internal standard is naturally present in the sample.

10.2.4 A concentration of 200 µg/L of each internal standard is recommended. Internal standards should be added to blanks, samples, and standards in a like manner so that dilution effects from the addition may be disregarded.

10.3 Instrument Performance

[Note: Check the performance of the instrument and verify the calibration using data gathered from analyses of calibration blanks, calibration standards and the QCS.]

10.3.1 After establishing calibration, it must be initially verified for all analytes by analyzing the QCS (see Section 8.8). If measurements exceed ± 10% of the established QCS value, terminate the analysis, identify and correct the problem, recalibrate the instrument, and reverify the calibration reverified before continuing analyses.

10.3.2 To verify that the instrument is properly calibrated on a continuing basis, run the calibration blank and calibration standards as surrogate samples after every 10 analyses. The results of the analyses of the standards will indicate whether the calibration remains valid. If the indicated concentration of any analyte deviates from the true concentration by more than 10%, reanalyze the standard. If the analyte is again outside the 10% limit, the instrument must be recalibrated and the previous ten samples reanalyzed. The instrument responses from the calibration check may be used for recalibration purposes. If the sample matrix is responsible for the calibration drift, the previous 10 samples should be reanalyzed in groups of five between calibration checks to prevent a similar drift situation from occurring.

11. Quality Control (QC)

11.1 Laboratory

Each laboratory using this method is required to operate a formal QC program. The minimum requirements of this program are an initial demonstration of laboratory capability and the analysis of laboratory reagent blanks, fortified blanks, and samples as a continuing check on performance. The laboratory is required to maintain performance records that define the quality of the data thus generated.

11.2 Initial Demonstration of Performance

11.2.1 The initial demonstration of performance is used to characterize instrument performance (method detection limits and linear calibration ranges) for analyses conducted by this method.

11.2.2 Method detection limits (MDL) should be established for all analytes, using reagent water (blank) fortified at a concentration of two to five times the estimated detection limit. To determine MDL values, take seven replicate aliquots of the fortified reagent water and process through the entire analytical method. Perform all calculations defined in the method and report the concentration values in the appropriate units. Calculate the MDL as follows:

$$MDL = (t) \times (S)$$

where:

t = Student's t value for a 99% confidence level and a standard deviation estimate with n-1 degrees of freedom [t = 3.14 for seven replicates].

S = standard deviation of the replicate analyses.

MDLs should be determined every 6 months or whenever a significant change in background or instrument response is expected (e.g., detector change).

11.2.3 Linear calibration ranges are primarily detector limited. The upper limit of the linear calibration range should be established for each analyte by determining the signal responses from a minimum of three different concentration standards, one of which is close to the upper limit of the linear range. Avoid damage to the detector during this process. The linear calibration range, which may be used for the analysis of samples, should be judged by the analyst from the resulting data. Linear calibration ranges should be determined every 6 months or whenever a significant change in instrument response is expected (e.g., detector change).

11.3 General Quality Control

[Note: The required general quality control requirements for ICP analysis are discussed below and summarized in Table 8.]

11.3.1 Initial Calibration. At least two calibration standards and a calibration blank are analyzed at the beginning of an analysis run. The standards used to calibration are diluted from certified stock standards and are used within the expiration dates. The calibration standards and blanks are prepared in the same matrix as the samples.

11.3.2 Initial Calibration Verification (ICV). The QCS is analyzed immediately following initial calibration to verify the initial calibration. The QCS is prepared at the midpoints of the calibration curves. It is prepared from certified stocks having a different manufacturer than the calibration standards. The measured concentration should be within 90% to 110% of the actual concentration.

11.3.3 Initial Calibration Blank (ICB). The ICB is analyzed immediately following ICV and prior to the high standard verification. The acceptance criteria for the ICB is the same as for continuing calibration blank (CCB) verification.

11.3.4 High Standard Verification (HSV). Immediately after the analysis of the ICB, and prior to the analysis of samples, the HSVs are reanalyzed. The measured concentration should be within 95% to 105% of actual concentration.

11.3.5 Interference Check Standards (ICS). The ICSs are analyzed at the beginning and end of the run and for every 8 hours of continuous operation. The results for the analytes should be within 80% and 120% of the actual concentration. Samples containing levels of interferences above the levels in the ICS should be considered for dilution.

11.3.6 Continuing Calibration Verification (CCV). CCV standards are prepared from the calibration standard stocks at the midpoint of the calibration curve. The CCV standards are analyzed at the beginning of the run prior to samples, after every 10 samples, and at the end of the run prior to the last continuing calibration blank (CCB) analysis. The measured concentration should be within 90% and 110% of the actual concentration.

11.3.7 Continuing Calibration Blanks (CCBs). The CCBs are analyzed following each CCV. The results of the CCBs are evaluated as follows:

- The CCBs are compared to the method detection limits.
- The absolute value of the instrument response must be less than the method detection limits.
- If not, then sample results for analyses < 5 times the amount of the blank must be flagged or analysis must be repeated.

11.3.8 Method Blank (MB). A MB sample is prepared and analyzed with each sample batch. This analysis is used to determine if concentrations reflect background levels from sample digestion. If the instrument measured response is greater than the method detection limits, then the sample results for the affected analyte(s) must be flagged. Samples may be considered candidates for redigestion and reanalysis for that analyte.

11.3.9 Laboratory Control Spike (LCS). An LCS is the same as a laboratory fortified blank. An LCS is prepared and analyzed with each sample batch (or 1 per 20 samples). The results for the analytes should be within 80% to 120% of actual concentration. If the results are not within this criterion, then the results must be qualified.

11.3.10 Matrix Spike (MS). A MS sample is prepared and analyzed with each sample batch (or 1 per 20 samples). These samples are used to provide information about the effect of the sample matrix on the digestion and measurement methodology. The spike is added before the digestion, (i.e., prior to the addition of other reagents). The percent recovery for the analyte as part of the MS should be between 75% and 125% for all analytes.

11.3.11 Duplicate and/or Spike Duplicate. Duplicate samples and/or matrix spike duplicates are prepared and analyzed with each sample batch. These samples are used to estimate method precision, expressed as relative percent difference (RPD). The RPD between the duplicate and/or matrix spike duplicate final concentrations should be <20%.

11.3.12 Serial Dilution. The ICP serial dilution analysis must be performed on one sample per batch. After a fivefold serial dilution, the analyte concentration must be within 90% and 110% of the undiluted sample results.

11.3.13 Sample Dilution. Dilute and reanalyze samples that are more concentrated than the linear calibration limit.

11.4 Assessing Analyte Recovery - Laboratory Fortified Sample Matrix

11.4.1 The laboratory must add a known amount of analyte to a minimum of 5% of the routine samples or one sample per sample set, whichever is greater.

11.4.2 Calculate the percent recovery for each analyte, corrected for background concentrations measured in the unfortified sample and compare these values to the control limits established in Section 11.3.3 for the analyses of LFBs. Recovery calculations are not required if the concentration of the analyte added is less than 10% of the sample background concentration. Percent recovery may be calculated in units appropriate to the matrix using the following equation:

$$R = (C_s - C)/s \times 100$$

where:

R = percent recovery, %.

C_s = fortified sample concentration, ng/L.

C = sample background concentration, ng/L.

s = concentration equivalent of fortifier added to sample, ng/L.

11.4.3 If recovery of any analyte falls outside the designated range and laboratory performance for that analyte is shown to be in control (see Section 11.3), the recovery problem encountered with the fortified sample is judged to be matrix-related, not system-related. The analyte in the unfortified sample must be labeled "suspect/matrix" to inform the user that the results are suspect due to matrix effects.

11.5 Internal Standards Responses

The analyst is expected to monitor the responses from the internal standards throughout the sample set being analyzed. Ratios of the internal standards responses against each other should also be monitored routinely. This information may be used to detect potential problems caused by mass dependent drift, errors incurred in adding the internal standards, or increases in the concentrations of individual internal standards caused by background contributions from the sample. The absolute response of any one internal standard should not deviate more than 60-125% of the original response in the calibration blank. If deviations greater than this are observed, use the following test procedure:

11.5.1 Flush the instrument with the rinse blank and monitor the responses in the calibration blank. If the responses of the internal standards are now within the limit, take a fresh aliquot of the sample, dilute by a further factor of two, add the internal standards and reanalyze.

11.5.2 If the test is not satisfied or if it is a blank or calibration standard that is out of limits, terminate the analysis and determine the cause of the drift. Possible causes may be a partially blocked sampling cone or a change in the tuning condition of the instrument.

12. Procedure

12.1 Samples should be received from the extraction laboratory in a 10-mL centrifuge tube. The samples contain a mixture of nitric and hydrochloric acids. This is not the most appropriate solution for ICP/MS determination. Therefore, corrections described in Section 13.4 must be applied.

12.2 For every new or unusual matrix, a semi-quantitative analysis should be carried out to screen for high element concentrations. Information gained from this procedure may be used to prevent potential damage to the detector during sample analysis and to identify elements that may be higher than the linear range. Matrix screening may be carried out by using intelligent software, if available, or by diluting the sample by a factor of 500 and analyzing in a semi-quantitative mode. The sample should also be screened for background levels of all elements chosen for use as internal standards to prevent bias.

12.3 Initiate instrument operating configuration. Tune and calibrate the instrument for the analytes of interest (see Section 10).

12.4 Establish instrument software run procedures for quantitative analysis. For all sample analyses, a minimum of three replicate integrations are required for data acquisition. Discard any integrations considered to be statistical outliers and use the average of the integrations for data reporting.

12.5 Monitor all masses that might affect data quality during the analytical run. At a minimum, those masses prescribed in Table 5 must be monitored in the same scan as is used for the collection of the data. This information should be used to correct the data for identified interferences.

12.6 Use the rinse blank to flush the system between samples. Allow sufficient time to remove traces of the previous sample or a minimum of 1 min. Aspirate the samples for 30 s prior to the collection of data.

12.7 Samples having concentrations higher than the established linear dynamic range should be diluted into range and reanalyzed. First, analyze the sample for trace elements, protecting the detector from the high concentration elements, if necessary, by selecting appropriate scanning windows. Then dilute the sample to determine the remaining elements. Alternatively, the dynamic range may be adjusted by selecting an alternative isotope of lower natural abundance, provided quality control data for that isotope have been established. Do not adjust the dynamic range by altering instrument conditions to an uncharacterized state.

13. Calculations

13.1 Elemental equations recommended for sample data calculations are listed in Table 6. Sample data should be reported in units of ng/m^3.

13.1.1 Calculate the air volume sampled, corrected to EPA-reference conditions:

$$V_{std} = V_s \left(\frac{T_{std}}{T_m}\right)\left(\frac{P_{bar}}{P_{std}}\right)$$

where:

V_{std} = volume of ambient air sampled at EPA-reference conditions, m^3
V_s = volume of ambient air pulled through the sampler, m^3.
T_{std} = absolute EPA-reference temperature, 298EK.
T_m = average ambient temperature, EK.
P_{bar} = barometric pressure during sampling measurement condition, mm Hg.
P_{std} = EPA-reference barometric pressure, 760 mm Hg.

13.1.2 Metal concentration in the air sample can then be calculated as follows:

$$C = [(\mu g\ metal/mL) \times (Digestion\ volume\ (i.e.,\ 20\ mL)\ mL/strip)(9) - F_m]/V_{std}$$

where:

C = concentration, µg metal/m^3.
µg metal/mL = metal concentration determined from Section 12.
final extract volume (mL)/strip = total sample extraction volume from extraction procedure (i.e., 20 mL).

$$9 = \frac{\text{Useable filter area, [20 cm x 23 cm (8" x 9")]}}{\text{Exposed area of one strip, [2.5 cm x 20 cm (1" x 8")].}}$$

F_m = average concentration of blank filters, µg.
V_{std} = standard air volume pulled through filter, std. m^3 (25EC and 760 mm Hg).

Do not report element concentrations below the determined MDL.

13.2 For data values less than 10, use two significant figures to report element concentrations. For data values greater than or equal to 10, three significant figures.

13.3 Reported values should be calibration blank subtracted (see Inorganic Compendium Method IO-3.1).

13.4 Correct data values for instrument drift or sample matrix induced interferences by applying internal standardization. Corrections for characterized spectral interferences should be applied to the data. Chloride interference corrections should be made on all samples, because of the addition of hydrochloric acid during filter extraction, as the chloride ion is a common constituent of environmental samples.

13.5 If an element has more than 1 monitored isotope, examine the concentration calculated for each isotope, or the isotope ratios, to detect a possible spectral interference. Consider both primary and secondary isotopes when evaluating the element concentration. In some cases, secondary isotopes may be less sensitive or more prone to interferences that the primary recommended isotopes; therefore, differences between the results do not necessarily indicate a problem with data calculated for the primary isotopes.

13.6 The QC data obtained during the analyses provide an indication of the quality of the sample data and should be provided with the sample results.

14. Precision and Accuracy

14.1 Instrument operating conditions for single laboratory testing of the method are summarized in Table 3.

14.2 Data obtained from single laboratory testing of the method for three solid samples consisting of SRM 1645 River Sediment, EPA Hazardous Soil, and EPA Electroplating Sludge are summarized in Table 7. For each method element, the sample background concentration, mean percent recovery, standard deviation of the percent recovery, and relative percent difference between the duplicate fortified samples were determined. Data for matrices other than air are presented because only very limited data on air samples was available when this method was written.

14.3 Activities required to be performed using ICP/MS to validate method precision and accuracy are summarized in Table 8.

15. References

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3. "Reference Method for the Determination of Lead in Suspended Particulate Matter Collected from Ambient Air.," *Federal Register* 43 (194): 46262-3, 1978.

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TABLE 1. ESTIMATED METHOD DETECTION[a] LIMITS

Element	Recommended analytical mass	Estimated Method Detection Limits (MDLs)[b]	
		µg/L	ng/m^3
Aluminum	27	0.05	0.01
Antimony	121	0.08	0.01
Arsenic	75	0.9	0.30
Barium	137	0.5	0.10
Beryllium	9	0.1	0.02
Cadmium	111	0.1	0.02
Chromium	52	0.07	0.01
Cobalt	59	0.03	0.01
Copper	63	0.03	0.01
Lead	206,207,208	0.08	0.01
Manganese	55	0.1	0.02
Molybdenum	98	0.1	0.02
Nickel	60	0.2	0.02
Selenium	82	5	1.10
Silver	107	0.05	0.01
Thallium	205	0.09	0.01
Thorium	232	0.03	0.01
Uranium	238	0.02	0.01
Vanadium	51	0.02	0.01
Zinc	66	0.2	0.04

[a]Instrument detection limits (3F) estimated from seven replicate integrations of the blank (1% v/v nitric acid) following calibration of the instrument with three replicate integrations of a multi-element standard.

[b]Based upon sampling rate of 1.13 m^3/min for 24-h for a total sample volume of 1,627.2 m^3, factor of 9 for partial filter analysis; digestion of 0.040 L/filter.

TABLE 2. COMMON POLYATOMIC ION INTERFERENCES IN ICP-MS

BACKGROUND MOLECULAR IONS		
Molecular Ion	**Mass**	**Element Interference**[1]
NH^+	15	
OH^+	17	
OH_2^+	18	
C_2^+	24	
CN^+	26	
CO^+	28	
N_2^+	28	
N_2H^+	29	
NO^+	30	
NOH^+	31	
O_2^+	32	
OH^+	33	
$^{36}ArH^+$	37	
$^{38}ArH^+$	39	
$^{40}ArH^+$	41	
CO_2^+	44	
CO_2H^+	45	Sc
ArC^+, ArO^+	52	Cr
ArN^+	54	Cr
$ArNH^+$	55	Mn
ArO^+	56	
$ArOH^+$	57	
$^{40}Ar^{36}Ar^+$	76	Se
$^{40}Ar^{38}Ar^+$	78	Se
$^{40}Ar_2$	80	Se

TABLE 2. (continued)

MATRIX MOLECULAR IONS		
CHLORIDE **Polyatomic Ion**	**Mass**	**Element Interference**
$^{35}ClO^+$	51	V
$^{35}ClOH^+$	52	Cr
$^{37}ClO^+$	53	Cr
$^{37}ClOH^+$	54	Cr
$Ar^{35}Cl^+$	75	As
$Ar^{37}Cl^+$	77	Se
SULFATE **Polyatomic Ion**	**Mass**	**Element Interference**
$^{32}SO^+$	48	Ti
$^{32}SOH^+$	49	Ti
$^{34}SO^+$	50	V, Cr
$^{34}SOH^+$	51	V
SO_2, S_2^+	64	Zn
$Ar^{32}S^+$	72	
$Ar^{34}S^+$	74	
PHOSPHATE **Polyatomic Ion**	**Mass**	**Element Interference**
PO^+	47	
POH^+	48	
PO_2^+	63	Cu
ArP^2	71	
GROUP I, II METALS **Polyatomic Ion**	**Mass**	**Element Interference**
$ArNa^+$	63	Cu
ArK^+	79	
$ArCa^+$	80	
MATRIX OXIDES[2] **Polyatomic Ion**	**Masses**	**Element Interference**
TiO	62-66	Ni, Cu, Zn
ZrO	106-112	Ag, Cd
MoO	108-116	Cd

[1]Method elements or internal standards affected by the polyatomic ions.

[2]Oxide interferences will normally be very small and will only impact the method elements when present at relatively high concentrations. Some examples of matrix oxides are listed of which the analyst should be aware. It is recommended that Ti and Zr isotopes are monitored in solid waste samples, which are likely to contain high levels of these elements. Mo is monitored as a method analyte.

TABLE 3. EXAMPLE INSTRUMENT OPERATING CONDITIONS

Instrument	VG PlasmaQuad Type I
Plasma forward power	1.35 kW
Coolant flow rate	13.5 L/min
Auxiliary flow rate	0.6 L/min
Nebulizer flow rate	0.78 L/min
Solution uptake rate	0.6 mL/min
Spray chamber temperature	15EC
Data Acquisition	
Detector mode	Pulse counting
Replicate integrations	3
Mass range	8 - 240 amu
Dwell time	320 µs
Number of MCA channels	2048
Number of scan sweeps	85
Total acquisition time	3 min per sample

TABLE 4. INTERNAL STANDARDS AND LIMITATIONS OF USE

Internal Standard	Mass	Possible Limitation
Lithium	6	a
Scandium	45	polyatomic ion interference
Yttrium	89	a,b
Rhodium	103	
Indium	115	isobaric interference by Sn
Terbium	159	
Holmium	165	
Lutetium	175	
Bismuth	209	a

[a]May be present in environmental samples.
[b]In some instruments yttrium may form measurable amounts of YO+ (105 amu) and YOH+ (106 amu). If this is the case, care should be taken in the use of the cadmium elemental correction equation.

TABLE 5. RECOMMENDED ANALYTICAL ISOTOPES AND ADDITIONAL MASSES WHICH MUST BE MONITORED

Isotope	Element of Interest
27	Aluminum
121,123	Antimony
75	Arsenic
135,137	Barium
9	Beryllium
106,108,111,114	Cadmium
52,53	Chromium
59	Cobalt
63,65	Copper
206,207,208	Lead
55	Manganese
95,97,98	Molybdenum
60,62	Nickel
77,82	Selenium
107,109	silver
203,205	Thallium
232	Thorium
238	Uranium
51	Vanadium
66,67,68	Zinc
83	Krypton
99	Ruthenium
105	Palladium
118	Tin

NOTE: Isotopes recommended for analytical determination are underlined.

TABLE 6. RECOMMENDED ELEMENTAL EQUATIONS FOR DATA CALCULATIONS

Element	Element Equation	Note
Al	$(1.000)(^{27}C)$	
Sb	$(1.000)(^{121}C)$	
As	$(1.000)(^{75}C)-(3.127)[(^{77}C)-(0.815)(^{82}C)]$	(1)
Ba	$(1.000)(^{137}C)$	
Be	$(1.000)(^{9}C)$	
Cd	$(1.000)(^{111}C)-(1.073)[(^{108}C)-(0.712)(^{106}C)]$	(2)
Cr	$(1.000)(^{52}C)$	(3)
Co	$(1.000)(^{59}C)$	
Cu	$(1.000)(^{63}C)$	
Pb	$(1.000)(^{206}C)+(1.000)(^{207}C)+(1.000)(^{208}C)$	(4)
Mn	$(1.000)(^{55}C)$	
Mo	$(1.000)(^{98}C)-(0.146)(^{99}C)$	(5)
Ni	$(1.000)(^{60}C)$	
Se	$(1.000)(^{82}C)$	(6)
Ag	$(1.000)(^{107}C)$	
Tl	$(1.000)(^{205}C)$	
Th	$(1.000)(^{232}C)$	
U	$(1.000)(^{238}C)$	
V	$(1.000)(^{51}C)-(3.127)[(^{53}C)-(0.113)(^{52}C)]$	(7)
Zn	$(1.000)(^{66}C)$	
Bi	$(1.000)(^{209}C)$	
In	$(1.000)(^{115}C)-(0.016)(^{118}C)$	(8)
Sc	$(1.000)(^{45}C)$	
Tb	$(1.000)(^{159}C)$	
Y	$(1.000)(^{89}C)$	

C - calibration blank subtracted counts at specified mass.
(1) - correction for chloride interference with adjustment for Se77. ArCl 75/77 ratio may be determined from the reagent blank.
(2) - correction for MoO interference. An additional isobaric elemental correction should be made if palladium is present.
(3) - in 0.4% v/v HCl, the background from ClOH will normally be small. However, the contribution may be estimated from the reagent blank.
(4) - allowance for isotopic variability of lead isotopes.
(5) - isobaric elemental correction for ruthenium.
(6) - some argon supplies contain krypton as an impurity. Selenium is corrected for Kr82 by background subtraction.
(7) - correction for chloride interference with adjustment for Cr53 ratio may be determined from the reagent blank.
(8) - isobaric elemental correction for tin.

TABLE 7. PRECISION AND RECOVERY DATA

EPA HAZARDOUS SOIL #884

Element	Sample Concn. (µg/L)	Low Spike (µg/L)	Average Recovery R (%)	S(R)	RPD	High Spike (µg/L)	Average Recovery R (%)	S(R)	RPD
Al	5170	20	*	*	-	100	*	*	-
Sb	5.4	20	69.8	2.5	4.7	100	70.4	1.8	6.5
As	8.8	20	104.7	5.4	9.1	100	102.2	2.2	5.4
Ba	113	20	54.9	63.6	18.6	100	91.0	9.8	0.5
Be	0.6	20	100.1	0.6	1.5	100	102.9	0.4	1.0
Cd	1.8	20	97.3	1.0	1.4	100	101.7	0.4	1.0
Cr	83.5	20	86.7	16.1	8.3	100	105.5	1.3	0.0
Co	7.1	20	98.8	1.2	1.9	100	102.9	0.7	1.8
Cu	115	20	86.3	13.8	3.4	100	102.5	4.2	4.6
Pb	152	20	85.0	45.0	13.9	100	151.7	25.7	23.7
Mn	370	20	*	*	12.7	100	85.2	10.4	2.2
Mo	4.8	20	95.4	1.5	2.9	100	95.2	0.7	2.0
Ni	19.2	20	101.7	3.8	1.0	100	102.3	0.8	0.8
Se	<3.2	20	79.5	7.4	26.4	100	100.7	9.4	26.5
Ag	1.1	20	96.1	0.6	0.5	100	94.8	0.8	2.3
Tl	0.24	20	94.3	1.1	3.1	100	97.9	1.0	2.9
Th	1.0	20	69.8	0.6	1.3	100	76.0	2.2	7.9
U	1.1	20	100.1	0.2	0.0	100	102.9	0.0	0.0
V	17.8	20	109.2	4.2	2.3	100	106.7	1.3	2.4
Zn	128	20	87.0	27.7	5.5	100	113.4	12.9	14.1

S(R) Standard deviation of percent recovery.
RPD Relative percent difference between duplicate spike determinations.
< Sample concentration below established method detection limit.
* Spike concentration <10% of sample background concentration.
- Not determined.
+ Equivalent.

TABLE 7. PRECISION AND RECOVERY DATA (continued)

NBS 1645 RIVER SEDIMENT

Element	Sample Concn. (µg/L)	Low Spike (µg/L)	Average Recovery R (%)	S(R)	RPD	High Spike (µg/L)	Average Recovery R (%)	S(R)	RPD
Al	5060	20	*	*	-	100	*	*	-
Sb	21.8	20	73.9	6.5	9.3	100	81.2	1.5	3.9
As	67.2	20	104.3	13.0	7.6	100	107.3	2.1	2.9
Ba	54.4	20	105.6	4.9	2.8	100	98.6	2.2	3.9
Be	0.59	20	88.8	0.2	0.5	100	87.9	0.1	0.2
Cd	8.3	20	92.9	0.4	0.0	100	95.7	1.4	3.9
Cr	29100	20	*	*	-	100	*	*	-
Co	7.9	20	97.6	1.3	2.6	100	103.1	0.0	0.0
Cu	112	20	121.0	9.1	1.5	100	105.2	2.2	1.8
Pb	742	20	*	*	-	100	-	-	-
Mn	717	20	*	*	-	100	-	-	-
Mo	17.1	20	89.8	8.1	12.0	100	98.4	0.7	0.9
Ni	41.8	20	103.7	6.5	4.8	100	102.2	0.8	0.0
Se	<3.2	20	108.3	14.3	37.4	100	93.9	5.0	15.1
Ag	1.8	20	94.8	1.6	4.3	100	96.2	0.7	1.9
Tl	1.2	20	91.2	1.3	3.6	100	94.4	0.4	1.3
Th	0.90	20	91.3	0.9	2.6	100	92.3	0.9	2.8
U	0.79	20	95.6	1.8	5.0	100	98.5	1.2	3.5
V	21.8	20	91.8	4.6	5.7	100	100.7	0.6	0.8
Zn	1780	20	*	*	-	100	*	*	-

S(R) Standard deviation of percent recovery.
RPD Relative percent difference between duplicate spike determinations.
< Sample concentration below established method detection limit.
* Spike concentration <10% of sample background concentration.
- Not determined.
+ Equivalent.

TABLE 7. PRECISION AND RECOVERY DATA (continued)

EPA ELECTROPLATING SLUDGE #286

Element	Sample Concn. (µg/L)	Low Spike (µg/L)	Average Recovery R (%)	S(R)	RPD	High Spike (µg/L)	Average Recovery R (%)	S(R)	RPD
Al	5110	20	*	*	-	100	*	*	-
Sb	8.4	20	55.4	1.5	4.1	100	61.0	0.2	0.9
As	41.8	20	91.0	2.3	1.7	100	94.2	0.8	1.5
Ba	27.3	20	1.8	7.1	8.3	100	0	1.5	10.0
Be	0.25	20	92.0	0.9	2.7	100	93.4	0.3	0.9
Cd	112	20	85.0	5.2	1.6	100	88.5	0.8	0.5
Cr	7980	20	*	*	-	100	*	*	-
Co	4.1	20	89.2	1.8	4.6	100	88.7	1.5	4.6
Cu	740	20	*	*	6.0	100	61.7	20.4	5.4
Pb	1480	20	*	*	-	100	*	*	-
Mn	295	20	*	*	-	100	-	-	-
Mo	13.3	20	82.9	1.2	1.3	100	89.2	0.4	1.0
Ni	450	20	*	*	6.8	100	83.0	10.0	4.5
Se	3.5	20	89.7	3.7	4.2	100	91.0	6.0	18.0
Ag	5.9	20	89.8	2.1	4.6	100	85.1	0.4	1.1
Tl	1.9	20	96.9	0.9	2.4	100	98.9	0.9	2.4
Th	3.6	20	91.5	1.3	3.2	100	97.4	0.7	2.0
U	2.4	20	107.7	2.0	4.6	100	109.6	0.7	1.8
V	21.1	20	105.6	1.8	2.1	100	97.4	1.1	2.5
Zn	13300	20	*	*	-	100	*	*	-

S(R) Standard deviation of percent recovery.
RPD Relative percent difference between duplicate spike determinations.
< Sample concentration below established method detection limit.
* Spike concentration <10% of sample background concentration.
- Not determined.
+ Equivalent.

TABLE 8. EXAMPLE OF QUALITY CONTROL REQUIREMENTS FOR ICP/MS ANALYSIS

QC procedure	Typical frequency	Criteria
Initial calibration (IC)	At the beginning of the analysis	None
Initial calibration verification (ICV) using the QCS	Immediately after initial calibration	90%-110% of the actual concentration
Initial calibration blank (ICB)	Immediately after initial calibration verification	May be less than project detection limits (MDLs)
High standard verification (HSV)	Following the initial calibration blank analysis	95%-105% of the actual concentration
Interference check standard (ICS)	Following the high standard verificatino, every 8 hours, and at the end of a run	80%-120% of the actual concentration
Continuing calibration verification (CCV)	Analyzed before the first sample, after every 10 samples, and at the end of the run	90%-110% of the actual concentration
Continuing clarification blanks (CCBs)	Analyzed following each continuing calibration verification	Must be less than project detection limits (MDLs)
Reagent blank (RB) or Method blank (MB)	1 per 40 samples, a minimum of 1 per batch	Must be less than project detection limits (MDLs)
Laboratory control spike (LCS) or Laboratory fortified blanks (LFB)	1 per 20 samples, a minimum of 1 per batch	80%-120% recovery, with the exception of Ag and Sb
Duplicate and/or spike duplicate	1 per sample batch	RPD $\leq$20%
Matrix spike (MS)	1 per 20 samples per sample batch	Percent recovery of 75%-125%
Serial dilution	1 per sample batch	90%-110% of undiluted sample
Sample dilution	Dilute sample beneath the upper calibration limit but no lower than at least 5X the MDL	As needed

INTERNATIONAL STANDARD

ISO 10312

First edition
1995-05-01

Ambient air - Determination of asbestos fibres - Direct-transfer transmission electron microscopy method

Air ambiant - Determination des fibres d'amiante - Methode de microscopie electronique a transmission directe

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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies}. The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC} on all matters of electrotechnical standardization.

Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

International Standard ISO 10312 was prepared by Technical Committee ISO/TC 146, *Air quality,* Subcommittee SC 3, *Ambient atmospheres.*

Annexes A. B, C, D, E and F form an integral part of this International Standard. Annexes G, H and *J* are for information only.

Introduction

This International Standard is applicable to the determination of airborne asbestos in a wide range of ambient air situations, including the interior atmospheres of buildings, and for detailed evaluation of any atmosphere in which asbestos structures are likely to be present. Because the best available medical evidence indicates that the numerical fibre concentration and the fibre sizes are the relevant parameters for evaluation of the inhalation hazards, a fibre counting technique is the only logical approach. Most fibres in ambient atmospheres are not asbestos, and therefore there is a requirement for fibres to be identified. Many airborne asbestos fibres in ambient atmospheres have diameters below the resolution limit of the optical microscope. This International Standard is based on transmission electron microscopy, which has adequate resolution to allow detection of small fibres and is currently the only technique capable of unequivocal identification of the majority of individual fibres of asbestos. Asbestos is often found, not as single fibres, but as very complex, aggregated structures which may or may not be also aggregated with other particles. The fibres found suspended in an ambient atmosphere can often be identified unequivocally, if a sufficient measurement effort is expended. However, if each fibre were to be identified in this way, the analysis would become prohibitively expensive. Because of instrumental deficiencies or because of the nature of the particulate, some fibres cannot be positively identified as asbestos, even though the measurements all indicate that they could be asbestos. Subjective factors therefore contribute to this measurement. and consequently a very precise definition of the procedure for identification and enumeration of asbestos fibres is required. The method specified in this International Standard is designed to provide the best description possible of the nature, numerical concentration, and sizes of asbestos-containing particles found in an air sample. This International Standard is necessarily complex, because the instrumental techniques used are complex, and also because a very detailed and logical procedure must be specified to reduce the subjective aspects of the measurement. The method of data recording specified in this International Standard is designed to allow re-evaluation of the structure counting data as new medical evidence becomes available. All of the feasible specimen preparation techniques result in some modification of the airborne particulate. Even the collection of particles from a three-dimensional airborne dispersion onto a two-dimensional filter surface can be considered a modification of the particulate, and some of the particles in most samples are modified by the specimen preparation procedures. However, the procedures specified in this International Standard are designed to minimize the disturbance of the collected particulate material, and the effect of those disturbances which do occur can be evaluated.

This International Standard describes the method of analysis for a single air filter. However, one of the largest potential errors in characterizing asbestos in ambient atmospheres is associated with the variability between filter samples. For this reason, it is necessary to design a replicate sampling scheme in order to determine this International Standard's accuracy and precision.

Ambient air - Determination of asbestos fibres - Direct-transfer transmission electron microscopy method

1 Scope

1.1 Substance determined

This International Standard specifies a reference method using transmission electron microscopy for the determination of the concentration of asbestos structures in ambient atmospheres and includes measurement of the lengths, **widths** and aspect ratios of the asbestos structures. The method allows determination of the type(s) of asbestos fibres present. The method cannot discriminate between individual fibres of the asbestos and non-asbestos analogues of the same amphibole mineral.

1.2 Type of sample

The method is defined for polycarbonate capillary-pore filters or cellulose ester (either mixed esters of cellulose or cellulose nitrate) filters through which a known volume of air has been drawn. The method is suitable for determination of asbestos in both exterior and building atmospheres.

1.3 Measuring range

The range of concentration which can be determined is 50 structures/mm^2 to 7 000 structures/mm^2 on the filter. The air concentrations represented by these values are a function of the *volume* of air sampled. There is no lower limit to the dimensions of asbestos fibres which can be detected. In practice, microscopists vary in their ability to detect *very* small asbestos fibres. Therefore, a minimum length of 0,5 µm has been defined as the shortest fibre to be incorporated in the reported results.

1.4 Limit of detection

The limit of detection theoretically can be lowered indefinitely by filtration of progressively larger volumes of air and by extending the examination of the specimens in the electron microscope. In practice, the lowest achievable limit of detection for a particular area of TEM specimen examined is controlled by the total suspended particulate concentration.

For total suspended particulate concentrations of approximately 10 µg/m , corresponding to clean, rural atmospheres, and assuming filtration of 4 000 litres of air, an analytical sensitivity of 0,5 structure/l can be obtained, equivalent to a limit of detection of 1,8 structure/l, if an area of 0,195 mm^2 of the TEM specimens is examined. If higher total suspended particulate concentrations are present, the volume of air filtered must be reduced in order to maintain an acceptable particulate loading on the filter, leading to a proportionate increase in the analytical sensitivity.

Where this is the case, lower limits of detection can be achieved by increasing the area of the TEM specimens that is examined. In order to achieve lower limits of detection for fibres and bundles longer than 5 µm, and for PCM equivalent fibres, lower magnifications are specified which permit more rapid examination of larger areas of the TEM specimens when the examination is limited to these dimensions of fibre. The direct analytical method cannot be used if the general particulate loading of the sample collection filter exceeds approximately 10 µg/cm^2 of filter surface, which corresponds to approximately 10 % *cov*erage of the collection filter by particulate. If the total suspended particulate is largely organic material, the limit of detection can be lowered significantly by using an indirect preparation method.

2 Normative references

The following standards contain prov1s1ons which, through reference in this text, constitute provisions of this International Standard. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this International Standard are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below. Members of IEC and ISO maintain registers of currently valid International Standards.

ISO 4225:1994, *Air quality - General aspects - Vocabulary.*

ISO 4226:1993, *Air quality - General aspects - Units of measurement.*

ISO Standard Handbook No. 2:1993, *Quantities and units.*

ISO Standard Handbook No. 3:1989, *Statistical Methods.*

3 Definitions

For the purposes of this International Standard, the following definitions apply (see also ISO 4225).

3.1 acicular: The shape of an extremely slender crystal with cross-sectional dimensions which are small relative to its length, i.e. needle-like.

3.2 amphibole: A group of rock-forming ferromagnesium silicate minerals, closely related in crystal form and composition, with the nominal formula:

$$A_0 \text{ or } {}_1B_2C_5T_8O_{22}(OH,F,Cl)_2$$

where

A= K, Na

B = Fe^{2+}, Mn, Mg, Ca, Na

C = Al, Cr, Ti, Fe3+, Mg, Fe^{2+}

T = Si, Al, Cr, Fe^{3+}. Ti

In some varieties of amphibole, these elements can be partially substituted by Li, Pb or Zn. Amphibole is characterized by a cross-linked double chain of Si-O tetrahedra with a silicon:oxygen ratio of 4:11, by columnar or fibrous prismatic crystals and by good prismatic cleavage in two directions parallel to the crystal faces and intersecting at angles of about 56° and 124°.

3.3 amphibole asbestos: Amphibole in an asbestiform habit.

3.4 analytical sensitivity: The calculated airborne asbestos structure concentration in asbestos structures/litre, equivalent to counting of one asbestos structure in the analysis. The method in this International Standard does not specify an analytical sensitivity.

3.5 asbestiform: A specific type of mineral fibrosity in which the fibres and fibrils possess high tensile strength and flexibility.

3.6 asbestos: A term applied to a group of silicate minerals belonging to the serpentine and amphibole groups which have crystallized in the asbestiform habit, causing them to be easily separated into long, thin, strong fibres when crushed or processed. The Chemical Abstracts Service Registry Numbers of the most common asbestos varieties are: chrysotile (12001-29-5), crocidolite (12001-28-4), grunerite asbestos (amosite) (12172-73-5), anthophyllite asbestos (77536-67-5), tremolite asbestos (77536-68-6) and actinolite asbestos (77536--66-4).

3.7 asbestos structure: A term applied to any connected or overlapping grouping of asbestos fibres or bundles, with or without other particles.

3.8 aspect ratio: The ratio of length to width of a particle.

3.9 blank: A structure count made on TEM specimens prepared from an unused filter, to determine the background measurement. •

3.10 camera length: The equivalent projection length between the specimen and its electron diffraction pattern, in the absence of lens action.

3.11 chrysotile: A fibrous mineral of the serpentine group which has the nominal composition

$$Mg_3Si_2O_5(OH)_4$$

Most natural chrysotile deviates little from this nominal composition. In some varieties of chrysotile, minor substitution of silicon by Al^{3+} may occur. Minor substitution of magnesium by Af+, Fe^{2+}, Fe^{3+}, Ni^{2+}, Mn^{2+} and Co^{2+} may also be present. Chrysotile is the most prevalent type of asbestos.

3.12 cleavage: The breaking of a mineral along one of its crystallographic directions.

3.13 cleavage fragment: A fragment of a crystal that is bounded by cleavage faces.

3.14 cluster: A structure in which two or more fibres, or fibre bundles, are randomly oriented in a connected grouping.

3.15 d-spacing: The distance between identical adjacent and parallel planes of atoms in a crystal.

3.16 electron diffraction: A technique in electron microscopy by which the crystal structure of a specimen is examined.

3.17 electron scattering power: The extent to which a thin layer of substance scatters electrons from their original directions.

3.18 energy dispersive X-ray analysis: Measurement of the energies and intensities of X-rays by use of a solid state detector and multichannel analyser system.

3.19 eucentric: The condition when the area of interest of an object is placed on a tilting axis at the intersection of the electron beam with that axis and is in the plane of focus.

3.20 field blank: A filter cassette which has been taken to the sampling site, opened, and then closed. Such a filter is used to determine the background structure count for the measurement.

3.21 fibril: A single fibre of asbestos, which cannot be further separated longitudinally into smaller components without losing its fibrous properties or appearances.

3.22 fibre: An elongated particle which has parallel or stepped sides. For the purposes of this International Standard, a fibre is defined to have an aspect ratio equal to or greater than 5:1 and a minimum length of 0,5 µm.

3.23 fibre bundle: A structure composed of parallel, smaller diameter fibres attached along their lengths. A fibre bundle may exhibit diverging fibres at one or both ends.

3.24 fibrous structure: A fibre, or connected grouping of fibres, with or without other particles.

3.25 habit: The characteristic crystal growth form, (or combination of these forms). of a mineral, including characteristic irregularities.

3.26 limit of detection: The calculated airborne asbestos structure concentration in structures per litre, equivalent to counting 2.99 asbestos structures in the analysis.

3.27 matrix: A structure in which one or *more* fi.. bres, or fibre bundles, touch, *are* attached to, or partially concealed by, a single particle or connected group of nonfibrous particles.

3.28 Miller index: A set of either three or four integer numbers used to specify the orientation of a crystallographic plane in relation to the crystal axes.

3.29 PCM equivalent fibre: A fibre of aspect ratio greater than or equal to 3:1, longer than 5 µm, and which has a diameter between 0,2 µm and 3,0 µm.

3.30 PCM equivalent structure: A fibrous structure of aspect ratio greater than or equal to 3:1, longer than 5 µm, and which has a diameter between 0,2 µm and 3,0 µm.

3.31 primary structure: A fibrous structure that is a separate entity in the TEM image.

3.32 replication: A procedure in electron microscopy specimen preparation *in* which a thin copy, or replica, of a surface is made.

3.33 selected area electron diffraction: A technique in electron microscopy in which the crystal structure of a small area of a sample is examined.

3.34 serpentine: A group of common rock-forming minerals having the nominal formula

$$Mg_3Si_2O_5(OH)_4$$

3.35 structure: A single fibre, fibre bundle, cluster or matrix.

3.36 twinning: The occurrence of crystals of the same species joined together at a particular mutual orientation, such that the relative orientations are related by a definite law.

3.37 unopened fibre: An asbestos fibre bundle of large diameter which has not been separated into its constituent fibrils or fibres.

3.38 zone-axis: The line or crystallographic direction through the centre of a crystal which is parallel to the intersection edges of the crystal faces defining the crystal zone.

4 Principle

A sample of airborne particulate is collected by drawing a measured volume of air through either a capillary-pore polycarbonate membrane filter of maximum pore size 0.4 µm or a cellulose ester (either mixed esters of cellulose or cellulose nitrate) membrane filter of maximum pore size 0.45 µm by means of a battery-powered or mains-powered pump. TEM specimens are prepared from polycarbonate filters by applying a thin film of carbon to the filter surface by vacuum evaporation. Small areas are cut from the carbon-coated filter, supported on TEM specimen grids. and the filter medium is dissolved away by a solvent extraction procedure. This procedure leaves a thin film of carbon which bridges the openings in the TEM specimen grid, and which supports each particle from the original filter in its original position. Cellulose ester filters are chemically treated to collapse the pore structure of the filter, and the surface of the collapsed filter is then etched in an oxygen plasma to ensure that all particles are exposed. A thin film of carbon is evaporated onto the filter surface and small areas are cut from the filter. These sections are supported on TEM specimen grids and the filter medium is dissolved away by a solvent extraction procedure.

The TEM specimen grids from either preparation method are examined at both low and high magnifications to check that they are suitable for analysis before carrying out a quantitative structure count on randomly-selected grid openings. In the TEM analysis, electron diffraction (ED) is used to examine the crystal structure of a fibre. and its elemental composition is determined by energy dispersive X-ray analysis (EDXA). For a number of reasons, it is not possible to identify each fibre unequivocally. and fibres are classified according to the techniques which have been used to identify them. A simple code is used to record, for each fibre, the manner in which it was classified. The fibre classification procedure is based on successive inspection of the morphology, the electron diffraction pattern for a selected area, and the qualitative and quantitative energy dispersive X-ray analyses. Confirmation of the identification of chrysotile is done only by quantitative ED, and confirmation of amphibole is done only by quantitative EDXA and quantitative zone axis ED.

In addition to isolated fibres, ambient air samples often contain more complex aggregates of fibres, with or without other particles. Some particles are composites of asbestos fibres with other materials. Individual fibres and structures that are more complex are referred to as "asbestos structures". A coding system is used to record the type of fibrous structure, and to provide the optimum description of each of these complex structures. The two codes remove the requirement to interpret the structure counting data from the microscopist, and allow this evaluation to be made later without the requirement for re-examination of the TEM specimens. Several levels of analysis are specified, the higher levels providing a more rigorous approach to the identification of fibres. The procedure permits a minimum required fibre identification criterion to be defined on the basis of previous knowledge, or lack of it. about the particular sample. Attempts are then made to achieve this minimum criterion for each fibre, and the degree of success is recorded for each fibre. The lengths and widths of all classified structures and fibres are recorded. The number of asbestos structures found on a known area of the microscope sample, together with the equivalent volume of air filtered through this area, is used to calculate the airborne concentration in asbestos structures/litre of air.

5 Symbols of units and abbreviations

5.1 Symbols of units (see also ISO 4226 and ISO No. 2)

eV = electron volt

kV = kilovolt

l/min = litres per minute

µg = microgram (10^{-6} gram)

µm = micrometre (10^{-6} metre)

nm = nanometre (10^{-9} metre)

W = watt

5.2 Abbreviations

DMF Dimethylformamide

DE Electron diffraction

EDXA Energy dispersive X-ray analysis

FWHM Full width, half maximum

HEPA High efficiency particle absolute

MEC Mixed esters of cellulose

PC Polycarbonate

PCM Phase contrast optical microscopy

SAED Selected area electron diffraction

SEM Scanning electron microscope

STEM Scanning transmission electron microscope

TEM Transmission electron microscope

UICC Union Internationale Contre le Cancer

6 Reagents

During the analysis, unless otherwise stated, use only reagents of recognized analytical grade and water (6.1).

WARNING - Use the reagents in accordance with the appropriate health and safety regulations.

6.1 water, fibre-free.

A supply of freshly distilled, fibre-free water, or another source of fibre-free, pyrogen--free water shall be used.

6.2 Chloroform, analytical grade, distilled in glass, preseNed with 1 % (VIV) ethanol.

6.3 1-Methyl-2-pyrrolidone.

6.4 DimethyHormamide.

6.5 Glacial acetic acid.

6.6 Acetone.

7 Apparatus

7.1 Air sampling - Equipment and consumable supplies

7.1.1 Alter cassette

Field monitors, comprising 25 mm to 50 mm diameter three-piece cassettes, with cowls which project less than 2 cm in front of the filter surface shall be used for sample collection. The cassette shall be loaded with either a capillary pore polycarbonate filter of maximum pore size 0,4 µm or an MEC or cellulose nitrate filter of maximum pore size 0,45 µm. Either type of filter shall be backed by a 5 µm pore size M EC or cellulose nitrate filter, and supported by a cellulose back-up pad. When the filters are in position, an elastic cellulose band or adhesive tape shall be applied to prevent air leakage. Suitable precautions shall be taken to ensure that the filters are tightly clamped in the assembly, so that significant air leakage around the filter cannot occur.

Representative filters from the filter lot shall be analysed as specified in 9.7 for the presence of asbestos structures before any are used for air sample collection.

7.1.2 Sampling pump

The sampling pump shall be capable of a flow-rate sufficient to achieve the desired analytical sensitivity. The face velocity through the filter shall be between 4,0 cm/s and 25,0 emfs. The sampling pump used shall provide a non-fluctuating airflow through the filter, and shall maintain the initial volume flow-rate to within ± 10 % throughout the sampling period. A constant flow or critical orifice controlled pump meets these requirements. Flexible tubing shall be used to connect the filter cassette to the sampling pump. A means for calibration of the flow-rate of each pump is also required.

7.1.3 Stand

A stand shall be used to hold the filter cassette at the desired height for sampling, and shall be isolated from the vibrations of the pump (7.1.2).

7.1.4 Variable area flowmeter

A calibrated variable are a flowmeter with a range of approximately 1 l/min to 10 l/min is required for calibration of the air sampling system.

The variable area flowmeter shall be cleaned before use to avoid transfer of asbestos contamination from the flowmeter to the sample being collected.

7.2 Specimen preparation laboratory

Asbestos, particularly chrysotile, is present in varying quantities in many laboratory reagents. Many building materials also contain significant amounts of asbestos or other mineral fibres which may interfere with the analysis if they are inadvertently introduced during preparation of specimens. It is most important to ensure that, during preparation, contamination of TEM specimens by any extraneous asbestos fibres is minimized. All specimen preparation steps shall therefore be performed in an environment where contamination of the sample is minimized. The primary requirement of the sample preparation laboratory is that a blank determination shall yield a result which will meet the requirements specified in 9.7. A minimum facility considered suitable for preparation of TEM specimens is a laminar flow hood with positive pressure. However, it has been established that work practices in specimen preparation appear to be more important than the tape of clean handling facilities in use. Preparation of samples shall be carried out only after acceptable blank values have been demonstrated.

NOTE 1 It is recommended that activities involving manipulation of bulk asbestos samples not be performed in the same area as TEM specimen preparation. because of the possibilities of contaminating the TEM specimens.

7.3 Equipment for analysis

7.3.1 Transmission electron microscope

A TEM operating at an accelerating potential of 80 kV to 120 kV, with a resolution better than 1,0 nm, and a magnification range of approximately x 300 to x 100 000 shall be used. The ability to obtain a direct screen magnification of about x 100 000 is necessary for inspection of fibre morphology; this magnification may be obtained by supplementary optical enlargement of the screen image by use of a binocular if it cannot be obtained directly. It is also required that the viewing screen of the microscope be calibrated such that the lengths and widths of fibre images down to 1 mm width can be measured in increments of 1 mm, regardless of image orientation. This requirement is often fulfilled through the use of a fluorescent screen with calibrated gradations in the form of circles, as shown in figure 1.

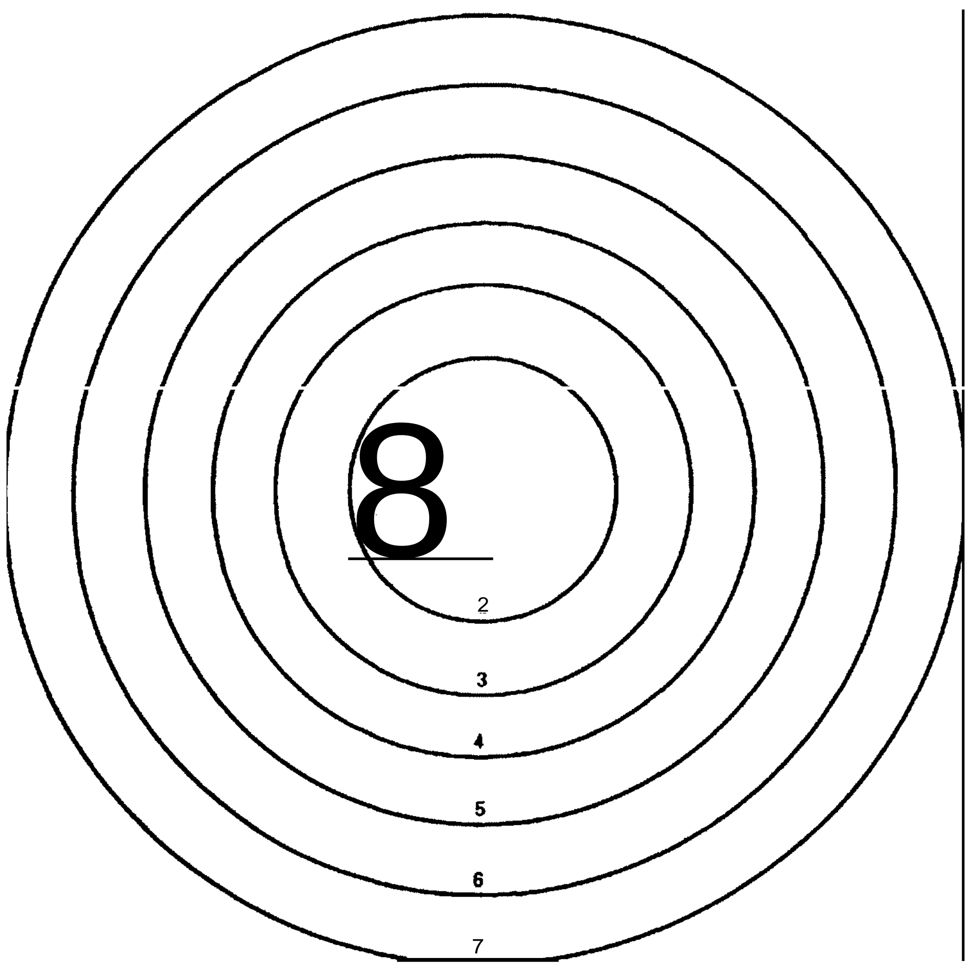


Figure 1 - Example of calibration markings on TEM viewing screen

For Bragg angles less than 0,01 rad, the TEM shall be capable of performing ED from an area of 0,6 µm^2 or less, selected from an in-focus image at a screen magnification of x 20 000. This performance requirement defines the minimum separation between particles at which independent ED patterns can be obtained from each particle. If SAED is used, the performance of a particular instrument may normally be calculated using the following equation

$$A = 0.785\ 4 \times \left(\underline{t} + 2\ 000 cs1J3 \right)^{2}$$

where

- *A* is the effective SAED area. in square micrometres;
- *D* is the diameter, in micrometres, of the SAED aperture;
- ***M*** is the magnification of the objective lens;
- C_5 is the spherical aberration coefficient, in millimetres, of the objective lens;
- *0* is the maximum required Bragg angle, in radians.

It is not possible to reduce the effective SAED area indefinitely by the use of progressively smaller SAED apertures, because there is a fundamental limitation imposed by the spherical aberration coefficient of the objective lens.

If zone-axis ED analyses are to be performed, the TEM shall incorporate a goniometer stage which permits the TEM specimen to be either

a) rotated through 360°, combined with tilting through at least + *30°* to - 30° about an axis in the plane of the specimen;

b) tilted through at least + 30° to - 30° about two perpendicular axes in the plane of the specimen.

The analysis is greatly facilitated if the goniometer permits eucentric tilting, although this is not essential. If EDXA and zone-axis ED are required on the same fibre, the goniometer shall be of a type which permits tilting of the specimen and acquisition of EDXA spectra without changing the specimen holder.

The TEM shall have an illumination and condenser lens system capable of forming an electron probe of diameter less than 250 nm.

NOTE 2 Use of an anti-contamination trap around the specimen is recommended if the required instrumental perlormance is to be obtained.

7.3.2 Energy dispersive X-ray analyser

The TEM shall be equipped with an energy dispersive X-ray analyser capable of achieving a resolution better than 180 eV (FWHM) on the MnKa. Since the performance of individual combinations of TEM and EDXA equipment is dependent on a number of geometrical factors, the required performance of the combination of the TEM and X-ray analyser is specified in terms of the measured X-ray intensity obtained from a fibre of small diameter, using a known electron beam diameter. Solid state X-ray detectors are least sensitive in the low energy region, and so measurement of sodium in crocidolite shall be the performance criterion. The combination of electron microscope and **X-ray** analyser shall yield, under routine analytical conditions, a background-subtracted NaKa: integrated peak count rate of more than 1 count per second (cps) from a fibre of UICC crocidolite, 50 nm in diameter or smaller, when irradiated by an electron probe of 250 nm diameter or smaller at an accelerating potential of 80 kV. The peak/background ratio for this performance test shall exceed 1,0.

The EDXA unit shall provide the means for subtraction of the background, identification of elemental peaks, and calculation of background-subtracted peak areas.

7.3.3 Computer

Many repetitive numerical calculations are necessary, and these may be performed conveniently by relatively simple computer programmes. For analyses of zone-axis ED pattern measurements, a computer with adequate memory is required to accommodate the more complex programmes involved.

7.3.4 Plasma asher

For preparation of TEM specimens from MEC filters, a plasma asher, with a radio frequency power rating of 50 W or higher, shall be used to etch the surface of collapsed MEC filters. The asher shall be supplied with a controlled oxygen flow, and shall be modified, if necessary, to provide a valve to control the speed of air admission so that rapid air admission does not disturb particulates from the surface of the filter after the etching step.

NOTE 3 It is recommended that filters be fitted to the oxygen supply and the air admission line.

7.3.5 Vacuum coating unit

A vacuum coating unit capable of producing a vacuum better than 0,013 Pa shall be used for vacuum deposition of carbon on the membrane filters. A sample holder is required which will allow a glass microscope slide to be continuously rotated during the coating procedure.

NOTE 4 A mechanism which also allows the rotating slide to be tilted through an angle of approximately 45° during the coating procedure is recommended. A liquid nitrogen cold trap above the diffusion pump may be used to minimize the possibility of contamination of the filter surfaces **by** oil from the pumping system. The vacuum coating unit may also be used for deposition of the thin film of gold, or other calibration material, when it is required on TEM specimens as an internal calibration of ED patterns.

7.3.6 Sputter coater

A sputter coater with a gold target may be used for deposition of gold onto TEM specimens as an integral calibration of ED patterns. Other calibration materials are acceptable. Experience has shown that a sputter coater allows better control of the thickness of the calibration material.

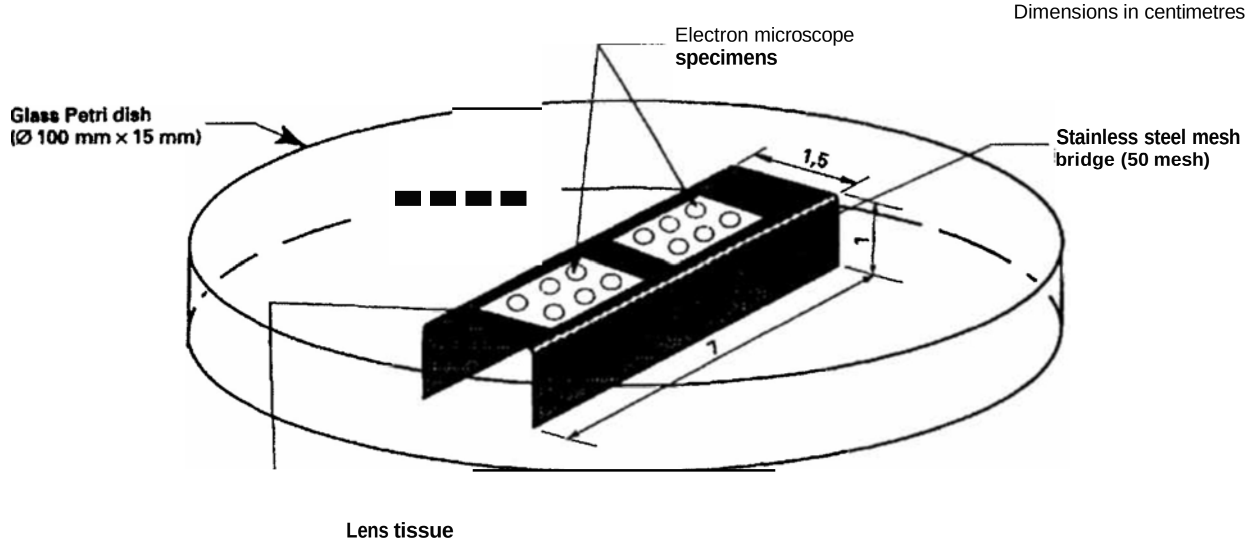
7.3.7 Solvent washer (Jaffe washer)

The purpose of the Jaffe washer is to allow dissolution of the filter polymer while leaving an intact evaporated carbon film supporting the fibres and other particles from the filter surface. One design of a washer which has been found satisfactory for various solvents and filter media is shown in figure 2. In general, either chloroform or 1-methyl-2-pyrrolidone has been used for dissolving polycarbonate filters and dimethylformamide or acetone has been used for dissolving MEC or cellulose nitrate filters. The higher evaporation rates of chloroform and acetone require that a reservoir of 10 ml to 50 ml of solvent be used, which may need replenishment during the procedure. Dimethylformamide and 1-methyl-2-pyrrolidone have lower vapour pressures and much smaller volumes of solvent may be used. It is recommended that all washers be used in a fume hood, and when specimens are not being inserted or removed, the Petri dish lid shall be in place during the solvent dissolution. The washer shall be cleaned before it *is* used for each batch of specimens.

7.3.8 Condensation washer

For more rapid dissolution of the filter polymer, or if difficulties are experienced in dissolving the filter polymer, use a condensation **washer,** consisting of **a** flask, condenser and cold finger assembly, with a heating mantle and means for controlling the temperature. **A** suitable assembly is shown in figure3, using either acetone or chloroform as the solvent, depending on the type of filter.

Dimensions in centimetres



NOTE - Solvent is added until the meniscus contacts the underside of the stainless steel mesh bridge.

Figure 2 - Example of design of solvent washer (Jaffe washer)

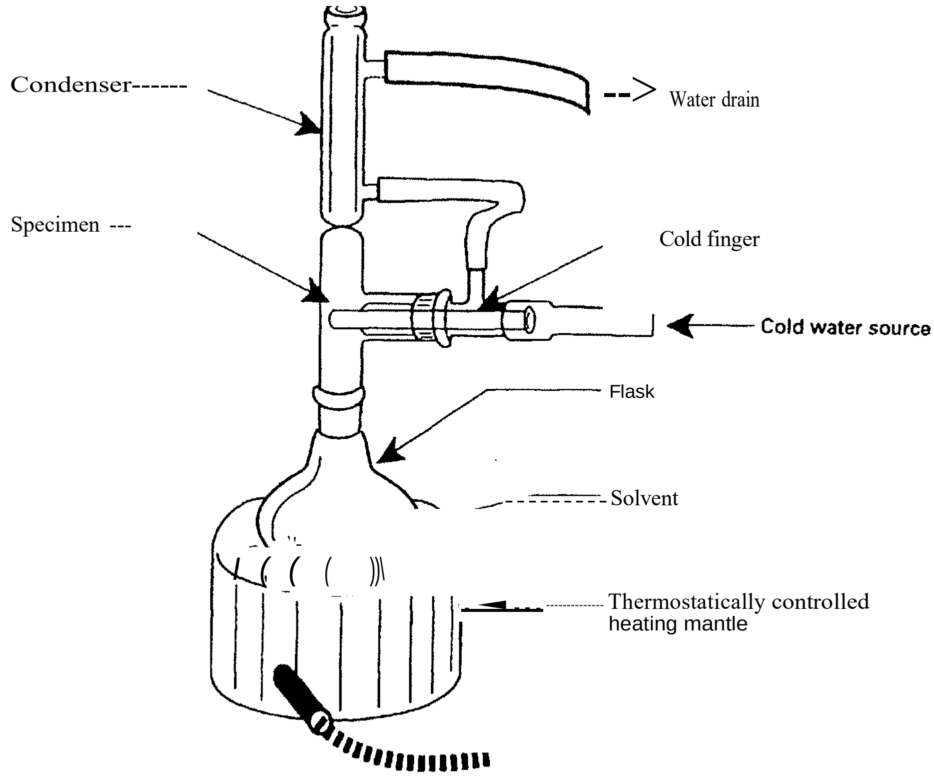


Figure 3 - Example of design of condensation washer

7.3.9 Slide warmer or oven

Use either a slide warmer or an oven for heating slides during the preparation of TEM specimens from MEC or cellulose nitrate filters. It is required to maintain a temperature of 65 °C to 70 °C.

7.3.10 Ultrasonic bath

An ultrasonic bath is necessary for cleaning the apparatus used for TEM specimen preparation.

7.3.11 Carbon grating replica

A carbon grating replica with about 2 000 parallel lines per millimetre shall be used to calibrate the magnification of the TEM.

7.3.12 Calibration specimen grids for EDXA

TEM specimen grids prepared from dispersions of calibration minerals are required for calibration of the EDXA system. Some suitable calibration minerals are riebeckite, chrysotile, halloysite, phlogopite, wollastonite and bustamite. The mineral used for calibration of the EDXA system for sodium shall be prepared using a gold TEM grid.

7.3.13 Carbon rod sharpener

The use of necked carbon rods, or equivalent, allows the carbon to be evaporated onto the filters with a minimum of heating.

7.3.14 Disposable tip micropipettes

A disposable tip micropipette, capable of transferring a volume of approximately 30 µl, is necessary for the preparation of TEM specimen grids from MEC filters.

7.4 Consumable supplies

7.4.1 Copper electron microscope grids

Copper TEM grids with 200 mesh are recommended. Grids which have grid openings of uniform size such that they meet the requirement specified in 9.6.2 shall be chosen. To facilitate the relocation of individual grid openings for quality assurance purposes, the use of grids with numerical or alphabetical indexing of individual grid openings is recommended.

7.4.2 Gold electron microscope grids

Gold TEM grids with 200 mesh are recommended to mount TEM specimens when sodium measurements are required in the fibre identification procedure. Grids which have grid openings of uniform size such that they meet the requirement specified in 9.6.2 shall be chosen. To facilitate the relocation of individual grid openings for quality assurance purposes, the use of grids with numerical or alphabetical indexing of individual grid openings is recommended.

7.4.3 Carbon rod electrodes

Spectrochemically pure carbon rods, shall be used in the vacuum evaporator (7.3.5) during carbon coating of filters.

7.4.4 Routine electron microscopy tools and supplies

Fine-point tweezers, scalpel holders and blades, microscope slides, double-coated adhesive tape, lens tissue, gold wire, tungsten filaments and other routine supplies are required.

7.4.5 Reference asbestos samples

Asbestos samples, shall be for preparation of reference TEM specimens of the primary asbestos minerals. The UICC set of minerals is suitable for this purpose.

8 Air sample collection

The desired analytical sensitivity is a parameter that shall be established for the analysis prior to sample collection. It is defined as the structure concentration corresponding to the detection of one structure in the analysis. For direct transfer methods of TEM specimen preparation, the analytical sensitivity is a function of the volume of air sampled, the active area of the collection filter, and the area of the TEM specimen over which structures are counted. If total airborne dust levels are high, it may be necessary to terminate sampling before the required volume has been sampled. If this happens, the analytical sensitivity required can be achieved only by counting structures on more grid openings, or by selective concentration of asbestos structures using an indirect TEM specimen preparation technique. Select the sampling rate and the period of sampling to yield the required analytical sensitivity, as detailed in table 1. Before air samples are collected, unused filters shall be analysed as described in 9.7 to determine the mean asbestos structure count for blank filters.

Air samples shall be collected using filter cassettes (7.1.1). During sampling, the cassette shall be supported on a stand (7.1.3) which is isolated from the vibrations of the pump (7.1.2). The cassette shall be held facing vertically downwards at a height of approximately 1,5 m to 2,0 m above ground/floor level, and shall be connected to the pump with a flexible tube.

Measure the sampling flow-rate at the front end of the cassette, both at the beginning and end of the sampling period, using a calibrated variable area flowmeter (7.1.4) temporarily attached to the inlet of the cassette. The mean value of these two measurements shall be used to calculate the total air volume sampled.

Basic strategies for monitoring environmental sources of airborne asbestos are described in annex G. After sampling, a cap shall be placed over the open end of the cassette, and the cassette packed with the filter face-upwards for return to the laboratory. Field blank filters shall also be included, as specified in 9.7, and submitted to the remaining analytical procedures along with the samples.

NOTES

5 In table 1 a collection filter area of 385 mm^2 is assumed, and the TEM grid openings are assumed to be 85 μm^2 square. The limit of detection is defined as the upper 95 % confidence limit of the Poisson distribution for a count of 0 structures. In the absence of background, this is equal to 2,99 times the analytical sensitivity. Backgrounds that are different from O observed during analysis of blank filters will degrade the limit of detection.

6 The analytical sensitivity *S*, expressed In number of structures per litre. is calculated using the following equation:

$$S = \frac{A_f}{kA_g V}$$

where

A_f is the active area, in square millimetres, of sample collection filter;

A_g is the mean area, in square millimetres, of grid openings examined;

k is the number of grid openings examined;

V is the volume of air sampled, in litres.

Table 1 - Examples of the minimum number of grid openings required to achieve a particular analytical sensitivity and limit of detection

Analytical sensitivity structures/l	Limit of detection structures/l	Volume of air sampled {litres} 500	1 000	2 000	3 000	4000	5000
0,1	0,30	1 066	533	267	178	134	107
0,2	0,60	533	267	134	89	67	54
0,3	0.90	356	178	89	60	45	36
0,4	1.2	267	134	67	45	34	27
0,5	1,5	214	107	54	36	27	22
0,7	2,1	153	77	39	26	20	16
1,0	3,0	107	54	27	18	14	11
2,0	6,0	54	27	14	9	7	6
3,0	9,0	36	18	9	6	5	4
4,0	12	27	14	7	5	4	4
5,0	15	22	11	6	4	4	4
7,0	21	16	8	4	4	4	4
10	30	11	6	4	4	4	4

9 Procedure for analysis

9.1 General

The techniques used to prepare TEM specimens are different for polycarbonate and cellulose ester filters. The preparation method to be used shall be either 9.3 or 9.4, depending on the type of membrane filter used for air sampling. Cleaning of the sample cassettes before they are opened, preparation of the carbon evaporator, criteria for acceptable specimen grids, and the requirement for blank determinations are identical for the two preparation techniques. TEM examination. structure counting, fibre identification and reporting of results are independent of the type of filter or preparation technique used.

The ability to meet the blank sample criteria is dependent on the cleanliness of equipment and supplies. Consider all supplies such as microscope slides and glassware as potential sources of asbestos contamination. It is necessary to wash all glassware before it is used. Wash any tools or glassware which come into contact with the air sampling filters or TEM specimen preparations both *before* use and between handling of individual samples. Where possible, disposable supplies should be used.

9.2 Cleaning of sample cassettes

Asbestos fibres can adher to the exterior surfaces of air sampling cassettes, and these fibres can be inadvertently transferred to the sample during handling. To prevent this possibility of contamination, and after ensuring that the cassette is tightly sealed, wipe the exterior surfaces of each sampling cassette before it is placed in the clean facility or laminar flow hood.

9.3 Direct preparation of TEM specimens from polycarbonate filters

9.3.1 Selection of filter area for carbon coating

Use a cleaned microscope slide to support representative portions of polycarbonate filter during the carbon evaporation. Double-coated adhesive tape is used to attach the filter portions to the glass slide. Take care not to stretch the polycarbonate filters during handling. Using freshly cleaned tweezers. remove the polycarbonate filter from the sampling cassette, and place it on to a second cleaned glass microscope slide which is used as a cutting surface. Using a freshly cleaned curved scalpel blade, cut the filter by rocking the blade from the point, pressing it into contact with the filter. Repeat the process as necessary. Several such portions may be mounted on the same microscope slide. The scalpel blade and tweezers shall be washed and dried between the handling of each filter. Identify the filter portions by writing on the glass slide.

9.3.2 Carbon coating of filter portions

Place the glass slide holding the filter portions on the rotation-tilting device, approximately 10 cm to 12 cm from the evaporation source, and evacuate the evaporator chamber (7.3.5) to a vacuum better than 0,013 Pa. The evaporation of carbon shall be performed in very short bursts, separated by a few seconds to allow the electrodes to cool. If evaporation of carbon is too rapid, the strips of polycarbonate filter will begin to curl, and cross-linking of the surface will occur. This cross-linking procedures a layer of polymer which is relatively insoluble in organic solvents, and it will not be possible to prepare satisfactory TEM specimens. The thickness of carbon required is dependent on the size of particles on the filter, and approximately 30 nm to 50 nm has been found to be satisfactory. If the carbon film is too thin, large particles will break out of the film during the later stages of preparation, and there will be few complete and undamaged grid openings on the specimen. Too thick a carbon film will lead to a TEM image which is lacking in contrast, and the ability to obtain ED patterns will be compromised. The carbon film thickness should be the minimum possible, while retaining most of the grid openings of the TEM specimen intact.

9.3.3 Preparation of the Jaffe washer

Place several pieces of lens tissue, as shown in figure 2, on the stainless steel bridge (7.1.3) and fill the washer (see 7.3.7) with chloroform (6.2) or 1-methyl-2-pyrrolidone (6.3) to a level where the meniscus contacts the underside of the mesh, resulting in saturation of the lens tissue.

9.3.4 Placing of specimens in the Jaffe washer

Using a curved scalpel blade, cut three 3 mm square pieces of carbon-coated polycarbonate filter form the carbon-coated filter portion. Select three squares to represent the centre and the periphery of the active surface of the filter. Place each square of filter, carbon side up, on a TEM specimen grid, and place the grid and filter on the saturated lens tissue in the Jaffe washer. Place the three specimen grids from one sample on the same piece of lens tissue. Any number of separate pieces of lens tissue may be placed in the same Jaffe washer. Cover the Jaffe washer with the lid, and allow the washer to stand for at least 8 h.

NOTE 7 It has been found that some polycarbonate filters will not completely dissolve in the Jaffe washer, even after exposure to chloroform for as tong as 3 d. This problem is more severe if the surface of the filter was overheated during the carbon evaporation. It has been found that the problem of residual undissolved filter polymer can be overcome in several ways:

a) condensation washing of the grids, using chloroform as the solvent, after the initial Jaffe washer treatment, can often remove much of the residual filter medium in a period of approximately 30 min. To carry out this procedure, transfer the piece of lens tissue supporting the specimen grids to the cold finger of the condensation washer (7.3.8), which has achieved stable operating conditions. Operate the washer for approximately 30 min after inserting the grids;

b) used in a Jaffe washer, 1-methyl-2-pyrrolidone has been found to be a more effective solvent than chloroform for polycarbonate lifters. This solvent is more effective if the lens paper is not used and grids are placed directly on the stainless steel mesh of the Jaffe washer. A dissolution period of 2 h to 6 h has been found to be satisfactory. After dissolution is complete, remove the stainless steel mesh from the Jaffe washer and allow the grids to dry. 1-methyl-2-pyrrolidone evaporates very slowly. If it is required to dry the grids more rapidly. transfer the stainless steel bridge into another Petri dish, and add water (6.1) until the meniscus contacts the underside of the mesh. After approximately 15 min, remove the mesh and allow the grids to dry. If it is desired to retain water-soluble particle species on the TEM grids, ethanol may be used instead of water (6.1) for the second wash;

c) a mixture of 20 % 1,2-diaminoethane [ethylenediamine) and 80 % 1-methyl-2-pyrrolidone. used in a Jaffe washer, completely dissolves polycarbonate filters in 15 min, even if the surface of the filter has been overheated. To use this solvent, place the grids directly on the stainless steel mesh of the Jaffe washer, do not use the lens paper. After a period of 15 min, transfer the stainless steel bridge into another Petri dish, and add water (6.1J until the meniscus contacts the underside of the mesh. After approximately 15 min, remove the mesh and allow the grids to dry. If it is desired to retain water-soluble particle species on the TEM grids, ethanol may be used instead of water (6.1) for the second wash.

9.3.5 Rapid preparation of TEM specimens from PC filters

TEM specimens can be prepared rapidly from PC filters, if desired, by washing for approximately 1 h in a Jaffe washer, followed by washing for 30 min in a condensation washer using chloroform as the solvent. The alternative filter dissolution procedures described in note 7 may also be used.

9.4 Direct preparation of TEM specimens from cellulose ester filters

9.4.1 Selection of area of filter for preparation

Using clean tweezers, remove the filter from the filter cassette, and place it on a cleaned microscope slide. Using a clean, curved scalpel blade, cut out a portion of the filter.

9.4.2 Preparation of solution for collapsing cellulose ester fitters

Mix 35 ml of dimethylformamide (6.4}, and 15 ml of glacial acetic acid (6.5) with 50 ml of water (6.1). Store this mixture in a clean bottle, The mixture is stable and suitable for use for up to 3 months after preparation.

9.4.3 Filter collapsing procedure

Using a micro ipette with a disposable tip (7.3.14), place 15 µl/cm to 25 µl/cm^2 of the solution prepared in 9.4.2 on a cleaned microscope slide, and using the end of the pipette tip, spread the liquid over the area to be occupied by the filter portion. Place the filter portion, active surface upwards, on top of the solution, lowering the edge of the filter at an angle of about 20° so that air bubbles are not created. Remove any solution not absorbed by the filter by allowing a paper tissue to contact the liquid at the edge of the filter. More than one filter portion may be placed on one slide. Place the slide either on a thermostatically controlled slide warmer (7.3.9) at a temperature of 65 °C to 70 °C. or in an oven (7.3.9) at this temperature, for 10 min. The filter collapses slowly to about 15 % of its original thickness. The procedure leaves a thin, transparent polymer film. with particles and fibres embedded in the upper surface.

9.4.4 Plasma etching of the filter surface

The optimum conditions and time for plasma etching (see 7.3.4) have been determined experimentally from the recovery of fine chrysotile fibrils on 0,8 µm pore size MEC filters. The conditions required in a particular plasma asher shall be established using the procedure specified in annex A Place the microscope slide holding the collapsed filter portions in the plasma asher. and etch for the time and under the conditions determined. Take care to ensure that the correct conditions are respected. After etching, admit air slowly to the chamber and remove the microscope slide.

Adjust the air admission valve of the plasma asher such that the time taken for the chamber to reach atmospheric pressure exceeds 2 min. Rapid air admission may disturb particulates on the surface *of* the etched filter.

9.4.5 Carbon coating

Coat the microscope slide holding the collapsed filter portions with carbon as specified in 9.3.2.

9.4.6 Preparation of the Jaffe washer

Place several pieces of lens tissue on the stainless steel bridge, and fill the washer **with** dimethylformamide (6.4) or acetone (6.6) to a level where the meniscus contacts the underside of the mesh. resulting in saturation of the lens tissue.

9.4.7 Placing of specimens in the Jaffe washer

Place the specimens in the Jaffe washer as specified in 9.3.4. Specimens are normally cleared after approximately 4 h.

9.4.8 Rapid preparation of TEM specimens from cellulose ester filters

An alternative washing procedure may be used to prepare TEM specimens from cellulose ester filters more rapidly than can be achieved by the Jaffe washing procedure. After the specimens have been washed in a Jaffe washer for approximately 1 h, transfer the piece of lens tissue supporting the specimens to the cold finger of a condensation washer (7.3.8) operating with acetone as the solvent because dimethylformamide shall not be used in a condensation washer. Operate the condensation washer for approximately 30 min. This treatment removes all the remaining filter polymer.

9.5 Criteria for acceptable TEM specimen grids

Valid data cannot be obtained unless the TEM specimens meet specified quality criteria. Examine the TEM specimen grid in the electron microscope at a sufficiently low magnification (x 300 to *x* 1 000) for complete grid openings to be inspected. Reject the grid if

a) the TEM specimen has not been cleared of filter medium by the filter dissolution step. If the TEM specimen exhibits areas of undissolved filter medium, and if at least two of the three specimen grids are not cleared. either additional washing with solvent shall be carried out, or new specimens shall be prepared from the filter;

b) the sample is overloaded with particulate. If the specimen grid exhibits more than approximately 10 % obscuration on the majority of the grid openings, the specimen shall be designated as overloaded. This filter cannot be alanysed satisfactorily using the direct preparation methods because the grid is too heavily loaded with debris to allow separate examination of individual particles by ED and EDXA, and obscuration of fibres by other particulates may lead to underestimation of the asbestos structure count;

c) the particulate deposits on the specimen are not uniformly distributed from one grid opening to the next. If the particulate deposits on the specimen are obviously not uniform from one grid opening to the next, the specimen shall be designated as non-uniform. This condition is a function either of the air sampling conditions or of the fundamental nature of the airborne particulate. Satisfactory analysis of this filter may not be possible unless a large number of grid openings is examined;

d) the TEM grid is too heavily loaded with fibrous structures to make an accurate count. Accurate counts cannot be made if the grid has more than approximately 7 000 structures/mm^2; or

e) more than approximately 25 % of the grid openings have broken carbon film over the whole grid opening. Since the breakage of carbon film is usually more frequent in areas of heavy deposit, counting of the intact openings can lead to an underestimate of the asbestos structure count.

NOTE 8 If the specimens are rejected because unacceptable numbers of grid openings exhibit broken carbon replica, an additional carbon coating may be applied to the carbon coated filter, and new specimen grids prepared. The larger particles can often be supported by using a thicker carbon film. If this action does not produce acceptable specimen grids, this filter cannot be analysed using the direct preparation methods.

If one or more of the conditions described in b), c), d) or e) exists, it may not be possible to analyse the sample by this method.

9.6 Procedure for structure counting by TEM

9.6.1 General

The examination consists of a count of asbestos structures which are present on a specified number of grid openings. Fibres are classified into groups on the basis of morphological observations, ED patterns and EDXA spectra. The total number of structures to be counted depends on the statistical precision desired. In the absence of asbestos structures. the area of the TEM specimen grids which must be examined depends on the analytical sensitivity required. The precision of the structure count depends not only on the total number of structures counted, but also on their uniformity from one grid opening to the next. Additional structure counting will be necessary if greater precision is required.

In order that the estimate of the structure density on the sampling filter shall not be based on the small area represented by one specimen grid, grid openings shall be examined on two of the three specimen grids prepared. Then combine the results in the calculation of the structure density. Structure counts shall be made at a magnification of approximately x 20 000, and shall be terminated at the end of the examination of the grid opening on which the 100th asbestos structure is observed, except that the count shall be continued until a minimum of 4 grid openings have been examined. Otherwise, the structure count shall continue to that number of grid openings at which the specified analytical sensitivity has been achieved.

NOTE 9 The normal range for the number of grid openings which should be examined is from 4 to 20. If in--sufficient air has been sampled through the filter. the calculation in 9.6.4 can indicate that an impractically large number of grid openings should be examined. When this situation occurs, a larger value of analytical sensitivity may have to be accepted.

9.6.2 Measurement of mean grid opening area

The mean grid opening area shall be measured for the type of TEM specimen grids in use. The standard deviation of the mean of 10 openings selected from 1O grids should be less than 5 %. As an optional procedure, or if the 5 % standard deviation criterion cannot be demonstrated, the dimensions of each grid opening examined in the TEM shall be measured at a calibrated magnification.

9.6.3 TEM alignment and calibration procedures

Before structure counting is performed, align the TEM according to instrumental specifications. Calibrate the TEM and EDXA system according to the procedures specified in annex B.

9.6.4 Determination of stopping point

Before structure counting is begun, calculate the area of specimen to be examined in order to achieve the selected analytical sensitivity. Calculate the maximum number of grid openings to be examined using the following equation:

$$k = \frac{A_f}{A_g V S}$$

where

k is the number of grid openings to be examined, rounded upwards to the next highest integer;

A_t is the area, in square millimetres, of sample filter;

A_g is the area. in square millimetres, ot TEM specimen grid opening;

V is the volume of air sampled. in litres;

S is the required analytical sensitivity, expressed in number of structures per litre.

9.6.5 General procedure for structure counting and size analysis

Use at least two specimen grids prepared from the filter in the structure count. Select at random several grid openings from each grid, and combine the data in the calculation of the results.

Use a form similar to that shown in figure 4 to record the data. Insert the first specimen grid into the TEM.

NOTE 10 In order to facilitate quality assurance measurements which require re-examination of the same grid opening by different microscopists, the grid should be inserted into the specimen holder in a standard orientation with the grid bars parallel and perpendicular to the axis of the specimen holder. This will provide scan directions parallel to the edges of the grid opening. It should be ensured that all microscopists begin scanning at the same starting point on the grid opening. and that they use similar scan patterns. This procedure permits rapid relocation of fibrous structures for further examination if necessary.

Select a typical grid opening and set the screen magnification to the calibrated value (approximately x 20 000). Adjust the sample height until the features in the centre of the TEM viewing screen are at the eucentric point. Set the goniometer tilt angle to zero. In column 1 of the data recording form, record the number or letter used to identify the grid. In column 2, record the identification of the particular grid opening. Position the specimen so that the grid opening is positioned with one corner visible on the screen. Move the image by adjustment of only one translation control, carefully examining the sample for fibres, until the opposite side of the grid opening is encountered. Move the image by a predetermined distance less than one screen diameter, using the other translation control, and scan the image in the reverse direction. Continue the procedure in this manner until the entire grid opening has been inspected in a pattern similar to that shown in figure 5. When a fibrous structure is detected, assign a sequential number to the primary structure in column 3, perform the identification procedures required as detailed in annex E, and enter the appropriate compositional classification on the structure counting form in column 5. Assign a morphological classification to the structure according to the procedures specified in annex D, and record this in column 6. Measure on the TEM viewing screen the length and width of the image of the primary structure, in millimetres, and record these measurements in columns 7 and 8. For a disperse cluster or matrix. assign a compositional classification and a morphological classification to each structure component, measure the length and width, and enter the data in columns 4 to 8. Use column 4 of the data recording form to tabulate the sequential number of total structures taking into account structure components. if non-asbestos fibres are observed, note their presence and type, if known. After a fibrous structure has been examined and measured, relocate the original field of view accurately before continuing scanning of the specimen. Failure to do this may cause structures to be overlooked or counted twice. Continue the examination until the completion of the grid opening on which the 100th asbestos structure has been recorded, or until the number of grid openings required to achieve the specified analytical sensitivity, calculated according to 9.6.4, have been examined whichever occurs first. The data shall be drawn approximately equally from a minimum of two grids. Regardless of the value calculated according to 9.6.4, fibrous structures on a minimum of four openings shall be counted.

9.6.6 Measurement of concentration for asbestos fibres and bundles longer than 5 µm

Consider improving the statistical validity for measurement of asbestos fibres and bundles longer than 5 µm by additional examination at a lower magnification, taking account only of the longer fibres and bundles. Perform this extended examination for fibres and bundles longer than 5 µm in accordance with the procedures specified in annex E. Use a magnification of approximately x 10 000 for counting all asbestos fibres and bundles longer than 5 µm, or approximately x 5 000 if only fibres and bundles within the diameter range 0,2 µm to 3,0 µm are to be counted. Continue the count until completion of the grid opening on which 100 fibres and bundles have been recorded, or until a sufficient area ot the specimen has been examined to achieve the desired analytical sensitivity. Only those structures which are identified as, or are suspected to be, either chrysotile or one of the amphibole minerals will be reported in either the original or the extended TEM examination. Other materials, such as gypsum, cellulose fibres, and filter artifacts such as undissolved filter strands, will not be included in the fibre count. This restriction is intended to ensure that the best statistical validity is obtained for the materials of interest.

TEM asbestos structure count (page of

Report number: ....

Sample number: ....

File name: ....

Sample description: ....

Preparation date: .... By: ....

Analysis date: .... By: ....

Computer entry date: .... By: ....

Air volume:... litres

Sample filter area: .... mm^2

Magnification: ....

Grid opening dimension:....................................... µm

Level of analysis (C): ....

(A):...........--..

Grid	Grid opening	Number of structures primary	Number of structures total	Class	Type of structure	Length mm	Width mm	Comments

Figure 4 - Example of structure counting form

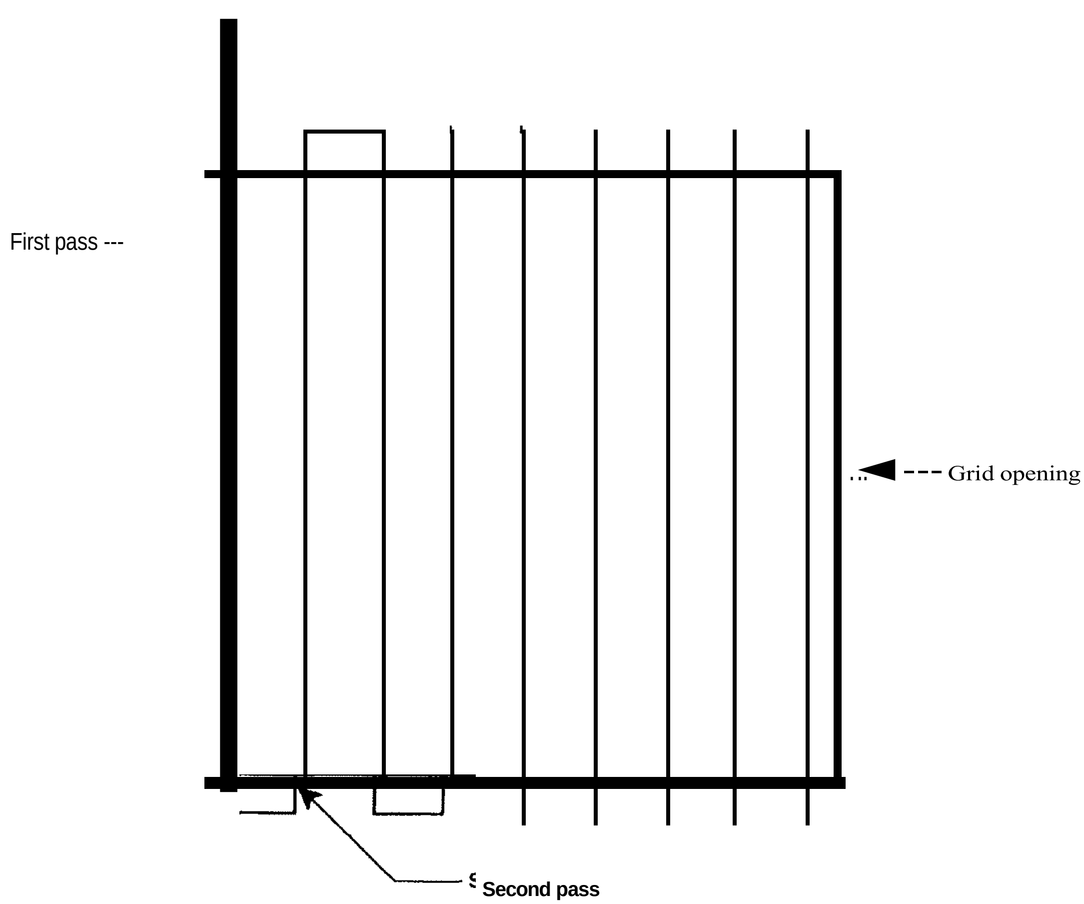


figure 5 - Example of scanning procedure for TEM specimen examination

9.7 Blank and quality control determinations

Before air samples are collected, a minimum of two unused filters from each filter lot of 100 filters shall be analysed to determine the mean asbestos structure count. If the mean count for all types of asbestos structures is found to be more than 10 structures/mm^2, or if the mean fibre count for asbestos fibres and bundles longer than 5 µm is more than 0,1 fibre/mm^2, reject the filter lot.

To ensure that contamination by extraneous asbestos fibres during specimen preparation is insignificant compared with the results reported on samples. establish a continuous programme of blank measurements. At least one field blank shall be processed along with each batch of samples. In addition, at least one unused filter shall be included with every group of samples prepared on one microscope slide.

Initially, and also at intervals afterwards, ensure that samples of known asbestos concentrations can be analysed satisfactorily. Since there is a subjective component in the structure counting procedure, it is necessary that recounts of some specimens be made by different microscopists, in order to minimize the subjective effects. Such recounts provide a means of maintaining comparability between counts made by different microscopists. Variability between and within microscopists and between laboratories shall be characterized. These quality assurance measurements shall constitute approximately 10 % of the analyses. Repeat results should not differ at the 5 % significance level.

9.8 Calculation of results

Calculate the results using the procedures detailed in annex F. Prior to the TEM examination of the specimens, the level of analysis was specified. Before the results are calculated, the compositional and morphological classifications to be included in the result shall be specified. The chi-squared uniformity test shall be conducted using the number of primary asbestos structures found on each grid opening, prior to the application of the cluster and matrix counting criteria. The concentration result shall be calculated using the numbers of asbestos structures reported after the application of the cluster and matrix counting criteria.

10 Performance characteristics

10.1 General

It is important to use this analytical method in conjunction with a continuous quality control programme. The quality control programme should include use of standard samples, blank samples, and both interlaboratory and intralaboratory analyses.

10.2 Interferences and limitations of fibre identification

Unequivocal identification of every chrysotile fibre is not possible, due to both instrumental limitations and the nature of some of the fibres. The requirement for a calibrated ED pattern eliminates the possibility of an incorrect identification of the fibre selected. However, there is a possibility of misidentification of fibres for which both the morphologies and the ED patterns are reported on the basis of visual inspection only. The only significant possibilities of misidentification occur with halloysite, vermiculite scrolls or palygorskite, all of which can be discriminated from chrysotile by the use of EDXA and by observation of the 0,73 nm (002) reflection of chrysotile in the ED pattern.

As in the case of chrysotile fibres, complete identification of every amphibole fibre is not possible due to instrumental limitations and the nature of some of the fibres. Moreover, complete identification of every amphibole fibre is not practical due to the limitations of both time and cost. Particles of a number of other minerals with compositions similar to those of some amphiboles could be erroneously classified as amphibole when the classification criteria do not include zone-axis ED techniques. However, the requirement for quantitative EDXA measurements on all fibres as support for the random orientation ED technique makes misidentification very unlikely, particularly when other similar fibres in the same sample have been identified as amphibole by zone-axis methods. The possibility of misidentification is further reduced with increasing aspect ratio, since it is rare for the minerals with which amphibole may be confused to display an asbestiform habit.

10.3 Precision and accuracy (see ISO Standard Handbook No. 3)

10.3.1 Precision

The analytical precision that can be obtained is dependent upon the number of structures counted, and also on the uniformity of the particulate deposit on the original filter. Assuming that the structures are randomly deposited on the filter. if 100 structures are counted and the loading is at least 3,5 structures/grid opening, computer modelling of the counting procedure shows that a coefficient of variation of about 10 % can be expected. As the number of structures counted decreases, the precision will also decrease approximately as $\sqrt{N}$, where N is the number of structures counted. In practice, particulate deposits obtained by filtration of ambient air samples are rarely ideally distributed, and it is found that the precision is correspondingly reduced. Degradation of precision is a consequence of several factors, such as:

a) non-uniformity of the filtered particulate deposit;

b) distorsion of the fibre distribution by application of the structure counting criteria;

c) variation between microscopists in their interpretation of the fibrous structures;

d) variation between microscopists in their ability to detect and identify fibres.

The 95 % confidence interval about the mean for a single structure concentration measurement using this analytical method should be approximately ± 25 % when 100 structures are counted over 1O grid openings.

10.3.2 Accuracy

There is no independent method available to determine the accuracy.

NOTE 11 It has been demonstrated that, after polycarbonate membrane filters have been coated with carbon, particulate material is transferred to the TEM specimens without measurable losses. However. if the filters are heavily loaded by particulate material, some of this may be lost before they are coated with carbon. Good comparability between the capillary-pore polycarbonate procedure and the cellulose ester filter procedure has been demonstrated for laboratory-generated aerosols of chrysotile asbestos.

10.3.3 Interlaboratory and intralaboratory analyses

Interlaboratory and intralaboratory analyses are required in order to monitor systematic errors that may develop among microscopists when using this method. These analyses should be designed to test both the overall method and the performance of individual microscopists. Repeating preparation of TEM grids from different sectors of a filter, followed by examination of the grids by a different microscopist, is a test for the reproducibility of the whole method. However, non-uniformity of the particulate deposit on the filter may lead to differences which are not related to the performance of the microscopists. Verified fibre counting (counting of asbestos structures on the same grid opening of a TEM grid by two or more operators, followed by resolution of any discrepancies} may be used both as a training aid and to determine the performance of different microscopists. The use of indexed TEM grids as described in 7.4.1 and 7.4.2 is recommended in order to facilitate relocation of specific grid openings.

10.4 Umlt of detection

The limit of detection of the method can be varied by choice of the area of the collection filter, the volume of air sampled and the area of the specimen examined in the TEM. It is also a function of the background of asbestos structures on unused filters. A limit of detection shall be quoted for each sample analysis.

NOTE 12 In practice, the lowest limit of detection is frequently determined by the total suspended particulate concentration, since each particle on the filter must be separated from adjacent ones by a distance large enough for the particle to be identified without interference. Particulate loadings on sampling filters greater than 25 µg/cm^2 usually preclude preparation of TEM specimens by the direct methods. If the analysis is to be performed **with** an acceptable expenditure of time, the area of the specimen examined in the TEM for structures of all sizes is limited in most cases to between 10 and 20 grid openings. In typical ambient or building atmospheres, it has been found that an analytical sensitivity of 1 structure/l can be achieved. *In* some circumstances, where the atmosphere is exceptionally clean, this can be reduced to 0,1 structure/l or lower. For fibres and bundles longer than 5 µm, the reduced magnifications specified permit larger areas of the TEM specimens to be examined with an acceptable expenditure of time, resulting in proportionately lower limits of detection. If no structures are found in the analysis, the upper 95 % confidence limit can be quoted as the upper boundary of the concentration, corresponding to 2,99 times the analytical sensitivity if a Poisson distribution of structures on the filter is assumed. This 95 % confidence limit for O structures counted is taken as the detection limit. Since there is sometimes contamination of unused samples filters by asbestos structures, this should also be taken into account in the discussion of limits of detection.

11 Test report

The test report shall include at least the following in-- formation:

a) reference to this International Standard;

b) identification of the sample;

c) the date and time of sampling, and all necessary sampling data;

d) the date of the analysis;

e) the identity of the analyst;

f) any procedure used that is not specified in this International Standard or regarded as optional;

g) a complete listing of the structure counting data (the following data should be included: grid opening number, structure number, identification category, structure type, length and width of the structure in micrometres, and any comments concerning the structure);

h) a statement of the minimum acceptable identification category and the maximum identification category attempted (refer to tables D.1 and D.2);

i) a statement specifying which identification and structure categories have been used to calculate the concentration values;

j) separate concentration values for chrysotile and amphibole structures, expressed in number of asbestos structures per litre;

k) the 95 % confidence interval limits for the concentration values, expressed in number of asbestos structures per litre;

l) the analytical sensitivity, expressed in number of asbestos structures per litre;

m) the limit of detection, expressed in number of asbestos structures per litre;

n) compositional data for the principal varieties of amphibole, if present;

o) items g) to m) for asbestos fibres and bundles longer than 5 µm;

p) items g) to m) for PCM equivalent asbestos fibres and bundles.

An example of a suitable format for the structure counting data is shown in figures 6 and 7.

Sample analysis information (page 1)

Laboratory name **Report number** **Date**

Sample: 456 Queen Street
Ashby de la Zouch
Exterior sample 1991-0 9

Air volume:	2 150,0 litres
Area of collection filter:	385,0 mm^2
Level of analysis (chrysotile):	CD or CMO
Level of analysis (amphibole):	ADO
Magnification used for fibre counting:	x 20 500
Aspect ratio for fibre definition:	5/1
Mean dimension of grid openings:	95,4 µm
Initials of analyst:	JMW
Number of grid openings examined:	10
Analytical sensitivity:	1,968 structures/l
Number of primary asbestos structures:	13
Number of asbestos structures counted:	26
Number of asbestos structures > 5 µm :	7
Number of asbestos fibres and bundles > 5 µm :	10
Number of PCM equivalent asbestos structures:	3
Number of PCM equivalent asbestos fibres:	5

Figure 6 - Example of format for reporting sample and preparation data

Sample analysis information (pages 2 and following)

Laboratoriy name **Report number** **Date**

Sample: 456 Queen Street
Ashby de la Zouch
Exterior sample 1991-0 9

TEM asbestos structure count - Raw data

Grid	Grid opening	Number of structures		Identif-ication[1]	Structure type	length	Width	Comments
		primary	total			µm	µm	
A	F4-4	1	1	CD	F	1,7	0,045	
		2	2	CMQ	B	2,6	0,09	
		3	3	ADO	F	4,0	0,15	Crocidolite
	E3-6	4	4	CD	MC+0	3,5	1,3	
	E5-1	5		CD	MD43	7,5	5,0	
			5	CD	MB	7,7	0,30	
			6	CMQ	MF	5,6	0,045	
			7	CD	MB	5,1	0,30	
			8	CD	MF	1,7	0,045	
B	F4-1	6		CD	CD+0	6,5	3,0	
			9	CD	CB	3,5	0,15	
			10	CD	CF	3,5	0,045	
			11	CMO	CR+0	2,6	1,9	
	G5-1	7		CD	CD31	6,1	3,2	
			12	CD	CB	5,6	0,3	
			13	CMQ	CF	4,0	0,045	
			14	CMG	CB	3,2	0,090	
	E4-4	8	15	CD	B	1,5	0,23	
		9	16	AD	F	8,7	0,15	
C	G4-4	10		CMO	CD42	25	5,6	
			17	CMQ	CB	15	0,15	
			18	CMQ	CF	9,4	0,045	
			19	ADO	CF	3,6	0,30	Tremolite
			20	CM	CF	4,2	0,045	
	E4-4			No fibres				
	E5-6	11		ADO	CD+3	9,4	2,5	
			21	ADO	CF	7,1	0,30	Amosite
			22	ADO	CF	6,2	0,10	Crocidolite
			23	CM	CB	5.1	0,2	
			24	CM	CR+0	3,3	1,8	
	F4-1	12	25	CMO	MC10	3,7	2,1	
		13	26	CD	CC+0	7,4	0,5	

1) Identification codes listed in tables D.1 and D.2.

Figure 7 - Example of format for reporting structure counting data

Annex A
(normative)

Determination of operating conditions for plasma asher

A.1 General

During the preparation of TEM specimens from an MEC or cellulose nitrate filter, the spongy structure of the filter is collapsed into a thinner film of polymer by the action of a solvent. Some of the particles on the surface of the original filter become completely buried in the polymer, and the specimen preparation procedure incorporates a plasma etching step to oxidize the surface layer of the polymer. Particles buried by the filter collapsing step are then exposed so that they can become subsequently affixed to the evaporated carbon film without altering their position on the original filter. The amount of etching is critical, and individual ashers vary in performance. Therefore, the plasma asher (7.3.4) shall be calibrated to give a known amount of etching of the surface of the collapsed filter. This is carried out by adjusting the radio-frequency power output and the oxygen flow-rate, and measuring the time taken to completely oxidize an uncollapsed cellulose ester filter with 25 mm diameter of the same type and pore size as those used in the analysis.

A.2 Procedure

Place an unused cellulose ester filter, with 25 mm diameter, of the same type as that being used, in the centre of a glass microscope slide. Position the slide approximately in the centre of the asher chamber. Close the chamber and evacuate to **a** pressure of approximately 40 Pa, while admitting oxygen to the chamber at a rate of 8 ml/min to 20 ml/min. Adjust the tuning of the system so that the intensity of the plasma in maximized. Measure the time required for complete oxidation of the filter. Determine operating parameters which result in complete oxydation of the filter in a period of approximately 15 min. For etching of collapsed filters, these operating parameters shall be used for a period of 8 min.

NOTE 13 Plasma oxidation at high radio-frequency powers will cause the filter to shrink and curl, followed by sudden violent ignition. At lower powers. the filter will remain in position and will slowly become thinner until it is nearly transparent. It is recommended that a radio-frequency power be used such that violent ignition does not occur. When multiple filters are etched, the rate of etching is reduced, and the system should be calibrated accordingly.

Annex B
(normative)

Calibration procedures

B.1 Calibration of the TEM

8.1.1 Calibration of TEM screen magnification

The electron microscope should be aligned according to the specifications of the manufacturer. Initially, and at regular intervals, calibrate the magnifications used for the analysis using a diffraction grating replica (7.3.11). Adjust the specimen height to the eucentric position before carrying out the calibration. Measure the distance on the fluorescent viewing screen occupied by a convenient number of repeat distances of the grating image, and calculate the magnification. Always repeat the calibration after any instrumental maintenance or change of operating conditions. The magnification of the image on the viewing screen is not the same as that obtained on photographic plates or film. The ratio between these is a constant value for the particular model of TEM.

B.1.2 Calibration of ED camera constant

Calibrate the camera constant of the TEM when used in ED mode. Use a specimen grid supporting a carbon film on which a thin film of gold has been evaporated or sputtered. Form an image of the gold film with the specimen adiusted to the eucentric position and select ED conditions. Adjust the objective lens current to optimize the pattern obtained, and measure the diameters of the innermost two rings either on the fluorescent viewing screen or on a recorded image. Calculate the radius-based camera constant, λL, for both the fluorescent screen and the photographic plate or film, using the following equation:

$$\lambda L = \frac{aD}{2\sqrt{h^2+k^2+l^2}}$$

where

λ is the wavelength, in nanometres, of the incident electrons;

L is the camera length, in millimetres;

a is the unit cell dimension of gold, in nanometres(= 0,407 86 nm);

D is the diameter, in millimetres, of the *(hkl)* diffraction ring.

Using gold as the calibration material, the radius-based camera constant is given by

$$\lambda L = 0{,}117\ 74D \text{ mm·nm (smallest ring)}$$

$$\lambda L = 0{,}101\ 97D \text{ mm·nm (second ring)}$$

8.2 Calibration of the EDXA system

Energy calibration of the EDXA system for a low energy and high energy peak shall be performed regularly. Calibration of the intensity scale of the EDXA system permits quantitative composition data, at an accuracy of about 10 % of the elemental concentration, to be obtained from EDXA spectra of reference silicate minerals involving the elements Na, Mg, Al, Si, K, Ca, Mn and Fe, and applicable certified reference materials. If quantitative determinations are required for minerals containing other elements, reference standards other than those referred to below will be required. Well-characterized mineral standards permit calibration of any TEM-EDXA combination which meets the instrumental specifications of 7.3.1 and 7.3.2, so that EDXA data from different instruments can be compared. Reference minerals are required for the calibration; the criteria for selection being that they should be silicate minerals with matrices as close as possible to those of the amphiboles or serpentine, and that small individual fragments of the minerals are homogeneous in composition within a few percent.

Determine the compositions of these standards by electron microprobe analysis or chemicals methods. Crush fragments of the same selected mineral standards and prepare filters by dispersal of the crushed material in water and immediate filtration of the suspensions. Prepare TEM specimens from these filters according to the procedures specified in clause 9. These TEM specimens can then be used to calibrate any TEM-EDXA system so that comparable compositional results can be obtained from different instruments.

NOTES

14 The microprobe analysis of the mineral standards are carried out by conventional techniques which can be found in annex J. The mineral is first embedded in a mount of poly(methyl methacrylate) or epoxy resin. The mount is then ground and polished to achieve a flat, polished surface of the mineral fragment. This surface is then analysed, using suitable reference standards, preferably oxide standards of the individual elements wherever these are available. It is necessary to take into account the water concentration in the minerals, which in the case of chrysotile amounts to 13 % by mass. This water content may vary due to losses in the vacuum system.

15 Aqueous suspensions of mineral standards should be filtered immediately after preparation, since alkali and alkali earth metals may be partially leached from minerals containing these elements.

Express the results of the electron microprobe analyses as atomic or mass percentage ratios relative to silicon. X-ray peak ratios of the same elements relative to silicon, obtained from the EDXA system, can then be used to calculate the relationship between peak area ratio and atomic or mass percentage ratio. The technique was described by Cliff and Lorimer (see annex J, reference [8]).

The X-rays generated in a thin specimen by an incident electron beam have a low probability of interacting with the specimen. Thus, mass absorption and fluorescence effects are negligible. In a silicate mineral specimen containing element *i*, the following equation can be used to perform quantitative analyses in the TEM:

$$\frac{C_i}{C_{Si}} = k_i \times \frac{A_i}{A_{Si}}$$

where

C_i is the concentration or atomic percentage of element *i*;

C_{Si} is the concentration or atomic percentage of silicon;

is the elemental integrated peak area for element *i*;

is the elemental integrated peak area for silicon;

k_i is the k-ratio for element i relative to silicon.

For a particular instrumental configuration and a particular particle size, the value of k_i is constant

To incorporate correction for the particle size effect on peak area ratios (see annex J, references [35] and [36], extend the Cliff and Lorimer technique by obtaining separate values of the constant k_i for different ranges of fibre diameter. It is recommended that 20 EDXA measurements be made for each range of fibre diameters. Suitable ranges of fibre diameter are:

< 0,25 µm; 0,25 µm to 0,5 µm; 0,5 µm to 1,0 µm; > 1,0 µm.

Insert the TEM grid into the transmission electron microscope, obtain an image at the calibrated higher magnification of about x 20 000, and adjust the specimen height to the eucentric point. If the X-ray detector is a side-entry variety, tilt the specimen towards the **X-ray** detector. Select an isolated fibre or particle less than 0,5 µm in width, and accumulate an EDXA spectrum using an electron probe of suitable diameter. When a well-defined spectrum has been obtained, perform a background subtraction and calculate the background-corrected peak areas for each element listed, using energy windows centred on the peaks. Calculate the ratio of the peak area for each specified element relative to the peak area for silicon. All background-subtracted peak areas used for calibration shall exceed 400 counts.

Repeat this procedure for 20 particles of each mineral standard. Reject analyses of any obviously foreign particles. Calculate the arithmetic mean concentration to peak area ratio, k_i (k-ratio), for each specified element of each mineral standard and for each of the fibre diameter ranges. Periodic routine checks shall be carried out to ensure that there has been no degradation of the detector performance. These k-ratios are used to calculate the elemental concentrations of unknown fibres, using the Cliff and Lorimer relationship.

Annex C
(normative)

Structure counting criteria

C.1 General

In addition to isolated fibres, other assemblages of particles and fibres frequently occur in air samples. Groupings of asbestos fibres and particles, referred to as "asbestos structures". are defined as fibre bundles, clusters and matrices. The numerical result of a TEM examination depends largely on whether the analyst assigns such an assemblage of fibres as a single entity, or as the estimated number of individual fibres which form the assemblage. It is therefore important that a logical system of counting criteria be defined, so that the interpretation of these complex structures is the same for all analysts, and so that the numerical result is meaningful. Imposition of specific structure-counting criteria generally requires that some interpretation, partially based on uncertain information on health effects, be made of each asbestos structure found. It is not the intention of this International Standard to make any interpretations based on health effects, and it is intended that a clear separation shall be made between recording of structure counting data, and later interpretation of those data. The system of coding specified in this International Standard permits a clear morphological description of the structures to be recorded in a concise manner suitable for later interpretation, if necessary, by a range of different criteria, without the necessity for re-examination of the specimens. In particular. the coding system is designed to permit the dimensions of each complex fibrous structure, and also whether these structures contain fibres longer than 5 µm, to be recorded. This approach permits later evaluations of the data to include considerations of particle respirability and comparisons with historical indices of asbestos exposure. Examples of the various types of morphological structure. and the manner in which these shall be recorded, are shown in figure C.1.

C.2 Structure definitions and treatment

Each fibrous structure that is a separate entity shall be designated as a primary structure. Each primary structure shall be designated as a fibre, bundle, cluster or matrix.

C.2.1 Fibre

Any particle with parallel or stepped sides, of minimum length 0,5 µm, and with an aspect ratio of 5/1 or greater, shall be defined as a fibre. For chrysotile asbestos, the single fibril shall be defined as a fibre. A fibre with stepped sides shall be assigned a width equal to the average of the minimum and maximum widths. This average shall be used as the width in determination of the aspect ratio.

C.2.2 Bundle

A grouping composed of apparently attached parallel fibres shall be defined as a bundle, with a width equal to an estimate of the mean bundle width, and a length equal to the maximum length of the structure. The overall aspect ratio of the bundle may have any value, provided that it contains individual constituent fibres with aspect ratios equal to or greater than 5/1. Bundles may exhibit diverging fibres at one or both ends.

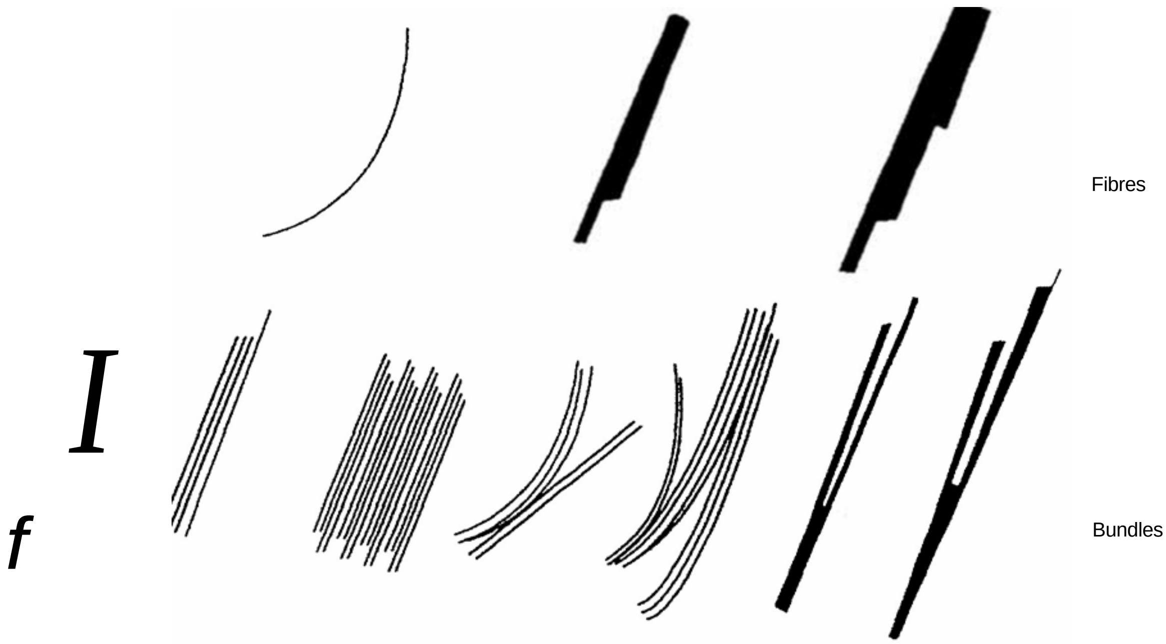
C.2.3 Cluster

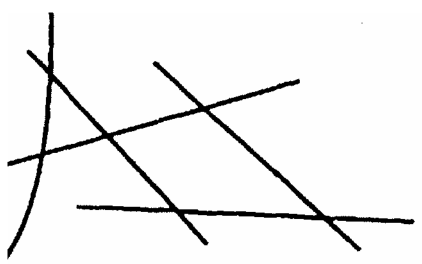
An aggregate of two or more randomly oriented fibres, with or without bundles, shall be defined as a cluster. Clusters occur as two varieties.

C2.3.1 disperse cluster (type D): Disperse and open network, in which at least one of the individual fibres or bundles can be separately identified and its dimensions measured;

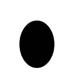
C2.3.2 compact cluster (type C): Complex and tightly bound network, in which one or both ends of each individual fibre or bundle is (are) obscured, such that the dimensions of individual fibres and bundles cannot be unambiguously determined.

In practice, clusters can occur in which the characteristics of both types of cluster occur in the same structure. Where this occurs, the structure should be defined as a disperse cluster, and then a logical procedure should be followed by recording structure components according to the counting criteria. The procedure for treatment of clusters is illustrated by examples in figure C.2.

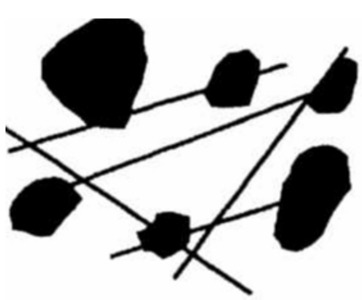




•I **Disperse** dua1er !type DJ



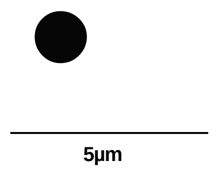
b) Compact duster (type Cl



cl Disperse matrix (type DJ

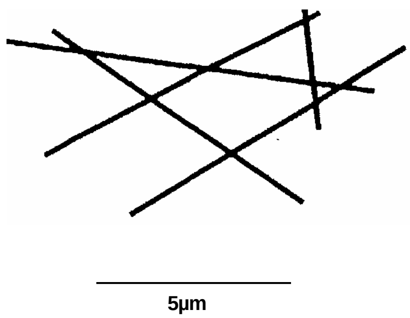
di Compact matrix (type C)

Agure C.1 - Fundamental morphological structure types



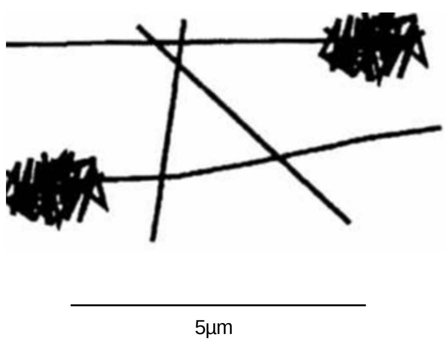
Count as 1 compact cluster containing more than 9 fibres (all fibres shorter than 5 µm}

Record as CC+O



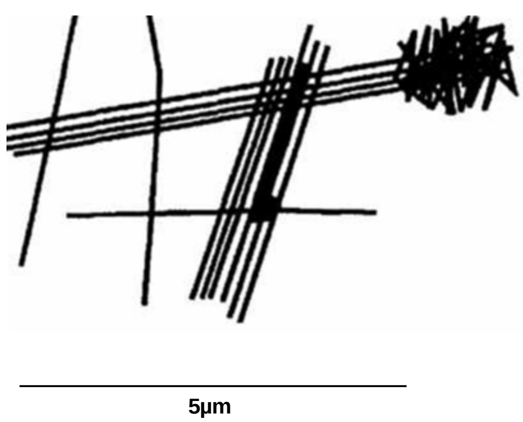
Count as 1 disperse cluster consisting of 5 fibres, 4 of which are longer than 5 µm

Record as CD54, followed by 5 fibres, each recorded as CF



Count as 1 disperse cluster consisting of 4 fibres, 2 of which are longer than 5 µm, and 2 cluster residuals, each containing more than 9 fibres

Record as CD+2, followed by 4 fibres, each recorded as CF, and 2 cluster residual, each recorded as CR+O



Count as 1 disperse cluster consisting of 3 fibres, 2 bundles, 1 of which is longer than 5 µm, and 1 cluster residual containing more than 9 fibres

Record as CD+1, followed by 3 fibres, each recorded as CF. 2 bundles, each recorded as CB, and 1 cluster residual recorded as CR+O

Figure C.2 - Examples of recording of complex asbestos clusters

C.2.4 Matrix

One or more fibres, or fibre bundles, may be attached to, or partially concealed by, a single particle or group of overlapping nonfibrous particles. This structure shall be defined as a matrix. The TEM image does not discriminate between particles which are attached to fibres, and those which have by chance overlapped in the TEM image. It is not known, therefore, whether such a structure is actually a complex particle, or whether it has arisen by a simple overlapping of particles and fibres on the filter.

Since a matrix structure may involve more than one fibre, it is important to define in detail how matrices shall be counted. Matrices exhibit different characteristics, and two types can be defined.

C.2.4.1 disperse matrix {type D): Structure consisting of a particle or linked group of particles, with overlapping or attached fibres or bundles in which at least one of the individual fibres or bundles can be separately identified and its dimensions measured.

C.2.4.2 compact matrix (type C): Structure consisting of a particle or linked group of particles, in which fibres or bundles can be seen either within the structure or projecting from it, such that the dimensions of individual fibres and bundles cannot be unambiguously determined.

In practice, matrices can occur in which the characteristics of both types of matrix occur in the same structure. Where this occurs, the structure should be assigned as a disperse matrix, and then a logical procedure should be followed by recording structure components according to the counting criteria. Examples of the procedure which shall be followed are shown in figure C.3.

C.2.5 Asbestos structure larger than 5 µm

Any fibre, bundle, cluster or matrix for which the largest dimension exceeds 5 µm. Asbestos structures larger than 5 µm do not necessarily contain asbestos fibres or bundles longer than 5 µm.

C.2.6 Asbestos fibre or bundle longer than 5µm

An asbestos fibre of any width, or bundle of such fibres. which has a length exceeding 5 µm.

C.2.7 PCM equivalent structure

Any fibre, bundle, cluster or matrix with an aspect ratio of 3/1 or greater. longer than 5 µm, and which has a diameter between 0,2 µm and 3,0 µm. PCM equivalent structures do not necessarily contain fibres or bundles longer than 5 µm, or PCM equivalent fibres.

C.2.8 PCM equivalent fibre

Any particle with parallel or stepped sides, with an aspect ratio of 3/1 or greater, longer than 5 µm, and which has a diameter between 0,2 µm and 3,0 µm. For chrysotile, PCM equivalent fibres will always be bundles.

C.3 Other structure counting criteria

C.3.1 Structures which intersect grid bars

A structure which intersects a grid bar shall only be counted on two sides of the grid opening, as illustrated in figure C.4. Record the dimensions of the structure such that the obscured portions of components are taken to be equivalent to the unobscured portions, as shown by the broken lines in figure C.4. For example, the length of a fibre intersecting a grid bar is taken to be twice the unobscured length. Structures intersecting either of the other two sides shall not be included in the count.

C.3.2 Fibres which extend outside the field of view

During scanning of a grid opening, count fibres which extend outside the field of view systematically, so as to avoid doubl ounting. In general, a rule should be established so that fibres extending outside the field of view in only two quadrants are counted. The procedure is illustrated by figure C.5. Measure the length of each of these fibre by moving the specimen to locate the other end of the fibre. and then return to the original field of view before continuing to scan the specimen. Fibres without terminations within the field of view shall not be counted.

5µm

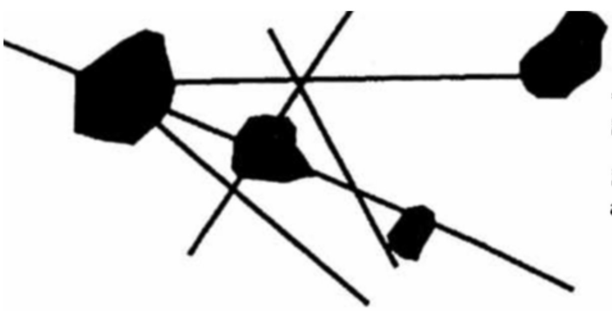
Count as 1 compact matrix. with all fibres shorter than 5µm

Record as MC+O

5µm

Count as 1 disperse matrix consisting of 1 fibre shorter than 5 µm

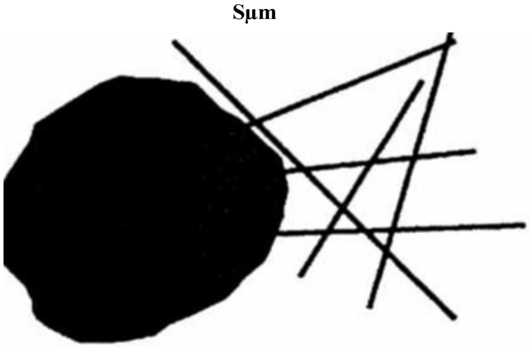
Record as MD1O. followed by 1 fibre recorded as MF



Sµm

Count as 1 disperse matrix consisting of 5 fibres. all longer than 5 µm

Record as MD55, followed by 5 fibres, each recorded as MF



Sµm

Count as 1 disperse matrix. consisting if 3 fibres, 1 of which is longer than 5 µm, and 1 matrix residual containing 3 fibres

Record as MD61, followed by 3 fibres, each recorded as MF. and 1 matrix residual recorded as MR30

Figure C.3 - Examples of recording of complex asbestos matrices

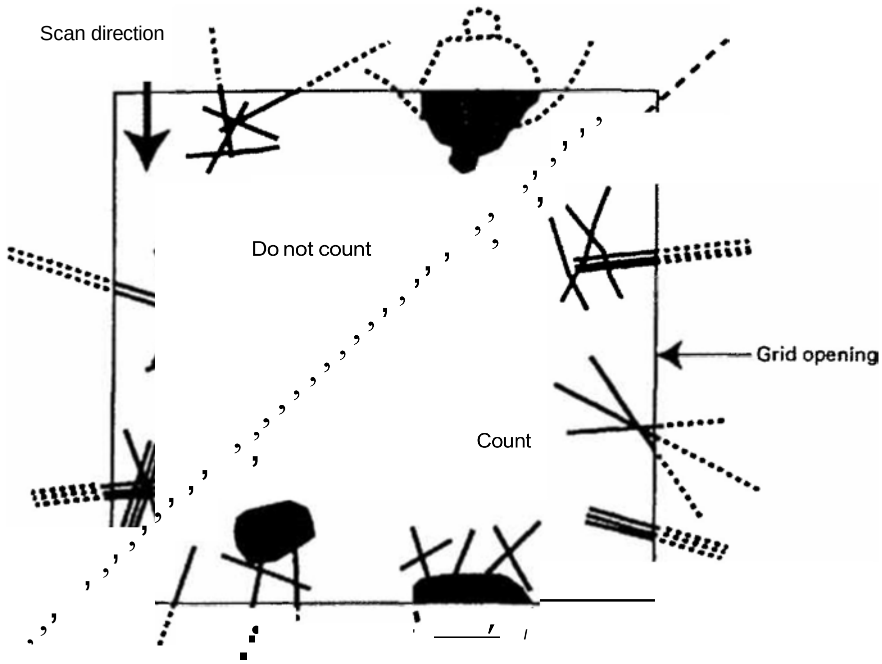
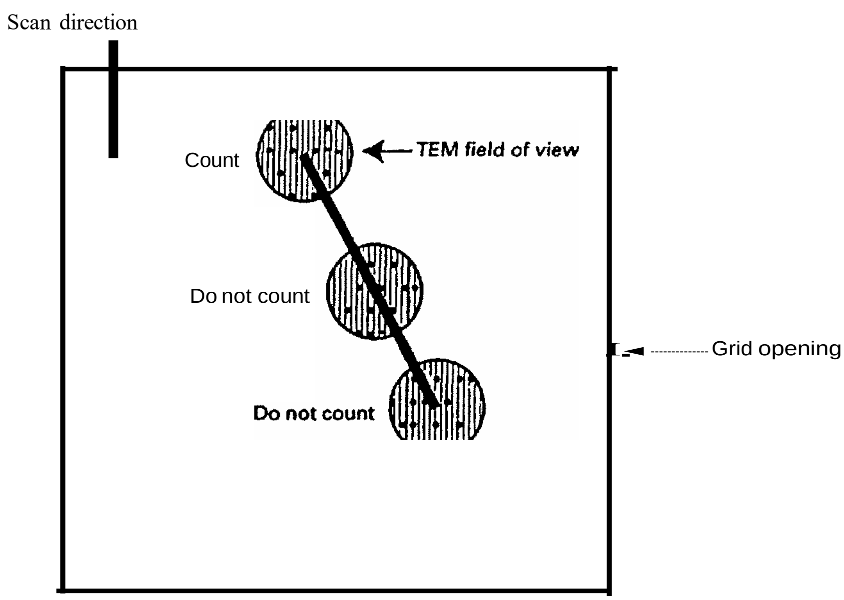


Figure C.4 - Example of counting of structures which intersect grid bars



Agure C.5 - Example of counting of fibres which extend outside the field of view

C.4 Procedure for data recording

C.4.1 General

The morphological codes specified are designed to facilitate computer data processing, and to allow recording of a complete representation of the important features of each asbestos structure. The procedure requires that the microscopist classify each primary fibrous structure into one of the four fundamental categories: fibres, bundles, clusters and matrices.

C.4.2 Fibres

On the structure counting form, a fibre as defined in C.2.1 shall be recorded by the designation "F". If the fibre is a separately-counted part of a cluster or matrix, the fibre shall be recorded by the designation "CF", or "MF", depending on whether it is a component of a cluster or matrix.

C.4.3 Bundles

On the structure counting form, a bundle as defined in C.2.2 shall be recorded by the designation "B". If the bundle is a separately-counted part of a cluster or matrix, the bundle shall be recorded by the designation "CB", or "MB", depending on whether it is a component of a cluster or matrix.

C.4.4 Disperse clusters (type D)

On the structure counting form, an isolated cluster of type D as defined in C.2.3 shall be recorded by the designation "CD", followed by a two-digit number. The first digit represents the analyst's estimate of the total number of fibres and bundles comprising the structure. The digit shall be from 1 to 9, or designated as "+" if there are estimated to be more than 9 component fibres or bundles. The second digit shall represent, in the same manner, the total number of fibres and bundles longer than 5 µm contained in the structure. The overall dimensions of the cluster, in two perpendicular directions representing the maximum dimensions, shall be recorded. In order of decreasing length, up to 5 component fibres or bundles shall be separately recorded, using the codes "CF" (cluster fibre) and "CB" (cluster bundle). If, after accounting for prominent component fibres and bundles, a group of clustered fibres remains, this shall be recorded by the designation "CR" (cluster residual). If the remaining clustered fibres are present as more than one localized group, it may be necessary to record more than one cluster residual. Do not record more than 5 cluster residuals for any cluster. A cluster residual shall be measured and assigned a two-digit number, derived in the same manner as specified for the overall cluster. Optionally, if the number of component fibres and bundles in either the original cluster or the cluster residual is outside the range 1 - 9, additional information concerning the number of component fibres and bundles may be noted in the "comments" column.

C.4.5 Compact clusters (type C)

On the structure counting form. an isolated cluster of type C as defined in C.2.3 shall be recorded by the designation "CC", followed by a two-digit number. The two-digit number describing the numbers of component fibres and bundles shall be assigned in the same manner as for clusters of type D. The overall dimensions of the cluster in two perpendicular directions shall be recorded in the same manner as for clusters of type D. By definition, the constitutent fibres and bundles of compact clusters cannot be separately measured; therefore, no separate tabulation of component fibres or bundles can be made.

C.4.6 Disperse matrices (type D)

On the structure counting form, an isolated matrix of type D as defined in C.2.4 shall be recorded by the designation "MD", followed by a two-digit number. The two-digit number shall be assigned in the same manner as for clusters of type D. The overall dimensions of the matrix in two perpendicular directions shall be recorded in the same manner as for clusters of type D. In order of decreasing length, up to 5 component fibres or bundles shall be separately recorded, using the codes "MF" (matrix fibre) and "MB" (matrix bundle). If after accounting for prominent component fibres and bundles, matrix material containing asbestos fibres remains, this shall be recorded by the designation "MR" (matrix residual). If the remaining matrix fibres are present as more than one localized group, it may be necessary to record more than one matrix residual. Do not record more than 5 matrix residuals for any matrix. A matrix residual shall be measured and assigned a two-digit number, derived in the same manner as specified for the overall matrix. Optionally, if the number of component fibres or bundles in either the original matrix or the matrix residual is outside the range 1 - 9, additional information concerning the number of component fibres and bundles may be noted in the "comments" column.

C.4.7 Compact matrices (type C)

On the structure counting form, an isolated matrix of type C as defined in C.2.4 shall be recorded by the designation "MC". followed by a two-digit number. The two-digit number shall be assigned in the same manner as for clusters of type D. The overall dimensions of the matrix in two perpendicular directions shall be recorded in the same manner as for clusters of type D. By definition. the constitutent fibres and bundles of compact matrices cannot be separately measured; therefore. no separate tabulation of component fibres or bundles can be made.

C.4.8 Procedure for recording of partially obscured fibres and bundles

The proportion of the length of a fibre or bundle that is obscured by other particulates shall be used as the basis for determining whether a fibre or bundle is to be recorded as a separate component or is to be considered as a part of a matrix of type C or part of a matrix residual. If the obscured length could not possibly be more than one-third of the total length. the fibre or bundle shall be considered a prominent feature to be separately recorded. The assigned length for each such partially obscured fibre or bundle shall be equal to the visible length plus the maximum possible contribution from the obscured portion. Fibres or bundles which appear to cross the matrix. and for which both ends can be located approximately, shall be included in the maximum of 5 and recorded according to the counting criteria as separate fibres or bundles. If the obscured length could be more than one third of the total length, the fibre or bundle shall be considered as a part of a compact matrix of type C or part of a matrix residual.

C.5 Special considerations for counting of PCM equivalent structures

Use 3/1 as the minimum aspect ratio for counting of PCM equivalent structures. This aspect ratio definition is required in order to achieve comparability of the results for this size range of structure with historical optical measurements. but use of this aspect ratio definition does not significantly affect the ability to interpret the whole fibre size distribution in terms of a minimum 5/1 aspect ratio. Some applications may require that a count be made of PCM equivalent structures only. The coding system permits discrimination between PCM equivalent structures that contain fibres and bundles longer than 5 µm and those that do not.

NOTE 16• In general. clusters and matrices will yield fewer components as the minimum dimensions specified for countable fibres are increased. Thus. it may be found that a particular structure yields a higher number of component fibres and bundles in a count for all fibre sizes than it does at a reduced magnification when only fibres and bundles longer than 5 µm are being counted. However. the requirement that component fibres and bundles be recorded in decreasing length order ensures that the data are consistent for a particular structure. regardless of the size category of fibres being counted and the magnification in use.

Annex D
(normative}

Fibre identification procedure

D.1 General

The criteria used for identification of asbestos fibres may be selected depending on the intended use of the measurements. In some circumstances, there can be a requirement that fibres shall be unequivocally identified as a specific mineral species. In other circumstances, there can be sufficient knowledge about the sample, so that rigorous identification of each fibre need not be carried out. The time required to perform the analysis, and therefore the cost of analysis, can vary widely depending on the identification criteria considered which are to be sufficiently definitive. The combination of criteria considered definitive for identification of fibres in a particular analysis shall be specified before the analysis is made, and this combination of criteria shall be referred to as the "level" of analysis. Various factors related to instrumental limitations and the character of the sample may prevent satisfaction of all of the specified fibre identification criteria for a particular fibre. Therefore, a record shall be made of the identification criteria which were satisfied for each suspected asbestos fibre included in the analysis. For example, if both ED and EDXA were specified to be attempted for definitive identification of each fibre, fibres with chrysotile morphology which, for some reason, do not give an ED pattern but which do yield an EDXA spectrum corresponding to chrysotile, are categorized in a way which conveys the level of confidence to be placed in the identification.

D.2 ED and EDXA techniques

0.2.1 General

Initially, fibres are classified into two categories on the basis of morphology: those fibres with tubular morphology, and those fibres without tubular morphology. Further analysis of each fibre is conducted using ED and EDXA methods. The following procedures should be used when fibres are examined by ED and EDXA.

The crystal structures of some mineral fibres. such as chrysotile, are easily damaged by the high current densities required for EDXA examination. Therefore, investigation of these sensitive fibres by ED should be completed before attempts are made to obtain EDXA spectra from the fibres. When more stable fibres, such as the amphiboles, are examined, EDXA and ED may be used in either order.

0.2.2 ED techniques

The ED technique can be either qualitative or quantitative. Qualitative ED consists of visual examination. without detailed measurement. of the general characteristics of the ED pattern obtained on the TEM viewing screen from a randomly oriented fibre. ED patterns obtained from fibres with cylindrical symmetry, such as chrysotile, do not change when the fibres are tilted about their axes, and patterns from randomly oriented fibres of these minerals can be interpreted quantitatively. For fibres which do not have cylindrical symmetry, only those ED patterns obtained when the fibre is oriented with a principal crystallographic axis closely parallel with the incident electron beam direction can be interpreted quantitatively. This type of ED pattern shall be referred to as a "zone-axis ED pattern*w.* In order to interpret a zone-axis ED pattern quantitatively, it shall be recorded photographically and its consistency with known mineral structures shall be checked. A computer program may be used to compare measurements of the zone-axis ED pattern with corresponding data calculated from known mineral structures. The zone-axis ED pattern obtained by examination of a fibre in a particular orientation can be insufficiently specific to permit unequivocal identification of the mineral fibre. but is is often possible to tilt the fibre to another angle and to record a different ED pattern corresponding to another zone-axis. The angle between the two zone-axes can also be checked for consistency with the structure of a suspected mineral.

For visual examination of the ED pattern, the camera length of the TEM should be set to a low value of approximately 250 mm and the ED pattern should then be viewed through the binoculars. This procedure minimizes the possible degradation of the fibre by the electron irradiation. However. the pattern is distorted by the tilt angle of the viewing screen. A camera length of at least 2 m should be used when the ED pattern is recorded, if accurate measurement of the pattern is to be possible. It is necessary that, when obtaining an ED pattern to be evaluated visually or to be recorded, the sample height shall be properly adjusted to the eucentric point and the image shall be focussed in the plane of the selected area aperture. If this is not done, there may be some components of the ED pattern which do not originate from the selected area. In general, it will be necessary to use the smallest available ED aperture.

For accurate measurements of the ED pattern, an internal calibration standard shall be used. A thin coating of gold, or another suitable calibration material. shall be applied to the underside of the TEM specimen. This coating may be applied either by vacuum evaporation or, more conveniently, by sputtering. The polycrystalline gold film yields diffraction rings on every ED pattern and these rings provide the required calibration information.

To form an ED pattern, move the image of the fibre to the centre of the viewing screen, adjust the height of the specimen to the eucentric position, and insert a suitable selected area aperture into the electron beam so that the fibre, or a portion of it, occupies a large proportion of the illuminated area. The size of the aperture and the portion of the fibre shall be such that particles other than the one to be examined are excluded from the selected area. Observe the ED pattern through the binoculars. During the observation, the objective lens current should be adjusted to the point where the most complete ED pattern is obtained. If an incomplete ED pattern is still obtained. move the particle around within the selected area to attempt to optimize the ED pattern, or to eliminate possible interferences from neighbouring particles.

If a zone-axis ED analysis is to be attempted on the fibre, the sample shall be mounted in the appropriate holder. The most convenient holder allows complete rotation of the specimen grid and tilting of the grid about a single axis. Rotate the sample until the fibre image indicates that the fibre is oriented with its length coincident with the tilt axis of the goniometer, and adjust the sample height until the fibre is at the eucentric position. Tilt the fibre until an ED appears which is a symmetrical. two dimensional array of spots. The recognition of zone-axis alignment conditions requires some experience on the part of the operator. During tilting of the fibre to obtain zone-axis conditions. the manner in which the intensities of the spots vary should be observed. If weak reflections occur at some points on a matrix of strong reflections, the possibility of twinning or multiple diffraction exists, and some caution should be exercised in the selection of diffraction spots for measurement and interpretation. A full discussion of electron diffraction and multiple diffraction can be found in the references by JA Gard [111 P.B. Hirsch *et al* **[14]** and H.R. Wenck **[42)** included in annex J. Not all zone-axis patterns which can be obtained are definitive. Only those which have closely spaced reflections corresponding to low indices in at least one direction should be recorded. Patterns in which all cl-spacings are less than about 0,3 nm are not definitive. A useful guideline is that the lowest angle reflections should be within the radius of the first gold diffraction ring (111), and that patterns with smaller distances between reflections are usually the most definitive.

Five spots, closest to the centre spot, along two intersecting lines of the zone-axis pattern shall be selected for measurement, as shown in figure D.1. The distances of these spots from the centre spot and the four angles shown provide the required data for analysis. Since the centre spot is usually very overexposed, it does not provide a well-defined origin for these measurements. The required distances shall therefore be obtained by measuring between pairs of spots symmetrically disposed about the centre spot, preferably separated by several repeat distances. The distances shall be measured with a precision of better than 0,3 mm, and the angles to a precision of better than 2,5°. The diameter of the first or second ring of the calibration pattern (111 and 200) shall also be measured with a precision of better than 0,3 mm.

Using gold as the calibration material, the radius-based camera constant is given by

$JL = 0{,}117\ 74D$ mm-nm (first ring}

$JL = 0{,}101\ 97D$ mm•nm (second ring)

D.2.3 EDXA measurements

Interpretation of the EDXA spectrum may be either qualitative or quantitative. For qualitative interpretation of a spectrum, the X-ray peaks originating from the elements in the fibre are recorded. For quantitative interpretation, the net peak areas, after background subtraction, are obtained for the X-ray peaks originating from the elements in the fibre. This method provides quantitative interpretation for those minerals which contain silicon.

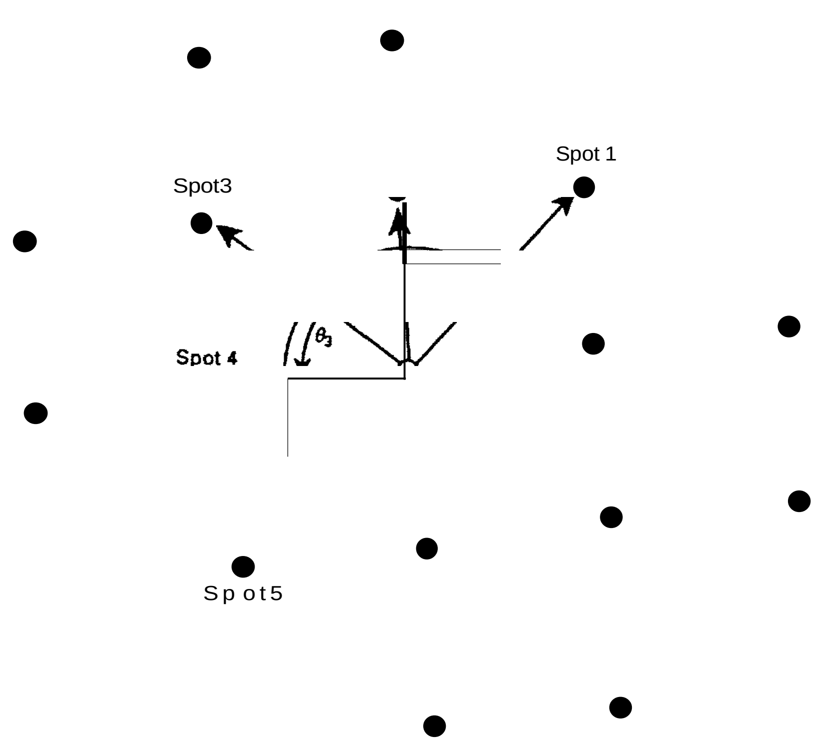


Figure D.1 - Example of measurement of zone-axis SAED patterns

To obtain an EDXA spectrum, move the image of the fibre to the centre of the screen and remove the objective aperture. Select an appropriate electron beam diameter and deflect the beam so that it impinges on the fibre. Depending on the instrumentation, it may be necessary to tilt the specimen towards the X-ray detector and, in some instruments, to use the Scanning Transmission Electron Microscopy (STEM) mode of operation.

The time for acquisition of a suitable spectrum varies with the fibre diameter, and also with instrumental factors. For quantitative interpretation, spectra should have a statistically valid number of counts in each peak. Analyses of small diameter fibres which contain sodium are the most critical, since it is in the low energy range that the X-ray detector is least sensitive. Consequently, it is necessary to acquire a spectrum for a period that is sufficiently long for the sodium to be detected in such fibres. It has been found that satisfactory quantitative an analyses can be obtained if acquisition is continued until the background subtracted silicon ***Kr.r.*** peak integral exceeds 1O 000 counts. The spectrum should then be manipulated to subtract the background and to obtain the net areas of the elemental peaks.

After quantitative EDXA classification of some fibres by computer analysis of the net peak areas, it may be possible to classify further fibres in the same sample on the basis of comparison of spectra at the intrument. Frequently, visual comparisons can be made after somewhat shorter acquisition times.

D.3 Interpretation of fibre analysis data

0.3.1 Chrysotile

The morphological structure of chrysotile is characteristic, and with experience, can be recognized readily. However, a few holder minerals have a similar appearance, and morphological observation by itself is inadequate for most samples. The ED pattern obtained from chrysotile is quite specific for this mineral if the specified characteristics of the pattern correspond to those from reference chrysotile. However, depending on the past history of the fibre, and on a number of other factors, the crystal structure of a particular fibre may be damaged, and it may not yield and ED pattern. In this case, the EDXA spectrum may be the only data available to supplement the morphological observations.

D.3.2 Amphiboles

Since the fibre identification procedure for asbestos fibres other than chrysotile can be involved and time-consuming, computer programmes, such as that developed by B.L. Rhoades (see annex J, reference

[32]), are recommended for interpretation of zone-axis ED patterns. The published literature contains composition and crystallographic data for all of the fibrous minerals likely to be encountered in TEM analysis of air samples, and the compositional and structural data from the unknown fibre should be compared with the published data. Demonstration that the measurements are consistent with the data for a particular test mineral does not uniquely identify the unknown, since the possibility exists that data from other minerals may also be consistent. It is, however, unlikely that a mineral of another structural class could yield data consistent with that from an amphibole fibre identified by quantitative EDXA and two zone-axis ED patterns.

Suspected amphibole fibres should be classified initially on the basis of chemical composition. Either qualitative or quantitative EDXA information may be used as the basis for this classification. From the published data on mineral compositions, a list of minerals which are consistent in composition with that measured for the unknown fibre should be compiled. To proceed further, it is necessary to obtain the first zone-axis ED pattern, according to D.2.2.

It is possible to specify a particular zone-axis pattern for identification of amphibole, since a few patterns are often considered to be characteristic. Unfortunately, for a fibre with random orientation on a TEM grid, no specimen holder and goniometer currently available will permit convenient and rapid location of two preselected zone-axes. The most practical approach has been adopted, which is to accept those low index patterns which are easily obtained, and then to test their consistency with the structures of the minerals already preselected on the basis of the EDXA data. Even the structures of non--amphibole minerals in this preselected list shall be tested against the zone-axis data obtained for the unknown fibre, since non--amphibole minerals in some orientations may yield similar patterns consistent with amphibole structures.

The zone-axis ED interpretation shall include all minerals previously selected from the mineral data file as being chemically compatible with the EDXA data. This procedure will usually shorten the list of minerals for which solutions have been found. A second set of zone-axis data from another pattern obtained on the same fibre can then be processed, either as further confirmation of the identification, or to attempt elimination of an ambiguity. In addition, the angle measured between the orientations of the two zone-axes can be checked for consistency with the structures of the minerals. Caution should be exercised in rationalizing the inter-zone-axis angle, since if the fibre contains c-axis twinning, the two zone-axis ED patterns may originate from the separate twin crystals. In practice, the full identification procedure will normally be applied to very few fibres, unless precise identification of all fibres is required for a particular reason.

0.4 Fibre classification categories

It is not always possible to proceed to a definitive identification of a fibre; this may be due to instrumental limitations or to the actual nature of the fibre. In many analyses, a definitive identification of each fibre may not actually be necessary if there is other knowledge available about the sample, or if the concentration is below a level of interest. The analytical procedure shall therefore take into account both instrumental limitations and varied analytical requirements. Accordingly, a system for fibre classification is used to permit accurate recording of data. The classifications are shown in tables D.1 and D.2. and are directed towards identification of chrysotile and amphibole respectively. Fibres shall be reported in these categories.

The general principle to be followed in this analytical procedure is first to define the most specific fibre classification which is to be attempted, or the "level" of analysis to be conducted. Then, for each fibre examined, record the classification which is actually achieved. Depending on the intended use of the results. criteria for acceptance of fibres as "identified" can then be established at any time after completion of the analysis.

In an unknown sample, chrysotile will be regarded as confirmed only if a recorded, calibrated ED pattern from one fibre in the CD categories is obtained, or if measurements of the ED pattern are recorded at the instrument. Amphibole will be regarded as confirmed only by obtaining recorded data which indicates exclusively the presence of amphiboles for fibres classified in the AZO, AZZ or *AZZQ* categories.

Table D.1 - Classification of fibres with tubular morphology

Category	Description
TM	Tubular Morphology, not sufficiently characteristic for classification as chrysotile
CM	Characteristic Chrysotile Morphology
CD	Chrysotile SAED pattern
CO	Chrysotile composition by Quantitative EDXA
CMQ	Chrysotile Morphology and composition by Quantitative EDXA
CDQ	Chrysotile SAED pattern and composition by Quantitative EDXA
NAM	Non-Asbestos Mineral

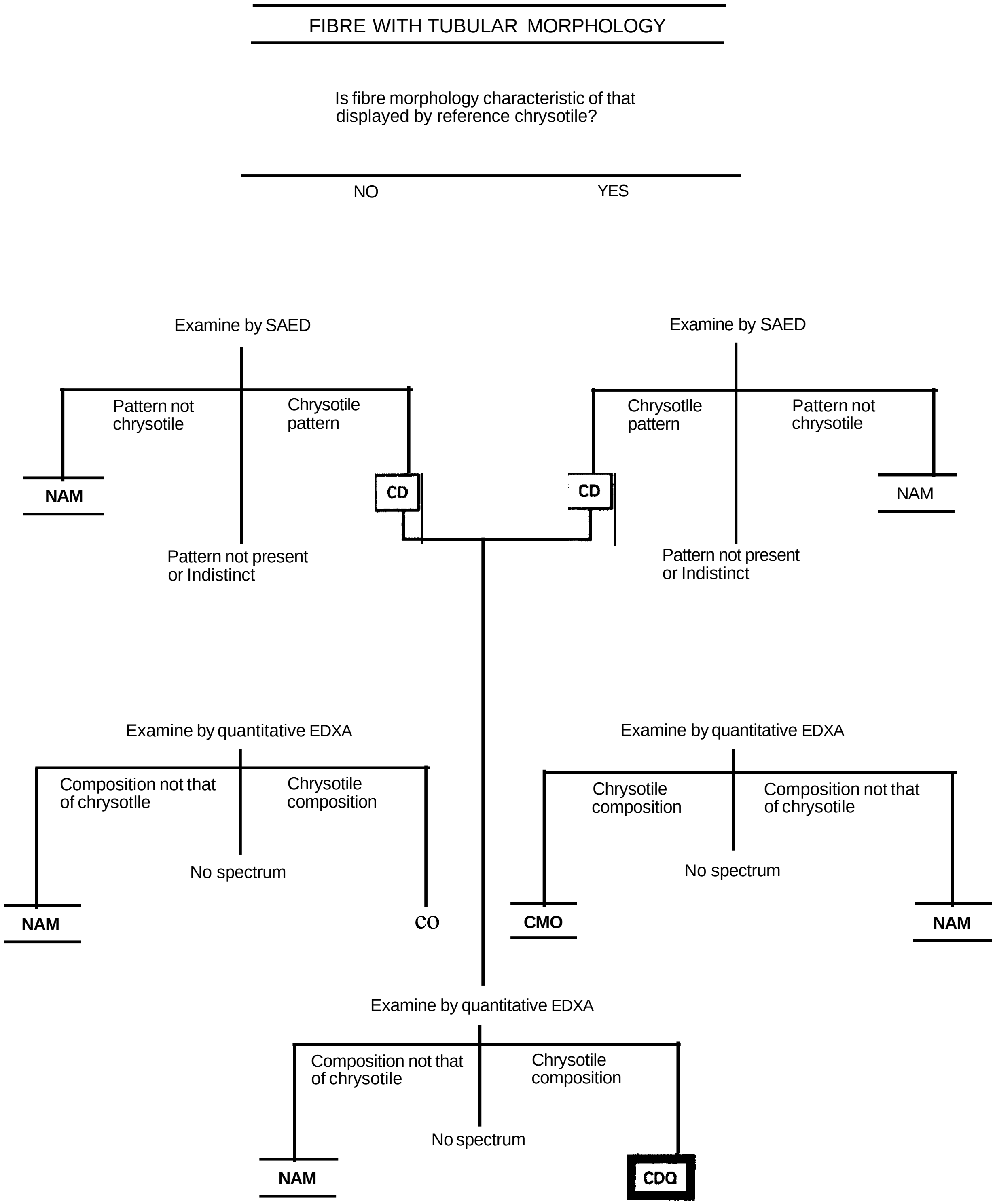
Table D.2 - Classification of fibres without tubular morphology

Category	Description
UF	Unidentified Fibre
AD	Amphibole by random orientation SAED (shows layer pattern of 0,53 nm spacing)
AX	Amphibole by qualitative EDXA. Spectrum has elemental components consistent with amphibole
ADX	Amphibole by random orientation SAED and qualitative EDXA
AO	Amphibole by Quantitative EDXA
AZ.	Amphibole by one Zone-axis SAED pattern
ADO	Amphibole by random orientation SAED and Quantitative EDXA
AZ.Q	Amphibole by one Zone-axis SAED pattern and Quantitative EDXA
AZ.Z	Amphibole by two Zone-axis SAED patterns, with consistent interaxial angle
AZZQ	Amphibole by two Zone-axis SAED patterns. with consistent interaxial angle, and Quantitative EDXA
NAM	Non-Asbestos Mineral

D.4.1 Procedure for classification of fibres with tubular morphology suspected to be chrysotile

Occasionally, ·fibres are encountered which have tubular morphology similar to that of chrysotile, but which cannot be characterized further either by ED or EDXA. They may be non-crystalline, in which case ED techniques are not useful. or they may be in a position on the grid which does not permit an EDXA spectrum to be obtained. Alternatively, the fibre may be of organic origin, but the morphology and composition may not be sufficiently definitive enough to be disregarded. Accordingly, there is a requirement to record each fibre, and to specify how confidently each fibre can be identified. Classification of fibres will meet with various degrees of success. Figure D.2 shows the classification procedure to be used for fibres which display any tubular morphology. The chart is self explanatory, and every fibre is either rejected as a non-asbestos mineral **(NAM),** or classified in some way which by some later criterion could still contribute to the chrysotile fibre count.

Morphology is the first consideration, and if this is not similar to that usually seen in chrysotile standard samples, designate the initial classification as TM. Regardless of the doubtful morphology, examine the fibre by ED and EDXA methods according to figure D.2. Where the morphology is more definitive, it may be possible to classify the fibre as having chrysotile morphology (CM).



F-.gure D.2 - Classification chart for fibre with tubular morphology

For classification as CM. the morphological characteristics required are the following:

a) the individual fibrils should have high aspect ratios exceeding 5/1, and be about 30 nm to 40 nm in diameter;

b) the electron scattering power of the fibre at 60 kV to 100 kV accelerating potential should be sufficiently low for the internal structure to be visible;

c) there should be some evidence of an internal structure suggesting a tubular appearance similar to that shown by reference UICC chrysotile, which may degrade in the electron beam.

Examine every fibre having these morphological characteristics by the ED technique, and classify as chrysotile by ED (CD) only those which give diffraction patterns with the precise characteristics shown in figure D.3. The relevant features in this pattern for identification of chrysotile are as follows:

a) the (002) reflections should be examined to determine that they correspond closely to a spacing of 0,73 nm;

bl the layer line repeat distance should correspond to 0,53 nm;

c) there should be "streaking" of the (110) and (130) reflections.

Figure D.3 - Chrysotile SAED pattern

Using the millimetre calibrations on the TEM viewing screen. these observations can readily be made at the instrument. If documentary proof of fibre identification is required, record a TEM micrograph of at least one representative fibre, and record its ED pattern on a separate film or plate. This film or plate shall also carry calibration rings from a known polycrystalline substance such as gold. This calibrated pattern is the only documentary proof that the particular fibre is chrysotile, and not some other tubular or scrolled species such as halloysite, palygorskite, talc or vermiculite. The proportion of fibres which can be successfully identified as chrysotile by ED is variable. and to some extent dependent on both the instrument and the procedures of the operator. The fibres that fail to yield an identifiable ED pattern will remain in the TM or CM categories unless they are examined by EDXA.

In the EDXA analysis of chrysotile there are only two elements which are relevant. For fibre classification, the EDXA• analysis shall be quantitative. If the spectrum displays prominent peaks from magnesium and silicon, with their areas in the appropriate ratio, and with only minor peaks from other elements, classify the fibre as chrysotile by quantitative EDXA, in the categories CO, CMG, or COO, as appropriate.

D.4.2 Procedure for classification of fibres without tubular morphology, suspected to be amphibole

Every particle without tubular morphology and which is not obviously of biological origin, with an aspect ratio of 5/1 or greater, and having parallel or stepped sides. shall be considered as a suspected amphibole fibre. Further examination of the fibre by ED and EDXA techniques will meet with a variable degree of success, depending on the nature of the fibre and on a number of instrumental limitations. It will not be possible to identify every fibre completely, even if time and cost are of no concern. Moreover. confirmation of the presence of amphibole can be achieved only by quantitative interpretation of zone-axis ED patterns. a very time-consuming procedure. Accordingly, for routine samples from unknown sources, this analytical procedure limits the requirement for zone-axis ED work to a minimum of one fibre representative of each compositional class reported. In some samples, it may be necessary to identify more fibres by the zone-axis technique. When analysing samples from well-characterized sources, the cost of identification by zone-axis methods may not be justified.

The 0,53 nm layer spacing of the random orientation ED pattern is not by itself diagnostic for amphibole, However. the presence of c-axis twinning in many fibres leads to contributions to the layers in the patterns by several individual parallel crystals of different axial orientations. This apparently random positioning of the spots along the layer lines, if also associated with a high fibre aspect ratio, is a characteristic of amphibole asbestos, and thus has some limited diagnostic value. If a pattern of this type is not obtained, the identity of the fibre is still ambiguous, since the absence of a recognizable pattern may be a consequence of an unsuitable orientation relative to the electron beam, or the fibre may **be** some other mineral species.

Figure D.4 shows the fibre classification chart to be used for suspected amphibole fibres. This chart shows all the classification paths possible in analysis of a suspected amphibole fibre, when examined systematically by ED and EDXA. Two routes are possible, depending on whether an attempt to obtain an EDXA spectrum or a random orientation ED pattern is made first. The normal procedure for analysis of a sample of unknown origin will be to examine the fibre by random orientation ED, qualitative EDXA, quantitative EDXA, and zone-axis ED, in this sequence. The final fibre classification assigned will be defined either by successful analysis at the maximum required level, or by the instrumental limitations. Any instrumental limitations which affect the quality of the results shall be noted. Record the maximum classification achieved for each fibre on the counting sheet in the appropriate column. The various classification categories can then be combined later in any desired way for calculation of the fibre concentration. The complete record of the results obtained when attempting to identify each fibre can also be used to re-assess the data if necessary.

In the unknown sample, zone-axis analysis will be required if the presence of amphibole is to be unequivocally confirmed. For this level of analysis, attempt to raise the classification of every suspected amphibole fibre to the ADO category by inspection of the random orientation ED pattern and the EDXA spectrum. In addition, examine at least one fibre from each type of suspected amphibole found by zone-axis methods to confirm their identification. In most cases, because information exists about possible sources of asbestos in close proximity to the air sampling location, some degree of ambiguity of identification can be accepted. Lower levels of analysis can therefore be accepted for these situations.

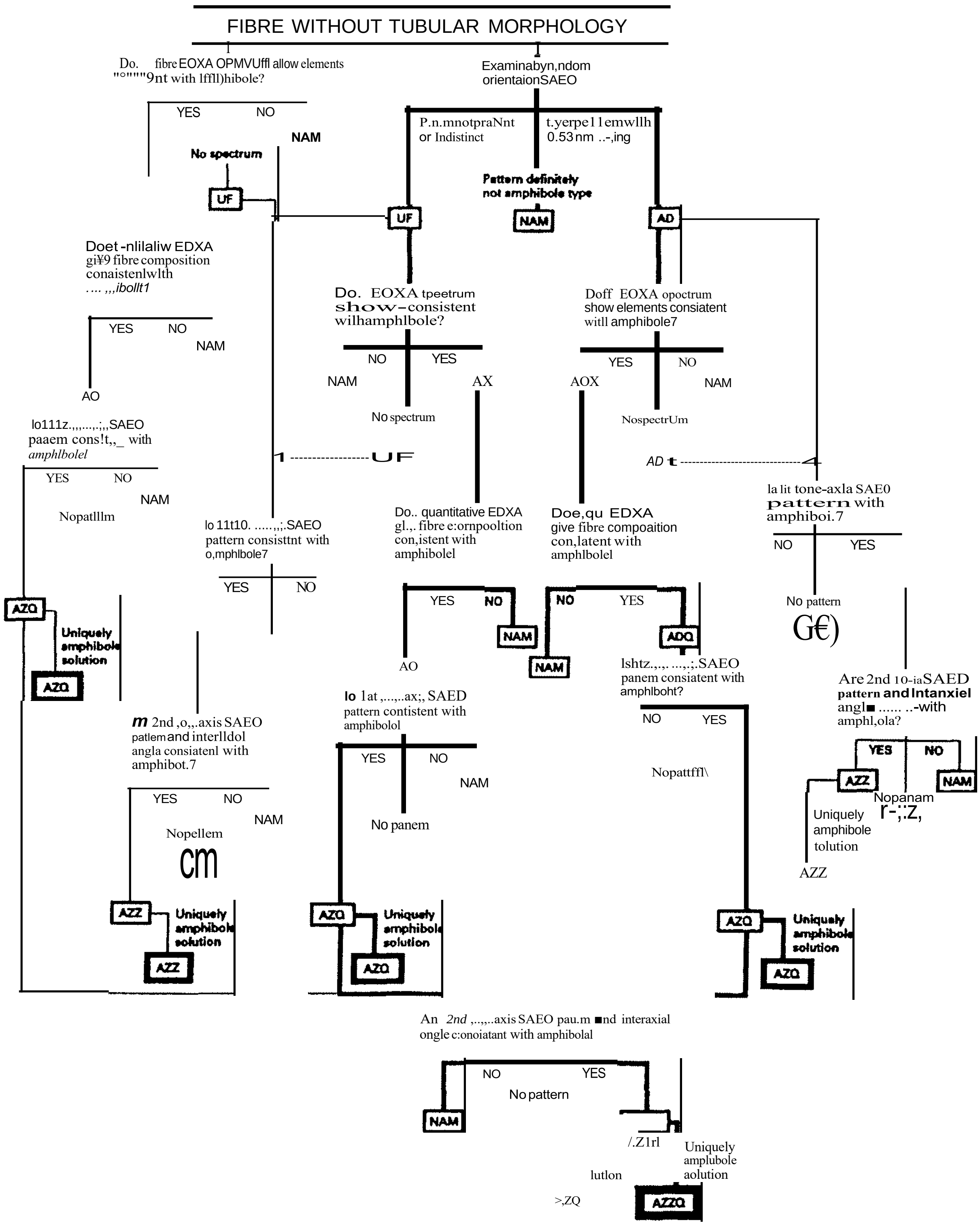


Figure D.4 - Classification chart for fibre without tubular morphology

Annex E
(normative)

Determination of the concentrations of asbestos fibres and bundles longer than 5 µm, and PCM equivalent asbestos fibres

In order to provide increased statistical precision and improved analytical sensitivity for those asbestos fibres and bundles longer than 5 µm, it may be decided to perform additional fibre counting at a lower magnification, taking account only into fibres and bundles within this dimensional range. The result shall be specified as " number of asbestos fibres and bundles longer than 5 µmH. For this examination, use a magnification of approximately x 10 000, and continue to assign a morphological code to each structure according to the procedures specified in annex C. Record fibres and bundles only if their lengths exceed 5 µm. Record cluster and matrix components only if their lengths exceed 5 µm.

It may also be decided to provide increased statistical precision and improved analytical sensitivity for fibrous structures longer than 5 µrn, with diameters between 0,2 µm and 3,0 µm, which have historically been the basis of risk estimation in the occupational environment (PCM equivalent asbestos fibres). Use a magnification of approximately x 5 000 for this extended fibre count. The result shall be specified as "number of PCM equivalent asbestos fibres". Asbestos structures within this dimensional range do not necessarily incorporate asbestos fibres or bundles longer than 5 µm.

Continue the extended sample examination until 100 asbestos structures have been counted, or until a sufficient area of the specimen has been examined to achieve the desired analytical sensitivity calculated according to table 1. The grid openings examined shall be divided approximately equally between a minimum of two specimen grids.

NOTES

17 The specimen area corresponding to the area of filter examined in the PCM fibre counting methods is 0,785 mm^2, and is equivalent to approximately 100 grid openings of a 200 mesh grid.

18 Some National Standards require that asbestos fibres longer than 2,5 µm, with diameters between 0,2 µm and 3,0 µm be counted. Use a magnification of x 5 000 for counting fibres within these dimensional ranges.

19 The minimum aspect ratio for definition of a fibre in PCM fibre counting methods and in some National Standards is 3/1. Use of a 3/1 aspect ratio is permitted in this International Standard, if this aspect ratio is mentioned in the test report.

The test reports shall include all of the items listed in clause 11.

Annex F
(normative)

Calculation of results

F.1 General

The results should be calculated using the procedures specified below. The results can be conveniently calculated using a computer programme.

F.2 Test for uniformity of distribution of fibrous structures on TEM grids

A chek shall be made using the chi-square test, to determine whether the asbestos structures found on individual grid openings are randomly and uniformly distributed among the grid openings. If the total number found in *k* grid openings is *n,* and the areas of the *k* individual frid openings are designated A_1 to *At,* then the total area of TEM specimen examined is

$$A = \sum_{i=1}^{i=k} A_i$$

The fraction of the total area examined which is represented by the individual grid opening area, *P;,* is given by ***Ai/A.*** If the structures are randomly and uniformly dispersed over the *k* grid openings examined, the expected number of structures falling in one grid opening with area '4j is *np;,* If the observed number of structures found on that grid opening is n_1, then

$$x^2 = \sum_{i=1}^{i=k} \frac{(n_i - np_i)^2}{np_i}$$

This value shall be compared with significance points of the chi-square distribution, having *(k* - 1) degrees of freedom. Significance levels lower than 0,1 % may be cause for the sample analysis to be rejected, since this correspond to a very inhomogeneous deposit. If the structure count fails this test, the precision of the result will be uncertain, and if new air samples cannot be collected. additional grid openings may be examined or the sample may be prepared by an indirect method.

F.3 Calculation of the analytical sensitivity

Calculate the required analytical sensitivity S, expressed in number of structures per litre, using the following equation:

$$S = \frac{A_f}{kA_g V}$$

where

is the area. in square millimetres. of sample collection filter;

is the area, in square millimetres. of TEM specimen grid opening;

k is the number of grid openings examined;

V is the volume of air sampled, in litres.

F.4 Calculation of the mean and confidence interval of the structure concentration

In the structure count made according to this International Standard, a number of grid openings have been sampled from a population of grid openings, and it is required to determine the mean grid opening structure count for the population on the basis of this small sample. The interval about the sample mean which, with 95 % confidence. contains the population mean, is also required.

F.4.1 Calculation of the mean structure concentration

Calculate the mean structure concentration *c,* expressed in number of structures per litre, using the following equation:

$$C = Sn$$

where

S is the analytical sensitivity, expressed in number of structures per litre;

n is the total number of structures found on all grid openings examined.

F.4.2 Calculation of confidence intervals

The distribution of structures on the grid openings should theoretically approximate to a Poisson distribution. Because of fibre aggregation and size-dependent identification effects, the actual structure counting data often does not conform to the Poisson distribution. particularly at high structure counts. An assumption that the structure counting data are distributed according to the Poisson distribution can therefore lead to confidence intervals narrower than are justified by the data. Moreover, if the Poisson distribution is assumed, the variance is related only to the total number of structures counted. Thus. a particular structure count conducted on one grid opening is considered to have the same confidence interval as that for the same number of structures found on many grid openings. However, the area of sample actually counted is very small in relation to the total area of the filter, and for this reason, structures shall be counted on a minimum of four grid openings taken from different areas of the filter in order to ensure that a representative evaluation of the deposit is made.

At high structure counts, where there are adequate numbers of structures per grid opening to allow a sample estimate of the variance to be made, the distribution can be approximated to a Gaussian, with independent values for the mean and variance. Where the sample estimate of variance exceeds that implicit in the Poissonian assumption. use of Gaussian statistics with the variance defined by the actual data is the most conservative approach to calculation of confidence intervals.

At low structure counts, it is not possible to obtain a reliable sample estimate of the variance, and the distribution also becomes asymmetric but not necessarily Poissonian. For 30 structures and below, the distribution becomes asymmetric enough for the fit to a Gaussian to no longer be a reasonable one, and estimates of sample variance are unreliable. Accordingly, for counts below 31 structures, the assumption of a Poisson distribution shall be made for calculation of the confidence intervals.

F.4.3 Example of calculation of Poissonian 95 % confidence intervals

For total structure counts less than 4, the lower 95 % confidence limit corresponds to less than 1 structure. Therefore, it is not meaningful to quote lower confidence interval points for structure counts of less than 4, and the result shall be recorded as "less than" the corresponding one-sided upper 95 % confidence limit of the Poisson distribution, as follows:

0 structure "" 2,99 times the analytical sensitivity

1 structure"" 4,74 times the analytical sensitivity

2 structures e 6,30 times the analytical sensitivity

3 structures e 7,75 times the analytical sensitivity

For total counts exceeding 4, the 95 % confidence interval shall be calculated using the values shown in table F.1. Table F.1 gives the upper and lower limits of the two-sided Poissonian 95 % confidence interval for structure counts up to 470.

F.4.4 Example of calculation of Gaussian 95 o/o confidence intervals

Calculate the sample estimate of variance s^2 using the following equation:

$$s^2 = \frac{\sum_{i=1}^{i=k} (n_i - nP_i)^2}{(k-1)}$$

where

n_i is the number of structures on the ith grid opening;

n is the total number of structures found in k grid openings;

P_i is the fraction of the total area examined represented by the ith grid opening;

k is the number of grid openings examined.

If the mean value of the structure count is calculated to be n, the upper and lower values of the Gaussian 95 % confidence interval are given respectively by

$$L_u = \frac{n}{k} + [illegible]$$

and

$$L_l = \frac{n}{k} - \frac{ts}{\sqrt{k}}$$

where

$L_{..}$, is the upper 95 % confidence limit;

is the lower 95 % confidence limit;

n is the total number of structures in all grid openings examined;

is the value of Student's test (probability 0,975) for {k - 1) degrees of freedom;

s is the standard deviation (square root of sample estimate of variance);

k is the number of grid openings examined.

F.4.5 Summary of procedure for calculation of results

In summary, structure counting data shall be calculated as follows:

No structures detected

The structure concentration shall be reported as less than the concentration equivalent ot the one-sided upper 95 % confidence limit of the Poisson distribution. This is equal to 2,99 times the analytical sensitivity.

From 1 to 3 structures

When 1 to 3 structures are counted, the result shall be reported as less than the corresponding one-sided upper 95 % confidence limit for the Poisson distribution. These are

1 structure e 4,74 times the analytical sensitivity

2 structures e 6,30 times the analytical sensitivity

3 structures e 7,75 times the analytical sensitivity

From 4 to 30 structures

The mean structure concentration and the 95 % confidence intervals shall be reported on the basis of the Poissonian assumption, using the values shown in table F.1.

More than 30 structures

When more 30 structures are counted, both the Gaussian 95 % confidence interval and the Poissonian 95 % confidence interval shall be calculated. The larger of these two intervals shall be used to express the precision of the structure concentration. When the Gaussian 95 % confidence interval is selected for data reporting, the Poissonian 95 % confidence interval shall also be mentioned.

F.5 Calculation of structure length, width, and aspect ratio distributions

The distributions all approximate to logarithmic-normal. and therefore the size range intervals for calculation of the distribution shall be spaced logarithmically. The other characteristics required for the choice of size intervals are that they should allow for a sufficient number of size classes, while still retaining a statistically valid number of structures in each class. Interpretation is also facilitated if each size class repeats at 10 intervals, and if 5 µm is a size class boundary. A ratio from one class to the next of 1,468 satisfies all of these requirements and this value shall be used. The distributions, being approximately logarithmic-normal, when presented graphically, shall be plotted using a logarithmic ordinate scale and a Gaussian abscissa.

F.5.1 Calculation of structure length cumulative number distribution

This distribution allows the fraction of the total number of structures either shorter or longer than a given length to be determined. It is calculated using the following equation:

$$C(P)_k = \frac{\sum_{i=1}^{i=k} n_i}{\sum_{i=1}^{i=P} n_i} \times 100$$

where

C(P)t is the cumulative number percentage of structures which have lengths less than the upper bound of the *kth* class;

n_i is the number of structures in the ith length class;

P is the total number of length classes.

F.5.2 Calculation of structure width cumulative number distribution

This distribution allows the fraction of the total number of structures either narrower or wider than a given width to be determined. It is calculated in a similar way to that used in F.5.1, but using the structure widths.

F.5.3 Calculation of structure aspect ratio cumulative number distribution

This distribution allows the fraction of the total number of structures which have aspect ratios either smaller or larger than a given aspect ratio to be determined. It is calculated in a similar way to that used in F.5.1, but using the structure aspect ratios.

Table F.1 - Upper and lower limits of the Poissonian 95 o/o confidence interval of a count

Structure count	Lower limit	Upper Umlt	Structure count	Lower limit	Upper limit	Structure count	LowerIlmlt	Upper limit
0	0	3,689[1]	46	33,678	61,358	92	74,164	112,83
1	0,025	5,572	47	34,534	62,501	93	75,061	113,94
2	0,242	7,225	48	35,392	63,642	94	75,959	115,04
3	0,619	8,767	49	36,251	64,781	95	76,858	116,14
4	1,090	10,242	50	37,112	65,919	96	77,757	117,24
5	1,624	11,669	51	37,973	67,056	97	78,657	118,34
6	2,202	13,060	52	38,837	68,192	98	79,557	119,44
7	2,814	14,423	53	39,701	69,326	99	80,458	120,53
8	3,454	15,764	54	40,567	70,459	100	81,360	121,66
9	4,115	17,085	55	41,433	71,591	110	90,400	132,61
10	4,795	18,391	56	42,301	72.721	120	99,490	143,52
11	5,491	19,683	57	43,171	73,851	130	108,61	154,39
12	6,201	20,962	58	44,041	74,979	140	117,77	165,23
13	6,922	22,231	59	44,912	76,106	150	126,96	176,04
14	7,654	23,490	60	45,785	77,232	160	136,17	186,83
15	8,396	24,741	61	46,658	78,357	170	145,41	197.59
16	9,146	25,983	62	47,533	79,482	180	154,66	208,33
17	9,904	27,219	63	48,409	80,605	190	163,94	219,05
18	10,668	28,448	64	49,286	81,727	200	173,24	229.75
19	11,440	29,671	65	50,164	82,848	210	182,56	240,43
20	12,217	30,889	66	51.042	83,969	220	191,89	251,10
21	13,00	32,101	67	51,922	85,088	230	201,24	261,75
22	13,788	33,309	68	52,803	86,207	240	210,60	272,39
23	14,581	34,512	69	53,685	87,324	250	219.97	283,01
24	15,378	35,711	70	54,567	88,441	260	229,36	293,62
25	16,178	36.905	71	55,451	89,557	270	238,75	304,23
26	16,983	38,097	72	56,335	90,673	280	248,16	314.82
27	17,793	39,284	73	57,220	91,787	290	257,58	325,39
28	18,606	40,468	74	58,106	92,901	300	267,01	335,96
29	19,422	41,649	75	58,993	94,014	310	276,45	346,52
30	20,241	42,827	76	59,880	95.126	320	285,90	357,08
31	21,063	44,002	77	60,768	96,237	330	295,36	367,62
32	21,888	45,175	78	61,657	97,348	340	304,82	378,15
33	22,715	46,345	79	62,547	98,458	350	314,29	388,68
34	23,545	47,512	80	63,437	99,567	360	323,77	399,20
35	24,378	48,677	81	64,328	100,68	370	333,26	409,71
36	25,213	49,840	82	65,219	101,79	380	342,75	420,22
37	26,050	51,000	83	66,111	102,90	390	352,25	430,72
38	26,890	52,158	84	67,003	104,00	400	361,76	441,21
39	27,732	53,315	85	67,897	105,11	410	371,27	451,69
40	28,575	54,469	86	68,790	106,21	420	380.79	462,18
41	29,421	55,622	87	69,684	107,32	430	390,32	472,65
42	30,269	56,772	88	70,579	108,42	440	399,85	483,12
43	31,119	57,921	89	71,474	109,53	450	409,38	493,58
44	31,970	59,068	90	72,370	110,63	460	418,92	504,04
45	32,823	60,214	91	73,267	111,73	470	428,47	514,50

1) The one-sided upper 95 % confidence limit for O structures is 2,99.

Annex G
(informative)

Strategies for collection of air samples

G.1 General

An important part of the sampling strategy is a statement of the purpose of the sampling programme. A sufficient number of samples should be collected so that the site is well characterized to the precision and accuracy desired, and also ensure that sample filters appropriately loaded for TEM analysis are obtained from all of the sampling locations.

G.2 Air sample collection in the outdoors environment

Weather conditions restrict the ability to collect satisfactory air samples in the outdoors environment. and whenever possible, sampling should be carried out in low-wind, low-humidity conditions. Detailed records of the weather conditions, windspeed and direction during the sampling period should be made. All available information concerning local topography, and the types and positions of sources should be recorded.

Sequential multipoint sampling is necessary to provide adequate characterization of complex sites and sources. It is recommended that multiple samples are taken upwind and downwind of the site, with a minimum of two samples in the downwind position expected to experience the maximum airborne concentration. The locations of the samplers should be carefully recorded.

G.3 Air sample collection inside buildings

Air samples are often collected inside buildings in which asbestos-containing construction materials are present, in order to determine whether these materials contribute to the asbestos fibre concentration in the building atmosphere. The optimum positions for collection of air samples can only be determined after a complete survey of the building to establish air movement patterns. Multiple samples should be collected in the area where asbestos building materials are present, and control samples should be collected in an adjacent area where no airborne asbestos fibres would be expected. The intakes for air conditioning systems are frequently used as the collection locations for control samples. Whenever possible, static samples should be taken over a period exceeding 4 h during normal activity in the building, at face velocities of between 4 cm/s and 25 cm/s.

Annex H
(informative)

Methods for removal of gypsum fibres

It is common to find fibres of calcium sulfate (gypsum) in airborne particulates collected in buildings and urban environments, and particularly in samples collected where demolition or construction work is in progress. The fibres are readily released when plasters and cement products are disturbed. In some circumstances, particles of calcite or dolomite collected on an air filter can react with atmospheric sulfur dioxide, to form long fibres of gypsum. Gypsum fibres can give rise to high fibre counts by both optical and electron microscopy. The gypsum fibres are often 2 µm to 6 µm long, with aspect ratios greater than 10/1. Sometimes. these fibres appear similar to amphibole asbestos fibres, and in some samples they can be morphologically very similar to chrysotile. In the TEM. the larger fibres have high contrast and at high magnification often exhibit a characteristic mottled appearance which changes under electron beam irradiation. Some gypsum fibres. however, are not easily discriminated from asbestos without examination by EDXA. TEM specimens which contain many such gypsum fibres require an extended examination time in the TEM, because it is necessary to examine each of these fibres by EDXA before it can be rejected.

It is possible to remove gypsum fibres selectively by water extraction. A Jaffe washer (7.3.7), or a condensation washer (7.3.8). should be prepared, but using a water (6.1) as the solvent. The TEM specimens, which have been previously prepared and initially examined in the TEM, should be placed in the washer to allow dissolution of the fibres. If a Jaffe washer is used, the treatment time can be reduced by heating the washer to 90 °C to 100 °C for a few minutes. If a condensation washer is used, the gypsum fibres will be dissolved by treatment for approximately 10 min. The effect of this treatment is to remove the gypsum fibres, leaving carbon replicas (7.3.11) which are readily distinguished from asbestos fibres.

NOTE 20 This procedure should be used only when examination of the untreated TEM specimen grids shows the gypsum fibres to be isolated from any asbestos fibres present. Losses of asbestos fibres may occur if matrices of gypsum and asbestos are exposed to this procedure.

Annex J
{informative)

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ICS 13.040.20

Descriptors: air, quality, air pollution, tests, determination, partide density (concentration). asbestos. microscopic analysis.

Price based on 51 pages

Site Name: Wildfire Cleanup – Kula, Maui, Hawaii	**Site Contact: Ted Brown**	**Telephone: 805.946.7413**
Location: Kula, Maui, Hawaii	**Client Contact: Marianne Fuji Rossio**	**Telephone:**
EPA ID No.	**Prepared By: Chelsea Saber**	**Date Prepared: 11.1.2023**
Project No. 103S864023141	**Dates of Activities:** November 6, 2023-November 6, 2024	**Emergency Response** ☐ Yes ☒ No

Objectives:

Ambient community air monitoring for Hawaii Department of Health during the wildfire cleanip response in Kula, Maui, Hawaii

Site Type: *Check as many as applicable.*

☒ Active	☐ Landfill	☐ Inner-City
☐ Inactive	☐ Railroad	☒ Rural
☐ Secured	☒ Residential	☐ Remote
☐ Unsecured	☐ Industrial	☐ Other (*specify*)

Project Scope of Work and Site Background

Tetra Tech will provide technical support to the HDOH Clean Air Branch (CAB) in efforts related to ambient community air monitoring during the wildfire cleanup response in the area of Kula, Maui, Hawaii. Tetra Tech will provide air monitoring field technicians and secure specialty laboratory and field equipment support subcontractors, uniquely qualified to undertake this task. Monitoring shall continue for the duration of cleanup efforts in the Kula area (anticipated to take up to 30 days), unless requested to be lessened or extended (minimum of 14 days).

Tetra Tech will conduct continuous air monitoring activities utilizing a E-BAM Mass Monitor (or equivalent). Tetra Tech personnel will conduct calibration and system checks of air monitoring equipment daily. Community monitoring locations will monitor PM2.5 and PM10 to allow for comparison to the National Ambient Air Quality Standards (NAAQS) and agreed upon regulatory standards for the State of Hawaii. Tetra Tech will collect ambient air samples in accordance with approved Standard Operating Procedures. Air sampling will occur once per week (once every 7 days).

Health and Safety Approver Comments or Additional Instructions: Primary PPE for air monitoring activities is Level D. Voluntary use of Dusk Masks are permitted for any field personnel who desire a dust mask while performing air monitoring activites.

Health and Safety Plan Approver Signature: David Brown **Date: 11/6/2023**

Note: A minimum of two persons with appropriate training and medical surveillance must be on site for any fieldwork subject to Level 2 HASP requirements.

Initial Isolation and Protective Action Distances (for emergency response operations only): Use 2012 Emergency Response Guidebook (ERG) or delete

Establishment of Work Zones; including exclusion, contamination reduction, and support zones; is required for ALL HAZWOPER projects. For heavy equipment (i.e. drilling operations), exclusions zone will established around each equiopment or drilling location based on site conditions and or noise levels (DCN 2-04, Hearing Conservation Program) at drilling operations (i.e. a circular exclusion zone based on noise levels >85 dbA from the drill rig or a minimum of 20 feet around the rig, whichever is greater). Work zones will be delineated using cones, barrier tape or similar visual indicators.

ALL investigation-derived waste shall be drummed and remain onsite pending characterization for subsequent disposal.

Spill control shall be conducted in accordance with the requirements of SWP 5-14, *Spill and Discharge Control Practices*.

Wind Speed and Direction (approach from upwind) Use www.weather.com or www.wunderground.com		Temperature (ºF)	Relative Humidity (%)	Probability of Precipitation (%)	Weather Forecast (such as partly cloudy, snow, etc.)
Speed (mph):	**From Direction:**				
Capture weather information daily on Tailgate Safety Briefing form or in site logbook					

On-Site Supplies: ☒ First Aid Kit ☒ Fire Extinguisher ☐ Air Horn ☐ Oral Thermometer ☐ Noise Dosimeter

Known or Anticipated Site Hazards or Concerns:

☐ Work on active roadway	☐ Overhead utilities	☐ Energized electrical systems
☐ Work over or near water	☐ Buried Utilities	☐ Portable hand tool use
☐ Explosion or fire hazard	☐ Surface or underground storage tanks	☐ Portable electrical tool use
☐ Oxygen deficiency	☒ General slips, trips, falls	☐ Machine guarding
☐ Unknown or poorly characterized chemical hazards	☐ Uneven, muddy, rugged terrain	☒ Portable fire extinguisher use
☒ Inorganic chemicals	☐ Lift (man lift, cherry picker) use	☐ Driving personal vehicles
☒ Organic chemicals	☐ Industrial truck (forklift) use	☐ All-terrain vehicle use
☒ Asbestos	☐ Wood or metal ladder use	☐ Injury and Illness Prevention Program (California only)
☒ Respirable particulates	☐ Dangerous goods shipped by air	☐ Ergonomics (California only)
☒ Respirable silica	☐ Elevated work (over 6' high)	☐ Work in strip or shaft mines
☐ Blasting and explosives	☐ Heavy equipment use or operation	☐ Client-specific safety requirements (attach to HASP)
☐ Non-ionizing radiation (lasers, UV)	☐ Construction work	☐ Confined space entry and/or rescue
☐ Ionizing radiation (alpha, beta, gamma, etc.)	☐ Excavation or trenching	☐ Methamphetamine lab
☒ Heat stress	☐ Benching, shoring, bracing	☒ Biological hazards (i.e. ticks, snakes, poisouos plants)
☐ Cold stress	☐ Scaffold use	☐ Mold
☒ Sun Exposure	☐ High noise	☐ *Other (insert)*

Explosion or Fire Potential: ☐ High ☐ Medium ☒ Low ☐ Unknown

Chemical Products Tetra Tech EM Inc. Will Use or Store On Site: (Attach a Material Safety Data Sheet [MSDS] for each item.)

☐ Alconox or Liquinox	☐ Calibration gas (Methane)	☐ Hydrogen gas	☐ Isopropyl alcohol
☐ Hydrochloric acid (HCl)	☐ Calibration gas (Isobutylene)	☐ Household bleach (NaOCl)	☐ HazCat Kit
☐ Nitric acid (HNO_3)	☐ Calibration gas (4-gas mixture)	☐ Sulfuric acid (H_2SO_4)	☐ Mark I Kits (*number?*) _______
☐ Sodium hydroxide (NaOH)	☒ Eyewash solution (potable water)	☐ Hexane	☐ Other (*specify*) ____________

WARNING: Eyewash solution shall be readily available on ALL projects where corrosives (acids or bases) are used, including sample preservatives

Applicable Safety Programs and Safe Work Practices (SWP). Attach to HASP:

- ☒ DCN 2-04 Hearing Conservation Program (always checked)
- ☐ DCN 4-05 Trenching and Excavation Safety
- ☒ DCN 4-08 Asbestos Protection Program
- ☐ DCN 4-09 Haulage and Earth Moving
- ☐ DCN 4-10 Lead Protection Program
- ☐ SWP DCN 5-01 General Safe Work Practices
- ☒ SWP DCN 5-02 General Safe Work Practices HAZWOPER
- ☐ SWP DCN 5-03 Safe Work Practices for Office Employees
- ☐ SWP DCN 5-04 Safe Drilling Practices
- ☐ SWP DCN 5-05 Safe Direct Push (GeoProbe) Practices
- ☐ SWP DCN 5-06 Working Over or Near Water
- ☐ SWP DCN 5-07 Use of Heavy Equipment
- ☐ SWP DCN 5-08 Special Site Hazards (Firearms, Remote Sites, Mines, aircraft, etc.)
- ☐ SWP DCN 5-09 Safe Electrical Work Practices
- ☐ SWP DCN 5-10 Fall Protection Practices
- ☐ SWP DCN 5-11 Portable Ladder Safety
- ☐ SWP DCN 5-12 Drum and Container Handling Practices
- ☐ SWP DCN 5-13 Flammable Hazards and Ignition Sources
- ☒ SWP DCN 5-14 Spill and Discharge Control Practices (always checked)
- ☒ SWP DCN 5-15 Heat Stress
- ☐ SWP DCN 5-16 Cold Stress
- ☐ SWP DCN 5-17 Biohazards
- ☐ SWP DCN 5-18 Underground Storage Tank Removal Practices
- ☐ SWP DCN 5-19 Safe Lifting Procedures
- ☐ SWP DCN 5-22 Hydrographic Data Collection
- ☐ SWP DCN 5-23 Permit-Required Confined Space Entry Practices
- ☐ SWP DCN 5-24 Non-Permit-Required Confined Space Entry Practices
- ☒ SWP DCN 5-26 Prevention of Sun Exposure
- ☐ SWP DCN 5-27 Respirator Cleaning Practices
- ☐ SWP DCN 5-28 Safe Use Practices for Use of Respirators
- ☐ SWP DCN 5-35 Underground Utilities, including 5-35F, Ground Disturbance Permit
- ☐ SWP DCN 5-36 Drill Rigs

Tasks Performed At Job Site that are NOT Covered by SWPs

NOTE: Many AHA's can be found on the Health & Safety intranet site at:
https://int.tetratech.com/sites/EMI/hs/Activity%20Hazard%20Analysis%20Documents/Forms/AllItems.aspx

Attach Activity Hazard Analysis (AHA) for each non-covered task

- ☐ (non-covered task)
- ☐ (non-covered task)
- ☐ (non-covered task)
- ☐ (non-covered task)
- ☐ (non-covered task)

Tetra Tech Employee Training and Medical Requirements:

Basic Training and Medical

- ☒ Initial 40 Hour Training
- ☐ 8-Hour Supervisor Training (one-time)
- ☒ Current 8-Hour Refresher Training
- ☒ Current Medical Clearance (including respirator use)
- ☐ Current First Aid Training and CPR Training
- ☐ Current Respirator Fit-Test

Other Specific Training and Medical Surveillance Requirements

- ☐ Confined Space Training
- ☐ Level A Training
- ☐ Radiation Training
- ☐ OSHA 10-hour Construction Safety Training
- ☐ OSHA 30-hour Construction Safety Training
- ☐ Asbestos Awareness Training
- ☐ Asbestos B-Reader X-Ray
- ☐ Blood Lead Level and ZPP Pre, during and Post-Project
- ☐ Urinary Arsenic Level Pre and Post-Project
- ☐ Other ____________________________________
- ☐ Other ____________________________________

Materials Present or Suspected at Site	Highest Observed Concentration (specify units and sample medium)	Exposure Limit (specify ppm or mg/m^3)	IDLH Level (specify ppm or mg/m^3)	Primary Hazards of the Material (explosive, flammable, corrosive, toxic, volatile, radioactive, biohazard, oxidizer, or other)	Symptoms and Effects of Acute Exposure	Photoionization Potential (eV)
Gasoline - Liquid	NE	PEL = NE REL = NE TLV = NE [Skin] Hazard ☐	NE	Flammable, Explosive	May cause irritation to respiratory system or eyes; lung fibrosis. Potential carcinogen.	NE
Diesel Fuel - Liquid	NE	PEL = NE REL = NE TLV = NE [Skin] Hazard ☒	NE	Flammable, Explosive	Highly Corrosive. May cause irritation eyes, skin, nose, throat; pulmonary edema, bronchitis; emphysema; conjunctivitis; stomatis; dental erosion; eye, skin burns; dermatitis.	NE
Lead - Solid	NE	PEL = 0.05 mg/m3 REL = 0.05 mg/m3 TWA TLV = 0.05 mg/m3 TWA [Skin] Hazard ☐	100 mg/m3	Toxic	Lassitude (weakness, exhaustion), insomnia; facial pallor; anorexia, weight loss, malnutrition; constipation, abdominal pain, colic; anemia; gingival lead line; tremor; paralysis wrist, ankles; encephalopathy; kidney disease; irritation eyes; hypertension.	NE
Asbestos - Solid	NE	PEL = 0.1 f/cc of Air (TWA) REL = Carcinogen; 0.1 f/cc of Air TWA TLV = 0.1 f/cc of Air TWA [Skin] Hazard ☐	NA	Toxic	Sensitization dermatitis, allergic asthma, pneumonitis. Potential carcinogen.	NE
Crystalline Silica	NE	PEL = 50 µg/m^3 TWA0.5 mg/m3 REL = 0.5 mg/m3 TWA TLV = 0.5 mg/m3 TWA [Skin] Hazard ☐	Carcinogen; [25 mg/m^3 (cristobalite, tridymite); 50 mg/m^3 (quartz, tripoli)]	Other	Cough, dyspnea (breathing difficulty), wheezing; decreased pulmonary function, progressive resp symptoms (silicosis); irritation eyes. Potential carcinogen.	NE
Cobalt	NE	NIOSH REL TWA 0.05 mg/m3 OSHA PEL TWA 0.1 mg/m3 [Skin] Hazard ☐	20 mg/m3	Toxic	Cough, dyspnea (breathing difficulty), wheezing, decreased pulmonary function; weight loss; dermatitis; diffuse nodular fibrosis; resp hypersensitivity, asthma	NE
Arsenic	NE	PEL = 0.01 mg/m3 TWA REL = 0.002 mg/m3 TWA TLV = 0.01 mg/m3 [Skin] Hazard ☒	5 mg/m3	Toxic	Dermatitis, gastrointestinal disturbances, peripheral neuropathy, respiratory irritation, hyperpigmentation of skin. Potential carcinogen.	NE

Specify Information Sources: For example: NIOSH Pocket Guide to Hazardous Chemicals, September 2005 and American Conference of Governmental Industrial Hygienists (ACGIH). "Threshold Limit Values and Biological Exposure Indices for 2013."

Note: In the Exposure Limit column, include Ceiling (C) and Short-Term Exposure Limits (STEL) if they are available. Also, use the following short forms and abbreviations to complete the table above.

A = Air
Ca = Carcinogenic
eV = Electron volt
U = Unknown
IDLH = Immediately dangerous to life or health
mg/m^3 = Milligram per cubic meter
NA = Not available

NE = None established	PEL = Permissible exposure limit	TLV = Threshold limit value
	ppm = Part per million	GW = Groundwater
	REL = Recommended exposure limit	SW = Surface water
	S = Soil	Sed = Sediment

Note: If no contingency level of protection is selected, all employees covered under this plan must evacuate the immediate site area if air contaminant levels require upgrading PPE. Level A field work typically requires a Level 3 HASP. This information is available on the chemical hazards page of this HASP.

Field Activities Covered Under this HASP:

Task Description	Level of Protection[1] Primary	Level of Protection[1] Contingency	Date of Activities
1 Ambient air monitoring and sample collection for asbestos, elemental metals, and particulates (PM10 and PM2.5)	☐ A ☐ B ☒ C ☐ D	☐ A ☐ B ☐ C ☒ D	11.6.23 – 11.6.24
2	☐ A ☐ B ☐ C ☐ D	☐ A ☐ B ☐ C ☐ D	
3	☐ A ☐ B ☐ C ☐ D	☐ A ☐ B ☐ C ☐ D	
4	☐ A ☐ B ☐ C ☐ D	☐ A ☐ B ☐ C ☐ D	
5	☐ A ☐ B ☐ C ☐ D	☐ A ☐ B ☐ C ☐ D	

Site Personnel and Responsibilities (include subcontractors):

Employee Name and Office Code / Location	Task(s)	Responsibilities
Eric Jensen, Honolulu, HI Chelsea Saber, Blue Bell, PA		• Project Manager: Manages the overall project, makes site safety coordinator (SSC) aware of pertinent project developments and plans, and maintains communications with client as necessary. Additionally, For projects lasting longer than one consecutive week on-site, the PM is responsible for conducting one field audit using Form AF-1.
Ted Brown, Redding, CA	1	• Field Team Leader: Directs field activities, makes site safety coordinator (SSC) aware of pertinent project developments and plans, and maintains communications with the Project Manager and the client as necessary
Ted Brown, Redding, CA	1	• Site Safety Coordinator (SSC): Ensures that appropriate personal protective equipment (PPE) is available, enforces proper use of PPE by on-site personnel and subcontractors; suspends investigative work if personnel are or may be exposed to an immediate health hazard; implements and enforces the HASP; identifies and controls site hazards when possible; communicates site hazards to all personnel; and reports any deviations observed from anticipated conditions described in the health and safety plan to the health and safety representative.
		• Alternate Site Safety Coordinator (if any)
TBD	1	• Field Personnel: Completes tasks as directed by the project manager, field team leader, and SSC, and follows the HASP and all SWPs and guidelines established in the Tetra Tech, Inc., Health and Safety Manual.

Note:
1. See next page for details on levels of protection

NOTE: Contingency level of protection section should be completed only if the upgraded level of protection is immediately available at the job site. If no contingency level of protection is denoted, all employees covered under this HASP must evacuate the immediate site area if air contaminant levels would require an upgrade of PPE.

Protective Equipment: (Indicate type or material as necessary for each task.)

Task	Primary Level of Protection (A,B,C,D)	PPE Component Description (Primary)	Contingency Level of Protection (A, B, C, D)	PPE Component Description (Contingency)
1	D	Respirator type: N/A Cartridge type (if applicable): N/A CPC material: N/A Glove material(s): latex Boot material: steel/composite Other: ’	D (modified)	Respirator type: Dust Mask or N95 Mask Cartridge type (if applicable): N/A CPC material: N/A Glove material(s): latex Boot material: steel/composite Other: ’
2		Respirator type: Cartridge type (if applicable): CPC material: Glove material(s): Boot material: Other: ’		Respirator type: Cartridge type (if applicable): CPC material: Glove material(s): Boot material: Other: ’
3		Respirator type: Cartridge type (if applicable): CPC material: Glove material(s): Boot material: Other: ’		Respirator type: Cartridge type (if applicable): CPC material: Glove material(s): Boot material: Other: ’
4		Respirator type: Cartridge type (if applicable): CPC material: Glove material(s): Boot material: Other: ’		Respirator type: Cartridge type (if applicable): CPC material: Glove material(s): Boot material: Other: ’
5		Respirator type: Cartridge type (if applicable): CPC material: Glove material(s): Boot material: Other: ’		Respirator type: Cartridge type (if applicable): CPC material: Glove material(s): Boot material: Other: ’

Respirator Notes:
Respirator cartridges may only be used for a maximum time of 8 hours or one work shift, whichever is less, and must be discarded at that time. For job sites with organic vapors, respirator cartridges may be used as described in this note as long as the concentration is less than 200 parts per million (ppm), the boiling point is greater than 70 °Celsius, and the relative humidity is less than 85 percent. If any of these levels are exceeded, a site-specific respirator cartridge change-out schedule must be developed and included in the HASP using Tetra Tech Form RP-2 (Respiratory Hazard Assessment Form)

Notes:
All levels of protection must include eye, head, and foot protection.
CPC = Chemical protective clothing
Thermoluminescent Dosimeter (TLD) Badges must be worn during all field activities on sites with radiation hazards. TLDs must be worn under CPC.

Monitoring Equipment: All monitoring equipment on site must be calibrated before and after each use and results recorded in the site logbook				
Instrument (Check all required)	**Task**	**Instrument Reading**	**Action Guideline**	**Comments**
☐ Combustible gas indicator model:	☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5	0 to 10% LEL	Monitor; evacuate if confined space	
		10 to 25% LEL	Potential explosion hazard; notify SSC	
		>25% LEL	Explosion hazard; interrupt task; evacuate site; notify SSC	
☐ Oxygen meter model:	☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5	>23.5% Oxygen	Potential fire hazard; evacuate site	
		23.5 to 19.5% Oxygen	Oxygen level normal	
		<19.5% Oxygen	Oxygen deficiency; interrupt task; evacuate site; notify SSC	
☐ Radiation survey meter model:	☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5	Normal background	Proceed	Annual exposure not to exceed 1,250 mrem per quarter Background reading must be taken in an area known to be free of radiation sources.
		Two to three times background	Notify SSC	
		>Three times background	Radiological hazard; interrupt task; evacuate site; notify RSO	
☐ Photoionization detector model: ☐ 11.7 eV ☐ 10.6 eV ☐ 10.2 eV ☐ 9.8 eV ☐ Other (specify): ____________	☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5	Any response above background to 5 ppm above background	Level B is recommended Level C[a] may be acceptable	These action levels are for unknown gases or vapors. After the contaminants are identified, action levels should be based on the specific contaminants involved.
		> 5 to 500 ppm above background	Level B	
		> 500 ppm above background	Level A	
☐ Flame ionization detector model:	☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5	Any response above background to 5 ppm above background	Level B is recommended Level C[a] may be acceptable	These action levels are for unknown gases or vapors. After the contaminants are identified, action levels should be based on the specific contaminants involved.
		>5 to 500 ppm above background	Level B	
		>500 above background	Level A	
☐ Detector tube models:	☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5	Specify: < 1/2 the PEL > 1/2 the PEL	Specify:	The action level for upgrading the level of protection is one-half of the contaminant's PEL. If the PEL is reached, evacuate the site and notify a safety specialist
☒ Other (specify): E-BAM	☒ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5	Specify: >PM25.35 ug/m3 TWA >PM 10 150 ug/m3 TWA	Specify: Monitor. Notify SSC	

Notes:
eV= electron volt LEL=Lower explosive limit mrem=Millirem PEL=Permissible exposure limit ppm=Part per million
a. Level B is required when chemical hazards are present, but are uncharacterized. Level C may be acceptable for certain tasks in some situations. If you are uncertain, consult your Safety Manager.

Project-Specific Industrial Hygiene Requirements

OSHA-Regulated Chemicals*:

Check any present on the job site in any medium (air, water, soil)

- [ ] No chemicals below are located on the job site
- [x] Friable Asbestos
- [x] Silica, crystalline
- [ ] alpha-Napthylamine
- [ ] Methyl chloromethyl ether
- [ ] 3,3'-Dichlorobenzidine (and its salts)
- [ ] bis-Chloromethyl ether
- [ ] beta-Napthylamine
- [ ] Benzidine
- [ ] 4-Aminodiphenyl
- [ ] Ethyleneimine
- [ ] beta-Propiolactone
- [ ] 2-Acetylaminoflourene
- [ ] 4-Dimethylaminoazobenzene
- [ ] N-nitrosomethylamine
- [ ] Vinyl chloride
- [ ] Inorganic arsenic
- [x] Lead
- [x] Chromium (VI)
- [x] Cadmium
- [x] Benzene
- [ ] Coke oven emissions
- [ ] 1,2-Dibromo-3-chloropropane
- [ ] Acrylonitrile
- [ ] Ethylene oxide
- [ ] Formaldehyde
- [ ] Methylenedianiline
- [ ] 1,3-Butadiene
- [ ] Methylene chloride

* NOTE: Many states, including California and New Jersey, have chemical-specific worker protection requirements and standards for many chemicals and known or suspected carcinogens.

Emergency Contacts:	**Telephone No.**
WorkCare and Incident Intervention	888.449.7787, or 800.455.6155
Tetra Tech EMI 24-hour Anonymous Hazard Reporting Line	866.383.8070
U.S. Coast Guard National Response Center	800.424.8802
InfoTrac	800.535.5053
Poison Control	800.222.1222
Fire department	911
Police department	911

Personnel Call-Down List:

Job Title or Position:	**Name**	**Cell Phone:**
Safety Manager		
Project Manager:	Chelsea Saber	703.489.2674
Field Team Leader:	Ted Brown	805.946.7413
Site Safety Coordinator (SSC):	Ted Brown	805.946.7413
Subcontractor SSC:	NA	

Medical and Site Emergencies:

Signal a site or medical emergency with three blasts of a loud horn (car horn, fog horn, or similar device). Site personnel should evacuate to the area of safe refuge designated on the site map.

Hospital Name: Kaiser Permanente
Address: 100 Keokea Pl, Kula, HI 96790

General Phone: +18087871221
Emergency Phone: 911
Ambulance Phone: 911

Hospital called to verify emergency services are offered? YES ☒ NO ☐

Step-by-step Route to Hospital: (see Page 11 of 12 for route map)

Note: This page must be posted on site.

Decontamination Procedures

The site safety coordinator overseas implementation of project decontamination procedures and is responsible for ensuring they are effective.

Personnel Decontamination

Level D Decon - ☐ Wet ☒ Dry

Level C Decon - ☐ Wet ☐ Dry

Level B Decon – Briefly outline the level B decontamination methods to be used on a separate page attached to this HASP.

Level A Decon – A Level 3 HASP is required. Notify your Safety Manager.

Equipment Decontamination

All tools, equipment, and machinery from the Exclusion Zone (hot) or Contamination Reduction Zone (warm) are decontaminated in the CRZ before they are removed to the Support Zone (cold). Equipment decontamination procedures are designed to minimize the potential for hazardous skin or inhalation exposure, cross-contamination, and chemical incompatibilities.

Respirator Decontamination

Respirators are decontaminated in compliance with SWP 5-27 and should be included with this HASP.

Waste Handling for Decontamination

Procedures for decontamination waste disposal meet all applicable local, state, and federal regulations.

Decontamination Equipment

- ☐ Washtubs
- ☐ Buckets
- ☒ Scrub brushes
- ☐ Pressurized sprayer
- ☐ Detergent [Type]
- ☐ Solvent [Type]
- ☐ Household bleach solution

  Concentration/Dilution: ___________
- ☐ Deionized water
- ☐ Disposable sanitizer wipes
- ☐ Potable eyewash/drench/wash water
- ☐ Wire brush
- ☐ Spray bottle
- ☐ Tubs / pools
- ☐ Banner/barrier tape
- ☐ Plastic sheeting
- ☐ Tarps and poles
- ☐ Trash bags
- ☐ Trash cans
- ☐ Duct tape
- ☐ Paper towels
- ☐ Folding chairs
- ☐ Other

Emergency Response Planning

During the pre-work briefing and daily tailgate safety meetings, all on-site employees will be trained in the provisions of emergency response planning, site communication systems, and site evacuation routes.

In the event of an emergency that necessitates evacuation of a work task area or the site, the following procedures will take place.

- The Tetra Tech SSC will contact all nearby personnel using the on-site communications to advise the personnel of the emergency.
- The personnel will proceed along site roads to a safe distance upwind from the hazard source.
- The personnel will remain in that area until the SSC or an authorized individual provides further instructions.

In the event of a severe spill or a leak, site personnel will follow the procedures listed below.

- Evacuate the affected area and relocate personnel to an upwind location.
- Inform the Tetra Tech SSC, a Tetra Tech office, and a site representative immediately.
- Locate the source of the spill or leak, and stop the flow if it is safe to do so.
- Begin containment and recovery of spilled or leaked materials.
- Notify appropriate local, state, and federal agencies.

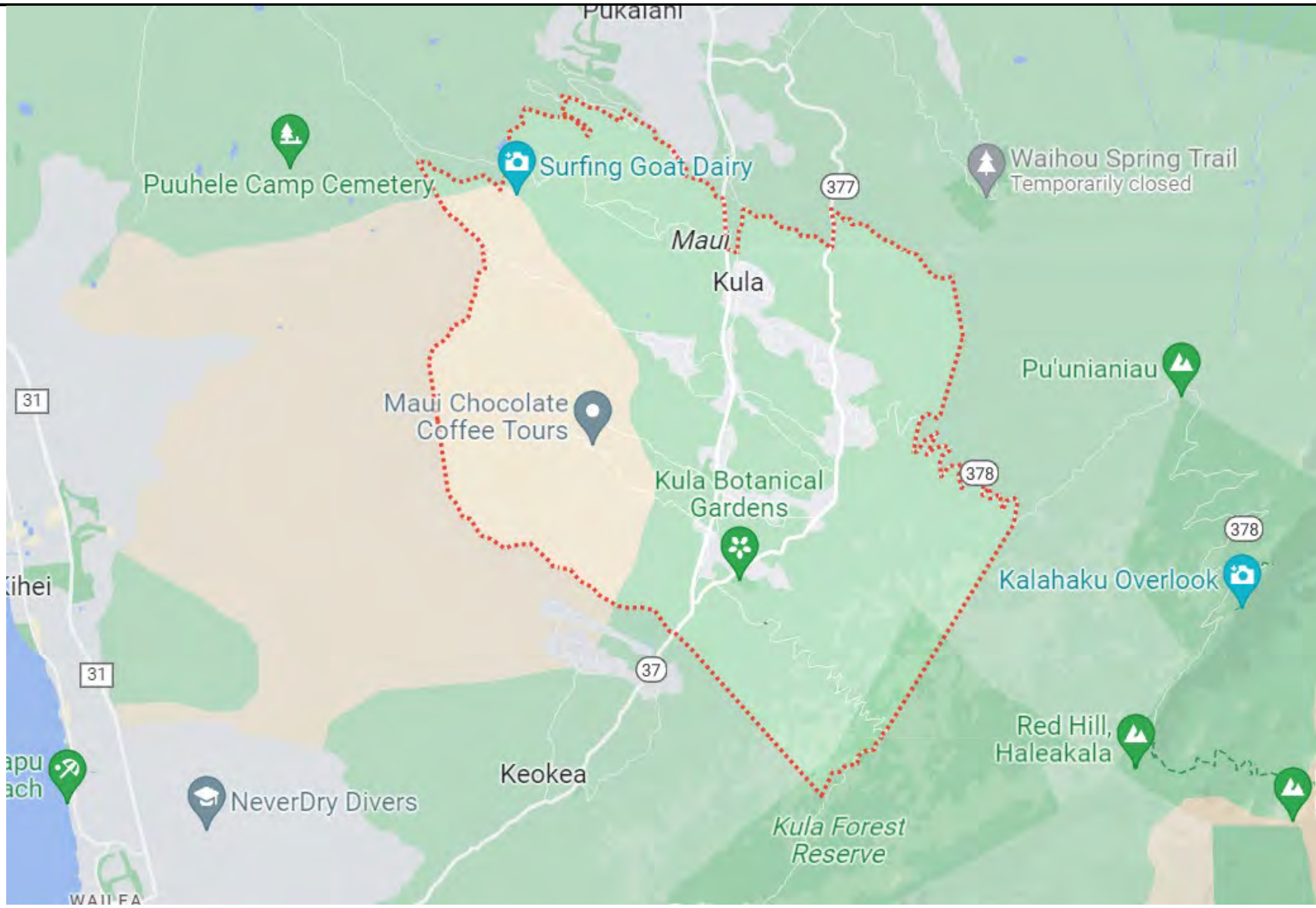
In the event of severe weather, site personnel will follow the procedures listed below.

- Site work shall not be conducted during severe weather, including high winds and lightning.
- In the event of severe weather, stop work, lower any equipment (drill rigs) and evacuate the affected area.
- Severe weather may cause heat or cold stress. Refer to SWPs 5-15 and 5-16 for additional information.

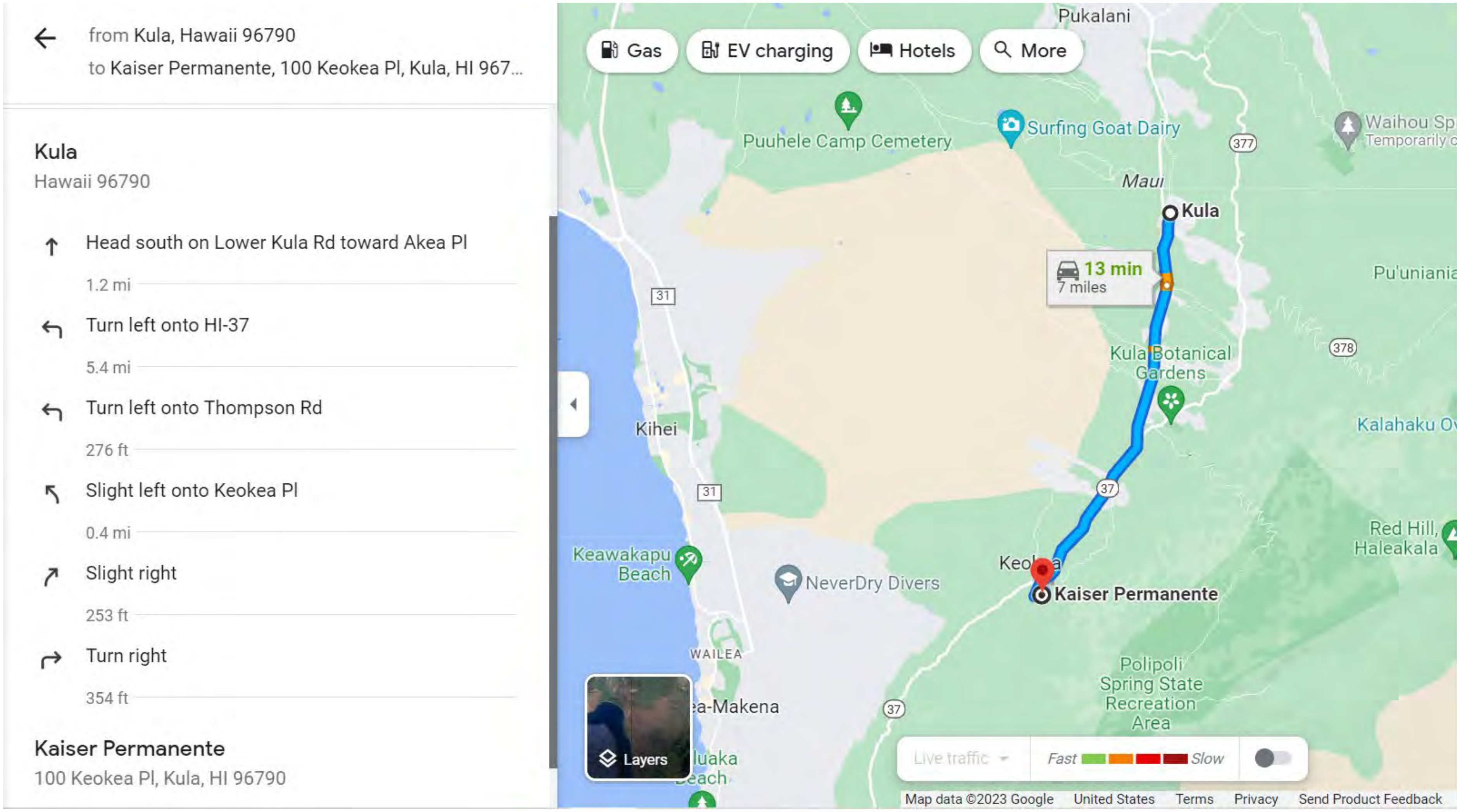
All personnel working on Tetra Tech projects are expected to and responsible for reporting ANY unsafe conditions, behaviors or incidents -- including injuries, illnesses, fires, spills/releases, property damages and near-misses -- they face or encounter while performing their work. According to TtEMI's reporting procedures, for non-emergency incidents you should:

- Notify WorkCare and Incident Intervention at 888.449.7787, or 800.455.6155
- Notify your Office, Project or Safety Manager via phone immediately.
- Complete a "Tetra Tech Incident Report" (Form IR) within 24 hours and send it to your Safety Manager. If an injury or illness has occurred, the Form IR-A must also be completed.
- Additional reports may be necessary

Site Map (May be drawn after crews arrive onsite or inserted using aerial photographs (https://maps.google.com/), site figures, etc.):



Hospital Route Map (attach or insert):



Note: A dry-run should be conducted to establish a physical location associated with the map included in the HASP. Verbal verification from the hospital emergency room should also be obtained to ensure that the hospital will accept chemically-contaminated patients.

APPROVAL AND SIGN-OFF FORM

Project No: ____________________

I have read, understood, and agree with the information set forth in this Health and Safety Plan and will follow the direction of the Site Safety Coordinator (SSC) as well as procedures and guidelines established in the Tetra Tech, Inc., Health and Safety Manual. I understand the training and medical requirements for conducting field work and have met these requirements.

Tetra Tech has prepared this plan solely for the purpose of the health and safety protection of Tetra Tech employees. Subcontractors, visitors, and others at the site, while required to read and follow the provisions outlined in this plan at a minimum, should refer to their safety program for specific information related to their health and safety protection.

Name	Company / Agency / Organization	Signature	Date

I have read, understood, and agree with the information set forth in this HASP and will comply with and enforce this HASP, as well as procedures and guidelines established in the Tetra Tech, Inc., Health and Safety Manual.
A Post-Project Field Team Check-In SHALL be conducted and documented below to ensure that ALL incidents and near-misses were reported at project completion.

Name	Project-Specific Position	Signature	Date
	Project Manager		
	Field Team Leader		
	Site Safety Coordinator		
	Subcontractor SSC		
	Required Post-Project Field Team Check-In		

Tetra Tech has prepared this plan solely for the purpose of the health and safety protection of Tetra Tech employees. Subcontractors, visitors, and others at the site, while required to read, acknowledge and follow the provisions outlined in this plan at a minimum, should refer to their safety program for specific information related to health and safety.

Note: Use Additional sheets as necessary to ensure that all personnel sign and affirm this document.

Emergency Contacts

WorkCare - For issues requiring an Occupational Health Physician; assistance is available 24 hours per day, 7 days per week.

InfoTrac - For issues related to incidents involving the transportation of hazardous chemicals; this hotline provides accident assistance 24 hours per day, 7 days per week

U.S. Coast Guard National Response Center - For issues related to spill containment, cleanup, and damage assessment; this hotline will direct spill information to the appropriate state or region

Poison Control Center – For known or suspected poisoning.

Limitations:

The Level-Two HASP is not appropriate in some cases:

- Projects involving unexploded ordnance (UXO), radiation sources as the primary hazard, or known chemical/biological weapons site must employ the Level 3 HASP
- Projects of duration longer than 90 days may need a Level 3 HASP (consult your RSO)

Decontamination:

Decontamination Solutions for Chemical and Biological Warfare Agents[a]: PPE and equipment can be decontaminated using 0.5 percent bleach (1 gallon laundry bleach to 9 gallons water) for biological agents (15 minutes of contact time for anthrax spores; 3 minutes for others) followed by water rinse for chemical and biological agents. In the absence of bleach, dry powders such as soap detergents, earth, and flour can be used. The powders should be applied and then wiped off using wet tissue paper. Finally, water and water/soap solutions can be used to physically remove or dilute chemical and biological agents. Do not use bleach solution on bare skin; use soap and water instead. Protect decontamination workers from exposure to bleach.

Decontamination for Radiological and Other Chemicals: Primary decontamination should use Alconox and water unless otherwise specified in chemical specific information resources. The effectiveness of radiation decontamination should be checked using a radiation survey instrument. Decontamination procedures should be repeated until the radiation meter reads less than 100 counts per minute over a 100-square-centimeter area when the probe is held 1 centimeter from the surface and moving slower than 2.5 centimeters per second.

Decontamination Corridor: The decontamination setup can be adjusted to meet the needs of the situation. The decontamination procedures can be altered to meet the needs of the specific situation when compound- and site-specific information is available.

Decontamination Waste: All disposable equipment, clothing, and decontamination solutions will be double-bagged or containerized in an acceptable manner and disposed of with investigation-derived waste.

Decontamination Personnel: Decontamination personnel should dress in the same level of PPE or one level below the entry team PPE level.

All investigation-derived waste should be left on site with the permission of the property owner and the EPA on-scene coordinator. In some instances, another contractor will dispose of decontamination waste and investigation-derived waste. DO NOT place waste in regular trash. DO NOT dispose of waste until proper procedures are established.

Notes:

[a] Source: Jane's Information Group. 2002. *Jane's Chem-Bio Handbook*. Page 39.

TETRA TECH, INC.

DAILY TAILGATE SAFETY MEETING FORM

Date: ______________ Time: ________________ Project No.: ________________

Client: __________________________________ Site Location: __________________________

Site Activities Planned for Today: ____

Weather Conditions: ____

Safety Topics Discussed	
Protective clothing and equipment:	
Chemical and physical hazards:	
Emergency procedures:	
Equipment hazards:	
Other:	
Attendees	
Printed Name	**Signature**

Meeting Conducted by:

Name ______________________________ Signature ______________________________

TETRA TECH EM INC.

HEALTH AND SAFETY PLAN AMENDMENT

Site Name: ____

Amendment Date: ____

Purpose or Reason for Amendment: ____

____

____

Required Additional Safe Work Practices or Activity Hazard Analyses:______________________

____

Required Changes in PPE: ____

____

____

Action Level Changes: ____

____

____

____

____

AMENDMENT APPROVAL

RSO or Designee	____________________ Name	________________________ Signature	______________ Date
Site Safety Coordinator	____________________ Name	________________________ Signature	______________ Date

Date presented during daily site safety meeting: ____________________________________

TETRA TECH, INC.

FIELD AUDIT CHECKLIST

Project Name: ______________________ Project No.: ______________________

Field Location: ______________________ Completed by: ______________________

Project Manager: ______________________ Site Safety Coordinator: ______________________

General Items		In Compliance?		
Health and Safety Plan Requirements		Yes	No	NA
1	Approved health and safety plan (HASP) on site or available			
2	Names of on-site personnel recorded in field logbook or daily log			
3	HASP compliance agreement form signed by all on-site personnel			
4	Material Safety Data Sheets on site or available			
5	Designated site safety coordinator physically present on jobsite			
6	Daily tailgate safety meetings conducted and documented on Form HST-2			
7	Documentation available proving compliance with HASP requirements for medical examinations, fit testing, and training (including subcontractors)			
8	HASP onsite matches scope of work being conducted			
9	Emergency evacuation plan in place and hospital located			
10	Exclusion, decontamination, and support zones delineated and enforced			
11	HASP attachments present onsite (VPP sheet, audit checklist, AHA, etc.)			
12	Illness and injury prevention program reports completed (California only)			
Emergency Planning				
13	Emergency telephone numbers posted			
14	Emergency route to hospital posted			
15	Local emergency providers notified of site activities			
16	Adequate safety equipment inventory available			
17	First aid provider and supplies available			
18	Eyewash solution available when corrosive chemicals are present			
Air Monitoring				
19	Monitoring equipment specified in HASP available and in working order			
20	Monitoring equipment calibrated and calibration records available			
21	Personnel know how to operate monitoring equipment and equipment manuals available on site			
22	Environmental and personnel monitoring performed as specified in HASP			

Safety Items		In Compliance?		
Personal Protection		Yes	No	NA
23	Splash suit, if required			
24	Chemical protective clothing, if required			
25	Safety glasses or goggles (always required)			
26	Gloves, if required			
27	Overboots, if required			
28	Hard hat (always required)			
29	High visibility vest, if required			
30	Hearing protection, if required			
31	Full-face respirator, if required			
Instrumentation				
32	Combustible gas meter and calibration notes			
33	Oxygen meter and calibration notes			
34	Organic vapor analyzer and calibration notes			
Supplies				
35	Decontamination equipment and supplies			
35	Fire extinguishers			
37	Spill cleanup supplies			
Corrective Action Taken During Audit:				

Note: NA = Not applicable

______________________________ Auditor's Signature

______________________________ Site Safety Coordinator's Signature

______________________________ Date

Tetra Tech, Inc.	ACTIVITY HAZARD ANALYSIS (AHA)
	Tetra Tech EM Inc.
	(Insert Task Name Here)

Task Description

This Activity Hazard Analysis (AHA) applies to the task listed above. It has been developed and approved by the Director of Health and Safety for Tetra Tech EMI. The AHA contains potential hazards posed by each major step in this task, lists procedures to control hazards, and presents required equipment (including safety equipment), inspections, and training. The hazard controls listed below are specific to this task.

Insert a brief narrative description of each task to be completed.

Below, go step by step through the whole process. For each step, identify the potential hazards and describe the "actions" taken to control the hazard (i.e. PPE, lock-out tagout, training, keeping unauthorized parties out of the area, etc.), Example below.

Hazards		Actions
Task Steps	**Potential Hazards**	**Critical Safety Procedures and Controls**
Insert additional rows as needed		
Equipment to be Used	**Inspection Requirements**	**Training Requirements**

Assessed By ____________________ ____________________ ____________________

Name Signature Date

Approved By ____________________ ____________________ ____________________

Name Signature Date

1.0 PURPOSE

Tetra Tech, Inc. (Tetra Tech) has established a Hearing Conservation Program to protect employees from the harmful effects of noise exposure. This program is designed to comply with the Occupational Safety and Health Administration (OSHA) occupational noise exposure standard in Title 29 of the *Code of Federal Regulations* (CFR), Part 1910.95, as well as federal, state, local, and contractual requirements.

1.1 SCOPE

Tetra Tech's hearing conservation program applies to all employees who have potential exposure to noise above 85 dBA. This program will be made available to employees and their representatives. The Hearing Conservation Program will outline the following requirements:

- Roles and Responsibilities,
- Action levels,
- Monitoring,
- Employee notification,
- Audiometric testing,
- Hearing protection,
- Warning signs and information, and
- Training.

2.0 ROLES AND RESPONSIBLITIES

Tetra Tech firmly believes protecting the health and safety of our employees is everyone's responsibility.

2.1 OU Health and Safety Representatives (HSR)

- Implementing and managing the hearing conservation program within their respective organizations.

- Maintaining records of all noise exposure measurements for at least two (2) years,

- Identifying employees to be included in the audiometric testing program and for scheduling audiometric exams through the Tetra Tech corporate medical provider.

2.2 Project Managers (PM), Managers, and Supervisors

- Ensuring compliance with hearing conservation controls and protection at their project sites.

2.3 Site Safety Coordinators (SSCs)

- Assisting project managers and the HSR with Implementing the hearing conservation controls within a project or on a site-specific basis.

- Identifying noise control areas and operations

2.4 Affected Employees

- Wearing appropriate hearing protection devices,

- Following hearing conservation procedures in noise control areas.

- Completing all required training

3.0 PROGRAM ELEMENTS

Permissible Exposure Limits

The following table identifies OSHA permissible exposure limits for noise exposures. Whenever possible, administrative or engineering controls will be used to reduce sound levels. If controls are not feasible or fail to reduce sound levels to below 85 dBA, hearing protection will be provided to employees to reduce sound exposures to below the 85 dBA limit. This Tetra Tech hearing conservation program ***mandates*** the use of hearing protection for 8-hour, TWA exposures of 85 dBA or greater.

TABLE 1 - PERMISSIBLE NOISE EXPOSURES*

Duration per day, hours	Sound level dBA slow response
8	90
6	92
4	95
3	97
2	100
1-1/2	102
1	105
½	110
¼ or less	115

* When the daily noise exposure is composed of two or more periods of noise exposure of different levels, their combined effect should be considered, rather than the individual effect of each. If the sum of the following fractions: C(1)/T(1) + C(2)/T(2) C(n)/T(n) exceeds unity, then, the mixed exposure should be considered to exceed the limit value. Cn indicates the total time of exposure at a specified noise level, and Tn indicates the total time of exposure permitted at that level. Exposure to impulsive or impact noise should not exceed 140 dB peak sound pressure level.

Monitoring

In most instances, high noise levels at a project site are generated by heavy equipment, such as drill rigs and backhoes, or sources associated with the work site operations such as operating equipment and vehicles. Most common high-noise-level sources have been measured, and instances where hearing protection is required shall be indicated in the site-specific hazard assessment documents such as a health and safety plan (HASP), construction health and safety plan (C-HASP), job hazard analysis (JHA), job safety analysis (JSA), or permit.

When noise exposures at a work site are suspected to equal or exceed an 8-hour, TWA of 85 dBA resulting from noise sources not previously measured, a qualified person will conduct noise sampling/monitoring to characterize the noise sources and exposure levels.

A portable sound-level meter is recommended for surveying general work areas and for estimating noise exposure when the noise levels are relatively constant. Noise dosimeters are recommended for documenting full-shift noise exposures when noise sources fluctuate, are intermittent, or otherwise difficult to document with the sound-level meter. Monitoring for occupational noise exposure will be conducted for each representative task or job position identified during the hazard assessment process. The HSR shall assist with sound level monitoring and reporting as necessary.

All noise measurements will be taken in the hearing zone of the affected employee. The hearing zone is an area within a radius not to exceed 12 inches from the ear closest or in most direct proximity to the noise source.

Monitoring equipment must be in factory calibration and will be checked in the field with an appropriate field calibration check standard according to the equipment manufacturer's recommendation before and after each set of measurements. Documentation of test field calibration checks will be kept with the field data collected.

In some cases, such as on short-term projects, the SSC may forgo actual noise level measurements and use a simple rule-of-thumb test to determine if noise levels are in excess of 85 dBA. The test requires the SSC to determine how loud he or she must speak to be heard at arm's length from another person. If the SSC must raise his or her voice to be heard, average noise levels likely exceed 85 dBA.

Employee Notification

The SSC is responsible for informing employees exposed at or above an 8-hour, TWA of 85 dBA of the results of the monitoring.

Audiometric testing

Audiometric testing shall be conducted for all Tetra Tech employees potentially exposed to sounds levels greater than 85 dBA time weighted average (TWA). The audiometric testing program consists of baseline audiograms, annual audiograms, and termination audiograms.

Within 6 months of an employee's first exposure at or above the action level, Tetra Tech will establish a valid baseline audiogram against which future audiograms can be compared. When a mobile van is used, the baseline shall be established within 1 year. When employees are scheduled for a baseline audiogram, exposure to workplace noise for 14-hour proceeding the exam is prohibited. Operating units can meet this requirement with the use of hearing protection.

Employees who are exposed at or above the 8-hour TWA of 85 dBA will be required to completed annual audiogram testing. These tests will be compared to the employee's baseline audiogram to determine if a standard threshold shift has occurred. If a standard threshold shift does occur, the employee will be informed of this shift in writing, within 21 days of the determination.

When a standard shift is identified, unless determined by a physician that the shift is not work related or aggravated by occupational noise exposure, the PM, Site Supervisor and SSC shall ensure that the employee's hearing protection is refitted with hearing protection that offers greater attenuation (if necessary) and the employee is retrained in the use of hearing protection.

Employees will be informed of the results of these tests at the time of their examination. Audiometric test results will be retained for Tetra Tech by the corporate medical advisor and will become a part of each employee's permanent medical record. Medial records will be maintained as required by regulation and according to Tetra Tech's *DCN 01-04 Recordkeeping and Reporting Requirements*. Exposure and audiometric records will be made available to employees upon request.

Hearing Protection

Hearing protection will be made available to employees exposed to an 8-hour time weighted average (TWA) of 85 dBA or more. The selection of hearing protection will consider the specific noise environments in which the hearing protection will be used and will provide sufficient attenuation to limit employee noise exposure to an 8-hour TWA of less than 85 dBA. .Employees will be given an opportunity to select hearing protection from pre-approved options. Hearing protection will be provided to employees at no cost and replaced as necessary. The Site-Safety Coordinator will supervise the correct use of hearing protection at a work site and ensure proper fitting of hearing protection for employees. Employees will receive training in the use and care of all hearing protectors, including how to obtain a proper fit.

Warning Signs and Information

The SSC will post "Hearing Protection Required" signs in areas where noise levels have been measured and determined to exceed the 85-dBA, TWA action level. Signs may also be posted in areas where monitoring has not been conducted but noise levels are expected to exceed the 85-dBA, TWA level based on similarity to past activities or on the judgment of the SSC.

For short-duration projects or where personnel exposure in the high-noise area is limited and controlled, the SSC may provide verbal notice of the need for hearing protection in place of the signs described above.

4.0 Training

Hearing conservation training may be conducted as a stand-alone course or may be included in HAZWOPER, construction safety, or other health and safety training. Hearing Conservation training will include the following:

- Effects of noise on hearing;
- The purpose of hearing protectors;
- The advantages, disadvantages, and attenuation of various types of hearing protection;
- Instruction on selection, fitting, use, and care of hearing protectors; and
- The purpose of audiometric testing and an explanation of the test procedure.

Employees within the Hearing Conservation Program are required to take training prior to initial work assignment and annually thereafter. Documentation of initial and refresher training will be through class attendance records and course agendas.

DEFINITIONS

Attenuation —The reduction of sound level received by the ear through use of hearing protectors or engineering controls.

Audiogram —A chart, graph, or table that is derived from audiometric testing and that depicts an individual's hearing sensitivity. An audiogram shows hearing threshold level (HTL) measured in decibels (dB) as a function of frequency measured in hertz (Hz). A baseline audiogram is one against which future audiograms are compared.

Decibel (dB) —A unit on a logarithmic scale for measuring the relative intensity of sound levels detectable by the human ear. The value 1 represents the faintest audible sound; the threshold of pain is 140 dB. The abbreviation dBA indicates the A weighting scale, which reflects perceived loudness as opposed to actual sound intensity.

Dosimeter —A device that accumulates an individual's exposure to a substance over time; in the context of hearing conservation, an instrument that measures the amount of noise energy received by the employee over a time period compared with an allowable amount.

Sound level meter (SLM) —An instrument for measuring sound pressure levels in decibels.
Standard Threshold Shift (STS)—A change in the hearing threshold, relative to the baseline audiogram, of an average of 10 dB or more in either ear at frequencies of 2000, 3000, and 4000 Hz.

Time-weighted average (TWA) —A value, expressed in dBA, that represents the average noise exposure measured over a typical workday (usually 8-hour or 12-hour).

REFERENCES AND STANDARDS

ANSI, S1.4-1983, “Specifications for Sound Level Meters”; S3.6-1969, “Specifications for Audiometers”; S1.32-1980, “Specifications for Personal Noise Dosimeters.”
OSHA, Department of Labor, 29 CFR 1910.95, “Occupational Noise Exposure.”

RELATED PROGRAMS, PROCEDURES AND FORMS

DCN 01-04 – Recordkeeping and Reporting Requirements
DCN 02-25 - Medical Oversight Program

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	Role	Name	Approval Date	
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	Sponsor	Chris McClain		

1.0 PURPOSE

The purpose of this program is to provide guidance in the proper maintenance, handling, removal, and disposal of asbestos-containing materials (ACM) or presumed ACM (PACM). Proper control of asbestos fibers will minimize the potential for asbestos exposure-related illnesses such as lung cancer and mesothelioma. The requirements stated in this policy reflect EPA, OSHA (29 CFR 1910.1001 and 1926.1101), and DOT rules. In addition, Tetra Tech must follow applicable client requirements along with state and local regulations, which may be more stringent than federal regulations. Work on Mine Safety and Health Administration (MSHA) regulated sites will follow this program in addition to any MSHA specific requirements outlined in site specific procedures.

1.1 SCOPE

This program shall apply to any project or work activities that have the potential to disturb asbestos-containing materials (ACM), presumed asbestos-containing materials (PACM), or suspect materials are present that may exposure personnel to asbestos fibers.

Tetra Tech, Inc. does not participate in asbestos removal services, and, as such, shall employ qualified contractors for those instances where disturbance, repair, or removal of asbestos is necessary. The contractor shall assign a competent person, as defined in 29 CFR 1926.1101, to oversee asbestos related activities and provide information to Tetra Tech regarding progress of the work and safety precautions necessary when working near the asbestos related activities.

The following sections describe the requirements for job sites with asbestos-containing materials (ACM) or presumed asbestos-containing materials (PACM).

2.0 ROLES AND RESPONSIBLITIES

2.1 Project Managers / Site-Supervisors

Project managers (PM)/supervisors are responsible for the following:

- Ensure asbestos containing materials are identified and properly removed prior to any remodeling, repair, refurbishing, or new construction that may disturb ACM, PACM, or suspect asbestos-containing material.

- Identify and hire appropriately certified contractors for the identification, handling, removal, and disposal of ACM. Contractors will be certified and trained to the Environmental

Protection Agency (EPA) model accreditation plan training requirements as specified in 40 CFR part 763.

- When responsible to do so, notify employees, prospective contractors, multi-employer worksites, and building occupants of the locations where ACM is present on a worksite, the quantity of ACM they may encounter, and the precautions that must be taken to control airborne asbestos fibers.

- Ensure personnel involved in the project where the removal of ACM and asbestos containing materials has the appropriate level of documented training for the work they are to perform. *(See section 4.0 for Class Level of Operations)*

- When deemed as the general contractor on a construction project, exercise general supervisory authority over the work covered by this program.

2.2 Health and Safety Representatives

Health and Safety Representatives are responsible for the following:

- Maintain a register of preferred contractors for ACM removal.

- Determine the health surveillance monitoring and reporting requirements for relevant workers.

- Maintain a record of the health surveillance results and reasons for initiating health surveillance in the worker's medical file.

- Notify the worker of the results of health surveillance and any other related exposure information (e.g., exposure monitoring results).

2.3 Employees

Employees affected by this program are responsible for the following:

- Do not knowingly disturb ACM, PACM, or suspect asbestos-containing materials without proper training and controls in place.

- Report any disturbed or deteriorated ACM, PACM, or suspect asbestos-containing material to a supervisor or project manager.

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- Complete the appropriate level of asbestos training based on the work activities performed and exposure potential.
- Properly wear and maintain personal protective equipment issued.
- Abide by signage and barriers established within the work zone.

3.0 PROJECT HAZARD ASSESSMENT AND SURVEYS

Tetra Tech worksites are required to perform a project hazard assessment and will document the process using an Activity Hazard Analysis (AHA) or similar document. This will be done prior to starting work and when the scope of work changes. During the hazard assessment process if ACM or PACM is identified, it will be necessary to establish and implement appropriate safety procedures for the identification, removal, and disposal of ACM materials. This may include conducting or reviewing ACM surveys to properly assess for potential exposure to onsite employees.

When Tetra Tech is the general or primary contractor, Tetra Tech will coordinate ACM surveys to be conducted by an authorized and qualified person prior to any activity which involves demolition or removal of building materials. In the event operations involve only small disturbances, such as removal of vinyl asbestos tile to allow coring through a concrete floor, the survey scope may be limited to the affected area only. When required by the scope of the project, Tetra Tech will only hire contractors who meet local, state, and federal regulatory requirements for ACM removal and disposal. Tetra Tech may also be responsible for the notification and communication of onsite hazards (section 5.0).

When ACM or PACM is identified on a worksite where Tetra Tech is a subcontractor, it will be necessary to gather the appropriate information from the ACM survey performed to properly address employee safety procedures for the Tetra Tech employees. Based on Tetra Tech employee exposure and work to be performed, it may be necessary to provide employee training (section 7.0).

4.0 ASBESTOS REMOVAL REQUIREMENTS AND PROCEDURES

This section was written to serve as guidance to Project Managers, Health and Safety Representatives and Employees to better understand the general and class specific work requirements for ACM or PACM removal. Reviewing this document does not certify anyone as competent to perform this type of work.

4.1 General Requirements

- Removing and handling of ACM must comply with all applicable local, state, and federal regulations and the requirements of this program.
- ACM removal and repair shall be conducted by qualified contractors only.
- For Class 1, Class II, and Class III asbestos work, other employers at the site must be informed for the nature of the work and the measures that will be taken to prevent or control exposure to asbestos fibers (e.g., the use of wet methods and regulated areas).
- ACM work areas shall be restricted and demarcated in a manner that minimizes the number of persons within the area and protects persons outside the area from exposure to airborne asbestos.
- Contractors performing removal projects shall utilize containment techniques necessary, and required under regulation, to limit release of airborne asbestos.
- Contractors shall perform suitable decontamination of the removal or repair area and clearance monitoring necessary to ensure safe occupancy or use of the area following completion of the work. Removal methods must include impermeable drop cloths or plastic sheeting, wet methods and a HEPA vacuum to collect dust. Debris must be bagged at the end of the workday.
- No sanding, grinding, or mechanical chipping, cutting, sawing or dry sweeping of ACM is permitted.
- No use of compressed air to remove asbestos, or materials containing asbestos, unless the compressed air is used in conjunction with an enclosed ventilation system.
- Utilization of employee rotations as a means to reducing employee exposure is prohibited.
- Electrical circuits shall be deactivated, unless equipped with ground-fault circuit interrupters.
- Records of exposure monitoring, medical surveillance, training, and required notifications must be retained.

4.2 Class I and II Asbestos Work

- Class I and II asbestos work must be performed by a trained, licensed, and qualified asbestos removal contractor.

- The work must be supervised and inspected frequently and regularly by a Competent Person trained in all aspects of asbestos removal and handling.

- Competent Persons are responsible for conducting initial exposure assessments and documenting a Negative Exposure Assessment, when applicable.

- If a Negative Exposure Assessment has not been made, the following additional requirements apply:

  - Daily personal exposure monitoring must be performed.

  - Demarcation signs must also include the following statement: “Respirators and Protective Clothing Are Required in This Area”

  - Workers must wear protective clothing. A decontamination area with HEPA vacuum and equipment-cleaning capabilities must be provided adjacent to the regulated area.

  - Workers must wear respiratory protection. A half-mask respirator with a HEPA cartridge is required at a minimum.

- Qualified persons are responsible for conducting daily exposure monitoring when a Negative Exposure Assessment is not documented. Daily exposure monitoring may be discontinued when measurements are below the allowable PELs and ELs.

- When alternative control methods are proposed for Class I asbestos work, the work must be certified by a CIH or PE who is also qualified as a project designer.

- Employee notification of monitoring results must occur as soon as possible, but no later than 5 working days after the receipt of the results. Results may be provided in writing or be posted in an appropriate area.

- Critical barriers shall be placed over all openings to the regulated area or other isolation method used to prevent migration of airborne asbestos.

- The material shall be wetted prior to and during removal unless this presents a significant safety hazard.
- The material shall be removed in an intact state whenever possible.
- Cutting, abrading, or breaking ACM material shall be avoided unless it can be done with methods that control fiber release (e.g., wet methods, HEPA vacuum).
- The work must be performed within a regulated area demarcated with signs that read: "Danger, Asbestos, Cancer and Lung Disease Hazard, Authorized Personnel Only."

4.3 Class III Asbestos Work

- Class III asbestos work is to be performed by workers who are trained in and qualified for Class III asbestos work.
- Competent Persons are responsible for conducting initial exposure assessments and documenting a Negative Exposure Assessment, when applicable.
- If a Negative Exposure Assessment has not been made, the following additional requirements apply:
    - Daily personal exposure monitoring must be performed.
    - Demarcation signs must also include the following statement: "Respirators and Protective Clothing Are Required in This Area"
    - Workers must wear protective clothing. A decontamination area with HEPA vacuum and equipment-cleaning capabilities must be provided adjacent to the regulated area.
    - Workers must wear respiratory protection. A half-mask respirator with a HEPA cartridge is required at a minimum.
- The work shall be performed using wet methods.
- The work must be performed within a regulated area demarcated with signs that read:

"Danger, Asbestos, Cancer and Lung Disease Hazard, Authorized Personnel Only."

- The work shall be performed using local exhaust, when feasible.
- When the work involves drilling, cutting, abrading, sanding, chipping, breaking, or sawing of thermal system insulation or surfacing material, the work area shall be isolated using mini-enclosures or glove bags and impermeable drop cloths.

4.4 Class IV Asbestos Work

- Class IV asbestos work shall be performed by workers who are trained to the asbestos awareness training program.
- The work shall be performed using wet methods, HEPA vacuums, and prompt clean up of debris containing ACM or PACM.
- Employees cleaning up debris and waste in a regulated area where respirators are required shall wear respirators which are selected, used, and fitted.

5.0 PERSONNEL NOTIFICATION AND HAZARD COMMUNICATION

Worksite requirements will include notifying and communicating the presence of ACM or PACM. The following will people need to be properly communicated regarding the worksite hazards:

- Potentially exposed employees,
- contractors, and
- building occupants

These work groups must be notified—verbally, in writing, or by posting (labeling, signage)—of the location and quantity of ACM and PACM they may encounter and the need to take precautions to contain potential airborne asbestos. Products and containers containing asbestos shall be labeled with a warning sign that reads:

- "Danger, Contains Asbestos Fibers, Avoid Creating Dust, Cancer and Lung Disease Hazard".

Regulated areas shall be marked with signs that read:

- "Danger, Asbestos, Cancer and Lung Disease Hazard, Authorized Personnel Only, Respirators and Protective Clothing Are Required in This Area".

6.0 WASTE DISPOSAL

Tetra Tech does not perform ACM waste disposal procedures. ACM waste will be handled by a contractor approved to do this type of work. Disposal of asbestos-containing materials must comply with applicable local, state, and federal regulations. Disposal processing includes:

- Properly containing both friable and non-friable ACM into containers with appropriate labeling.
- Transporting ACM, including appropriately containerizing and labeling the vehicle based on the location of travel.
- Completing a hazardous waste manifest to accompany the waste during transport. This will be done by a competent person trained in Shipping of Hazardous Waste.

7.0 TRAINING

Asbestos awareness training is required initially and annually thereafter for employees who do not perform asbestos abatement/removal activities but may be potentially exposed to asbestos at project sites or facilities through activities of the client facility and/or other contractors.

Contractors who perform Class I asbestos work must be qualified, licensed asbestos removal contractors who employ qualified personnel, including a Competent Person trained in the requirements of EPA 40 CFR 763, subpart E, appendix C and OSHA's asbestos standard 1926.1101. If the job involves the removal of RACM, the Competent Person must also be trained in the requirements of EPA asbestos regulations for demolition and renovation work (40 CFR 61.145); certification of such training must be posted on-site; and contractor personnel must also receive on-site individual training in asbestos demolition and renovation (40 CFR 61.145).

Personnel who perform Class II asbestos work must complete 8 hours of annual "hands-on" training that includes the following:

- General asbestos information (methods of recognizing asbestos, health effects, the relationship between smoking and asbestos exposure)

- Specific work practices and controls
- Nature of asbestos operations
- Respiratory protection
- Medical surveillance
- OSHA asbestos standards
- Smoking cessation programs
- Posting and labeling requirements

Personnel who perform Class III asbestos work must complete 16 hours of initial "hands-on" training and annual refresher training consistent with the training requirements specified by EPA for custodial and maintenance crews.

Personnel who perform Class IV asbestos work must complete at least 2 hours of asbestos awareness training that includes the following:

- Locations of identified or suspected asbestos-containing materials
- Recognition of damage, deterioration, and delamination of asbestos-containing building materials

Employee training records shall be maintained for one year beyond the last date of employment.

8.0 RECORDKEEPING

Worksite Objective and/or exposure measurement data, data to rebut PACM, and records of required notifications during the course of project completion will need to be maintained for 30 years past the date of work completion. Records required to be maintained will be made available to OSHA Inspector for examination and copying, upon written request, and will comply with record transfer requirements. Records impacting Tetra Tech employees for things like medical surveillance, exposure monitoring, or physician clearances, will be maintained according to the *Tetra Tech DCN 01-04 Recordkeeping Requirements Program*.

Definitions

If a definition is not listed in this section, please contact your supervisor. If your supervisor is unaware of what the term means, please contact your Health and Safety Representative.

Asbestos: a naturally occurring fibrous mineral which is mined from the earth as one of the many varieties including chrysotile, amosite, crocidolite, tremolite asbestos, anthophyllite asbestos, actinolite asbestos, and any of these minerals that have been chemically treated and/or altered. This mineral features crystals that form long, thin, needle-like fibers.

Asbestos-containing material (ACM): means any material containing more than 1% asbestos. The Environmental Protection Agency (EPA) identifies three (3) basic categories: 1) Thermal systems insulations, 2) surface materials, and 3) Miscellaneous such as floor tile, transite, etc.

Certified Industrial Hygienist (CIH): means one certified in the practice of industrial hygiene by the American Board of Industrial Hygiene.

Class I Asbestos Work: includes the removal of asbestos-containing thermal system insulation (TSI) and sprayed-on or troweled-on surfacing materials. Thermal system insulation includes ACM applied to pipes, boilers, tanks, ducts, or other structural components to prevent heat loss or gain. Surfacing materials include decorative plaster on ceilings and walls; acoustical materials on decking, walls, and ceilings; and fireproofing on structural members.

Class II Asbestos Work: includes the removal of other types of ACM that are not thermal system insulation such as resilient flooring and roofing materials. Examples of Class II work include removal of asbestos-containing floor or ceiling tiles, siding, roofing, or transite panels.

Class III Asbestos Work: includes repair and maintenance operations, where ACM or PACM, including thermal system insulation and surfacing material, is likely to be disturbed.

Class IV Asbestos Work: Class IV of the OSHA asbestos standard is for cleanup activities. Workers remove dust and waste related to the Class I, II and III activities but do not actually remove asbestos. The work focuses on the identification of asbestos damage and ways to avoid exposure.

Excursion limit for ACM: The employer shall ensure that no employee is exposed to an airborne concentration of asbestos in excess of 1.0 fiber per cubic centimeter of air (1 f/cc) as averaged over a sampling period of thirty (30) minutes, as described in *OSHA 29 CFR 1926.1101 Appendix A.*

Friable ACM: means easily crumbled. Any material that is friable and containing more than 1% asbestos will be considered a Regulated Asbestos-Containing Material.

High-efficiency particulate air (HEPA): filter means a filter capable of trapping and retaining at least 99.97 percent of 0.3 micrometer diameter mono-disperse particles.

Negative Exposure Assessment: means a demonstration by the employer, which complies with the criteria outlined in OSHA 29 CFR 1926.1101 paragraph (f)(2)(iii), that employee exposure during an operation is expected to be consistently below the PELs.

Non-Friable ACM: means bonded asbestos, refers to when asbestos is firmly bound in with the material - such as cement.

Presumed Asbestos-Containing Materials (PACM): thermal system insulation and surfacing material found in buildings constructed no later than 1980. The designation of a material as "PACM" may be rebutted pursuant to paragraph (j)(8) of this section.

Professional Engineer (PE): an individual, who has fulfilled education and experience requirements and passed rigorous exams that, under State licensure laws, permits them to offer engineering services directly to the public.

Regulated area: means an area established by the employer to demarcate areas where airborne concentrations of asbestos exceed, or there is a reasonable possibility they may exceed, the permissible exposure limits.

Time-weighted average limit (TWA) for ACM. The employer shall ensure that no employee is exposed to an airborne concentration of asbestos in excess of 0.1 fiber per cubic centimeter of air as an eight (8) hour time-weighted average (TWA). as described in *OSHA 29 CFR 1926.1101 Appendix A.*

REFERENCES AND STANDARDS

OSHA 29 CFR 1926.1101 – Construction Standard for Asbestos
OSHA 29 CFR 1926.1101 – Construction Standard for Asbestos - Appendix A
OSHA 29 CFR 1910.1001 – General Industry Standard for Asbestos
EPA 40 CFR 763, Subpart E, Appendix C – Asbestos Model Accreditation Plan
EPA 40 CFR 61.145 – Standard for Demolition and Renovation

RELATED PROGRAMS, PROCEDURES AND FORMS

Tetra Tech DCN 01-04 Recordkeeping Requirements Program

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Jan 2023	Author	Amber Bill	Jan 2023	Abatement Processes, including Hazard assessment process was updated, included tetra tech roles and responsibilities, added training and recordkeeping requirements.
	Sponsor	Chris McClain	Feb 2023	

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To prevent injuries and adverse health effects, the following general safe work practices (SWP) are to be followed when conducting work involving known and unknown site hazards on hazardous waste sites. These SWPs establish a pattern of general precautions and measures for reducing risks associated with hazardous site operations. This list is not inclusive and may be amended as necessary.

- Do not eat, drink, chew gum or tobacco, take medication, or smoke in contaminated or potentially contaminated areas or where the possibility for contact with site contamination exists.
- Wash hands and face thoroughly upon leaving a contaminated or suspected contaminated area. If a source of potable water is not available at the work site that can be used for hands-washing, the use of waterless hand cleaning products will be used, followed by actual hand-washing as soon as practicable upon exiting the site. A thorough shower and wash must be conducted as soon as possible if excessive skin contamination occurs.
- Avoid contact with potentially contaminated substances. Do not walk through puddles, pools, mud, or other such areas. Avoid, whenever possible, kneeling on the ground or leaning or sitting on drums, equipment, or the ground. Do not place monitoring equipment on potentially contaminated surfaces.
- Remove beards or facial hair that interferes with a satisfactory qualitative respirator fit test or routine pre-entry positive and negative pressure checks.
- Be familiar with and knowledgeable of and adhere to all instructions in the site-specific health and safety plan (HASP). At a minimum, a safety meeting will be held at the start of each project to discuss the HASP. Additional meetings will be held, as necessary, to address new or continuing safety and health concerns.
- Be aware of the location of the nearest telephone and all emergency telephone numbers.
- Attend a briefing on the anticipated hazards, equipment requirements, SWPs, emergency procedures, and communication methods before going on site.
- Plan and delineate entrance, exit, and emergency escape routes.
- Rehearse unfamiliar operations prior to implementation.

- Use the "buddy system" whenever respiratory protection equipment is in use. Buddies should establish hand signals or other means of emergency communication in case radios break down or are unavailable.

- Buddies should maintain visual contact with each other and with other on-site team members by remaining in close proximity in order to assist each other in case of emergency.

- Minimize the number of personnel and equipment in contaminated areas (such as the exclusion zone). Nonessential vehicles and equipment should remain within the support zone.

- Establish appropriate support, contamination reduction, and exclusion zones.

- Establish appropriate decontamination procedures for leaving the site.

- Immediately report all injuries, illnesses, and unsafe conditions, practices, and equipment to the site safety coordinator (SSC).

- Maintain a portion of the site field logbook as a project safety log. The project safety log will be used to record the names, entry and exit dates, and times on site of all Tetra Tech personnel, subcontractor personnel, and project site visitors; air quality and personal exposure monitoring data; and other information related to safety matters. Form SSC-1, Daily Site Log, may be used to record names of on-site personnel.

- A portable eyewash station should be located in the support zone if chemical splashes to eyes are possible.

- Do not bring matches and lighters in the exclusion zone or contamination reduction zone. Flames and open fires are not permitted on site.

- Observe coworkers for signs of toxic exposure and heat or cold stress.

- Inform coworkers of nonvisual effects of illness if you experience them, such as headaches, dizziness, nausea, or blurred vision.

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	Rick Lemmon		

This safe work practice (SWP) provides contingency measures for spills and unintentional discharges from handling and transporting hazardous materials. Spill and discharge control practices should follow specific procedures to ensure the safety of responders and bystanders and to limit environmental impacts.

1.0 GENERAL PROCEDURES

Immediate action should be taken to control and contain any spill following the general guidelines below:

- Unnecessary personnel should be kept away from the spill or discharge.
- The hazardous area should be isolated.
- If the spill or discharge creates a hazardous situation or results in injury or an environmental release, the emergency procedures of the HASP should be implemented. Emergency response telephone numbers, designated contacts, and special reporting procedures are presented in the HASP.
- Personnel should stay on the upwind side of the spill or discharge.
- Entry into a confined space or low area where liquids or vapors may accumulate should be avoided.
- Sources of ignition should be eliminated if the spill or discharge involves combustible materials.
- Drains, manholes, waterways, sewers, and the like should be identified and covered or protected.
- The spill should be controlled or absorbed using appropriate media or devices.
- When the spill or discharge is fully contained and under control, spill or discharge material should be collected.
- Following cleanup, the spill area should be evaluated by collecting soil samples and screening the area with air monitoring instruments.

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2.0 SOLIDS

If the spill or discharge material is solid and nonreactive, the material should be scooped up and placed in a suitable and compatible container until the disposal method has been determined.

3.0 LIQUIDS

If liquid is discharged, the following general procedures apply:

- The point of discharge should be immediately identified and measures taken to eliminate further discharges by uprighting or patching containers, transferring contents, or other appropriate methods.
- Any discharged liquids or sludge should be removed or retrieved.
- Discharged materials should be cleaned up with absorbent materials or devices.
- Spent absorbent material should be placed into storage or disposal containers.

4.0 REPORTING

In some instances, a release may require reporting to government agencies. If a reportable quantity is released (this quantity is stated on the Material Safety Data Sheet) or human health or the environment is threatened, appropriate national, state, and local administering agency personnel should be notified. The timeframe for notification may vary from agency to agency. Notification may be required immediately or within 24 hours, depending on the type, location, and amount of released material. The appropriate agency to report spills to should be determined during HASP development.

All spills and chemical releases must be reported and investigated in accordance with DCN 2-2 Incident Reporting and Investigation Program. Details must be documented on the IR Form and IR – B.

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1.0 INTRODUCTION

This safe work practice (SWP) addresses situations during which heat illness is likely to occur and provides procedures for preventing and treating heat-related injuries and illnesses. This SWP is applicable to all Tetra Tech employees performing outdoor activities at both domestic and international project locations. This SWP incorporates safety regulations of the States of California and Washington to protect outdoor workers from heat-related illness. An "outdoor place" is an open area such as an agricultural field, forest, park, equipment and storage yard, outdoor utility installation, tarmac, and road. An outdoor workplace also can include a construction site at which no building shell has been completed, and areas of a construction site outside of any building shells that may be present.

Many factors contribute to heat illness and UV exposure, including personal protective equipment (PPE), ambient temperature and humidity, workload, sun exposure, and the physical condition of the employee, as well as predisposing medical conditions. However, the primary factors of heat illness are elevated ambient temperatures in combination with fluid loss. Because heat illness is one of the more common health concerns during field activities, employees must be familiar with the signs, symptoms, and various treatment methods of each form of heat illness. Health effects from heat illness may range from transient heat fatigue or rashes to serious illness or death. Tracking the weather is imperative during outdoor field projects because heat-related illness and fatalities occur primarily during heat waves.

2.0 Definitions

The following are typical terms and definitions associated with heat illness prevention and monitoring activities:

Acclimatization – Gradual adaptation of the body to work under temperature conditions to which it is exposed. Acclimatization peaks in most people within 4 to 14 days of regular work taking up at least 2 hours per day in the heat.

Ambient Temperature – Temperature of the surroundings.

Electrolytic Sports Drink – A beverage containing sodium and potassium salts that replenish the body's water and electrolyte levels after dehydration caused by physical activity.

Environmental Risk Factors for Heat Illness – Working conditions under which heat illness could occur. Environmental risk factors include air temperature, relative humidity, radiant heat from the sun and other sources, conductive heat sources such as the ground, air movement (or lack of), workload severity and duration, and protective clothing and PPE worn by employees.

Heat Illness – A serious medical condition resulting from the body's inability to cope with a particular heat load. Symptoms include heat cramps, heat exhaustion, and heat stroke (see Table 1).

Heat Index – An index that combines air temperature and relative humidity to indicate the human-perceived equivalent temperature (i.e., how hot it feels outdoors).

Heavy Work – Digging/hand-auguring, heavy lifting, cutting trees, using heavy hand tools, and similar tasks.

Light Work – Walking, writing notes, handling samples, and similar tasks.

Medium Work – Bailing wells, moving light equipment, driving nails, and similar tasks.

Personal Risk Factors for Heat Illness – Factors such as an individual's age, degree of acclimatization, health, water consumption, alcohol consumption, caffeine consumption, and use of prescription medications that affect the body's water retention or other physiological responses to heat.

Preventive Cool Down and Recovery Period – Period of time needed to recover from the heat in order to prevent heat illness.

Relative Humidity – The amount of water vapor that exists in a gaseous mixture of air and water vapor.

Shade – Blockage of direct sunlight. Canopies, umbrellas, and other temporary structures or devices may be used to provide shade. One indicator that blockage is sufficient is absence of a shadow of an object within the area of blocked sunlight. Shade is not adequate when heat in the area of shade defeats the purpose of shade, which is to allow the body to cool. For example, a car sitting in the sun does not provide acceptable shade to a person inside it unless the car is running with air conditioning.

Wet Bulb Globe Temperature (WBGT) - a measurement used to indicate heat stress. WBGT takes into account the effects of humidity

3.0 Employee Duties and Responsibilities

Written procedures help Project Managers (PM), Site Safety Coordinators (SSC), and field team members reduce the risk of heat-related illnesses, and ensure that emergency assistance is provided without delay to all Tetra Tech employees. The following are the duties and responsibilities of the Project Team for implementing and managing the Heat Illness Prevention and Monitoring SWP.

3.1 Project Management

The PM must understand and agree to the responsibility for implementing this SWP for worker safety. The PM will assure that all employees at the work site comply with this SWP.

- The PM must designate an appropriate field team member to serve as the SSC who will implement this SWP and who will perform and document necessary monitoring requirements for worker safety.
- The PM will ensure necessary resources required to implement this SWP and necessary monitoring resources for worker safety are acquired and present at the work site prior to initiation of project activities in hot environments.
- The PM will work with the Director of Health and Safety and identify at risk employees.
- The PM will ensure all field team members are trained in heat illness management and emergency response procedures prior to working outdoors.
- The PM and SSC will modify working hours to schedule work during the cooler hours of the day, when possible. When a modified or shorter work-shift is not possible, more water and rest breaks shall be provided.
- The PM and SSC will verify that the elements of this SWP are documented in the Health and Safety Plan, as necessary.

3.2 Site Safety Coordinator

- The SSC must understand and agree to the responsibility for implementing this SWP in the field and implement the necessary monitoring requirements for worker safety during outdoor activities.
- The SSC must have appropriate Occupational Safety and Health Administration (OSHA)-related training and experience to understand and implement this SWP, and to ensure required monitoring for worker safety during outdoor activities.
- The SSC must ensure that resources needed to implement this SWP and required monitoring for worker safety are acquired and present at the work site prior to initiation of project activities in hot environments.
- The SSC must maintain all necessary resources required under the SWP during project activities in hot environments.
- The SSC must ensure implementation and appropriate documentation of required monitoring for worker safety during site activities.
- The SSC must be familiar with and continuously monitor all employees and must remain alert for onset of heat-related symptoms.
- The SSC and co-workers are encouraged never to discount any signs or symptoms of heat-related illness shown by one or more project team members, and to immediately report these signs or symptoms.
- The SSC will carry a cell phone or other means of communication to ensure that emergency services can be contacted and will verify that these resources are functional at the worksite prior to each shift.

3.3 Field Team

- The field team will be able to recognize the hazards of working in warm environments.

- Co-workers will use a "buddy system" to monitor each other closely for discomfort or symptoms of heat illness.
- Every morning, workers must attend a daily tailgate safety meeting to be reminded of site-specific emergency procedures.
- A copy of site specific heat illness procedures shall be available for employee review.

4.0 Description and Requirements

4.1 Effects of Hot Weather

As the environment heats up, the body tends to warm up as well. The body's internal thermostat maintains a constant temperature by pumping more blood to the skin, which is cooled by evaporation from increasing perspiration production. In this way, the body increases the rate of heat loss to balance the heat burden created by a hot environment. Such situations generally do not cause harm, as long as the body is allowed to adjust to cope with the increasing heat.

In a very hot environment, however, the rate of heat gain exceeds the rate of heat loss. In this situation, the body's coping mechanisms can be overwhelmed, resulting in heat illness and leading to a range of serious and possibly fatal conditions.

4.2 Preparation for Hot Weather Work

The following list describes the process for preparing to work in hot weather conditions:

- Identify work that can pose a risk of heat stress and Ultraviolet (UV) exposure.
- Identify at-risk employees.
- Identify possible controls:
  - Establish controls for hot weather situations
  - Determine mandatory work and rest regimens based on current conditions, workload, clothing requirements, temperature and humidity for Threshold Limit Value (TLV).
  - Identify required fluid and food replacement schedules.

- Provide a location to cool down during breaks.
- Establish requirements to address UV exposure.
- Monitor workers in extreme heat conditions.

• Establish emergency response procedures to be followed for heat-related emergency situations.

• Provide for first aid and establish the requirement that first aid be administered immediately to employees displaying symptoms of heat-related illness.

• Provide training to employees and verify training records about site legal and regulatory requirements and about the characteristics and effects of heat stress and the recognition and prevention of heat-related injuries (See Table 1).

5.0 Employee Training

Training is an important component of heat illness prevention. Employees are instructed to recognize and treat heat-related illnesses during 8-hour health and safety refresher and first aid training courses. The conditions, symptoms, and treatment for heat-related illnesses are listed below in Table 1.

TABLE 1
HEAT ILLNESS CONDITIONS

Condition	Causes	Signs and Symptoms	Treatment
Heat cramps	Fluid loss and electrolyte imbalance from dehydration	• Painful muscle cramps, especially in legs and abdomen • Faintness • Profuse perspiration	• Move affected worker to cool location • Provide sips of liquid such as Gatorade® • Stretch cramped muscles • Transport affected worker to hospital if condition worsens
Heat Exhaustion	Blood transport to skin to dissipate excessive body heat, resulting in blood pooling in the skin with inadequate return to the heart	• Weak pulse • Rapid and shallow breathing • General weakness • Pale, clammy skin • Profuse perspiration • Dizziness • Unconsciousness	• Move affected worker to cool area • Remove as much clothing as possible • Provide sips of cool liquid or Gatorade® (only if conscious) • Fan the person but do not overcool or chill • Treat for shock • Transport to hospital if condition worsens
Heat Stroke**	Life threatening condition from profound disturbance of body's heat-regulating mechanism	• Dry, hot, and flushed skin • Constricted pupils • Early loss of consciousness • Rapid pulse • Deep breathing at first, and then shallow breathing • Muscle twitching leading to convulsions • Body temperature reaching 105 or 106 degrees Fahrenheit (°F) or higher	• Immediately transport victim to medical facility • Move victim to cool area • Remove as much clothing as possible • Reduce body heat promptly by dousing with water or wrapping in wet cloth • Place ice packs under arms, around neck, at ankles, and wherever blood vessels are close to skin surface • Protect patient during convulsions
**** Any of these symptoms require immediate attention. If heat stroke is suspected, emergency medical personnel should be immediately contacted and on-site first aid provided.**			

Employee training procedures include, but are not limited to, the following:

- All employees (including and especially newly hired employees) will receive heat illness prevention training prior to working outdoors. This training will review the signs and symptoms of heat illness, detail the concept and importance of acclimatization and Tetra Tech's responsility to provide water, shade, cool-down rests and access to first aid. Training will also communicate the employees' right to exercise their rights without retaliation.

- SSCs will hold short tailgate meetings daily to review important heat illness and prevention information with all field team members. Information communicated in tailgate meetings will include a reminder of the importance of frequent consumption of small quantities of water, up to 4 cups per hour when the work environement is hot and employees are likely to be sweating more than usual.

- The expectation to immediately report any symptoms or signs of heat illness in themselves or in co-workers.

- All workers will be assigned a "buddy" or experienced coworker to ensure that they understood the training and follow the company procedures.

- Training will include a review of how emergency services will be provided if necessary, procedures for contacting emergency medical services and if necessary transporting employees to a point where they can be reached by emergency medical services.

- PMs and SSCs will be trained before assignment to supervise outdoor workers.

6.0 Heat Illness Prevention and Monitoring Requirements

6.1 Identification of Work Conditions

Hot weather is a condition that will be encountered during Tetra Tech operations. When work takes place outdoors during warm weather, working conditions shall be identified for both heat stress conditions and UV exposure.

6.2 Heat Index

The Heat Index (HI) can be used as a first indicator of thermal comfort. The HI can be obtained by directly measuring the dry bulb temperature and relative humidity. The dry bulb temperature and relative humidity forecast can be obtained by checking the local weather station information or measured by using a wet bulb thermometer. A direct reading of HI can be obtained by placing a heat stress monitor in full shade at the workplace.

The HI does not take into account acclimation, clothing or nature of work; therefore, if the HI is at 80°F (26.7°C) or above, further evaluation is required to adjust workload and clothing.

6.3 Heat Exposure Limits and Measurement

The TLV is a means of providing heat exposure limits and gauging potential heat impacts. To determine the TLV, the Wet Bulb Globe Temperature (WBGT) index is measured. The WBGT is calculated using a formula that takes into account air temperature, speed of air movement, radiant heat from hot objects, sunshine and body cooling due to sweat evaporation. WBGT direct reading meters, often called 'heat stress analyzers,' are also available. These meters give direct WBGT readings; no calculations are necessary.

A trained person shall take WBGT measurements. If a WBGT direct reading meter is not available, two different methods are used to calculate WBGT in the workplace: one for workplaces with direct sunlight, and the other for workplaces without direct sunlight. In addition, when conditions of the workplace fluctuate widely, time-weighted WBGT is often used. The WBGT calculation is used in determining heat stress exposure guidelines and heat stress and clothing guidelines. Table 2 presents approximate WBGT values.

APPROXIMATE WBGT VALUE (°F) TABLE

Dry Bulb Temperature		Relative Humidity																			
°C	°F	5%	10%	15%	20%	25%	30%	35%	40%	45%	50%	55%	60%	65%	70%	75%	80%	85%	90%	95%	100%
18.33	65	59	59	60	61	62	62	63	64	64	65	66	67	67	68	69	70	70	71	72	73
18.89	66	59	60	61	61	62	63	64	65	65	66	67	68	68	69	70	71	71	72	73	74
19.44	67	60	61	61	62	63	64	65	65	66	67	68	69	69	70	71	72	72	73	74	75
20.00	68	60	61	62	63	64	64	65	66	67	68	69	69	70	71	72	73	74	74	75	76
20.56	69	61	62	63	63	64	65	66	67	68	69	69	70	71	72	73	74	75	75	76	77
21.11	70	62	62	63	64	65	66	67	68	69	69	70	71	72	73	74	75	76	77	77	78
21.67	71	62	63	64	65	66	67	68	69	69	70	71	72	73	74	75	76	77	78	79	79
22.22	72	63	64	65	66	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81
22.78	73	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82
23.33	74	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83
23.89	75	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84
24.44	76	65	66	67	68	69	71	72	73	74	75	76	77	78	79	80	81	82	83	85	86
25.00	77	66	67	68	69	70	71	72	74	75	76	77	78	79	80	81	82	84	85	86	87
25.56	78	66	67	69	70	71	72	73	74	76	77	78	79	80	81	82	84	85	86	87	88
26.11	79	67	68	69	71	72	73	74	75	76	78	79	80	81	82	84	85	86	87	88	90
26.67	80	68	69	70	71	72	74	75	76	77	79	80	81	82	84	85	86	87	88	90	91
27.22	81	68	69	71	72	73	75	76	77	78	80	81	82	83	85	86	87	89	90	91	92
27.78	82	69	70	71	73	74	75	77	78	79	81	82	83	85	86	87	88	90	91	92	94
28.33	83	69	71	72	73	75	76	78	79	80	82	83	84	86	87	88	90	91	92	94	95
28.89	84	70	71	73	74	76	77	78	80	81	83	84	85	87	88	90	91	92	94	95	97
29.44	85	71	72	73	75	76	78	79	81	82	84	85	87	88	89	91	92	94	95	97	98
30.00	86	71	73	74	76	77	79	80	82	83	85	86	88	89	91	92	94	95	97	98	100
30.56	87	72	73	75	76	78	80	81	83	84	86	87	89	90	92	93	95	97	98	100	101
31.11	88	72	74	76	77	79	80	82	84	85	87	88	90	92	93	95	96	98	100	101	103
31.67	89	73	75	76	78	80	81	83	85	86	88	90	91	93	94	96	98	99	101	103	104
32.22	90	74	75	77	79	80	82	84	86	87	89	91	92	94	96	97	99	101	103	104	106
32.78	91	74	76	78	80	81	83	85	87	88	90	92	94	95	97	99	101	102	104	106	108
33.33	92	75	77	79	80	82	84	86	88	89	91	93	95	97	98	100	102	104	106	107	109
33.89	93	76	77	79	81	83	85	87	89	90	92	94	96	98	100	102	103	105	107	109	111
34.44	94	76	78	80	82	84	86	88	90	92	93	95	97	99	101	103	105	107	109	111	113
35.00	95	77	79	81	83	85	87	89	91	93	95	97	99	101	103	105	107	108	110	112	114
35.56	96	77	79	82	84	86	88	90	92	94	96	98	100	102	104	106	108	110	112	114	116
36.11	97	78	80	82	84	86	89	91	93	95	97	99	101	103	105	108	110	112	114	116	118
36.67	98	79	81	83	85	87	90	92	94	96	98	100	103	105	107	109	111	113	116	118	120
37.22	99	79	82	84	86	88	91	93	95	97	99	102	104	106	108	111	113	115	117	120	122
37.78	100	80	82	85	87	89	91	94	96	98	101	103	105	108	110	112	115	117	119	121	124
38.33	101	81	83	85	88	90	92	95	97	100	102	104	107	109	111	114	116	119	121	123	126
38.89	102	81	84	86	89	91	93	96	98	101	103	106	108	111	113	116	118	120	123	125	128
39.44	103	82	84	87	89	92	94	97	100	102	105	107	110	112	115	117	120	122	125	127	130
40.00	104	83	85	88	90	93	96	98	101	103	106	108	111	114	116	119	121	124	127	129	132
40.56	105	83	86	89	91	94	97	99	102	105	107	110	113	115	118	121	123	126	129	131	134
41.11	106	84	87	89	92	95	98	100	103	106	109	111	114	117	120	122	125	128	131	133	136
41.67	107	84	87	90	93	96	99	101	104	107	110	113	116	119	121	124	127	130	133	136	138
42.22	108	85	88	91	94	97	100	103	106	108	111	114	117	120	123	126	129	132	135	138	141
42.78	109	86	89	92	95	98	101	104	107	110	113	116	119	122	125	128	131	134	137	140	143
43.33	110	86	90	93	96	99	102	105	108	111	114	117	120	124	127	130	133	136	139	142	145
43.89	111	87	90	93	97	100	103	106	109	113	116	119	122	125	128	132	135	138	141	144	148
44.44	112	88	91	94	98	101	104	107	111	114	117	121	124	127	130	134	137	140	143	147	150
45.00	113	88	92	95	99	102	105	109	112	115	119	122	126	129	132	136	139	142	146	149	153
45.56	114	89	93	96	99	103	106	110	113	117	120	124	127	131	134	138	141	145	148	152	155
46.11	115	90	93	97	100	104	108	111	115	118	122	125	129	133	136	140	143	147	150	154	158
46.67	116	90	94	98	101	105	109	112	116	120	123	127	131	134	138	142	146	149	153	157	160
47.22	117	91	95	99	102	106	110	114	118	121	125	129	133	136	140	144	148	152	155	159	163
47.78	118	92	96	100	103	107	111	115	119	123	127	131	134	138	142	146	150	154	158	162	166
48.33	119	92	96	100	104	108	112	116	120	124	128	132	136	140	144	148	152	156	160	164	168
48.89	120	93	97	101	105	110	114	118	122	126	130	134	138	142	147	151	155	159	163	167	171

Notes: Calculated values assume outdoor work in full sun, with a light (<5 mph) wind.
WBGT of green-shaded cells is less than dry-bulb temperature.

6.4 Heat Stress Exposure Guidelines

Heat stress exposure guidelines recommended by the American Conference of Governmental Industrial Hygienists (ACGIH) are shown in Table 3: ACGIH Screening Criteria for Heat Stress Exposure. This table is used to determine the allocation of work in a work/rest cycle, which is dependent on the type of work and WBGT values.

Table 3: ACGIH Screening Criteria for Heat Stress Exposure

PERMISSIBLE HEAT EXPOSURE THRESHOLD LIMIT VALUE															
Clothing Type	Summer Lightweight			Cotton Coveralls			Winter Work			Permeable Water Barrier (Tyvek)			Fully-Encapsulating Suit (Level 4)		
Work Load	Light	Moderate	Heavy	Light	Moderate	Heavy	Light	Moderate	Heavy	Light	Moderate	Heavy	Light	Moderate	Heavy
Work/Rest Schedule / WBGT	(°F)	(°F)	(°F)	(°F)	(°F)	(°F)	(°F)	(°F)	(°F)	(°F)	(°F)	(°F)	(°F)	(°F)	(°F)
Continuous Work	86	80	77	82	76	73	79	73	70	75	69	66	68	62	59
75% Work, 25% Rest / Hr	87	82	79	83	79	75	80	75	71	76	72	68	69	64	61
50% Work, 50% Rest / Hr	89	85	82	85	81	79	81	78	75	78	74	71	71	67	64
25% Work, 75% Rest / Hr	90	88	86	86	84	82	83	81	79	79	77	75	72	70	68

Notes: Temperature is approximate WBGT from accompanying tables, based on outdoor work, temperature, and relative humidity measurement during work activities. Light Work includes walking, writing notes, handling samples, and similar activities (metabolic rate up to 200 kilocalories [kcal]/hour). Medium Work includes bailing wells, moving light equipment, driving nails, and similar tasks (metabolic rate of 200-350 kcal/hour). Heavy Work is digging, heavy lifting, cutting trees, using heavy hand tools, and similar tasks (metabolic rate above 350 kcal/hour).

Table 3 is based on five-day work weeks and eight-hour work days with conventional breaks. Conventional breaks include a 15-minute break in a four-hour period and a half-hour lunch in an eight-hour period. The ACGIH exposure limits are intended to protect most workers from heat-related illnesses. The limits are higher than that if they had been developed to prevent discomfort. A safety factor should be used to protect sensitive individuals or increase comfort. Examples to clarify work load intensity:

- Rest: sitting (quietly or with moderate arm movements).
- Light work: sitting or standing to control machines, performing light hand or arm work (e.g., using a table saw), occasional walking, driving.
- Moderate work: walking about with moderate lifting and pushing or pulling, walking at a moderate pace, scrubbing in a standing position.
- Heavy work: digging, carrying, pushing/pulling heavy loads, walking at a fast pace, pick and shovel work, carpenter sawing by hand.
- Very heavy: very intense activity at a fast to maximum pace (e.g., shoveling wet sand).

For example, in order to minimize heat stress exposure, an employee who is acclimated and is performing heavy work such as shoveling dirt in a temperature of 78°F (25.6°C), would fall into a work/rest regimen of 100% work.

TLVs assume that workers who are exposed to these conditions are adequately hydrated, are not taking medication, are wearing lightweight clothing and are in generally good health.
When the WBGT is at a temperature that exceeds the TLV, ‘Stop Work’ should be enforced.

6.5 Heat Stress and Clothing Guidelines

The exposure limit should be adjusted for workers wearing heavy clothing. ACGIH recommendations for these conditions are listed in Table 4: Correction of TLV for Clothing.

Table 4: Correction of TLV for Clothing

Clothing Type	WBGT Correction (in °F [°C])
Work Clothes (long-sleeved shirts and pants)	0 (0)
Cloth coveralls (woven material)	+3 (0)
Spunbonded Meltdown Spunbonded polypropylene coveralls	+6 (+0.5)
Polyolefin coveralls	+8 (+1)
Double-layer woven clothing	+9 (+3)
Limited-use vapor-barrier coveralls	+18 (+11)

For example, an acclimated worker wearing double-layer woven clothing doing moderate work in 30ºC would have a corrected exposure level of 30 + 3 = 33ºC (91.4ºF). This would lower the allowable exposure to 0-25% work from 25-50% work.

For Fire Retardant Clothing (FRC), there is no WBGT correction. FRC can be obtained in various weight materials. The lightest weight FRC should be worn during work in warm environments. No second layer of clothing should be worn except for cotton undergarments.

These values are not to be used for completely encapsulating suits. The assumption is that coveralls are worn with only modest clothing underneath, not a second layer of clothing.

6.6 Identifying At-risk Employees

A screening program for identifying at risk employees shall include identification of health conditions that are aggravated by extreme environmental temperatures. How a person functions under conditions of heat stress will be unique that person and will depend on:

- Age.
- Weight.
- Metabolism.
- Alcohol or drug use.
- Pre-existing medical conditions.

- Level of physical fitness.
- Use of medications.
- Individual sensitivity to heat.
- Possibility of hypertension.

Note: Employees with any 'at-risk' conditions shall have more stringent work/rest regimens or controls

6.7 Health and Safety Controls

Controls shall be based on a risk assessment approach. Conditions and available controls will vary from site to site. Therefore, the HASP shall define and document the site-specific control plan. Controls shall be appropriate for the risks that are associated with heat hazards.

6.7.1 Acclimation

The human body can adapt to heat exposure to some extent. This physiological adaptation is called acclimation. Acclimation is a response by the body that results in increased heat tolerance.

People differ in their ability to acclimate to heat. Usually, acclimation is obtained in four to five days. However, it is lost in approximately the same amount of time. After a period of acclimation, the same activity will produce fewer cardiovascular demands. The worker will perspire more efficiently, leading to better evaporative cooling, and thus will more easily be able to maintain normal body temperatures.

All site workers who could be exposed to hot weather conditions shall be acclimated or go through an acclimation process, as necessary. Where workers are already acclimated, no acclimation process is necessary. A previously acclimated person is someone who has already been in similar working and heat conditions. Employees newly assigned to a high heat area will be closely observed by the SSC or designees for the first 14 days of the employee's assignment.

All employees shall be closely observed by a supervisor or designee during a heat wave. For acclimization purposes only, a heat wave is defined as any day in which the predicted high temperature for the day will be at least 80 degrees Fahrenheit and at least ten degrees Fahrenheit higher than the average high daily temperature in the preceding five days.

6.7.2 Fluid and Nutrient Replacement

Cool (50°-60°F [10°-15°C]) water or other cool liquid, except alcoholic beverages, should be made available to workers.

Provision of Water (Not Temperature Dependent)

Water is the principal preventive measure to minimize the risk of heat-related illnesses. Tetra Tech employees shall have access to potable drinking water (or electrolytic sports drink). Where the supply of water is not plumbed or otherwise continuously supplied, water shall be provided in sufficient quantity at the beginning of the work shift to provide **1 quart per employee per hour for drinking for the entire shift**. Frequent drinking of water shall be encouraged by the SSC. Water provision requirements include the following:

- At least 2 quarts of water per employee will be available at the start of the shift.
- The SSC will monitor water containers every 30 minutes, and employees are encouraged to report low levels or dirty water to the SSC when observed.
- The SSC will provide reminders to the field team members to drink frequently, and more water breaks will be provided as needed.
- During the daily tailgate safety meeting each morning, the SSC will remind the field team about the importance of frequent water consumption throughout the shift.
- Water containers will be placed as close to the workers as safety conditions allow.
- When drinking water levels within a container drop below 50%, the water shall be replenished immediately.
- If a common water source is used, disposable/single-use drinking cups will be provided to employees each day.
- Communication devices such as radios, cell phones, or air horns may be used to remind field team members to take water breaks.

Although some commercial replacement drinks contain salt, this is not necessary for acclimated people, because most people have enough salt in their normal diets. Commercial replacement drinks contain high amounts of sugar and may contribute to an individual's inability to cope with the warm environment. If used, commercial replacement drinks should not be used at full strength and should be diluted with water on at least a one-to-one ratio.

Energy drinks shall not be used while working in warm environments.

Poor nutrition, over eating and under eating are factors contributing to heat stress. During hot conditions, employees should eat small, regular meals.

6.7.3 Additional Control Measures

Outdoor workers are exposed to not only potential heat illness, but also UV radiation. Long-term exposure to UV radiation poses additional risks and can lead to a variety of skin disorders, including skin cancer and cataracts of the eyes.

Protection from UV exposure, sunscreen and appropriate eye protection should be considered in addition to the additional controls listed below:

<u>Access to Shade</u>

Access to rest and shade or other cooling measures are important preventative steps to minimize the risk of heat-related illnesses and exposure to UV radiation. Tetra Tech employees working in temperatures exceeding 80 degrees Fahrenheit for any period shall be provided access to an area with shade that is either open to the air or provided with ventilation or cooling. Such access to shade shall be permitted at all times. The amount of shade present shall be at least enough to accommodate the number of employees on recovery or rest periods, so that they can sit in a normal posture fully in the shade without having to be in physical contact with each other. When the outdoor temperature in the work area does not exceed 80 degrees Fahrenheit, shade shall be made available as addressed in this section or employees may be provided timely access to shade upon request.

Procedures for the provision of shade include the following:

- SSC will set up an adequate number of shaded areas as needed. Examples of shaded areas include vehicles with air conditioning, umbrellas, canopies, or other portable devices. Shading should be placed in close proximity to the work activity (no more than 50-100 yards away, or at the closest location safety conditions allow). Employees will be allowed and encouraged to take preventative cool down rest in the shade when they feel the need to do so to protect themselves from overheating. Employees should have access to an office, construction trailer, or other places with air conditioning.

- Any individual who takes a preventative cool down rest shall be monitored and asked if they are experiencing symptoms of heat illness.

- If an employee exhibits signs or reports symptoms of heat illness while taking a preventative cool down rest or during a preventative cool down rest period, appropriate first aid or emergency response measures must be provided.

- Any employee experiencing signs and symptoms of heat illness shall not be ordered back to work until signs and symptoms of heat illness have abated but in no event less than 5 minutes in addition to the time needed to access the shade.

- Every morning a short tailgate meeting will occur to remind workers about the importance of rest breaks and the location of shade.

- As safety conditions allow, SSCs shall provide areas for employee breaks that are:
    - Readily accessible
    - In the shade, open to air, and ventilated
    - Near sufficient supplies of drinking water, shade provided during meal periods shall be enough to accommodate the number of employees who remain outside.

7.0 Heat Illness Monitoring

A medical monitoring program shall be planned with the assistance of a medical or industrial hygiene professional. The monitoring program shall be specify the leading indicators to be used (e.g. heat rate, body temperature, blood pressure, respiration rate, and other) and frequency of measurement.

Heat illness monitoring will be conducted by the SSC or his/her designee when work conditions warrant implementation of a work/rest schedule based on temperature conditions and PPE requirements associated with project activities. Monitoring will be conducted as follows:

- Heart Rate: Count the radial (wrist) pulse during a 30-second period as early as possible in the rest period; if heart rate exceeds 110 beats per minute at the beginning of the rest period, shorten the next work cycle by one-third without changing the rest period.
    - If the heart rate still exceeds 110 beats per minute at the next period, shorten the following work cycle by one-third.
- Body Temperature: If body temperature exceeds 99.6 degrees Fahrenheit (°F) (37.6 degrees Celsius [°C]), shorten the next work cycle by one-third without changing the rest period. If body temperature still exceeds 99.6 °F at the beginning of the next rest period, shorten the following work cycle by one-third. Do not permit a worker to wear impermeable PPE when his or her body temperature exceeds 100.6 °F (38.1 °C). Use any of the following thermometers:
    - Oral Thermometer – Use a clinical thermometer (3 minutes under the tongue) to measure the oral temperature at the end of the work period.
    - Tympanic (ear) Thermometer
    - Temporal (swipe) Thermometer

The SSC will document throughout the entire work shift results of heat illness monitoring for each team member participating in work activities. Any employee exhibiting signs and symptoms of heat illness shall not be left alone or sent home without being offered onsite first aid and/or being provided with necessary emergency medical services in accordance with Site HASP emergency response procedures.

8.0 HIGH HEAT PROCEDURES

Extra Measures During Heat Waves

Extreme environmental conditions during a heat wave can cause an employee's physical and mental conditions to change rapidly into a serious medical condition. Workers previously fully acclimatized are at risk for heat illness during a heat wave because during a heat wave, the body does not have enough time to adjust to a sudden, abnormally high temperature or other extreme conditions. The onset of heat illness may be confused with other problems and may not always be obvious before it becomes life-threatening. Therefore, the following extra measures may be required to prevent and/or respond to heat illness during heat waves or when temperatures exceed 95 degrees Fahrenheit. These measures will be discussed at the preshift tail gate meeting before commencement of work.

- **Communication** – Make sure voice, observation or electronic means of communication (text messaging or cell phone if service is available) is maintained so that site personnel can contact a supervisor when necessary. Designate one or more employees at the site as authorized to call for emergency services, when designated person(s) are not available any employee can call for emergency services.

- **Alertness to the Weather** – Make sure to monitor the weather and the specific locations where work activities are occurring. Continue to stay updated throughout the work shift on the changing air temperatures and other environmental factors. **Use current weather information to make the appropriate adjustments in work activities throughout the workday.**

- **Extra Vigilance and Observation** – Apply real-time communication methods as stated above as well as a mandatory "Buddy System" to account for the whereabouts of employees at more frequent intervals throughout the work shift and at the end of the work shift. Employee observation methods may also include, supervisor or designee direct observation if less than 20 employees are at the site.

- **Additional Water Consumption** – Remind employees throughout the work shift to drink small quantities of water more frequently and have effective replenishment measures in place for provision of extra drinking water to ensure available supplies.

- **Additional Cooling Measures** – Other alternative cooling measures may be necessary in addition to shade (e.g., allowing employees to spend time in air-conditioned places or having them spray themselves with water).

- **Additional and/or Longer Rest Breaks** – Remind employees of their right to take a more frequent and cool down rests when necessary.

- **Change of Work Scheduling and Assignments** – One or more of the following additional measures may be necessary:

  - Start the work shift earlier in the day or later in the evening.
  - Cut work shifts short or stop work altogether.
  - Bring in more personnel to accommodate longer, more frequent breaks as necessary to meet production requirements.
  - Reduce the severity of work by scheduling slower paced, less physically demanding work during the hot parts of the day, and the heaviest work activities during the cooler parts of the day (early morning or evening).

9.0 Establish Emergency Response

Specific procedures to be followed for heat related first aid and emergency response shall be established relevant to project location and task and documented in the Site-specific HASP. The HASP emergency response procedures must include clear and concise directions to the work site that can be provided to emergency responders. The HASP will also identify local emergency services and if necessary provide a means to transport employees to a place where they can be reached by emergency responders.

10.0 Variation to the Heat Illness Prevention and Monitoring Program

Before deviation from the requirements of this document, a designated manager shall authorize the variation. The exception process does not need to be followed for variations that impose more stringent requirements that those outlined in this document.

11.0 Disclaimer

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Revision Date	Document Authorizer		Revision Details
	Name	Approval Date	
12/19/2018	Chris McClain	12/21/2018	Revision to align with Cal-OSHA Heat Illness Prevention

By far, the most common cause of skin cancer is overexposure to the sun. Ninety percent of all skin cancers occur on parts of the body that not usually covered by clothing. People who sunburn easily, and those with fair skin and red or blond hair are more prone to develop skin cancer. The amount of time spent in the sun also affects a person's risk of skin cancer. Premature aging of the skin also occurs with prolonged sun exposure. Tetra Tech encourages personnel to avoid prolonged exposure to the sun, and recommends the following:

- Sunburn can occur during any time of the year. To avoid sunburn, wear hats with wide brims.
- Use sunscreen with a Sun Protective Factor (SPF) rating of 15 or higher.
- To prevent skin cancer:
  - Cover up with a wide brimmed hat and a bandanna for your neck. Wear long-sleeved shirts and pants which the sun cannot penetrate.
  - Use sunscreens to help prevent skin cancer as well as premature aging of your skin. Use a Sun Protective Factor (SPF) rating of 15 or higher.
  - Apply sunscreen at least an hour before going into the sun and again after swimming or perspiring a lot.
  - Do not use indoor sun lamps, tanning salons/parlors, or tanning pills.
- You can still get burned on a cloudy day. Try to stay out of the direct sun at midday, because sun rays are their strongest between 10 a.m. and 3 p.m. Beware of high altitudes - where there is less atmosphere to filter out the ultraviolet rays. Skiers should remember that snow reflects the sun's rays, too.
- Know your skin. Whatever your skin type, do a monthly self-examination of your skin to note any moles, blemishes or birthmarks. Check them once a month and if you notice any changes in size, shape or color, or if a sore does not heal, see your physician without delay.

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Revision Date	Document Authorizer	Revision Details
10/1/2008	Chris McClain	NEW

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Airborne Asbestos Fiber Analysis
by Transmission Electron Microscopy (TEM)
ISO 10312 - Ambient Air - Determination of Asbestos Fibers
Direct-Transfer Transmission Electron Microscopy Method

Maura McAleese
TetraTech
1999 Harrison St, Suite 500
Oakland, CA 94612

EBET Order #: 3454309
Project #: 1032864023141
Receipt Date: 15-Nov-2023
Analysis Date: 20-Nov-2023
Report Date: 20-Nov-2023

HDOH Kula Community Air

Sample Number **MFK-AMO1-111023-AB**

Air Volume:	2261.714
Effective Filter Area:	385.0 mm^2
Level of Analysis (Chrysotile):	CDQ
Level of Analysis (Amphibole):	ADQ
Magnification Used for Fiber Counting:	20,000
Aspect Ratio for Fiber Definition:	5:1
Mean Dimension of Grid Openings (GOs):	0.0132 mm^2
Initials of Analyst:	WC
Number of GO's Examined:	10
Analytical Sensitivity: f/Liter:	1.28958
Analytical Sensitivity: f/cm3:	0.00129
Number of primary asbestos structures:	0
Number of asbestos structures counted:	0
Number of asbestos structures > 5 um :	0
Number of asbestos fibers and bundles > 5 um:	0
Number of PCM equivalent asbestos structures:	0
Number of PCM equivalent asbestos fibers:	0
Concentration of Asbestos (Chrysotile) f/cm3:	<0.00129
Concentration of Asbestos (Amphibole) f/cm3:	<0.00129
Concentration of PCME Asbestos (Chrysotile) f/cm3:	<0.00129
Concentration of Asbestos (Chrysotile), Str/L:	0
Concentration of Asbestos (Amphibole), Str/L:	0
Lower 95% Confidence Limit (Chrysotile), Str/L:	0
Upper 95% Confidence Limit (Chrysotile), Str/L:	4.8
Lower 95% Confidence Limit (Amphibole), Str/L:	0
Upper 95% Confidence Limit (Amphibole), Str/L:	4.8

Analyst: William Colbert

Scott M. Ward, Ph.D. **Lab Director**

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HDOH Kula Community Air

Sample Number **MFK-AMO2-111023-AB**

Air Volume:	2885.531
Effective Filter Area:	385.0 mm^2
Level of Analysis (Chrysotile):	CDQ
Level of Analysis (Amphibole):	ADQ
Magnification Used for Fiber Counting:	20,000
Aspect Ratio for Fiber Definition:	5:1
Mean Dimension of Grid Openings (GOs):	0.0132 mm^2
Initials of Analyst:	WC
Number of GO's Examined:	10
Analytical Sensitivity: f/Liter:	1.01079
Analytical Sensitivity: f/cm3:	0.00101
Number of primary asbestos structures:	0
Number of asbestos structures counted:	0
Number of asbestos structures > 5 um :	0
Number of asbestos fibers and bundles > 5 um:	0
Number of PCM equivalent asbestos structures:	0
Number of PCM equivalent asbestos fibers:	0
Concentration of Asbestos (Chrysotile) f/cm3:	<0.00101
Concentration of Asbestos (Amphibole) f/cm3:	<0.00101
Concentration of PCME Asbestos (Chrysotile) f/cm3:	<0.00101
Concentration of Asbestos (Chrysotile), Str/L:	0
Concentration of Asbestos (Amphibole), Str/L:	0
Lower 95% Confidence Limit (Chrysotile), Str/L:	0
Upper 95% Confidence Limit (Chrysotile), Str/L:	3.7
Lower 95% Confidence Limit (Amphibole), Str/L:	0
Upper 95% Confidence Limit (Amphibole), Str/L:	3.7

Analyst: William Colbert

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HDOH Kula Community Air

Sample Number **MFK-AMO3-111023-AB**

Air Volume:	3312.221
Effective Filter Area:	385.0 mm^2
Level of Analysis (Chrysotile):	CDQ
Level of Analysis (Amphibole):	ADQ
Magnification Used for Fiber Counting:	20,000
Aspect Ratio for Fiber Definition:	5:1
Mean Dimension of Grid Openings (GOs):	0.0132 mm^2
Initials of Analyst:	WC
Number of GO's Examined:	10
Analytical Sensitivity: f/Liter:	0.88058
Analytical Sensitivity: f/cm3:	0.00088
Number of primary asbestos structures:	0
Number of asbestos structures counted:	0
Number of asbestos structures > 5 um :	0
Number of asbestos fibers and bundles > 5 um:	0
Number of PCM equivalent asbestos structures:	0
Number of PCM equivalent asbestos fibers:	0
Concentration of Asbestos (Chrysotile) f/cm3:	<0.00088
Concentration of Asbestos (Amphibole) f/cm3:	<0.00088
Concentration of PCME Asbestos (Chrysotile) f/cm3:	<0.00088
Concentration of Asbestos (Chrysotile), Str/L:	0
Concentration of Asbestos (Amphibole), Str/L:	0
Lower 95% Confidence Limit (Chrysotile), Str/L:	0
Upper 95% Confidence Limit (Chrysotile), Str/L:	3.2
Lower 95% Confidence Limit (Amphibole), Str/L:	0
Upper 95% Confidence Limit (Amphibole), Str/L:	3.2

Analyst: William Colbert

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HDOH Kula Community Air

Sample Number **MFK-AMO1-111123-AB**

Air Volume:	5658.48
Effective Filter Area:	385.0 mm^2
Level of Analysis (Chrysotile):	CDQ
Level of Analysis (Amphibole):	ADQ
Magnification Used for Fiber Counting:	20,000
Aspect Ratio for Fiber Definition:	5:1
Mean Dimension of Grid Openings (GOs):	0.0132 mm^2
Initials of Analyst:	WC
Number of GO's Examined:	10
Analytical Sensitivity: f/Liter:	0.51545
Analytical Sensitivity: f/cm3:	0.00052
Number of primary asbestos structures:	0
Number of asbestos structures counted:	0
Number of asbestos structures > 5 um :	0
Number of asbestos fibers and bundles > 5 um:	0
Number of PCM equivalent asbestos structures:	0
Number of PCM equivalent asbestos fibers:	0
Concentration of Asbestos (Chrysotile) f/cm3:	<0.00052
Concentration of Asbestos (Amphibole) f/cm3:	<0.00052
Concentration of PCME Asbestos (Chrysotile) f/cm3:	<0.00052
Concentration of Asbestos (Chrysotile), Str/L:	0
Concentration of Asbestos (Amphibole), Str/L:	0
Lower 95% Confidence Limit (Chrysotile), Str/L:	0
Upper 95% Confidence Limit (Chrysotile), Str/L:	1.9
Lower 95% Confidence Limit (Amphibole), Str/L:	0
Upper 95% Confidence Limit (Amphibole), Str/L:	1.9

Analyst: William Colbert

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HDOH Kula Community Air

Sample Number **MFK-AMO2-111123-AB**

Air Volume:	5148.37
Effective Filter Area:	385.0 mm^2
Level of Analysis (Chrysotile):	CDQ
Level of Analysis (Amphibole):	ADQ
Magnification Used for Fiber Counting:	20,000
Aspect Ratio for Fiber Definition:	5:1
Mean Dimension of Grid Openings (GOs):	0.0132 mm^2
Initials of Analyst:	WC
Number of GO's Examined:	10
Analytical Sensitivity: f/Liter:	0.56652
Analytical Sensitivity: f/cm3:	0.00057
Number of primary asbestos structures:	0
Number of asbestos structures counted:	0
Number of asbestos structures > 5 um :	0
Number of asbestos fibers and bundles > 5 um:	0
Number of PCM equivalent asbestos structures:	0
Number of PCM equivalent asbestos fibers:	0
Concentration of Asbestos (Chrysotile) f/cm3:	<0.00057
Concentration of Asbestos (Amphibole) f/cm3:	<0.00057
Concentration of PCME Asbestos (Chrysotile) f/cm3:	<0.00057
Concentration of Asbestos (Chrysotile), Str/L:	0
Concentration of Asbestos (Amphibole), Str/L:	0
Lower 95% Confidence Limit (Chrysotile), Str/L:	0
Upper 95% Confidence Limit (Chrysotile), Str/L:	2.1
Lower 95% Confidence Limit (Amphibole), Str/L:	0
Upper 95% Confidence Limit (Amphibole), Str/L:	2.1

Analyst: William Colbert

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HDOH Kula Community Air

Sample Number **MFK-AMO3-111123-AB**

Air Volume:	6677.049
Effective Filter Area:	385.0 mm^2
Level of Analysis (Chrysotile):	CDQ
Level of Analysis (Amphibole):	ADQ
Magnification Used for Fiber Counting:	20,000
Aspect Ratio for Fiber Definition:	5:1
Mean Dimension of Grid Openings (GOs):	0.0132 mm^2
Initials of Analyst:	WC
Number of GO's Examined:	10
Analytical Sensitivity: f/Liter:	0.43682
Analytical Sensitivity: f/cm3:	0.00044
Number of primary asbestos structures:	0
Number of asbestos structures counted:	0
Number of asbestos structures > 5 um :	0
Number of asbestos fibers and bundles > 5 um:	0
Number of PCM equivalent asbestos structures:	0
Number of PCM equivalent asbestos fibers:	0
Concentration of Asbestos (Chrysotile) f/cm3:	<0.00044
Concentration of Asbestos (Amphibole) f/cm3:	<0.00044
Concentration of PCME Asbestos (Chrysotile) f/cm3:	<0.00044
Concentration of Asbestos (Chrysotile), Str/L:	0
Concentration of Asbestos (Amphibole), Str/L:	0
Lower 95% Confidence Limit (Chrysotile), Str/L:	0
Upper 95% Confidence Limit (Chrysotile), Str/L:	1.6
Lower 95% Confidence Limit (Amphibole), Str/L:	0
Upper 95% Confidence Limit (Amphibole), Str/L:	1.6

Analyst: William Colbert

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Sample Number **MFK-AMO1-111223-AB**

Air Volume:	5121.496
Effective Filter Area:	385.0 mm^2
Level of Analysis (Chrysotile):	CDQ
Level of Analysis (Amphibole):	ADQ
Magnification Used for Fiber Counting:	20,000
Aspect Ratio for Fiber Definition:	5:1
Mean Dimension of Grid Openings (GOs):	0.0132 mm^2
Initials of Analyst:	WC
Number of GO's Examined:	10
Analytical Sensitivity: f/Liter:	0.56950
Analytical Sensitivity: f/cm3:	0.00057
Number of primary asbestos structures:	0
Number of asbestos structures counted:	0
Number of asbestos structures > 5 um :	0
Number of asbestos fibers and bundles > 5 um:	0
Number of PCM equivalent asbestos structures:	0
Number of PCM equivalent asbestos fibers:	0
Concentration of Asbestos (Chrysotile) f/cm3:	<0.00057
Concentration of Asbestos (Amphibole) f/cm3:	<0.00057
Concentration of PCME Asbestos (Chrysotile) f/cm3:	<0.00057
Concentration of Asbestos (Chrysotile), Str/L:	0
Concentration of Asbestos (Amphibole), Str/L:	0
Lower 95% Confidence Limit (Chrysotile), Str/L:	0
Upper 95% Confidence Limit (Chrysotile), Str/L:	2.1
Lower 95% Confidence Limit (Amphibole), Str/L:	0
Upper 95% Confidence Limit (Amphibole), Str/L:	2.1

Analyst: William Colbert

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HDOH Kula Community Air

Sample Number **MFK-AMO2-111223-AB**

Air Volume:	4696.992
Effective Filter Area:	385.0 mm^2
Level of Analysis (Chrysotile):	CDQ
Level of Analysis (Amphibole):	ADQ
Magnification Used for Fiber Counting:	20,000
Aspect Ratio for Fiber Definition:	5:1
Mean Dimension of Grid Openings (GOs):	0.0132 mm^2
Initials of Analyst:	WC
Number of GO’s Examined:	10
Analytical Sensitivity: f/Liter:	0.62096
Analytical Sensitivity: f/cm3:	0.00062
Number of primary asbestos structures:	0
Number of asbestos structures counted:	0
Number of asbestos structures > 5 um :	0
Number of asbestos fibers and bundles > 5 um:	0
Number of PCM equivalent asbestos structures:	0
Number of PCM equivalent asbestos fibers:	0
Concentration of Asbestos (Chrysotile) f/cm3:	<0.00062
Concentration of Asbestos (Amphibole) f/cm3:	<0.00062
Concentration of PCME Asbestos (Chrysotile) f/cm3:	<0.00062
Concentration of Asbestos (Chrysotile), Str/L:	0
Concentration of Asbestos (Amphibole), Str/L:	0
Lower 95% Confidence Limit (Chrysotile), Str/L:	0
Upper 95% Confidence Limit (Chrysotile), Str/L:	2.3
Lower 95% Confidence Limit (Amphibole), Str/L:	0
Upper 95% Confidence Limit (Amphibole), Str/L:	2.3

Analyst: William Colbert

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HDOH Kula Community Air

Sample Number **MFK-AMO3-111223-AB**

Air Volume:	5134.032
Effective Filter Area:	385.0 mm^2
Level of Analysis (Chrysotile):	CDQ
Level of Analysis (Amphibole):	ADQ
Magnification Used for Fiber Counting:	20,000
Aspect Ratio for Fiber Definition:	5:1
Mean Dimension of Grid Openings (GOs):	0.0132 mm^2
Initials of Analyst:	WC
Number of GO's Examined:	10
Analytical Sensitivity: f/Liter:	0.56810
Analytical Sensitivity: f/cm3:	0.00057
Number of primary asbestos structures:	0
Number of asbestos structures counted:	0
Number of asbestos structures > 5 um :	0
Number of asbestos fibers and bundles > 5 um:	0
Number of PCM equivalent asbestos structures:	0
Number of PCM equivalent asbestos fibers:	0
Concentration of Asbestos (Chrysotile) f/cm3:	<0.00057
Concentration of Asbestos (Amphibole) f/cm3:	<0.00057
Concentration of PCME Asbestos (Chrysotile) f/cm3:	<0.00057
Concentration of Asbestos (Chrysotile), Str/L:	0
Concentration of Asbestos (Amphibole), Str/L:	0
Lower 95% Confidence Limit (Chrysotile), Str/L:	0
Upper 95% Confidence Limit (Chrysotile), Str/L:	2.1
Lower 95% Confidence Limit (Amphibole), Str/L:	0
Upper 95% Confidence Limit (Amphibole), Str/L:	2.1

Analyst: William Colbert

Scott M. Ward, Ph.D. **Lab Director**

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Report for:

Maura McAleese
Tetra Tech- Maui Fire
1999 Harrison St. Ste. 500
Oakland, CA 94612

Regarding: Eurofins J3 Resources, Inc.
Project: 103286402341; HDOH Kula Community Air
EML ID: 3458356

Approved by:

Dates of Analysis:
Asbestos TEM ISO 10312 / ASTM6281-06: 11-27-2023

Lab Director
Scott Ward

All samples were received in acceptable condition unless noted in the Report Comments portion in the body of the report. Due to the nature of the analyses performed, field blank correction of results is not applied. The results relate only to the samples as received and tested.

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Airborne Asbestos Fiber Analysis by Transmission Electron Microscopy (TEM) ISO 10312 - Ambient Air - Determination of Asbestos Fibers Direct-Transfer Transmission Electron Microscopy Method

Maura McAleese
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EJ3 Order #: 3458356
Project #: 103286402341.00
Receipt Date: 20-Nov-2023
Analysis Date: 27-Nov-2023
Report Date: 27-Nov-2023

HDOH Kula Community Air

Sample Number **MFK-AM01-111323-AB**

Air Volume:	7394.855
Effective Filter Area:	385.0 mm^2
Level of Analysis (Chrysotile):	CDQ
Level of Analysis (Amphibole):	ADQ
Magnification Used for Fiber Counting:	20,000
Aspect Ratio for Fiber Definition:	5:1
Mean Dimension of Grid Openings (GOs):	0.0132 mm^2
Initials of Analyst:	TS
Number of GO's Examined:	10
Analytical Sensitivity: f/Liter:	0.39442
Analytical Sensitivity: f/cm3:	0.00039
Number of primary asbestos structures:	0
Number of asbestos structures counted:	0
Number of asbestos structures > 5 um :	0
Number of asbestos fibers and bundles > 5 um:	0
Number of PCM equivalent asbestos structures:	0
Number of PCM equivalent asbestos fibers:	0
Concentration of Asbestos (Chrysotile) f/cm3:	<0.00039
Concentration of Asbestos (Amphibole) f/cm3:	<0.00039
Concentration of PCME Asbestos (Chrysotile) f/cm3:	<0.00039
Concentration of Asbestos (Chrysotile), Str/L:	0
Concentration of Asbestos (Amphibole), Str/L:	0
Lower 95% Confidence Limit (Chrysotile), Str/L:	0
Upper 95% Confidence Limit (Chrysotile), Str/L:	1.5
Lower 95% Confidence Limit (Amphibole), Str/L:	0
Upper 95% Confidence Limit (Amphibole), Str/L:	1.5

Analyst: Taylor Smylie

Scott M. Ward, Ph.D. **Lab Director**

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EJ3 Order #: 3458356
Project #: 103286402341.00
Receipt Date: 20-Nov-2023
Analysis Date: 27-Nov-2023
Report Date: 27-Nov-2023

HDOH Kula Community Air

Sample Number **MFK-AM02-111323-AB**

Air Volume:	7670.678
Effective Filter Area:	385.0 mm^2
Level of Analysis (Chrysotile):	CDQ
Level of Analysis (Amphibole):	ADQ
Magnification Used for Fiber Counting:	20,000
Aspect Ratio for Fiber Definition:	5:1
Mean Dimension of Grid Openings (GOs):	0.0132 mm^2
Initials of Analyst:	TS
Number of GO's Examined:	10
Analytical Sensitivity: f/Liter:	0.38024
Analytical Sensitivity: f/cm3:	0.00038
Number of primary asbestos structures:	0
Number of asbestos structures counted:	0
Number of asbestos structures > 5 um :	0
Number of asbestos fibers and bundles > 5 um:	0
Number of PCM equivalent asbestos structures:	0
Number of PCM equivalent asbestos fibers:	0
Concentration of Asbestos (Chrysotile) f/cm3:	<0.00038
Concentration of Asbestos (Amphibole) f/cm3:	<0.00038
Concentration of PCME Asbestos (Chrysotile) f/cm3:	<0.00038
Concentration of Asbestos (Chrysotile), Str/L:	0
Concentration of Asbestos (Amphibole), Str/L:	0
Lower 95% Confidence Limit (Chrysotile), Str/L:	0
Upper 95% Confidence Limit (Chrysotile), Str/L:	1.4
Lower 95% Confidence Limit (Amphibole), Str/L:	0
Upper 95% Confidence Limit (Amphibole), Str/L:	1.4

Analyst: Taylor Smylie

Scott M. Ward, Ph.D. **Lab Director**

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EJ3 Order #: 3458356
Project #: 103286402341.00
Receipt Date: 20-Nov-2023
Analysis Date: 27-Nov-2023
Report Date: 27-Nov-2023

HDOH Kula Community Air

Sample Number **MFK-AM03-111323-AB**

Air Volume:	4540.176
Effective Filter Area:	385.0 mm^2
Level of Analysis (Chrysotile):	CDQ
Level of Analysis (Amphibole):	ADQ
Magnification Used for Fiber Counting:	20,000
Aspect Ratio for Fiber Definition:	5:1
Mean Dimension of Grid Openings (GOs):	0.0132 mm^2
Initials of Analyst:	TS
Number of GO's Examined:	10
Analytical Sensitivity: f/Liter:	0.64241
Analytical Sensitivity: f/cm3:	0.00064
Number of primary asbestos structures:	0
Number of asbestos structures counted:	0
Number of asbestos structures > 5 um :	0
Number of asbestos fibers and bundles > 5 um:	0
Number of PCM equivalent asbestos structures:	0
Number of PCM equivalent asbestos fibers:	0
Concentration of Asbestos (Chrysotile) f/cm3:	<0.00064
Concentration of Asbestos (Amphibole) f/cm3:	<0.00064
Concentration of PCME Asbestos (Chrysotile) f/cm3:	<0.00064
Concentration of Asbestos (Chrysotile), Str/L:	0
Concentration of Asbestos (Amphibole), Str/L:	0
Lower 95% Confidence Limit (Chrysotile), Str/L:	0
Upper 95% Confidence Limit (Chrysotile), Str/L:	2.4
Lower 95% Confidence Limit (Amphibole), Str/L:	0
Upper 95% Confidence Limit (Amphibole), Str/L:	2.4

Analyst: Taylor Smylie

Scott M. Ward, Ph.D. **Lab Director**

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EJ3 Order #: 3458356
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Receipt Date: 20-Nov-2023
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Report Date: 27-Nov-2023

HDOH Kula Community Air

Sample Number **MFK-AM01-111423-AB**

Air Volume:	7307.402
Effective Filter Area:	385.0 mm^2
Level of Analysis (Chrysotile):	CDQ
Level of Analysis (Amphibole):	ADQ
Magnification Used for Fiber Counting:	20,000
Aspect Ratio for Fiber Definition:	5:1
Mean Dimension of Grid Openings (GOs):	0.0132 mm^2
Initials of Analyst:	TS
Number of GO's Examined:	10
Analytical Sensitivity: f/Liter:	0.39914
Analytical Sensitivity: f/cm3:	0.00040
Number of primary asbestos structures:	0
Number of asbestos structures counted:	0
Number of asbestos structures > 5 um :	0
Number of asbestos fibers and bundles > 5 um:	0
Number of PCM equivalent asbestos structures:	0
Number of PCM equivalent asbestos fibers:	0
Concentration of Asbestos (Chrysotile) f/cm3:	<0.00040
Concentration of Asbestos (Amphibole) f/cm3:	<0.00040
Concentration of PCME Asbestos (Chrysotile) f/cm3:	<0.00040
Concentration of Asbestos (Chrysotile), Str/L:	0
Concentration of Asbestos (Amphibole), Str/L:	0
Lower 95% Confidence Limit (Chrysotile), Str/L:	0
Upper 95% Confidence Limit (Chrysotile), Str/L:	1.5
Lower 95% Confidence Limit (Amphibole), Str/L:	0
Upper 95% Confidence Limit (Amphibole), Str/L:	1.5

Analyst: Taylor Smylie

Scott M. Ward, Ph.D. **Lab Director**

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Airborne Asbestos Fiber Analysis by Transmission Electron Microscopy (TEM) ISO 10312 - Ambient Air - Determination of Asbestos Fibers Direct-Transfer Transmission Electron Microscopy Method

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Report Date: 27-Nov-2023

HDOH Kula Community Air

Sample Number **MFK-AM02-111423-AB**

Air Volume:	8400.285
Effective Filter Area:	385.0 mm^2
Level of Analysis (Chrysotile):	CDQ
Level of Analysis (Amphibole):	ADQ
Magnification Used for Fiber Counting:	20,000
Aspect Ratio for Fiber Definition:	5:1
Mean Dimension of Grid Openings (GOs):	0.0132 mm^2
Initials of Analyst:	TS
Number of GO's Examined:	10
Analytical Sensitivity: f/Liter:	0.34721
Analytical Sensitivity: f/cm3:	0.00035
Number of primary asbestos structures:	0
Number of asbestos structures counted:	0
Number of asbestos structures > 5 um :	0
Number of asbestos fibers and bundles > 5 um:	0
Number of PCM equivalent asbestos structures:	0
Number of PCM equivalent asbestos fibers:	0
Concentration of Asbestos (Chrysotile) f/cm3:	<0.00035
Concentration of Asbestos (Amphibole) f/cm3:	<0.00035
Concentration of PCME Asbestos (Chrysotile) f/cm3:	<0.00035
Concentration of Asbestos (Chrysotile), Str/L:	0
Concentration of Asbestos (Amphibole), Str/L:	0
Lower 95% Confidence Limit (Chrysotile), Str/L:	0
Upper 95% Confidence Limit (Chrysotile), Str/L:	1.3
Lower 95% Confidence Limit (Amphibole), Str/L:	0
Upper 95% Confidence Limit (Amphibole), Str/L:	1.3

Analyst: Taylor Smylie

Scott M. Ward, Ph.D. **Lab Director**

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HDOH Kula Community Air

Sample Number **MFK-AM03-111423-AB**

Air Volume:	5086.31
Effective Filter Area:	385.0 mm^2
Level of Analysis (Chrysotile):	CDQ
Level of Analysis (Amphibole):	ADQ
Magnification Used for Fiber Counting:	20,000
Aspect Ratio for Fiber Definition:	5:1
Mean Dimension of Grid Openings (GOs):	0.0132 mm^2
Initials of Analyst:	TS
Number of GO's Examined:	10
Analytical Sensitivity: f/Liter:	0.57343
Analytical Sensitivity: f/cm3:	0.00057
Number of primary asbestos structures:	0
Number of asbestos structures counted:	0
Number of asbestos structures > 5 um :	0
Number of asbestos fibers and bundles > 5 um:	0
Number of PCM equivalent asbestos structures:	0
Number of PCM equivalent asbestos fibers:	0
Concentration of Asbestos (Chrysotile) f/cm3:	<0.00057
Concentration of Asbestos (Amphibole) f/cm3:	<0.00057
Concentration of PCME Asbestos (Chrysotile) f/cm3:	<0.00057
Concentration of Asbestos (Chrysotile), Str/L:	0
Concentration of Asbestos (Amphibole), Str/L:	0
Lower 95% Confidence Limit (Chrysotile), Str/L:	0
Upper 95% Confidence Limit (Chrysotile), Str/L:	2.1
Lower 95% Confidence Limit (Amphibole), Str/L:	0
Upper 95% Confidence Limit (Amphibole), Str/L:	2.1

Analyst: Taylor Smylie

Scott M. Ward, Ph.D. **Lab Director**

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EJ3 Order #: 3458356
Project #: 103286402341.00
Receipt Date: 20-Nov-2023
Analysis Date: 27-Nov-2023
Report Date: 27-Nov-2023

HDOH Kula Community Air

Sample Number **MFK-AM01-111523-AB**

Air Volume:	7228.224
Effective Filter Area:	385.0 mm^2
Level of Analysis (Chrysotile):	CDQ
Level of Analysis (Amphibole):	ADQ
Magnification Used for Fiber Counting:	20,000
Aspect Ratio for Fiber Definition:	5:1
Mean Dimension of Grid Openings (GOs):	0.0132 mm^2
Initials of Analyst:	TS
Number of GO's Examined:	10
Analytical Sensitivity: f/Liter:	0.40351
Analytical Sensitivity: f/cm3:	0.00040
Number of primary asbestos structures:	0
Number of asbestos structures counted:	0
Number of asbestos structures > 5 um :	0
Number of asbestos fibers and bundles > 5 um:	0
Number of PCM equivalent asbestos structures:	0
Number of PCM equivalent asbestos fibers:	0
Concentration of Asbestos (Chrysotile) f/cm3:	<0.00040
Concentration of Asbestos (Amphibole) f/cm3:	<0.00040
Concentration of PCME Asbestos (Chrysotile) f/cm3:	<0.00040
Concentration of Asbestos (Chrysotile), Str/L:	0
Concentration of Asbestos (Amphibole), Str/L:	0
Lower 95% Confidence Limit (Chrysotile), Str/L:	0
Upper 95% Confidence Limit (Chrysotile), Str/L:	1.5
Lower 95% Confidence Limit (Amphibole), Str/L:	0
Upper 95% Confidence Limit (Amphibole), Str/L:	1.5

Analyst: Taylor Smylie

Scott M. Ward, Ph.D. **Lab Director**

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EJ3 Order #: 3458356
Project #: 103286402341.00
Receipt Date: 20-Nov-2023
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Report Date: 27-Nov-2023

HDOH Kula Community Air

Sample Number **MFK-AM02-111523-AB**

Air Volume:	7311.168
Effective Filter Area:	385.0 mm^2
Level of Analysis (Chrysotile):	CDQ
Level of Analysis (Amphibole):	ADQ
Magnification Used for Fiber Counting:	20,000
Aspect Ratio for Fiber Definition:	5:1
Mean Dimension of Grid Openings (GOs):	0.0132 mm^2
Initials of Analyst:	TS
Number of GO's Examined:	10
Analytical Sensitivity: f/Liter:	0.39893
Analytical Sensitivity: f/cm3:	0.00040
Number of primary asbestos structures:	0
Number of asbestos structures counted:	0
Number of asbestos structures > 5 um :	0
Number of asbestos fibers and bundles > 5 um:	0
Number of PCM equivalent asbestos structures:	0
Number of PCM equivalent asbestos fibers:	0
Concentration of Asbestos (Chrysotile) f/cm3:	<0.00040
Concentration of Asbestos (Amphibole) f/cm3:	<0.00040
Concentration of PCME Asbestos (Chrysotile) f/cm3:	<0.00040
Concentration of Asbestos (Chrysotile), Str/L:	0
Concentration of Asbestos (Amphibole), Str/L:	0
Lower 95% Confidence Limit (Chrysotile), Str/L:	0
Upper 95% Confidence Limit (Chrysotile), Str/L:	1.5
Lower 95% Confidence Limit (Amphibole), Str/L:	0
Upper 95% Confidence Limit (Amphibole), Str/L:	1.5

Analyst: Taylor Smylie

Scott M. Ward, Ph.D. **Lab Director**

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EJ3 Order #: 3458356
Project #: 103286402341.00
Receipt Date: 20-Nov-2023
Analysis Date: 27-Nov-2023
Report Date: 27-Nov-2023

HDOH Kula Community Air

Sample Number **MFK-AM03-111523-AB**

Air Volume:	6445.728
Effective Filter Area:	385.0 mm^2
Level of Analysis (Chrysotile):	CDQ
Level of Analysis (Amphibole):	ADQ
Magnification Used for Fiber Counting:	20,000
Aspect Ratio for Fiber Definition:	5:1
Mean Dimension of Grid Openings (GOs):	0.0132 mm^2
Initials of Analyst:	TS
Number of GO's Examined:	10
Analytical Sensitivity: f/Liter:	0.45250
Analytical Sensitivity: f/cm3:	0.00045
Number of primary asbestos structures:	0
Number of asbestos structures counted:	0
Number of asbestos structures > 5 um :	0
Number of asbestos fibers and bundles > 5 um:	0
Number of PCM equivalent asbestos structures:	0
Number of PCM equivalent asbestos fibers:	0
Concentration of Asbestos (Chrysotile) f/cm3:	<0.00045
Concentration of Asbestos (Amphibole) f/cm3:	<0.00045
Concentration of PCME Asbestos (Chrysotile) f/cm3:	<0.00045
Concentration of Asbestos (Chrysotile), Str/L:	0
Concentration of Asbestos (Amphibole), Str/L:	0
Lower 95% Confidence Limit (Chrysotile), Str/L:	0
Upper 95% Confidence Limit (Chrysotile), Str/L:	1.7
Lower 95% Confidence Limit (Amphibole), Str/L:	0
Upper 95% Confidence Limit (Amphibole), Str/L:	1.7

Analyst: Taylor Smylie

Scott M. Ward, Ph.D. **Lab Director**

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NVLAP Lab Code: 200525-0; TDSHS License: 30-0273

Built Environment Testing

Report for:

Maura McAleese
Tetra Tech- Maui Fire
1999 Harrison St. Ste. 500
Oakland, CA 94612

Regarding: Eurofins J3 Resources, Inc.
Project: 1032864023141; HDOH Kula Community Air
EML ID: 3461524

Approved by:

Lab Director
Scott Ward

Dates of Analysis:
Asbestos TEM ISO 10312 / ASTM6281-06: 11-29-2023

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Airborn Asbestos Fiber Analysis
by Transmission Electron Microscopy (TEM)
ISO 10312 - Ambient Air - Determination of Asbestos Fibers
Direct-Transfer Transmission Electron Microscopy Method

Maura McAleese
Tetra Tech- Maui Fire
1999 Harrison St. Ste. 500
Oakland, CA 94612

J3 Order #: 3461524
Project #: 1032864023141
Receipt Date: 22-Nov-2023
Analysis Date: 29-Nov-2023
Report Date: 29-Nov-2023

HDOH Kula Community Air

Sample Number **MFK-AM01-111623-AB**

Air Volume:	7674.048
Effective Filter Area:	385.0 mm^2
Level of Analysis (Chrysotile):	CDQ
Level of Analysis (Amphibole):	ADQ
Magnification Used for Fiber Counting:	20,000
Aspect Ratio for Fiber Definition:	5:1
Mean Dimension of Grid Openings (GOs):	0.0132 mm^2
Initials of Analyst:	TS
Number of GO’s Examined:	10
Analytical Sensitivity: f/Liter:	0.38007
Analytical Sensitivity: f/cm3:	0.00038
Number of primary asbestos structures:	0
Number of asbestos structures counted:	0
Number of asbestos structures > 5 um :	0
Number of asbestos fibers and bundles > 5 um:	0
Number of PCM equivalent asbestos structures:	0
Number of PCM equivalent asbestos fibers:	0
Concentration of Asbestos (Chrysotile) f/cm3:	<0.00038
Concentration of Asbestos (Amphibole) f/cm3:	<0.00038
Concentration of PCME Asbestos (Chrysotile) f/cm3:	<0.00038
Concentration of Asbestos (Chrysotile), Str/L:	0
Concentration of Asbestos (Amphibole), Str/L:	0
Lower 95% Confidence Limit (Chrysotile), Str/L:	0
Upper 95% Confidence Limit (Chrysotile), Str/L:	1.4
Lower 95% Confidence Limit (Amphibole), Str/L:	0
Upper 95% Confidence Limit (Amphibole), Str/L:	1.4

Analyst: Taylor Smylie

Scott M. Ward, Ph.D. **Lab Director**

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Receipt Date: 22-Nov-2023
Analysis Date: 29-Nov-2023
Report Date: 29-Nov-2023

HDOH Kula Community Air

Sample Number **MFK-AM02-111623-AB**

Air Volume:	4944.096
Effective Filter Area:	385.0 mm^2
Level of Analysis (Chrysotile):	CDQ
Level of Analysis (Amphibole):	ADQ
Magnification Used for Fiber Counting:	20,000
Aspect Ratio for Fiber Definition:	5:1
Mean Dimension of Grid Openings (GOs):	0.0132 mm^2
Initials of Analyst:	TS
Number of GO's Examined:	10
Analytical Sensitivity: f/Liter:	0.58993
Analytical Sensitivity: f/cm3:	0.00059
Number of primary asbestos structures:	0
Number of asbestos structures counted:	0
Number of asbestos structures > 5 um :	0
Number of asbestos fibers and bundles > 5 um:	0
Number of PCM equivalent asbestos structures:	0
Number of PCM equivalent asbestos fibers:	0
Concentration of Asbestos (Chrysotile) f/cm3:	<0.00059
Concentration of Asbestos (Amphibole) f/cm3:	<0.00059
Concentration of PCME Asbestos (Chrysotile) f/cm3:	<0.00059
Concentration of Asbestos (Chrysotile), Str/L:	0
Concentration of Asbestos (Amphibole), Str/L:	0
Lower 95% Confidence Limit (Chrysotile), Str/L:	0
Upper 95% Confidence Limit (Chrysotile), Str/L:	2.2
Lower 95% Confidence Limit (Amphibole), Str/L:	0
Upper 95% Confidence Limit (Amphibole), Str/L:	2.2

Analyst: Taylor Smylie

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J3 Order #: 3461524
Project #: 1.03286E+12
Receipt Date: 22-Nov-2023
Analysis Date: 29-Nov-2023
Report Date: 29-Nov-2023

HDOH Kula Community Air

Sample Number **MFK-AM03-111623-AB**

Air Volume:	6285.168
Effective Filter Area:	385.0 mm^2
Level of Analysis (Chrysotile):	CDQ
Level of Analysis (Amphibole):	ADQ
Magnification Used for Fiber Counting:	20,000
Aspect Ratio for Fiber Definition:	5:1
Mean Dimension of Grid Openings (GOs):	0.0132 mm^2
Initials of Analyst:	TS
Number of GO’s Examined:	10
Analytical Sensitivity: f/Liter:	0.46406
Analytical Sensitivity: f/cm3:	0.00046
Number of primary asbestos structures:	0
Number of asbestos structures counted:	0
Number of asbestos structures > 5 um :	0
Number of asbestos fibers and bundles > 5 um:	0
Number of PCM equivalent asbestos structures:	0
Number of PCM equivalent asbestos fibers:	0
Concentration of Asbestos (Chrysotile) f/cm3:	<0.00046
Concentration of Asbestos (Amphibole) f/cm3:	<0.00046
Concentration of PCME Asbestos (Chrysotile) f/cm3:	<0.00046
Concentration of Asbestos (Chrysotile), Str/L:	0
Concentration of Asbestos (Amphibole), Str/L:	0
Lower 95% Confidence Limit (Chrysotile), Str/L:	0
Upper 95% Confidence Limit (Chrysotile), Str/L:	1.7
Lower 95% Confidence Limit (Amphibole), Str/L:	0
Upper 95% Confidence Limit (Amphibole), Str/L:	1.7

Analyst: Taylor Smylie

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Report Date: 29-Nov-2023

HDOH Kula Community Air

Sample Number **MFK-FB01-111623-AB**

Air Volume:	0
Effective Filter Area:	385.0 mm^2
Level of Analysis (Chrysotile):	CDQ
Level of Analysis (Amphibole):	ADQ
Magnification Used for Fiber Counting:	20,000
Aspect Ratio for Fiber Definition:	5:1
Mean Dimension of Grid Openings (GOs):	0.0132 mm^2
Initials of Analyst:	TS
Number of GO's Examined:	10
Analytical Sensitivity: f/Liter:	N/A
Analytical Sensitivity: f/cm3:	N/A
Number of primary asbestos structures:	0
Number of asbestos structures counted:	0
Number of asbestos structures > 5 um :	0
Number of asbestos fibers and bundles > 5 um:	0
Number of PCM equivalent asbestos structures:	0
Number of PCM equivalent asbestos fibers:	0
Concentration of Asbestos (Chrysotile) f/cm3:	N/A
Concentration of Asbestos (Amphibole) f/cm3:	N/A
Concentration of PCME Asbestos (Chrysotile) f/cm3:	NA
Concentration of Asbestos (Chrysotile), Str/L:	N/A
Concentration of Asbestos (Amphibole), Str/L:	N/A
Lower 95% Confidence Limit (Chrysotile), Str/L:	N/A
Upper 95% Confidence Limit (Chrysotile), Str/L:	N/A
Lower 95% Confidence Limit (Amphibole), Str/L:	N/A
Upper 95% Confidence Limit (Amphibole), Str/L:	N/A

Analyst: Taylor Smylie

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Receipt Date: 22-Nov-2023
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Report Date: 29-Nov-2023

HDOH Kula Community Air

Sample Number **MFK-LB01-111623-AB**

Air Volume:	0
Effective Filter Area:	385.0 mm^2
Level of Analysis (Chrysotile):	CDQ
Level of Analysis (Amphibole):	ADQ
Magnification Used for Fiber Counting:	20,000
Aspect Ratio for Fiber Definition:	5:1
Mean Dimension of Grid Openings (GOs):	0.0132 mm^2
Initials of Analyst:	TS
Number of GO's Examined:	10
Analytical Sensitivity: f/Liter:	N/A
Analytical Sensitivity: f/cm3:	N/A
Number of primary asbestos structures:	0
Number of asbestos structures counted:	0
Number of asbestos structures > 5 um :	0
Number of asbestos fibers and bundles > 5 um:	0
Number of PCM equivalent asbestos structures:	0
Number of PCM equivalent asbestos fibers:	0
Concentration of Asbestos (Chrysotile) f/cm3:	N/A
Concentration of Asbestos (Amphibole) f/cm3:	N/A
Concentration of PCME Asbestos (Chrysotile) f/cm3:	N/A
Concentration of Asbestos (Chrysotile), Str/L:	N/A
Concentration of Asbestos (Amphibole), Str/L:	N/A
Lower 95% Confidence Limit (Chrysotile), Str/L:	N/A
Upper 95% Confidence Limit (Chrysotile), Str/L:	N/A
Lower 95% Confidence Limit (Amphibole), Str/L:	N/A
Upper 95% Confidence Limit (Amphibole), Str/L:	N/A

Analyst: Taylor Smylie

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HDOH Kula Community Air

Sample Number **MFK-AM02-111723-AB**

Air Volume:	5061.466
Effective Filter Area:	385.0 mm^2
Level of Analysis (Chrysotile):	CDQ
Level of Analysis (Amphibole):	ADQ
Magnification Used for Fiber Counting:	20,000
Aspect Ratio for Fiber Definition:	5:1
Mean Dimension of Grid Openings (GOs):	0.0132 mm^2
Initials of Analyst:	TS
Number of GO's Examined:	10
Analytical Sensitivity: f/Liter:	0.57625
Analytical Sensitivity: f/cm3:	0.00058
Number of primary asbestos structures:	0
Number of asbestos structures counted:	0
Number of asbestos structures > 5 um :	0
Number of asbestos fibers and bundles > 5 um:	0
Number of PCM equivalent asbestos structures:	0
Number of PCM equivalent asbestos fibers:	0
Concentration of Asbestos (Chrysotile) f/cm3:	<0.00058
Concentration of Asbestos (Amphibole) f/cm3:	<0.00058
Concentration of PCME Asbestos (Chrysotile) f/cm3:	<0.00058
Concentration of Asbestos (Chrysotile), Str/L:	0
Concentration of Asbestos (Amphibole), Str/L:	0
Lower 95% Confidence Limit (Chrysotile), Str/L:	0
Upper 95% Confidence Limit (Chrysotile), Str/L:	2.1
Lower 95% Confidence Limit (Amphibole), Str/L:	0
Upper 95% Confidence Limit (Amphibole), Str/L:	2.1

Analyst: Taylor Smylie

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HDOH Kula Community Air

Sample Number **MFK-AM01-111723-AB**

Air Volume:	7855.781
Effective Filter Area:	385.0 mm^2
Level of Analysis (Chrysotile):	CDQ
Level of Analysis (Amphibole):	ADQ
Magnification Used for Fiber Counting:	20,000
Aspect Ratio for Fiber Definition:	5:1
Mean Dimension of Grid Openings (GOs):	0.0132 mm^2
Initials of Analyst:	TS
Number of GO's Examined:	10
Analytical Sensitivity: f/Liter:	0.37128
Analytical Sensitivity: f/cm3:	0.00037
Number of primary asbestos structures:	0
Number of asbestos structures counted:	0
Number of asbestos structures > 5 um :	0
Number of asbestos fibers and bundles > 5 um:	0
Number of PCM equivalent asbestos structures:	0
Number of PCM equivalent asbestos fibers:	0
Concentration of Asbestos (Chrysotile) f/cm3:	<0.00037
Concentration of Asbestos (Amphibole) f/cm3:	<0.00037
Concentration of PCME Asbestos (Chrysotile) f/cm3:	<0.00037
Concentration of Asbestos (Chrysotile), Str/L:	0
Concentration of Asbestos (Amphibole), Str/L:	0
Lower 95% Confidence Limit (Chrysotile), Str/L:	0
Upper 95% Confidence Limit (Chrysotile), Str/L:	1.4
Lower 95% Confidence Limit (Amphibole), Str/L:	0
Upper 95% Confidence Limit (Amphibole), Str/L:	1.4

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HDOH Kula Community Air

Sample Number **MFK-AM03-111723-AB**

Air Volume:	7055.702
Effective Filter Area:	385.0 mm^2
Level of Analysis (Chrysotile):	CDQ
Level of Analysis (Amphibole):	ADQ
Magnification Used for Fiber Counting:	20,000
Aspect Ratio for Fiber Definition:	5:1
Mean Dimension of Grid Openings (GOs):	0.0132 mm^2
Initials of Analyst:	TS
Number of GO's Examined:	10
Analytical Sensitivity: f/Liter:	0.41338
Analytical Sensitivity: f/cm3:	0.00041
Number of primary asbestos structures:	0
Number of asbestos structures counted:	0
Number of asbestos structures > 5 um :	0
Number of asbestos fibers and bundles > 5 um:	0
Number of PCM equivalent asbestos structures:	0
Number of PCM equivalent asbestos fibers:	0
Concentration of Asbestos (Chrysotile) f/cm3:	<0.00041
Concentration of Asbestos (Amphibole) f/cm3:	<0.00041
Concentration of PCME Asbestos (Chrysotile) f/cm3:	<0.00041
Concentration of Asbestos (Chrysotile), Str/L:	0
Concentration of Asbestos (Amphibole), Str/L:	0
Lower 95% Confidence Limit (Chrysotile), Str/L:	0
Upper 95% Confidence Limit (Chrysotile), Str/L:	1.5
Lower 95% Confidence Limit (Amphibole), Str/L:	0
Upper 95% Confidence Limit (Amphibole), Str/L:	1.5

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HDOH Kula Community Air

Sample Number **MFK-FB01-111723-AB**

Air Volume:	0
Effective Filter Area:	385.0 mm^2
Level of Analysis (Chrysotile):	CDQ
Level of Analysis (Amphibole):	ADQ
Magnification Used for Fiber Counting:	20,000
Aspect Ratio for Fiber Definition:	5:1
Mean Dimension of Grid Openings (GOs):	0.0132 mm^2
Initials of Analyst:	TS
Number of GO's Examined:	10
Analytical Sensitivity: f/Liter:	N/A
Analytical Sensitivity: f/cm3:	N/A
Number of primary asbestos structures:	0
Number of asbestos structures counted:	0
Number of asbestos structures > 5 um :	0
Number of asbestos fibers and bundles > 5 um:	0
Number of PCM equivalent asbestos structures:	0
Number of PCM equivalent asbestos fibers:	0
Concentration of Asbestos (Chrysotile) f/cm3:	N/A
Concentration of Asbestos (Amphibole) f/cm3:	N/A
Concentration of PCME Asbestos (Chrysotile) f/cm3:	N/A
Concentration of Asbestos (Chrysotile), Str/L:	N/A
Concentration of Asbestos (Amphibole), Str/L:	N/A
Lower 95% Confidence Limit (Chrysotile), Str/L:	N/A
Upper 95% Confidence Limit (Chrysotile), Str/L:	N/A
Lower 95% Confidence Limit (Amphibole), Str/L:	N/A
Upper 95% Confidence Limit (Amphibole), Str/L:	N/A

Analyst: Taylor Smylie

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Report Date: 29-Nov-2023

HDOH Kula Community Air

Sample Number **MFK-AM01-111823-AB**

Air Volume:	7808.4
Effective Filter Area:	385.0 mm^2
Level of Analysis (Chrysotile):	CDQ
Level of Analysis (Amphibole):	ADQ
Magnification Used for Fiber Counting:	20,000
Aspect Ratio for Fiber Definition:	5:1
Mean Dimension of Grid Openings (GOs):	0.0132 mm^2
Initials of Analyst:	TS
Number of GO’s Examined:	10
Analytical Sensitivity: f/Liter:	0.37353
Analytical Sensitivity: f/cm3:	0.00037
Number of primary asbestos structures:	0
Number of asbestos structures counted:	0
Number of asbestos structures > 5 um :	0
Number of asbestos fibers and bundles > 5 um:	0
Number of PCM equivalent asbestos structures:	0
Number of PCM equivalent asbestos fibers:	0
Concentration of Asbestos (Chrysotile) f/cm3:	<0.00037
Concentration of Asbestos (Amphibole) f/cm3:	<0.00037
Concentration of PCME Asbestos (Chrysotile) f/cm3:	<0.00037
Concentration of Asbestos (Chrysotile), Str/L:	0
Concentration of Asbestos (Amphibole), Str/L:	0
Lower 95% Confidence Limit (Chrysotile), Str/L:	0
Upper 95% Confidence Limit (Chrysotile), Str/L:	1.4
Lower 95% Confidence Limit (Amphibole), Str/L:	0
Upper 95% Confidence Limit (Amphibole), Str/L:	1.4

Analyst: Taylor Smylie

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HDOH Kula Community Air

Sample Number **MFK-AM02-111823-AB**

Air Volume:	7230.672
Effective Filter Area:	385.0 mm^2
Level of Analysis (Chrysotile):	CDQ
Level of Analysis (Amphibole):	ADQ
Magnification Used for Fiber Counting:	20,000
Aspect Ratio for Fiber Definition:	5:1
Mean Dimension of Grid Openings (GOs):	0.0132 mm^2
Initials of Analyst:	TS
Number of GO's Examined:	10
Analytical Sensitivity: f/Liter:	0.40337
Analytical Sensitivity: f/cm3:	0.00040
Number of primary asbestos structures:	0
Number of asbestos structures counted:	0
Number of asbestos structures > 5 um :	0
Number of asbestos fibers and bundles > 5 um:	0
Number of PCM equivalent asbestos structures:	0
Number of PCM equivalent asbestos fibers:	0
Concentration of Asbestos (Chrysotile) f/cm3:	<0.00040
Concentration of Asbestos (Amphibole) f/cm3:	<0.00040
Concentration of PCME Asbestos (Chrysotile) f/cm3:	<0.00040
Concentration of Asbestos (Chrysotile), Str/L:	0
Concentration of Asbestos (Amphibole), Str/L:	0
Lower 95% Confidence Limit (Chrysotile), Str/L:	0
Upper 95% Confidence Limit (Chrysotile), Str/L:	1.5
Lower 95% Confidence Limit (Amphibole), Str/L:	0
Upper 95% Confidence Limit (Amphibole), Str/L:	1.5

Analyst: Taylor Smylie

Scott M. Ward, Ph.D.   **Lab Director**

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J3 Resources, Inc.
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Airborn Asbestos Fiber Analysis by Transmission Electron Microscopy (TEM) ISO 10312 - Ambient Air - Determination of Asbestos Fibers Direct-Transfer Transmission Electron Microscopy Method

Maura McAleese
Tetra Tech- Maui Fire
1999 Harrison St. Ste. 500
Oakland, CA 94612

J3 Order #: 3461524
Project #: 1032864023141
Receipt Date: 22-Nov-2023
Analysis Date: 29-Nov-2023
Report Date: 29-Nov-2023

HDOH Kula Community Air

Sample Number **MFK-AM03-111823-AB**

Air Volume:	7132.752
Effective Filter Area:	385.0 mm^2
Level of Analysis (Chrysotile):	CDQ
Level of Analysis (Amphibole):	ADQ
Magnification Used for Fiber Counting:	20,000
Aspect Ratio for Fiber Definition:	5:1
Mean Dimension of Grid Openings (GOs):	0.0132 mm^2
Initials of Analyst:	TS
Number of GO's Examined:	10
Analytical Sensitivity: f/Liter:	0.40891
Analytical Sensitivity: f/cm3:	0.00041
Number of primary asbestos structures:	0
Number of asbestos structures counted:	0
Number of asbestos structures > 5 um :	0
Number of asbestos fibers and bundles > 5 um:	0
Number of PCM equivalent asbestos structures:	0
Number of PCM equivalent asbestos fibers:	0
Concentration of Asbestos (Chrysotile) f/cm3:	<0.00041
Concentration of Asbestos (Amphibole) f/cm3:	<0.00041
Concentration of PCME Asbestos (Chrysotile) f/cm3:	<0.00041
Concentration of Asbestos (Chrysotile), Str/L:	0
Concentration of Asbestos (Amphibole), Str/L:	0
Lower 95% Confidence Limit (Chrysotile), Str/L:	0
Upper 95% Confidence Limit (Chrysotile), Str/L:	1.5
Lower 95% Confidence Limit (Amphibole), Str/L:	0
Upper 95% Confidence Limit (Amphibole), Str/L:	1.5

Analyst: Taylor Smylie

Scott M. Ward, Ph.D. **Lab Director**

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J3 Order #: 3461524
Project #: 1032864023141
Receipt Date: 22-Nov-2023
Analysis Date: 29-Nov-2023
Report Date: 29-Nov-2023

HDOH Kula Community Air

Sample Number **MFK-AM01-111923-AB**

Air Volume:	7660.644
Effective Filter Area:	385.0 mm^2
Level of Analysis (Chrysotile):	CDQ
Level of Analysis (Amphibole):	ADQ
Magnification Used for Fiber Counting:	20,000
Aspect Ratio for Fiber Definition:	5:1
Mean Dimension of Grid Openings (GOs):	0.0132 mm^2
Initials of Analyst:	TS
Number of GO's Examined:	10
Analytical Sensitivity: f/Liter:	0.38073
Analytical Sensitivity: f/cm3:	0.00038
Number of primary asbestos structures:	0
Number of asbestos structures counted:	0
Number of asbestos structures > 5 um :	0
Number of asbestos fibers and bundles > 5 um:	0
Number of PCM equivalent asbestos structures:	0
Number of PCM equivalent asbestos fibers:	0
Concentration of Asbestos (Chrysotile) f/cm3:	<0.00038
Concentration of Asbestos (Amphibole) f/cm3:	<0.00038
Concentration of PCME Asbestos (Chrysotile) f/cm3:	<0.00038
Concentration of Asbestos (Chrysotile), Str/L:	0
Concentration of Asbestos (Amphibole), Str/L:	0
Lower 95% Confidence Limit (Chrysotile), Str/L:	0
Upper 95% Confidence Limit (Chrysotile), Str/L:	1.4
Lower 95% Confidence Limit (Amphibole), Str/L:	0
Upper 95% Confidence Limit (Amphibole), Str/L:	1.4

Analyst: Taylor Smylie

Scott M. Ward, Ph.D. **Lab Director**

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J3 Order #: 3461524
Project #: 1032864023141
Receipt Date: 22-Nov-2023
Analysis Date: 29-Nov-2023
Report Date: 29-Nov-2023

HDOH Kula Community Air

Sample Number **MFK-AM02-111923-AB**

Air Volume:	7576.003
Effective Filter Area:	385.0 mm^2
Level of Analysis (Chrysotile):	CDQ
Level of Analysis (Amphibole):	ADQ
Magnification Used for Fiber Counting:	20,000
Aspect Ratio for Fiber Definition:	5:1
Mean Dimension of Grid Openings (GOs):	0.0132 mm^2
Initials of Analyst:	TS
Number of GO's Examined:	10
Analytical Sensitivity: f/Liter:	0.38499
Analytical Sensitivity: f/cm3:	0.00038
Number of primary asbestos structures:	0
Number of asbestos structures counted:	0
Number of asbestos structures > 5 um :	0
Number of asbestos fibers and bundles > 5 um:	0
Number of PCM equivalent asbestos structures:	0
Number of PCM equivalent asbestos fibers:	0
Concentration of Asbestos (Chrysotile) f/cm3:	<0.00038
Concentration of Asbestos (Amphibole) f/cm3:	<0.00038
Concentration of PCME Asbestos (Chrysotile) f/cm3:	<0.00038
Concentration of Asbestos (Chrysotile), Str/L:	0
Concentration of Asbestos (Amphibole), Str/L:	0
Lower 95% Confidence Limit (Chrysotile), Str/L:	0
Upper 95% Confidence Limit (Chrysotile), Str/L:	1.4
Lower 95% Confidence Limit (Amphibole), Str/L:	0
Upper 95% Confidence Limit (Amphibole), Str/L:	1.4

Analyst: Taylor Smylie

SMWard

Scott M. Ward, Ph.D. **Lab Director**

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J3 Order #: 3461524
Project #: 1032864023141
Receipt Date: 22-Nov-2023
Analysis Date: 29-Nov-2023
Report Date: 29-Nov-2023

HDOH Kula Community Air

Sample Number **MFK-AM03-111923-AB**

Air Volume:	7655.727
Effective Filter Area:	385.0 mm^2
Level of Analysis (Chrysotile):	CDQ
Level of Analysis (Amphibole):	ADQ
Magnification Used for Fiber Counting:	20,000
Aspect Ratio for Fiber Definition:	5:1
Mean Dimension of Grid Openings (GOs):	0.0132 mm^2
Initials of Analyst:	TS
Number of GO's Examined:	10
Analytical Sensitivity: f/Liter:	0.38098
Analytical Sensitivity: f/cm3:	0.00038
Number of primary asbestos structures:	0
Number of asbestos structures counted:	0
Number of asbestos structures > 5 um :	0
Number of asbestos fibers and bundles > 5 um:	0
Number of PCM equivalent asbestos structures:	0
Number of PCM equivalent asbestos fibers:	0
Concentration of Asbestos (Chrysotile) f/cm3:	<0.00038
Concentration of Asbestos (Amphibole) f/cm3:	<0.00038
Concentration of PCME Asbestos (Chrysotile) f/cm3:	<0.00038
Concentration of Asbestos (Chrysotile), Str/L:	0
Concentration of Asbestos (Amphibole), Str/L:	0
Lower 95% Confidence Limit (Chrysotile), Str/L:	0
Upper 95% Confidence Limit (Chrysotile), Str/L:	1.4
Lower 95% Confidence Limit (Amphibole), Str/L:	0
Upper 95% Confidence Limit (Amphibole), Str/L:	1.4

Analyst: Taylor Smylie

Scott M. Ward, Ph.D. **Lab Director**

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Airborn Asbestos Fiber Analysis
by Transmission Electron Microscopy (TEM)
ISO 10312 - Ambient Air - Determination of Asbestos Fibers
Direct-Transfer Transmission Electron Microscopy Method

Maura McAleese
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J3 Order #: 3461524
Project #: 1032864023141
Receipt Date: 22-Nov-2023
Analysis Date: 29-Nov-2023
Report Date: 29-Nov-2023

HDOH Kula Community Air

Sample Number **MFK-FB01-111823-AB**

Air Volume:	0
Effective Filter Area:	385.0 mm^2
Level of Analysis (Chrysotile):	CDQ
Level of Analysis (Amphibole):	ADQ
Magnification Used for Fiber Counting:	20,000
Aspect Ratio for Fiber Definition:	5:1
Mean Dimension of Grid Openings (GOs):	0.0132 mm^2
Initials of Analyst:	TS
Number of GO's Examined:	10
Analytical Sensitivity: f/Liter:	N/A
Analytical Sensitivity: f/cm3:	N/A
Number of primary asbestos structures:	0
Number of asbestos structures counted:	0
Number of asbestos structures > 5 um :	0
Number of asbestos fibers and bundles > 5 um:	0
Number of PCM equivalent asbestos structures:	0
Number of PCM equivalent asbestos fibers:	0
Concentration of Asbestos (Chrysotile) f/cm3:	N/A
Concentration of Asbestos (Amphibole) f/cm3:	N/A
Concentration of PCME Asbestos (Chrysotile) f/cm3:	N/A
Concentration of Asbestos (Chrysotile), Str/L:	N/A
Concentration of Asbestos (Amphibole), Str/L:	N/A
Lower 95% Confidence Limit (Chrysotile), Str/L:	N/A
Upper 95% Confidence Limit (Chrysotile), Str/L:	N/A
Lower 95% Confidence Limit (Amphibole), Str/L:	N/A
Upper 95% Confidence Limit (Amphibole), Str/L:	N/A

Analyst: Taylor Smylie

Scott M. Warel, Ph.D. **Lab Director**

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Maura McAleese
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Oakland, CA 94612

J3 Order #: 3461524
Project #: 1032864023141
Receipt Date: 22-Nov-2023
Analysis Date: 29-Nov-2023
Report Date: 29-Nov-2023

HDOH Kula Community Air

Sample Number **MFK-FB01-111923-AB**

Air Volume:	0
Effective Filter Area:	385.0 mm^2
Level of Analysis (Chrysotile):	CDQ
Level of Analysis (Amphibole):	ADQ
Magnification Used for Fiber Counting:	20,000
Aspect Ratio for Fiber Definition:	5:1
Mean Dimension of Grid Openings (GOs):	0.0132 mm^2
Initials of Analyst:	TS
Number of GO's Examined:	10
Analytical Sensitivity: f/Liter:	N/A
Analytical Sensitivity: f/cm3:	N/A
Number of primary asbestos structures:	0
Number of asbestos structures counted:	0
Number of asbestos structures > 5 um :	0
Number of asbestos fibers and bundles > 5 um:	0
Number of PCM equivalent asbestos structures:	0
Number of PCM equivalent asbestos fibers:	0
Concentration of Asbestos (Chrysotile) f/cm3:	N/A
Concentration of Asbestos (Amphibole) f/cm3:	N/A
Concentration of PCME Asbestos (Chrysotile) f/cm3:	N/A
Concentration of Asbestos (Chrysotile), Str/L:	N/A
Concentration of Asbestos (Amphibole), Str/L:	N/A
Lower 95% Confidence Limit (Chrysotile), Str/L:	N/A
Upper 95% Confidence Limit (Chrysotile), Str/L:	N/A
Lower 95% Confidence Limit (Amphibole), Str/L:	N/A
Upper 95% Confidence Limit (Amphibole), Str/L:	N/A

Analyst: Taylor Smylie

Scott M. Ward, Ph.D. **Lab Director**

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Report for:

Maura McAleese
Tetra Tech- Maui Fire
1999 Harrison St. Ste. 500
Oakland, CA 94612

Regarding: Eurofins J3 Resources, Inc.
Project: 1032864023141; HDOH Kula Community Air
EML ID: 3463023

Approved by:

Dates of Analysis:
Asbestos TEM ISO 10312 / ASTM6281-06: 11-30-2023

Lab Director
Scott Ward

All samples were received in acceptable condition unless noted in the Report Comments portion in the body of the report. Due to the nature of the analyses performed, field blank correction of results is not applied. The results relate only to the samples as received and tested.

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Airborne Asbestos Fiber Analysis by Transmission Electron Microscopy (TEM) ISO 10312 - Ambient Air - Determination of Asbestos Fibers Direct-Transfer Transmission Electron Microscopy Method

Maura McAleese
Tetra Tech- Maui Fire
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EJ3 Order #: 3463023
Project #: 1032864023141
Receipt Date: 27-Nov-2023
Analysis Date: 30-Nov-2023
Report Date: 30-Nov-2023

HDOH Kula Community Air (11/20 to 11/23)

Sample Number **MFK-AM01-112023-AB**

Air Volume:	7645.248
Effective Filter Area:	385.0 mm^2
Level of Analysis (Chrysotile):	CDQ
Level of Analysis (Amphibole):	ADQ
Magnification Used for Fiber Counting:	20,000
Aspect Ratio for Fiber Definition:	5:1
Mean Dimension of Grid Openings (GOs):	0.0132 mm^2
Initials of Analyst:	TS
Number of GO's Examined:	10
Analytical Sensitivity: f/Liter:	0.38150
Analytical Sensitivity: f/cm3:	0.00038
Number of primary asbestos structures:	0
Number of asbestos structures counted:	0
Number of asbestos structures > 5 um :	0
Number of asbestos fibers and bundles > 5 um:	0
Number of PCM equivalent asbestos structures:	0
Number of PCM equivalent asbestos fibers:	0
Concentration of Asbestos (Chrysotile) f/cm3:	<0.00038
Concentration of Asbestos (Amphibole) f/cm3:	<0.00038
Concentration of PCME Asbestos (Chrysotile) f/cm3:	<0.00038
Concentration of Asbestos (Chrysotile), Str/L:	0
Concentration of Asbestos (Amphibole), Str/L:	0
Lower 95% Confidence Limit (Chrysotile), Str/L:	0
Upper 95% Confidence Limit (Chrysotile), Str/L:	1.4
Lower 95% Confidence Limit (Amphibole), Str/L:	0
Upper 95% Confidence Limit (Amphibole), Str/L:	1.4

Analyst: Taylor Smylie

Scott M. Ward, Ph.D. **Lab Director**

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EJ3 Order #: 3463023
Project #: 1032864023141
Receipt Date: 27-Nov-2023
Analysis Date: 30-Nov-2023
Report Date: 30-Nov-2023

HDOH Kula Community Air (11/20 to 11/23)

Sample Number **MFK-AM02-112023-AB**

Air Volume:	7373.436
Effective Filter Area:	385.0 mm^2
Level of Analysis (Chrysotile):	CDQ
Level of Analysis (Amphibole):	ADQ
Magnification Used for Fiber Counting:	20,000
Aspect Ratio for Fiber Definition:	5:1
Mean Dimension of Grid Openings (GOs):	0.0132 mm^2
Initials of Analyst:	TS
Number of GO's Examined:	10
Analytical Sensitivity: f/Liter:	0.39556
Analytical Sensitivity: f/cm3:	0.00040
Number of primary asbestos structures:	0
Number of asbestos structures counted:	0
Number of asbestos structures > 5 um :	0
Number of asbestos fibers and bundles > 5 um:	0
Number of PCM equivalent asbestos structures:	0
Number of PCM equivalent asbestos fibers:	0
Concentration of Asbestos (Chrysotile) f/cm3:	<0.00040
Concentration of Asbestos (Amphibole) f/cm3:	<0.00040
Concentration of PCME Asbestos (Chrysotile) f/cm3:	<0.00040
Concentration of Asbestos (Chrysotile), Str/L:	0
Concentration of Asbestos (Amphibole), Str/L:	0
Lower 95% Confidence Limit (Chrysotile), Str/L:	0
Upper 95% Confidence Limit (Chrysotile), Str/L:	1.5
Lower 95% Confidence Limit (Amphibole), Str/L:	0
Upper 95% Confidence Limit (Amphibole), Str/L:	1.5

Analyst: Taylor Smylie

Scott M. Ward, Ph.D. **Lab Director**

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EJ3 Order #: 3463023
Project #: 1032864023141
Receipt Date: 27-Nov-2023
Analysis Date: 30-Nov-2023
Report Date: 30-Nov-2023

HDOH Kula Community Air (11/20 to 11/23)

Sample Number **MFK-AM03-112023-AB**

Air Volume:	7528.505
Effective Filter Area:	385.0 mm^2
Level of Analysis (Chrysotile):	CDQ
Level of Analysis (Amphibole):	ADQ
Magnification Used for Fiber Counting:	20,000
Aspect Ratio for Fiber Definition:	5:1
Mean Dimension of Grid Openings (GOs):	0.0132 mm^2
Initials of Analyst:	TS
Number of GO's Examined:	10
Analytical Sensitivity: f/Liter:	0.38742
Analytical Sensitivity: f/cm3:	0.00039
Number of primary asbestos structures:	0
Number of asbestos structures counted:	0
Number of asbestos structures > 5 um :	0
Number of asbestos fibers and bundles > 5 um:	0
Number of PCM equivalent asbestos structures:	0
Number of PCM equivalent asbestos fibers:	0
Concentration of Asbestos (Chrysotile) f/cm3:	<0.00039
Concentration of Asbestos (Amphibole) f/cm3:	<0.00039
Concentration of PCME Asbestos (Chrysotile) f/cm3:	<0.00039
Concentration of Asbestos (Chrysotile), Str/L:	0
Concentration of Asbestos (Amphibole), Str/L:	0
Lower 95% Confidence Limit (Chrysotile), Str/L:	0
Upper 95% Confidence Limit (Chrysotile), Str/L:	1.4
Lower 95% Confidence Limit (Amphibole), Str/L:	0
Upper 95% Confidence Limit (Amphibole), Str/L:	1.4

Analyst: Taylor Smylie

Scott M. Ward, Ph.D. **Lab Director**

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Airborne Asbestos Fiber Analysis by Transmission Electron Microscopy (TEM) ISO 10312 - Ambient Air - Determination of Asbestos Fibers Direct-Transfer Transmission Electron Microscopy Method

Maura McAleese
Tetra Tech- Maui Fire
1999 Harrison St. Ste. 500
Oakland, CA 94612

EJ3 Order #: 3463023
Project #: 1032864023141
Receipt Date: 27-Nov-2023
Analysis Date: 30-Nov-2023
Report Date: 30-Nov-2023

HDOH Kula Community Air (11/20 to 11/23)

Sample Number **MFK-AM01-112123-AB**

Air Volume:	6935.184
Effective Filter Area:	385.0 mm^2
Level of Analysis (Chrysotile):	CDQ
Level of Analysis (Amphibole):	ADQ
Magnification Used for Fiber Counting:	20,000
Aspect Ratio for Fiber Definition:	5:1
Mean Dimension of Grid Openings (GOs):	0.0132 mm^2
Initials of Analyst:	TS
Number of GO's Examined:	10
Analytical Sensitivity: f/Liter:	0.42056
Analytical Sensitivity: f/cm3:	0.00042
Number of primary asbestos structures:	0
Number of asbestos structures counted:	0
Number of asbestos structures > 5 um :	0
Number of asbestos fibers and bundles > 5 um:	0
Number of PCM equivalent asbestos structures:	0
Number of PCM equivalent asbestos fibers:	0
Concentration of Asbestos (Chrysotile) f/cm3:	<0.00042
Concentration of Asbestos (Amphibole) f/cm3:	<0.00042
Concentration of PCME Asbestos (Chrysotile) f/cm3:	<0.00042
Concentration of Asbestos (Chrysotile), Str/L:	0
Concentration of Asbestos (Amphibole), Str/L:	0
Lower 95% Confidence Limit (Chrysotile), Str/L:	0
Upper 95% Confidence Limit (Chrysotile), Str/L:	1.6
Lower 95% Confidence Limit (Amphibole), Str/L:	0
Upper 95% Confidence Limit (Amphibole), Str/L:	1.6

Analyst: Taylor Smylie

Scott M. Ward, Ph.D. **Lab Director**

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Report Date: 30-Nov-2023

HDOH Kula Community Air (11/20 to 11/23)

Sample Number **MFK-AM02-112123-AB**

Air Volume:	6804.508
Effective Filter Area:	385.0 mm^2
Level of Analysis (Chrysotile):	CDQ
Level of Analysis (Amphibole):	ADQ
Magnification Used for Fiber Counting:	20,000
Aspect Ratio for Fiber Definition:	5:1
Mean Dimension of Grid Openings (GOs):	0.0132 mm^2
Initials of Analyst:	TS
Number of GO's Examined:	10
Analytical Sensitivity: f/Liter:	0.42864
Analytical Sensitivity: f/cm3:	0.00043
Number of primary asbestos structures:	0
Number of asbestos structures counted:	0
Number of asbestos structures > 5 um :	0
Number of asbestos fibers and bundles > 5 um:	0
Number of PCM equivalent asbestos structures:	0
Number of PCM equivalent asbestos fibers:	0
Concentration of Asbestos (Chrysotile) f/cm3:	<0.00043
Concentration of Asbestos (Amphibole) f/cm3:	<0.00043
Concentration of PCME Asbestos (Chrysotile) f/cm3:	<0.00043
Concentration of Asbestos (Chrysotile), Str/L:	0
Concentration of Asbestos (Amphibole), Str/L:	0
Lower 95% Confidence Limit (Chrysotile), Str/L:	0
Upper 95% Confidence Limit (Chrysotile), Str/L:	1.6
Lower 95% Confidence Limit (Amphibole), Str/L:	0
Upper 95% Confidence Limit (Amphibole), Str/L:	1.6

Analyst: Taylor Smylie

Scott M. Ward, Ph.D. **Lab Director**

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Report Date: 30-Nov-2023

HDOH Kula Community Air (11/20 to 11/23)

Sample Number **MFK-AM03-112123-AB**

Air Volume:	7344
Effective Filter Area:	385.0 mm^2
Level of Analysis (Chrysotile):	CDQ
Level of Analysis (Amphibole):	ADQ
Magnification Used for Fiber Counting:	20,000
Aspect Ratio for Fiber Definition:	5:1
Mean Dimension of Grid Openings (GOs):	0.0132 mm^2
Initials of Analyst:	TS
Number of GO's Examined:	10
Analytical Sensitivity: f/Liter:	0.39715
Analytical Sensitivity: f/cm3:	0.00040
Number of primary asbestos structures:	0
Number of asbestos structures counted:	0
Number of asbestos structures > 5 um :	0
Number of asbestos fibers and bundles > 5 um:	0
Number of PCM equivalent asbestos structures:	0
Number of PCM equivalent asbestos fibers:	0
Concentration of Asbestos (Chrysotile) f/cm3:	<0.00040
Concentration of Asbestos (Amphibole) f/cm3:	<0.00040
Concentration of PCME Asbestos (Chrysotile) f/cm3:	<0.00040
Concentration of Asbestos (Chrysotile), Str/L:	0
Concentration of Asbestos (Amphibole), Str/L:	0
Lower 95% Confidence Limit (Chrysotile), Str/L:	0
Upper 95% Confidence Limit (Chrysotile), Str/L:	1.5
Lower 95% Confidence Limit (Amphibole), Str/L:	0
Upper 95% Confidence Limit (Amphibole), Str/L:	1.5

Analyst: Taylor Smylie

Scott M. Ward, Ph.D. **Lab Director**

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HDOH Kula Community Air (11/20 to 11/23)

Sample Number **MFK-FB01-112123-AB**

Air Volume:	0
Effective Filter Area:	385.0 mm^2
Level of Analysis (Chrysotile):	CDQ
Level of Analysis (Amphibole):	ADQ
Magnification Used for Fiber Counting:	20,000
Aspect Ratio for Fiber Definition:	5:1
Mean Dimension of Grid Openings (GOs):	0.0132 mm^2
Initials of Analyst:	
Number of GO's Examined:	10
Analytical Sensitivity: f/Liter:	N/A
Analytical Sensitivity: f/cm3:	N/A
Number of primary asbestos structures:	0
Number of asbestos structures counted:	0
Number of asbestos structures > 5 um :	0
Number of asbestos fibers and bundles > 5 um:	0
Number of PCM equivalent asbestos structures:	0
Number of PCM equivalent asbestos fibers:	0
Concentration of Asbestos (Chrysotile) f/cm3:	N/A
Concentration of Asbestos (Amphibole) f/cm3:	N/A
Concentration of PCME Asbestos (Chrysotile) f/cm3:	N/A
Concentration of Asbestos (Chrysotile), Str/L:	N/A
Concentration of Asbestos (Amphibole), Str/L:	N/A
Lower 95% Confidence Limit (Chrysotile), Str/L:	N/A
Upper 95% Confidence Limit (Chrysotile), Str/L:	N/A
Lower 95% Confidence Limit (Amphibole), Str/L:	N/A
Upper 95% Confidence Limit (Amphibole), Str/L:	N/A

Analyst:

Scott M. Ward, Ph.D. **Lab Director**

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Maura McAleese	**EJ3 Order #:** 3463023
Tetra Tech- Maui Fire	**Project #:** 1032864023141
1999 Harrison St. Ste. 500	**Receipt Date:** 27-Nov-2023
Oakland, CA 94612	**Analysis Date:** 30-Nov-2023
	Report Date: 30-Nov-2023

HDOH Kula Community Air (11/20 to 11/23)

Sample Number **MFK-LB01-112123-AB**

Air Volume:	0
Effective Filter Area:	385.0 mm^2
Level of Analysis (Chrysotile):	CDQ
Level of Analysis (Amphibole):	ADQ
Magnification Used for Fiber Counting:	20,000
Aspect Ratio for Fiber Definition:	5:1
Mean Dimension of Grid Openings (GOs):	0.0132 mm^2
Initials of Analyst:	TS
Number of GO's Examined:	10
Analytical Sensitivity: f/Liter:	N/A
Analytical Sensitivity: f/cm3:	N/A
Number of primary asbestos structures:	0
Number of asbestos structures counted:	0
Number of asbestos structures > 5 um :	0
Number of asbestos fibers and bundles > 5 um:	0
Number of PCM equivalent asbestos structures:	0
Number of PCM equivalent asbestos fibers:	0
Concentration of Asbestos (Chrysotile) f/cm3:	N/A
Concentration of Asbestos (Amphibole) f/cm3:	N/A
Concentration of PCME Asbestos (Chrysotile) f/cm3:	N/A
Concentration of Asbestos (Chrysotile), Str/L:	N/A
Concentration of Asbestos (Amphibole), Str/L:	N/A
Lower 95% Confidence Limit (Chrysotile), Str/L:	N/A
Upper 95% Confidence Limit (Chrysotile), Str/L:	N/A
Lower 95% Confidence Limit (Amphibole), Str/L:	N/A
Upper 95% Confidence Limit (Amphibole), Str/L:	N/A

Analyst: Taylor Smylie

Scott M. Ward, Ph.D. **Lab Director**

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HDOH Kula Community Air (11/20 to 11/23)

Sample Number **MFK-AM02-112223-AB**

Air Volume:	6692.074
Effective Filter Area:	385.0 mm^2
Level of Analysis (Chrysotile):	CDQ
Level of Analysis (Amphibole):	ADQ
Magnification Used for Fiber Counting:	20,000
Aspect Ratio for Fiber Definition:	5:1
Mean Dimension of Grid Openings (GOs):	0.0132 mm^2
Initials of Analyst:	Taylor Smylie
Number of GO's Examined:	10
Analytical Sensitivity: f/Liter:	0.43584
Analytical Sensitivity: f/cm3:	0.00044
Number of primary asbestos structures:	0
Number of asbestos structures counted:	0
Number of asbestos structures > 5 um :	0
Number of asbestos fibers and bundles > 5 um:	0
Number of PCM equivalent asbestos structures:	0
Number of PCM equivalent asbestos fibers:	0
Concentration of Asbestos (Chrysotile) f/cm3:	<0.00044
Concentration of Asbestos (Amphibole) f/cm3:	<0.00044
Concentration of PCME Asbestos (Chrysotile) f/cm3:	<0.00044
Concentration of Asbestos (Chrysotile), Str/L:	0
Concentration of Asbestos (Amphibole), Str/L:	0
Lower 95% Confidence Limit (Chrysotile), Str/L:	0
Upper 95% Confidence Limit (Chrysotile), Str/L:	1.6
Lower 95% Confidence Limit (Amphibole), Str/L:	0
Upper 95% Confidence Limit (Amphibole), Str/L:	1.6

Analyst: Taylor Smylie 45260 **Scott M. Ward, Ph.D.** **Lab Director**

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HDOH Kula Community Air (11/20 to 11/23)

Sample Number **MFK-AM03-112223-AB**

Air Volume:	5331.024
Effective Filter Area:	385.0 mm^2
Level of Analysis (Chrysotile):	CDQ
Level of Analysis (Amphibole):	ADQ
Magnification Used for Fiber Counting:	20,000
Aspect Ratio for Fiber Definition:	5:1
Mean Dimension of Grid Openings (GOs):	0.0132 mm^2
Initials of Analyst:	TS
Number of GO's Examined:	10
Analytical Sensitivity: f/Liter:	0.54711
Analytical Sensitivity: f/cm3:	0.00055
Number of primary asbestos structures:	0
Number of asbestos structures counted:	0
Number of asbestos structures > 5 um :	0
Number of asbestos fibers and bundles > 5 um:	0
Number of PCM equivalent asbestos structures:	0
Number of PCM equivalent asbestos fibers:	0
Concentration of Asbestos (Chrysotile) f/cm3:	<0.00055
Concentration of Asbestos (Amphibole) f/cm3:	<0.00055
Concentration of PCME Asbestos (Chrysotile) f/cm3:	<0.00055
Concentration of Asbestos (Chrysotile), Str/L:	0
Concentration of Asbestos (Amphibole), Str/L:	0
Lower 95% Confidence Limit (Chrysotile), Str/L:	0
Upper 95% Confidence Limit (Chrysotile), Str/L:	2
Lower 95% Confidence Limit (Amphibole), Str/L:	0
Upper 95% Confidence Limit (Amphibole), Str/L:	2

SMWard

Analyst: Taylor Smylie

Scott M. Ward, Ph.D. **Lab Director**

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HDOH Kula Community Air (11/20 to 11/23)

Sample Number **MFK-FB01-112223-AB**

Air Volume:	0
Effective Filter Area:	385.0 mm^2
Level of Analysis (Chrysotile):	CDQ
Level of Analysis (Amphibole):	ADQ
Magnification Used for Fiber Counting:	20,000
Aspect Ratio for Fiber Definition:	5:1
Mean Dimension of Grid Openings (GOs):	0.0132 mm^2
Initials of Analyst:	Taylor Smylie
Number of GO's Examined:	10
Analytical Sensitivity: f/Liter:	N/A
Analytical Sensitivity: f/cm3:	N/A
Number of primary asbestos structures:	0
Number of asbestos structures counted:	0
Number of asbestos structures > 5 um :	0
Number of asbestos fibers and bundles > 5 um:	0
Number of PCM equivalent asbestos structures:	0
Number of PCM equivalent asbestos fibers:	0
Concentration of Asbestos (Chrysotile) f/cm3:	N/A
Concentration of Asbestos (Amphibole) f/cm3:	N/A
Concentration of PCME Asbestos (Chrysotile) f/cm3:	N/A
Concentration of Asbestos (Chrysotile), Str/L:	N/A
Concentration of Asbestos (Amphibole), Str/L:	N/A
Lower 95% Confidence Limit (Chrysotile), Str/L:	N/A
Upper 95% Confidence Limit (Chrysotile), Str/L:	N/A
Lower 95% Confidence Limit (Amphibole), Str/L:	N/A
Upper 95% Confidence Limit (Amphibole), Str/L:	N/A

Analyst: Taylor Smylie 45260 **Scott M. Ward, Ph.D.** **Lab Director**

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HDOH Kula Community Air (11/20 to 11/23)

Sample Number **MFK-AM01-112323-AB**

Air Volume:	7639.827
Effective Filter Area:	385.0 mm^2
Level of Analysis (Chrysotile):	CDQ
Level of Analysis (Amphibole):	ADQ
Magnification Used for Fiber Counting:	20,000
Aspect Ratio for Fiber Definition:	5:1
Mean Dimension of Grid Openings (GOs):	0.0132 mm^2
Initials of Analyst:	
Number of GO's Examined:	10
Analytical Sensitivity: f/Liter:	0.38177
Analytical Sensitivity: f/cm3:	0.00038
Number of primary asbestos structures:	0
Number of asbestos structures counted:	0
Number of asbestos structures > 5 um :	0
Number of asbestos fibers and bundles > 5 um:	0
Number of PCM equivalent asbestos structures:	0
Number of PCM equivalent asbestos fibers:	0
Concentration of Asbestos (Chrysotile) f/cm3:	<0.00038
Concentration of Asbestos (Amphibole) f/cm3:	<0.00038
Concentration of PCME Asbestos (Chrysotile) f/cm3:	<0.00038
Concentration of Asbestos (Chrysotile), Str/L:	0
Concentration of Asbestos (Amphibole), Str/L:	0
Lower 95% Confidence Limit (Chrysotile), Str/L:	0
Upper 95% Confidence Limit (Chrysotile), Str/L:	1.4
Lower 95% Confidence Limit (Amphibole), Str/L:	0
Upper 95% Confidence Limit (Amphibole), Str/L:	1.4

Analyst: Taylor Smylie

Scott M. Ward, Ph.D. **Lab Director**

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HDOH Kula Community Air (11/20 to 11/23)

Sample Number **MFK-AM02-112323-AB**

Air Volume:	7247.664
Effective Filter Area:	385.0 mm^2
Level of Analysis (Chrysotile):	CDQ
Level of Analysis (Amphibole):	ADQ
Magnification Used for Fiber Counting:	20,000
Aspect Ratio for Fiber Definition:	5:1
Mean Dimension of Grid Openings (GOs):	0.0132 mm^2
Initials of Analyst:	TS
Number of GO's Examined:	10
Analytical Sensitivity: f/Liter:	0.40243
Analytical Sensitivity: f/cm3:	0.00040
Number of primary asbestos structures:	0
Number of asbestos structures counted:	0
Number of asbestos structures > 5 um :	0
Number of asbestos fibers and bundles > 5 um:	0
Number of PCM equivalent asbestos structures:	0
Number of PCM equivalent asbestos fibers:	0
Concentration of Asbestos (Chrysotile) f/cm3:	<0.00040
Concentration of Asbestos (Amphibole) f/cm3:	<0.00040
Concentration of PCME Asbestos (Chrysotile) f/cm3:	<0.00040
Concentration of Asbestos (Chrysotile), Str/L:	0
Concentration of Asbestos (Amphibole), Str/L:	0
Lower 95% Confidence Limit (Chrysotile), Str/L:	0
Upper 95% Confidence Limit (Chrysotile), Str/L:	1.5
Lower 95% Confidence Limit (Amphibole), Str/L:	0
Upper 95% Confidence Limit (Amphibole), Str/L:	1.5

Analyst: Taylor Smylie

Scott M. Ward, Ph.D. **Lab Director**

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Airborne Asbestos Fiber Analysis by Transmission Electron Microscopy (TEM) ISO 10312 - Ambient Air - Determination of Asbestos Fibers Direct-Transfer Transmission Electron Microscopy Method

Maura McAleese
Tetra Tech- Maui Fire
1999 Harrison St. Ste. 500
Oakland, CA 94612

EJ3 Order #: 3463023
Project #: 1032864023141
Receipt Date: 27-Nov-2023
Analysis Date: 30-Nov-2023
Report Date: 30-Nov-2023

HDOH Kula Community Air (11/20 to 11/23)

Sample Number **MFK-AM03-112323-AB**

Air Volume:	7587.504
Effective Filter Area:	385.0 mm^2
Level of Analysis (Chrysotile):	CDQ
Level of Analysis (Amphibole):	ADQ
Magnification Used for Fiber Counting:	20,000
Aspect Ratio for Fiber Definition:	5:1
Mean Dimension of Grid Openings (GOs):	0.0132 mm^2
Initials of Analyst:	TS
Number of GO's Examined:	10
Analytical Sensitivity: f/Liter:	0.38440
Analytical Sensitivity: f/cm3:	0.00038
Number of primary asbestos structures:	0
Number of asbestos structures counted:	0
Number of asbestos structures > 5 um :	0
Number of asbestos fibers and bundles > 5 um:	0
Number of PCM equivalent asbestos structures:	0
Number of PCM equivalent asbestos fibers:	0
Concentration of Asbestos (Chrysotile) f/cm3:	<0.00038
Concentration of Asbestos (Amphibole) f/cm3:	<0.00038
Concentration of PCME Asbestos (Chrysotile) f/cm3:	<0.00038
Concentration of Asbestos (Chrysotile), Str/L:	0
Concentration of Asbestos (Amphibole), Str/L:	0
Lower 95% Confidence Limit (Chrysotile), Str/L:	0
Upper 95% Confidence Limit (Chrysotile), Str/L:	1.4
Lower 95% Confidence Limit (Amphibole), Str/L:	0
Upper 95% Confidence Limit (Amphibole), Str/L:	1.4

Analyst: Taylor Smylie

Scott M. Ward, Ph.D. **Lab Director**

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Analysis Date: 30-Nov-2023
Report Date: 30-Nov-2023

HDOH Kula Community Air (11/20 to 11/23)

Sample Number **MFK-FB01-112323-AB**

Air Volume:	0
Effective Filter Area:	385.0 mm^2
Level of Analysis (Chrysotile):	CDQ
Level of Analysis (Amphibole):	ADQ
Magnification Used for Fiber Counting:	20,000
Aspect Ratio for Fiber Definition:	5:1
Mean Dimension of Grid Openings (GOs):	0.0132 mm^2
Initials of Analyst:	TS
Number of GO's Examined:	10
Analytical Sensitivity: f/Liter:	N/A
Analytical Sensitivity: f/cm3:	N/A
Number of primary asbestos structures:	0
Number of asbestos structures counted:	0
Number of asbestos structures > 5 um :	0
Number of asbestos fibers and bundles > 5 um:	0
Number of PCM equivalent asbestos structures:	0
Number of PCM equivalent asbestos fibers:	0
Concentration of Asbestos (Chrysotile) f/cm3:	N/A
Concentration of Asbestos (Amphibole) f/cm3:	N/A
Concentration of PCME Asbestos (Chrysotile) f/cm3:	N/A
Concentration of Asbestos (Chrysotile), Str/L:	N/A
Concentration of Asbestos (Amphibole), Str/L:	N/A
Lower 95% Confidence Limit (Chrysotile), Str/L:	N/A
Upper 95% Confidence Limit (Chrysotile), Str/L:	N/A
Lower 95% Confidence Limit (Amphibole), Str/L:	N/A
Upper 95% Confidence Limit (Amphibole), Str/L:	N/A

Analyst: Taylor Smylie

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EJ3 Order #: 3465949
Project #: 1.03286E+12
Receipt Date: 29-Nov-2023
Analysis Date: 4-Dec-2023
Report Date: 4-Dec-2023

HDOH Kula Community Air

Sample Number **MFK-AM01-112423-AB**

Air Volume:	7574.791
Effective Filter Area:	385.0 mm^2
Level of Analysis (Chrysotile):	CDQ
Level of Analysis (Amphibole):	ADQ
Magnification Used for Fiber Counting:	20,000
Aspect Ratio for Fiber Definition:	5:1
Mean Dimension of Grid Openings (GOs):	0.0132 mm^2
Initials of Analyst:	TS
Number of GO's Examined:	10
Analytical Sensitivity: f/Liter:	0.38505
Analytical Sensitivity: f/cm3:	0.00039
Number of primary asbestos structures:	0
Number of asbestos structures counted:	0
Number of asbestos structures > 5 um :	0
Number of asbestos fibers and bundles > 5 um:	0
Number of PCM equivalent asbestos structures:	0
Number of PCM equivalent asbestos fibers:	0
Concentration of Asbestos (Chrysotile) f/cm3:	<0.00039
Concentration of Asbestos (Amphibole) f/cm3:	<0.00039
Concentration of PCME Asbestos (Chrysotile) f/cm3:	<0.00039
Concentration of Asbestos (Chrysotile), Str/L:	0
Concentration of Asbestos (Amphibole), Str/L:	0
Lower 95% Confidence Limit (Chrysotile), Str/L:	0
Upper 95% Confidence Limit (Chrysotile), Str/L:	1.4
Lower 95% Confidence Limit (Amphibole), Str/L:	0
Upper 95% Confidence Limit (Amphibole), Str/L:	1.4

Analyst: Taylor Smylie

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Analysis Date: 4-Dec-2023
Report Date: 4-Dec-2023

HDOH Kula Community Air

Sample Number **MFK-AM02-112423-AB**

Air Volume:	7041.571
Effective Filter Area:	385.0 mm^2
Level of Analysis (Chrysotile):	CDQ
Level of Analysis (Amphibole):	ADQ
Magnification Used for Fiber Counting:	20,000
Aspect Ratio for Fiber Definition:	5:1
Mean Dimension of Grid Openings (GOs):	0.0132 mm^2
Initials of Analyst:	TS
Number of GO's Examined:	10
Analytical Sensitivity: f/Liter:	0.41421
Analytical Sensitivity: f/cm3:	0.00041
Number of primary asbestos structures:	0
Number of asbestos structures counted:	0
Number of asbestos structures > 5 um :	0
Number of asbestos fibers and bundles > 5 um:	0
Number of PCM equivalent asbestos structures:	0
Number of PCM equivalent asbestos fibers:	0
Concentration of Asbestos (Chrysotile) f/cm3:	<0.0041
Concentration of Asbestos (Amphibole) f/cm3:	<0.0041
Concentration of PCME Asbestos (Chrysotile) f/cm3:	<0.0041
Concentration of Asbestos (Chrysotile), Str/L:	0
Concentration of Asbestos (Amphibole), Str/L:	0
Lower 95% Confidence Limit (Chrysotile), Str/L:	0
Upper 95% Confidence Limit (Chrysotile), Str/L:	1.5
Lower 95% Confidence Limit (Amphibole), Str/L:	0
Upper 95% Confidence Limit (Amphibole), Str/L:	1.5

Analyst: Taylor Smylie

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HDOH Kula Community Air

Sample Number **MFK-AM03-112423-AB**

Air Volume:	6431.553
Effective Filter Area:	385.0 mm^2
Level of Analysis (Chrysotile):	CDQ
Level of Analysis (Amphibole):	ADQ
Magnification Used for Fiber Counting:	20,000
Aspect Ratio for Fiber Definition:	5:1
Mean Dimension of Grid Openings (GOs):	0.0132 mm^2
Initials of Analyst:	TS
Number of GO's Examined:	10
Analytical Sensitivity: f/Liter:	0.45349
Analytical Sensitivity: f/cm3:	0.00045
Number of primary asbestos structures:	0
Number of asbestos structures counted:	0
Number of asbestos structures > 5 um :	0
Number of asbestos fibers and bundles > 5 um:	0
Number of PCM equivalent asbestos structures:	0
Number of PCM equivalent asbestos fibers:	0
Concentration of Asbestos (Chrysotile) f/cm3:	<0.00045
Concentration of Asbestos (Amphibole) f/cm3:	<0.00045
Concentration of PCME Asbestos (Chrysotile) f/cm3:	<0.00045
Concentration of Asbestos (Chrysotile), Str/L:	0
Concentration of Asbestos (Amphibole), Str/L:	0
Lower 95% Confidence Limit (Chrysotile), Str/L:	0
Upper 95% Confidence Limit (Chrysotile), Str/L:	1.7
Lower 95% Confidence Limit (Amphibole), Str/L:	0
Upper 95% Confidence Limit (Amphibole), Str/L:	1.7

Analyst: Taylor Smylie

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HDOH Kula Community Air

Sample Number **MFK-FB01-112423-AB**

Air Volume:	0
Effective Filter Area:	385.0 mm^2
Level of Analysis (Chrysotile):	CDQ
Level of Analysis (Amphibole):	ADQ
Magnification Used for Fiber Counting:	20,000
Aspect Ratio for Fiber Definition:	5:1
Mean Dimension of Grid Openings (GOs):	0.0132 mm^2
Initials of Analyst:	TS
Number of GO's Examined:	10
Analytical Sensitivity: f/Liter:	N/A
Analytical Sensitivity: f/cm3:	N/A
Number of primary asbestos structures:	0
Number of asbestos structures counted:	0
Number of asbestos structures > 5 um :	0
Number of asbestos fibers and bundles > 5 um:	0
Number of PCM equivalent asbestos structures:	0
Number of PCM equivalent asbestos fibers:	0
Concentration of Asbestos (Chrysotile) f/cm3:	N/A
Concentration of Asbestos (Amphibole) f/cm3:	N/A
Concentration of PCME Asbestos (Chrysotile) f/cm3:	N/A
Concentration of Asbestos (Chrysotile), Str/L:	N/A
Concentration of Asbestos (Amphibole), Str/L:	N/A
Lower 95% Confidence Limit (Chrysotile), Str/L:	N/A
Upper 95% Confidence Limit (Chrysotile), Str/L:	N/A
Lower 95% Confidence Limit (Amphibole), Str/L:	N/A
Upper 95% Confidence Limit (Amphibole), Str/L:	N/A

Analyst: Taylor Smylie

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HDOH Kula Community Air

Sample Number **MFK-AM01-112523-AB**

Air Volume:	7754.256
Effective Filter Area:	385.0 mm^2
Level of Analysis (Chrysotile):	CDQ
Level of Analysis (Amphibole):	ADQ
Magnification Used for Fiber Counting:	20,000
Aspect Ratio for Fiber Definition:	5:1
Mean Dimension of Grid Openings (GOs):	0.0132 mm^2
Initials of Analyst:	TS
Number of GO's Examined:	10
Analytical Sensitivity: f/Liter:	0.37614
Analytical Sensitivity: f/cm3:	0.00038
Number of primary asbestos structures:	0
Number of asbestos structures counted:	0
Number of asbestos structures > 5 um :	0
Number of asbestos fibers and bundles > 5 um:	0
Number of PCM equivalent asbestos structures:	0
Number of PCM equivalent asbestos fibers:	0
Concentration of Asbestos (Chrysotile) f/cm3:	<0.00038
Concentration of Asbestos (Amphibole) f/cm3:	<0.00038
Concentration of PCME Asbestos (Chrysotile) f/cm3:	<0.00038
Concentration of Asbestos (Chrysotile), Str/L:	0
Concentration of Asbestos (Amphibole), Str/L:	0
Lower 95% Confidence Limit (Chrysotile), Str/L:	0
Upper 95% Confidence Limit (Chrysotile), Str/L:	1.4
Lower 95% Confidence Limit (Amphibole), Str/L:	0
Upper 95% Confidence Limit (Amphibole), Str/L:	1.4

Analyst: Taylor Smylie

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HDOH Kula Community Air

Sample Number **MFK-AM02-112523-AB**

Air Volume:	6246.288
Effective Filter Area:	385.0 mm^2
Level of Analysis (Chrysotile):	CDQ
Level of Analysis (Amphibole):	ADQ
Magnification Used for Fiber Counting:	20,000
Aspect Ratio for Fiber Definition:	5:1
Mean Dimension of Grid Openings (GOs):	0.0132 mm^2
Initials of Analyst:	TS
Number of GO's Examined:	10
Analytical Sensitivity: f/Liter:	0.46694
Analytical Sensitivity: f/cm3:	0.00047
Number of primary asbestos structures:	0
Number of asbestos structures counted:	0
Number of asbestos structures > 5 um :	0
Number of asbestos fibers and bundles > 5 um:	0
Number of PCM equivalent asbestos structures:	0
Number of PCM equivalent asbestos fibers:	0
Concentration of Asbestos (Chrysotile) f/cm3:	<0.00047
Concentration of Asbestos (Amphibole) f/cm3:	<0.00047
Concentration of PCME Asbestos (Chrysotile) f/cm3:	<0.00047
Concentration of Asbestos (Chrysotile), Str/L:	0
Concentration of Asbestos (Amphibole), Str/L:	0
Lower 95% Confidence Limit (Chrysotile), Str/L:	0
Upper 95% Confidence Limit (Chrysotile), Str/L:	1.7
Lower 95% Confidence Limit (Amphibole), Str/L:	0
Upper 95% Confidence Limit (Amphibole), Str/L:	1.7

Analyst: Taylor Smylie

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HDOH Kula Community Air

Sample Number **MFK-AM03-112523-AB**

Air Volume:	6210.72
Effective Filter Area:	385.0 mm^2
Level of Analysis (Chrysotile):	CDQ
Level of Analysis (Amphibole):	ADQ
Magnification Used for Fiber Counting:	20,000
Aspect Ratio for Fiber Definition:	5:1
Mean Dimension of Grid Openings (GOs):	0.0132 mm^2
Initials of Analyst:	TS
Number of GO's Examined:	10
Analytical Sensitivity: f/Liter:	0.46962
Analytical Sensitivity: f/cm3:	0.00047
Number of primary asbestos structures:	0
Number of asbestos structures counted:	0
Number of asbestos structures > 5 um :	0
Number of asbestos fibers and bundles > 5 um:	0
Number of PCM equivalent asbestos structures:	0
Number of PCM equivalent asbestos fibers:	0
Concentration of Asbestos (Chrysotile) f/cm3:	<0.00047
Concentration of Asbestos (Amphibole) f/cm3:	<0.00047
Concentration of PCME Asbestos (Chrysotile) f/cm3:	<0.00047
Concentration of Asbestos (Chrysotile), Str/L:	0
Concentration of Asbestos (Amphibole), Str/L:	0
Lower 95% Confidence Limit (Chrysotile), Str/L:	0
Upper 95% Confidence Limit (Chrysotile), Str/L:	1.7
Lower 95% Confidence Limit (Amphibole), Str/L:	0
Upper 95% Confidence Limit (Amphibole), Str/L:	1.7

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HDOH Kula Community Air

Sample Number **MFK-FB01-112523-AB**

Air Volume:	0
Effective Filter Area:	385.0 mm^2
Level of Analysis (Chrysotile):	CDQ
Level of Analysis (Amphibole):	ADQ
Magnification Used for Fiber Counting:	20,000
Aspect Ratio for Fiber Definition:	5:1
Mean Dimension of Grid Openings (GOs):	0.0132 mm^2
Initials of Analyst:	TS
Number of GO's Examined:	10
Analytical Sensitivity: f/Liter:	N/A
Analytical Sensitivity: f/cm3:	N/A
Number of primary asbestos structures:	0
Number of asbestos structures counted:	0
Number of asbestos structures > 5 um :	0
Number of asbestos fibers and bundles > 5 um:	0
Number of PCM equivalent asbestos structures:	0
Number of PCM equivalent asbestos fibers:	0
Concentration of Asbestos (Chrysotile) f/cm3:	N/A
Concentration of Asbestos (Amphibole) f/cm3:	N/A
Concentration of PCME Asbestos (Chrysotile) f/cm3:	N/A
Concentration of Asbestos (Chrysotile), Str/L:	N/A
Concentration of Asbestos (Amphibole), Str/L:	N/A
Lower 95% Confidence Limit (Chrysotile), Str/L:	N/A
Upper 95% Confidence Limit (Chrysotile), Str/L:	N/A
Lower 95% Confidence Limit (Amphibole), Str/L:	N/A
Upper 95% Confidence Limit (Amphibole), Str/L:	N/A

Analyst: Taylor Smylie

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Project #: 1.03286E+12
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Analysis Date: 4-Dec-2023
Report Date: 4-Dec-2023

HDOH Kula Community Air

Sample Number **MFK-AM01-112623-AB**

Air Volume:	7351.344
Effective Filter Area:	385.0 mm^2
Level of Analysis (Chrysotile):	CDQ
Level of Analysis (Amphibole):	ADQ
Magnification Used for Fiber Counting:	20,000
Aspect Ratio for Fiber Definition:	5:1
Mean Dimension of Grid Openings (GOs):	0.0132 mm^2
Initials of Analyst:	TS
Number of GO's Examined:	10
Analytical Sensitivity: f/Liter:	0.39675
Analytical Sensitivity: f/cm3:	0.00040
Number of primary asbestos structures:	0
Number of asbestos structures counted:	0
Number of asbestos structures > 5 um :	0
Number of asbestos fibers and bundles > 5 um:	0
Number of PCM equivalent asbestos structures:	0
Number of PCM equivalent asbestos fibers:	0
Concentration of Asbestos (Chrysotile) f/cm3:	<0.00040
Concentration of Asbestos (Amphibole) f/cm3:	<0.00040
Concentration of PCME Asbestos (Chrysotile) f/cm3:	<0.00040
Concentration of Asbestos (Chrysotile), Str/L:	0
Concentration of Asbestos (Amphibole), Str/L:	0
Lower 95% Confidence Limit (Chrysotile), Str/L:	0
Upper 95% Confidence Limit (Chrysotile), Str/L:	1.5
Lower 95% Confidence Limit (Amphibole), Str/L:	0
Upper 95% Confidence Limit (Amphibole), Str/L:	1.5

Analyst: Taylor Smylie

Scott M. Ward, Ph.D. **Lab Director**

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Airborne Asbestos Fiber Analysis by Transmission Electron Microscopy (TEM) ISO 10312 - Ambient Air - Determination of Asbestos Fibers Direct-Transfer Transmission Electron Microscopy Method

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EJ3 Order #: 3465949
Project #: 1.03286E+12
Receipt Date: 29-Nov-2023
Analysis Date: 4-Dec-2023
Report Date: 4-Dec-2023

HDOH Kula Community Air

Sample Number **MFK-AM02-112623-AB**

Air Volume:	5769.072
Effective Filter Area:	385.0 mm^2
Level of Analysis (Chrysotile):	CDQ
Level of Analysis (Amphibole):	ADQ
Magnification Used for Fiber Counting:	20,000
Aspect Ratio for Fiber Definition:	5:1
Mean Dimension of Grid Openings (GOs):	0.0132 mm^2
Initials of Analyst:	TS
Number of GO's Examined:	10
Analytical Sensitivity: f/Liter:	0.50557
Analytical Sensitivity: f/cm3:	0.00051
Number of primary asbestos structures:	0
Number of asbestos structures counted:	0
Number of asbestos structures > 5 um :	0
Number of asbestos fibers and bundles > 5 um:	0
Number of PCM equivalent asbestos structures:	0
Number of PCM equivalent asbestos fibers:	0
Concentration of Asbestos (Chrysotile) f/cm3:	<0.00051
Concentration of Asbestos (Amphibole) f/cm3:	<0.00051
Concentration of PCME Asbestos (Chrysotile) f/cm3:	<0.00051
Concentration of Asbestos (Chrysotile), Str/L:	0
Concentration of Asbestos (Amphibole), Str/L:	0
Lower 95% Confidence Limit (Chrysotile), Str/L:	0
Upper 95% Confidence Limit (Chrysotile), Str/L:	1.9
Lower 95% Confidence Limit (Amphibole), Str/L:	0
Upper 95% Confidence Limit (Amphibole), Str/L:	1.9

Analyst: Taylor Smylie

Scott M. Ward, Ph.D. **Lab Director**

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Report Date: 4-Dec-2023

HDOH Kula Community Air

Sample Number **MFK-AM03-112623-AB**

Air Volume:	5143.177
Effective Filter Area:	385.0 mm^2
Level of Analysis (Chrysotile):	CDQ
Level of Analysis (Amphibole):	ADQ
Magnification Used for Fiber Counting:	20,000
Aspect Ratio for Fiber Definition:	5:1
Mean Dimension of Grid Openings (GOs):	0.0132 mm^2
Initials of Analyst:	TS
Number of GO's Examined:	10
Analytical Sensitivity: f/Liter:	0.56709
Analytical Sensitivity: f/cm3:	0.00057
Number of primary asbestos structures:	0
Number of asbestos structures counted:	0
Number of asbestos structures > 5 um :	0
Number of asbestos fibers and bundles > 5 um:	0
Number of PCM equivalent asbestos structures:	0
Number of PCM equivalent asbestos fibers:	0
Concentration of Asbestos (Chrysotile) f/cm3:	<0.00057
Concentration of Asbestos (Amphibole) f/cm3:	<0.00057
Concentration of PCME Asbestos (Chrysotile) f/cm3:	<0.00057
Concentration of Asbestos (Chrysotile), Str/L:	0
Concentration of Asbestos (Amphibole), Str/L:	0
Lower 95% Confidence Limit (Chrysotile), Str/L:	0
Upper 95% Confidence Limit (Chrysotile), Str/L:	2.1
Lower 95% Confidence Limit (Amphibole), Str/L:	0
Upper 95% Confidence Limit (Amphibole), Str/L:	2.1

Analyst: Taylor Smylie

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EJ3 Order #: 3465949
Project #: 1.03286E+12
Receipt Date: 29-Nov-2023
Analysis Date: 4-Dec-2023
Report Date: 4-Dec-2023

HDOH Kula Community Air

Sample Number **MFK-FB01-112623-AB**

Air Volume:	0
Effective Filter Area:	385.0 mm^2
Level of Analysis (Chrysotile):	CDQ
Level of Analysis (Amphibole):	ADQ
Magnification Used for Fiber Counting:	20,000
Aspect Ratio for Fiber Definition:	5:1
Mean Dimension of Grid Openings (GOs):	0.0132 mm^2
Initials of Analyst:	TS
Number of GO's Examined:	10
Analytical Sensitivity: f/Liter:	N/A
Analytical Sensitivity: f/cm3:	N/A
Number of primary asbestos structures:	0
Number of asbestos structures counted:	0
Number of asbestos structures > 5 um :	0
Number of asbestos fibers and bundles > 5 um:	0
Number of PCM equivalent asbestos structures:	0
Number of PCM equivalent asbestos fibers:	0
Concentration of Asbestos (Chrysotile) f/cm3:	N/A
Concentration of Asbestos (Amphibole) f/cm3:	N/A
Concentration of PCME Asbestos (Chrysotile) f/cm3:	N/A
Concentration of Asbestos (Chrysotile), Str/L:	N/A
Concentration of Asbestos (Amphibole), Str/L:	N/A
Lower 95% Confidence Limit (Chrysotile), Str/L:	N/A
Upper 95% Confidence Limit (Chrysotile), Str/L:	N/A
Lower 95% Confidence Limit (Amphibole), Str/L:	N/A
Upper 95% Confidence Limit (Amphibole), Str/L:	N/A

Analyst: Taylor Smylie

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EJ3 Order #: 3470571
Project #: 1.03286E+12
Receipt Date: 4-Dec-2023
Analysis Date: 7-Dec-2023
Report Date: 7-Dec-2023

HDOH Kula Community Air

Sample Number **MFK-AM01-112723-AB**

Air Volume:	5400.941
Effective Filter Area:	385.0 mm^2
Level of Analysis (Chrysotile):	CDQ
Level of Analysis (Amphibole):	ADQ
Magnification Used for Fiber Counting:	20,000
Aspect Ratio for Fiber Definition:	5:1
Mean Dimension of Grid Openings (GOs):	0.0132 mm^2
Initials of Analyst:	TS
Number of GO's Examined:	10
Analytical Sensitivity: f/Liter:	0.54003
Analytical Sensitivity: f/cm3:	0.00054
Number of primary asbestos structures:	0
Number of asbestos structures counted:	0
Number of asbestos structures > 5 um :	0
Number of asbestos fibers and bundles > 5 um:	0
Number of PCM equivalent asbestos structures:	0
Number of PCM equivalent asbestos fibers:	0
Concentration of Asbestos (Chrysotile) f/cm3:	<0.00054
Concentration of Asbestos (Amphibole) f/cm3:	<0.00054
Concentration of PCME Asbestos (Chrysotile) f/cm3:	<0.00054
Concentration of Asbestos (Chrysotile), Str/L:	0
Concentration of Asbestos (Amphibole), Str/L:	0
Lower 95% Confidence Limit (Chrysotile), Str/L:	0
Upper 95% Confidence Limit (Chrysotile), Str/L:	2
Lower 95% Confidence Limit (Amphibole), Str/L:	0
Upper 95% Confidence Limit (Amphibole), Str/L:	2

Analyst: Taylor Smylie

Scott M. Ward, Ph.D. **Lab Director**

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Receipt Date: 4-Dec-2023
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Report Date: 7-Dec-2023

HDOH Kula Community Air

Sample Number **MFK-AM02-112723-AB**

Air Volume:	5889.811
Effective Filter Area:	385.0 mm^2
Level of Analysis (Chrysotile):	CDQ
Level of Analysis (Amphibole):	ADQ
Magnification Used for Fiber Counting:	20,000
Aspect Ratio for Fiber Definition:	5:1
Mean Dimension of Grid Openings (GOs):	0.0132 mm^2
Initials of Analyst:	TS
Number of GO's Examined:	10
Analytical Sensitivity: f/Liter:	0.49521
Analytical Sensitivity: f/cm3:	0.00050
Number of primary asbestos structures:	0
Number of asbestos structures counted:	0
Number of asbestos structures > 5 um :	0
Number of asbestos fibers and bundles > 5 um:	0
Number of PCM equivalent asbestos structures:	0
Number of PCM equivalent asbestos fibers:	0
Concentration of Asbestos (Chrysotile) f/cm3:	<0.00050
Concentration of Asbestos (Amphibole) f/cm3:	<0.00050
Concentration of PCME Asbestos (Chrysotile) f/cm3:	<0.00050
Concentration of Asbestos (Chrysotile), Str/L:	0
Concentration of Asbestos (Amphibole), Str/L:	0
Lower 95% Confidence Limit (Chrysotile), Str/L:	0
Upper 95% Confidence Limit (Chrysotile), Str/L:	1.8
Lower 95% Confidence Limit (Amphibole), Str/L:	0
Upper 95% Confidence Limit (Amphibole), Str/L:	1.8

Analyst: Taylor Smylie

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Receipt Date: 4-Dec-2023
Analysis Date: 7-Dec-2023
Report Date: 7-Dec-2023

HDOH Kula Community Air

Sample Number **MFK-FB01-112723-AB**

Air Volume:	0
Effective Filter Area:	385.0 mm^2
Level of Analysis (Chrysotile):	CDQ
Level of Analysis (Amphibole):	ADQ
Magnification Used for Fiber Counting:	20,000
Aspect Ratio for Fiber Definition:	5:1
Mean Dimension of Grid Openings (GOs):	0.0132 mm^2
Initials of Analyst:	TS
Number of GO's Examined:	10
Analytical Sensitivity: f/Liter:	N/A
Analytical Sensitivity: f/cm3:	N/A
Number of primary asbestos structures:	0
Number of asbestos structures counted:	0
Number of asbestos structures > 5 um :	0
Number of asbestos fibers and bundles > 5 um:	0
Number of PCM equivalent asbestos structures:	0
Number of PCM equivalent asbestos fibers:	0
Concentration of Asbestos (Chrysotile) f/cm3:	N/A
Concentration of Asbestos (Amphibole) f/cm3:	N/A
Concentration of PCME Asbestos (Chrysotile) f/cm3:	N/A
Concentration of Asbestos (Chrysotile), Str/L:	N/A
Concentration of Asbestos (Amphibole), Str/L:	N/A
Lower 95% Confidence Limit (Chrysotile), Str/L:	N/A
Upper 95% Confidence Limit (Chrysotile), Str/L:	N/A
Lower 95% Confidence Limit (Amphibole), Str/L:	N/A
Upper 95% Confidence Limit (Amphibole), Str/L:	N/A

Analyst: Taylor Smylie

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Report Date: 7-Dec-2023

HDOH Kula Community Air

Sample Number **MFK-AM01-112823-AB**

Air Volume:	4811.299
Effective Filter Area:	385.0 mm^2
Level of Analysis (Chrysotile):	CDQ
Level of Analysis (Amphibole):	ADQ
Magnification Used for Fiber Counting:	20,000
Aspect Ratio for Fiber Definition:	5:1
Mean Dimension of Grid Openings (GOs):	0.0132 mm^2
Initials of Analyst:	TS
Number of GO's Examined:	10
Analytical Sensitivity: f/Liter:	0.60621
Analytical Sensitivity: f/cm3:	0.00061
Number of primary asbestos structures:	0
Number of asbestos structures counted:	0
Number of asbestos structures > 5 um :	0
Number of asbestos fibers and bundles > 5 um:	0
Number of PCM equivalent asbestos structures:	0
Number of PCM equivalent asbestos fibers:	0
Concentration of Asbestos (Chrysotile) f/cm3:	<0.00061
Concentration of Asbestos (Amphibole) f/cm3:	<0.00061
Concentration of PCME Asbestos (Chrysotile) f/cm3:	<0.00061
Concentration of Asbestos (Chrysotile), Str/L:	0
Concentration of Asbestos (Amphibole), Str/L:	0
Lower 95% Confidence Limit (Chrysotile), Str/L:	0
Upper 95% Confidence Limit (Chrysotile), Str/L:	2.2
Lower 95% Confidence Limit (Amphibole), Str/L:	0
Upper 95% Confidence Limit (Amphibole), Str/L:	2.2

Analyst: Taylor Smylie

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Report Date: 7-Dec-2023

HDOH Kula Community Air

Sample Number **MFK-AM02-112823-AB**

Air Volume:	5823.046
Effective Filter Area:	385.0 mm^2
Level of Analysis (Chrysotile):	CDQ
Level of Analysis (Amphibole):	ADQ
Magnification Used for Fiber Counting:	20,000
Aspect Ratio for Fiber Definition:	5:1
Mean Dimension of Grid Openings (GOs):	0.0132 mm^2
Initials of Analyst:	TS
Number of GO's Examined:	10
Analytical Sensitivity: f/Liter:	0.50088
Analytical Sensitivity: f/cm3:	0.00050
Number of primary asbestos structures:	0
Number of asbestos structures counted:	0
Number of asbestos structures > 5 um :	0
Number of asbestos fibers and bundles > 5 um:	0
Number of PCM equivalent asbestos structures:	0
Number of PCM equivalent asbestos fibers:	0
Concentration of Asbestos (Chrysotile) f/cm3:	<0.00050
Concentration of Asbestos (Amphibole) f/cm3:	<0.00050
Concentration of PCME Asbestos (Chrysotile) f/cm3:	<0.00050
Concentration of Asbestos (Chrysotile), Str/L:	0
Concentration of Asbestos (Amphibole), Str/L:	0
Lower 95% Confidence Limit (Chrysotile), Str/L:	0
Upper 95% Confidence Limit (Chrysotile), Str/L:	1.8
Lower 95% Confidence Limit (Amphibole), Str/L:	0
Upper 95% Confidence Limit (Amphibole), Str/L:	1.8

Analyst: Taylor Smylie

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Analysis Date: 7-Dec-2023
Report Date: 7-Dec-2023

HDOH Kula Community Air

Sample Number **MFK-AM03-112823-AB**

Air Volume:	6850.368
Effective Filter Area:	385.0 mm^2
Level of Analysis (Chrysotile):	CDQ
Level of Analysis (Amphibole):	ADQ
Magnification Used for Fiber Counting:	20,000
Aspect Ratio for Fiber Definition:	5:1
Mean Dimension of Grid Openings (GOs):	0.0132 mm^2
Initials of Analyst:	TS
Number of GO's Examined:	10
Analytical Sensitivity: f/Liter:	0.42577
Analytical Sensitivity: f/cm3:	0.00043
Number of primary asbestos structures:	0
Number of asbestos structures counted:	0
Number of asbestos structures > 5 um :	0
Number of asbestos fibers and bundles > 5 um:	0
Number of PCM equivalent asbestos structures:	0
Number of PCM equivalent asbestos fibers:	0
Concentration of Asbestos (Chrysotile) f/cm3:	<0.00043
Concentration of Asbestos (Amphibole) f/cm3:	<0.00043
Concentration of PCME Asbestos (Chrysotile) f/cm3:	<0.00043
Concentration of Asbestos (Chrysotile), Str/L:	0
Concentration of Asbestos (Amphibole), Str/L:	0
Lower 95% Confidence Limit (Chrysotile), Str/L:	0
Upper 95% Confidence Limit (Chrysotile), Str/L:	1.6
Lower 95% Confidence Limit (Amphibole), Str/L:	0
Upper 95% Confidence Limit (Amphibole), Str/L:	1.6

Analyst: Taylor Smylie

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Report Date: 7-Dec-2023

HDOH Kula Community Air

Sample Number **MFK-FB01-112823-AB**

Air Volume:	0
Effective Filter Area:	385.0 mm^2
Level of Analysis (Chrysotile):	CDQ
Level of Analysis (Amphibole):	ADQ
Magnification Used for Fiber Counting:	20,000
Aspect Ratio for Fiber Definition:	5:1
Mean Dimension of Grid Openings (GOs):	0.0132 mm^2
Initials of Analyst:	TS
Number of GO's Examined:	10
Analytical Sensitivity: f/Liter:	N/A
Analytical Sensitivity: f/cm3:	N/A
Number of primary asbestos structures:	0
Number of asbestos structures counted:	0
Number of asbestos structures > 5 um :	0
Number of asbestos fibers and bundles > 5 um:	0
Number of PCM equivalent asbestos structures:	0
Number of PCM equivalent asbestos fibers:	0
Concentration of Asbestos (Chrysotile) f/cm3:	N/A
Concentration of Asbestos (Amphibole) f/cm3:	N/A
Concentration of PCME Asbestos (Chrysotile) f/cm3:	N/A
Concentration of Asbestos (Chrysotile), Str/L:	N/A
Concentration of Asbestos (Amphibole), Str/L:	N/A
Lower 95% Confidence Limit (Chrysotile), Str/L:	N/A
Upper 95% Confidence Limit (Chrysotile), Str/L:	N/A
Lower 95% Confidence Limit (Amphibole), Str/L:	N/A
Upper 95% Confidence Limit (Amphibole), Str/L:	N/A

Analyst: Taylor Smylie

Scott M. Ward, Ph.D. **Lab Director**

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Airborne Asbestos Fiber Analysis by Transmission Electron Microscopy (TEM) ISO 10312 - Ambient Air - Determination of Asbestos Fibers Direct-Transfer Transmission Electron Microscopy Method

Maura McAleese
Tetra Tech- Maui Fire
1999 Harrison St. Ste. 500
Oakland, CA 94612

EJ3 Order #: 3470571
Project #: 1.03286E+12
Receipt Date: 4-Dec-2023
Analysis Date: 7-Dec-2023
Report Date: 7-Dec-2023

HDOH Kula Community Air

Sample Number **MFK-AM01-112923-AB**

Air Volume:	6711.485
Effective Filter Area:	385.0 mm^2
Level of Analysis (Chrysotile):	CDQ
Level of Analysis (Amphibole):	ADQ
Magnification Used for Fiber Counting:	20,000
Aspect Ratio for Fiber Definition:	5:1
Mean Dimension of Grid Openings (GOs):	0.0132 mm^2
Initials of Analyst:	TS
Number of GO's Examined:	10
Analytical Sensitivity: f/Liter:	0.43458
Analytical Sensitivity: f/cm3:	0.00043
Number of primary asbestos structures:	0
Number of asbestos structures counted:	0
Number of asbestos structures > 5 um :	0
Number of asbestos fibers and bundles > 5 um:	0
Number of PCM equivalent asbestos structures:	0
Number of PCM equivalent asbestos fibers:	0
Concentration of Asbestos (Chrysotile) f/cm3:	<0.00043
Concentration of Asbestos (Amphibole) f/cm3:	<0.00043
Concentration of PCME Asbestos (Chrysotile) f/cm3:	<0.00043
Concentration of Asbestos (Chrysotile), Str/L:	0
Concentration of Asbestos (Amphibole), Str/L:	0
Lower 95% Confidence Limit (Chrysotile), Str/L:	0
Upper 95% Confidence Limit (Chrysotile), Str/L:	1.6
Lower 95% Confidence Limit (Amphibole), Str/L:	0
Upper 95% Confidence Limit (Amphibole), Str/L:	1.6

Analyst: Taylor Smylie

Scott M. Ward, Ph.D. **Lab Director**

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Airborne Asbestos Fiber Analysis by Transmission Electron Microscopy (TEM) ISO 10312 - Ambient Air - Determination of Asbestos Fibers Direct-Transfer Transmission Electron Microscopy Method

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EJ3 Order #: 3470571
Project #: 1.03286E+12
Receipt Date: 4-Dec-2023
Analysis Date: 7-Dec-2023
Report Date: 7-Dec-2023

HDOH Kula Community Air

Sample Number **MFK-AM02-112923-AB**

Air Volume:	6355.2
Effective Filter Area:	385.0 mm^2
Level of Analysis (Chrysotile):	CDQ
Level of Analysis (Amphibole):	ADQ
Magnification Used for Fiber Counting:	20,000
Aspect Ratio for Fiber Definition:	5:1
Mean Dimension of Grid Openings (GOs):	0.0132 mm^2
Initials of Analyst:	AP
Number of GO's Examined:	10
Analytical Sensitivity: f/Liter:	0.45894
Analytical Sensitivity: f/cm3:	0.00046
Number of primary asbestos structures:	0
Number of asbestos structures counted:	0
Number of asbestos structures > 5 um :	0
Number of asbestos fibers and bundles > 5 um:	0
Number of PCM equivalent asbestos structures:	0
Number of PCM equivalent asbestos fibers:	0
Concentration of Asbestos (Chrysotile) f/cm3:	<0.00046
Concentration of Asbestos (Amphibole) f/cm3:	<0.00046
Concentration of PCME Asbestos (Chrysotile) f/cm3:	<0.00046
Concentration of Asbestos (Chrysotile), Str/L:	0
Concentration of Asbestos (Amphibole), Str/L:	0
Lower 95% Confidence Limit (Chrysotile), Str/L:	0
Upper 95% Confidence Limit (Chrysotile), Str/L:	1.7
Lower 95% Confidence Limit (Amphibole), Str/L:	0
Upper 95% Confidence Limit (Amphibole), Str/L:	1.7

Analyst: Anh Phung

Scott M. Ward, Ph.D. **Lab Director**

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Report Date: 7-Dec-2023

HDOH Kula Community Air

Sample Number **MFK-AM03-112923-AB**

Air Volume:	5176.51
Effective Filter Area:	385.0 mm^2
Level of Analysis (Chrysotile):	CDQ
Level of Analysis (Amphibole):	ADQ
Magnification Used for Fiber Counting:	20,000
Aspect Ratio for Fiber Definition:	5:1
Mean Dimension of Grid Openings (GOs):	0.0132 mm^2
Initials of Analyst:	AP
Number of GO's Examined:	10
Analytical Sensitivity: f/Liter:	0.56344
Analytical Sensitivity: f/cm3:	0.00056
Number of primary asbestos structures:	0
Number of asbestos structures counted:	0
Number of asbestos structures > 5 um :	0
Number of asbestos fibers and bundles > 5 um:	0
Number of PCM equivalent asbestos structures:	0
Number of PCM equivalent asbestos fibers:	0
Concentration of Asbestos (Chrysotile) f/cm3:	<0.00056
Concentration of Asbestos (Amphibole) f/cm3:	<0.00056
Concentration of PCME Asbestos (Chrysotile) f/cm3:	<0.00056
Concentration of Asbestos (Chrysotile), Str/L:	0
Concentration of Asbestos (Amphibole), Str/L:	0
Lower 95% Confidence Limit (Chrysotile), Str/L:	0
Upper 95% Confidence Limit (Chrysotile), Str/L:	2.1
Lower 95% Confidence Limit (Amphibole), Str/L:	0
Upper 95% Confidence Limit (Amphibole), Str/L:	2.1

Analyst: Anh Phung

Scott M. Ward, Ph.D. **Lab Director**

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EJ3 Order #: 3470571
Project #: 1.03286E+12
Receipt Date: 4-Dec-2023
Analysis Date: 7-Dec-2023
Report Date: 7-Dec-2023

HDOH Kula Community Air

Sample Number **MFK-FB01-112923-AB**

Air Volume:	0
Effective Filter Area:	385.0 mm^2
Level of Analysis (Chrysotile):	CDQ
Level of Analysis (Amphibole):	ADQ
Magnification Used for Fiber Counting:	20,000
Aspect Ratio for Fiber Definition:	5:1
Mean Dimension of Grid Openings (GOs):	0.0132 mm^2
Initials of Analyst:	AP
Number of GO's Examined:	10
Analytical Sensitivity: f/Liter:	N/A
Analytical Sensitivity: f/cm3:	N/A
Number of primary asbestos structures:	0
Number of asbestos structures counted:	0
Number of asbestos structures > 5 um :	0
Number of asbestos fibers and bundles > 5 um:	0
Number of PCM equivalent asbestos structures:	0
Number of PCM equivalent asbestos fibers:	0
Concentration of Asbestos (Chrysotile) f/cm3:	N/A
Concentration of Asbestos (Amphibole) f/cm3:	N/A
Concentration of PCME Asbestos (Chrysotile) f/cm3:	N/A
Concentration of Asbestos (Chrysotile), Str/L:	N/A
Concentration of Asbestos (Amphibole), Str/L:	N/A
Lower 95% Confidence Limit (Chrysotile), Str/L:	N/A
Upper 95% Confidence Limit (Chrysotile), Str/L:	N/A
Lower 95% Confidence Limit (Amphibole), Str/L:	N/A
Upper 95% Confidence Limit (Amphibole), Str/L:	N/A

Analyst: Anh Phung

Scott M. Ward, Ph.D. **Lab Director**

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Airborne Asbestos Fiber Analysis by Transmission Electron Microscopy (TEM) ISO 10312 - Ambient Air - Determination of Asbestos Fibers Direct-Transfer Transmission Electron Microscopy Method

Maura McAleese	**EJ3 Order #:** 3473235
Tetra Tech	**Project #:** 1.03286E+12
1999 Harrison St, Ste. 500	**Receipt Date:** 6-Dec-2023
Oakland, CA 94612	**Analysis Date:** 11-Dec-2023
	Report Date: 11-Dec-2023

HDOH Kula Community Air

Sample Number **MFK-AM03-113023-AB**

Air Volume:	5543.868
Effective Filter Area:	385.0 mm^2
Level of Analysis (Chrysotile):	CDQ
Level of Analysis (Amphibole):	ADQ
Magnification Used for Fiber Counting:	20,000
Aspect Ratio for Fiber Definition:	5:1
Mean Dimension of Grid Openings (GOs):	0.0132 mm^2
Initials of Analyst:	TS
Number of GO's Examined:	10
Analytical Sensitivity: f/Liter:	0.52611
Analytical Sensitivity: f/cm3:	0.00053
Number of primary asbestos structures:	0
Number of asbestos structures counted:	0
Number of asbestos structures > 5 um :	0
Number of asbestos fibers and bundles > 5 um:	0
Number of PCM equivalent asbestos structures:	0
Number of PCM equivalent asbestos fibers:	0
Concentration of Asbestos (Chrysotile) f/cm3:	<0.00053
Concentration of Asbestos (Amphibole) f/cm3:	<0.00053
Concentration of PCME Asbestos (Chrysotile) f/cm3:	<0.00053
Concentration of Asbestos (Chrysotile), Str/L:	0
Concentration of Asbestos (Amphibole), Str/L:	0
Lower 95% Confidence Limit (Chrysotile), Str/L:	0
Upper 95% Confidence Limit (Chrysotile), Str/L:	1.9
Lower 95% Confidence Limit (Amphibole), Str/L:	0
Upper 95% Confidence Limit (Amphibole), Str/L:	1.9

Analyst: Taylor Smylie

Scott M. Ward, Ph.D. **Lab Director**

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Airborne Asbestos Fiber Analysis by Transmission Electron Microscopy (TEM) ISO 10312 - Ambient Air - Determination of Asbestos Fibers Direct-Transfer Transmission Electron Microscopy Method

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Tetra Tech
1999 Harrison St, Ste. 500
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EJ3 Order #: 3473235
Project #: 1.03286E+12
Receipt Date: 6-Dec-2023
Analysis Date: 11-Dec-2023
Report Date: 11-Dec-2023

HDOH Kula Community Air

Sample Number **MFK-FB01-113023-AB**

Air Volume:	0
Effective Filter Area:	385.0 mm^2
Level of Analysis (Chrysotile):	CDQ
Level of Analysis (Amphibole):	ADQ
Magnification Used for Fiber Counting:	20,000
Aspect Ratio for Fiber Definition:	5:1
Mean Dimension of Grid Openings (GOs):	0.0132 mm^2
Initials of Analyst:	TS
Number of GO's Examined:	10
Analytical Sensitivity: f/Liter:	N/A
Analytical Sensitivity: f/cm3:	N/A
Number of primary asbestos structures:	0
Number of asbestos structures counted:	0
Number of asbestos structures > 5 um :	0
Number of asbestos fibers and bundles > 5 um:	0
Number of PCM equivalent asbestos structures:	0
Number of PCM equivalent asbestos fibers:	0
Concentration of Asbestos (Chrysotile) f/cm3:	N/A
Concentration of Asbestos (Amphibole) f/cm3:	N/A
Concentration of PCME Asbestos (Chrysotile) f/cm3:	N/A
Concentration of Asbestos (Chrysotile), Str/L:	N/A
Concentration of Asbestos (Amphibole), Str/L:	N/A
Lower 95% Confidence Limit (Chrysotile), Str/L:	N/A
Upper 95% Confidence Limit (Chrysotile), Str/L:	N/A
Lower 95% Confidence Limit (Amphibole), Str/L:	N/A
Upper 95% Confidence Limit (Amphibole), Str/L:	N/A

Analyst: Taylor Smylie

Scott M. Ward, Ph.D. **Lab Director**

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EJ3 Order #: 3473235
Project #: 1.03286E+12
Receipt Date: 6-Dec-2023
Analysis Date: 11-Dec-2023
Report Date: 11-Dec-2023

HDOH Kula Community Air

Sample Number **MFK-AM01-120123-AB**

Air Volume:	6318.465
Effective Filter Area:	385.0 mm^2
Level of Analysis (Chrysotile):	CDQ
Level of Analysis (Amphibole):	ADQ
Magnification Used for Fiber Counting:	20,000
Aspect Ratio for Fiber Definition:	5:1
Mean Dimension of Grid Openings (GOs):	0.0132 mm^2
Initials of Analyst:	TS
Number of GO’s Examined:	10
Analytical Sensitivity: f/Liter:	0.46161
Analytical Sensitivity: f/cm3:	0.00046
Number of primary asbestos structures:	0
Number of asbestos structures counted:	0
Number of asbestos structures > 5 um :	0
Number of asbestos fibers and bundles > 5 um:	0
Number of PCM equivalent asbestos structures:	0
Number of PCM equivalent asbestos fibers:	0
Concentration of Asbestos (Chrysotile) f/cm3:	<0.00046
Concentration of Asbestos (Amphibole) f/cm3:	<0.00046
Concentration of PCME Asbestos (Chrysotile) f/cm3:	<0.00046
Concentration of Asbestos (Chrysotile), Str/L:	0
Concentration of Asbestos (Amphibole), Str/L:	0
Lower 95% Confidence Limit (Chrysotile), Str/L:	0
Upper 95% Confidence Limit (Chrysotile), Str/L:	1.7
Lower 95% Confidence Limit (Amphibole), Str/L:	0
Upper 95% Confidence Limit (Amphibole), Str/L:	1.7

Analyst: Taylor Smylie

Scott M. Ward, Ph.D. **Lab Director**

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ISO 10312 - Ambient Air - Determination of Asbestos Fibers
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Analysis Date: 11-Dec-2023
Report Date: 11-Dec-2023

HDOH Kula Community Air

Sample Number **MFK-AM03-120123-AB**

Air Volume:	5932.815
Effective Filter Area:	385.0 mm^2
Level of Analysis (Chrysotile):	CDQ
Level of Analysis (Amphibole):	ADQ
Magnification Used for Fiber Counting:	20,000
Aspect Ratio for Fiber Definition:	5:1
Mean Dimension of Grid Openings (GOs):	0.0132 mm^2
Initials of Analyst:	TS
Number of GO's Examined:	10
Analytical Sensitivity: f/Liter:	0.49162
Analytical Sensitivity: f/cm3:	0.00049
Number of primary asbestos structures:	0
Number of asbestos structures counted:	0
Number of asbestos structures > 5 um :	0
Number of asbestos fibers and bundles > 5 um:	0
Number of PCM equivalent asbestos structures:	0
Number of PCM equivalent asbestos fibers:	0
Concentration of Asbestos (Chrysotile) f/cm3:	<0.00049
Concentration of Asbestos (Amphibole) f/cm3:	<0.00049
Concentration of PCME Asbestos (Chrysotile) f/cm3:	<0.00049
Concentration of Asbestos (Chrysotile), Str/L:	0
Concentration of Asbestos (Amphibole), Str/L:	0
Lower 95% Confidence Limit (Chrysotile), Str/L:	0
Upper 95% Confidence Limit (Chrysotile), Str/L:	1.8
Lower 95% Confidence Limit (Amphibole), Str/L:	0
Upper 95% Confidence Limit (Amphibole), Str/L:	1.8

Analyst: Taylor Smylie

Scott M. Ward, Ph.D. **Lab Director**

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Analysis Date: 11-Dec-2023
Report Date: 11-Dec-2023

HDOH Kula Community Air

Sample Number **MFK-FB01-120123-AB**

Air Volume:	0
Effective Filter Area:	385.0 mm^2
Level of Analysis (Chrysotile):	CDQ
Level of Analysis (Amphibole):	ADQ
Magnification Used for Fiber Counting:	20,000
Aspect Ratio for Fiber Definition:	5:1
Mean Dimension of Grid Openings (GOs):	0.0132 mm^2
Initials of Analyst:	TS
Number of GO's Examined:	10
Analytical Sensitivity: f/Liter:	N/A
Analytical Sensitivity: f/cm3:	N/A
Number of primary asbestos structures:	0
Number of asbestos structures counted:	0
Number of asbestos structures > 5 um :	0
Number of asbestos fibers and bundles > 5 um:	0
Number of PCM equivalent asbestos structures:	0
Number of PCM equivalent asbestos fibers:	0
Concentration of Asbestos (Chrysotile) f/cm3:	N/A
Concentration of Asbestos (Amphibole) f/cm3:	N/A
Concentration of PCME Asbestos (Chrysotile) f/cm3:	N/A
Concentration of Asbestos (Chrysotile), Str/L:	N/A
Concentration of Asbestos (Amphibole), Str/L:	N/A
Lower 95% Confidence Limit (Chrysotile), Str/L:	N/A
Upper 95% Confidence Limit (Chrysotile), Str/L:	N/A
Lower 95% Confidence Limit (Amphibole), Str/L:	N/A
Upper 95% Confidence Limit (Amphibole), Str/L:	N/A

Analyst: Taylor Smylie

Scott M. Ward, Ph.D. **Lab Director**

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EJ3 Order #: 3473235
Project #: 1.03286E+12
Receipt Date: 6-Dec-2023
Analysis Date: 11-Dec-2023
Report Date: 11-Dec-2023

HDOH Kula Community Air

Sample Number **MFK-AM01-120323-AB**

Air Volume:	5629.303
Effective Filter Area:	385.0 mm^2
Level of Analysis (Chrysotile):	CDQ
Level of Analysis (Amphibole):	ADQ
Magnification Used for Fiber Counting:	20,000
Aspect Ratio for Fiber Definition:	5:1
Mean Dimension of Grid Openings (GOs):	0.0132 mm^2
Initials of Analyst:	TS
Number of GO's Examined:	10
Analytical Sensitivity: f/Liter:	0.51812
Analytical Sensitivity: f/cm3:	0.00052
Number of primary asbestos structures:	0
Number of asbestos structures counted:	0
Number of asbestos structures > 5 um :	0
Number of asbestos fibers and bundles > 5 um:	0
Number of PCM equivalent asbestos structures:	0
Number of PCM equivalent asbestos fibers:	0
Concentration of Asbestos (Chrysotile) f/cm3:	<0.00052
Concentration of Asbestos (Amphibole) f/cm3:	<0.00052
Concentration of PCME Asbestos (Chrysotile) f/cm3:	<0.00052
Concentration of Asbestos (Chrysotile), Str/L:	0
Concentration of Asbestos (Amphibole), Str/L:	0
Lower 95% Confidence Limit (Chrysotile), Str/L:	0
Upper 95% Confidence Limit (Chrysotile), Str/L:	1.9
Lower 95% Confidence Limit (Amphibole), Str/L:	0
Upper 95% Confidence Limit (Amphibole), Str/L:	1.9

Analyst: Taylor Smylie

Scott M. Ward, Ph.D. **Lab Director**

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Airborne Asbestos Fiber Analysis by Transmission Electron Microscopy (TEM) ISO 10312 - Ambient Air - Determination of Asbestos Fibers Direct-Transfer Transmission Electron Microscopy Method

Maura McAleese
Tetra Tech
1999 Harrison St, Ste. 500
Oakland, CA 94612

EJ3 Order #: 3473235
Project #: 1.03286E+12
Receipt Date: 6-Dec-2023
Analysis Date: 11-Dec-2023
Report Date: 11-Dec-2023

HDOH Kula Community Air

Sample Number **MFK-FB01-120323-AB**

Air Volume:	0
Effective Filter Area:	385.0 mm^2
Level of Analysis (Chrysotile):	CDQ
Level of Analysis (Amphibole):	ADQ
Magnification Used for Fiber Counting:	20,000
Aspect Ratio for Fiber Definition:	5:1
Mean Dimension of Grid Openings (GOs):	0.0132 mm^2
Initials of Analyst:	TS
Number of GO's Examined:	10
Analytical Sensitivity: f/Liter:	N/A
Analytical Sensitivity: f/cm3:	N/A
Number of primary asbestos structures:	0
Number of asbestos structures counted:	0
Number of asbestos structures > 5 um :	0
Number of asbestos fibers and bundles > 5 um:	0
Number of PCM equivalent asbestos structures:	0
Number of PCM equivalent asbestos fibers:	0
Concentration of Asbestos (Chrysotile) f/cm3:	N/A
Concentration of Asbestos (Amphibole) f/cm3:	N/A
Concentration of PCME Asbestos (Chrysotile) f/cm3:	N/A
Concentration of Asbestos (Chrysotile), Str/L:	N/A
Concentration of Asbestos (Amphibole), Str/L:	N/A
Lower 95% Confidence Limit (Chrysotile), Str/L:	N/A
Upper 95% Confidence Limit (Chrysotile), Str/L:	N/A
Lower 95% Confidence Limit (Amphibole), Str/L:	N/A
Upper 95% Confidence Limit (Amphibole), Str/L:	N/A

Analyst: Taylor Smylie

Scott M. Ward, Ph.D. **Lab Director**

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Airborne Asbestos Fiber Analysis by Transmission Electron Microscopy (TEM) ISO 10312 - Ambient Air - Determination of Asbestos Fibers Direct-Transfer Transmission Electron Microscopy Method

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EJ3 Order #: 3474752
Project #: 1.03286E+12
Receipt Date: 7-Dec-2023
Analysis Date: 12-Dec-2023
Report Date: 12-Dec-2023

HDOH Kula Community Air

Sample Number **MFK-AM01-113023-AB**

Air Volume:	2263.269
Effective Filter Area:	385.0 mm^2
Level of Analysis (Chrysotile):	CDQ
Level of Analysis (Amphibole):	ADQ
Magnification Used for Fiber Counting:	20,000
Aspect Ratio for Fiber Definition:	5:1
Mean Dimension of Grid Openings (GOs):	0.0132 mm^2
Initials of Analyst:	TS
Number of GO's Examined:	10
Analytical Sensitivity: f/Liter:	1.28870
Analytical Sensitivity: f/cm3:	0.00129
Number of primary asbestos structures:	0
Number of asbestos structures counted:	0
Number of asbestos structures > 5 um :	0
Number of asbestos fibers and bundles > 5 um:	0
Number of PCM equivalent asbestos structures:	0
Number of PCM equivalent asbestos fibers:	0
Concentration of Asbestos (Chrysotile) f/cm3:	<0.00129
Concentration of Asbestos (Amphibole) f/cm3:	<0.00129
Concentration of PCME Asbestos (Chrysotile) f/cm3:	<0.00129
Concentration of Asbestos (Chrysotile), Str/L:	0
Concentration of Asbestos (Amphibole), Str/L:	0
Lower 95% Confidence Limit (Chrysotile), Str/L:	0
Upper 95% Confidence Limit (Chrysotile), Str/L:	4.8
Lower 95% Confidence Limit (Amphibole), Str/L:	0
Upper 95% Confidence Limit (Amphibole), Str/L:	4.8

Analyst: Taylor Smylie

Scott M. Ward, Ph.D. **Lab Director**

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Airborne Asbestos Fiber Analysis
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ISO 10312 - Ambient Air - Determination of Asbestos Fibers
Direct-Transfer Transmission Electron Microscopy Method

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EJ3 Order #: 3474752
Project #: 1.03286E+12
Receipt Date: 7-Dec-2023
Analysis Date: 12-Dec-2023
Report Date: 12-Dec-2023

HDOH Kula Community Air

Sample Number **MFK-AM02-120223-AB**

Air Volume:	2388.282
Effective Filter Area:	385.0 mm^2
Level of Analysis (Chrysotile):	CDQ
Level of Analysis (Amphibole):	ADQ
Magnification Used for Fiber Counting:	20,000
Aspect Ratio for Fiber Definition:	5:1
Mean Dimension of Grid Openings (GOs):	0.0132 mm^2
Initials of Analyst:	TS
Number of GO's Examined:	10
Analytical Sensitivity: f/Liter:	1.22124
Analytical Sensitivity: f/cm3:	0.00122
Number of primary asbestos structures:	0
Number of asbestos structures counted:	0
Number of asbestos structures > 5 um :	0
Number of asbestos fibers and bundles > 5 um:	0
Number of PCM equivalent asbestos structures:	0
Number of PCM equivalent asbestos fibers:	0
Concentration of Asbestos (Chrysotile) f/cm3:	<0.00122
Concentration of Asbestos (Amphibole) f/cm3:	<0.00122
Concentration of PCME Asbestos (Chrysotile) f/cm3:	<0.00122
Concentration of Asbestos (Chrysotile), Str/L:	0
Concentration of Asbestos (Amphibole), Str/L:	0
Lower 95% Confidence Limit (Chrysotile), Str/L:	0
Upper 95% Confidence Limit (Chrysotile), Str/L:	4.5
Lower 95% Confidence Limit (Amphibole), Str/L:	0
Upper 95% Confidence Limit (Amphibole), Str/L:	4.5

Analyst: Taylor Smylie

Scott M. Ward, Ph.D. **Lab Director**

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Airborne Asbestos Fiber Analysis by Transmission Electron Microscopy (TEM) ISO 10312 - Ambient Air - Determination of Asbestos Fibers Direct-Transfer Transmission Electron Microscopy Method

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EJ3 Order #: 3474752
Project #: 1.03286E+12
Receipt Date: 7-Dec-2023
Analysis Date: 12-Dec-2023
Report Date: 12-Dec-2023

HDOH Kula Community Air

Sample Number **MFK-AM03-120223-AB**

Air Volume:	2207.715
Effective Filter Area:	385.0 mm^2
Level of Analysis (Chrysotile):	CDQ
Level of Analysis (Amphibole):	ADQ
Magnification Used for Fiber Counting:	20,000
Aspect Ratio for Fiber Definition:	5:1
Mean Dimension of Grid Openings (GOs):	0.0132 mm^2
Initials of Analyst:	TS
Number of GO's Examined:	10
Analytical Sensitivity: f/Liter:	1.32112
Analytical Sensitivity: f/cm3:	0.00132
Number of primary asbestos structures:	0
Number of asbestos structures counted:	0
Number of asbestos structures > 5 um :	0
Number of asbestos fibers and bundles > 5 um:	0
Number of PCM equivalent asbestos structures:	0
Number of PCM equivalent asbestos fibers:	0
Concentration of Asbestos (Chrysotile) f/cm3:	<0.00132
Concentration of Asbestos (Amphibole) f/cm3:	<0.00132
Concentration of PCME Asbestos (Chrysotile) f/cm3:	<0.00132
Concentration of Asbestos (Chrysotile), Str/L:	0
Concentration of Asbestos (Amphibole), Str/L:	0
Lower 95% Confidence Limit (Chrysotile), Str/L:	0
Upper 95% Confidence Limit (Chrysotile), Str/L:	4.9
Lower 95% Confidence Limit (Amphibole), Str/L:	0
Upper 95% Confidence Limit (Amphibole), Str/L:	4.9

Analyst: Taylor Smylie

Scott M. Ward, Ph.D. **Lab Director**

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Direct-Transfer Transmission Electron Microscopy Method

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EJ3 Order #: 3474752
Project #: 1.03286E+12
Receipt Date: 7-Dec-2023
Analysis Date: 12-Dec-2023
Report Date: 12-Dec-2023

HDOH Kula Community Air

Sample Number **MFK-FB01-120223-AB**

Air Volume:	0
Effective Filter Area:	385.0 mm^2
Level of Analysis (Chrysotile):	CDQ
Level of Analysis (Amphibole):	ADQ
Magnification Used for Fiber Counting:	20,000
Aspect Ratio for Fiber Definition:	5:1
Mean Dimension of Grid Openings (GOs):	0.0132 mm^2
Initials of Analyst:	TS
Number of GO's Examined:	10
Analytical Sensitivity: f/Liter:	N/A
Analytical Sensitivity: f/cm3:	N/A
Number of primary asbestos structures:	0
Number of asbestos structures counted:	0
Number of asbestos structures > 5 um :	0
Number of asbestos fibers and bundles > 5 um:	0
Number of PCM equivalent asbestos structures:	0
Number of PCM equivalent asbestos fibers:	0
Concentration of Asbestos (Chrysotile) f/cm3:	N/A
Concentration of Asbestos (Amphibole) f/cm3:	N/A
Concentration of PCME Asbestos (Chrysotile) f/cm3:	N/A
Concentration of Asbestos (Chrysotile), Str/L:	N/A
Concentration of Asbestos (Amphibole), Str/L:	N/A
Lower 95% Confidence Limit (Chrysotile), Str/L:	N/A
Upper 95% Confidence Limit (Chrysotile), Str/L:	N/A
Lower 95% Confidence Limit (Amphibole), Str/L:	N/A
Upper 95% Confidence Limit (Amphibole), Str/L:	N/A

Analyst: Taylor Smylie

Scott M. Ward, Ph.D. **Lab Director**

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Airborne Asbestos Fiber Analysis by Transmission Electron Microscopy (TEM) ISO 10312 - Ambient Air - Determination of Asbestos Fibers Direct-Transfer Transmission Electron Microscopy Method

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Tetra Tech
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Oakland, CA 94612

EJ3 Order #: 3474752
Project #: 1.03286E+12
Receipt Date: 7-Dec-2023
Analysis Date: 12-Dec-2023
Report Date: 12-Dec-2023

HDOH Kula Community Air

Sample Number **MFK-AM02-120323-AB**

Air Volume:	2106.972
Effective Filter Area:	385.0 mm^2
Level of Analysis (Chrysotile):	CDQ
Level of Analysis (Amphibole):	ADQ
Magnification Used for Fiber Counting:	20,000
Aspect Ratio for Fiber Definition:	5:1
Mean Dimension of Grid Openings (GOs):	0.0132 mm^2
Initials of Analyst:	TS
Number of GO's Examined:	10
Analytical Sensitivity: f/Liter:	1.38429
Analytical Sensitivity: f/cm3:	0.00138
Number of primary asbestos structures:	0
Number of asbestos structures counted:	0
Number of asbestos structures > 5 um :	0
Number of asbestos fibers and bundles > 5 um:	0
Number of PCM equivalent asbestos structures:	0
Number of PCM equivalent asbestos fibers:	0
Concentration of Asbestos (Chrysotile) f/cm3:	<0.00138
Concentration of Asbestos (Amphibole) f/cm3:	<0.00138
Concentration of PCME Asbestos (Chrysotile) f/cm3:	<0.00138
Concentration of Asbestos (Chrysotile), Str/L:	0
Concentration of Asbestos (Amphibole), Str/L:	0
Lower 95% Confidence Limit (Chrysotile), Str/L:	0
Upper 95% Confidence Limit (Chrysotile), Str/L:	5.1
Lower 95% Confidence Limit (Amphibole), Str/L:	0
Upper 95% Confidence Limit (Amphibole), Str/L:	5.1

Analyst: Taylor Smylie

Scott M. Ward, Ph.D. **Lab Director**

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Report for:

Maura McAleese
Tetra Tech- Maui Fire
1999 Harrison St. Ste. 500
Oakland, CA 94612

Regarding: Eurofins J3 Resources, Inc.
Project: 103S864023141; HDOH Kula Air Community
EML ID: 3477431

Approved by:

Lab Director
Scott Ward

Dates of Analysis:
Asbestos TEM ISO 10312 / ASTM6281-06: 12-14-2023

All samples were received in acceptable condition unless noted in the Report Comments portion in the body of the report. Due to the nature of the analyses performed, field blank correction of results is not applied. The results relate only to the samples as received and tested.

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Airborne Asbestos Fiber Analysis
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ISO 10312 - Ambient Air - Determination of Asbestos Fibers
Direct-Transfer Transmission Electron Microscopy Method

Maura McAleese
Tetra Tech
1999 Harrison St, Ste. 500
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EJ3 Order #: 3477431
Project #: 1.03286E+12
Receipt Date: 11-Dec-2023
Analysis Date: 14-Dec-2023
Report Date: 14-Dec-2023

HDOH Kula Community Air

Sample Number **MFK-AM02-120423-AB**

Air Volume:	5268.423
Effective Filter Area:	385.0 mm^2
Level of Analysis (Chrysotile):	CDQ
Level of Analysis (Amphibole):	ADQ
Magnification Used for Fiber Counting:	20,000
Aspect Ratio for Fiber Definition:	5:1
Mean Dimension of Grid Openings (GOs):	0.0132 mm^2
Initials of Analyst:	TS
Number of GO's Examined:	10
Analytical Sensitivity: f/Liter:	0.55361
Analytical Sensitivity: f/cm3:	0.00055
Number of primary asbestos structures:	0
Number of asbestos structures counted:	0
Number of asbestos structures > 5 um :	0
Number of asbestos fibers and bundles > 5 um:	0
Number of PCM equivalent asbestos structures:	0
Number of PCM equivalent asbestos fibers:	0
Concentration of Asbestos (Chrysotile) f/cm3:	<0.00055
Concentration of Asbestos (Amphibole) f/cm3:	<0.00055
Concentration of PCME Asbestos (Chrysotile) f/cm3:	<0.00055
Concentration of Asbestos (Chrysotile), Str/L:	0
Concentration of Asbestos (Amphibole), Str/L:	0
Lower 95% Confidence Limit (Chrysotile), Str/L:	0
Upper 95% Confidence Limit (Chrysotile), Str/L:	2
Lower 95% Confidence Limit (Amphibole), Str/L:	0
Upper 95% Confidence Limit (Amphibole), Str/L:	2

Analyst: Taylor Smylie

Scott M. Ward, Ph.D. **Lab Director**

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Airborne Asbestos Fiber Analysis by Transmission Electron Microscopy (TEM) ISO 10312 - Ambient Air - Determination of Asbestos Fibers Direct-Transfer Transmission Electron Microscopy Method

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EJ3 Order #: 3477431
Project #: 1.03286E+12
Receipt Date: 11-Dec-2023
Analysis Date: 14-Dec-2023
Report Date: 14-Dec-2023

HDOH Kula Community Air

Sample Number **MFK-FB01-120423-AB**

Air Volume:	0
Effective Filter Area:	385.0 mm^2
Level of Analysis (Chrysotile):	CDQ
Level of Analysis (Amphibole):	ADQ
Magnification Used for Fiber Counting:	20,000
Aspect Ratio for Fiber Definition:	5:1
Mean Dimension of Grid Openings (GOs):	0.0132 mm^2
Initials of Analyst:	TS
Number of GO's Examined:	10
Analytical Sensitivity: f/Liter:	N/A
Analytical Sensitivity: f/cm3:	N/A
Number of primary asbestos structures:	0
Number of asbestos structures counted:	0
Number of asbestos structures > 5 um :	0
Number of asbestos fibers and bundles > 5 um:	0
Number of PCM equivalent asbestos structures:	0
Number of PCM equivalent asbestos fibers:	0
Concentration of Asbestos (Chrysotile) f/cm3:	N/A
Concentration of Asbestos (Amphibole) f/cm3:	N/A
Concentration of PCME Asbestos (Chrysotile) f/cm3:	N/A
Concentration of Asbestos (Chrysotile), Str/L:	N/A
Concentration of Asbestos (Amphibole), Str/L:	N/A
Lower 95% Confidence Limit (Chrysotile), Str/L:	N/A
Upper 95% Confidence Limit (Chrysotile), Str/L:	N/A
Lower 95% Confidence Limit (Amphibole), Str/L:	N/A
Upper 95% Confidence Limit (Amphibole), Str/L:	N/A

Analyst: Taylor Smylie

Scott M. Ward, Ph.D. **Lab Director**

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EJ3 Order #: 3477431
Project #: 1.03286E+12
Receipt Date: 11-Dec-2023
Analysis Date: 14-Dec-2023
Report Date: 14-Dec-2023

HDOH Kula Community Air

Sample Number **MFK-AM01-120523-AB**

Air Volume:	5733.535
Effective Filter Area:	385.0 mm^2
Level of Analysis (Chrysotile):	CDQ
Level of Analysis (Amphibole):	ADQ
Magnification Used for Fiber Counting:	20,000
Aspect Ratio for Fiber Definition:	5:1
Mean Dimension of Grid Openings (GOs):	0.0132 mm^2
Initials of Analyst:	TS
Number of GO's Examined:	10
Analytical Sensitivity: f/Liter:	0.50870
Analytical Sensitivity: f/cm3:	0.00051
Number of primary asbestos structures:	0
Number of asbestos structures counted:	0
Number of asbestos structures > 5 um :	0
Number of asbestos fibers and bundles > 5 um:	0
Number of PCM equivalent asbestos structures:	0
Number of PCM equivalent asbestos fibers:	0
Concentration of Asbestos (Chrysotile) f/cm3:	<0.00051
Concentration of Asbestos (Amphibole) f/cm3:	<0.00051
Concentration of PCME Asbestos (Chrysotile) f/cm3:	<0.00051
Concentration of Asbestos (Chrysotile), Str/L:	0
Concentration of Asbestos (Amphibole), Str/L:	0
Lower 95% Confidence Limit (Chrysotile), Str/L:	0
Upper 95% Confidence Limit (Chrysotile), Str/L:	1.9
Lower 95% Confidence Limit (Amphibole), Str/L:	0
Upper 95% Confidence Limit (Amphibole), Str/L:	1.9

Analyst: Taylor Smylie

Scott M. Ward, Ph.D. **Lab Director**

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EJ3 Order #: 3477431
Project #: 1.03286E+12
Receipt Date: 11-Dec-2023
Analysis Date: 14-Dec-2023
Report Date: 14-Dec-2023

HDOH Kula Community Air

Sample Number **MFK-AM02-120523-AB**

Air Volume:	6103.497
Effective Filter Area:	385.0 mm^2
Level of Analysis (Chrysotile):	CDQ
Level of Analysis (Amphibole):	ADQ
Magnification Used for Fiber Counting:	20,000
Aspect Ratio for Fiber Definition:	5:1
Mean Dimension of Grid Openings (GOs):	0.0132 mm^2
Initials of Analyst:	TS
Number of GO's Examined:	10
Analytical Sensitivity: f/Liter:	0.47787
Analytical Sensitivity: f/cm3:	0.00048
Number of primary asbestos structures:	0
Number of asbestos structures counted:	0
Number of asbestos structures > 5 um :	0
Number of asbestos fibers and bundles > 5 um:	0
Number of PCM equivalent asbestos structures:	0
Number of PCM equivalent asbestos fibers:	0
Concentration of Asbestos (Chrysotile) f/cm3:	<0.00048
Concentration of Asbestos (Amphibole) f/cm3:	<0.00048
Concentration of PCME Asbestos (Chrysotile) f/cm3:	<0.00048
Concentration of Asbestos (Chrysotile), Str/L:	0
Concentration of Asbestos (Amphibole), Str/L:	0
Lower 95% Confidence Limit (Chrysotile), Str/L:	0
Upper 95% Confidence Limit (Chrysotile), Str/L:	1.8
Lower 95% Confidence Limit (Amphibole), Str/L:	0
Upper 95% Confidence Limit (Amphibole), Str/L:	1.8

Analyst: Taylor Smylie

Scott M. Ward, Ph.D. **Lab Director**

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Airborne Asbestos Fiber Analysis by Transmission Electron Microscopy (TEM) ISO 10312 - Ambient Air - Determination of Asbestos Fibers Direct-Transfer Transmission Electron Microscopy Method

Maura McAleese
Tetra Tech
1999 Harrison St, Ste. 500
Oakland, CA 94612

EJ3 Order #: 3477431
Project #: 1.03286E+12
Receipt Date: 11-Dec-2023
Analysis Date: 14-Dec-2023
Report Date: 14-Dec-2023

HDOH Kula Community Air

Sample Number **MFK-AM03-120523-AB**

Air Volume:	3834.436
Effective Filter Area:	385.0 mm^2
Level of Analysis (Chrysotile):	CDQ
Level of Analysis (Amphibole):	ADQ
Magnification Used for Fiber Counting:	20,000
Aspect Ratio for Fiber Definition:	5:1
Mean Dimension of Grid Openings (GOs):	0.0132 mm^2
Initials of Analyst:	TS
Number of GO's Examined:	10
Analytical Sensitivity: f/Liter:	0.76065
Analytical Sensitivity: f/cm3:	0.00076
Number of primary asbestos structures:	0
Number of asbestos structures counted:	0
Number of asbestos structures > 5 um :	0
Number of asbestos fibers and bundles > 5 um:	0
Number of PCM equivalent asbestos structures:	0
Number of PCM equivalent asbestos fibers:	0
Concentration of Asbestos (Chrysotile) f/cm3:	<0.00076
Concentration of Asbestos (Amphibole) f/cm3:	<0.00076
Concentration of PCME Asbestos (Chrysotile) f/cm3:	<0.00076
Concentration of Asbestos (Chrysotile), Str/L:	0
Concentration of Asbestos (Amphibole), Str/L:	0
Lower 95% Confidence Limit (Chrysotile), Str/L:	0
Upper 95% Confidence Limit (Chrysotile), Str/L:	2.8
Lower 95% Confidence Limit (Amphibole), Str/L:	0
Upper 95% Confidence Limit (Amphibole), Str/L:	2.8

Analyst: Taylor Smylie

Scott M. Ward, Ph.D. **Lab Director**

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Airborne Asbestos Fiber Analysis by Transmission Electron Microscopy (TEM) ISO 10312 - Ambient Air - Determination of Asbestos Fibers Direct-Transfer Transmission Electron Microscopy Method

Maura McAleese	**EJ3 Order #:** 3477431
Tetra Tech	**Project #:** 1.03286E+12
1999 Harrison St, Ste. 500	**Receipt Date:** 11-Dec-2023
Oakland, CA 94612	**Analysis Date:** 14-Dec-2023
	Report Date: 14-Dec-2023

HDOH Kula Community Air

Sample Number **MFK-FB01-120523-AB**

Air Volume:	0
Effective Filter Area:	385.0 mm^2
Level of Analysis (Chrysotile):	CDQ
Level of Analysis (Amphibole):	ADQ
Magnification Used for Fiber Counting:	20,000
Aspect Ratio for Fiber Definition:	5:1
Mean Dimension of Grid Openings (GOs):	0.0132 mm^2
Initials of Analyst:	TS
Number of GO's Examined:	10
Analytical Sensitivity: f/Liter:	N/A
Analytical Sensitivity: f/cm3:	N/A
Number of primary asbestos structures:	0
Number of asbestos structures counted:	0
Number of asbestos structures > 5 um :	0
Number of asbestos fibers and bundles > 5 um:	0
Number of PCM equivalent asbestos structures:	0
Number of PCM equivalent asbestos fibers:	0
Concentration of Asbestos (Chrysotile) f/cm3:	N/A
Concentration of Asbestos (Amphibole) f/cm3:	N/A
Concentration of PCME Asbestos (Chrysotile) f/cm3:	N/A
Concentration of Asbestos (Chrysotile), Str/L:	N/A
Concentration of Asbestos (Amphibole), Str/L:	N/A
Lower 95% Confidence Limit (Chrysotile), Str/L:	N/A
Upper 95% Confidence Limit (Chrysotile), Str/L:	N/A
Lower 95% Confidence Limit (Amphibole), Str/L:	N/A
Upper 95% Confidence Limit (Amphibole), Str/L:	N/A

Analyst: Taylor Smylie

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EJ3 Order #: 3477431
Project #: 1.03286E+12
Receipt Date: 11-Dec-2023
Analysis Date: 14-Dec-2023
Report Date: 14-Dec-2023

HDOH Kula Community Air

Sample Number **MFK-AM01-120623-AB**

Air Volume:	6006.458
Effective Filter Area:	385.0 mm^2
Level of Analysis (Chrysotile):	CDQ
Level of Analysis (Amphibole):	ADQ
Magnification Used for Fiber Counting:	20,000
Aspect Ratio for Fiber Definition:	5:1
Mean Dimension of Grid Openings (GOs):	0.0132 mm^2
Initials of Analyst:	TS
Number of GO's Examined:	10
Analytical Sensitivity: f/Liter:	0.48559
Analytical Sensitivity: f/cm3:	0.00049
Number of primary asbestos structures:	0
Number of asbestos structures counted:	0
Number of asbestos structures > 5 um :	0
Number of asbestos fibers and bundles > 5 um:	0
Number of PCM equivalent asbestos structures:	0
Number of PCM equivalent asbestos fibers:	0
Concentration of Asbestos (Chrysotile) f/cm3:	<0.00049
Concentration of Asbestos (Amphibole) f/cm3:	<0.00049
Concentration of PCME Asbestos (Chrysotile) f/cm3:	<0.00049
Concentration of Asbestos (Chrysotile), Str/L:	0
Concentration of Asbestos (Amphibole), Str/L:	0
Lower 95% Confidence Limit (Chrysotile), Str/L:	0
Upper 95% Confidence Limit (Chrysotile), Str/L:	1.8
Lower 95% Confidence Limit (Amphibole), Str/L:	0
Upper 95% Confidence Limit (Amphibole), Str/L:	1.8

Analyst: Taylor Smylie

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Airborne Asbestos Fiber Analysis
by Transmission Electron Microscopy (TEM)
ISO 10312 - Ambient Air - Determination of Asbestos Fibers
Direct-Transfer Transmission Electron Microscopy Method

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Analysis Date: 14-Dec-2023
Report Date: 14-Dec-2023

HDOH Kula Community Air

Sample Number **MFK-AM02-120623-AB**

Air Volume:	8143.715
Effective Filter Area:	385.0 mm^2
Level of Analysis (Chrysotile):	CDQ
Level of Analysis (Amphibole):	ADQ
Magnification Used for Fiber Counting:	20,000
Aspect Ratio for Fiber Definition:	5:1
Mean Dimension of Grid Openings (GOs):	0.0132 mm^2
Initials of Analyst:	TS
Number of GO's Examined:	10
Analytical Sensitivity: f/Liter:	0.35815
Analytical Sensitivity: f/cm3:	0.00036
Number of primary asbestos structures:	0
Number of asbestos structures counted:	0
Number of asbestos structures > 5 um :	0
Number of asbestos fibers and bundles > 5 um:	0
Number of PCM equivalent asbestos structures:	0
Number of PCM equivalent asbestos fibers:	0
Concentration of Asbestos (Chrysotile) f/cm3:	<0.00036
Concentration of Asbestos (Amphibole) f/cm3:	<0.00036
Concentration of PCME Asbestos (Chrysotile) f/cm3:	<0.00036
Concentration of Asbestos (Chrysotile), Str/L:	0
Concentration of Asbestos (Amphibole), Str/L:	0
Lower 95% Confidence Limit (Chrysotile), Str/L:	0
Upper 95% Confidence Limit (Chrysotile), Str/L:	1.3
Lower 95% Confidence Limit (Amphibole), Str/L:	0
Upper 95% Confidence Limit (Amphibole), Str/L:	1.3

Analyst: Taylor Smylie

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Report Date: 14-Dec-2023

HDOH Kula Community Air

Sample Number **MFK-AM03-120623-AB**

Air Volume:	8117.277
Effective Filter Area:	385.0 mm^2
Level of Analysis (Chrysotile):	CDQ
Level of Analysis (Amphibole):	ADQ
Magnification Used for Fiber Counting:	20,000
Aspect Ratio for Fiber Definition:	5:1
Mean Dimension of Grid Openings (GOs):	0.0132 mm^2
Initials of Analyst:	TS
Number of GO's Examined:	10
Analytical Sensitivity: f/Liter:	0.35932
Analytical Sensitivity: f/cm3:	0.00036
Number of primary asbestos structures:	0
Number of asbestos structures counted:	0
Number of asbestos structures > 5 um :	0
Number of asbestos fibers and bundles > 5 um:	0
Number of PCM equivalent asbestos structures:	0
Number of PCM equivalent asbestos fibers:	0
Concentration of Asbestos (Chrysotile) f/cm3:	<0.00036
Concentration of Asbestos (Amphibole) f/cm3:	<0.00036
Concentration of PCME Asbestos (Chrysotile) f/cm3:	<0.00036
Concentration of Asbestos (Chrysotile), Str/L:	0
Concentration of Asbestos (Amphibole), Str/L:	0
Lower 95% Confidence Limit (Chrysotile), Str/L:	0
Upper 95% Confidence Limit (Chrysotile), Str/L:	1.3
Lower 95% Confidence Limit (Amphibole), Str/L:	0
Upper 95% Confidence Limit (Amphibole), Str/L:	1.3

Analyst: Taylor Smylie

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Project #: 1.03286E+12
Receipt Date: 11-Dec-2023
Analysis Date: 14-Dec-2023
Report Date: 14-Dec-2023

HDOH Kula Community Air

Sample Number **MFK-FB01-120623-AB**

Air Volume:	0
Effective Filter Area:	385.0 mm^2
Level of Analysis (Chrysotile):	CDQ
Level of Analysis (Amphibole):	ADQ
Magnification Used for Fiber Counting:	20,000
Aspect Ratio for Fiber Definition:	5:1
Mean Dimension of Grid Openings (GOs):	0.0132 mm^2
Initials of Analyst:	TS
Number of GO's Examined:	10
Analytical Sensitivity: f/Liter:	N/A
Analytical Sensitivity: f/cm3:	N/A
Number of primary asbestos structures:	0
Number of asbestos structures counted:	0
Number of asbestos structures > 5 um :	0
Number of asbestos fibers and bundles > 5 um:	0
Number of PCM equivalent asbestos structures:	0
Number of PCM equivalent asbestos fibers:	0
Concentration of Asbestos (Chrysotile) f/cm3:	N/A
Concentration of Asbestos (Amphibole) f/cm3:	N/A
Concentration of PCME Asbestos (Chrysotile) f/cm3:	N/A
Concentration of Asbestos (Chrysotile), Str/L:	N/A
Concentration of Asbestos (Amphibole), Str/L:	N/A
Lower 95% Confidence Limit (Chrysotile), Str/L:	N/A
Upper 95% Confidence Limit (Chrysotile), Str/L:	N/A
Lower 95% Confidence Limit (Amphibole), Str/L:	N/A
Upper 95% Confidence Limit (Amphibole), Str/L:	N/A

Analyst: Taylor Smylie

Scott M. Ward, Ph.D. **Lab Director**

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EJ3 Order #: 3480279
Project #: 103S864023141
Receipt Date: 13-Dec-2023
Analysis Date: 18-Dec-2023
Report Date: 18-Dec-2023

HDOH Kula Community Air

Sample Number **MFK-AM01-120723-AB**

Air Volume:	5847.007
Effective Filter Area:	385.0 mm^2
Level of Analysis (Chrysotile):	CDQ
Level of Analysis (Amphibole):	ADQ
Magnification Used for Fiber Counting:	20,000
Aspect Ratio for Fiber Definition:	5:1
Mean Dimension of Grid Openings (GOs):	0.0132 mm^2
Initials of Analyst:	TS
Number of GO's Examined:	10
Analytical Sensitivity: f/Liter:	0.49883
Analytical Sensitivity: f/cm3:	0.00050
Number of primary asbestos structures:	0
Number of asbestos structures counted:	0
Number of asbestos structures > 5 um :	0
Number of asbestos fibers and bundles > 5 um:	0
Number of PCM equivalent asbestos structures:	0
Number of PCM equivalent asbestos fibers:	0
Concentration of Asbestos (Chrysotile) f/cm3:	<0.00050
Concentration of Asbestos (Amphibole) f/cm3:	<0.00050
Concentration of PCME Asbestos (Chrysotile) f/cm3:	<0.00050
Concentration of Asbestos (Chrysotile), Str/L:	0
Concentration of Asbestos (Amphibole), Str/L:	0
Lower 95% Confidence Limit (Chrysotile), Str/L:	0
Upper 95% Confidence Limit (Chrysotile), Str/L:	1.8
Lower 95% Confidence Limit (Amphibole), Str/L:	0
Upper 95% Confidence Limit (Amphibole), Str/L:	1.8

Analyst: Taylor Smylie

Scott M. Ward, Ph.D. **Lab Director**

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Receipt Date: 13-Dec-2023
Analysis Date: 18-Dec-2023
Report Date: 18-Dec-2023

HDOH Kula Community Air

Sample Number **MFK-AM02-120723-AB**

Air Volume:	6252.266
Effective Filter Area:	385.0 mm^2
Level of Analysis (Chrysotile):	CDQ
Level of Analysis (Amphibole):	ADQ
Magnification Used for Fiber Counting:	20,000
Aspect Ratio for Fiber Definition:	5:1
Mean Dimension of Grid Openings (GOs):	0.0132 mm^2
Initials of Analyst:	TS
Number of GO's Examined:	10
Analytical Sensitivity: f/Liter:	0.46650
Analytical Sensitivity: f/cm3:	0.00047
Number of primary asbestos structures:	0
Number of asbestos structures counted:	0
Number of asbestos structures > 5 um :	0
Number of asbestos fibers and bundles > 5 um:	0
Number of PCM equivalent asbestos structures:	0
Number of PCM equivalent asbestos fibers:	0
Concentration of Asbestos (Chrysotile) f/cm3:	<0.00047
Concentration of Asbestos (Amphibole) f/cm3:	<0.00047
Concentration of PCME Asbestos (Chrysotile) f/cm3:	<0.00047
Concentration of Asbestos (Chrysotile), Str/L:	0
Concentration of Asbestos (Amphibole), Str/L:	0
Lower 95% Confidence Limit (Chrysotile), Str/L:	0
Upper 95% Confidence Limit (Chrysotile), Str/L:	1.7
Lower 95% Confidence Limit (Amphibole), Str/L:	0
Upper 95% Confidence Limit (Amphibole), Str/L:	1.7

Analyst: Taylor Smylie

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Receipt Date: 13-Dec-2023
Analysis Date: 18-Dec-2023
Report Date: 18-Dec-2023

HDOH Kula Community Air

Sample Number **MFK-FB01-120723-AB**

Air Volume:	0
Effective Filter Area:	385.0 mm^2
Level of Analysis (Chrysotile):	CDQ
Level of Analysis (Amphibole):	ADQ
Magnification Used for Fiber Counting:	20,000
Aspect Ratio for Fiber Definition:	5:1
Mean Dimension of Grid Openings (GOs):	0.0132 mm^2
Initials of Analyst:	TS
Number of GO's Examined:	10
Analytical Sensitivity: f/Liter:	N/A
Analytical Sensitivity: f/cm3:	N/A
Number of primary asbestos structures:	0
Number of asbestos structures counted:	0
Number of asbestos structures > 5 um :	0
Number of asbestos fibers and bundles > 5 um:	0
Number of PCM equivalent asbestos structures:	0
Number of PCM equivalent asbestos fibers:	0
Concentration of Asbestos (Chrysotile) f/cm3:	N/A
Concentration of Asbestos (Amphibole) f/cm3:	N/A
Concentration of PCME Asbestos (Chrysotile) f/cm3:	N/A
Concentration of Asbestos (Chrysotile), Str/L:	N/A
Concentration of Asbestos (Amphibole), Str/L:	N/A
Lower 95% Confidence Limit (Chrysotile), Str/L:	N/A
Upper 95% Confidence Limit (Chrysotile), Str/L:	N/A
Lower 95% Confidence Limit (Amphibole), Str/L:	N/A
Upper 95% Confidence Limit (Amphibole), Str/L:	N/A

Analyst: Taylor Smylie

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EJ3 Order #: 3480279
Project #: 103S864023141
Receipt Date: 13-Dec-2023
Analysis Date: 18-Dec-2023
Report Date: 18-Dec-2023

HDOH Kula Community Air

Sample Number **MFK-AM01-120823-AB**

Air Volume:	6110.793
Effective Filter Area:	385.0 mm^2
Level of Analysis (Chrysotile):	CDQ
Level of Analysis (Amphibole):	ADQ
Magnification Used for Fiber Counting:	20,000
Aspect Ratio for Fiber Definition:	5:1
Mean Dimension of Grid Openings (GOs):	0.0132 mm^2
Initials of Analyst:	TS
Number of GO's Examined:	10
Analytical Sensitivity: f/Liter:	0.47730
Analytical Sensitivity: f/cm3:	0.00048
Number of primary asbestos structures:	0
Number of asbestos structures counted:	0
Number of asbestos structures > 5 um :	0
Number of asbestos fibers and bundles > 5 um:	0
Number of PCM equivalent asbestos structures:	0
Number of PCM equivalent asbestos fibers:	0
Concentration of Asbestos (Chrysotile) f/cm3:	<0.00048
Concentration of Asbestos (Amphibole) f/cm3:	<0.00048
Concentration of PCME Asbestos (Chrysotile) f/cm3:	<0.00048
Concentration of Asbestos (Chrysotile), Str/L:	0
Concentration of Asbestos (Amphibole), Str/L:	0
Lower 95% Confidence Limit (Chrysotile), Str/L:	0
Upper 95% Confidence Limit (Chrysotile), Str/L:	1.8
Lower 95% Confidence Limit (Amphibole), Str/L:	0
Upper 95% Confidence Limit (Amphibole), Str/L:	1.8

Analyst: Taylor Smylie

Scott M. Ward, Ph.D. **Lab Director**

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Airborne Asbestos Fiber Analysis by Transmission Electron Microscopy (TEM) ISO 10312 - Ambient Air - Determination of Asbestos Fibers Direct-Transfer Transmission Electron Microscopy Method

Maura McAleese
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1999 Harrison St, Ste. 500
Oakland, CA 94612

EJ3 Order #: 3480279
Project #: 103S864023141
Receipt Date: 13-Dec-2023
Analysis Date: 18-Dec-2023
Report Date: 18-Dec-2023

HDOH Kula Community Air

Sample Number **MFK-AM02-120823-AB**

Air Volume:	2468.729
Effective Filter Area:	385.0 mm^2
Level of Analysis (Chrysotile):	CDQ
Level of Analysis (Amphibole):	ADQ
Magnification Used for Fiber Counting:	20,000
Aspect Ratio for Fiber Definition:	5:1
Mean Dimension of Grid Openings (GOs):	0.0132 mm^2
Initials of Analyst:	
Number of GO's Examined:	10
Analytical Sensitivity: f/Liter:	1.18144
Analytical Sensitivity: f/cm3:	0.00118
Number of primary asbestos structures:	0
Number of asbestos structures counted:	0
Number of asbestos structures > 5 um :	0
Number of asbestos fibers and bundles > 5 um:	0
Number of PCM equivalent asbestos structures:	0
Number of PCM equivalent asbestos fibers:	0
Concentration of Asbestos (Chrysotile) f/cm3:	<0.00118
Concentration of Asbestos (Amphibole) f/cm3:	<0.00118
Concentration of PCME Asbestos (Chrysotile) f/cm3:	<0.00118
Concentration of Asbestos (Chrysotile), Str/L:	0
Concentration of Asbestos (Amphibole), Str/L:	0
Lower 95% Confidence Limit (Chrysotile), Str/L:	0
Upper 95% Confidence Limit (Chrysotile), Str/L:	4.4
Lower 95% Confidence Limit (Amphibole), Str/L:	0
Upper 95% Confidence Limit (Amphibole), Str/L:	4.4

Analyst: Taylor Smylie

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EJ3 Order #: 3480279
Project #: 103S864023141
Receipt Date: 13-Dec-2023
Analysis Date: 18-Dec-2023
Report Date: 18-Dec-2023

HDOH Kula Community Air

Sample Number **MFK-FB01-120823-AB**

Air Volume:	0
Effective Filter Area:	385.0 mm^2
Level of Analysis (Chrysotile):	CDQ
Level of Analysis (Amphibole):	ADQ
Magnification Used for Fiber Counting:	20,000
Aspect Ratio for Fiber Definition:	5:1
Mean Dimension of Grid Openings (GOs):	0.0132 mm^2
Initials of Analyst:	TS
Number of GO's Examined:	10
Analytical Sensitivity: f/Liter:	N/A
Analytical Sensitivity: f/cm3:	N/A
Number of primary asbestos structures:	0
Number of asbestos structures counted:	0
Number of asbestos structures > 5 um :	0
Number of asbestos fibers and bundles > 5 um:	0
Number of PCM equivalent asbestos structures:	0
Number of PCM equivalent asbestos fibers:	0
Concentration of Asbestos (Chrysotile) f/cm3:	N/A
Concentration of Asbestos (Amphibole) f/cm3:	N/A
Concentration of PCME Asbestos (Chrysotile) f/cm3:	N/A
Concentration of Asbestos (Chrysotile), Str/L:	N/A
Concentration of Asbestos (Amphibole), Str/L:	N/A
Lower 95% Confidence Limit (Chrysotile), Str/L:	N/A
Upper 95% Confidence Limit (Chrysotile), Str/L:	N/A
Lower 95% Confidence Limit (Amphibole), Str/L:	N/A
Upper 95% Confidence Limit (Amphibole), Str/L:	N/A

Analyst: Taylor Smylie

SMWard

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Project #: 103S864023141
Receipt Date: 13-Dec-2023
Analysis Date: 18-Dec-2023
Report Date: 18-Dec-2023

HDOH Kula Community Air

Sample Number **MFK-AM01-120923-AB**

Air Volume:	3184.383
Effective Filter Area:	385.0 mm^2
Level of Analysis (Chrysotile):	CDQ
Level of Analysis (Amphibole):	ADQ
Magnification Used for Fiber Counting:	20,000
Aspect Ratio for Fiber Definition:	5:1
Mean Dimension of Grid Openings (GOs):	0.0132 mm^2
Initials of Analyst:	TS
Number of GO's Examined:	10
Analytical Sensitivity: f/Liter:	0.91593
Analytical Sensitivity: f/cm3:	0.00092
Number of primary asbestos structures:	0
Number of asbestos structures counted:	0
Number of asbestos structures > 5 um :	0
Number of asbestos fibers and bundles > 5 um:	0
Number of PCM equivalent asbestos structures:	0
Number of PCM equivalent asbestos fibers:	0
Concentration of Asbestos (Chrysotile) f/cm3:	<0.00092
Concentration of Asbestos (Amphibole) f/cm3:	<0.00092
Concentration of PCME Asbestos (Chrysotile) f/cm3:	<0.00092
Concentration of Asbestos (Chrysotile), Str/L:	0
Concentration of Asbestos (Amphibole), Str/L:	0
Lower 95% Confidence Limit (Chrysotile), Str/L:	0
Upper 95% Confidence Limit (Chrysotile), Str/L:	3.4
Lower 95% Confidence Limit (Amphibole), Str/L:	0
Upper 95% Confidence Limit (Amphibole), Str/L:	3.4

Analyst: Taylor Smylie

Scott M. Ward, Ph.D. **Lab Director**

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Report Date: 18-Dec-2023

HDOH Kula Community Air

Sample Number **MFK-AM02-120923-AB**

Air Volume:	3293.601
Effective Filter Area:	385.0 mm^2
Level of Analysis (Chrysotile):	CDQ
Level of Analysis (Amphibole):	ADQ
Magnification Used for Fiber Counting:	20,000
Aspect Ratio for Fiber Definition:	5:1
Mean Dimension of Grid Openings (GOs):	0.0132 mm^2
Initials of Analyst:	TS
Number of GO's Examined:	10
Analytical Sensitivity: f/Liter:	0.88556
Analytical Sensitivity: f/cm3:	0.00089
Number of primary asbestos structures:	0
Number of asbestos structures counted:	0
Number of asbestos structures > 5 um :	0
Number of asbestos fibers and bundles > 5 um:	0
Number of PCM equivalent asbestos structures:	0
Number of PCM equivalent asbestos fibers:	0
Concentration of Asbestos (Chrysotile) f/cm3:	<0.00089
Concentration of Asbestos (Amphibole) f/cm3:	<0.00089
Concentration of PCME Asbestos (Chrysotile) f/cm3:	<0.00089
Concentration of Asbestos (Chrysotile), Str/L:	0
Concentration of Asbestos (Amphibole), Str/L:	0
Lower 95% Confidence Limit (Chrysotile), Str/L:	0
Upper 95% Confidence Limit (Chrysotile), Str/L:	3.3
Lower 95% Confidence Limit (Amphibole), Str/L:	0
Upper 95% Confidence Limit (Amphibole), Str/L:	3.3

Analyst: Taylor Smylie

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Project #: 103S864023141
Receipt Date: 13-Dec-2023
Analysis Date: 18-Dec-2023
Report Date: 18-Dec-2023

HDOH Kula Community Air

Sample Number **MFK-FB01-120923-AB**

Air Volume:	0
Effective Filter Area:	385.0 mm^2
Level of Analysis (Chrysotile):	CDQ
Level of Analysis (Amphibole):	ADQ
Magnification Used for Fiber Counting:	20,000
Aspect Ratio for Fiber Definition:	5:1
Mean Dimension of Grid Openings (GOs):	0.0132 mm^2
Initials of Analyst:	TS
Number of GO's Examined:	10
Analytical Sensitivity: f/Liter:	N/A
Analytical Sensitivity: f/cm3:	N/A
Number of primary asbestos structures:	0
Number of asbestos structures counted:	0
Number of asbestos structures > 5 um :	0
Number of asbestos fibers and bundles > 5 um:	0
Number of PCM equivalent asbestos structures:	0
Number of PCM equivalent asbestos fibers:	0
Concentration of Asbestos (Chrysotile) f/cm3:	N/A
Concentration of Asbestos (Amphibole) f/cm3:	N/A
Concentration of PCME Asbestos (Chrysotile) f/cm3:	N/A
Concentration of Asbestos (Chrysotile), Str/L:	N/A
Concentration of Asbestos (Amphibole), Str/L:	N/A
Lower 95% Confidence Limit (Chrysotile), Str/L:	N/A
Upper 95% Confidence Limit (Chrysotile), Str/L:	N/A
Lower 95% Confidence Limit (Amphibole), Str/L:	N/A
Upper 95% Confidence Limit (Amphibole), Str/L:	N/A

Analyst: Taylor Smylie

Scott M. Ward, Ph.D. **Lab Director**

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Project #: 103S864023141
Receipt Date: 13-Dec-2023
Analysis Date: 18-Dec-2023
Report Date: 18-Dec-2023

HDOH Kula Community Air

Sample Number **MFK-AM01-121023-AB**

Air Volume:	5841.036
Effective Filter Area:	385.0 mm^2
Level of Analysis (Chrysotile):	CDQ
Level of Analysis (Amphibole):	ADQ
Magnification Used for Fiber Counting:	20,000
Aspect Ratio for Fiber Definition:	5:1
Mean Dimension of Grid Openings (GOs):	0.0132 mm^2
Initials of Analyst:	TS
Number of GO's Examined:	10
Analytical Sensitivity: f/Liter:	0.49934
Analytical Sensitivity: f/cm3:	0.00050
Number of primary asbestos structures:	0
Number of asbestos structures counted:	0
Number of asbestos structures > 5 um :	0
Number of asbestos fibers and bundles > 5 um:	0
Number of PCM equivalent asbestos structures:	0
Number of PCM equivalent asbestos fibers:	0
Concentration of Asbestos (Chrysotile) f/cm3:	<0.00050
Concentration of Asbestos (Amphibole) f/cm3:	<0.00050
Concentration of PCME Asbestos (Chrysotile) f/cm3:	<0.00050
Concentration of Asbestos (Chrysotile), Str/L:	0
Concentration of Asbestos (Amphibole), Str/L:	0
Lower 95% Confidence Limit (Chrysotile), Str/L:	0
Upper 95% Confidence Limit (Chrysotile), Str/L:	1.8
Lower 95% Confidence Limit (Amphibole), Str/L:	0
Upper 95% Confidence Limit (Amphibole), Str/L:	1.8

Analyst: Taylor Smylie

Scott M. Ward, Ph.D. **Lab Director**

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EJ3 Order #: 3480279
Project #: 103S864023141
Receipt Date: 13-Dec-2023
Analysis Date: 18-Dec-2023
Report Date: 18-Dec-2023

HDOH Kula Community Air

Sample Number **MFK-AM03-121023-AB**

Air Volume:	5832.724
Effective Filter Area:	385.0 mm^2
Level of Analysis (Chrysotile):	CDQ
Level of Analysis (Amphibole):	ADQ
Magnification Used for Fiber Counting:	20,000
Aspect Ratio for Fiber Definition:	5:1
Mean Dimension of Grid Openings (GOs):	0.0132 mm^2
Initials of Analyst:	TS
Number of GO's Examined:	10
Analytical Sensitivity: f/Liter:	0.50005
Analytical Sensitivity: f/cm3:	0.00050
Number of primary asbestos structures:	0
Number of asbestos structures counted:	0
Number of asbestos structures > 5 um :	0
Number of asbestos fibers and bundles > 5 um:	0
Number of PCM equivalent asbestos structures:	0
Number of PCM equivalent asbestos fibers:	0
Concentration of Asbestos (Chrysotile) f/cm3:	<0.00050
Concentration of Asbestos (Amphibole) f/cm3:	<0.00050
Concentration of PCME Asbestos (Chrysotile) f/cm3:	<0.00050
Concentration of Asbestos (Chrysotile), Str/L:	0
Concentration of Asbestos (Amphibole), Str/L:	0
Lower 95% Confidence Limit (Chrysotile), Str/L:	0
Upper 95% Confidence Limit (Chrysotile), Str/L:	1.8
Lower 95% Confidence Limit (Amphibole), Str/L:	0
Upper 95% Confidence Limit (Amphibole), Str/L:	1.8

Analyst: Taylor Smylie

Scott M. Ward, Ph.D. **Lab Director**

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Receipt Date: 13-Dec-2023
Analysis Date: 18-Dec-2023
Report Date: 18-Dec-2023

HDOH Kula Community Air

Sample Number **MFK-FB01-121023-AB**

Air Volume:	0
Effective Filter Area:	385.0 mm^2
Level of Analysis (Chrysotile):	CDQ
Level of Analysis (Amphibole):	ADQ
Magnification Used for Fiber Counting:	20,000
Aspect Ratio for Fiber Definition:	5:1
Mean Dimension of Grid Openings (GOs):	0.0132 mm^2
Initials of Analyst:	TS
Number of GO’s Examined:	10
Analytical Sensitivity: f/Liter:	N/A
Analytical Sensitivity: f/cm3:	N/A
Number of primary asbestos structures:	0
Number of asbestos structures counted:	0
Number of asbestos structures > 5 um :	0
Number of asbestos fibers and bundles > 5 um:	0
Number of PCM equivalent asbestos structures:	0
Number of PCM equivalent asbestos fibers:	0
Concentration of Asbestos (Chrysotile) f/cm3:	N/A
Concentration of Asbestos (Amphibole) f/cm3:	N/A
Concentration of PCME Asbestos (Chrysotile) f/cm3:	N/A
Concentration of Asbestos (Chrysotile), Str/L:	N/A
Concentration of Asbestos (Amphibole), Str/L:	N/A
Lower 95% Confidence Limit (Chrysotile), Str/L:	N/A
Upper 95% Confidence Limit (Chrysotile), Str/L:	N/A
Lower 95% Confidence Limit (Amphibole), Str/L:	N/A
Upper 95% Confidence Limit (Amphibole), Str/L:	N/A

Analyst: Taylor Smylie

Scott M. Ward, Ph.D. **Lab Director**

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EJ3 Order #: 3484617
Project #: 103S864023141
Receipt Date: 18-Dec-2023
Analysis Date: 21-Dec-2023
Report Date: 21-Dec-2023

HDOH Kula Community Air

Sample Number **MFK-AM01-121123-AB**

Air Volume:	2727.594
Effective Filter Area:	385.0 mm^2
Level of Analysis (Chrysotile):	CDQ
Level of Analysis (Amphibole):	ADQ
Magnification Used for Fiber Counting:	20,000
Aspect Ratio for Fiber Definition:	5:1
Mean Dimension of Grid Openings (GOs):	0.0132 mm^2
Initials of Analyst:	TS
Number of GO's Examined:	10
Analytical Sensitivity: f/Liter:	1.06932
Analytical Sensitivity: f/cm3:	0.00107
Number of primary asbestos structures:	0
Number of asbestos structures counted:	0
Number of asbestos structures > 5 um :	0
Number of asbestos fibers and bundles > 5 um:	0
Number of PCM equivalent asbestos structures:	0
Number of PCM equivalent asbestos fibers:	0
Concentration of Asbestos (Chrysotile) f/cm3:	<0.00107
Concentration of Asbestos (Amphibole) f/cm3:	<0.00107
Concentration of PCME Asbestos (Chrysotile) f/cm3:	<0.00107
Concentration of Asbestos (Chrysotile), Str/L:	0
Concentration of Asbestos (Amphibole), Str/L:	0
Lower 95% Confidence Limit (Chrysotile), Str/L:	0
Upper 95% Confidence Limit (Chrysotile), Str/L:	3.9
Lower 95% Confidence Limit (Amphibole), Str/L:	0
Upper 95% Confidence Limit (Amphibole), Str/L:	3.9

Analyst: Taylor Smylie

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EJ3 Order #: 3484617
Project #: 103S864023141
Receipt Date: 18-Dec-2023
Analysis Date: 21-Dec-2023
Report Date: 21-Dec-2023

HDOH Kula Community Air

Sample Number **MFK-AM02-121123-AB**

Air Volume:	6013.504
Effective Filter Area:	385.0 mm^2
Level of Analysis (Chrysotile):	CDQ
Level of Analysis (Amphibole):	ADQ
Magnification Used for Fiber Counting:	20,000
Aspect Ratio for Fiber Definition:	5:1
Mean Dimension of Grid Openings (GOs):	0.0132 mm^2
Initials of Analyst:	TS
Number of GO's Examined:	10
Analytical Sensitivity: f/Liter:	0.48502
Analytical Sensitivity: f/cm3:	0.00049
Number of primary asbestos structures:	0
Number of asbestos structures counted:	0
Number of asbestos structures > 5 um :	0
Number of asbestos fibers and bundles > 5 um:	0
Number of PCM equivalent asbestos structures:	0
Number of PCM equivalent asbestos fibers:	0
Concentration of Asbestos (Chrysotile) f/cm3:	<0.00049
Concentration of Asbestos (Amphibole) f/cm3:	<0.00049
Concentration of PCME Asbestos (Chrysotile) f/cm3:	<0.00049
Concentration of Asbestos (Chrysotile), Str/L:	0
Concentration of Asbestos (Amphibole), Str/L:	0
Lower 95% Confidence Limit (Chrysotile), Str/L:	0
Upper 95% Confidence Limit (Chrysotile), Str/L:	1.8
Lower 95% Confidence Limit (Amphibole), Str/L:	0
Upper 95% Confidence Limit (Amphibole), Str/L:	1.8

Analyst: Taylor Smylie

Scott M. Ward, Ph.D. **Lab Director**

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Airborne Asbestos Fiber Analysis by Transmission Electron Microscopy (TEM) ISO 10312 - Ambient Air - Determination of Asbestos Fibers Direct-Transfer Transmission Electron Microscopy Method

Maura McAleese
Tetra Tech
1999 Harrison St, Ste. 500
Oakland, CA 94612

EJ3 Order #: 3484617
Project #: 103S864023141
Receipt Date: 18-Dec-2023
Analysis Date: 21-Dec-2023
Report Date: 21-Dec-2023

HDOH Kula Community Air

Sample Number **MFK-AM03-121123-AB**

Air Volume:	3395.72
Effective Filter Area:	385.0 mm^2
Level of Analysis (Chrysotile):	CDQ
Level of Analysis (Amphibole):	ADQ
Magnification Used for Fiber Counting:	20,000
Aspect Ratio for Fiber Definition:	5:1
Mean Dimension of Grid Openings (GOs):	0.0132 mm^2
Initials of Analyst:	TS
Number of GO's Examined:	10
Analytical Sensitivity: f/Liter:	0.85892
Analytical Sensitivity: f/cm3:	0.00086
Number of primary asbestos structures:	0
Number of asbestos structures counted:	0
Number of asbestos structures > 5 um :	0
Number of asbestos fibers and bundles > 5 um:	0
Number of PCM equivalent asbestos structures:	0
Number of PCM equivalent asbestos fibers:	0
Concentration of Asbestos (Chrysotile) f/cm3:	<0.00086
Concentration of Asbestos (Amphibole) f/cm3:	<0.00086
Concentration of PCME Asbestos (Chrysotile) f/cm3:	<0.00086
Concentration of Asbestos (Chrysotile), Str/L:	0
Concentration of Asbestos (Amphibole), Str/L:	0
Lower 95% Confidence Limit (Chrysotile), Str/L:	0
Upper 95% Confidence Limit (Chrysotile), Str/L:	3.2
Lower 95% Confidence Limit (Amphibole), Str/L:	0
Upper 95% Confidence Limit (Amphibole), Str/L:	3.2

Analyst: Taylor Smylie

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EJ3 Order #: 3484617
Project #: 103S864023141
Receipt Date: 18-Dec-2023
Analysis Date: 21-Dec-2023
Report Date: 21-Dec-2023

HDOH Kula Community Air

Sample Number **MFK-FB01-121123-AB**

Air Volume:	0
Effective Filter Area:	385.0 mm^2
Level of Analysis (Chrysotile):	CDQ
Level of Analysis (Amphibole):	ADQ
Magnification Used for Fiber Counting:	20,000
Aspect Ratio for Fiber Definition:	5:1
Mean Dimension of Grid Openings (GOs):	0.0132 mm^2
Initials of Analyst:	TS
Number of GO's Examined:	10
Analytical Sensitivity: f/Liter:	N/A
Analytical Sensitivity: f/cm3:	N/A
Number of primary asbestos structures:	0
Number of asbestos structures counted:	0
Number of asbestos structures > 5 um :	0
Number of asbestos fibers and bundles > 5 um:	0
Number of PCM equivalent asbestos structures:	0
Number of PCM equivalent asbestos fibers:	0
Concentration of Asbestos (Chrysotile) f/cm3:	N/A
Concentration of Asbestos (Amphibole) f/cm3:	N/A
Concentration of PCME Asbestos (Chrysotile) f/cm3:	N/A
Concentration of Asbestos (Chrysotile), Str/L:	N/A
Concentration of Asbestos (Amphibole), Str/L:	N/A
Lower 95% Confidence Limit (Chrysotile), Str/L:	N/A
Upper 95% Confidence Limit (Chrysotile), Str/L:	N/A
Lower 95% Confidence Limit (Amphibole), Str/L:	N/A
Upper 95% Confidence Limit (Amphibole), Str/L:	N/A

Analyst: Taylor Smylie

Scott M. Ward, Ph.D. **Lab Director**

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Receipt Date: 18-Dec-2023
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Report Date: 21-Dec-2023

HDOH Kula Community Air

Sample Number **MFK-AM01-121223-AB**

Air Volume:	2441.473
Effective Filter Area:	385.0 mm^2
Level of Analysis (Chrysotile):	CDQ
Level of Analysis (Amphibole):	ADQ
Magnification Used for Fiber Counting:	20,000
Aspect Ratio for Fiber Definition:	5:1
Mean Dimension of Grid Openings (GOs):	0.0132 mm^2
Initials of Analyst:	TS
Number of GO's Examined:	10
Analytical Sensitivity: f/Liter:	1.19463
Analytical Sensitivity: f/cm3:	0.00119
Number of primary asbestos structures:	0
Number of asbestos structures counted:	0
Number of asbestos structures > 5 um :	0
Number of asbestos fibers and bundles > 5 um:	0
Number of PCM equivalent asbestos structures:	0
Number of PCM equivalent asbestos fibers:	0
Concentration of Asbestos (Chrysotile) f/cm3:	<0.00119
Concentration of Asbestos (Amphibole) f/cm3:	<0.00119
Concentration of PCME Asbestos (Chrysotile) f/cm3:	<0.00119
Concentration of Asbestos (Chrysotile), Str/L:	0
Concentration of Asbestos (Amphibole), Str/L:	0
Lower 95% Confidence Limit (Chrysotile), Str/L:	0
Upper 95% Confidence Limit (Chrysotile), Str/L:	4.4
Lower 95% Confidence Limit (Amphibole), Str/L:	0
Upper 95% Confidence Limit (Amphibole), Str/L:	4.4

Analyst: Taylor Smylie

Scott M. Ward, Ph.D. **Lab Director**

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Airborne Asbestos Fiber Analysis
by Transmission Electron Microscopy (TEM)
ISO 10312 - Ambient Air - Determination of Asbestos Fibers
Direct-Transfer Transmission Electron Microscopy Method

Maura McAleese	**EJ3 Order #:** 3484617
Tetra Tech	**Project #:** 103S864023141
1999 Harrison St, Ste. 500	**Receipt Date:** 18-Dec-2023
Oakland, CA 94612	**Analysis Date:** 21-Dec-2023
	Report Date: 21-Dec-2023

HDOH Kula Community Air

Sample Number **MFK-AM02-121223-AB**

Air Volume:	2607.576
Effective Filter Area:	385.0 mm^2
Level of Analysis (Chrysotile):	CDQ
Level of Analysis (Amphibole):	ADQ
Magnification Used for Fiber Counting:	20,000
Aspect Ratio for Fiber Definition:	5:1
Mean Dimension of Grid Openings (GOs):	0.0132 mm^2
Initials of Analyst:	TS
Number of GO’s Examined:	10
Analytical Sensitivity: f/Liter:	1.11854
Analytical Sensitivity: f/cm3:	0.00112
Number of primary asbestos structures:	0
Number of asbestos structures counted:	0
Number of asbestos structures > 5 um :	0
Number of asbestos fibers and bundles > 5 um:	0
Number of PCM equivalent asbestos structures:	0
Number of PCM equivalent asbestos fibers:	0
Concentration of Asbestos (Chrysotile) f/cm3:	<0.00112
Concentration of Asbestos (Amphibole) f/cm3:	<0.00112
Concentration of PCME Asbestos (Chrysotile) f/cm3:	<0.00112
Concentration of Asbestos (Chrysotile), Str/L:	0
Concentration of Asbestos (Amphibole), Str/L:	0
Lower 95% Confidence Limit (Chrysotile), Str/L:	0
Upper 95% Confidence Limit (Chrysotile), Str/L:	4.1
Lower 95% Confidence Limit (Amphibole), Str/L:	0
Upper 95% Confidence Limit (Amphibole), Str/L:	4.1

Analyst: Taylor Smylie

Scott M. Ward, Ph.D.   **Lab Director**

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Airborne Asbestos Fiber Analysis by Transmission Electron Microscopy (TEM) ISO 10312 - Ambient Air - Determination of Asbestos Fibers Direct-Transfer Transmission Electron Microscopy Method

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EJ3 Order #: 3484617
Project #: 103S864023141
Receipt Date: 18-Dec-2023
Analysis Date: 21-Dec-2023
Report Date: 21-Dec-2023

HDOH Kula Community Air

Sample Number **MFK-FB01-121223-AB**

Air Volume:	0
Effective Filter Area:	385.0 mm^2
Level of Analysis (Chrysotile):	CDQ
Level of Analysis (Amphibole):	ADQ
Magnification Used for Fiber Counting:	20,000
Aspect Ratio for Fiber Definition:	5:1
Mean Dimension of Grid Openings (GOs):	0.0132 mm^2
Initials of Analyst:	TS
Number of GO's Examined:	10
Analytical Sensitivity: f/Liter:	N/A
Analytical Sensitivity: f/cm3:	N/A
Number of primary asbestos structures:	0
Number of asbestos structures counted:	0
Number of asbestos structures > 5 um :	0
Number of asbestos fibers and bundles > 5 um:	0
Number of PCM equivalent asbestos structures:	0
Number of PCM equivalent asbestos fibers:	0
Concentration of Asbestos (Chrysotile) f/cm3:	N/A
Concentration of Asbestos (Amphibole) f/cm3:	N/A
Concentration of PCME Asbestos (Chrysotile) f/cm3:	N/A
Concentration of Asbestos (Chrysotile), Str/L:	N/A
Concentration of Asbestos (Amphibole), Str/L:	N/A
Lower 95% Confidence Limit (Chrysotile), Str/L:	N/A
Upper 95% Confidence Limit (Chrysotile), Str/L:	N/A
Lower 95% Confidence Limit (Amphibole), Str/L:	N/A
Upper 95% Confidence Limit (Amphibole), Str/L:	N/A

Analyst: Taylor Smylie

Scott M. Ward, Ph.D. **Lab Director**

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Report Date: 21-Dec-2023

HDOH Kula Community Air

Sample Number **MFK-AM01-121323-AB**

Air Volume:	4279.203
Effective Filter Area:	385.0 mm^2
Level of Analysis (Chrysotile):	CDQ
Level of Analysis (Amphibole):	ADQ
Magnification Used for Fiber Counting:	20,000
Aspect Ratio for Fiber Definition:	5:1
Mean Dimension of Grid Openings (GOs):	0.0132 mm^2
Initials of Analyst:	TS
Number of GO's Examined:	10
Analytical Sensitivity: f/Liter:	0.68159
Analytical Sensitivity: f/cm3:	0.00068
Number of primary asbestos structures:	0
Number of asbestos structures counted:	0
Number of asbestos structures > 5 um :	0
Number of asbestos fibers and bundles > 5 um:	0
Number of PCM equivalent asbestos structures:	0
Number of PCM equivalent asbestos fibers:	0
Concentration of Asbestos (Chrysotile) f/cm3:	<0.00068
Concentration of Asbestos (Amphibole) f/cm3:	<0.00068
Concentration of PCME Asbestos (Chrysotile) f/cm3:	<0.00068
Concentration of Asbestos (Chrysotile), Str/L:	0
Concentration of Asbestos (Amphibole), Str/L:	0
Lower 95% Confidence Limit (Chrysotile), Str/L:	0
Upper 95% Confidence Limit (Chrysotile), Str/L:	2.5
Lower 95% Confidence Limit (Amphibole), Str/L:	0
Upper 95% Confidence Limit (Amphibole), Str/L:	2.5

Analyst: Taylor Smylie

Scott M. Ward, Ph.D. **Lab Director**

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Report Date: 21-Dec-2023

HDOH Kula Community Air

Sample Number **MFK-AM02-121323-AB**

Air Volume:	5596.052
Effective Filter Area:	385.0 mm^2
Level of Analysis (Chrysotile):	CDQ
Level of Analysis (Amphibole):	ADQ
Magnification Used for Fiber Counting:	20,000
Aspect Ratio for Fiber Definition:	5:1
Mean Dimension of Grid Openings (GOs):	0.0132 mm^2
Initials of Analyst:	TS
Number of GO's Examined:	10
Analytical Sensitivity: f/Liter:	0.52120
Analytical Sensitivity: f/cm3:	0.00052
Number of primary asbestos structures:	0
Number of asbestos structures counted:	0
Number of asbestos structures > 5 um :	0
Number of asbestos fibers and bundles > 5 um:	0
Number of PCM equivalent asbestos structures:	0
Number of PCM equivalent asbestos fibers:	0
Concentration of Asbestos (Chrysotile) f/cm3:	<0.00052
Concentration of Asbestos (Amphibole) f/cm3:	<0.00052
Concentration of PCME Asbestos (Chrysotile) f/cm3:	<0.00052
Concentration of Asbestos (Chrysotile), Str/L:	0
Concentration of Asbestos (Amphibole), Str/L:	0
Lower 95% Confidence Limit (Chrysotile), Str/L:	0
Upper 95% Confidence Limit (Chrysotile), Str/L:	1.9
Lower 95% Confidence Limit (Amphibole), Str/L:	0
Upper 95% Confidence Limit (Amphibole), Str/L:	1.9

Analyst: Taylor Smylie

Scott M. Ward, Ph.D. **Lab Director**

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Report Date: 21-Dec-2023

HDOH Kula Community Air

Sample Number **MFK-AM03-121323-AB**

Air Volume:	6722.751
Effective Filter Area:	385.0 mm^2
Level of Analysis (Chrysotile):	CDQ
Level of Analysis (Amphibole):	ADQ
Magnification Used for Fiber Counting:	20,000
Aspect Ratio for Fiber Definition:	5:1
Mean Dimension of Grid Openings (GOs):	0.0132 mm^2
Initials of Analyst:	TS
Number of GO's Examined:	10
Analytical Sensitivity: f/Liter:	0.43385
Analytical Sensitivity: f/cm3:	0.00043
Number of primary asbestos structures:	0
Number of asbestos structures counted:	0
Number of asbestos structures > 5 um :	0
Number of asbestos fibers and bundles > 5 um:	0
Number of PCM equivalent asbestos structures:	0
Number of PCM equivalent asbestos fibers:	0
Concentration of Asbestos (Chrysotile) f/cm3:	<0.00043
Concentration of Asbestos (Amphibole) f/cm3:	<0.00043
Concentration of PCME Asbestos (Chrysotile) f/cm3:	<0.00043
Concentration of Asbestos (Chrysotile), Str/L:	0
Concentration of Asbestos (Amphibole), Str/L:	0
Lower 95% Confidence Limit (Chrysotile), Str/L:	0
Upper 95% Confidence Limit (Chrysotile), Str/L:	1.6
Lower 95% Confidence Limit (Amphibole), Str/L:	0
Upper 95% Confidence Limit (Amphibole), Str/L:	1.6

Analyst: Taylor Smylie

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HDOH Kula Community Air

Sample Number **MFK-FB01-121323-AB**

Air Volume:	0
Effective Filter Area:	385.0 mm^2
Level of Analysis (Chrysotile):	CDQ
Level of Analysis (Amphibole):	ADQ
Magnification Used for Fiber Counting:	20,000
Aspect Ratio for Fiber Definition:	5:1
Mean Dimension of Grid Openings (GOs):	0.0132 mm^2
Initials of Analyst:	TS
Number of GO's Examined:	10
Analytical Sensitivity: f/Liter:	N/A
Analytical Sensitivity: f/cm3:	N/A
Number of primary asbestos structures:	0
Number of asbestos structures counted:	0
Number of asbestos structures > 5 um :	0
Number of asbestos fibers and bundles > 5 um:	0
Number of PCM equivalent asbestos structures:	0
Number of PCM equivalent asbestos fibers:	0
Concentration of Asbestos (Chrysotile) f/cm3:	N/A
Concentration of Asbestos (Amphibole) f/cm3:	N/A
Concentration of PCME Asbestos (Chrysotile) f/cm3:	N/A
Concentration of Asbestos (Chrysotile), Str/L:	N/A
Concentration of Asbestos (Amphibole), Str/L:	N/A
Lower 95% Confidence Limit (Chrysotile), Str/L:	N/A
Upper 95% Confidence Limit (Chrysotile), Str/L:	N/A
Lower 95% Confidence Limit (Amphibole), Str/L:	N/A
Upper 95% Confidence Limit (Amphibole), Str/L:	N/A

Analyst: Taylor Smylie

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Receipt Date: 18-Dec-2023
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Report Date: 21-Dec-2023

HDOH Kula Community Air

Sample Number **MFK-LB01-121323-AB**

Air Volume:	0
Effective Filter Area:	385.0 mm^2
Level of Analysis (Chrysotile):	CDQ
Level of Analysis (Amphibole):	ADQ
Magnification Used for Fiber Counting:	20,000
Aspect Ratio for Fiber Definition:	5:1
Mean Dimension of Grid Openings (GOs):	0.0132 mm^2
Initials of Analyst:	TS
Number of GO's Examined:	10
Analytical Sensitivity: f/Liter:	N/A
Analytical Sensitivity: f/cm3:	N/A
Number of primary asbestos structures:	0
Number of asbestos structures counted:	0
Number of asbestos structures > 5 um :	0
Number of asbestos fibers and bundles > 5 um:	0
Number of PCM equivalent asbestos structures:	0
Number of PCM equivalent asbestos fibers:	0
Concentration of Asbestos (Chrysotile) f/cm3:	N/A
Concentration of Asbestos (Amphibole) f/cm3:	N/A
Concentration of PCME Asbestos (Chrysotile) f/cm3:	N/A
Concentration of Asbestos (Chrysotile), Str/L:	N/A
Concentration of Asbestos (Amphibole), Str/L:	N/A
Lower 95% Confidence Limit (Chrysotile), Str/L:	N/A
Upper 95% Confidence Limit (Chrysotile), Str/L:	N/A
Lower 95% Confidence Limit (Amphibole), Str/L:	N/A
Upper 95% Confidence Limit (Amphibole), Str/L:	N/A

Analyst: Taylor Smylie

Scott M. Ward, Ph.D. **Lab Director**

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Airborne Asbestos Fiber Analysis by Transmission Electron Microscopy (TEM) ISO 10312 - Ambient Air - Determination of Asbestos Fibers Direct-Transfer Transmission Electron Microscopy Method

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Oakland, CA 94612

EJ3 Order #: 3484617
Project #: 103S864023141
Receipt Date: 18-Dec-2023
Analysis Date: 21-Dec-2023
Report Date: 21-Dec-2023

HDOH Kula Community Air

Sample Number **MFK-AM01-112223-AB**

Air Volume:	2146.56
Effective Filter Area:	385.0 mm^2
Level of Analysis (Chrysotile):	CDQ
Level of Analysis (Amphibole):	ADQ
Magnification Used for Fiber Counting:	20,000
Aspect Ratio for Fiber Definition:	5:1
Mean Dimension of Grid Openings (GOs):	0.0132 mm^2
Initials of Analyst:	TS
Number of GO's Examined:	10
Analytical Sensitivity: f/Liter:	1.35876
Analytical Sensitivity: f/cm3:	0.00136
Number of primary asbestos structures:	0
Number of asbestos structures counted:	0
Number of asbestos structures > 5 um :	0
Number of asbestos fibers and bundles > 5 um:	0
Number of PCM equivalent asbestos structures:	0
Number of PCM equivalent asbestos fibers:	0
Concentration of Asbestos (Chrysotile) f/cm3:	<0.00136
Concentration of Asbestos (Amphibole) f/cm3:	<0.00136
Concentration of PCME Asbestos (Chrysotile) f/cm3:	<0.00136
Concentration of Asbestos (Chrysotile), Str/L:	0
Concentration of Asbestos (Amphibole), Str/L:	0
Lower 95% Confidence Limit (Chrysotile), Str/L:	0
Upper 95% Confidence Limit (Chrysotile), Str/L:	5
Lower 95% Confidence Limit (Amphibole), Str/L:	0
Upper 95% Confidence Limit (Amphibole), Str/L:	5

Analyst: Taylor Smylie

Scott M. Ward, Ph.D. **Lab Director**

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Airborne Asbestos Fiber Analysis by Transmission Electron Microscopy (TEM) ISO 10312 - Ambient Air - Determination of Asbestos Fibers Direct-Transfer Transmission Electron Microscopy Method

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EJ3 Order #: 3488212
Project #: 103S864023141
Receipt Date: 20-Dec-2023
Analysis Date: 27-Dec-2023
Report Date: 27-Dec-2023

HDOH Kula Community Air

Sample Number **MFK-AM01-121423-AB**

Air Volume:	7225.747
Effective Filter Area:	385.0 mm^2
Level of Analysis (Chrysotile):	CDQ
Level of Analysis (Amphibole):	ADQ
Magnification Used for Fiber Counting:	20,000
Aspect Ratio for Fiber Definition:	5:1
Mean Dimension of Grid Openings (GOs):	0.0132 mm^2
Initials of Analyst:	TS
Number of GO's Examined:	10
Analytical Sensitivity: f/Liter:	0.40365
Analytical Sensitivity: f/cm3:	0.00040
Number of primary asbestos structures:	0
Number of asbestos structures counted:	0
Number of asbestos structures > 5 um :	0
Number of asbestos fibers and bundles > 5 um:	0
Number of PCM equivalent asbestos structures:	0
Number of PCM equivalent asbestos fibers:	0
Concentration of Asbestos (Chrysotile) f/cm3:	<0.00040
Concentration of Asbestos (Amphibole) f/cm3:	<0.00040
Concentration of PCME Asbestos (Chrysotile) f/cm3:	<0.00040
Concentration of Asbestos (Chrysotile), Str/L:	0
Concentration of Asbestos (Amphibole), Str/L:	0
Lower 95% Confidence Limit (Chrysotile), Str/L:	0
Upper 95% Confidence Limit (Chrysotile), Str/L:	1.5
Lower 95% Confidence Limit (Amphibole), Str/L:	0
Upper 95% Confidence Limit (Amphibole), Str/L:	1.5

Analyst: Taylor Smylie

Scott M. Ward, Ph.D. **Lab Director**

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Direct-Transfer Transmission Electron Microscopy Method

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EJ3 Order #: 3488212
Project #: 103S864023141
Receipt Date: 20-Dec-2023
Analysis Date: 27-Dec-2023
Report Date: 27-Dec-2023

HDOH Kula Community Air

Sample Number **MFK-AM03-121423-AB**

Air Volume:	4049.983
Effective Filter Area:	385.0 mm^2
Level of Analysis (Chrysotile):	CDQ
Level of Analysis (Amphibole):	ADQ
Magnification Used for Fiber Counting:	20,000
Aspect Ratio for Fiber Definition:	5:1
Mean Dimension of Grid Openings (GOs):	0.0132 mm^2
Initials of Analyst:	TS
Number of GO's Examined:	10
Analytical Sensitivity: f/Liter:	0.72017
Analytical Sensitivity: f/cm3:	0.00072
Number of primary asbestos structures:	0
Number of asbestos structures counted:	0
Number of asbestos structures > 5 um :	0
Number of asbestos fibers and bundles > 5 um:	0
Number of PCM equivalent asbestos structures:	0
Number of PCM equivalent asbestos fibers:	0
Concentration of Asbestos (Chrysotile) f/cm3:	<0.00072
Concentration of Asbestos (Amphibole) f/cm3:	<0.00072
Concentration of PCME Asbestos (Chrysotile) f/cm3:	<0.00072
Concentration of Asbestos (Chrysotile), Str/L:	0
Concentration of Asbestos (Amphibole), Str/L:	0
Lower 95% Confidence Limit (Chrysotile), Str/L:	0
Upper 95% Confidence Limit (Chrysotile), Str/L:	2.7
Lower 95% Confidence Limit (Amphibole), Str/L:	0
Upper 95% Confidence Limit (Amphibole), Str/L:	2.7

Analyst: Taylor Smylie

Scott M. Ward, Ph.D. **Lab Director**

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EJ3 Order #: 3488212
Project #: 103S864023141
Receipt Date: 20-Dec-2023
Analysis Date: 27-Dec-2023
Report Date: 27-Dec-2023

HDOH Kula Community Air

Sample Number **MFK-FB01-121423-AB**

Air Volume:	0
Effective Filter Area:	385.0 mm^2
Level of Analysis (Chrysotile):	CDQ
Level of Analysis (Amphibole):	ADQ
Magnification Used for Fiber Counting:	20,000
Aspect Ratio for Fiber Definition:	5:1
Mean Dimension of Grid Openings (GOs):	0.0132 mm^2
Initials of Analyst:	TS
Number of GO's Examined:	10
Analytical Sensitivity: f/Liter:	N/A
Analytical Sensitivity: f/cm3:	N/A
Number of primary asbestos structures:	0
Number of asbestos structures counted:	0
Number of asbestos structures > 5 um :	0
Number of asbestos fibers and bundles > 5 um:	0
Number of PCM equivalent asbestos structures:	0
Number of PCM equivalent asbestos fibers:	0
Concentration of Asbestos (Chrysotile) f/cm3:	N/A
Concentration of Asbestos (Amphibole) f/cm3:	N/A
Concentration of PCME Asbestos (Chrysotile) f/cm3:	N/A
Concentration of Asbestos (Chrysotile), Str/L:	N/A
Concentration of Asbestos (Amphibole), Str/L:	N/A
Lower 95% Confidence Limit (Chrysotile), Str/L:	N/A
Upper 95% Confidence Limit (Chrysotile), Str/L:	N/A
Lower 95% Confidence Limit (Amphibole), Str/L:	N/A
Upper 95% Confidence Limit (Amphibole), Str/L:	N/A

Analyst: Taylor Smylie

Scott M. Ward, Ph.D. **Lab Director**

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EJ3 Order #: 3488212
Project #: 103S864023141
Receipt Date: 20-Dec-2023
Analysis Date: 27-Dec-2023
Report Date: 27-Dec-2023

HDOH Kula Community Air

Sample Number **MFK-AM01-121523-AB**

Air Volume:	7316.594
Effective Filter Area:	385.0 mm^2
Level of Analysis (Chrysotile):	CDQ
Level of Analysis (Amphibole):	ADQ
Magnification Used for Fiber Counting:	20,000
Aspect Ratio for Fiber Definition:	5:1
Mean Dimension of Grid Openings (GOs):	0.0132 mm^2
Initials of Analyst:	TS
Number of GO’s Examined:	10
Analytical Sensitivity: f/Liter:	0.39864
Analytical Sensitivity: f/cm3:	0.00040
Number of primary asbestos structures:	0
Number of asbestos structures counted:	0
Number of asbestos structures > 5 um :	0
Number of asbestos fibers and bundles > 5 um:	0
Number of PCM equivalent asbestos structures:	0
Number of PCM equivalent asbestos fibers:	0
Concentration of Asbestos (Chrysotile) f/cm3:	<0.00040
Concentration of Asbestos (Amphibole) f/cm3:	<0.00040
Concentration of PCME Asbestos (Chrysotile) f/cm3:	<0.00040
Concentration of Asbestos (Chrysotile), Str/L:	0
Concentration of Asbestos (Amphibole), Str/L:	0
Lower 95% Confidence Limit (Chrysotile), Str/L:	0
Upper 95% Confidence Limit (Chrysotile), Str/L:	1.5
Lower 95% Confidence Limit (Amphibole), Str/L:	0
Upper 95% Confidence Limit (Amphibole), Str/L:	1.5

Analyst: Taylor Smylie

Scott M. Ward, Ph.D. **Lab Director**

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EJ3 Order #: 3488212
Project #: 103S864023141
Receipt Date: 20-Dec-2023
Analysis Date: 27-Dec-2023
Report Date: 27-Dec-2023

HDOH Kula Community Air

Sample Number **MFK-AM02-121523-AB**

Air Volume:	7445.514
Effective Filter Area:	385.0 mm^2
Level of Analysis (Chrysotile):	CDQ
Level of Analysis (Amphibole):	ADQ
Magnification Used for Fiber Counting:	20,000
Aspect Ratio for Fiber Definition:	5:1
Mean Dimension of Grid Openings (GOs):	0.0132 mm^2
Initials of Analyst:	ts
Number of GO's Examined:	10
Analytical Sensitivity: f/Liter:	0.39173
Analytical Sensitivity: f/cm3:	0.00039
Number of primary asbestos structures:	0
Number of asbestos structures counted:	0
Number of asbestos structures > 5 um :	0
Number of asbestos fibers and bundles > 5 um:	0
Number of PCM equivalent asbestos structures:	0
Number of PCM equivalent asbestos fibers:	0
Concentration of Asbestos (Chrysotile) f/cm3:	<0.00039
Concentration of Asbestos (Amphibole) f/cm3:	<0.00039
Concentration of PCME Asbestos (Chrysotile) f/cm3:	<0.00039
Concentration of Asbestos (Chrysotile), Str/L:	0
Concentration of Asbestos (Amphibole), Str/L:	0
Lower 95% Confidence Limit (Chrysotile), Str/L:	0
Upper 95% Confidence Limit (Chrysotile), Str/L:	1.4
Lower 95% Confidence Limit (Amphibole), Str/L:	0
Upper 95% Confidence Limit (Amphibole), Str/L:	1.4

Analyst: Taylor Smylie

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EJ3 Order #: 3488212
Project #: 103S864023141
Receipt Date: 20-Dec-2023
Analysis Date: 27-Dec-2023
Report Date: 27-Dec-2023

HDOH Kula Community Air

Sample Number **MFK-AM03-121523-AB**

Air Volume:	5853.24
Effective Filter Area:	385.0 mm^2
Level of Analysis (Chrysotile):	CDQ
Level of Analysis (Amphibole):	ADQ
Magnification Used for Fiber Counting:	20,000
Aspect Ratio for Fiber Definition:	5:1
Mean Dimension of Grid Openings (GOs):	0.0132 mm^2
Initials of Analyst:	ts
Number of GO's Examined:	10
Analytical Sensitivity: f/Liter:	0.49830
Analytical Sensitivity: f/cm3:	0.00050
Number of primary asbestos structures:	0
Number of asbestos structures counted:	0
Number of asbestos structures > 5 um :	0
Number of asbestos fibers and bundles > 5 um:	0
Number of PCM equivalent asbestos structures:	0
Number of PCM equivalent asbestos fibers:	0
Concentration of Asbestos (Chrysotile) f/cm3:	<0.00050
Concentration of Asbestos (Amphibole) f/cm3:	<0.00050
Concentration of PCME Asbestos (Chrysotile) f/cm3:	<0.00050
Concentration of Asbestos (Chrysotile), Str/L:	0
Concentration of Asbestos (Amphibole), Str/L:	0
Lower 95% Confidence Limit (Chrysotile), Str/L:	0
Upper 95% Confidence Limit (Chrysotile), Str/L:	1.8
Lower 95% Confidence Limit (Amphibole), Str/L:	0
Upper 95% Confidence Limit (Amphibole), Str/L:	1.8

Analyst: Taylor Smylie

Scott M. Ward, Ph.D. **Lab Director**

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Direct-Transfer Transmission Electron Microscopy Method

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EJ3 Order #: 3488212
Project #: 103S864023141
Receipt Date: 20-Dec-2023
Analysis Date: 27-Dec-2023
Report Date: 27-Dec-2023

HDOH Kula Community Air

Sample Number **MFK-FB01-121523-AB**

Air Volume:	0
Effective Filter Area:	385.0 mm^2
Level of Analysis (Chrysotile):	CDQ
Level of Analysis (Amphibole):	ADQ
Magnification Used for Fiber Counting:	20,000
Aspect Ratio for Fiber Definition:	5:1
Mean Dimension of Grid Openings (GOs):	0.0132 mm^2
Initials of Analyst:	
Number of GO's Examined:	10
Analytical Sensitivity: f/Liter:	N/A
Analytical Sensitivity: f/cm3:	N/A
Number of primary asbestos structures:	0
Number of asbestos structures counted:	0
Number of asbestos structures > 5 um :	0
Number of asbestos fibers and bundles > 5 um:	0
Number of PCM equivalent asbestos structures:	0
Number of PCM equivalent asbestos fibers:	0
Concentration of Asbestos (Chrysotile) f/cm3:	N/A
Concentration of Asbestos (Amphibole) f/cm3:	N/A
Concentration of PCME Asbestos (Chrysotile) f/cm3:	N/A
Concentration of Asbestos (Chrysotile), Str/L:	N/A
Concentration of Asbestos (Amphibole), Str/L:	N/A
Lower 95% Confidence Limit (Chrysotile), Str/L:	N/A
Upper 95% Confidence Limit (Chrysotile), Str/L:	N/A
Lower 95% Confidence Limit (Amphibole), Str/L:	N/A
Upper 95% Confidence Limit (Amphibole), Str/L:	N/A

Analyst: Taylor Smylie**:**

Scott M. Ward, Ph.D. **Lab Director**

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EJ3 Order #: 3488212
Project #: 103S864023141
Receipt Date: 20-Dec-2023
Analysis Date: 27-Dec-2023
Report Date: 27-Dec-2023

HDOH Kula Community Air

Sample Number **MFK-AM01-121623-AB**

Air Volume:	8105.184
Effective Filter Area:	385.0 mm^2
Level of Analysis (Chrysotile):	CDQ
Level of Analysis (Amphibole):	ADQ
Magnification Used for Fiber Counting:	20,000
Aspect Ratio for Fiber Definition:	5:1
Mean Dimension of Grid Openings (GOs):	0.0132 mm^2
Initials of Analyst:	TS
Number of GO's Examined:	10
Analytical Sensitivity: f/Liter:	0.35985
Analytical Sensitivity: f/cm3:	0.00036
Number of primary asbestos structures:	0
Number of asbestos structures counted:	0
Number of asbestos structures > 5 um :	0
Number of asbestos fibers and bundles > 5 um:	0
Number of PCM equivalent asbestos structures:	0
Number of PCM equivalent asbestos fibers:	0
Concentration of Asbestos (Chrysotile) f/cm3:	<0.00036
Concentration of Asbestos (Amphibole) f/cm3:	<0.00036
Concentration of PCME Asbestos (Chrysotile) f/cm3:	<0.00036
Concentration of Asbestos (Chrysotile), Str/L:	0
Concentration of Asbestos (Amphibole), Str/L:	0
Lower 95% Confidence Limit (Chrysotile), Str/L:	0
Upper 95% Confidence Limit (Chrysotile), Str/L:	1.3
Lower 95% Confidence Limit (Amphibole), Str/L:	0
Upper 95% Confidence Limit (Amphibole), Str/L:	1.3

Analyst: Taylor Smylie

Scott M. Ward, Ph.D. **Lab Director**

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EJ3 Order #: 3488212
Project #: 103S864023141
Receipt Date: 20-Dec-2023
Analysis Date: 27-Dec-2023
Report Date: 27-Dec-2023

HDOH Kula Community Air

Sample Number **MFK-AM02-121623-AB**

Air Volume:	2783.804
Effective Filter Area:	385.0 mm^2
Level of Analysis (Chrysotile):	CDQ
Level of Analysis (Amphibole):	ADQ
Magnification Used for Fiber Counting:	20,000
Aspect Ratio for Fiber Definition:	5:1
Mean Dimension of Grid Openings (GOs):	0.0132 mm^2
Initials of Analyst:	ts
Number of GO's Examined:	11
Analytical Sensitivity: f/Liter:	0.95248
Analytical Sensitivity: f/cm3:	0.00095
Number of primary asbestos structures:	0
Number of asbestos structures counted:	0
Number of asbestos structures > 5 um :	0
Number of asbestos fibers and bundles > 5 um:	0
Number of PCM equivalent asbestos structures:	0
Number of PCM equivalent asbestos fibers:	0
Concentration of Asbestos (Chrysotile) f/cm3:	<0.00095
Concentration of Asbestos (Amphibole) f/cm3:	<0.00095
Concentration of PCME Asbestos (Chrysotile) f/cm3:	<0.00095
Concentration of Asbestos (Chrysotile), Str/L:	0
Concentration of Asbestos (Amphibole), Str/L:	0
Lower 95% Confidence Limit (Chrysotile), Str/L:	0
Upper 95% Confidence Limit (Chrysotile), Str/L:	3.5
Lower 95% Confidence Limit (Amphibole), Str/L:	0
Upper 95% Confidence Limit (Amphibole), Str/L:	3.5

Analyst: Taylor Smylie

Scott M. Ward, Ph.D. **Lab Director**

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Airborne Asbestos Fiber Analysis by Transmission Electron Microscopy (TEM) ISO 10312 - Ambient Air - Determination of Asbestos Fibers Direct-Transfer Transmission Electron Microscopy Method

Maura McAleese
Tetra Tech
1999 Harrison St, Ste. 500
Oakland, CA 94612

EJ3 Order #: 3488212
Project #: 103S864023141
Receipt Date: 20-Dec-2023
Analysis Date: 27-Dec-2023
Report Date: 27-Dec-2023

HDOH Kula Community Air

Sample Number **MFK-AM03-121623-AB**

Air Volume:	4136.605
Effective Filter Area:	385.0 mm^2
Level of Analysis (Chrysotile):	CDQ
Level of Analysis (Amphibole):	ADQ
Magnification Used for Fiber Counting:	20,000
Aspect Ratio for Fiber Definition:	5:1
Mean Dimension of Grid Openings (GOs):	0.0132 mm^2
Initials of Analyst:	ts
Number of GO’s Examined:	10
Analytical Sensitivity: f/Liter:	0.70509
Analytical Sensitivity: f/cm3:	0.00071
Number of primary asbestos structures:	0
Number of asbestos structures counted:	0
Number of asbestos structures > 5 um :	0
Number of asbestos fibers and bundles > 5 um:	0
Number of PCM equivalent asbestos structures:	0
Number of PCM equivalent asbestos fibers:	0
Concentration of Asbestos (Chrysotile) f/cm3:	<0.00071
Concentration of Asbestos (Amphibole) f/cm3:	<0.00071
Concentration of PCME Asbestos (Chrysotile) f/cm3:	<0.00071
Concentration of Asbestos (Chrysotile), Str/L:	0
Concentration of Asbestos (Amphibole), Str/L:	0
Lower 95% Confidence Limit (Chrysotile), Str/L:	0
Upper 95% Confidence Limit (Chrysotile), Str/L:	2.6
Lower 95% Confidence Limit (Amphibole), Str/L:	0
Upper 95% Confidence Limit (Amphibole), Str/L:	2.6

Analyst: Taylor Smylie

Scott M. Ward, Ph.D. **Lab Director**

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EJ3 Order #: 3488212
Project #: 103S864023141
Receipt Date: 20-Dec-2023
Analysis Date: 27-Dec-2023
Report Date: 27-Dec-2023

HDOH Kula Community Air

Sample Number **MFK-FB01-121623-AB**

Air Volume:	0
Effective Filter Area:	385.0 mm^2
Level of Analysis (Chrysotile):	CDQ
Level of Analysis (Amphibole):	ADQ
Magnification Used for Fiber Counting:	20,000
Aspect Ratio for Fiber Definition:	5:1
Mean Dimension of Grid Openings (GOs):	0.0132 mm^2
Initials of Analyst:	ts
Number of GO's Examined:	10
Analytical Sensitivity: f/Liter:	N/A
Analytical Sensitivity: f/cm3:	N/A
Number of primary asbestos structures:	0
Number of asbestos structures counted:	0
Number of asbestos structures > 5 um :	0
Number of asbestos fibers and bundles > 5 um:	0
Number of PCM equivalent asbestos structures:	0
Number of PCM equivalent asbestos fibers:	0
Concentration of Asbestos (Chrysotile) f/cm3:	N/A
Concentration of Asbestos (Amphibole) f/cm3:	N/A
Concentration of PCME Asbestos (Chrysotile) f/cm3:	N/A
Concentration of Asbestos (Chrysotile), Str/L:	N/A
Concentration of Asbestos (Amphibole), Str/L:	N/A
Lower 95% Confidence Limit (Chrysotile), Str/L:	N/A
Upper 95% Confidence Limit (Chrysotile), Str/L:	N/A
Lower 95% Confidence Limit (Amphibole), Str/L:	N/A
Upper 95% Confidence Limit (Amphibole), Str/L:	N/A

Analyst: Taylor Smylie

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Receipt Date: 20-Dec-2023
Analysis Date: 27-Dec-2023
Report Date: 27-Dec-2023

HDOH Kula Community Air

Sample Number **MFK-AM01-121723-AB**

Air Volume:	7339.695
Effective Filter Area:	385.0 mm^2
Level of Analysis (Chrysotile):	CDQ
Level of Analysis (Amphibole):	ADQ
Magnification Used for Fiber Counting:	20,000
Aspect Ratio for Fiber Definition:	5:1
Mean Dimension of Grid Openings (GOs):	0.0132 mm^2
Initials of Analyst:	TS
Number of GO's Examined:	10
Analytical Sensitivity: f/Liter:	0.39738
Analytical Sensitivity: f/cm3:	0.00040
Number of primary asbestos structures:	0
Number of asbestos structures counted:	0
Number of asbestos structures > 5 um :	0
Number of asbestos fibers and bundles > 5 um:	0
Number of PCM equivalent asbestos structures:	0
Number of PCM equivalent asbestos fibers:	0
Concentration of Asbestos (Chrysotile) f/cm3:	<0.00040
Concentration of Asbestos (Amphibole) f/cm3:	<0.00040
Concentration of PCME Asbestos (Chrysotile) f/cm3:	<0.00040
Concentration of Asbestos (Chrysotile), Str/L:	0
Concentration of Asbestos (Amphibole), Str/L:	0
Lower 95% Confidence Limit (Chrysotile), Str/L:	0
Upper 95% Confidence Limit (Chrysotile), Str/L:	1.5
Lower 95% Confidence Limit (Amphibole), Str/L:	0
Upper 95% Confidence Limit (Amphibole), Str/L:	1.5

Analyst: Taylor Smylie

Scott M. Ward, Ph.D. **Lab Director**

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Report Date: 27-Dec-2023

HDOH Kula Community Air

Sample Number **MFK-AM02-121723-AB**

Air Volume:	2207.932
Effective Filter Area:	385.0 mm^2
Level of Analysis (Chrysotile):	CDQ
Level of Analysis (Amphibole):	ADQ
Magnification Used for Fiber Counting:	20,000
Aspect Ratio for Fiber Definition:	5:1
Mean Dimension of Grid Openings (GOs):	0.0132 mm^2
Initials of Analyst:	TS
Number of GO's Examined:	10
Analytical Sensitivity: f/Liter:	1.32099
Analytical Sensitivity: f/cm3:	0.00132
Number of primary asbestos structures:	0
Number of asbestos structures counted:	0
Number of asbestos structures > 5 um :	0
Number of asbestos fibers and bundles > 5 um:	0
Number of PCM equivalent asbestos structures:	0
Number of PCM equivalent asbestos fibers:	0
Concentration of Asbestos (Chrysotile) f/cm3:	<0.00132
Concentration of Asbestos (Amphibole) f/cm3:	<0.00132
Concentration of PCME Asbestos (Chrysotile) f/cm3:	<0.00132
Concentration of Asbestos (Chrysotile), Str/L:	0
Concentration of Asbestos (Amphibole), Str/L:	0
Lower 95% Confidence Limit (Chrysotile), Str/L:	0
Upper 95% Confidence Limit (Chrysotile), Str/L:	4.9
Lower 95% Confidence Limit (Amphibole), Str/L:	0
Upper 95% Confidence Limit (Amphibole), Str/L:	4.9

Analyst: Tyalor Smylie

Scott M. Ward, Ph.D. **Lab Director**

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Report Date: 27-Dec-2023

HDOH Kula Community Air

Sample Number **MFK-AM03-121723-AB**

Air Volume:	8032.999
Effective Filter Area:	385.0 mm^2
Level of Analysis (Chrysotile):	CDQ
Level of Analysis (Amphibole):	ADQ
Magnification Used for Fiber Counting:	20,000
Aspect Ratio for Fiber Definition:	5:1
Mean Dimension of Grid Openings (GOs):	0.0132 mm^2
Initials of Analyst:	ts
Number of GO's Examined:	10
Analytical Sensitivity: f/Liter:	0.36309
Analytical Sensitivity: f/cm3:	0.00036
Number of primary asbestos structures:	0
Number of asbestos structures counted:	0
Number of asbestos structures > 5 um :	0
Number of asbestos fibers and bundles > 5 um:	0
Number of PCM equivalent asbestos structures:	0
Number of PCM equivalent asbestos fibers:	0
Concentration of Asbestos (Chrysotile) f/cm3:	<0.00036
Concentration of Asbestos (Amphibole) f/cm3:	<0.00036
Concentration of PCME Asbestos (Chrysotile) f/cm3:	<0.00036
Concentration of Asbestos (Chrysotile), Str/L:	0
Concentration of Asbestos (Amphibole), Str/L:	0
Lower 95% Confidence Limit (Chrysotile), Str/L:	0
Upper 95% Confidence Limit (Chrysotile), Str/L:	1.3
Lower 95% Confidence Limit (Amphibole), Str/L:	0
Upper 95% Confidence Limit (Amphibole), Str/L:	1.3

Analyst: Taylor Smylie

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Receipt Date: 20-Dec-2023
Analysis Date: 27-Dec-2023
Report Date: 27-Dec-2023

HDOH Kula Community Air

Sample Number **MFK-FB01-121723-AB**

Air Volume:	0
Effective Filter Area:	385.0 mm^2
Level of Analysis (Chrysotile):	CDQ
Level of Analysis (Amphibole):	ADQ
Magnification Used for Fiber Counting:	20,000
Aspect Ratio for Fiber Definition:	5:1
Mean Dimension of Grid Openings (GOs):	0.0132 mm^2
Initials of Analyst:	TS
Number of GO's Examined:	10
Analytical Sensitivity: f/Liter:	N/A
Analytical Sensitivity: f/cm3:	N/A
Number of primary asbestos structures:	0
Number of asbestos structures counted:	0
Number of asbestos structures > 5 um :	0
Number of asbestos fibers and bundles > 5 um:	0
Number of PCM equivalent asbestos structures:	0
Number of PCM equivalent asbestos fibers:	0
Concentration of Asbestos (Chrysotile) f/cm3:	N/A
Concentration of Asbestos (Amphibole) f/cm3:	N/A
Concentration of PCME Asbestos (Chrysotile) f/cm3:	N/A
Concentration of Asbestos (Chrysotile), Str/L:	N/A
Concentration of Asbestos (Amphibole), Str/L:	N/A
Lower 95% Confidence Limit (Chrysotile), Str/L:	N/A
Upper 95% Confidence Limit (Chrysotile), Str/L:	N/A
Lower 95% Confidence Limit (Amphibole), Str/L:	N/A
Upper 95% Confidence Limit (Amphibole), Str/L:	N/A

Analyst: Taylor Smylie

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Airborne Asbestos Fiber Analysis by Transmission Electron Microscopy (TEM) ISO 10312 - Ambient Air - Determination of Asbestos Fibers Direct-Transfer Transmission Electron Microscopy Method

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Tetra Tech - Maui Fire
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Oakland, CA 94612

EJ3 Order #: 3492635
Project #: 103S864023141
Receipt Date: 27-Dec-2023
Analysis Date: 2-Jan-2024
Report Date: 2-Jan-2024

HDOH Kula Community Air

Sample Number **MFK-AM01-121823-AB**

Air Volume:	7331.264
Effective Filter Area:	385.0 mm^2
Level of Analysis (Chrysotile):	CDQ
Level of Analysis (Amphibole):	ADQ
Magnification Used for Fiber Counting:	20,000
Aspect Ratio for Fiber Definition:	5:1
Mean Dimension of Grid Openings (GOs):	0.0132 mm^2
Initials of Analyst:	AF
Number of GO's Examined:	10
Analytical Sensitivity: f/Liter:	0.39784
Analytical Sensitivity: f/cm3:	0.00040
Number of primary asbestos structures:	0
Number of asbestos structures counted:	0
Number of asbestos structures > 5 um :	0
Number of asbestos fibers and bundles > 5 um:	0
Number of PCM equivalent asbestos structures:	0
Number of PCM equivalent asbestos fibers:	0
Concentration of Asbestos (Chrysotile) f/cm3:	<0.00040
Concentration of Asbestos (Amphibole) f/cm3:	<0.00040
Concentration of PCME Asbestos (Chrysotile) f/cm3:	<0.00040
Concentration of Asbestos (Chrysotile), Str/L:	0
Concentration of Asbestos (Amphibole), Str/L:	0
Lower 95% Confidence Limit (Chrysotile), Str/L:	0
Upper 95% Confidence Limit (Chrysotile), Str/L:	1.5
Lower 95% Confidence Limit (Amphibole), Str/L:	0
Upper 95% Confidence Limit (Amphibole), Str/L:	1.5

Analyst: Arnold Flores

Scott M. Ward, Ph.D. **Lab Director**

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Receipt Date: 27-Dec-2023
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Report Date: 2-Jan-2024

HDOH Kula Community Air

Sample Number **MFK-AM02-121823-AB**

Air Volume:	3776.906
Effective Filter Area:	385.0 mm^2
Level of Analysis (Chrysotile):	CDQ
Level of Analysis (Amphibole):	ADQ
Magnification Used for Fiber Counting:	20,000
Aspect Ratio for Fiber Definition:	5:1
Mean Dimension of Grid Openings (GOs):	0.0132 mm^2
Initials of Analyst:	AF
Number of GO's Examined:	10
Analytical Sensitivity: f/Liter:	0.77224
Analytical Sensitivity: f/cm3:	0.00077
Number of primary asbestos structures:	0
Number of asbestos structures counted:	0
Number of asbestos structures > 5 um :	0
Number of asbestos fibers and bundles > 5 um:	0
Number of PCM equivalent asbestos structures:	0
Number of PCM equivalent asbestos fibers:	0
Concentration of Asbestos (Chrysotile) f/cm3:	<0.00077
Concentration of Asbestos (Amphibole) f/cm3:	<0.00077
Concentration of PCME Asbestos (Chrysotile) f/cm3:	<0.00077
Concentration of Asbestos (Chrysotile), Str/L:	0
Concentration of Asbestos (Amphibole), Str/L:	0
Lower 95% Confidence Limit (Chrysotile), Str/L:	0
Upper 95% Confidence Limit (Chrysotile), Str/L:	2.8
Lower 95% Confidence Limit (Amphibole), Str/L:	0
Upper 95% Confidence Limit (Amphibole), Str/L:	2.8

Analyst: Arnold Flores

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Maura McAleese		**EJ3 Order #:**	3492635
Tetra Tech - Maui Fire		**Project #:**	103S864023141
1999 Harrison St. Ste. 500		**Receipt Date:**	27-Dec-2023
Oakland, CA 94612		**Analysis Date:**	2-Jan-2024
		Report Date:	2-Jan-2024

HDOH Kula Community Air

Sample Number **MFK-AM03-121823-AB**

Air Volume:	3356.77
Effective Filter Area:	385.0 mm^2
Level of Analysis (Chrysotile):	CDQ
Level of Analysis (Amphibole):	ADQ
Magnification Used for Fiber Counting:	20,000
Aspect Ratio for Fiber Definition:	5:1
Mean Dimension of Grid Openings (GOs):	0.0132 mm^2
Initials of Analyst:	AF
Number of GO’s Examined:	10
Analytical Sensitivity: f/Liter:	0.86889
Analytical Sensitivity: f/cm3:	0.00087
Number of primary asbestos structures:	0
Number of asbestos structures counted:	0
Number of asbestos structures > 5 um :	0
Number of asbestos fibers and bundles > 5 um:	0
Number of PCM equivalent asbestos structures:	0
Number of PCM equivalent asbestos fibers:	0
Concentration of Asbestos (Chrysotile) f/cm3:	<0.00087
Concentration of Asbestos (Amphibole) f/cm3:	<0.00087
Concentration of PCME Asbestos (Chrysotile) f/cm3:	<0.00087
Concentration of Asbestos (Chrysotile), Str/L:	0
Concentration of Asbestos (Amphibole), Str/L:	0
Lower 95% Confidence Limit (Chrysotile), Str/L:	0
Upper 95% Confidence Limit (Chrysotile), Str/L:	3.2
Lower 95% Confidence Limit (Amphibole), Str/L:	0
Upper 95% Confidence Limit (Amphibole), Str/L:	3.2

Analyst: Arnold Flores

Scott M. Ward, Ph.D. **Lab Director**

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HDOH Kula Community Air

Sample Number **MFK-FB01-121823-AB**

Air Volume:	0
Effective Filter Area:	385.0 mm^2
Level of Analysis (Chrysotile):	CDQ
Level of Analysis (Amphibole):	ADQ
Magnification Used for Fiber Counting:	20,000
Aspect Ratio for Fiber Definition:	5:1
Mean Dimension of Grid Openings (GOs):	0.0132 mm^2
Initials of Analyst:	AF
Number of GO's Examined:	10
Analytical Sensitivity: f/Liter:	N/A
Analytical Sensitivity: f/cm3:	N/A
Number of primary asbestos structures:	0
Number of asbestos structures counted:	0
Number of asbestos structures > 5 um :	0
Number of asbestos fibers and bundles > 5 um:	0
Number of PCM equivalent asbestos structures:	0
Number of PCM equivalent asbestos fibers:	0
Concentration of Asbestos (Chrysotile) f/cm3:	N/A
Concentration of Asbestos (Amphibole) f/cm3:	N/A
Concentration of PCME Asbestos (Chrysotile) f/cm3:	N/A
Concentration of Asbestos (Chrysotile), Str/L:	N/A
Concentration of Asbestos (Amphibole), Str/L:	N/A
Lower 95% Confidence Limit (Chrysotile), Str/L:	N/A
Upper 95% Confidence Limit (Chrysotile), Str/L:	N/A
Lower 95% Confidence Limit (Amphibole), Str/L:	N/A
Upper 95% Confidence Limit (Amphibole), Str/L:	N/A

Analyst: Arnold Flores

Scott M. Ward, Ph.D. **Lab Director**

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Airborne Asbestos Fiber Analysis by Transmission Electron Microscopy (TEM) ISO 10312 - Ambient Air - Determination of Asbestos Fibers Direct-Transfer Transmission Electron Microscopy Method

Maura McAleese
Tetra Tech - Maui Fire
1999 Harrison St. Ste. 500
Oakland, CA 94612

EJ3 Order #: 3492635
Project #: 103S864023141
Receipt Date: 27-Dec-2023
Analysis Date: 2-Jan-2024
Report Date: 2-Jan-2024

HDOH Kula Community Air

Sample Number **MFK-AM01-121923-AB**

Air Volume:	7927.423
Effective Filter Area:	385.0 mm^2
Level of Analysis (Chrysotile):	CDQ
Level of Analysis (Amphibole):	ADQ
Magnification Used for Fiber Counting:	20,000
Aspect Ratio for Fiber Definition:	5:1
Mean Dimension of Grid Openings (GOs):	0.0132 mm^2
Initials of Analyst:	AF
Number of GO's Examined:	10
Analytical Sensitivity: f/Liter:	0.36792
Analytical Sensitivity: f/cm3:	0.00037
Number of primary asbestos structures:	0
Number of asbestos structures counted:	0
Number of asbestos structures > 5 um :	0
Number of asbestos fibers and bundles > 5 um:	0
Number of PCM equivalent asbestos structures:	0
Number of PCM equivalent asbestos fibers:	0
Concentration of Asbestos (Chrysotile) f/cm3:	<0.00037
Concentration of Asbestos (Amphibole) f/cm3:	<0.00037
Concentration of PCME Asbestos (Chrysotile) f/cm3:	<0.00037
Concentration of Asbestos (Chrysotile), Str/L:	0
Concentration of Asbestos (Amphibole), Str/L:	0
Lower 95% Confidence Limit (Chrysotile), Str/L:	0
Upper 95% Confidence Limit (Chrysotile), Str/L:	1.4
Lower 95% Confidence Limit (Amphibole), Str/L:	0
Upper 95% Confidence Limit (Amphibole), Str/L:	1.4

Analyst: Arnold Flores

Scott M. Ward, Ph.D. **Lab Director**

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EJ3 Order #: 3492635
Project #: 103S864023141
Receipt Date: 27-Dec-2023
Analysis Date: 2-Jan-2024
Report Date: 2-Jan-2024

HDOH Kula Community Air

Sample Number **MFK-AM02-121923-AB**

Air Volume:	6446.633
Effective Filter Area:	385.0 mm^2
Level of Analysis (Chrysotile):	CDQ
Level of Analysis (Amphibole):	ADQ
Magnification Used for Fiber Counting:	20,000
Aspect Ratio for Fiber Definition:	5:1
Mean Dimension of Grid Openings (GOs):	0.0132 mm^2
Initials of Analyst:	AF
Number of GO's Examined:	10
Analytical Sensitivity: f/Liter:	0.45243
Analytical Sensitivity: f/cm3:	0.00045
Number of primary asbestos structures:	0
Number of asbestos structures counted:	0
Number of asbestos structures > 5 um :	0
Number of asbestos fibers and bundles > 5 um:	0
Number of PCM equivalent asbestos structures:	0
Number of PCM equivalent asbestos fibers:	0
Concentration of Asbestos (Chrysotile) f/cm3:	<0.00045
Concentration of Asbestos (Amphibole) f/cm3:	<0.00045
Concentration of PCME Asbestos (Chrysotile) f/cm3:	<0.00045
Concentration of Asbestos (Chrysotile), Str/L:	0
Concentration of Asbestos (Amphibole), Str/L:	0
Lower 95% Confidence Limit (Chrysotile), Str/L:	0
Upper 95% Confidence Limit (Chrysotile), Str/L:	1.7
Lower 95% Confidence Limit (Amphibole), Str/L:	0
Upper 95% Confidence Limit (Amphibole), Str/L:	1.7

Analyst: Arnold Flores

Scott M. Ward, Ph.D. **Lab Director**

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EJ3 Order #: 3492635
Project #: 103S864023141
Receipt Date: 27-Dec-2023
Analysis Date: 2-Jan-2024
Report Date: 2-Jan-2024

HDOH Kula Community Air

Sample Number **MFK-AM03-121923-AB**

Air Volume:	5509.867
Effective Filter Area:	385.0 mm^2
Level of Analysis (Chrysotile):	CDQ
Level of Analysis (Amphibole):	ADQ
Magnification Used for Fiber Counting:	20,000
Aspect Ratio for Fiber Definition:	5:1
Mean Dimension of Grid Openings (GOs):	0.0132 mm^2
Initials of Analyst:	AF
Number of GO’s Examined:	10
Analytical Sensitivity: f/Liter:	0.52935
Analytical Sensitivity: f/cm3:	0.00053
Number of primary asbestos structures:	0
Number of asbestos structures counted:	0
Number of asbestos structures > 5 um :	0
Number of asbestos fibers and bundles > 5 um:	0
Number of PCM equivalent asbestos structures:	0
Number of PCM equivalent asbestos fibers:	0
Concentration of Asbestos (Chrysotile) f/cm3:	<0.00053
Concentration of Asbestos (Amphibole) f/cm3:	<0.00053
Concentration of PCME Asbestos (Chrysotile) f/cm3:	<0.00053
Concentration of Asbestos (Chrysotile), Str/L:	0
Concentration of Asbestos (Amphibole), Str/L:	0
Lower 95% Confidence Limit (Chrysotile), Str/L:	0
Upper 95% Confidence Limit (Chrysotile), Str/L:	2
Lower 95% Confidence Limit (Amphibole), Str/L:	0
Upper 95% Confidence Limit (Amphibole), Str/L:	2

Analyst: Arnold Flores

Scott M. Ward, Ph.D. **Lab Director**

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EJ3 Order #: 3492635
Project #: 103S864023141
Receipt Date: 27-Dec-2023
Analysis Date: 2-Jan-2024
Report Date: 2-Jan-2024

HDOH Kula Community Air

Sample Number **MFK-FB01-121923-AB**

Air Volume:	0
Effective Filter Area:	385.0 mm^2
Level of Analysis (Chrysotile):	CDQ
Level of Analysis (Amphibole):	ADQ
Magnification Used for Fiber Counting:	20,000
Aspect Ratio for Fiber Definition:	5:1
Mean Dimension of Grid Openings (GOs):	0.0132 mm^2
Initials of Analyst:	AF
Number of GO's Examined:	10
Analytical Sensitivity: f/Liter:	N/A
Analytical Sensitivity: f/cm3:	N/A
Number of primary asbestos structures:	0
Number of asbestos structures counted:	0
Number of asbestos structures > 5 um :	0
Number of asbestos fibers and bundles > 5 um:	0
Number of PCM equivalent asbestos structures:	0
Number of PCM equivalent asbestos fibers:	0
Concentration of Asbestos (Chrysotile) f/cm3:	N/A
Concentration of Asbestos (Amphibole) f/cm3:	N/A
Concentration of PCME Asbestos (Chrysotile) f/cm3:	N/A
Concentration of Asbestos (Chrysotile), Str/L:	N/A
Concentration of Asbestos (Amphibole), Str/L:	N/A
Lower 95% Confidence Limit (Chrysotile), Str/L:	N/A
Upper 95% Confidence Limit (Chrysotile), Str/L:	N/A
Lower 95% Confidence Limit (Amphibole), Str/L:	N/A
Upper 95% Confidence Limit (Amphibole), Str/L:	N/A

Analyst: Arnold Flores

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EJ3 Order #: 3492635
Project #: 103S864023141
Receipt Date: 27-Dec-2023
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Report Date: 2-Jan-2024

HDOH Kula Community Air

Sample Number **MFK-AM01-122023-AB**

Air Volume:	7875.824
Effective Filter Area:	385.0 mm^2
Level of Analysis (Chrysotile):	CDQ
Level of Analysis (Amphibole):	ADQ
Magnification Used for Fiber Counting:	20,000
Aspect Ratio for Fiber Definition:	5:1
Mean Dimension of Grid Openings (GOs):	0.0132 mm^2
Initials of Analyst:	AF
Number of GO's Examined:	10
Analytical Sensitivity: f/Liter:	0.37033
Analytical Sensitivity: f/cm3:	0.00037
Number of primary asbestos structures:	0
Number of asbestos structures counted:	0
Number of asbestos structures > 5 um :	0
Number of asbestos fibers and bundles > 5 um:	0
Number of PCM equivalent asbestos structures:	0
Number of PCM equivalent asbestos fibers:	0
Concentration of Asbestos (Chrysotile) f/cm3:	<0.00037
Concentration of Asbestos (Amphibole) f/cm3:	<0.00037
Concentration of PCME Asbestos (Chrysotile) f/cm3:	<0.00037
Concentration of Asbestos (Chrysotile), Str/L:	0
Concentration of Asbestos (Amphibole), Str/L:	0
Lower 95% Confidence Limit (Chrysotile), Str/L:	0
Upper 95% Confidence Limit (Chrysotile), Str/L:	1.4
Lower 95% Confidence Limit (Amphibole), Str/L:	0
Upper 95% Confidence Limit (Amphibole), Str/L:	1.4

Analyst: Arnold Flores

Scott M. Ward, Ph.D. **Lab Director**

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EJ3 Order #: 3492635
Project #: 103S864023141
Receipt Date: 27-Dec-2023
Analysis Date: 2-Jan-2024
Report Date: 2-Jan-2024

HDOH Kula Community Air

Sample Number **MFK-AM02-122023-AB**

Air Volume:	3924.248
Effective Filter Area:	385.0 mm^2
Level of Analysis (Chrysotile):	CDQ
Level of Analysis (Amphibole):	ADQ
Magnification Used for Fiber Counting:	20,000
Aspect Ratio for Fiber Definition:	5:1
Mean Dimension of Grid Openings (GOs):	0.0132 mm^2
Initials of Analyst:	AF
Number of GO's Examined:	10
Analytical Sensitivity: f/Liter:	0.74324
Analytical Sensitivity: f/cm3:	0.00074
Number of primary asbestos structures:	0
Number of asbestos structures counted:	0
Number of asbestos structures > 5 um :	0
Number of asbestos fibers and bundles > 5 um:	0
Number of PCM equivalent asbestos structures:	0
Number of PCM equivalent asbestos fibers:	0
Concentration of Asbestos (Chrysotile) f/cm3:	<0.00074
Concentration of Asbestos (Amphibole) f/cm3:	<0.00074
Concentration of PCME Asbestos (Chrysotile) f/cm3:	<0.00074
Concentration of Asbestos (Chrysotile), Str/L:	0
Concentration of Asbestos (Amphibole), Str/L:	0
Lower 95% Confidence Limit (Chrysotile), Str/L:	0
Upper 95% Confidence Limit (Chrysotile), Str/L:	2.7
Lower 95% Confidence Limit (Amphibole), Str/L:	0
Upper 95% Confidence Limit (Amphibole), Str/L:	2.7

Analyst: Arnold Flores

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Receipt Date: 27-Dec-2023
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Report Date: 2-Jan-2024

HDOH Kula Community Air

Sample Number **MFK-AM03-122023-AB**

Air Volume:	4328.274
Effective Filter Area:	385.0 mm^2
Level of Analysis (Chrysotile):	CDQ
Level of Analysis (Amphibole):	ADQ
Magnification Used for Fiber Counting:	20,000
Aspect Ratio for Fiber Definition:	5:1
Mean Dimension of Grid Openings (GOs):	0.0132 mm^2
Initials of Analyst:	AF
Number of GO's Examined:	10
Analytical Sensitivity: f/Liter:	0.67386
Analytical Sensitivity: f/cm3:	0.00067
Number of primary asbestos structures:	0
Number of asbestos structures counted:	0
Number of asbestos structures > 5 um :	0
Number of asbestos fibers and bundles > 5 um:	0
Number of PCM equivalent asbestos structures:	0
Number of PCM equivalent asbestos fibers:	0
Concentration of Asbestos (Chrysotile) f/cm3:	<0.00067
Concentration of Asbestos (Amphibole) f/cm3:	<0.00067
Concentration of PCME Asbestos (Chrysotile) f/cm3:	<0.00067
Concentration of Asbestos (Chrysotile), Str/L:	0
Concentration of Asbestos (Amphibole), Str/L:	0
Lower 95% Confidence Limit (Chrysotile), Str/L:	0
Upper 95% Confidence Limit (Chrysotile), Str/L:	2.5
Lower 95% Confidence Limit (Amphibole), Str/L:	0
Upper 95% Confidence Limit (Amphibole), Str/L:	2.5

Analyst: Arnold Flores

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Project #: 103S864023141
Receipt Date: 27-Dec-2023
Analysis Date: 2-Jan-2024
Report Date: 2-Jan-2024

HDOH Kula Community Air

Sample Number **MFK-FB01-122023-AB**

Air Volume:	0
Effective Filter Area:	385.0 mm^2
Level of Analysis (Chrysotile):	CDQ
Level of Analysis (Amphibole):	ADQ
Magnification Used for Fiber Counting:	20,000
Aspect Ratio for Fiber Definition:	5:1
Mean Dimension of Grid Openings (GOs):	0.0132 mm^2
Initials of Analyst:	AF
Number of GO's Examined:	10
Analytical Sensitivity: f/Liter:	N/A
Analytical Sensitivity: f/cm3:	N/A
Number of primary asbestos structures:	0
Number of asbestos structures counted:	0
Number of asbestos structures > 5 um :	0
Number of asbestos fibers and bundles > 5 um:	0
Number of PCM equivalent asbestos structures:	0
Number of PCM equivalent asbestos fibers:	0
Concentration of Asbestos (Chrysotile) f/cm3:	N/A
Concentration of Asbestos (Amphibole) f/cm3:	N/A
Concentration of PCME Asbestos (Chrysotile) f/cm3:	N/A
Concentration of Asbestos (Chrysotile), Str/L:	N/A
Concentration of Asbestos (Amphibole), Str/L:	N/A
Lower 95% Confidence Limit (Chrysotile), Str/L:	N/A
Upper 95% Confidence Limit (Chrysotile), Str/L:	N/A
Lower 95% Confidence Limit (Amphibole), Str/L:	N/A
Upper 95% Confidence Limit (Amphibole), Str/L:	N/A

Analyst: Arnold Flores

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EJ3 Order #: 3493379
Project #: 103S864023141
Receipt Date: 28-Dec-2023
Analysis Date: 3-Jan-2024
Report Date: 3-Jan-2024

HDOH Kula Community Air

Sample Number **MFK-AM01-122123-AB**

Air Volume:	7533.188
Effective Filter Area:	385.0 mm^2
Level of Analysis (Chrysotile):	CDQ
Level of Analysis (Amphibole):	ADQ
Magnification Used for Fiber Counting:	20,000
Aspect Ratio for Fiber Definition:	5:1
Mean Dimension of Grid Openings (GOs):	0.0132 mm^2
Initials of Analyst:	TS
Number of GO's Examined:	10
Analytical Sensitivity: f/Liter:	0.38718
Analytical Sensitivity: f/cm3:	0.00039
Number of primary asbestos structures:	0
Number of asbestos structures counted:	0
Number of asbestos structures > 5 um :	0
Number of asbestos fibers and bundles > 5 um:	0
Number of PCM equivalent asbestos structures:	0
Number of PCM equivalent asbestos fibers:	0
Concentration of Asbestos (Chrysotile) f/cm3:	<0.00039
Concentration of Asbestos (Amphibole) f/cm3:	<0.00039
Concentration of PCME Asbestos (Chrysotile) f/cm3:	<0.00039
Concentration of Asbestos (Chrysotile), Str/L:	0
Concentration of Asbestos (Amphibole), Str/L:	0
Lower 95% Confidence Limit (Chrysotile), Str/L:	0
Upper 95% Confidence Limit (Chrysotile), Str/L:	1.4
Lower 95% Confidence Limit (Amphibole), Str/L:	0
Upper 95% Confidence Limit (Amphibole), Str/L:	1.4

Analyst: Taylor Smylie

Scott M. Ward, Ph.D. **Lab Director**

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EJ3 Order #: 3493379
Project #: 103S864023141
Receipt Date: 28-Dec-2023
Analysis Date: 3-Jan-2024
Report Date: 3-Jan-2024

HDOH Kula Community Air

Sample Number **MFK-AM02-122123-AB**

Air Volume:	3921.046
Effective Filter Area:	385.0 mm^2
Level of Analysis (Chrysotile):	CDQ
Level of Analysis (Amphibole):	ADQ
Magnification Used for Fiber Counting:	20,000
Aspect Ratio for Fiber Definition:	5:1
Mean Dimension of Grid Openings (GOs):	0.0132 mm^2
Initials of Analyst:	TS
Number of GO's Examined:	10
Analytical Sensitivity: f/Liter:	0.74385
Analytical Sensitivity: f/cm3:	0.00074
Number of primary asbestos structures:	0
Number of asbestos structures counted:	0
Number of asbestos structures > 5 um :	0
Number of asbestos fibers and bundles > 5 um:	0
Number of PCM equivalent asbestos structures:	0
Number of PCM equivalent asbestos fibers:	0
Concentration of Asbestos (Chrysotile) f/cm3:	<0.00074
Concentration of Asbestos (Amphibole) f/cm3:	<0.00074
Concentration of PCME Asbestos (Chrysotile) f/cm3:	<0.00074
Concentration of Asbestos (Chrysotile), Str/L:	0
Concentration of Asbestos (Amphibole), Str/L:	0
Lower 95% Confidence Limit (Chrysotile), Str/L:	0
Upper 95% Confidence Limit (Chrysotile), Str/L:	2.7
Lower 95% Confidence Limit (Amphibole), Str/L:	0
Upper 95% Confidence Limit (Amphibole), Str/L:	2.7

Analyst: Taylor Smylie

Scott M. Ward, Ph.D. **Lab Director**

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Airborne Asbestos Fiber Analysis by Transmission Electron Microscopy (TEM) ISO 10312 - Ambient Air - Determination of Asbestos Fibers Direct-Transfer Transmission Electron Microscopy Method

Maura McAleese
Tetra Tech-Maui Fire
1999 Harrison St. Ste. 500
Oakland, CA 94612

EJ3 Order #: 3493379
Project #: 103S864023141
Receipt Date: 28-Dec-2023
Analysis Date: 3-Jan-2024
Report Date: 3-Jan-2024

HDOH Kula Community Air

Sample Number **MFK-AM03-122123-AB**

Air Volume:	7533.188
Effective Filter Area:	385.0 mm^2
Level of Analysis (Chrysotile):	CDQ
Level of Analysis (Amphibole):	ADQ
Magnification Used for Fiber Counting:	20,000
Aspect Ratio for Fiber Definition:	5:1
Mean Dimension of Grid Openings (GOs):	0.0132 mm^2
Initials of Analyst:	TS
Number of GO's Examined:	10
Analytical Sensitivity: f/Liter:	0.38718
Analytical Sensitivity: f/cm3:	0.00039
Number of primary asbestos structures:	0
Number of asbestos structures counted:	0
Number of asbestos structures > 5 um :	0
Number of asbestos fibers and bundles > 5 um:	0
Number of PCM equivalent asbestos structures:	0
Number of PCM equivalent asbestos fibers:	0
Concentration of Asbestos (Chrysotile) f/cm3:	<0.00039
Concentration of Asbestos (Amphibole) f/cm3:	<0.00039
Concentration of PCME Asbestos (Chrysotile) f/cm3:	<0.00039
Concentration of Asbestos (Chrysotile), Str/L:	0
Concentration of Asbestos (Amphibole), Str/L:	0
Lower 95% Confidence Limit (Chrysotile), Str/L:	0
Upper 95% Confidence Limit (Chrysotile), Str/L:	1.4
Lower 95% Confidence Limit (Amphibole), Str/L:	0
Upper 95% Confidence Limit (Amphibole), Str/L:	1.4

Analyst: Taylor Smylie

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EJ3 Order #: 3493379
Project #: 103S864023141
Receipt Date: 28-Dec-2023
Analysis Date: 3-Jan-2024
Report Date: 3-Jan-2024

HDOH Kula Community Air

Sample Number **MFK-FB01-122123-AB**

Air Volume:	0
Effective Filter Area:	385.0 mm^2
Level of Analysis (Chrysotile):	CDQ
Level of Analysis (Amphibole):	ADQ
Magnification Used for Fiber Counting:	20,000
Aspect Ratio for Fiber Definition:	5:1
Mean Dimension of Grid Openings (GOs):	0.0132 mm^2
Initials of Analyst:	TS
Number of GO's Examined:	10
Analytical Sensitivity: f/Liter:	N/A
Analytical Sensitivity: f/cm3:	N/A
Number of primary asbestos structures:	0
Number of asbestos structures counted:	0
Number of asbestos structures > 5 um :	0
Number of asbestos fibers and bundles > 5 um:	0
Number of PCM equivalent asbestos structures:	0
Number of PCM equivalent asbestos fibers:	0
Concentration of Asbestos (Chrysotile) f/cm3:	N/A
Concentration of Asbestos (Amphibole) f/cm3:	N/A
Concentration of PCME Asbestos (Chrysotile) f/cm3:	N/A
Concentration of Asbestos (Chrysotile), Str/L:	N/A
Concentration of Asbestos (Amphibole), Str/L:	N/A
Lower 95% Confidence Limit (Chrysotile), Str/L:	N/A
Upper 95% Confidence Limit (Chrysotile), Str/L:	N/A
Lower 95% Confidence Limit (Amphibole), Str/L:	N/A
Upper 95% Confidence Limit (Amphibole), Str/L:	N/A

Analyst: Taylor Smylie

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Report Date: 3-Jan-2024

HDOH Kula Community Air

Sample Number **MFK-AM01-122223-AB**

Air Volume:	7931.31
Effective Filter Area:	385.0 mm^2
Level of Analysis (Chrysotile):	CDQ
Level of Analysis (Amphibole):	ADQ
Magnification Used for Fiber Counting:	20,000
Aspect Ratio for Fiber Definition:	5:1
Mean Dimension of Grid Openings (GOs):	0.0132 mm^2
Initials of Analyst:	TS
Number of GO's Examined:	10
Analytical Sensitivity: f/Liter:	0.36774
Analytical Sensitivity: f/cm3:	0.00037
Number of primary asbestos structures:	0
Number of asbestos structures counted:	0
Number of asbestos structures > 5 um :	0
Number of asbestos fibers and bundles > 5 um:	0
Number of PCM equivalent asbestos structures:	0
Number of PCM equivalent asbestos fibers:	0
Concentration of Asbestos (Chrysotile) f/cm3:	<0.00037
Concentration of Asbestos (Amphibole) f/cm3:	<0.00037
Concentration of PCME Asbestos (Chrysotile) f/cm3:	<0.00037
Concentration of Asbestos (Chrysotile), Str/L:	0
Concentration of Asbestos (Amphibole), Str/L:	0
Lower 95% Confidence Limit (Chrysotile), Str/L:	0
Upper 95% Confidence Limit (Chrysotile), Str/L:	1.4
Lower 95% Confidence Limit (Amphibole), Str/L:	0
Upper 95% Confidence Limit (Amphibole), Str/L:	1.4

Analyst: Taylor Smylie

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EJ3 Order #: 3493379
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Report Date: 3-Jan-2024

HDOH Kula Community Air

Sample Number **MFK-AM02-122223-AB**

Air Volume:	6086.993
Effective Filter Area:	385.0 mm^2
Level of Analysis (Chrysotile):	CDQ
Level of Analysis (Amphibole):	ADQ
Magnification Used for Fiber Counting:	20,000
Aspect Ratio for Fiber Definition:	5:1
Mean Dimension of Grid Openings (GOs):	0.0132 mm^2
Initials of Analyst:	TS
Number of GO's Examined:	10
Analytical Sensitivity: f/Liter:	0.47916
Analytical Sensitivity: f/cm3:	0.00048
Number of primary asbestos structures:	0
Number of asbestos structures counted:	0
Number of asbestos structures > 5 um :	0
Number of asbestos fibers and bundles > 5 um:	0
Number of PCM equivalent asbestos structures:	0
Number of PCM equivalent asbestos fibers:	0
Concentration of Asbestos (Chrysotile) f/cm3:	<0.00048
Concentration of Asbestos (Amphibole) f/cm3:	<0.00048
Concentration of PCME Asbestos (Chrysotile) f/cm3:	<0.00048
Concentration of Asbestos (Chrysotile), Str/L:	0
Concentration of Asbestos (Amphibole), Str/L:	0
Lower 95% Confidence Limit (Chrysotile), Str/L:	0
Upper 95% Confidence Limit (Chrysotile), Str/L:	1.8
Lower 95% Confidence Limit (Amphibole), Str/L:	0
Upper 95% Confidence Limit (Amphibole), Str/L:	1.8

Analyst: Taylor Smylie

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ISO 10312 - Ambient Air - Determination of Asbestos Fibers
Direct-Transfer Transmission Electron Microscopy Method

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Receipt Date: 28-Dec-2023
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Report Date: 3-Jan-2024

HDOH Kula Community Air

Sample Number **MFK-AM03-122223-AB**

Air Volume:	5918.076
Effective Filter Area:	385.0 mm^2
Level of Analysis (Chrysotile):	CDQ
Level of Analysis (Amphibole):	ADQ
Magnification Used for Fiber Counting:	20,000
Aspect Ratio for Fiber Definition:	5:1
Mean Dimension of Grid Openings (GOs):	0.0132 mm^2
Initials of Analyst:	TS
Number of GO's Examined:	10
Analytical Sensitivity: f/Liter:	0.49284
Analytical Sensitivity: f/cm3:	0.00049
Number of primary asbestos structures:	0
Number of asbestos structures counted:	0
Number of asbestos structures > 5 um :	0
Number of asbestos fibers and bundles > 5 um:	0
Number of PCM equivalent asbestos structures:	0
Number of PCM equivalent asbestos fibers:	0
Concentration of Asbestos (Chrysotile) f/cm3:	<0.00049
Concentration of Asbestos (Amphibole) f/cm3:	<0.00049
Concentration of PCME Asbestos (Chrysotile) f/cm3:	<0.00049
Concentration of Asbestos (Chrysotile), Str/L:	0
Concentration of Asbestos (Amphibole), Str/L:	0
Lower 95% Confidence Limit (Chrysotile), Str/L:	0
Upper 95% Confidence Limit (Chrysotile), Str/L:	1.8
Lower 95% Confidence Limit (Amphibole), Str/L:	0
Upper 95% Confidence Limit (Amphibole), Str/L:	1.8

Analyst: Taylor Smylie

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Report Date: 3-Jan-2024

HDOH Kula Community Air

Sample Number **MFK-FB01-122223-AB**

Air Volume:	0
Effective Filter Area:	385.0 mm^2
Level of Analysis (Chrysotile):	CDQ
Level of Analysis (Amphibole):	ADQ
Magnification Used for Fiber Counting:	20,000
Aspect Ratio for Fiber Definition:	5:1
Mean Dimension of Grid Openings (GOs):	0.0132 mm^2
Initials of Analyst:	TS
Number of GO's Examined:	10
Analytical Sensitivity: f/Liter:	N/A
Analytical Sensitivity: f/cm3:	N/A
Number of primary asbestos structures:	0
Number of asbestos structures counted:	0
Number of asbestos structures > 5 um :	0
Number of asbestos fibers and bundles > 5 um:	0
Number of PCM equivalent asbestos structures:	0
Number of PCM equivalent asbestos fibers:	0
Concentration of Asbestos (Chrysotile) f/cm3:	N/A
Concentration of Asbestos (Amphibole) f/cm3:	N/A
Concentration of PCME Asbestos (Chrysotile) f/cm3:	N/A
Concentration of Asbestos (Chrysotile), Str/L:	N/A
Concentration of Asbestos (Amphibole), Str/L:	N/A
Lower 95% Confidence Limit (Chrysotile), Str/L:	N/A
Upper 95% Confidence Limit (Chrysotile), Str/L:	N/A
Lower 95% Confidence Limit (Amphibole), Str/L:	N/A
Upper 95% Confidence Limit (Amphibole), Str/L:	N/A

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Receipt Date: 28-Dec-2023
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Report Date: 3-Jan-2024

HDOH Kula Community Air

Sample Number **MFK-AM01-122323-AB**

Air Volume:	7980.742
Effective Filter Area:	385.0 mm^2
Level of Analysis (Chrysotile):	CDQ
Level of Analysis (Amphibole):	ADQ
Magnification Used for Fiber Counting:	20,000
Aspect Ratio for Fiber Definition:	5:1
Mean Dimension of Grid Openings (GOs):	0.0132 mm^2
Initials of Analyst:	TS
Number of GO's Examined:	10
Analytical Sensitivity: f/Liter:	0.36546
Analytical Sensitivity: f/cm3:	0.00037
Number of primary asbestos structures:	0
Number of asbestos structures counted:	0
Number of asbestos structures > 5 um :	0
Number of asbestos fibers and bundles > 5 um:	0
Number of PCM equivalent asbestos structures:	0
Number of PCM equivalent asbestos fibers:	0
Concentration of Asbestos (Chrysotile) f/cm3:	<0.00037
Concentration of Asbestos (Amphibole) f/cm3:	<0.00037
Concentration of PCME Asbestos (Chrysotile) f/cm3:	<0.00037
Concentration of Asbestos (Chrysotile), Str/L:	0
Concentration of Asbestos (Amphibole), Str/L:	0
Lower 95% Confidence Limit (Chrysotile), Str/L:	0
Upper 95% Confidence Limit (Chrysotile), Str/L:	1.3
Lower 95% Confidence Limit (Amphibole), Str/L:	0
Upper 95% Confidence Limit (Amphibole), Str/L:	1.3

Analyst: Taylor Smylie

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Report Date: 3-Jan-2024

HDOH Kula Community Air

Sample Number **MFK-AM02-122323-AB**

Air Volume:	6675.376
Effective Filter Area:	385.0 mm^2
Level of Analysis (Chrysotile):	CDQ
Level of Analysis (Amphibole):	ADQ
Magnification Used for Fiber Counting:	20,000
Aspect Ratio for Fiber Definition:	5:1
Mean Dimension of Grid Openings (GOs):	0.0132 mm^2
Initials of Analyst:	TS
Number of GO's Examined:	10
Analytical Sensitivity: f/Liter:	0.43693
Analytical Sensitivity: f/cm3:	0.00044
Number of primary asbestos structures:	0
Number of asbestos structures counted:	0
Number of asbestos structures > 5 um :	0
Number of asbestos fibers and bundles > 5 um:	0
Number of PCM equivalent asbestos structures:	0
Number of PCM equivalent asbestos fibers:	0
Concentration of Asbestos (Chrysotile) f/cm3:	<0.00044
Concentration of Asbestos (Amphibole) f/cm3:	<0.00044
Concentration of PCME Asbestos (Chrysotile) f/cm3:	<0.00044
Concentration of Asbestos (Chrysotile), Str/L:	0
Concentration of Asbestos (Amphibole), Str/L:	0
Lower 95% Confidence Limit (Chrysotile), Str/L:	0
Upper 95% Confidence Limit (Chrysotile), Str/L:	1.6
Lower 95% Confidence Limit (Amphibole), Str/L:	0
Upper 95% Confidence Limit (Amphibole), Str/L:	1.6

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HDOH Kula Community Air

Sample Number **MFK-AM03-122323-AB**

Air Volume:	6335.225
Effective Filter Area:	385.0 mm^2
Level of Analysis (Chrysotile):	CDQ
Level of Analysis (Amphibole):	ADQ
Magnification Used for Fiber Counting:	20,000
Aspect Ratio for Fiber Definition:	5:1
Mean Dimension of Grid Openings (GOs):	0.0132 mm^2
Initials of Analyst:	TS
Number of GO's Examined:	10
Analytical Sensitivity: f/Liter:	0.46039
Analytical Sensitivity: f/cm3:	0.00046
Number of primary asbestos structures:	0
Number of asbestos structures counted:	0
Number of asbestos structures > 5 um :	0
Number of asbestos fibers and bundles > 5 um:	0
Number of PCM equivalent asbestos structures:	0
Number of PCM equivalent asbestos fibers:	0
Concentration of Asbestos (Chrysotile) f/cm3:	<0.00046
Concentration of Asbestos (Amphibole) f/cm3:	<0.00046
Concentration of PCME Asbestos (Chrysotile) f/cm3:	<0.00046
Concentration of Asbestos (Chrysotile), Str/L:	0
Concentration of Asbestos (Amphibole), Str/L:	0
Lower 95% Confidence Limit (Chrysotile), Str/L:	0
Upper 95% Confidence Limit (Chrysotile), Str/L:	1.7
Lower 95% Confidence Limit (Amphibole), Str/L:	0
Upper 95% Confidence Limit (Amphibole), Str/L:	1.7

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HDOH Kula Community Air

Sample Number **MFK-FB01-122323-AB**

Air Volume:	0
Effective Filter Area:	385.0 mm^2
Level of Analysis (Chrysotile):	CDQ
Level of Analysis (Amphibole):	ADQ
Magnification Used for Fiber Counting:	20,000
Aspect Ratio for Fiber Definition:	5:1
Mean Dimension of Grid Openings (GOs):	0.0132 mm^2
Initials of Analyst:	TS
Number of GO's Examined:	10
Analytical Sensitivity: f/Liter:	N/A
Analytical Sensitivity: f/cm3:	N/A
Number of primary asbestos structures:	0
Number of asbestos structures counted:	0
Number of asbestos structures > 5 um :	0
Number of asbestos fibers and bundles > 5 um:	0
Number of PCM equivalent asbestos structures:	0
Number of PCM equivalent asbestos fibers:	0
Concentration of Asbestos (Chrysotile) f/cm3:	N/A
Concentration of Asbestos (Amphibole) f/cm3:	N/A
Concentration of PCME Asbestos (Chrysotile) f/cm3:	N/A
Concentration of Asbestos (Chrysotile), Str/L:	N/A
Concentration of Asbestos (Amphibole), Str/L:	N/A
Lower 95% Confidence Limit (Chrysotile), Str/L:	N/A
Upper 95% Confidence Limit (Chrysotile), Str/L:	N/A
Lower 95% Confidence Limit (Amphibole), Str/L:	N/A
Upper 95% Confidence Limit (Amphibole), Str/L:	N/A

Analyst: Taylor Smylie

Scott M. Ward, Ph.D. **Lab Director**

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Airborne Asbestos Fiber Analysis by Transmission Electron Microscopy (TEM) ISO 10312 - Ambient Air - Determination of Asbestos Fibers Direct-Transfer Transmission Electron Microscopy Method

Maura McAleese
Tetra Tech-Maui Fire
1999 Harrison St. Ste. 500
Oakland, CA 94612

EJ3 Order #: 3493379
Project #: 103S864023141
Receipt Date: 28-Dec-2023
Analysis Date: 3-Jan-2024
Report Date: 3-Jan-2024

HDOH Kula Community Air

Sample Number **MFK-AM01-122423-AB**

Air Volume:	7501.983
Effective Filter Area:	385.0 mm^2
Level of Analysis (Chrysotile):	CDQ
Level of Analysis (Amphibole):	ADQ
Magnification Used for Fiber Counting:	20,000
Aspect Ratio for Fiber Definition:	5:1
Mean Dimension of Grid Openings (GOs):	0.0132 mm^2
Initials of Analyst:	TS
Number of GO's Examined:	10
Analytical Sensitivity: f/Liter:	0.38879
Analytical Sensitivity: f/cm3:	0.00039
Number of primary asbestos structures:	0
Number of asbestos structures counted:	0
Number of asbestos structures > 5 um :	0
Number of asbestos fibers and bundles > 5 um:	0
Number of PCM equivalent asbestos structures:	0
Number of PCM equivalent asbestos fibers:	0
Concentration of Asbestos (Chrysotile) f/cm3:	<0.00039
Concentration of Asbestos (Amphibole) f/cm3:	<0.00039
Concentration of PCME Asbestos (Chrysotile) f/cm3:	<0.00039
Concentration of Asbestos (Chrysotile), Str/L:	0
Concentration of Asbestos (Amphibole), Str/L:	0
Lower 95% Confidence Limit (Chrysotile), Str/L:	0
Upper 95% Confidence Limit (Chrysotile), Str/L:	1.4
Lower 95% Confidence Limit (Amphibole), Str/L:	0
Upper 95% Confidence Limit (Amphibole), Str/L:	1.4

Analyst: Taylor Smylie

Scott M. Ward, Ph.D. **Lab Director**

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EJ3 Order #: 3493379
Project #: 103S864023141
Receipt Date: 28-Dec-2023
Analysis Date: 3-Jan-2024
Report Date: 3-Jan-2024

HDOH Kula Community Air

Sample Number **MFK-AM02-122423-AB**

Air Volume:	2776.689
Effective Filter Area:	385.0 mm^2
Level of Analysis (Chrysotile):	CDQ
Level of Analysis (Amphibole):	ADQ
Magnification Used for Fiber Counting:	20,000
Aspect Ratio for Fiber Definition:	5:1
Mean Dimension of Grid Openings (GOs):	0.0132 mm^2
Initials of Analyst:	TS
Number of GO's Examined:	10
Analytical Sensitivity: f/Liter:	1.05041
Analytical Sensitivity: f/cm3:	0.00105
Number of primary asbestos structures:	0
Number of asbestos structures counted:	0
Number of asbestos structures > 5 um :	0
Number of asbestos fibers and bundles > 5 um:	0
Number of PCM equivalent asbestos structures:	0
Number of PCM equivalent asbestos fibers:	0
Concentration of Asbestos (Chrysotile) f/cm3:	<0.00105
Concentration of Asbestos (Amphibole) f/cm3:	<0.00105
Concentration of PCME Asbestos (Chrysotile) f/cm3:	<0.00105
Concentration of Asbestos (Chrysotile), Str/L:	0
Concentration of Asbestos (Amphibole), Str/L:	0
Lower 95% Confidence Limit (Chrysotile), Str/L:	0
Upper 95% Confidence Limit (Chrysotile), Str/L:	3.9
Lower 95% Confidence Limit (Amphibole), Str/L:	0
Upper 95% Confidence Limit (Amphibole), Str/L:	3.9

Analyst: Taylor Smylie

Scott M. Ward, Ph.D. **Lab Director**

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EJ3 Order #: 3493379
Project #: 103S864023141
Receipt Date: 28-Dec-2023
Analysis Date: 3-Jan-2024
Report Date: 3-Jan-2024

HDOH Kula Community Air

Sample Number **MFK-AM03-122423-AB**

Air Volume:	2997.767
Effective Filter Area:	385.0 mm^2
Level of Analysis (Chrysotile):	CDQ
Level of Analysis (Amphibole):	ADQ
Magnification Used for Fiber Counting:	20,000
Aspect Ratio for Fiber Definition:	5:1
Mean Dimension of Grid Openings (GOs):	0.0132 mm^2
Initials of Analyst:	TS
Number of GO's Examined:	10
Analytical Sensitivity: f/Liter:	0.97295
Analytical Sensitivity: f/cm3:	0.00097
Number of primary asbestos structures:	0
Number of asbestos structures counted:	0
Number of asbestos structures > 5 um :	0
Number of asbestos fibers and bundles > 5 um:	0
Number of PCM equivalent asbestos structures:	0
Number of PCM equivalent asbestos fibers:	0
Concentration of Asbestos (Chrysotile) f/cm3:	<0.00097
Concentration of Asbestos (Amphibole) f/cm3:	<0.00097
Concentration of PCME Asbestos (Chrysotile) f/cm3:	<0.00097
Concentration of Asbestos (Chrysotile), Str/L:	0
Concentration of Asbestos (Amphibole), Str/L:	0
Lower 95% Confidence Limit (Chrysotile), Str/L:	0
Upper 95% Confidence Limit (Chrysotile), Str/L:	3.6
Lower 95% Confidence Limit (Amphibole), Str/L:	0
Upper 95% Confidence Limit (Amphibole), Str/L:	3.6

Analyst: Taylor Smylie

Scott M. Ward, Ph.D. **Lab Director**

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Maura McAleese
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EJ3 Order #: 3493379
Project #: 103S864023141
Receipt Date: 28-Dec-2023
Analysis Date: 3-Jan-2024
Report Date: 3-Jan-2024

HDOH Kula Community Air

Sample Number **MFK-FB01-122423-AB**

Air Volume:	0
Effective Filter Area:	385.0 mm^2
Level of Analysis (Chrysotile):	CDQ
Level of Analysis (Amphibole):	ADQ
Magnification Used for Fiber Counting:	20,000
Aspect Ratio for Fiber Definition:	5:1
Mean Dimension of Grid Openings (GOs):	0.0132 mm^2
Initials of Analyst:	TS
Number of GO's Examined:	10
Analytical Sensitivity: f/Liter:	N/A
Analytical Sensitivity: f/cm3:	N/A
Number of primary asbestos structures:	0
Number of asbestos structures counted:	0
Number of asbestos structures > 5 um :	0
Number of asbestos fibers and bundles > 5 um:	0
Number of PCM equivalent asbestos structures:	0
Number of PCM equivalent asbestos fibers:	0
Concentration of Asbestos (Chrysotile) f/cm3:	N/A
Concentration of Asbestos (Amphibole) f/cm3:	N/A
Concentration of PCME Asbestos (Chrysotile) f/cm3:	N/A
Concentration of Asbestos (Chrysotile), Str/L:	N/A
Concentration of Asbestos (Amphibole), Str/L:	N/A
Lower 95% Confidence Limit (Chrysotile), Str/L:	N/A
Upper 95% Confidence Limit (Chrysotile), Str/L:	N/A
Lower 95% Confidence Limit (Amphibole), Str/L:	N/A
Upper 95% Confidence Limit (Amphibole), Str/L:	N/A

Analyst: Taylor Smylie

Scott M. Ward, Ph.D. **Lab Director**

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Airborne Asbestos Fiber Analysis by Transmission Electron Microscopy (TEM) ISO 10312 - Ambient Air - Determination of Asbestos Fibers Direct-Transfer Transmission Electron Microscopy Method

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EJ3 Order #: 3495358
Project #: 103S864023141
Receipt Date: 2-Jan-2024
Analysis Date: 4-Jan-2024
Report Date: 4-Jan-2024

HDOH Kula Community Air

Sample Number **MFK-AM01-122723-AB**

Air Volume:	6989.499
Effective Filter Area:	385.0 mm^2
Level of Analysis (Chrysotile):	CDQ
Level of Analysis (Amphibole):	ADQ
Magnification Used for Fiber Counting:	20,000
Aspect Ratio for Fiber Definition:	5:1
Mean Dimension of Grid Openings (GOs):	0.0132 mm^2
Initials of Analyst:	AF
Number of GO's Examined:	10
Analytical Sensitivity: f/Liter:	0.41729
Analytical Sensitivity: f/cm3:	0.00042
Number of primary asbestos structures:	0
Number of asbestos structures counted:	0
Number of asbestos structures > 5 um :	0
Number of asbestos fibers and bundles > 5 um:	0
Number of PCM equivalent asbestos structures:	0
Number of PCM equivalent asbestos fibers:	0
Concentration of Asbestos (Chrysotile) f/cm3:	<0.00042
Concentration of Asbestos (Amphibole) f/cm3:	<0.00042
Concentration of PCME Asbestos (Chrysotile) f/cm3:	<0.00042
Concentration of Asbestos (Chrysotile), Str/L:	0
Concentration of Asbestos (Amphibole), Str/L:	0
Lower 95% Confidence Limit (Chrysotile), Str/L:	0
Upper 95% Confidence Limit (Chrysotile), Str/L:	1.5
Lower 95% Confidence Limit (Amphibole), Str/L:	0
Upper 95% Confidence Limit (Amphibole), Str/L:	1.5

Analyst: Arnold Flores

Scott M. Ward, Ph.D. **Lab Director**

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EJ3 Order #: 3495358
Project #: 103S864023141
Receipt Date: 2-Jan-2024
Analysis Date: 4-Jan-2024
Report Date: 4-Jan-2024

HDOH Kula Community Air

Sample Number **MFK-AM02-122723-AB**

Air Volume:	7907.303
Effective Filter Area:	385.0 mm^2
Level of Analysis (Chrysotile):	CDQ
Level of Analysis (Amphibole):	ADQ
Magnification Used for Fiber Counting:	20,000
Aspect Ratio for Fiber Definition:	5:1
Mean Dimension of Grid Openings (GOs):	0.0132 mm^2
Initials of Analyst:	AF
Number of GO's Examined:	10
Analytical Sensitivity: f/Liter:	0.36886
Analytical Sensitivity: f/cm3:	0.00037
Number of primary asbestos structures:	0
Number of asbestos structures counted:	0
Number of asbestos structures > 5 um :	0
Number of asbestos fibers and bundles > 5 um:	0
Number of PCM equivalent asbestos structures:	0
Number of PCM equivalent asbestos fibers:	0
Concentration of Asbestos (Chrysotile) f/cm3:	<0.00037
Concentration of Asbestos (Amphibole) f/cm3:	<0.00037
Concentration of PCME Asbestos (Chrysotile) f/cm3:	<0.00037
Concentration of Asbestos (Chrysotile), Str/L:	0
Concentration of Asbestos (Amphibole), Str/L:	0
Lower 95% Confidence Limit (Chrysotile), Str/L:	0
Upper 95% Confidence Limit (Chrysotile), Str/L:	1.4
Lower 95% Confidence Limit (Amphibole), Str/L:	0
Upper 95% Confidence Limit (Amphibole), Str/L:	1.4

Analyst: Arnold Flores

Scott M. Ward, Ph.D. **Lab Director**

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EJ3 Order #: 3495358
Project #: 103S864023141
Receipt Date: 2-Jan-2024
Analysis Date: 4-Jan-2024
Report Date: 4-Jan-2024

HDOH Kula Community Air

Sample Number **MFK-AM03-122723-AB**

Air Volume:	9694.414
Effective Filter Area:	385.0 mm^2
Level of Analysis (Chrysotile):	CDQ
Level of Analysis (Amphibole):	ADQ
Magnification Used for Fiber Counting:	20,000
Aspect Ratio for Fiber Definition:	5:1
Mean Dimension of Grid Openings (GOs):	0.0132 mm^2
Initials of Analyst:	AF
Number of GO's Examined:	10
Analytical Sensitivity: f/Liter:	0.30086
Analytical Sensitivity: f/cm3:	0.00030
Number of primary asbestos structures:	0
Number of asbestos structures counted:	0
Number of asbestos structures > 5 um :	0
Number of asbestos fibers and bundles > 5 um:	0
Number of PCM equivalent asbestos structures:	0
Number of PCM equivalent asbestos fibers:	0
Concentration of Asbestos (Chrysotile) f/cm3:	<0.00030
Concentration of Asbestos (Amphibole) f/cm3:	<0.00030
Concentration of PCME Asbestos (Chrysotile) f/cm3:	<0.00030
Concentration of Asbestos (Chrysotile), Str/L:	0
Concentration of Asbestos (Amphibole), Str/L:	0
Lower 95% Confidence Limit (Chrysotile), Str/L:	0
Upper 95% Confidence Limit (Chrysotile), Str/L:	1.1
Lower 95% Confidence Limit (Amphibole), Str/L:	0
Upper 95% Confidence Limit (Amphibole), Str/L:	1.1

Analyst: Arnold Flores

Scott M. Ward, Ph.D. **Lab Director**

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EJ3 Order #: 3495358
Project #: 103S864023141
Receipt Date: 2-Jan-2024
Analysis Date: 4-Jan-2024
Report Date: 4-Jan-2024

HDOH Kula Community Air

Sample Number **MFK-FB01-122723-AB**

Air Volume:	0
Effective Filter Area:	385.0 mm^2
Level of Analysis (Chrysotile):	CDQ
Level of Analysis (Amphibole):	ADQ
Magnification Used for Fiber Counting:	20,000
Aspect Ratio for Fiber Definition:	5:1
Mean Dimension of Grid Openings (GOs):	0.0132 mm^2
Initials of Analyst:	AF
Number of GO's Examined:	10
Analytical Sensitivity: f/Liter:	N/A
Analytical Sensitivity: f/cm3:	N/A
Number of primary asbestos structures:	0
Number of asbestos structures counted:	0
Number of asbestos structures > 5 um :	0
Number of asbestos fibers and bundles > 5 um:	0
Number of PCM equivalent asbestos structures:	0
Number of PCM equivalent asbestos fibers:	0
Concentration of Asbestos (Chrysotile) f/cm3:	N/A
Concentration of Asbestos (Amphibole) f/cm3:	N/A
Concentration of PCME Asbestos (Chrysotile) f/cm3:	N/A
Concentration of Asbestos (Chrysotile), Str/L:	N/A
Concentration of Asbestos (Amphibole), Str/L:	N/A
Lower 95% Confidence Limit (Chrysotile), Str/L:	N/A
Upper 95% Confidence Limit (Chrysotile), Str/L:	N/A
Lower 95% Confidence Limit (Amphibole), Str/L:	N/A
Upper 95% Confidence Limit (Amphibole), Str/L:	N/A

Analyst: Arnold Flores

Scott M. Ward, Ph.D. **Lab Director**

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Oakland, CA 94612

EJ3 Order #: 3495358
Project #: 103S864023141
Receipt Date: 2-Jan-2024
Analysis Date: 4-Jan-2024
Report Date: 4-Jan-2024

HDOH Kula Community Air

Sample Number **MFK-LB01-122723-AB**

Air Volume:	0
Effective Filter Area:	385.0 mm^2
Level of Analysis (Chrysotile):	CDQ
Level of Analysis (Amphibole):	ADQ
Magnification Used for Fiber Counting:	20,000
Aspect Ratio for Fiber Definition:	5:1
Mean Dimension of Grid Openings (GOs):	0.0132 mm^2
Initials of Analyst:	AF
Number of GO's Examined:	10
Analytical Sensitivity: f/Liter:	N/A
Analytical Sensitivity: f/cm3:	N/A
Number of primary asbestos structures:	0
Number of asbestos structures counted:	0
Number of asbestos structures > 5 um :	0
Number of asbestos fibers and bundles > 5 um:	0
Number of PCM equivalent asbestos structures:	0
Number of PCM equivalent asbestos fibers:	0
Concentration of Asbestos (Chrysotile) f/cm3:	N/A
Concentration of Asbestos (Amphibole) f/cm3:	N/A
Concentration of PCME Asbestos (Chrysotile) f/cm3:	N/A
Concentration of Asbestos (Chrysotile), Str/L:	N/A
Concentration of Asbestos (Amphibole), Str/L:	N/A
Lower 95% Confidence Limit (Chrysotile), Str/L:	N/A
Upper 95% Confidence Limit (Chrysotile), Str/L:	N/A
Lower 95% Confidence Limit (Amphibole), Str/L:	N/A
Upper 95% Confidence Limit (Amphibole), Str/L:	N/A

Analyst: Arnold Flores

Scott M. Ward, Ph.D. **Lab Director**

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NVLAP Lab Code: 200525-0; TDSHS License: 30-0273

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Report for:

Maura McAleese
Tetra Tech- Maui Fire
1999 Harrison St. Ste. 500
Oakland, CA 94612

Regarding: Eurofins J3 Resources, Inc.
Project: 103S864023141; HDOH Kula Community Air
EML ID: 3495311

Approved by:

Lab Director
Scott Ward

Dates of Analysis:
Asbestos TEM ISO 10312 / ASTM6281-06: 01-05-2024

All samples were received in acceptable condition unless noted in the Report Comments portion in the body of the report. Due to the nature of the analyses performed, field blank correction of results is not applied. The results relate only to the samples as received and tested.

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Airborne Asbestos Fiber Analysis by Transmission Electron Microscopy (TEM) ISO 10312 - Ambient Air - Determination of Asbestos Fibers Direct-Transfer Transmission Electron Microscopy Method

Maura McAleese
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1999 Harrison St, Ste. 500
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EJ3 Order #: 3495311
Project #: 103S864023141
Receipt Date: 2-Jan-2024
Analysis Date: 4-Jan-2024
Report Date: 4-Jan-2024

HDOH Kula Community Air

Sample Number **MFK-AM01-122823-AB**

Air Volume:	6446.938
Effective Filter Area:	385.0 mm^2
Level of Analysis (Chrysotile):	CDQ
Level of Analysis (Amphibole):	ADQ
Magnification Used for Fiber Counting:	20,000
Aspect Ratio for Fiber Definition:	5:1
Mean Dimension of Grid Openings (GOs):	0.0132 mm^2
Initials of Analyst:	AF
Number of GO's Examined:	10
Analytical Sensitivity: f/Liter:	0.45241
Analytical Sensitivity: f/cm3:	0.00045
Number of primary asbestos structures:	0
Number of asbestos structures counted:	0
Number of asbestos structures > 5 um :	0
Number of asbestos fibers and bundles > 5 um:	0
Number of PCM equivalent asbestos structures:	0
Number of PCM equivalent asbestos fibers:	0
Concentration of Asbestos (Chrysotile) f/cm3:	<0.00045
Concentration of Asbestos (Amphibole) f/cm3:	<0.00045
Concentration of PCME Asbestos (Chrysotile) f/cm3:	<0.00045
Concentration of Asbestos (Chrysotile), Str/L:	0
Concentration of Asbestos (Amphibole), Str/L:	0
Lower 95% Confidence Limit (Chrysotile), Str/L:	0
Upper 95% Confidence Limit (Chrysotile), Str/L:	1.7
Lower 95% Confidence Limit (Amphibole), Str/L:	0
Upper 95% Confidence Limit (Amphibole), Str/L:	1.7

Analyst: Arnold Flores

Scott M. Ward, Ph.D. **Lab Director**

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NVLAP Lab Code: 200525-0; TDSHS License: 30-0273

Eurofins J3 Resources, Inc.
6110 W. 34th Street, Houston, Texas 77092
Phone: (713) 290-0221 Fax: (713) 290-0248
j3resources.com

eurofins | J3 Resources

Airborne Asbestos Fiber Analysis by Transmission Electron Microscopy (TEM) ISO 10312 - Ambient Air - Determination of Asbestos Fibers Direct-Transfer Transmission Electron Microscopy Method

Maura McAleese
Tetra Tech
1999 Harrison St, Ste. 500
Oakland, CA 94612

EJ3 Order #: 3495311
Project #: 103S864023141
Receipt Date: 2-Jan-2024
Analysis Date: 4-Jan-2024
Report Date: 4-Jan-2024

HDOH Kula Community Air

Sample Number **MFK-AM02-122823-AB**

Air Volume:	4502.584
Effective Filter Area:	385.0 mm^2
Level of Analysis (Chrysotile):	CDQ
Level of Analysis (Amphibole):	ADQ
Magnification Used for Fiber Counting:	20,000
Aspect Ratio for Fiber Definition:	5:1
Mean Dimension of Grid Openings (GOs):	0.0132 mm^2
Initials of Analyst:	AF
Number of GO’s Examined:	10
Analytical Sensitivity: f/Liter:	0.64778
Analytical Sensitivity: f/cm3:	0.00065
Number of primary asbestos structures:	0
Number of asbestos structures counted:	0
Number of asbestos structures > 5 um :	0
Number of asbestos fibers and bundles > 5 um:	0
Number of PCM equivalent asbestos structures:	0
Number of PCM equivalent asbestos fibers:	0
Concentration of Asbestos (Chrysotile) f/cm3:	<0.00065
Concentration of Asbestos (Amphibole) f/cm3:	<0.00065
Concentration of PCME Asbestos (Chrysotile) f/cm3:	<0.00065
Concentration of Asbestos (Chrysotile), Str/L:	0
Concentration of Asbestos (Amphibole), Str/L:	0
Lower 95% Confidence Limit (Chrysotile), Str/L:	0
Upper 95% Confidence Limit (Chrysotile), Str/L:	2.4
Lower 95% Confidence Limit (Amphibole), Str/L:	0
Upper 95% Confidence Limit (Amphibole), Str/L:	2.4

Analyst: Arnold Flores

Scott M. Ward, Ph.D. **Lab Director**

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Airborne Asbestos Fiber Analysis by Transmission Electron Microscopy (TEM) ISO 10312 - Ambient Air - Determination of Asbestos Fibers Direct-Transfer Transmission Electron Microscopy Method

Maura McAleese		**EJ3 Order #:**	3495311
Tetra Tech		**Project #:**	103S864023141
1999 Harrison St, Ste. 500		**Receipt Date:**	2-Jan-2024
Oakland, CA 94612		**Analysis Date:**	4-Jan-2024
		Report Date:	4-Jan-2024

HDOH Kula Community Air

Sample Number **MFK-AM03-122823-AB**

Air Volume:	7776.869
Effective Filter Area:	385.0 mm^2
Level of Analysis (Chrysotile):	CDQ
Level of Analysis (Amphibole):	ADQ
Magnification Used for Fiber Counting:	20,000
Aspect Ratio for Fiber Definition:	5:1
Mean Dimension of Grid Openings (GOs):	0.0132 mm^2
Initials of Analyst:	AF
Number of GO's Examined:	10
Analytical Sensitivity: f/Liter:	0.37504
Analytical Sensitivity: f/cm3:	0.00038
Number of primary asbestos structures:	0
Number of asbestos structures counted:	0
Number of asbestos structures > 5 um :	0
Number of asbestos fibers and bundles > 5 um:	0
Number of PCM equivalent asbestos structures:	0
Number of PCM equivalent asbestos fibers:	0
Concentration of Asbestos (Chrysotile) f/cm3:	<0.00038
Concentration of Asbestos (Amphibole) f/cm3:	<0.00038
Concentration of PCME Asbestos (Chrysotile) f/cm3:	<0.00038
Concentration of Asbestos (Chrysotile), Str/L:	0
Concentration of Asbestos (Amphibole), Str/L:	0
Lower 95% Confidence Limit (Chrysotile), Str/L:	0
Upper 95% Confidence Limit (Chrysotile), Str/L:	1.4
Lower 95% Confidence Limit (Amphibole), Str/L:	0
Upper 95% Confidence Limit (Amphibole), Str/L:	1.4

Analyst: Arnold Flores

Scott M. Ward, Ph.D. **Lab Director**

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j3resources.com

Airborne Asbestos Fiber Analysis by Transmission Electron Microscopy (TEM) ISO 10312 - Ambient Air - Determination of Asbestos Fibers Direct-Transfer Transmission Electron Microscopy Method

Maura McAleese
Tetra Tech
1999 Harrison St, Ste. 500
Oakland, CA 94612

EJ3 Order #: 3495311
Project #: 103S864023141
Receipt Date: 2-Jan-2024
Analysis Date: 5-Jan-2024
Report Date: 5-Jan-2024

HDOH Kula Community Air

Sample Number **MFK-FB01-122823-AB**

Air Volume:	0
Effective Filter Area:	385.0 mm^2
Level of Analysis (Chrysotile):	CDQ
Level of Analysis (Amphibole):	ADQ
Magnification Used for Fiber Counting:	20,000
Aspect Ratio for Fiber Definition:	5:1
Mean Dimension of Grid Openings (GOs):	0.0132 mm^2
Initials of Analyst:	AF
Number of GO's Examined:	10
Analytical Sensitivity: f/Liter:	N/A
Analytical Sensitivity: f/cm3:	N/A
Number of primary asbestos structures:	0
Number of asbestos structures counted:	0
Number of asbestos structures > 5 um :	0
Number of asbestos fibers and bundles > 5 um:	0
Number of PCM equivalent asbestos structures:	0
Number of PCM equivalent asbestos fibers:	0
Concentration of Asbestos (Chrysotile) f/cm3:	N/A
Concentration of Asbestos (Amphibole) f/cm3:	N/A
Concentration of PCME Asbestos (Chrysotile) f/cm3:	N/A
Concentration of Asbestos (Chrysotile), Str/L:	N/A
Concentration of Asbestos (Amphibole), Str/L:	N/A
Lower 95% Confidence Limit (Chrysotile), Str/L:	N/A
Upper 95% Confidence Limit (Chrysotile), Str/L:	N/A
Lower 95% Confidence Limit (Amphibole), Str/L:	N/A
Upper 95% Confidence Limit (Amphibole), Str/L:	N/A

Analyst: Arnold Flores

Scott M. Ward, Ph.D. **Lab Director**

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Airborne Asbestos Fiber Analysis by Transmission Electron Microscopy (TEM) ISO 10312 - Ambient Air - Determination of Asbestos Fibers Direct-Transfer Transmission Electron Microscopy Method

Maura McAleese
Tetra Tech
1999 Harrison St, Ste. 500
Oakland, CA 94612

EJ3 Order #: 3495311
Project #: 103S864023141
Receipt Date: 2-Jan-2024
Analysis Date: 5-Jan-2024
Report Date: 5-Jan-2024

HDOH Kula Community Air

Sample Number **MFK-AM01-122923-AB**

Air Volume:	2448.073
Effective Filter Area:	385.0 mm^2
Level of Analysis (Chrysotile):	CDQ
Level of Analysis (Amphibole):	ADQ
Magnification Used for Fiber Counting:	20,000
Aspect Ratio for Fiber Definition:	5:1
Mean Dimension of Grid Openings (GOs):	0.0132 mm^2
Initials of Analyst:	AF
Number of GO's Examined:	10
Analytical Sensitivity: f/Liter:	1.19141
Analytical Sensitivity: f/cm3:	0.00119
Number of primary asbestos structures:	0
Number of asbestos structures counted:	0
Number of asbestos structures > 5 um :	0
Number of asbestos fibers and bundles > 5 um:	0
Number of PCM equivalent asbestos structures:	0
Number of PCM equivalent asbestos fibers:	0
Concentration of Asbestos (Chrysotile) f/cm3:	<0.00119
Concentration of Asbestos (Amphibole) f/cm3:	<0.00119
Concentration of PCME Asbestos (Chrysotile) f/cm3:	<0.00119
Concentration of Asbestos (Chrysotile), Str/L:	0
Concentration of Asbestos (Amphibole), Str/L:	0
Lower 95% Confidence Limit (Chrysotile), Str/L:	0
Upper 95% Confidence Limit (Chrysotile), Str/L:	4.4
Lower 95% Confidence Limit (Amphibole), Str/L:	0
Upper 95% Confidence Limit (Amphibole), Str/L:	4.4

Analyst: Arnold Flores

Scott M. Ward, Ph.D. **Lab Director**

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Airborne Asbestos Fiber Analysis
by Transmission Electron Microscopy (TEM)
ISO 10312 - Ambient Air - Determination of Asbestos Fibers
Direct-Transfer Transmission Electron Microscopy Method

Maura McAleese
Tetra Tech
1999 Harrison St, Ste. 500
Oakland, CA 94612

EJ3 Order #: 3495311
Project #: 103S864023141
Receipt Date: 2-Jan-2024
Analysis Date: 5-Jan-2024
Report Date: 5-Jan-2024

HDOH Kula Community Air

Sample Number **MFK-AM02-122923-AB**

Air Volume:	6461.735
Effective Filter Area:	385.0 mm^2
Level of Analysis (Chrysotile):	CDQ
Level of Analysis (Amphibole):	ADQ
Magnification Used for Fiber Counting:	20,000
Aspect Ratio for Fiber Definition:	5:1
Mean Dimension of Grid Openings (GOs):	0.0132 mm^2
Initials of Analyst:	AF
Number of GO's Examined:	10
Analytical Sensitivity: f/Liter:	0.45138
Analytical Sensitivity: f/cm3:	0.00045
Number of primary asbestos structures:	0
Number of asbestos structures counted:	0
Number of asbestos structures > 5 um :	0
Number of asbestos fibers and bundles > 5 um:	0
Number of PCM equivalent asbestos structures:	0
Number of PCM equivalent asbestos fibers:	0
Concentration of Asbestos (Chrysotile) f/cm3:	<0.00045
Concentration of Asbestos (Amphibole) f/cm3:	<0.00045
Concentration of PCME Asbestos (Chrysotile) f/cm3:	<0.00045
Concentration of Asbestos (Chrysotile), Str/L:	0
Concentration of Asbestos (Amphibole), Str/L:	0
Lower 95% Confidence Limit (Chrysotile), Str/L:	0
Upper 95% Confidence Limit (Chrysotile), Str/L:	1.7
Lower 95% Confidence Limit (Amphibole), Str/L:	0
Upper 95% Confidence Limit (Amphibole), Str/L:	1.7

Analyst: Arnold Flores

Scott M. Ward, Ph.D. **Lab Director**

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Maura McAleese
Tetra Tech
1999 Harrison St, Ste. 500
Oakland, CA 94612

EJ3 Order #: 3495311
Project #: 103S864023141
Receipt Date: 2-Jan-2024
Analysis Date: 5-Jan-2024
Report Date: 5-Jan-2024

HDOH Kula Community Air

Sample Number **MFK-AM03-122923-AB**

Air Volume:	1094.381
Effective Filter Area:	385.0 mm^2
Level of Analysis (Chrysotile):	CDQ
Level of Analysis (Amphibole):	ADQ
Magnification Used for Fiber Counting:	20,000
Aspect Ratio for Fiber Definition:	5:1
Mean Dimension of Grid Openings (GOs):	0.0132 mm^2
Initials of Analyst:	AF
Number of GO's Examined:	10
Analytical Sensitivity: f/Liter:	2.66513
Analytical Sensitivity: f/cm3:	0.00267
Number of primary asbestos structures:	0
Number of asbestos structures counted:	0
Number of asbestos structures > 5 um :	0
Number of asbestos fibers and bundles > 5 um:	0
Number of PCM equivalent asbestos structures:	0
Number of PCM equivalent asbestos fibers:	0
Concentration of Asbestos (Chrysotile) f/cm3:	<0.00267
Concentration of Asbestos (Amphibole) f/cm3:	<0.00267
Concentration of PCME Asbestos (Chrysotile) f/cm3:	<0.00267
Concentration of Asbestos (Chrysotile), Str/L:	0
Concentration of Asbestos (Amphibole), Str/L:	0
Lower 95% Confidence Limit (Chrysotile), Str/L:	0
Upper 95% Confidence Limit (Chrysotile), Str/L:	9.8
Lower 95% Confidence Limit (Amphibole), Str/L:	0
Upper 95% Confidence Limit (Amphibole), Str/L:	9.8

Analyst: Arnold Flores

Scott M. Ward, Ph.D. **Lab Director**

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Maura McAleese
Tetra Tech
1999 Harrison St, Ste. 500
Oakland, CA 94612

EJ3 Order #: 3495311
Project #: 103S864023141
Receipt Date: 2-Jan-2024
Analysis Date: 5-Jan-2024
Report Date: 5-Jan-2024

HDOH Kula Community Air

Sample Number **MFK-FB01-122923-AB**

Air Volume:	0
Effective Filter Area:	385.0 mm^2
Level of Analysis (Chrysotile):	CDQ
Level of Analysis (Amphibole):	ADQ
Magnification Used for Fiber Counting:	20,000
Aspect Ratio for Fiber Definition:	5:1
Mean Dimension of Grid Openings (GOs):	0.0132 mm^2
Initials of Analyst:	AF
Number of GO’s Examined:	10
Analytical Sensitivity: f/Liter:	N/A
Analytical Sensitivity: f/cm3:	N/A
Number of primary asbestos structures:	0
Number of asbestos structures counted:	0
Number of asbestos structures > 5 um :	0
Number of asbestos fibers and bundles > 5 um:	0
Number of PCM equivalent asbestos structures:	0
Number of PCM equivalent asbestos fibers:	0
Concentration of Asbestos (Chrysotile) f/cm3:	N/A
Concentration of Asbestos (Amphibole) f/cm3:	N/A
Concentration of PCME Asbestos (Chrysotile) f/cm3:	N/A
Concentration of Asbestos (Chrysotile), Str/L:	N/A
Concentration of Asbestos (Amphibole), Str/L:	N/A
Lower 95% Confidence Limit (Chrysotile), Str/L:	N/A
Upper 95% Confidence Limit (Chrysotile), Str/L:	N/A
Lower 95% Confidence Limit (Amphibole), Str/L:	N/A
Upper 95% Confidence Limit (Amphibole), Str/L:	N/A

Analyst: Arnold Flores

Scott M. Ward, Ph.D. **Lab Director**

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NVLAP Lab Code: 200525-0; TDSHS License: 30-0273

Eastern Research Group
601 Keystone Park Drive
Suite 700
Morrisville, NC 27560

November 21, 2023

Ms. Chelsea Saber
Tetra Tech, Inc.
1777 Sentry Pkwy, Bldg 12
Blue Bell, PA 19422
Project Name: Maui fires

Dear Ms. Chelsea Saber,

This report contains the analytical results for the sample(s) received under chain(s) of custody by Eastern Research Group on 11/15/23 13:08.

Values below the MDL for QC results in this report are recorded as ND, however the actual values are reported in the accompanying Excel report with a "U" flag (Under the detection limit). The actual values are reported in AQS.

This test is accredited under the 2016 TNI Standard for Environmental Laboratories (FL DOH Certification # E87673). All analyses were performed as described in the US EPA-approved QAPP, under the contract for National Hazardous Air Pollutant Support (US EPA Contract No. 68HERH22D0002). This cover page is an integral part of this report, and any exceptions or comments are noted on the last page.

Release of the data contained in this data package and in the data submitted in the electronic data deliverable, has been authorized by the Program Manager, or the Program Manager's designee as verified by the following signature.

The issuance of the final Certificate of Analysis takes precedence over any previous Report. If you have any questions, please contact me at 919-468-7924.

Sincerely,

Julie Swift
Program Manager
julie.swift@erg.com

The information contained in this report and its attachment(s) are intended only for the use of the individual to whom it is addressed and may contain information that is privileged, confidential, or exempt from disclosure. If the reader of this message is not the intended recipient, you are hereby notified that any dissemination, distribution, or copying of this report is strictly prohibited. If you have received this report in error, please notify julie.swift@erg.com and delete the report without retaining any copies.

CERTIFICATE OF ANALYSIS

Tetra Tech, Inc.
1777 Sentry Pkwy, Bldg 12
Blue Bell, PA 19422
ATTN: Ms. Chelsea Saber
PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 11/21/23 13:30
SUBMITTED: 11/15/23
AQS SITE CODE:
SITE CODE: Maui fires

ANALYTICAL REPORT FOR SAMPLES

SampleName	LabNumber	Matrix	Sampled	Received
Q9541253	3111547-01	Air	11/11/23 23:59	11/15/23 13:08
Q9541250	3111547-02	Air	11/12/23 23:59	11/15/23 13:08
Q9541247	3111547-03	Air	11/12/23 23:59	11/15/23 13:08
Q9541246	3111547-04	Air	11/12/23 23:59	11/15/23 13:08

The results in this report apply only to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

CERTIFICATE OF ANALYSIS

ERG

Tetra Tech, Inc.
1777 Sentry Pkwy, Bldg 12
Blue Bell, PA 19422
ATTN: Ms. Chelsea Saber
PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 11/21/23 13:30
SUBMITTED: 11/15/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: Q9541253 **Lab ID:** 3111547-01 **Sampled:** 11/11/23 23:59
Matrix: Air **Sample Volume:** 1639.8 m³ **Received:** 11/15/23 13:08
Filter ID: **Analysis Date:** 11/18/23 02:37
Comments: MFK-AM-03-111123-HM - Sample received unfolded in envelope

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	**7429-90-5**	**530**		**31.8**
Antimony	**7440-36-0**	**0.123**	SL	**0.0438**
Arsenic	**7440-38-2**	**0.170**		**0.00948**
Barium	**7440-39-3**	**7.56**		**0.941**
Beryllium	**7440-41-7**	**0.0224**		**0.00329**
Cadmium	7440-43-9	0.0124	U	0.108
Calcium	**7440-70-2**	**537**		**290**
Chromium	**7440-47-3**	**2.27**		**2.01**
Cobalt	**7440-48-4**	**0.447**		**0.0155**
Copper	**7440-50-8**	**27.0**		**2.98**
Iron	**7439-89-6**	**778**		**24.0**
Lead	**7439-92-1**	**0.390**		**0.274**
Magnesium	**7439-95-4**	**311**		**95.6**
Manganese	**7439-96-5**	**24.2**		**1.18**
Molybdenum	**7439-98-7**	**0.867**		**0.211**
Nickel	**7440-02-0**	**1.09**		**0.795**
Phosphorus	7723-14-0	406	U, E, ICS-01, LK, QX	1240
Potassium	**7440-09-7**	**138**		**37.7**
Rubidium		**0.253**		**0.0182**
Selenium	**7782-49-2**	**0.237**		**0.0109**
Sodium	**7440-23-5**	**2570**	E, ICS-01, LK	**1980**
Strontium	**7440-24-6**	**4.88**		**0.647**
Thallium	**7440-28-0**	**0.00156**		**4.99E-4**
Thorium	**7440-29-01**	**0.0229**		**0.00298**
Uranium	NA	0.0160	U	0.0169
Vanadium	**7440-62-2**	**2.43**		**0.0488**
Zinc	7440-66-6	15.1	U	96.9

CERTIFICATE OF ANALYSIS

Tetra Tech, Inc.
1777 Sentry Pkwy, Bldg 12
Blue Bell, PA 19422
ATTN: Ms. Chelsea Saber
PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 11/21/23 13:30
SUBMITTED: 11/15/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: Q9541250 **Lab ID:** 3111547-02 **Sampled:** 11/12/23 23:59
Matrix: Air **Sample Volume:** 1641.6 m³ **Received:** 11/15/23 13:08
Filter ID: **Analysis Date:** 11/17/23 17:44
Comments: MFK-AM-01-111223-HM - Sample received unfolded in envelope

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	**7429-90-5**	**703**		**31.8**
Antimony	**7440-36-0**	**0.120**	SL	**0.0437**
Arsenic	**7440-38-2**	**0.211**		**0.00947**
Barium	**7440-39-3**	**8.02**		**0.940**
Beryllium	**7440-41-7**	**0.0259**		**0.00329**
Cadmium	7440-43-9	0.0172	U	0.108
Calcium	**7440-70-2**	**638**		**289**
Chromium	**7440-47-3**	**2.63**		**2.01**
Cobalt	**7440-48-4**	**0.517**		**0.0155**
Copper	**7440-50-8**	**19.9**		**2.97**
Iron	**7439-89-6**	**949**		**24.0**
Lead	**7439-92-1**	**0.480**		**0.274**
Magnesium	**7439-95-4**	**345**		**95.5**
Manganese	**7439-96-5**	**27.5**		**1.18**
Molybdenum	**7439-98-7**	**0.848**		**0.211**
Nickel	**7440-02-0**	**1.26**		**0.794**
Phosphorus	7723-14-0	404	U, E, ICS-01, LK, QX	1240
Potassium	**7440-09-7**	**145**		**37.7**
Rubidium		**0.293**		**0.0181**
Selenium	**7782-49-2**	**0.264**		**0.0109**
Sodium	**7440-23-5**	**2640**	E, ICS-01, LK	**1980**
Strontium	**7440-24-6**	**6.21**		**0.646**
Thallium	**7440-28-0**	**0.00228**		**4.99E-4**
Thorium	**7440-29-01**	**0.0273**		**0.00297**
Uranium	**NA**	**0.0195**		**0.0168**
Vanadium	**7440-62-2**	**2.87**		**0.0488**
Zinc	7440-66-6	18.1	U	96.8

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Tetra Tech, Inc.
1777 Sentry Pkwy, Bldg 12
Blue Bell, PA 19422
ATTN: Ms. Chelsea Saber
PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 11/21/23 13:30
SUBMITTED: 11/15/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: Q9541247 **Lab ID:** 3111547-03 **Sampled:** 11/12/23 23:59
Matrix: Air **Sample Volume:** 1627.2 m³ **Received:** 11/15/23 13:08
Filter ID: **Analysis Date:** 11/18/23 02:53
Comments: MFK-AM-02-111223-HM - Sample received unfolded in envelope

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	**7429-90-5**	**851**	E	**32.1**
Antimony	**7440-36-0**	**0.0881**	SL	**0.0441**
Arsenic	**7440-38-2**	**0.262**		**0.00955**
Barium	**7440-39-3**	**9.23**		**0.948**
Beryllium	**7440-41-7**	**0.0277**		**0.00332**
Cadmium	7440-43-9	0.0154	U	0.109
Calcium	**7440-70-2**	**664**		**292**
Chromium	**7440-47-3**	**2.68**		**2.03**
Cobalt	**7440-48-4**	**0.543**		**0.0156**
Copper	**7440-50-8**	**10.9**		**3.00**
Iron	**7439-89-6**	**1030**		**24.2**
Lead	**7439-92-1**	**0.379**		**0.276**
Magnesium	**7439-95-4**	**342**		**96.4**
Manganese	**7439-96-5**	**29.3**		**1.19**
Molybdenum	**7439-98-7**	**0.571**		**0.213**
Nickel	**7440-02-0**	**2.04**		**0.801**
Phosphorus	7723-14-0	468	U, E, ICS-01, LK, QX	1250
Potassium	**7440-09-7**	**169**		**38.0**
Rubidium		**0.344**		**0.0183**
Selenium	**7782-49-2**	**0.256**		**0.0110**
Sodium	**7440-23-5**	**2700**	E, ICS-01, LK	**2000**
Strontium	**7440-24-6**	**6.79**		**0.652**
Thallium	**7440-28-0**	**0.00246**		**5.03E-4**
Thorium	**7440-29-01**	**0.0292**		**0.00300**
Uranium	**NA**	**0.0210**		**0.0170**
Vanadium	**7440-62-2**	**2.94**		**0.0492**
Zinc	7440-66-6	10.3	U	97.7

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FILE #: 0000.00
REPORTED: 11/21/23 13:30
SUBMITTED: 11/15/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: Q9541246 **Lab ID:** 3111547-04 **Sampled:** 11/12/23 23:59
Matrix: Air **Sample Volume:** 1834.56 m^3 **Received:** 11/15/23 13:08
Filter ID: **Analysis Date:** 11/18/23 03:48
Comments: MFK-AM-03-111223-HM - Sample received unfolded in envelope

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	**7429-90-5**	**675**		**28.5**
Antimony	**7440-36-0**	**0.0881**	SL	**0.0391**
Arsenic	**7440-38-2**	**0.220**		**0.00847**
Barium	**7440-39-3**	**8.73**		**0.841**
Beryllium	**7440-41-7**	**0.0259**		**0.00294**
Cadmium	7440-43-9	0.0141	U	0.0967
Calcium	**7440-70-2**	**583**		**259**
Chromium	**7440-47-3**	**2.40**		**1.80**
Cobalt	**7440-48-4**	**0.565**		**0.0138**
Copper	**7440-50-8**	**17.1**		**2.66**
Iron	**7439-89-6**	**1020**		**21.5**
Lead	**7439-92-1**	**0.345**		**0.245**
Magnesium	**7439-95-4**	**317**		**85.5**
Manganese	**7439-96-5**	**30.1**		**1.06**
Molybdenum	**7439-98-7**	**0.648**		**0.189**
Nickel	**7440-02-0**	**1.10**		**0.710**
Phosphorus	7723-14-0	385	U, E, ICS-01, LK, QX	1110
Potassium	**7440-09-7**	**146**		**33.7**
Rubidium		**0.305**		**0.0162**
Selenium	**7782-49-2**	**0.243**		**0.00976**
Sodium	**7440-23-5**	**2400**	E, ICS-01, LK	**1770**
Strontium	**7440-24-6**	**5.77**		**0.578**
Thallium	**7440-28-0**	**0.00244**		**4.46E-4**
Thorium	**7440-29-01**	**0.0336**		**0.00266**
Uranium	**NA**	**0.0212**		**0.0151**
Vanadium	**7440-62-2**	**2.92**		**0.0436**
Zinc	7440-66-6	8.69	U	86.6

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SUBMITTED: 11/15/23
AQS SITE CODE:
SITE CODE: Maui fires

Inorganics by Compendium Method IO-3.5 - Quality Control

Batch 2311043 - B3K1601

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Calibration Blank (2311043-CCB1)				Prepared: 11/16/23 Analyzed: 11/17/23						
Aluminum	41.6		ng/l							
Antimony	1.87		ng/l							
Arsenic	-1.80		ng/l							U
Barium	5.10		ng/l							
Beryllium	-0.108		ng/l							U
Cadmium	0.862		ng/l							
Calcium	801		ng/l							
Chromium	8.29		ng/l							
Cobalt	1.16		ng/l							
Copper	61.2		ng/l							
Iron	145		ng/l							
Lead	11.9		ng/l							
Magnesium	46.5		ng/l							
Manganese	15.1		ng/l							
Molybdenum	39.8		ng/l							
Nickel	2.50		ng/l							
Phosphorus	106		ng/l							ICS-01, LK, QX
Potassium	2360		ng/l							
Rubidium	-0.371		ng/l							U
Selenium	-2.22		ng/l							U
Sodium	-3210		ng/l							ICS-01, LK, U
Strontium	0.927		ng/l							
Thallium	0.499		ng/l							
Thorium	0.391		ng/l							
Uranium	0.0504		ng/l							
Vanadium	-57.9		ng/l							U
Zinc	-15.4		ng/l							U
Calibration Blank (2311043-CCB2)				Prepared: 11/16/23 Analyzed: 11/17/23						
Aluminum	33.7		ng/l							
Antimony	1.30		ng/l							
Arsenic	1.95		ng/l							
Barium	4.42		ng/l							
Beryllium	-0.359		ng/l							U
Cadmium	0.569		ng/l							
Calcium	286		ng/l							
Chromium	7.03		ng/l							
Cobalt	0.989		ng/l							

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Blue Bell, PA 19422
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FILE #: 0000.00
REPORTED: 11/21/23 13:30
SUBMITTED: 11/15/23
AQS SITE CODE:
SITE CODE: Maui fires

Inorganics by Compendium Method IO-3.5 - Quality Control

Batch 2311043 - B3K1601

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Calibration Blank (2311043-CCB2) Contin				Prepared: 11/16/23 Analyzed: 11/17/23						
Copper	49.3		ng/l							
Iron	143		ng/l							
Lead	11.9		ng/l							
Magnesium	39.1		ng/l							
Manganese	9.63		ng/l							
Molybdenum	12.2		ng/l							
Nickel	2.73		ng/l							
Phosphorus	-20.4		ng/l							ICS-01, LK, QX, U
Potassium	1010		ng/l							
Rubidium	0.765		ng/l							
Selenium	2.26		ng/l							
Sodium	-3920		ng/l							ICS-01, LK, U
Strontium	0.601		ng/l							
Thallium	0.498		ng/l							
Thorium	0.814		ng/l							
Uranium	0.00911		ng/l							
Vanadium	-64.0		ng/l							U
Zinc	-42.7		ng/l							U
Calibration Blank (2311043-CCB3)				Prepared: 11/16/23 Analyzed: 11/17/23						
Aluminum	47.4		ng/l							
Antimony	1.51		ng/l							
Arsenic	-3.21		ng/l							U
Barium	3.95		ng/l							
Beryllium	-0.706		ng/l							U
Cadmium	0.456		ng/l							
Calcium	251		ng/l							
Chromium	5.93		ng/l							
Cobalt	0.737		ng/l							
Copper	43.9		ng/l							
Iron	91.0		ng/l							
Lead	13.0		ng/l							
Magnesium	34.5		ng/l							
Manganese	8.71		ng/l							
Molybdenum	15.6		ng/l							
Nickel	4.22		ng/l							
Phosphorus	-160		ng/l							ICS-01, LK, QX, U
Potassium	633		ng/l							

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Inorganics by Compendium Method IO-3.5 - Quality Control

Batch 2311043 - B3K1601

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Calibration Blank (2311043-CCB3) Contin				Prepared: 11/16/23 Analyzed: 11/17/23						
Rubidium	-0.0142		ng/l							U
Selenium	-0.348		ng/l							U
Sodium	-5730		ng/l							ICS-01, LK, U
Strontium	-0.111		ng/l							U
Thallium	0.428		ng/l							
Thorium	0.916		ng/l							
Uranium	0.00701		ng/l							
Vanadium	-67.3		ng/l							U
Zinc	-61.7		ng/l							U
Calibration Blank (2311043-CCB4)				Prepared: 11/16/23 Analyzed: 11/18/23						
Aluminum	-6.92		ng/l							U
Antimony	1.48		ng/l							
Arsenic	0.304		ng/l							
Barium	4.99		ng/l							
Beryllium	-0.852		ng/l							U
Cadmium	0.542		ng/l							
Calcium	347		ng/l							
Chromium	6.09		ng/l							
Cobalt	0.998		ng/l							
Copper	57.8		ng/l							
Iron	118		ng/l							
Lead	10.8		ng/l							
Magnesium	58.2		ng/l							
Manganese	11.2		ng/l							
Molybdenum	13.4		ng/l							
Nickel	5.80		ng/l							
Phosphorus	38.3		ng/l							ICS-01, LK, QX
Potassium	127		ng/l							
Rubidium	0.556		ng/l							
Selenium	11.3		ng/l							
Sodium	-4480		ng/l							ICS-01, LK, U
Strontium	1.92		ng/l							
Thallium	0.360		ng/l							
Thorium	0.489		ng/l							
Uranium	0.0121		ng/l							
Vanadium	-65.2		ng/l							U
Zinc	-45.4		ng/l							U

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SUBMITTED: 11/15/23
AQS SITE CODE:
SITE CODE: Maui fires

Inorganics by Compendium Method IO-3.5 - Quality Control

Batch 2311043 - B3K1601

Calibration Blank (2311043-CCB5) Prepared: 11/16/23 Analyzed: 11/18/23

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Aluminum	101		ng/l							
Antimony	1.89		ng/l							
Arsenic	-0.504		ng/l							U
Barium	5.84		ng/l							
Beryllium	-0.952		ng/l							U
Cadmium	0.677		ng/l							
Calcium	717		ng/l							
Chromium	7.19		ng/l							
Cobalt	0.920		ng/l							
Copper	56.9		ng/l							
Iron	183		ng/l							
Lead	11.1		ng/l							
Magnesium	69.2		ng/l							
Manganese	12.6		ng/l							
Molybdenum	33.7		ng/l							
Nickel	5.69		ng/l							
Phosphorus	35.2		ng/l							ICS-01, LK, QX
Potassium	1010		ng/l							
Rubidium	-0.160		ng/l							U
Selenium	6.04		ng/l							
Sodium	-5750		ng/l							ICS-01, LK, U
Strontium	1.84		ng/l							
Thallium	0.408		ng/l							
Thorium	0.677		ng/l							
Uranium	0.0332		ng/l							
Vanadium	-67.6		ng/l							U
Zinc	-57.8		ng/l							U

Calibration Check (2311043-CCV1) Prepared: 11/16/23 Analyzed: 11/17/23

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Aluminum	1.56E6		ng/l	1.5000E6		104	90-110			
Antimony	20300		ng/l	20000		101	90-110			
Arsenic	20000		ng/l	20000		100	90-110			
Barium	200000		ng/l	200000		100	90-110			
Beryllium	4880		ng/l	5000.0		97.6	90-110			
Cadmium	20500		ng/l	20000		102	90-110			
Calcium	2.61E7		ng/l	2.5000E7		104	90-110			
Chromium	244000		ng/l	240000		102	90-110			
Cobalt	53400		ng/l	50000		107	90-110			
Copper	2.10E6		ng/l	2.0000E6		105	90-110			

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AQS SITE CODE:
SITE CODE: Maui fires

Inorganics by Compendium Method IO-3.5 - Quality Control

Batch 2311043 - B3K1601

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Calibration Check (2311043-CCV1) Contin				Prepared: 11/16/23		Analyzed: 11/17/23				
Iron	2.63E6		ng/l	2.5000E6		105	90-110			
Lead	201000		ng/l	200000		100	90-110			
Magnesium	1.07E6		ng/l	1.0000E6		107	90-110			
Manganese	515000		ng/l	500000		103	90-110			
Molybdenum	50600		ng/l	50000		101	90-110			
Nickel	129000		ng/l	120000		108	90-110			
Phosphorus	208000		ng/l	200000		104	90-110			ICS-01, LK, QX
Potassium	2.66E6		ng/l	2.5000E6		107	90-110			
Rubidium	10000		ng/l	10000		100	90-110			
Selenium	19900		ng/l	20000		99.6	90-110			
Sodium	2.67E6		ng/l	2.5000E6		107	90-110			ICS-01, LK
Strontium	50300		ng/l	50000		101	90-110			
Thallium	510		ng/l	500.00		102	90-110			
Thorium	495		ng/l	500.00		99.1	90-110			
Uranium	496		ng/l	500.00		99.1	90-110			
Vanadium	20400		ng/l	20000		102	90-110			
Zinc	538000		ng/l	500000		108	90-110			
Calibration Check (2311043-CCV2)				Prepared: 11/16/23		Analyzed: 11/17/23				
Aluminum	1.47E6		ng/l	1.5000E6		97.8	90-110			
Antimony	20300		ng/l	20000		102	90-110			
Arsenic	20000		ng/l	20000		100	90-110			
Barium	201000		ng/l	200000		100	90-110			
Beryllium	4710		ng/l	5000.0		94.2	90-110			
Cadmium	20600		ng/l	20000		103	90-110			
Calcium	2.52E7		ng/l	2.5000E7		101	90-110			
Chromium	244000		ng/l	240000		102	90-110			
Cobalt	51700		ng/l	50000		103	90-110			
Copper	2.07E6		ng/l	2.0000E6		103	90-110			
Iron	2.54E6		ng/l	2.5000E6		102	90-110			
Lead	201000		ng/l	200000		101	90-110			
Magnesium	999000		ng/l	1.0000E6		99.9	90-110			
Manganese	497000		ng/l	500000		99.4	90-110			
Molybdenum	51700		ng/l	50000		103	90-110			
Nickel	126000		ng/l	120000		105	90-110			
Phosphorus	193000		ng/l	200000		96.3	90-110			ICS-01, LK, QX
Potassium	2.53E6		ng/l	2.5000E6		101	90-110			
Rubidium	10000		ng/l	10000		100	90-110			

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FILE #: 0000.00
REPORTED: 11/21/23 13:30
SUBMITTED: 11/15/23
AQS SITE CODE:
SITE CODE: Maui fires

Inorganics by Compendium Method IO-3.5 - Quality Control

Batch 2311043 - B3K1601

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Calibration Check (2311043-CCV2) Contin				Prepared: 11/16/23 Analyzed: 11/17/23						
Selenium	19900		ng/l	20000		99.7	90-110			
Sodium	2.50E6		ng/l	2.5000E6		100	90-110			ICS-01, LK
Strontium	50200		ng/l	50000		100	90-110			
Thallium	505		ng/l	500.00		101	90-110			
Thorium	502		ng/l	500.00		100	90-110			
Uranium	501		ng/l	500.00		100	90-110			
Vanadium	20300		ng/l	20000		101	90-110			
Zinc	529000		ng/l	500000		106	90-110			
Calibration Check (2311043-CCV3)				Prepared: 11/16/23 Analyzed: 11/17/23						
Aluminum	1.45E6		ng/l	1.5000E6		96.7	90-110			
Antimony	20400		ng/l	20000		102	90-110			
Arsenic	20000		ng/l	20000		100	90-110			
Barium	200000		ng/l	200000		99.9	90-110			
Beryllium	4640		ng/l	5000.0		92.7	90-110			
Cadmium	20700		ng/l	20000		104	90-110			
Calcium	2.53E7		ng/l	2.5000E7		101	90-110			
Chromium	244000		ng/l	240000		102	90-110			
Cobalt	51500		ng/l	50000		103	90-110			
Copper	2.05E6		ng/l	2.0000E6		103	90-110			
Iron	2.54E6		ng/l	2.5000E6		102	90-110			
Lead	203000		ng/l	200000		101	90-110			
Magnesium	1.00E6		ng/l	1.0000E6		100	90-110			
Manganese	500000		ng/l	500000		100	90-110			
Molybdenum	51500		ng/l	50000		103	90-110			
Nickel	125000		ng/l	120000		104	90-110			
Phosphorus	193000		ng/l	200000		96.4	90-110			ICS-01, LK, QX
Potassium	2.54E6		ng/l	2.5000E6		101	90-110			
Rubidium	9960		ng/l	10000		99.6	90-110			
Selenium	19900		ng/l	20000		99.6	90-110			
Sodium	2.51E6		ng/l	2.5000E6		101	90-110			ICS-01, LK
Strontium	50200		ng/l	50000		100	90-110			
Thallium	498		ng/l	500.00		99.6	90-110			
Thorium	498		ng/l	500.00		99.6	90-110			
Uranium	506		ng/l	500.00		101	90-110			
Vanadium	20400		ng/l	20000		102	90-110			
Zinc	531000		ng/l	500000		106	90-110			
Calibration Check (2311043-CCV4)				Prepared: 11/16/23 Analyzed: 11/18/23						

CERTIFICATE OF ANALYSIS

Tetra Tech, Inc.
1777 Sentry Pkwy, Bldg 12
Blue Bell, PA 19422
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AQS SITE CODE:
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Inorganics by Compendium Method IO-3.5 - Quality Control

Batch 2311043 - B3K1601

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Calibration Check (2311043-CCV4) Contin				Prepared: 11/16/23		Analyzed: 11/18/23				
Aluminum	1.48E6		ng/l	1.5000E6		98.5	90-110			
Antimony	20500		ng/l	20000		103	90-110			
Arsenic	20300		ng/l	20000		101	90-110			
Barium	202000		ng/l	200000		101	90-110			
Beryllium	4640		ng/l	5000.0		92.7	90-110			
Cadmium	20900		ng/l	20000		104	90-110			
Calcium	2.56E7		ng/l	2.5000E7		102	90-110			
Chromium	249000		ng/l	240000		104	90-110			
Cobalt	52700		ng/l	50000		105	90-110			
Copper	2.11E6		ng/l	2.0000E6		105	90-110			
Iron	2.56E6		ng/l	2.5000E6		103	90-110			
Lead	203000		ng/l	200000		101	90-110			
Magnesium	1.01E6		ng/l	1.0000E6		101	90-110			
Manganese	510000		ng/l	500000		102	90-110			
Molybdenum	52400		ng/l	50000		105	90-110			
Nickel	128000		ng/l	120000		107	90-110			
Phosphorus	191000		ng/l	200000		95.3	90-110			ICS-01, LK, QX
Potassium	2.58E6		ng/l	2.5000E6		103	90-110			
Rubidium	10100		ng/l	10000		101	90-110			
Selenium	20400		ng/l	20000		102	90-110			
Sodium	2.56E6		ng/l	2.5000E6		102	90-110			ICS-01, LK
Strontium	50800		ng/l	50000		102	90-110			
Thallium	496		ng/l	500.00		99.2	90-110			
Thorium	497		ng/l	500.00		99.5	90-110			
Uranium	499		ng/l	500.00		99.8	90-110			
Vanadium	20500		ng/l	20000		103	90-110			
Zinc	534000		ng/l	500000		107	90-110			
Calibration Check (2311043-CCV5)				Prepared: 11/16/23		Analyzed: 11/18/23				
Aluminum	1.50E6		ng/l	1.5000E6		99.8	90-110			
Antimony	20500		ng/l	20000		102	90-110			
Arsenic	20300		ng/l	20000		102	90-110			
Barium	203000		ng/l	200000		101	90-110			
Beryllium	4650		ng/l	5000.0		93.0	90-110			
Cadmium	20700		ng/l	20000		104	90-110			
Calcium	2.56E7		ng/l	2.5000E7		102	90-110			
Chromium	246000		ng/l	240000		102	90-110			
Cobalt	52700		ng/l	50000		105	90-110			

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Inorganics by Compendium Method IO-3.5 - Quality Control

Batch 2311043 - B3K1601

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Calibration Check (2311043-CCV5) Contir				Prepared: 11/16/23		Analyzed: 11/18/23				
Copper	2.10E6		ng/l	2.0000E6		105	90-110			
Iron	2.59E6		ng/l	2.5000E6		104	90-110			
Lead	204000		ng/l	200000		102	90-110			
Magnesium	1.02E6		ng/l	1.0000E6		102	90-110			
Manganese	511000		ng/l	500000		102	90-110			
Molybdenum	51500		ng/l	50000		103	90-110			
Nickel	128000		ng/l	120000		107	90-110			
Phosphorus	197000		ng/l	200000		98.3	90-110			ICS-01, LK, QX
Potassium	2.59E6		ng/l	2.5000E6		104	90-110			
Rubidium	10100		ng/l	10000		101	90-110			
Selenium	20000		ng/l	20000		100	90-110			
Sodium	2.57E6		ng/l	2.5000E6		103	90-110			ICS-01, LK
Strontium	50600		ng/l	50000		101	90-110			
Thallium	506		ng/l	500.00		101	90-110			
Thorium	502		ng/l	500.00		100	90-110			
Uranium	501		ng/l	500.00		100	90-110			
Vanadium	20400		ng/l	20000		102	90-110			
Zinc	538000		ng/l	500000		108	90-110			
High Cal Check (2311043-HCV1)				Prepared: 11/16/23		Analyzed: 11/17/23				
Aluminum	3.01E6		ng/l	3.0000E6		100	95-105			
Antimony	41400		ng/l	40000		103	95-105			
Arsenic	40700		ng/l	40000		102	95-105			
Barium	409000		ng/l	400000		102	95-105			
Beryllium	9810		ng/l	10000		98.1	95-105			
Cadmium	41200		ng/l	40000		103	95-105			
Calcium	5.20E7		ng/l	5.0000E7		104	95-105			
Chromium	493000		ng/l	480000		103	95-105			
Cobalt	101000		ng/l	100000		101	95-105			
Copper	4.03E6		ng/l	4.0000E6		101	95-105			
Iron	5.07E6		ng/l	5.0000E6		101	95-105			
Lead	409000		ng/l	400000		102	95-105			
Magnesium	2.01E6		ng/l	2.0000E6		100	95-105			
Manganese	1.01E6		ng/l	1.0000E6		101	95-105			
Molybdenum	104000		ng/l	100000		104	95-105			
Nickel	240000		ng/l	240000		99.8	95-105			
Phosphorus	399000		ng/l	400000		99.7	95-105			ICS-01, LK, QX
Potassium	4.93E6		ng/l	5.0000E6		98.6	95-105			

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Inorganics by Compendium Method IO-3.5 - Quality Control

Batch 2311043 - B3K1601

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
High Cal Check (2311043-HCV1) Continue				Prepared: 11/16/23		Analyzed: 11/17/23				
Rubidium	20400		ng/l	20000		102	95-105			
Selenium	40500		ng/l	40000		101	95-105			
Sodium	4.98E6		ng/l	5.0000E6		99.6	95-105			ICS-01, LK
Strontium	104000		ng/l	100000		104	95-105			
Thallium	1020		ng/l	1000.0		102	95-105			
Thorium	1040		ng/l	1000.0		104	95-105			
Uranium	1050		ng/l	1000.0		105	95-105			
Vanadium	41500		ng/l	40000		104	95-105			
Zinc	1.00E6		ng/l	1.0000E6		100	95-105			
Initial Cal Blank (2311043-ICB1)				Prepared: 11/16/23		Analyzed: 11/17/23				
Aluminum	14.5		ng/l							
Antimony	1.81		ng/l							
Arsenic	-7.99		ng/l							U
Barium	3.22		ng/l							
Beryllium	0.748		ng/l							
Cadmium	0.540		ng/l							
Calcium	-117		ng/l							U
Chromium	7.03		ng/l							
Cobalt	0.818		ng/l							
Copper	51.2		ng/l							
Iron	50.9		ng/l							
Lead	14.8		ng/l							
Magnesium	6.01		ng/l							
Manganese	12.4		ng/l							
Molybdenum	20.1		ng/l							
Nickel	0.702		ng/l							
Phosphorus	-13.2		ng/l							ICS-01, LK, QX, U
Potassium	-152		ng/l							U
Rubidium	-0.579		ng/l							U
Selenium	5.30		ng/l							
Sodium	-5650		ng/l							ICS-01, LK, U
Strontium	-0.536		ng/l							U
Thallium	0.412		ng/l							
Thorium	0.807		ng/l							
Uranium	0.0330		ng/l							
Vanadium	-57.3		ng/l							U
Zinc	-14.6		ng/l							U

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Inorganics by Compendium Method IO-3.5 - Quality Control

Batch 2311043 - B3K1601

Initial Cal Check (2311043-ICV1) Prepared: 11/16/23 Analyzed: 11/17/23

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Aluminum	1.48E6		ng/l	1.5000E6		98.7	90-110			
Antimony	20200		ng/l	20000		101	90-110			
Arsenic	20200		ng/l	20000		101	90-110			
Barium	202000		ng/l	200000		101	90-110			
Beryllium	4740		ng/l	5000.0		94.8	90-110			
Cadmium	20600		ng/l	20000		103	90-110			
Calcium	2.51E7		ng/l	2.5000E7		100	90-110			
Chromium	238000		ng/l	240000		99.3	90-110			
Cobalt	51200		ng/l	50000		102	90-110			
Copper	2.00E6		ng/l	2.0000E6		100	90-110			
Iron	2.52E6		ng/l	2.5000E6		101	90-110			
Lead	199000		ng/l	200000		99.6	90-110			
Magnesium	997000		ng/l	1.0000E6		99.7	90-110			
Manganese	490000		ng/l	500000		98.1	90-110			
Molybdenum	50200		ng/l	50000		100	90-110			
Nickel	127000		ng/l	120000		106	90-110			
Phosphorus	190000		ng/l	200000		95.2	90-110			ICS-01, LK, QX
Potassium	2.53E6		ng/l	2.5000E6		101	90-110			
Rubidium	9030		ng/l	10000		90.3	90-110			
Selenium	20200		ng/l	20000		101	90-110			
Sodium	2.43E6		ng/l	2.5000E6		97.0	90-110			ICS-01, LK
Strontium	50500		ng/l	50000		101	90-110			
Thallium	482		ng/l	500.00		96.4	90-110			
Thorium	493		ng/l	500.00		98.7	90-110			
Uranium	493		ng/l	500.00		98.5	90-110			
Vanadium	20500		ng/l	20000		102	90-110			
Zinc	536000		ng/l	500000		107	90-110			

Interference Check A (2311043-IFA1) Prepared: 11/16/23 Analyzed: 11/17/23

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Aluminum	1.60E7		ng/l	1.5000E7		107	80-120			
Antimony	0.00		ng/l				80-120			U
Arsenic	0.00		ng/l				80-120			U
Barium	0.00		ng/l				80-120			U
Beryllium	0.00		ng/l				80-120			U
Cadmium	0.00		ng/l				80-120			U
Calcium	9.91E7		ng/l	1.0040E8		98.7	80-120			
Chromium	0.00		ng/l				80-120			U
Cobalt	0.00		ng/l				80-120			U
Copper	0.00		ng/l				80-120			U

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Inorganics by Compendium Method IO-3.5 - Quality Control

Batch 2311043 - B3K1601

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Interference Check A (2311043-IFA1) Co				Prepared: 11/16/23		Analyzed: 11/17/23				
Iron	1.57E7		ng/l	1.5000E7		104	80-120			
Lead	0.00		ng/l				80-120			U
Magnesium	1.58E7		ng/l	1.5000E7		105	80-120			
Manganese	0.00		ng/l				80-120			U
Molybdenum	305000		ng/l	300000		102	80-120			
Nickel	0.00		ng/l				80-120			U
Phosphorus	1.72E7		ng/l	1.5000E7		115	80-120			ICS-01, LK, QX
Potassium	1.60E7		ng/l	1.5000E7		107	80-120			
Rubidium	0.00		ng/l				80-120			U
Selenium	0.00		ng/l				80-120			U
Sodium	1.66E7		ng/l	1.5000E7		111	80-120			ICS-01, LK
Strontium	0.00		ng/l				80-120			U
Thallium	0.00		ng/l				80-120			U
Thorium	0.00		ng/l				80-120			U
Uranium	0.00		ng/l				80-120			U
Vanadium	0.00		ng/l				80-120			U
Zinc	0.00		ng/l				80-120			U
Interference Check B (2311043-IFB1)				Prepared: 11/16/23		Analyzed: 11/17/23				
Aluminum	1.90E7		ng/l	1.6500E7		115	80-120			
Antimony	21000		ng/l	20000		105	80-120			
Arsenic	20800		ng/l	20000		104	80-120			
Barium	207000		ng/l	200000		104	80-120			
Beryllium	4590		ng/l	5000.0		91.8	80-120			
Cadmium	20400		ng/l	20000		102	80-120			
Calcium	1.30E8		ng/l	1.2540E8		104	80-120			
Chromium	240000		ng/l	240000		100	80-120			
Cobalt	54000		ng/l	50000		108	80-120			
Copper	2.02E6		ng/l	2.0000E6		101	80-120			
Iron	1.91E7		ng/l	1.7500E7		109	80-120			
Lead	209000		ng/l	200000		105	80-120			
Magnesium	1.82E7		ng/l	1.6000E7		114	80-120			
Manganese	556000		ng/l	500000		111	80-120			
Molybdenum	367000		ng/l	350000		105	80-120			
Nickel	128000		ng/l	120000		106	80-120			
Phosphorus	1.87E7		ng/l	1.5200E7		123	80-120			ICS-01, LK, QX
Potassium	1.99E7		ng/l	1.7500E7		114	80-120			
Rubidium	10200		ng/l	10000		102	80-120			

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Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes

Inorganics by Compendium Method IO-3.5 - Quality Control

Batch 2311043 - B3K1601

Interference Check B (2311043-IFB1) Co Prepared: 11/16/23 Analyzed: 11/17/23

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Selenium	19400		ng/l	20000		96.9	80-120			
Sodium	2.11E7		ng/l	1.7500E7		121	80-120			ICS-01, LK
Strontium	51000		ng/l	50000		102	80-120			
Thallium	531		ng/l	500.00		106	80-120			
Thorium	552		ng/l	500.00		110	80-120			
Uranium	561		ng/l	500.00		112	80-120			
Vanadium	19600		ng/l	20000		98.1	80-120			
Zinc	508000		ng/l	500000		102	80-120			

Serial Dilution (2311043-SRD1) **Source: 3111547-02** Prepared: 11/16/23 Analyzed: 11/17/23

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Aluminum	693	159	ng/m³ Air		703			1.37	10	
Antimony	ND	0.219	ng/m³ Air		ND				10	SL, U
Arsenic	0.212	0.0473	ng/m³ Air		0.211			0.247	10	
Barium	7.82	4.70	ng/m³ Air		8.02			2.47	10	
Beryllium	0.0261	0.0165	ng/m³ Air		0.0259			0.942	10	
Cadmium	ND	0.540	ng/m³ Air		ND				10	U
Calcium	ND	1450	ng/m³ Air		ND				10	U
Chromium	ND	10.1	ng/m³ Air		ND				10	U
Cobalt	0.520	0.0773	ng/m³ Air		0.517			0.420	10	
Copper	20.0	14.9	ng/m³ Air		19.9			0.226	10	
Iron	936	120	ng/m³ Air		949			1.37	10	
Lead	ND	1.37	ng/m³ Air		ND				10	U
Magnesium	ND	478	ng/m³ Air		ND				10	U
Manganese	27.4	5.90	ng/m³ Air		27.5			0.519	10	
Molybdenum	ND	1.06	ng/m³ Air		ND				10	U
Nickel	ND	3.97	ng/m³ Air		ND				10	U
Phosphorus	ND	6190	ng/m³ Air		ND				10	ICS-01, LK, QX, U
Potassium	ND	188	ng/m³ Air		ND				10	U
Rubidium	0.293	0.0907	ng/m³ Air		0.293			0.0326	10	
Selenium	0.292	0.0545	ng/m³ Air		0.264			9.95	10	
Sodium	ND	9910	ng/m³ Air		ND				10	ICS-01, LK, U
Strontium	6.23	3.23	ng/m³ Air		6.21			0.416	10	
Thallium	0.00297	0.00249	ng/m³ Air		ND			26.4	10	
Thorium	0.0254	0.0149	ng/m³ Air		0.0273			7.33	10	
Uranium	ND	0.0842	ng/m³ Air		ND				10	U
Vanadium	2.76	0.244	ng/m³ Air		2.87			3.77	10	
Zinc	ND	484	ng/m³ Air		ND				10	U

Batch B3K1601 - ICP-MS Extraction

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Inorganics by Compendium Method IO-3.5 - Quality Control

Batch B3K1601 - ICP-MS Extraction

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (B3K1601-BLK1)				Prepared: 11/16/23 Analyzed: 11/17/23						
Aluminum	ND	32.1	ng/m³ Air							U
Antimony	ND	0.0441	ng/m³ Air							U, SL
Arsenic	ND	0.00955	ng/m³ Air							U
Barium	ND	0.948	ng/m³ Air							U
Beryllium	ND	0.00332	ng/m³ Air							U
Cadmium	ND	0.109	ng/m³ Air							U
Calcium	ND	292	ng/m³ Air							U
Chromium	ND	2.03	ng/m³ Air							U
Cobalt	ND	0.0156	ng/m³ Air							U
Copper	ND	3.00	ng/m³ Air							U
Iron	ND	24.2	ng/m³ Air							U
Lead	ND	0.276	ng/m³ Air							U
Magnesium	ND	96.4	ng/m³ Air							U
Manganese	ND	1.19	ng/m³ Air							U
Molybdenum	ND	0.213	ng/m³ Air							U
Nickel	ND	0.801	ng/m³ Air							U
Phosphorus	ND	1250	ng/m³ Air							ICS-01, LK, QX, U
Potassium	ND	38.0	ng/m³ Air							U
Rubidium	ND	0.0183	ng/m³ Air							U
Selenium	ND	0.0110	ng/m³ Air							U
Sodium	ND	2000	ng/m³ Air							ICS-01, LK, U
Strontium	ND	0.652	ng/m³ Air							U
Thallium	ND	5.03E-4	ng/m³ Air							U
Thorium	ND	0.00300	ng/m³ Air							U
Uranium	ND	0.0170	ng/m³ Air							U
Vanadium	ND	0.0492	ng/m³ Air							U
Zinc	ND	97.7	ng/m³ Air							U
LCS (B3K1601-BS1)				Prepared: 11/16/23 Analyzed: 11/17/23						
Aluminum	86.3	32.1	ng/m³ Air	82.975		104	80-120			
Antimony	0.944	0.0441	ng/m³ Air	1.3829		68.3	80-120			SL
Arsenic	2.77	0.00955	ng/m³ Air	2.7658		100	80-120			
Barium	28.0	0.948	ng/m³ Air	27.658		101	80-120			
Beryllium	1.25	0.00332	ng/m³ Air	1.3829		90.3	80-120			
Cadmium	1.43	0.109	ng/m³ Air	1.3829		104	80-120			
Calcium	ND	292	ng/m³ Air	69.146			80-120			U
Chromium	15.2	2.03	ng/m³ Air	13.829		110	80-120			
Cobalt	1.43	0.0156	ng/m³ Air	1.3829		103	80-120			
Copper	30.7	3.00	ng/m³ Air	27.658		111	80-120			

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Tetra Tech, Inc.
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Blue Bell, PA 19422
ATTN: Ms. Chelsea Saber
PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 11/21/23 13:30
SUBMITTED: 11/15/23
AQS SITE CODE:
SITE CODE: Maui fires

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes

Inorganics by Compendium Method IO-3.5 - Quality Control

Batch B3K1601 - ICP-MS Extraction

LCS (B3K1601-BS1) Continued Prepared: 11/16/23 Analyzed: 11/17/23

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Iron	35.2	24.2	ng/m³ Air	27.658		127	80-120			
Lead	13.9	0.276	ng/m³ Air	13.829		100	80-120			
Magnesium	ND	96.4	ng/m³ Air	27.658			80-120			U
Manganese	8.56	1.19	ng/m³ Air	8.2975		103	80-120			
Molybdenum	1.50	0.213	ng/m³ Air	1.3829		108	80-120			
Nickel	3.12	0.801	ng/m³ Air	2.7658		113	80-120			
Phosphorus	ND	1250	ng/m³ Air	13.829			80-120			GC-BS, ICS-01, LK,
Potassium	61.6	38.0	ng/m³ Air	55.317		111	80-120			
Rubidium	1.36	0.0183	ng/m³ Air	1.3829		98.4	80-120			
Selenium	2.72	0.0110	ng/m³ Air	2.7658		98.4	80-120			
Sodium	ND	2000	ng/m³ Air	55.317			80-120			GC-BS, ICS-01, LK, U
Strontium	1.64	0.652	ng/m³ Air	1.3829		119	80-120			
Thallium	0.132	5.03E-4	ng/m³ Air	0.13829		95.2	80-120			
Thorium	0.134	0.00300	ng/m³ Air	0.13829		96.7	80-120			
Uranium	0.132	0.0170	ng/m³ Air	0.13829		95.8	80-120			
Vanadium	2.88	0.0492	ng/m³ Air	2.7658		104	80-120			
Zinc	109	97.7	ng/m³ Air	82.975		131	80-120			

Duplicate (B3K1601-DUP1) **Source: 3111547-02** Prepared: 11/16/23 Analyzed: 11/17/23

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Aluminum	715	31.8	ng/m³ Air		703			1.71	10	
Antimony	0.0989	0.0437	ng/m³ Air		0.120			19.0	10	SL
Arsenic	0.210	0.00947	ng/m³ Air		0.211			0.348	10	
Barium	8.03	0.940	ng/m³ Air		8.02			0.142	10	
Beryllium	0.0296	0.00329	ng/m³ Air		0.0259			13.7	10	
Cadmium	ND	0.108	ng/m³ Air		ND				10	U
Calcium	633	289	ng/m³ Air		638			0.738	10	
Chromium	2.70	2.01	ng/m³ Air		2.63			2.56	10	
Cobalt	0.525	0.0155	ng/m³ Air		0.517			1.46	10	
Copper	20.7	2.97	ng/m³ Air		19.9			3.67	10	
Iron	967	24.0	ng/m³ Air		949			1.93	10	
Lead	0.568	0.274	ng/m³ Air		0.480			16.8	10	
Magnesium	349	95.5	ng/m³ Air		345			1.17	10	
Manganese	27.8	1.18	ng/m³ Air		27.5			1.04	10	
Molybdenum	0.825	0.211	ng/m³ Air		0.848			2.70	10	
Nickel	1.21	0.794	ng/m³ Air		1.26			3.98	10	
Phosphorus	ND	1240	ng/m³ Air		ND				10	U, E, ICS-01, LK, QX
Potassium	146	37.7	ng/m³ Air		145			0.337	10	

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FILE #: 0000.00
REPORTED: 11/21/23 13:30
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AQS SITE CODE:
SITE CODE: Maui fires

Inorganics by Compendium Method IO-3.5 - Quality Control

Batch B3K1601 - ICP-MS Extraction

Duplicate (B3K1601-DUP1) Continued **Source: 3111547-02** Prepared: 11/16/23 Analyzed: 11/17/23

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Rubidium	0.289	0.0181	ng/m³ Air		0.293			1.22	10	
Selenium	0.251	0.0109	ng/m³ Air		0.264			5.10	10	
Sodium	2730	1980	ng/m³ Air		2640			3.30	10	ICS-01, LK, SI
Strontium	6.09	0.646	ng/m³ Air		6.21			1.94	10	
Thallium	0.00244	4.99E-4	ng/m³ Air		0.00228			6.88	10	
Thorium	0.0290	0.00297	ng/m³ Air		0.0273			5.89	10	
Uranium	0.0188	0.0168	ng/m³ Air		0.0195			3.83	10	
Vanadium	2.84	0.0488	ng/m³ Air		2.87			0.947	10	
Zinc	ND	96.8	ng/m³ Air		ND				10	U

Matrix Spike (B3K1601-MS1) **Source: 3111547-02** Prepared: 11/16/23 Analyzed: 11/17/23

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Aluminum	827	31.8	ng/m³ Air	82.237	703	151	80-120			E, QM-4X
Antimony	0.766	0.0437	ng/m³ Air	1.3706	0.120	47.2	80-120			SL
Arsenic	2.84	0.00947	ng/m³ Air	2.7412	0.211	95.7	80-120			
Barium	35.5	0.940	ng/m³ Air	27.412	8.02	100	80-120			
Beryllium	1.53	0.00329	ng/m³ Air	1.3706	0.0259	110	80-120			
Cadmium	1.43	0.108	ng/m³ Air	1.3706	ND	104	80-120			
Calcium	740	289	ng/m³ Air	68.531	638	148	80-120			QM-4X
Chromium	16.5	2.01	ng/m³ Air	13.706	2.63	101	80-120			
Cobalt	1.96	0.0155	ng/m³ Air	1.3706	0.517	105	80-120			
Copper	48.8	2.97	ng/m³ Air	27.412	19.9	105	80-120			
Iron	1010	24.0	ng/m³ Air	27.412	949	214	80-120			QM-4X
Lead	14.0	0.274	ng/m³ Air	13.706	0.480	98.7	80-120			
Magnesium	393	95.5	ng/m³ Air	27.412	345	175	80-120			QM-4X
Manganese	37.9	1.18	ng/m³ Air	8.2237	27.5	126	80-120			QM-07
Molybdenum	2.19	0.211	ng/m³ Air	1.3706	0.848	98.2	80-120			
Nickel	4.03	0.794	ng/m³ Air	2.7412	1.26	101	80-120			
Phosphorus	ND	1240	ng/m³ Air	13.706	ND		80-120			U, E, ICS-01, LK, QM-4X,
Potassium	205	37.7	ng/m³ Air	54.825	145	108	80-120			
Rubidium	1.55	0.0181	ng/m³ Air	1.3706	0.293	91.7	80-120			
Selenium	2.86	0.0109	ng/m³ Air	2.7412	0.264	94.6	80-120			
Sodium	2900	1980	ng/m³ Air	54.825	2640	478	80-120			E, ICS-01, LK, QM-4X
Strontium	7.47	0.646	ng/m³ Air	1.3706	6.21	92.4	80-120			
Thallium	0.131	4.99E-4	ng/m³ Air	0.13706	0.00228	93.6	80-120			
Thorium	0.0815	0.00297	ng/m³ Air	0.13706	0.0273	39.5	80-120			QM-07
Uranium	0.149	0.0168	ng/m³ Air	0.13706	0.0195	94.1	80-120			
Vanadium	5.65	0.0488	ng/m³ Air	2.7412	2.87	101	80-120			
Zinc	111	96.8	ng/m³ Air	82.237	ND	135	80-120			

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FILE #: 0000.00
REPORTED: 11/21/23 13:30
SUBMITTED: 11/15/23
AQS SITE CODE:
SITE CODE: Maui fires

Inorganics by Compendium Method IO-3.5 - Quality Control

Batch B3K1601 - ICP-MS Extraction

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Matrix Spike Dup (B3K1601-MSD1)		**Source: 3111547-02**		Prepared: 11/16/23	Analyzed: 11/17/23					
Aluminum	850	31.8	ng/m³ Air	82.237	703	178	80-120	2.65	20	E, QM-4X
Antimony	0.784	0.0437	ng/m³ Air	1.3706	0.120	48.5	80-120	2.30	20	SL
Arsenic	2.90	0.00947	ng/m³ Air	2.7412	0.211	98.1	80-120	2.22	20	
Barium	36.0	0.940	ng/m³ Air	27.412	8.02	102	80-120	1.34	20	
Beryllium	1.30	0.00329	ng/m³ Air	1.3706	0.0259	93.3	80-120	16.0	20	
Cadmium	1.44	0.108	ng/m³ Air	1.3706	ND	105	80-120	0.658	20	
Calcium	764	289	ng/m³ Air	68.531	638	183	80-120	3.20	20	QM-4X
Chromium	17.2	2.01	ng/m³ Air	13.706	2.63	106	80-120	3.82	20	
Cobalt	2.01	0.0155	ng/m³ Air	1.3706	0.517	109	80-120	2.85	20	
Copper	52.0	2.97	ng/m³ Air	27.412	19.9	117	80-120	6.39	20	
Iron	1040	24.0	ng/m³ Air	27.412	949	321	80-120	2.85	20	QM-4X
Lead	14.4	0.274	ng/m³ Air	13.706	0.480	102	80-120	3.06	20	
Magnesium	407	95.5	ng/m³ Air	27.412	345	228	80-120	3.62	20	QM-4X
Manganese	38.7	1.18	ng/m³ Air	8.2237	27.5	136	80-120	2.16	20	QM-07
Molybdenum	2.37	0.211	ng/m³ Air	1.3706	0.848	111	80-120	7.75	20	
Nickel	4.18	0.794	ng/m³ Air	2.7412	1.26	106	80-120	3.50	20	
Phosphorus	ND	1240	ng/m³ Air	13.706	ND		80-120		20	U, E, ICS-01, LK, QM-4X,
Potassium	209	37.7	ng/m³ Air	54.825	145	117	80-120	2.28	20	
Rubidium	1.57	0.0181	ng/m³ Air	1.3706	0.293	93.3	80-120	1.48	20	
Selenium	2.88	0.0109	ng/m³ Air	2.7412	0.264	95.3	80-120	0.695	20	
Sodium	3010	1980	ng/m³ Air	54.825	2640	682	80-120	3.79	20	E, ICS-01, LK, QM-4X
Strontium	7.71	0.646	ng/m³ Air	1.3706	6.21	110	80-120	3.16	20	
Thallium	0.134	4.99E-4	ng/m³ Air	0.13706	0.00228	95.8	80-120	2.22	20	
Thorium	0.0866	0.00297	ng/m³ Air	0.13706	0.0273	43.2	80-120	6.07	20	QM-07
Uranium	0.153	0.0168	ng/m³ Air	0.13706	0.0195	97.1	80-120	2.71	20	
Vanadium	5.75	0.0488	ng/m³ Air	2.7412	2.87	105	80-120	1.71	20	
Zinc	106	96.8	ng/m³ Air	82.237	ND	129	80-120	4.57	20	
Post Spike (B3K1601-PS1)		**Source: 3111547-02**		Prepared: 11/16/23	Analyzed: 11/17/23					
Aluminum	748	31.8	ng/m³ Air	27.412	703	165	75-125			PS-01
Antimony	0.390	0.0437	ng/m³ Air	0.27412	0.120	98.6	75-125			SL
Arsenic	1.53	0.00947	ng/m³ Air	1.3706	0.211	95.9	75-125			
Barium	10.6	0.940	ng/m³ Air	2.7412	8.02	94.9	75-125			
Beryllium	0.293	0.00329	ng/m³ Air	0.27412	0.0259	97.5	75-125			
Cadmium	0.152	0.108	ng/m³ Air	0.13706	ND	111	75-125			
Calcium	653	289	ng/m³ Air		638		75-125			
Chromium	3.95	2.01	ng/m³ Air	1.3706	2.63	96.2	75-125			
Cobalt	0.806	0.0155	ng/m³ Air	0.27412	0.517	105	75-125			

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AQS SITE CODE:
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Inorganics by Compendium Method IO-3.5 - Quality Control

Batch B3K1601 - ICP-MS Extraction

Post Spike (B3K1601-PS1) Continued **Source: 3111547-02** Prepared: 11/16/23 Analyzed: 11/17/23

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Copper	33.9	2.97	ng/m³ Air	13.706	19.9	102	75-125			
Iron	984	24.0	ng/m³ Air	27.412	949	126	75-125			PS-01
Lead	27.5	0.274	ng/m³ Air	27.412	0.480	98.7	75-125			
Magnesium	385	95.5	ng/m³ Air	27.412	345	145	75-125			PS-01
Manganese	30.8	1.18	ng/m³ Air	2.7412	27.5	119	75-125			
Molybdenum	2.13	0.211	ng/m³ Air	1.3706	0.848	93.5	75-125			
Nickel	4.05	0.794	ng/m³ Air	2.7412	1.26	102	75-125			
Phosphorus	ND	1240	ng/m³ Air	5.4825	ND		75-125			E, ICS-01, LK, PS-01, QX, U
Potassium	177	37.7	ng/m³ Air	27.412	145	114	75-125			
Rubidium	0.402	0.0181	ng/m³ Air	0.13706	0.293	79.5	75-125			
Selenium	1.51	0.0109	ng/m³ Air	1.3706	0.264	90.9	75-125			
Sodium	2790	1980	ng/m³ Air	27.412	2640	567	75-125			E, ICS-01, LK, PS-01
Strontium	7.25	0.646	ng/m³ Air	1.3706	6.21	76.3	75-125			
Thallium	0.0669	4.99E-4	ng/m³ Air	6.8531E-2	0.00228	94.3	75-125			
Thorium	0.0895	0.00297	ng/m³ Air	6.8531E-2	0.0273	90.7	75-125			
Uranium	0.0838	0.0168	ng/m³ Air	6.8531E-2	0.0195	93.8	75-125			
Vanadium	4.16	0.0488	ng/m³ Air	1.3706	2.87	93.9	75-125			
Zinc	ND	96.8	ng/m³ Air	27.412	ND		75-125			U

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Notes and Definitions

U	Under Detection Limit
SL	The spike recovery was outside acceptance limits. Reported value may be biased low.
QX	Compound does not meet QC criteria. Results should be considered an estimate.
QM-4X	The MS/MSD recovery exceeds criteria because the parent sample concentration is greater than 4x the spike concentration. Sample results for the QC batch were accepted based on acceptable BS/BSD recoveries.
QM-07	The spike recovery was outside acceptance limits for the MS and/or MSD. The batch was accepted based on acceptable LCS recovery.
PS-01	Post Spike exceeds DQO criteria.
LK	Analyte identified; Reported value may be biased high.
ICS-01	Interference check exceeds criteria.
GC-BS	Compound exceeds Blank Spike Criteria
E	The concentration indicated for this analyte is an estimated value above the calibration range of the instrument. This value is considered an estimate (CLP E-flag).
ND	Analyte NOT DETECTED
NR	Not Reported
MDL	Method Detection Limit
RPD	Relative Percent Difference

Note: This test is accredited under the 2016 TNI Standard.

Eastern Research Group
601 Keystone Park Drive
Suite 700
Morrisville, NC 27560

November 29, 2023

Ms. Chelsea Saber
Tetra Tech, Inc.
1777 Sentry Pkwy, Bldg 12
Blue Bell, PA 19422
Project Name: Maui fires

Dear Ms. Chelsea Saber,

This report contains the analytical results for the sample(s) received under chain(s) of custody by Eastern Research Group on 11/20/23 10:27.

Values below the MDL for QC results in this report are recorded as ND, however the actual values are reported in the accompanying Excel report with a "U" flag (Under the detection limit). The actual values are reported in AQS.

This test is accredited under the 2016 TNI Standard for Environmental Laboratories (FL DOH Certification # E87673). All analyses were performed as described in the US EPA-approved QAPP, under the contract for National Hazardous Air Pollutant Support (US EPA Contract No. 68HERH22D0002). This cover page is an integral part of this report, and any exceptions or comments are noted on the last page.

Release of the data contained in this data package and in the data submitted in the electronic data deliverable, has been authorized by the Program Manager, or the Program Manager's designee as verified by the following signature.

The issuance of the final Certificate of Analysis takes precedence over any previous Report. If you have any questions, please contact me at 919-468-7924.

Sincerely,

Julie Swift
Program Manager
julie.swift@erg.com

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ATTN: Ms. Chelsea Saber
PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 11/29/23 10:49
SUBMITTED: 11/20/23
AQS SITE CODE:
SITE CODE: Maui fires

ANALYTICAL REPORT FOR SAMPLES

SampleName	LabNumber	Matrix	Sampled	Received
Q9541243	3112027-01	Air	11/13/23 23:59	11/20/23 10:27
Q9541244	3112027-02	Air	11/13/23 23:59	11/20/23 10:27
Q9541245	3112027-03	Air	11/13/23 23:59	11/20/23 10:27
Q9541239	3112027-04	Air	11/14/23 23:59	11/20/23 10:27
Q9541241	3112027-05	Air	11/14/23 23:59	11/20/23 10:27
Q9541242	3112027-06	Air	11/14/23 23:59	11/20/23 10:27

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FILE #: 0000.00
REPORTED: 11/29/23 10:49
SUBMITTED: 11/20/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: Q9541243 **Lab ID:** 3112027-01 **Sampled:** 11/13/23 23:59
Matrix: Air **Sample Volume:** 1713.6 m³ **Received:** 11/20/23 10:27
Filter ID: **Analysis Date:** 11/23/23 00:32
Comments: MFK-AM-03-111323-HM

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	**7429-90-5**	**1080**		**30.5**
Antimony	**7440-36-0**	**0.104**	SL	**0.0419**
Arsenic	**7440-38-2**	**0.332**		**0.00907**
Barium	**7440-39-3**	**15.1**		**0.900**
Cadmium	7440-43-9	0.0246	U	0.103
Calcium	**7440-70-2**	**940**	LJ	**277**
Chromium	**7440-47-3**	**3.36**		**1.93**
Cobalt	**7440-48-4**	**0.896**		**0.0148**
Copper	**7440-50-8**	**31.1**		**2.85**
Lead	**7439-92-1**	**0.563**		**0.262**
Magnesium	**7439-95-4**	**538**		**91.5**
Manganese	**7439-96-5**	**46.4**		**1.13**
Molybdenum	**7439-98-7**	**1.00**		**0.202**
Nickel	**7440-02-0**	**1.48**		**0.761**
Phosphorus	7723-14-0	447	U, GC-BS	1190
Potassium	**7440-09-7**	**240**		**36.1**
Rubidium		**0.446**		**0.0174**
Selenium	**7782-49-2**	**0.527**		**0.0104**
Sodium	**7440-23-5**	**3770**	GC-BS	**1900**
Strontium	**7440-24-6**	**9.01**		**0.619**
Thallium	**7440-28-0**	**0.00341**		**4.78E-4**
Thorium	**7440-29-01**	**0.0593**		**0.00285**
Uranium	**NA**	**0.0313**		**0.0161**
Vanadium	**7440-62-2**	**3.95**		**0.0467**
Zinc	7440-66-6	27.6	U	92.8

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FILE #: 0000.00
REPORTED: 11/29/23 10:49
SUBMITTED: 11/20/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: Q9541243 **Lab ID:** 3112027-01RE1 **Sampled:** 11/13/23 23:59
Matrix: Air **Sample Volume:** 1713.6 m^3 **Received:** 11/20/23 10:27
Filter ID: **Analysis Date:** 11/23/23 03:28
Comments: MFK-AM-03-111323-HM

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m^3 Air	Flag	MDL ng/m^3 Air
Iron	7439-89-6	1580	D	230

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FILE #: 0000.00
REPORTED: 11/29/23 10:49
SUBMITTED: 11/20/23
AQS SITE CODE:
SITE CODE: Maui fires

Description:	Q9541243	**Lab ID:**	3112027-01RE2	**Sampled:**	11/13/23 23:59
Matrix:	Air	**Sample Volume:**	1713.6 m^3	**Received:**	11/20/23 10:27
		Filter ID:		**Analysis Date:**	11/24/23 13:17
Comments:	MFK-AM-03-111323-HM				

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m^3 Air	Flag	MDL ng/m^3 Air
Beryllium	**7440-41-7**	**0.0465**		**0.00315**

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FILE #: 0000.00
REPORTED: 11/29/23 10:49
SUBMITTED: 11/20/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: Q9541244
Matrix: Air
Lab ID: 3112027-02
Sample Volume: 1617.28 m³
Filter ID:
Sampled: 11/13/23 23:59
Received: 11/20/23 10:27
Analysis Date: 11/23/23 00:49
Comments: MFK-AM-02-111323-HM

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	**7429-90-5**	**1320**		**32.3**
Antimony	**7440-36-0**	**0.0794**	SL	**0.0444**
Arsenic	**7440-38-2**	**0.478**		**0.00961**
Barium	**7440-39-3**	**14.3**		**0.954**
Cadmium	7440-43-9	0.0236	U	0.110
Calcium	**7440-70-2**	**990**	LJ	**294**
Chromium	**7440-47-3**	**3.09**		**2.04**
Cobalt	**7440-48-4**	**1.02**		**0.0157**
Copper	**7440-50-8**	**15.1**		**3.02**
Lead	**7439-92-1**	**0.512**		**0.278**
Magnesium	**7439-95-4**	**502**		**97.0**
Manganese	**7439-96-5**	**53.9**		**1.20**
Molybdenum	**7439-98-7**	**0.720**		**0.214**
Nickel	**7440-02-0**	**1.79**		**0.806**
Phosphorus	7723-14-0	474	U, GC-BS	1260
Potassium	**7440-09-7**	**206**		**38.2**
Rubidium		**0.445**		**0.0184**
Selenium	**7782-49-2**	**0.560**		**0.0111**
Sodium	**7440-23-5**	**3440**	GC-BS	**2010**
Strontium	**7440-24-6**	**9.52**		**0.656**
Thallium	**7440-28-0**	**0.00354**		**5.06E-4**
Thorium	**7440-29-01**	**0.0754**		**0.00302**
Uranium	**NA**	**0.0359**		**0.0171**
Vanadium	**7440-62-2**	**4.60**		**0.0495**
Zinc	7440-66-6	17.3	U	98.3

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SUBMITTED: 11/20/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: Q9541244
Matrix: Air
Lab ID: 3112027-02RE1
Sample Volume: 1617.28 m^3
Filter ID:
Sampled: 11/13/23 23:59
Received: 11/20/23 10:27
Analysis Date: 11/23/23 03:43
Comments: MFK-AM-02-111323-HM

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Iron	7439-89-6	1770	D	243

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FILE #: 0000.00
REPORTED: 11/29/23 10:49
SUBMITTED: 11/20/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: Q9541244
Matrix: Air
Lab ID: 3112027-02RE2
Sample Volume: 1617.28 m³
Filter ID:
Sampled: 11/13/23 23:59
Received: 11/20/23 10:27
Analysis Date: 11/24/23 13:25
Comments: MFK-AM-02-111323-HM

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Beryllium	7440-41-7	0.0474		0.00334

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FILE #: 0000.00
REPORTED: 11/29/23 10:49
SUBMITTED: 11/20/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: Q9541245 **Lab ID:** 3112027-03 **Sampled:** 11/13/23 23:59
Matrix: Air **Sample Volume:** 1699.2 m³ **Received:** 11/20/23 10:27
Filter ID: **Analysis Date:** 11/23/23 01:06
Comments: MFK-AM-01-111323-HM

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	**7429-90-5**	**1660**		**30.7**
Antimony	**7440-36-0**	**0.0832**	SL	**0.0422**
Arsenic	**7440-38-2**	**0.457**		**0.00914**
Barium	**7440-39-3**	**18.0**		**0.908**
Cadmium	7440-43-9	0.0220	U	0.104
Calcium	**7440-70-2**	**1130**	LJ	**280**
Chromium	**7440-47-3**	**3.55**		**1.94**
Cobalt	**7440-48-4**	**1.24**		**0.0149**
Copper	**7440-50-8**	**20.1**		**2.87**
Lead	**7439-92-1**	**0.804**		**0.264**
Magnesium	**7439-95-4**	**548**		**92.3**
Manganese	**7439-96-5**	**67.5**		**1.14**
Molybdenum	**7439-98-7**	**1.02**		**0.204**
Nickel	**7440-02-0**	**1.78**		**0.767**
Phosphorus	7723-14-0	484	U, GC-BS	1200
Potassium	**7440-09-7**	**241**		**36.4**
Rubidium		**0.530**		**0.0175**
Selenium	**7782-49-2**	**0.642**		**0.0105**
Sodium	**7440-23-5**	**3530**	GC-BS	**1920**
Strontium	**7440-24-6**	**11.0**		**0.624**
Thallium	**7440-28-0**	**0.00408**		**4.82E-4**
Thorium	**7440-29-01**	**0.0884**		**0.00287**
Uranium	**NA**	**0.0421**		**0.0163**
Vanadium	**7440-62-2**	**5.45**		**0.0471**
Zinc	7440-66-6	17.7	U	93.5

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FILE #: 0000.00
REPORTED: 11/29/23 10:49
SUBMITTED: 11/20/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: Q9541245 **Lab ID:** 3112027-03RE1 **Sampled:** 11/13/23 23:59
Matrix: Air **Sample Volume:** 1699.2 m^3 **Received:** 11/20/23 10:27
Filter ID: **Analysis Date:** 11/23/23 04:03
Comments: MFK-AM-01-111323-HM

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Iron	**7439-89-6**	**2120**	D	**232**

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REPORTED: 11/29/23 10:49
SUBMITTED: 11/20/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: Q9541245 **Lab ID:** 3112027-03RE2 **Sampled:** 11/13/23 23:59
Matrix: Air **Sample Volume:** 1699.2 m^3 **Received:** 11/20/23 10:27
Filter ID: **Analysis Date:** 11/24/23 13:48
Comments: MFK-AM-01-111323-HM

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Beryllium	7440-41-7	0.0656		0.00318

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FILE #: 0000.00
REPORTED: 11/29/23 10:49
SUBMITTED: 11/20/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: Q9541239 **Lab ID:** 3112027-04 **Sampled:** 11/14/23 23:59
Matrix: Air **Sample Volume:** 1785.6 m³ **Received:** 11/20/23 10:27
Filter ID: **Analysis Date:** 11/23/23 02:33
Comments: MFK-AM-03-111423-HM

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	**7429-90-5**	**907**		**29.2**
Antimony	**7440-36-0**	**0.107**	SL	**0.0402**
Arsenic	**7440-38-2**	**0.238**		**0.00870**
Barium	**7440-39-3**	**13.5**		**0.864**
Cadmium	7440-43-9	0.0356	U	0.0993
Calcium	**7440-70-2**	**758**	LJ	**266**
Chromium	**7440-47-3**	**2.22**		**1.85**
Cobalt	**7440-48-4**	**0.560**		**0.0142**
Copper	**7440-50-8**	**36.3**		**2.73**
Iron	**7439-89-6**	**1100**		**22.1**
Lead	**7439-92-1**	**0.443**		**0.251**
Magnesium	**7439-95-4**	**349**		**87.8**
Manganese	**7439-96-5**	**35.4**		**1.08**
Molybdenum	**7439-98-7**	**1.20**		**0.194**
Nickel	**7440-02-0**	**1.06**		**0.730**
Phosphorus	7723-14-0	438	U, GC-BS	1140
Potassium	**7440-09-7**	**231**		**34.6**
Rubidium		**0.408**		**0.0167**
Selenium	**7782-49-2**	**0.333**		**0.0100**
Sodium	**7440-23-5**	**2270**	GC-BS	**1820**
Strontium	**7440-24-6**	**10.0**		**0.594**
Thallium	**7440-28-0**	**0.00312**		**4.58E-4**
Thorium	**7440-29-01**	**0.0322**		**0.00273**
Uranium	**NA**	**0.0242**		**0.0155**
Vanadium	**7440-62-2**	**2.52**		**0.0448**
Zinc	7440-66-6	17.3	U	89.0

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REPORTED: 11/29/23 10:49
SUBMITTED: 11/20/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: Q9541239 **Lab ID:** 3112027-04RE2 **Sampled:** 11/14/23 23:59
Matrix: Air **Sample Volume:** 1785.6 m^3 **Received:** 11/20/23 10:27
Filter ID: **Analysis Date:** 11/24/23 13:56
Comments: MFK-AM-03-111423-HM

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m^3 Air	Flag	MDL ng/m^3 Air
Beryllium	7440-41-7	0.0393		0.00303

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FILE #: 0000.00
REPORTED: 11/29/23 10:49
SUBMITTED: 11/20/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: Q9541241 **Lab ID:** 3112027-05 **Sampled:** 11/14/23 23:59
Matrix: Air **Sample Volume:** 1857.6 m³ **Received:** 11/20/23 10:27
Filter ID: **Analysis Date:** 11/23/23 02:52
Comments: MFK-AM-02-111423-HM

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	**7429-90-5**	**1340**		**28.1**
Antimony	**7440-36-0**	**0.0876**	SL	**0.0386**
Arsenic	**7440-38-2**	**0.349**		**0.00836**
Barium	**7440-39-3**	**13.7**		**0.830**
Cadmium	7440-43-9	0.0195	U	0.0955
Calcium	**7440-70-2**	**789**	LJ	**256**
Chromium	**7440-47-3**	**2.59**		**1.78**
Cobalt	**7440-48-4**	**0.644**		**0.0137**
Copper	**7440-50-8**	**18.8**		**2.63**
Lead	**7439-92-1**	**0.635**		**0.242**
Magnesium	**7439-95-4**	**342**		**84.4**
Manganese	**7439-96-5**	**36.2**		**1.04**
Molybdenum	**7439-98-7**	**0.695**		**0.187**
Nickel	**7440-02-0**	**1.19**		**0.702**
Phosphorus	7723-14-0	412	U, GC-BS	1090
Potassium	**7440-09-7**	**197**		**33.3**
Rubidium		**0.381**		**0.0160**
Selenium	**7782-49-2**	**0.390**		**0.00963**
Sodium	**7440-23-5**	**2160**	GC-BS	**1750**
Strontium	**7440-24-6**	**9.71**		**0.571**
Thallium	**7440-28-0**	**0.00244**		**4.41E-4**
Thorium	**7440-29-01**	**0.0458**		**0.00263**
Uranium	**NA**	**0.0288**		**0.0149**
Vanadium	**7440-62-2**	**3.39**		**0.0431**
Zinc	7440-66-6	16.9	U	85.6

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REPORTED: 11/29/23 10:49
SUBMITTED: 11/20/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: Q9541241 **Lab ID:** 3112027-05RE1 **Sampled:** 11/14/23 23:59
Matrix: Air **Sample Volume:** 1857.6 m³ **Received:** 11/20/23 10:27
Filter ID: **Analysis Date:** 11/23/23 04:32
Comments: MFK-AM-02-111423-HM

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Iron	7439-89-6	1360	D	212

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REPORTED: 11/29/23 10:49
SUBMITTED: 11/20/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: Q9541241 **Lab ID:** 3112027-05RE2 **Sampled:** 11/14/23 23:59
Matrix: Air **Sample Volume:** 1857.6 m^3 **Received:** 11/20/23 10:27
Filter ID: **Analysis Date:** 11/24/23 14:04
Comments: MFK-AM-02-111423-HM

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Beryllium	**7440-41-7**	**0.0433**		**0.00291**

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FILE #: 0000.00
REPORTED: 11/29/23 10:49
SUBMITTED: 11/20/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: Q9541242 **Lab ID:** 3112027-06 **Sampled:** 11/14/23 23:59
Matrix: Air **Sample Volume:** 1826.8 m³ **Received:** 11/20/23 10:27
Filter ID: **Analysis Date:** 11/23/23 03:09
Comments: MFK-AM-01-111423-HM

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	**7429-90-5**	**1900**		**28.6**
Antimony	**7440-36-0**	**0.111**	SL	**0.0393**
Arsenic	**7440-38-2**	**0.361**		**0.00851**
Barium	**7440-39-3**	**17.4**		**0.844**
Cadmium	7440-43-9	0.0281	U	0.0971
Calcium	**7440-70-2**	**1680**	LJ	**260**
Chromium	**7440-47-3**	**3.26**		**1.81**
Cobalt	**7440-48-4**	**0.899**		**0.0139**
Copper	**7440-50-8**	**51.4**		**2.67**
Lead	**7439-92-1**	**2.34**		**0.246**
Magnesium	**7439-95-4**	**437**		**85.9**
Manganese	**7439-96-5**	**52.8**		**1.06**
Molybdenum	**7439-98-7**	**0.965**		**0.190**
Nickel	**7440-02-0**	**1.73**		**0.713**
Phosphorus	7723-14-0	506	U, GC-BS	1110
Potassium	**7440-09-7**	**222**		**33.8**
Rubidium		**0.537**		**0.0163**
Selenium	**7782-49-2**	**0.514**		**0.00980**
Sodium	**7440-23-5**	**2480**	GC-BS	**1780**
Strontium	**7440-24-6**	**24.7**		**0.581**
Thallium	**7440-28-0**	**0.00344**		**4.48E-4**
Thorium	**7440-29-01**	**0.0667**		**0.00267**
Uranium	**NA**	**0.0405**		**0.0151**
Vanadium	**7440-62-2**	**4.47**		**0.0438**
Zinc	7440-66-6	36.2	U	87.0

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REPORTED: 11/29/23 10:49
SUBMITTED: 11/20/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: Q9541242 **Lab ID:** 3112027-06RE1 **Sampled:** 11/14/23 23:59
Matrix: Air **Sample Volume:** 1826.8 m^3 **Received:** 11/20/23 10:27
Filter ID: **Analysis Date:** 11/23/23 04:46
Comments: MFK-AM-01-111423-HM

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Iron	7439-89-6	1850	D	216

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REPORTED: 11/29/23 10:49
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AQS SITE CODE:
SITE CODE: Maui fires

Description: Q9541242
Matrix: Air
Comments: MFK-AM-01-111423-HM

Lab ID: 3112027-06RE2
Sample Volume: 1826.8 m^3
Filter ID:

Sampled: 11/14/23 23:59
Received: 11/20/23 10:27
Analysis Date: 11/24/23 14:11

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Beryllium	7440-41-7	0.0497		0.00296

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1777 Sentry Pkwy, Bldg 12
Blue Bell, PA 19422
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PHONE: (703) 885-5495 **FAX:**

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Inorganics by Compendium Method IO-3.5 - Quality Control

Batch 2311061 - B3K2104

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Calibration Blank (2311061-CCB1)				Prepared & Analyzed: 11/22/23						
Aluminum	293		ng/l							
Antimony	2.24		ng/l							
Arsenic	10.7		ng/l							
Barium	4.84		ng/l							
Beryllium	-0.442		ng/l							U
Cadmium	0.661		ng/l							
Calcium	2100		ng/l							
Chromium	6.17		ng/l							
Cobalt	0.752		ng/l							
Copper	48.2		ng/l							
Iron	237		ng/l							
Lead	9.93		ng/l							
Magnesium	216		ng/l							
Manganese	12.6		ng/l							
Molybdenum	38.1		ng/l							
Nickel	0.461		ng/l							
Phosphorus	105		ng/l							
Potassium	2770		ng/l							
Rubidium	0.325		ng/l							
Selenium	0.980		ng/l							
Sodium	2810		ng/l							
Strontium	1.04		ng/l							
Thallium	0.524		ng/l							
Thorium	0.265		ng/l							
Uranium	-0.00683		ng/l							U
Vanadium	-22.6		ng/l							U
Zinc	-4.13		ng/l							U
Calibration Blank (2311061-CCB2)				Prepared & Analyzed: 11/22/23						
Aluminum	36.6		ng/l							
Antimony	2.09		ng/l							
Arsenic	5.50		ng/l							
Barium	7.46		ng/l							
Beryllium	-0.964		ng/l							U
Cadmium	0.423		ng/l							
Calcium	868		ng/l							
Chromium	6.14		ng/l							
Cobalt	1.18		ng/l							
Copper	50.8		ng/l							

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Inorganics by Compendium Method IO-3.5 - Quality Control

Batch 2311061 - B3K2104

Calibration Blank (2311061-CCB2) Contin — Prepared & Analyzed: 11/22/23

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Iron	112		ng/l							
Lead	7.59		ng/l							
Magnesium	31.6		ng/l							
Manganese	12.9		ng/l							
Molybdenum	9.27		ng/l							
Nickel	2.47		ng/l							
Phosphorus	-740		ng/l							U
Potassium	1320		ng/l							
Rubidium	0.00678		ng/l							
Selenium	2.82		ng/l							
Sodium	964		ng/l							
Strontium	3.17		ng/l							
Thallium	0.715		ng/l							
Thorium	0.348		ng/l							
Uranium	0.0131		ng/l							
Vanadium	-16.5		ng/l							U
Zinc	77.2		ng/l							

Calibration Blank (2311061-CCB3) — Prepared: 11/22/23 Analyzed: 11/23/23

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Aluminum	151		ng/l							
Antimony	2.35		ng/l							
Arsenic	11.7		ng/l							
Barium	6.87		ng/l							
Beryllium	-1.25		ng/l							U
Cadmium	1.21		ng/l							
Calcium	1390		ng/l							
Chromium	11.4		ng/l							
Cobalt	1.67		ng/l							
Copper	76.2		ng/l							
Iron	175		ng/l							
Lead	9.11		ng/l							
Magnesium	77.3		ng/l							
Manganese	19.0		ng/l							
Molybdenum	12.3		ng/l							
Nickel	7.19		ng/l							
Phosphorus	-707		ng/l							U
Potassium	973		ng/l							
Rubidium	0.924		ng/l							
Selenium	4.38		ng/l							

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Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Inorganics by Compendium Method IO-3.5 - Quality Control										
Batch 2311061 - B3K2104										
Calibration Blank (2311061-CCB3) Contin				Prepared: 11/22/23 Analyzed: 11/23/23						
Sodium	3240		ng/l							
Strontium	4.72		ng/l							
Thallium	0.549		ng/l							
Thorium	0.500		ng/l							
Uranium	0.0167		ng/l							
Vanadium	-21.0		ng/l							U
Zinc	63.2		ng/l							
Calibration Blank (2311061-CCB4)				Prepared: 11/22/23 Analyzed: 11/23/23						
Aluminum	374		ng/l							
Antimony	2.91		ng/l							
Arsenic	7.52		ng/l							
Barium	20.9		ng/l							
Beryllium	-0.259		ng/l							U
Cadmium	1.75		ng/l							
Calcium	4480		ng/l							
Chromium	17.3		ng/l							
Cobalt	3.46		ng/l							
Copper	158		ng/l							
Iron	592		ng/l							
Lead	17.3		ng/l							
Magnesium	224		ng/l							
Manganese	45.9		ng/l							
Molybdenum	13.4		ng/l							
Nickel	11.4		ng/l							
Phosphorus	-393		ng/l							U
Potassium	494		ng/l							
Rubidium	0.483		ng/l							
Selenium	10.7		ng/l							
Sodium	2910		ng/l							
Strontium	16.9		ng/l							
Thallium	0.520		ng/l							
Thorium	0.524		ng/l							
Uranium	0.0405		ng/l							
Vanadium	-19.9		ng/l							U
Zinc	167		ng/l							
Calibration Check (2311061-CCV1)				Prepared & Analyzed: 11/22/23						
Aluminum	1.55E6		ng/l	1.5000E6		103	90-110			
Antimony	19800		ng/l	20000		98.8	90-110			

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Inorganics by Compendium Method IO-3.5 - Quality Control

Batch 2311061 - B3K2104

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Calibration Check (2311061-CCV1) Contir				Prepared & Analyzed: 11/22/23						
Arsenic	19700		ng/l	20000		98.6	90-110			
Barium	200000		ng/l	200000		100	90-110			
Beryllium	4850		ng/l	5000.0		96.9	90-110			
Cadmium	19800		ng/l	20000		99.2	90-110			
Calcium	2.50E7		ng/l	2.5000E7		99.8	90-110			
Chromium	224000		ng/l	240000		93.3	90-110			
Cobalt	52300		ng/l	50000		105	90-110			
Copper	2.02E6		ng/l	2.0000E6		101	90-110			
Iron	2.51E6		ng/l	2.5000E6		100	90-110			
Lead	196000		ng/l	200000		98.1	90-110			
Magnesium	1.05E6		ng/l	1.0000E6		105	90-110			
Manganese	503000		ng/l	500000		101	90-110			
Molybdenum	49100		ng/l	50000		98.3	90-110			
Nickel	124000		ng/l	120000		104	90-110			
Phosphorus	206000		ng/l	200000		103	90-110			
Potassium	2.61E6		ng/l	2.5000E6		104	90-110			
Rubidium	9840		ng/l	10000		98.4	90-110			
Selenium	19700		ng/l	20000		98.6	90-110			
Sodium	2.62E6		ng/l	2.5000E6		105	90-110			
Strontium	49100		ng/l	50000		98.2	90-110			
Thallium	488		ng/l	500.00		97.6	90-110			
Thorium	489		ng/l	500.00		97.8	90-110			
Uranium	488		ng/l	500.00		97.6	90-110			
Vanadium	18800		ng/l	20000		94.2	90-110			
Zinc	526000		ng/l	500000		105	90-110			
Calibration Check (2311061-CCV2)				Prepared & Analyzed: 11/22/23						
Aluminum	1.47E6		ng/l	1.5000E6		97.9	90-110			
Antimony	20000		ng/l	20000		99.9	90-110			
Arsenic	19600		ng/l	20000		98.2	90-110			
Barium	212000		ng/l	200000		106	90-110			
Beryllium	4690		ng/l	5000.0		93.9	90-110			
Cadmium	20100		ng/l	20000		101	90-110			
Calcium	2.47E7		ng/l	2.5000E7		99.0	90-110			
Chromium	224000		ng/l	240000		93.4	90-110			
Cobalt	51500		ng/l	50000		103	90-110			
Copper	2.00E6		ng/l	2.0000E6		100	90-110			
Iron	2.46E6		ng/l	2.5000E6		98.2	90-110			
Lead	199000		ng/l	200000		99.4	90-110			

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Inorganics by Compendium Method IO-3.5 - Quality Control

Batch 2311061 - B3K2104

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Calibration Check (2311061-CCV2) Contin				Prepared & Analyzed: 11/22/23						
Magnesium	1.01E6		ng/l	1.0000E6		101	90-110			
Manganese	488000		ng/l	500000		97.6	90-110			
Molybdenum	51500		ng/l	50000		103	90-110			
Nickel	122000		ng/l	120000		102	90-110			
Phosphorus	188000		ng/l	200000		94.0	90-110			
Potassium	2.51E6		ng/l	2.5000E6		100	90-110			
Rubidium	9960		ng/l	10000		99.6	90-110			
Selenium	19800		ng/l	20000		98.8	90-110			
Sodium	2.56E6		ng/l	2.5000E6		102	90-110			
Strontium	49400		ng/l	50000		98.7	90-110			
Thallium	500		ng/l	500.00		100	90-110			
Thorium	497		ng/l	500.00		99.3	90-110			
Uranium	498		ng/l	500.00		99.6	90-110			
Vanadium	19500		ng/l	20000		97.3	90-110			
Zinc	530000		ng/l	500000		106	90-110			
Calibration Check (2311061-CCV3)				Prepared: 11/22/23 Analyzed: 11/23/23						
Aluminum	1.47E6		ng/l	1.5000E6		98.1	90-110			
Antimony	20200		ng/l	20000		101	90-110			
Arsenic	19800		ng/l	20000		98.8	90-110			
Barium	212000		ng/l	200000		106	90-110			
Beryllium	4430		ng/l	5000.0		88.5	90-110			
Cadmium	20400		ng/l	20000		102	90-110			
Calcium	2.49E7		ng/l	2.5000E7		99.7	90-110			
Chromium	231000		ng/l	240000		96.1	90-110			
Cobalt	51800		ng/l	50000		104	90-110			
Copper	2.02E6		ng/l	2.0000E6		101	90-110			
Iron	2.47E6		ng/l	2.5000E6		98.8	90-110			
Lead	200000		ng/l	200000		100	90-110			
Magnesium	1.01E6		ng/l	1.0000E6		101	90-110			
Manganese	496000		ng/l	500000		99.1	90-110			
Molybdenum	52100		ng/l	50000		104	90-110			
Nickel	123000		ng/l	120000		102	90-110			
Phosphorus	193000		ng/l	200000		96.6	90-110			
Potassium	2.55E6		ng/l	2.5000E6		102	90-110			
Rubidium	10000		ng/l	10000		100	90-110			
Selenium	19700		ng/l	20000		98.3	90-110			
Sodium	2.55E6		ng/l	2.5000E6		102	90-110			
Strontium	49900		ng/l	50000		99.9	90-110			

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Inorganics by Compendium Method IO-3.5 - Quality Control

Batch 2311061 - B3K2104

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Calibration Check (2311061-CCV3) Contir				Prepared: 11/22/23		Analyzed: 11/23/23				
Thallium	493		ng/l	500.00		98.5	90-110			
Thorium	497		ng/l	500.00		99.3	90-110			
Uranium	495		ng/l	500.00		99.0	90-110			
Vanadium	19700		ng/l	20000		98.3	90-110			
Zinc	528000		ng/l	500000		106	90-110			
Calibration Check (2311061-CCV4)				Prepared: 11/22/23		Analyzed: 11/23/23				
Aluminum	1.41E6		ng/l	1.5000E6		94.3	90-110			
Antimony	20400		ng/l	20000		102	90-110			
Arsenic	19900		ng/l	20000		99.6	90-110			
Barium	216000		ng/l	200000		108	90-110			
Beryllium	4530		ng/l	5000.0		90.5	90-110			
Cadmium	20500		ng/l	20000		103	90-110			
Calcium	2.48E7		ng/l	2.5000E7		99.0	90-110			
Chromium	233000		ng/l	240000		97.1	90-110			
Cobalt	51000		ng/l	50000		102	90-110			
Copper	2.00E6		ng/l	2.0000E6		100	90-110			
Iron	2.44E6		ng/l	2.5000E6		97.8	90-110			
Lead	199000		ng/l	200000		99.7	90-110			
Magnesium	968000		ng/l	1.0000E6		96.8	90-110			
Manganese	488000		ng/l	500000		97.6	90-110			
Molybdenum	52200		ng/l	50000		104	90-110			
Nickel	121000		ng/l	120000		101	90-110			
Phosphorus	186000		ng/l	200000		93.0	90-110			
Potassium	2.49E6		ng/l	2.5000E6		99.7	90-110			
Rubidium	10200		ng/l	10000		102	90-110			
Selenium	20200		ng/l	20000		101	90-110			
Sodium	2.48E6		ng/l	2.5000E6		99.2	90-110			
Strontium	50700		ng/l	50000		101	90-110			
Thallium	497		ng/l	500.00		99.5	90-110			
Thorium	504		ng/l	500.00		101	90-110			
Uranium	503		ng/l	500.00		101	90-110			
Vanadium	20200		ng/l	20000		101	90-110			
Zinc	531000		ng/l	500000		106	90-110			
High Cal Check (2311061-HCV1)				Prepared & Analyzed: 11/22/23						
Aluminum	2.95E6		ng/l	3.0000E6		98.4	95-105			
Antimony	40500		ng/l	40000		101	95-105			
Arsenic	40000		ng/l	40000		99.9	95-105			
Barium	406000		ng/l	400000		101	95-105			

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Batch 2311061 - B3K2104

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
High Cal Check (2311061-HCV1) Continue				Prepared & Analyzed: 11/22/23						
Beryllium	9610		ng/l	10000		96.1	95-105			
Cadmium	40200		ng/l	40000		101	95-105			
Calcium	4.99E7		ng/l	5.0000E7		99.8	95-105			
Chromium	470000		ng/l	480000		97.9	95-105			
Cobalt	98000		ng/l	100000		98.0	95-105			
Copper	3.92E6		ng/l	4.0000E6		98.0	95-105			
Iron	4.95E6		ng/l	5.0000E6		98.9	95-105			
Lead	402000		ng/l	400000		101	95-105			
Magnesium	1.98E6		ng/l	2.0000E6		98.9	95-105			
Manganese	986000		ng/l	1.0000E6		98.6	95-105			
Molybdenum	101000		ng/l	100000		101	95-105			
Nickel	239000		ng/l	240000		99.4	95-105			
Phosphorus	394000		ng/l	400000		98.5	95-105			
Potassium	4.99E6		ng/l	5.0000E6		99.7	95-105			
Rubidium	20000		ng/l	20000		100	95-105			
Selenium	40200		ng/l	40000		101	95-105			
Sodium	4.93E6		ng/l	5.0000E6		98.6	95-105			
Strontium	101000		ng/l	100000		101	95-105			
Thallium	999		ng/l	1000.0		99.9	95-105			
Thorium	1000		ng/l	1000.0		100	95-105			
Uranium	1020		ng/l	1000.0		102	95-105			
Vanadium	39600		ng/l	40000		98.9	95-105			
Zinc	980000		ng/l	1.0000E6		98.0	95-105			
Initial Cal Blank (2311061-ICB1)				Prepared & Analyzed: 11/22/23						
Aluminum	-62.2		ng/l							U
Antimony	9.15		ng/l							
Arsenic	-0.710		ng/l							U
Barium	1.23		ng/l							
Beryllium	-0.0373		ng/l							U
Cadmium	0.0937		ng/l							
Calcium	301		ng/l							
Chromium	2.95		ng/l							
Cobalt	0.166		ng/l							
Copper	16.8		ng/l							
Iron	-25.5		ng/l							U
Lead	6.73		ng/l							
Magnesium	55.7		ng/l							
Manganese	5.62		ng/l							

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Inorganics by Compendium Method IO-3.5 - Quality Control

Batch 2311061 - B3K2104

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Initial Cal Blank (2311061-ICB1) Continu				Prepared & Analyzed: 11/22/23						
Molybdenum	13.4		ng/l							
Nickel	-1.45		ng/l							U
Phosphorus	-143		ng/l							U
Potassium	663		ng/l							
Rubidium	0.487		ng/l							
Selenium	10.7		ng/l							
Sodium	-1010		ng/l							U
Strontium	1.09		ng/l							
Thallium	0.173		ng/l							
Thorium	0.293		ng/l							
Uranium	0.00257		ng/l							
Vanadium	-21.9		ng/l							U
Zinc	10.4		ng/l							
Initial Cal Check (2311061-ICV1)				Prepared & Analyzed: 11/22/23						
Aluminum	1.44E6		ng/l	1.5000E6		96.1	90-110			
Antimony	19600		ng/l	20000		97.8	90-110			
Arsenic	19700		ng/l	20000		98.3	90-110			
Barium	197000		ng/l	200000		98.6	90-110			
Beryllium	4700		ng/l	5000.0		94.0	90-110			
Cadmium	20700		ng/l	20000		103	90-110			
Calcium	2.43E7		ng/l	2.5000E7		97.0	90-110			
Chromium	231000		ng/l	240000		96.2	90-110			
Cobalt	50400		ng/l	50000		101	90-110			
Copper	1.99E6		ng/l	2.0000E6		99.3	90-110			
Iron	2.45E6		ng/l	2.5000E6		98.1	90-110			
Lead	197000		ng/l	200000		98.3	90-110			
Magnesium	970000		ng/l	1.0000E6		97.0	90-110			
Manganese	483000		ng/l	500000		96.6	90-110			
Molybdenum	49600		ng/l	50000		99.1	90-110			
Nickel	121000		ng/l	120000		101	90-110			
Phosphorus	186000		ng/l	200000		93.2	90-110			
Potassium	2.49E6		ng/l	2.5000E6		99.8	90-110			
Rubidium	9610		ng/l	10000		96.1	90-110			
Selenium	20200		ng/l	20000		101	90-110			
Sodium	2.40E6		ng/l	2.5000E6		96.1	90-110			
Strontium	50200		ng/l	50000		100	90-110			
Thallium	468		ng/l	500.00		93.7	90-110			
Thorium	489		ng/l	500.00		97.8	90-110			

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CERTIFICATE OF ANALYSIS

Tetra Tech, Inc.
1777 Sentry Pkwy, Bldg 12
Blue Bell, PA 19422
ATTN: Ms. Chelsea Saber
PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 11/29/23 10:49
SUBMITTED: 11/20/23
AQS SITE CODE:
SITE CODE: Maui fires

Inorganics by Compendium Method IO-3.5 - Quality Control

Batch 2311061 - B3K2104

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Initial Cal Check (2311061-ICV1) Continu				Prepared & Analyzed: 11/22/23						
Uranium	487		ng/l	500.00		97.3	90-110			
Vanadium	20100		ng/l	20000		100	90-110			
Zinc	532000		ng/l	500000		106	90-110			
Interference Check A (2311061-IFA1)				Prepared & Analyzed: 11/22/23						
Aluminum	1.53E7		ng/l	1.5000E7		102	80-120			
Antimony	0.00		ng/l				80-120			U
Arsenic	0.00		ng/l				80-120			U
Barium	0.00		ng/l				80-120			U
Beryllium	0.00		ng/l				80-120			U
Cadmium	0.00		ng/l				80-120			U
Calcium	9.02E7		ng/l	1.0040E8		89.9	80-120			
Chromium	0.00		ng/l				80-120			U
Cobalt	0.00		ng/l				80-120			U
Copper	0.00		ng/l				80-120			U
Iron	1.47E7		ng/l	1.5000E7		98.1	80-120			
Lead	0.00		ng/l				80-120			U
Magnesium	1.59E7		ng/l	1.5000E7		106	80-120			
Manganese	0.00		ng/l				80-120			U
Molybdenum	294000		ng/l	300000		97.9	80-120			
Nickel	0.00		ng/l				80-120			U
Phosphorus	1.69E7		ng/l	1.5000E7		112	80-120			
Potassium	1.53E7		ng/l	1.5000E7		102	80-120			
Rubidium	0.00		ng/l				80-120			U
Selenium	0.00		ng/l				80-120			U
Sodium	1.59E7		ng/l	1.5000E7		106	80-120			
Strontium	0.00		ng/l				80-120			U
Thallium	0.00		ng/l				80-120			U
Thorium	0.00		ng/l				80-120			U
Uranium	0.00		ng/l				80-120			U
Vanadium	0.00		ng/l				80-120			U
Zinc	0.00		ng/l				80-120			U
Interference Check B (2311061-IFB1)				Prepared & Analyzed: 11/22/23						
Aluminum	1.79E7		ng/l	1.6500E7		109	80-120			
Antimony	20100		ng/l	20000		101	80-120			
Arsenic	20500		ng/l	20000		103	80-120			
Barium	206000		ng/l	200000		103	80-120			
Beryllium	4690		ng/l	5000.0		93.9	80-120			
Cadmium	19300		ng/l	20000		96.4	80-120			

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Inorganics by Compendium Method IO-3.5 - Quality Control

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 2311061 - B3K2104										
Interference Check B (2311061-IFB1) Co				Prepared & Analyzed: 11/22/23						
Calcium	1.16E8		ng/l	1.2540E8		92.9	80-120			
Chromium	219000		ng/l	240000		91.0	80-120			
Cobalt	51900		ng/l	50000		104	80-120			
Copper	1.89E6		ng/l	2.0000E6		94.7	80-120			
Iron	1.77E7		ng/l	1.7500E7		101	80-120			
Lead	204000		ng/l	200000		102	80-120			
Magnesium	1.80E7		ng/l	1.6000E7		112	80-120			
Manganese	535000		ng/l	500000		107	80-120			
Molybdenum	343000		ng/l	350000		98.0	80-120			
Nickel	120000		ng/l	120000		99.8	80-120			
Phosphorus	1.81E7		ng/l	1.5200E7		119	80-120			
Potassium	1.88E7		ng/l	1.7500E7		107	80-120			
Rubidium	10200		ng/l	10000		102	80-120			
Selenium	19300		ng/l	20000		96.7	80-120			
Sodium	1.99E7		ng/l	1.7500E7		114	80-120			
Strontium	50000		ng/l	50000		100	80-120			
Thallium	511		ng/l	500.00		102	80-120			
Thorium	528		ng/l	500.00		106	80-120			
Uranium	531		ng/l	500.00		106	80-120			
Vanadium	17400		ng/l	20000		87.2	80-120			
Zinc	486000		ng/l	500000		97.2	80-120			
Batch 2311063 - B3K2104										
Calibration Blank (2311063-CCB1)				Prepared & Analyzed: 11/24/23						
Beryllium	-0.134		ng/l							U
Calibration Blank (2311063-CCB2)				Prepared & Analyzed: 11/24/23						
Beryllium	-0.893		ng/l							U
Calibration Blank (2311063-CCB3)				Prepared & Analyzed: 11/24/23						
Beryllium	-1.67		ng/l							U
Calibration Check (2311063-CCV1)				Prepared & Analyzed: 11/24/23						
Beryllium	4570		ng/l	5000.0		91.4	90-110			
Calibration Check (2311063-CCV2)				Prepared & Analyzed: 11/24/23						
Beryllium	4680		ng/l	5000.0		93.6	90-110			
Calibration Check (2311063-CCV3)				Prepared & Analyzed: 11/24/23						
Beryllium	4560		ng/l	5000.0		91.2	90-110			
High Cal Check (2311063-HCV1)				Prepared & Analyzed: 11/24/23						
Beryllium	9800		ng/l	10000		98.0	95-105			

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AQS SITE CODE:
SITE CODE: Maui fires

Inorganics by Compendium Method IO-3.5 - Quality Control

Batch 2311063 - B3K2104

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Initial Cal Blank (2311063-ICB1)				Prepared & Analyzed: 11/24/23						
Beryllium	-0.0416		ng/l							U
Initial Cal Check (2311063-ICV1)				Prepared & Analyzed: 11/24/23						
Beryllium	4580		ng/l	5000.0		91.6	90-110			
Interference Check A (2311063-IFA1)				Prepared & Analyzed: 11/24/23						
Beryllium	0.00		ng/l				80-120			U
Interference Check B (2311063-IFB1)				Prepared & Analyzed: 11/24/23						
Beryllium	4610		ng/l	5000.0		92.2	80-120			
Batch B3K2104 - ICP-MS Extraction										
Blank (B3K2104-BLK1)				Prepared: 11/21/23 Analyzed: 11/22/23						
Aluminum	ND	32.1	ng/m³ Air							U
Antimony	ND	0.0441	ng/m³ Air							U, SL
Arsenic	ND	0.00955	ng/m³ Air							U
Barium	ND	0.948	ng/m³ Air							U
Beryllium	ND	0.00332	ng/m³ Air							U
Cadmium	ND	0.109	ng/m³ Air							U
Calcium	ND	292	ng/m³ Air							U
Chromium	ND	2.03	ng/m³ Air							U
Cobalt	ND	0.0156	ng/m³ Air							U
Copper	ND	3.00	ng/m³ Air							U
Iron	ND	24.2	ng/m³ Air							U
Lead	ND	0.276	ng/m³ Air							U
Magnesium	ND	96.4	ng/m³ Air							U
Manganese	ND	1.19	ng/m³ Air							U
Molybdenum	ND	0.213	ng/m³ Air							U
Nickel	ND	0.801	ng/m³ Air							U
Phosphorus	ND	1250	ng/m³ Air							U, GC-BS
Potassium	ND	38.0	ng/m³ Air							U
Rubidium	ND	0.0183	ng/m³ Air							U
Selenium	ND	0.0110	ng/m³ Air							U
Sodium	ND	2000	ng/m³ Air							U
Strontium	ND	0.652	ng/m³ Air							U
Thallium	ND	5.03E-4	ng/m³ Air							U
Thorium	ND	0.00300	ng/m³ Air							U
Uranium	ND	0.0170	ng/m³ Air							U
Vanadium	ND	0.0492	ng/m³ Air							U
Zinc	ND	97.7	ng/m³ Air							U
LCS (B3K2104-BS1)				Prepared: 11/21/23 Analyzed: 11/22/23						

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FILE #: 0000.00
REPORTED: 11/29/23 10:49
SUBMITTED: 11/20/23
AQS SITE CODE:
SITE CODE: Maui fires

Inorganics by Compendium Method IO-3.5 - Quality Control

Batch B3K2104 - ICP-MS Extraction

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
LCS (B3K2104-BS1) Continued				Prepared: 11/21/23 Analyzed: 11/22/23						
Aluminum	87.7	32.1	ng/m³ Air	82.975		106	80-120			
Antimony	0.896	0.0441	ng/m³ Air	1.3829		64.8	80-120			SL
Arsenic	2.67	0.00955	ng/m³ Air	2.7658		96.5	80-120			
Barium	27.8	0.948	ng/m³ Air	27.658		101	80-120			
Beryllium	1.33	0.00332	ng/m³ Air	1.3829		96.3	80-120			
Cadmium	1.38	0.109	ng/m³ Air	1.3829		99.5	80-120			
Calcium	ND	292	ng/m³ Air	69.146			80-120			U
Chromium	14.0	2.03	ng/m³ Air	13.829		101	80-120			
Cobalt	1.39	0.0156	ng/m³ Air	1.3829		101	80-120			
Copper	29.8	3.00	ng/m³ Air	27.658		108	80-120			
Iron	36.2	24.2	ng/m³ Air	27.658		131	80-120			
Lead	13.5	0.276	ng/m³ Air	13.829		97.4	80-120			
Magnesium	ND	96.4	ng/m³ Air	27.658			80-120			U
Manganese	8.26	1.19	ng/m³ Air	8.2975		99.5	80-120			
Molybdenum	1.43	0.213	ng/m³ Air	1.3829		103	80-120			
Nickel	2.96	0.801	ng/m³ Air	2.7658		107	80-120			
Phosphorus	ND	1250	ng/m³ Air	13.829			80-120			U, GC-BS
Potassium	61.3	38.0	ng/m³ Air	55.317		111	80-120			
Rubidium	1.33	0.0183	ng/m³ Air	1.3829		96.4	80-120			
Selenium	2.63	0.0110	ng/m³ Air	2.7658		95.1	80-120			
Sodium	ND	2000	ng/m³ Air	55.317			80-120			U, GC-BS
Strontium	1.63	0.652	ng/m³ Air	1.3829		118	80-120			
Thallium	0.128	5.03E-4	ng/m³ Air	0.13829		92.8	80-120			
Thorium	0.129	0.00300	ng/m³ Air	0.13829		93.4	80-120			
Uranium	0.127	0.0170	ng/m³ Air	0.13829		91.8	80-120			
Vanadium	2.70	0.0492	ng/m³ Air	2.7658		97.7	80-120			
Zinc	111	97.7	ng/m³ Air	82.975		133	80-120			
LCS (B3K2104-BS2)				Prepared: 11/21/23 Analyzed: 11/22/23						
Aluminum	77.1	32.1	ng/m³ Air	82.975		92.9	80-120			
Antimony	1.34	0.0441	ng/m³ Air	1.3829		97.0	80-120			SL
Arsenic	2.62	0.00955	ng/m³ Air	2.7658		94.8	80-120			
Barium	26.8	0.948	ng/m³ Air	27.658		96.9	80-120			
Beryllium	1.41	0.00332	ng/m³ Air	1.3829		102	80-120			
Cadmium	1.37	0.109	ng/m³ Air	1.3829		98.9	80-120			
Calcium	ND	292	ng/m³ Air	69.146			80-120			U, LJ
Chromium	13.2	2.03	ng/m³ Air	13.829		95.6	80-120			
Cobalt	1.36	0.0156	ng/m³ Air	1.3829		98.2	80-120			
Copper	29.0	3.00	ng/m³ Air	27.658		105	80-120			

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Blue Bell, PA 19422
ATTN: Ms. Chelsea Saber
PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 11/29/23 10:49
SUBMITTED: 11/20/23
AQS SITE CODE:
SITE CODE: Maui fires

Inorganics by Compendium Method IO-3.5 - Quality Control

Batch B3K2104 - ICP-MS Extraction

LCS (B3K2104-BS2) Continued Prepared: 11/21/23 Analyzed: 11/22/23

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Iron	25.8	24.2	ng/m³ Air	27.658		93.4	80-120			
Lead	13.3	0.276	ng/m³ Air	13.829		96.3	80-120			
Magnesium	ND	96.4	ng/m³ Air	27.658			80-120			U
Manganese	7.88	1.19	ng/m³ Air	8.2975		95.0	80-120			
Molybdenum	1.33	0.213	ng/m³ Air	1.3829		96.5	80-120			
Nickel	2.69	0.801	ng/m³ Air	2.7658		97.3	80-120			
Phosphorus	ND	1250	ng/m³ Air	13.829			80-120			U, GC-BS
Potassium	54.3	38.0	ng/m³ Air	55.317		98.1	80-120			
Rubidium	1.32	0.0183	ng/m³ Air	1.3829		95.4	80-120			
Selenium	2.62	0.0110	ng/m³ Air	2.7658		94.8	80-120			
Sodium	ND	2000	ng/m³ Air	55.317			80-120			U
Strontium	1.34	0.652	ng/m³ Air	1.3829		97.1	80-120			
Thallium	0.129	5.03E-4	ng/m³ Air	0.13829		93.0	80-120			
Thorium	0.126	0.00300	ng/m³ Air	0.13829		90.9	80-120			
Uranium	0.124	0.0170	ng/m³ Air	0.13829		90.0	80-120			
Vanadium	2.69	0.0492	ng/m³ Air	2.7658		97.2	80-120			
Zinc	ND	97.7	ng/m³ Air	82.975			80-120			U

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Tetra Tech, Inc.
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FILE #: 0000.00
REPORTED: 11/29/23 10:49
SUBMITTED: 11/20/23
AQS SITE CODE:
SITE CODE: Maui fires

Notes and Definitions

U	Under Detection Limit
SL	The spike recovery was outside acceptance limits. Reported value may be biased low.
LJ	Identification of analyte is acceptable; reported value is an estimate.
GC-BS	Compound exceeds Blank Spike Criteria
D	This result obtained by dilution.
ND	Analyte NOT DETECTED
NR	Not Reported
MDL	Method Detection Limit
RPD	Relative Percent Difference

Note: This test is accredited under the 2016 TNI Standard.

Eastern Research Group
601 Keystone Park Drive
Suite 700
Morrisville, NC 27560

December 01, 2023

Ms. Chelsea Saber
Tetra Tech, Inc.
1777 Sentry Pkwy, Bldg 12
Blue Bell, PA 19422
Project Name: Maui fires

Dear Ms. Chelsea Saber,

This report contains the analytical results for the sample(s) received under chain(s) of custody by Eastern Research Group on 11/24/23 10:33.

Values below the MDL for QC results in this report are recorded as ND, however the actual values are reported in the accompanying Excel report with a "U" flag (Under the detection limit). The actual values are reported in AQS.

This test is accredited under the 2016 TNI Standard for Environmental Laboratories (FL DOH Certification # E87673). All analyses were performed as described in the US EPA-approved QAPP, under the contract for National Hazardous Air Pollutant Support (US EPA Contract No. 68HERH22D0002). This cover page is an integral part of this report, and any exceptions or comments are noted on the last page.

Release of the data contained in this data package and in the data submitted in the electronic data deliverable, has been authorized by the Program Manager, or the Program Manager's designee as verified by the following signature.

The issuance of the final Certificate of Analysis takes precedence over any previous Report. If you have any questions, please contact me at 919-468-7924.

Sincerely,

Julie Swift
Program Manager
julie.swift@erg.com

The information contained in this report and its attachment(s) are intended only for the use of the individual to whom it is addressed and may contain information that is privileged, confidential, or exempt from disclosure. If the reader of this message is not the intended recipient, you are hereby notified that any dissemination, distribution, or copying of this report is strictly prohibited. If you have received this report in error, please notify julie.swift@erg.com and delete the report without retaining any copies.

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Tetra Tech, Inc.
1777 Sentry Pkwy, Bldg 12
Blue Bell, PA 19422
ATTN: Ms. Chelsea Saber
PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 12/01/23 13:09
SUBMITTED: 11/24/23
AQS SITE CODE:
SITE CODE: Maui fires

ANALYTICAL REPORT FOR SAMPLES

SampleName	LabNumber	Matrix	Sampled	Received
TetraTech Q9541238	3112732-01	Air	11/16/23 23:59	11/24/23 10:33
TetraTech Q9541237	3112732-02	Air	11/16/23 23:59	11/24/23 10:33
TetraTech Q9541233	3112732-03	Air	11/16/23 23:59	11/24/23 10:33
TetraTech Q9541264 FB	3112732-04	Air	11/16/23 00:00	11/24/23 10:33
TetraTech Q9541263 LB	3112732-05	Air	11/16/23 00:00	11/24/23 10:33
TetraTech Q9541232	3112732-06	Air	11/17/23 23:59	11/24/23 10:33
TetraTech Q9541231	3112732-07	Air	11/17/23 23:59	11/24/23 10:33
TetraTech Q9541265	3112732-08	Air	11/17/23 23:59	11/24/23 10:33
TetraTech Q9541257 FB	3112732-09	Air	11/17/23 00:00	11/24/23 10:33
TetraTech Q9541260	3112732-10	Air	11/18/23 23:59	11/24/23 10:33
TetraTech Q9541259	3112732-11	Air	11/18/23 23:59	11/24/23 10:33
TetraTech Q9541258	3112732-12	Air	11/18/23 23:59	11/24/23 10:33
TetraTech Q9541272 FB	3112732-13	Air	11/18/23 00:00	11/24/23 10:33
TetraTech Q9541254	3112732-14	Air	11/19/23 23:59	11/24/23 10:33
TetraTech Q9541283	3112732-15	Air	11/19/23 23:59	11/24/23 10:33
TetraTech Q9541282	3112732-16	Air	11/19/23 23:59	11/24/23 10:33
TetraTech Q9541269 - FB	3112732-17	Air	11/19/23 00:00	11/24/23 10:33

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FILE #: 0000.00
REPORTED: 12/01/23 13:09
SUBMITTED: 11/24/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9541238 **Lab ID:** 3112732-01 **Sampled:** 11/16/23 23:59
Matrix: Air **Sample Volume:** 2038.818 m³ **Received:** 11/24/23 10:33
Filter ID: **Analysis Date:** 11/29/23 21:14
Comments: MFK-AM01-111623-HM

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	**7429-90-5**	**847**	ICS-01, LK	**25.6**
Antimony	**7440-36-0**	**0.0768**	GC-BS, SL	**0.0352**
Arsenic	**7440-38-2**	**0.176**		**0.00762**
Barium	**7440-39-3**	**7.89**		**0.757**
Beryllium	**7440-41-7**	**0.0289**		**0.00265**
Cadmium	7440-43-9	0.0107	U	0.0870
Calcium	**7440-70-2**	**623**	GC-BS, LJ, QB-01	**233**
Chromium	**7440-47-3**	**1.71**		**1.62**
Cobalt	**7440-48-4**	**0.453**	QB-01	**0.0124**
Copper	**7440-50-8**	**12.8**		**2.39**
Iron	**7439-89-6**	**935**	GC-BS	**19.3**
Lead	**7439-92-1**	**0.353**		**0.220**
Magnesium	**7439-95-4**	**417**	ICS-01, LK	**76.9**
Manganese	**7439-96-5**	**24.3**		**0.950**
Molybdenum	**7439-98-7**	**0.710**	QB-01	**0.170**
Nickel	**7440-02-0**	**0.661**		**0.639**
Phosphorus	7723-14-0	380	GC-BS, ICS-01, LK, U	998
Potassium	**7440-09-7**	**164**		**30.3**
Rubidium		**0.280**	QB-01	**0.0146**
Selenium	**7782-49-2**	**0.302**		**0.00878**
Sodium	**7440-23-5**	**3130**	ICS-01, LK	**1600**
Strontium	**7440-24-6**	**6.57**	QB-01	**0.520**
Thallium	**7440-28-0**	**0.00170**		**4.01E-4**
Thorium	**7440-29-01**	**0.0303**		**0.00239**
Uranium	**NA**	**0.0175**		**0.0136**
Vanadium	**7440-62-2**	**2.05**		**0.0393**
Zinc	7440-66-6	16.9	U	78.0

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Tetra Tech, Inc.
1777 Sentry Pkwy, Bldg 12
Blue Bell, PA 19422
ATTN: Ms. Chelsea Saber
PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 12/01/23 13:09
SUBMITTED: 11/24/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9541237 **Lab ID:** 3112732-02 **Sampled:** 11/16/23 23:59
Matrix: Air **Sample Volume:** 2026.064 m^3 **Received:** 11/24/23 10:33
Filter ID: **Analysis Date:** 11/29/23 21:29
Comments: MFK-AM02-111623-HM

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	**7429-90-5**	**891**	ICS-01, LK	**25.8**
Antimony	**7440-36-0**	**0.0617**	GC-BS, SL	**0.0354**
Arsenic	**7440-38-2**	**0.249**		**0.00767**
Barium	**7440-39-3**	**7.97**		**0.761**
Beryllium	**7440-41-7**	**0.0318**		**0.00267**
Cadmium	7440-43-9	0.0127	U	0.0875
Calcium	**7440-70-2**	**604**	GC-BS, LJ, QB-01	**234**
Chromium	**7440-47-3**	**1.69**		**1.63**
Cobalt	**7440-48-4**	**0.442**	QB-01	**0.0125**
Copper	**7440-50-8**	**12.1**		**2.41**
Iron	**7439-89-6**	**957**	GC-BS	**19.4**
Lead	**7439-92-1**	**0.312**		**0.222**
Magnesium	**7439-95-4**	**376**	ICS-01, LK	**77.4**
Manganese	**7439-96-5**	**23.8**		**0.956**
Molybdenum	**7439-98-7**	**0.660**	QB-01	**0.171**
Nickel	**7440-02-0**	**0.668**		**0.643**
Phosphorus	7723-14-0	375	GC-BS, ICS-01, LK, U	1000
Potassium	**7440-09-7**	**145**		**30.5**
Rubidium		**0.290**	QB-01	**0.0147**
Selenium	**7782-49-2**	**0.277**		**0.00883**
Sodium	**7440-23-5**	**2870**	ICS-01, LK	**1610**
Strontium	**7440-24-6**	**6.58**	QB-01	**0.524**
Thallium	**7440-28-0**	**0.00173**		**4.04E-4**
Thorium	**7440-29-01**	**0.0358**		**0.00241**
Uranium	**NA**	**0.0180**		**0.0137**
Vanadium	**7440-62-2**	**2.08**		**0.0395**
Zinc	7440-66-6	17.8	U	78.5

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FILE #: 0000.00
REPORTED: 12/01/23 13:09
SUBMITTED: 11/24/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9541233 **Lab ID:** 3112732-03 **Sampled:** 11/16/23 23:59
Matrix: Air **Sample Volume:** 2012.196 m³ **Received:** 11/24/23 10:33
Filter ID: **Analysis Date:** 11/29/23 18:57
Comments: MFK-AM03-111623-HM

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	**7429-90-5**	**613**	ICS-01, LK, QM-4X	**26.0**
Antimony	**7440-36-0**	**0.109**	GC-BS, QM-07, SL	**0.0357**
Arsenic	**7440-38-2**	**0.129**		**0.00772**
Barium	**7440-39-3**	**7.56**		**0.767**
Beryllium	**7440-41-7**	**0.0253**		**0.00268**
Cadmium	7440-43-9	0.0103	U	0.0881
Calcium	**7440-70-2**	**544**	GC-BS, LJ, QB-01, QM-4X	**236**
Chromium	**7440-47-3**	**1.72**		**1.64**
Cobalt	**7440-48-4**	**0.451**	QB-01	**0.0126**
Copper	**7440-50-8**	**15.9**	QM-07	**2.43**
Iron	**7439-89-6**	**750**	GC-BS, QM-4X	**19.6**
Lead	**7439-92-1**	**0.302**		**0.223**
Magnesium	**7439-95-4**	**401**	ICS-01, LK, QM-4X, QX	**77.9**
Manganese	**7439-96-5**	**20.1**	QM-07	**0.962**
Molybdenum	**7439-98-7**	**0.787**	QB-01	**0.172**
Nickel	**7440-02-0**	**0.674**		**0.648**
Phosphorus	7723-14-0	366	U, GC-BS, ICS-01, LK, QM-4X	1010
Potassium	**7440-09-7**	**147**	QM-4X	**30.7**
Rubidium		**0.258**	QB-01, QM-07	**0.0148**
Selenium	**7782-49-2**	**0.235**		**0.00889**
Sodium	**7440-23-5**	**3150**	ICS-01, LK, QM-4X, QX	**1620**
Strontium	**7440-24-6**	**5.62**	QB-01, QM-4X	**0.527**
Thallium	**7440-28-0**	**0.00148**	QM-4X	**4.07E-4**
Thorium	**7440-29-01**	**0.0274**	QM-07	**0.00243**
Uranium	**NA**	**0.0147**		**0.0137**
Vanadium	**7440-62-2**	**1.65**		**0.0398**
Zinc	7440-66-6	20.7	U	79.0

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FILE #: 0000.00
REPORTED: 12/01/23 13:09
SUBMITTED: 11/24/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9541264 FB **Lab ID:** 3112732-04 **Sampled:** 11/16/23 00:00
Matrix: Air **Sample Volume:** 2038.818 m³ **Received:** 11/24/23 10:33
Filter ID: **Analysis Date:** 11/29/23 21:44
Comments: Field Blank - MFK-FB01-111623-HM

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	7429-90-5	16.2	U, ICS-01, LK	25.6
Antimony	7440-36-0	0.0115	U, GC-BS, SL	0.0352
Arsenic	7440-38-2	0.00567	U	0.00762
Barium	7440-39-3	0.472	U	0.757
Beryllium	7440-41-7	0.00109	U	0.00265
Cadmium	7440-43-9	0.00132	U	0.0870
Calcium	7440-70-2	159	U, GC-BS, LJ, QB-01	233
Chromium	7440-47-3	1.12	U	1.62
Cobalt	**7440-48-4**	**0.0257**	FB-01, QB-01	**0.0124**
Copper	7440-50-8	0.286	U	2.39
Iron	7439-89-6	12.7	U, GC-BS	19.3
Lead	7439-92-1	0.0336	U	0.220
Magnesium	7439-95-4	43.7	U, ICS-01, LK	76.9
Manganese	7439-96-5	0.183	U	0.950
Molybdenum	**7439-98-7**	**0.178**	FB-01, QB-01	**0.170**
Nickel	7440-02-0	0.269	U	0.639
Phosphorus	7723-14-0	329	GC-BS, ICS-01, LK, U	998
Potassium	7440-09-7	8.25	U	30.3
Rubidium		0.0104	QB-01, U	0.0146
Selenium	7782-49-2	0.00242	U	0.00878
Sodium	7440-23-5	820	ICS-01, LK, U	1600
Strontium	7440-24-6	0.372	QB-01, U	0.520
Thallium	7440-28-0	9.35E-5	U	4.01E-4
Thorium	7440-29-01	0.00238	U	0.00239
Uranium	NA	0.00127	U	0.0136
Vanadium	7440-62-2	0.0144	U	0.0393
Zinc	7440-66-6	10.4	U	78.0

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FILE #: 0000.00
REPORTED: 12/01/23 13:09
SUBMITTED: 11/24/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9541263 LB **Lab ID:** 3112732-05 **Sampled:** 11/16/23 00:00
Matrix: Air **Sample Volume:** 2038.818 m³ **Received:** 11/24/23 10:33
Filter ID: **Analysis Date:** 11/29/23 21:58
Comments: Lot Blank - MFK-LB01-111623-HM

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	7429-90-5	17.5	ICS-01, LK, U	25.6
Antimony	7440-36-0	0.0122	GC-BS, SL, U	0.0352
Arsenic	7440-38-2	0.00488	U	0.00762
Barium	7440-39-3	0.481	U	0.757
Beryllium	7440-41-7	0.00121	U	0.00265
Cadmium	7440-43-9	0.00141	U	0.0870
Calcium	7440-70-2	157	GC-BS, LJ, QB-01, U	233
Chromium	7440-47-3	1.10	U	1.62
Cobalt	**7440-48-4**	**0.0223**	FB-01, QB-01	**0.0124**
Copper	7440-50-8	0.356	U	2.39
Iron	7439-89-6	13.6	GC-BS, U	19.3
Lead	7439-92-1	0.0342	U	0.220
Magnesium	7439-95-4	41.7	ICS-01, LK, U	76.9
Manganese	7439-96-5	0.194	U	0.950
Molybdenum	**7439-98-7**	**0.177**	FB-01, QB-01	**0.170**
Nickel	7440-02-0	0.265	U	0.639
Phosphorus	7723-14-0	317	GC-BS, ICS-01, LK, U	998
Potassium	7440-09-7	8.39	U	30.3
Rubidium		0.0111	QB-01, U	0.0146
Selenium	7782-49-2	0.00227	U	0.00878
Sodium	7440-23-5	782	ICS-01, LK, U	1600
Strontium	7440-24-6	0.379	QB-01, U	0.520
Thallium	7440-28-0	1.21E-4	U	4.01E-4
Thorium	7440-29-01	0.00235	U	0.00239
Uranium	NA	0.00127	U	0.0136
Vanadium	7440-62-2	0.0161	U	0.0393
Zinc	7440-66-6	10.9	U	78.0

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FILE #: 0000.00
REPORTED: 12/01/23 13:09
SUBMITTED: 11/24/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9541232 **Lab ID:** 3112732-06 **Sampled:** 11/17/23 23:59
Matrix: Air **Sample Volume:** 2038.818 m³ **Received:** 11/24/23 10:33
Filter ID: **Analysis Date:** 11/29/23 22:12
Comments: MFK-AM01-111723-HM

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	**7429-90-5**	**542**	ICS-01, LK	**25.6**
Antimony	**7440-36-0**	**0.0747**	GC-BS, SL	**0.0352**
Arsenic	**7440-38-2**	**0.165**		**0.00762**
Barium	**7440-39-3**	**5.90**		**0.757**
Beryllium	**7440-41-7**	**0.0193**		**0.00265**
Cadmium	7440-43-9	0.0106	U	0.0870
Calcium	**7440-70-2**	**443**	GC-BS, LJ, QB-01	**233**
Chromium	7440-47-3	1.52	U	1.62
Cobalt	**7440-48-4**	**0.312**	QB-01	**0.0124**
Copper	**7440-50-8**	**17.0**		**2.39**
Iron	**7439-89-6**	**628**	GC-BS	**19.3**
Lead	**7439-92-1**	**0.518**		**0.220**
Magnesium	**7439-95-4**	**281**	ICS-01, LK	**76.9**
Manganese	**7439-96-5**	**16.9**		**0.950**
Molybdenum	**7439-98-7**	**0.722**	QB-01	**0.170**
Nickel	7440-02-0	0.562	U	0.639
Phosphorus	7723-14-0	357	GC-BS, ICS-01, LK, U	998
Potassium	**7440-09-7**	**117**		**30.3**
Rubidium		**0.210**	QB-01	**0.0146**
Selenium	**7782-49-2**	**0.214**		**0.00878**
Sodium	**7440-23-5**	**2350**	ICS-01, LK	**1600**
Strontium	**7440-24-6**	**4.42**	QB-01	**0.520**
Thallium	**7440-28-0**	**0.00147**		**4.01E-4**
Thorium	**7440-29-01**	**0.0178**		**0.00239**
Uranium	NA	0.0127	U	0.0136
Vanadium	**7440-62-2**	**1.44**		**0.0393**
Zinc	7440-66-6	18.9	U	78.0

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Blue Bell, PA 19422
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PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 12/01/23 13:09
SUBMITTED: 11/24/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9541231 **Lab ID:** 3112732-07 **Sampled:** 11/17/23 23:59
Matrix: Air **Sample Volume:** 2110.483 m³ **Received:** 11/24/23 10:33
Filter ID: **Analysis Date:** 11/29/23 22:26
Comments: MFK-AM02-111723-HM

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	**7429-90-5**	**1110**	ICS-01, LK	**24.7**
Antimony	**7440-36-0**	**0.0673**	GC-BS, SL	**0.0340**
Arsenic	**7440-38-2**	**0.842**		**0.00736**
Barium	**7440-39-3**	**11.3**		**0.731**
Beryllium	**7440-41-7**	**0.0332**		**0.00256**
Cadmium	7440-43-9	0.0199	U	0.0840
Calcium	**7440-70-2**	**766**	QB-01, GC-BS, LJ	**225**
Chromium	**7440-47-3**	**1.99**		**1.56**
Cobalt	**7440-48-4**	**0.466**	QB-01	**0.0120**
Copper	**7440-50-8**	**13.8**		**2.31**
Lead	**7439-92-1**	**0.565**		**0.213**
Magnesium	**7439-95-4**	**332**	ICS-01, LK	**74.3**
Manganese	**7439-96-5**	**28.6**		**0.917**
Molybdenum	**7439-98-7**	**0.685**	QB-01	**0.164**
Nickel	**7440-02-0**	**0.762**		**0.618**
Phosphorus	7723-14-0	390	GC-BS, ICS-01, LK, U	964
Potassium	**7440-09-7**	**177**		**29.3**
Rubidium		**0.378**	QB-01	**0.0141**
Selenium	**7782-49-2**	**0.318**		**0.00848**
Sodium	**7440-23-5**	**2340**	ICS-01, LK	**1540**
Strontium	**7440-24-6**	**9.66**	QB-01	**0.503**
Thallium	**7440-28-0**	**0.00224**		**3.88E-4**
Thorium	**7440-29-01**	**0.0404**		**0.00231**
Uranium	**NA**	**0.0246**		**0.0131**
Vanadium	**7440-62-2**	**2.53**		**0.0379**
Zinc	7440-66-6	15.7	U	75.3

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PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 12/01/23 13:09
SUBMITTED: 11/24/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9541231
Matrix: Air
Comments: MFK-AM02-111723-HM

Lab ID: 3112732-07RE1
Sample Volume: 2110.483 m³
Filter ID:

Sampled: 11/17/23 23:59
Received: 11/24/23 10:33
Analysis Date: 11/30/23 03:50

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Iron	7439-89-6	1060	D, GC-BS	187

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FILE #: 0000.00
REPORTED: 12/01/23 13:09
SUBMITTED: 11/24/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9541265 **Lab ID:** 3112732-08 **Sampled:** 11/17/23 23:59
Matrix: Air **Sample Volume:** 2059.148 m³ **Received:** 11/24/23 10:33
Filter ID: **Analysis Date:** 11/29/23 22:41
Comments: MFK-AM03-111723-HM

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	**7429-90-5**	**504**	ICS-01, LK	**25.4**
Antimony	**7440-36-0**	**0.0994**	SL, GC-BS	**0.0348**
Arsenic	**7440-38-2**	**0.140**		**0.00755**
Barium	**7440-39-3**	**6.94**		**0.749**
Beryllium	**7440-41-7**	**0.0212**		**0.00262**
Cadmium	7440-43-9	0.0104	U	0.0861
Calcium	**7440-70-2**	**471**	GC-BS, LJ, QB-01	**231**
Chromium	7440-47-3	1.58	U	1.60
Cobalt	**7440-48-4**	**0.319**	QB-01	**0.0123**
Copper	**7440-50-8**	**15.9**		**2.37**
Iron	**7439-89-6**	**638**	GC-BS	**19.1**
Lead	**7439-92-1**	**0.358**		**0.218**
Magnesium	**7439-95-4**	**345**	ICS-01, LK	**76.2**
Manganese	**7439-96-5**	**17.1**		**0.940**
Molybdenum	**7439-98-7**	**0.918**	QB-01	**0.168**
Nickel	**7440-02-0**	**0.647**		**0.633**
Phosphorus	7723-14-0	369	GC-BS, ICS-01, LK, U	988
Potassium	**7440-09-7**	**129**		**30.0**
Rubidium		**0.238**	QB-01	**0.0145**
Selenium	**7782-49-2**	**0.223**		**0.00869**
Sodium	**7440-23-5**	**2850**	ICS-01, LK	**1580**
Strontium	**7440-24-6**	**4.58**	QB-01	**0.515**
Thallium	**7440-28-0**	**0.00172**		**3.97E-4**
Thorium	**7440-29-01**	**0.0219**		**0.00237**
Uranium	NA	0.0126	U	0.0134
Vanadium	**7440-62-2**	**1.39**		**0.0389**
Zinc	7440-66-6	15.2	U	77.2

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ATTN: Ms. Chelsea Saber
PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 12/01/23 13:09
SUBMITTED: 11/24/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9541257 FB
Matrix: Air
Lab ID: 3112732-09
Sample Volume: 2038.818 m³
Filter ID:
Sampled: 11/17/23 00:00
Received: 11/24/23 10:33
Analysis Date: 11/29/23 22:55
Comments: Field Blank - MFK-FB01-111723-HM

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	7429-90-5	17.2	ICS-01, LK, U	25.6
Antimony	7440-36-0	0.0113	GC-BS, SL, U	0.0352
Arsenic	7440-38-2	0.00458	U	0.00762
Barium	7440-39-3	0.490	U	0.757
Beryllium	7440-41-7	0.00108	U	0.00265
Cadmium	7440-43-9	0.00131	U	0.0870
Calcium	7440-70-2	155	GC-BS, LJ, QB-01, U	233
Chromium	7440-47-3	1.10	U	1.62
Cobalt	**7440-48-4**	**0.0219**	FB-01, QB-01	**0.0124**
Copper	7440-50-8	0.337	U	2.39
Iron	7439-89-6	13.8	GC-BS, U	19.3
Lead	7439-92-1	0.0336	U	0.220
Magnesium	7439-95-4	41.1	ICS-01, LK, U	76.9
Manganese	7439-96-5	0.192	U	0.950
Molybdenum	**7439-98-7**	**0.179**	FB-01, QB-01	**0.170**
Nickel	7440-02-0	0.272	U	0.639
Phosphorus	7723-14-0	309	GC-BS, ICS-01, LK, U	998
Potassium	7440-09-7	9.23	U	30.3
Rubidium		0.0107	QB-01, U	0.0146
Selenium	7782-49-2	0.00322	U	0.00878
Sodium	7440-23-5	781	ICS-01, LK, U	1600
Strontium	7440-24-6	0.371	QB-01, U	0.520
Thallium	7440-28-0	7.57E-5	U	4.01E-4
Thorium	7440-29-01	0.00234	U	0.00239
Uranium	NA	0.00127	U	0.0136
Vanadium	7440-62-2	0.0167	U	0.0393
Zinc	7440-66-6	8.98	U	78.0

ERG

CERTIFICATE OF ANALYSIS

Tetra Tech, Inc.
1777 Sentry Pkwy, Bldg 12
Blue Bell, PA 19422
ATTN: Ms. Chelsea Saber
PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 12/01/23 13:09
SUBMITTED: 11/24/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9541260 **Lab ID:** 3112732-10 **Sampled:** 11/18/23 23:59
Matrix: Air **Sample Volume:** 2128.508 m³ **Received:** 11/24/23 10:33
Filter ID: **Analysis Date:** 11/29/23 23:09
Comments: MFK-AM01-111823-HM

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	**7429-90-5**	**578**	ICS-01, LK	**24.5**
Antimony	**7440-36-0**	**0.0990**	GC-BS, SL	**0.0337**
Arsenic	**7440-38-2**	**0.352**		**0.00730**
Barium	**7440-39-3**	**6.25**		**0.725**
Beryllium	**7440-41-7**	**0.0195**		**0.00254**
Cadmium	7440-43-9	0.0164	U	0.0833
Calcium	**7440-70-2**	**473**	GC-BS, LJ, QB-01	**223**
Chromium	**7440-47-3**	**1.81**		**1.55**
Cobalt	**7440-48-4**	**0.320**	QB-01	**0.0119**
Copper	**7440-50-8**	**17.7**		**2.29**
Iron	**7439-89-6**	**652**	GC-BS	**18.5**
Lead	**7439-92-1**	**0.883**		**0.211**
Magnesium	**7439-95-4**	**345**	ICS-01, LK	**73.7**
Manganese	**7439-96-5**	**17.1**		**0.910**
Molybdenum	**7439-98-7**	**0.603**	QB-01	**0.163**
Nickel	**7440-02-0**	**0.691**		**0.612**
Phosphorus	7723-14-0	337	LK, GC-BS, ICS-01, U	955
Potassium	**7440-09-7**	**120**		**29.0**
Rubidium		**0.214**	QB-01	**0.0140**
Selenium	**7782-49-2**	**0.253**		**0.00841**
Sodium	**7440-23-5**	**2840**	ICS-01, LK	**1530**
Strontium	**7440-24-6**	**4.75**	QB-01	**0.498**
Thallium	**7440-28-0**	**0.00336**		**3.84E-4**
Thorium	**7440-29-01**	**0.0198**		**0.00229**
Uranium	**NA**	**0.0140**		**0.0130**
Vanadium	**7440-62-2**	**1.54**		**0.0376**
Zinc	7440-66-6	15.4	U	74.7

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FILE #: 0000.00
REPORTED: 12/01/23 13:09
SUBMITTED: 11/24/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9541259
Matrix: Air
Lab ID: 3112732-11
Sample Volume: 2044.401 m³
Filter ID:
Sampled: 11/18/23 23:59
Received: 11/24/23 10:33
Analysis Date: 11/30/23 00:13
Comments: MFK-AM02-111823-HM

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	**7429-90-5**	**788**	ICS-01, LK	**25.5**
Antimony	**7440-36-0**	**0.0846**	GC-BS, SL	**0.0351**
Arsenic	**7440-38-2**	**0.354**		**0.00760**
Barium	**7440-39-3**	**8.44**		**0.754**
Beryllium	**7440-41-7**	**0.0270**		**0.00264**
Cadmium	7440-43-9	0.0189	U	0.0867
Calcium	**7440-70-2**	**544**	GC-BS, LJ, QB-01	**232**
Chromium	**7440-47-3**	**1.66**		**1.62**
Cobalt	**7440-48-4**	**0.388**	QB-01	**0.0124**
Copper	**7440-50-8**	**9.95**		**2.39**
Iron	**7439-89-6**	**846**	GC-BS	**19.3**
Lead	**7439-92-1**	**0.434**		**0.220**
Magnesium	**7439-95-4**	**364**	LK, ICS-01	**76.7**
Manganese	**7439-96-5**	**21.9**		**0.947**
Molybdenum	**7439-98-7**	**0.547**	QB-01	**0.170**
Nickel	**7440-02-0**	**0.696**		**0.637**
Phosphorus	7723-14-0	362	GC-BS, ICS-01, LK, U	995
Potassium	**7440-09-7**	**173**		**30.2**
Rubidium		**0.340**	QB-01	**0.0146**
Selenium	**7782-49-2**	**0.299**		**0.00875**
Sodium	**7440-23-5**	**2890**	ICS-01, LK	**1590**
Strontium	**7440-24-6**	**6.14**	QB-01	**0.519**
Thallium	**7440-28-0**	**0.00393**		**4.00E-4**
Thorium	**7440-29-01**	**0.0277**		**0.00239**
Uranium	**NA**	**0.0197**		**0.0135**
Vanadium	**7440-62-2**	**2.05**		**0.0392**
Zinc	7440-66-6	17.2	U	77.8

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FILE #: 0000.00
REPORTED: 12/01/23 13:09
SUBMITTED: 11/24/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9541258
Matrix: Air
Lab ID: 3112732-12
Sample Volume: 1231.803 m³
Filter ID:
Sampled: 11/18/23 23:59
Received: 11/24/23 10:33
Analysis Date: 11/30/23 00:28

Comments: MFK-AM03-111823-HM

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	**7429-90-5**	**428**	ICS-01, LK	**42.4**
Antimony	**7440-36-0**	**0.129**	GC-BS, SL	**0.0582**
Arsenic	**7440-38-2**	**0.171**		**0.0126**
Barium	**7440-39-3**	**6.59**		**1.25**
Beryllium	**7440-41-7**	**0.0194**		**0.00439**
Cadmium	7440-43-9	0.0157	U	0.144
Calcium	**7440-70-2**	**544**	QB-01, GC-BS, LJ	**386**
Chromium	7440-47-3	2.38	U	2.68
Cobalt	**7440-48-4**	**0.303**	QB-01	**0.0206**
Copper	**7440-50-8**	**14.5**		**3.96**
Iron	**7439-89-6**	**569**	GC-BS	**32.0**
Lead	**7439-92-1**	**0.468**		**0.365**
Magnesium	**7439-95-4**	**392**	ICS-01, LK	**127**
Manganese	**7439-96-5**	**15.9**		**1.57**
Molybdenum	**7439-98-7**	**0.972**	QB-01	**0.281**
Nickel	7440-02-0	1.00	U	1.06
Phosphorus	7723-14-0	562	GC-BS, ICS-01, LK, U	1650
Potassium	**7440-09-7**	**139**		**50.2**
Rubidium		**0.245**	QB-01	**0.0242**
Selenium	**7782-49-2**	**0.224**		**0.0145**
Sodium	**7440-23-5**	**3540**	ICS-01, LK	**2640**
Strontium	**7440-24-6**	**4.77**	QB-01	**0.861**
Thallium	**7440-28-0**	**0.00393**		**6.64E-4**
Thorium	**7440-29-01**	**0.0181**		**0.00396**
Uranium	NA	0.0132	U	0.0225
Vanadium	**7440-62-2**	**1.37**		**0.0650**
Zinc	7440-66-6	21.8	U	129

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PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 12/01/23 13:09
SUBMITTED: 11/24/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9541272 FB **Lab ID:** 3112732-13 **Sampled:** 11/18/23 00:00
Matrix: Air **Sample Volume:** 2128.508 m³ **Received:** 11/24/23 10:33
Filter ID: **Analysis Date:** 11/30/23 00:43
Comments: Field Blank - MFK-FB01-111823-HM

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	7429-90-5	15.0	ICS-01, LK, U	24.5
Antimony	7440-36-0	0.0106	GC-BS, SL, U	0.0337
Arsenic	7440-38-2	0.00362	U	0.00730
Barium	7440-39-3	0.465	U	0.725
Beryllium	7440-41-7	8.20E-4	U	0.00254
Cadmium	7440-43-9	0.00117	U	0.0833
Calcium	7440-70-2	146	GC-BS, LJ, QB-01, U	223
Chromium	7440-47-3	1.25	U	1.55
Cobalt	**7440-48-4**	**0.0251**	FB-01, QB-01	**0.0119**
Copper	7440-50-8	0.296	U	2.29
Iron	7439-89-6	13.5	GC-BS, U	18.5
Lead	7439-92-1	0.0348	U	0.211
Magnesium	7439-95-4	39.2	ICS-01, LK, U	73.7
Manganese	7439-96-5	0.200	U	0.910
Molybdenum	**7439-98-7**	**0.201**	FB-01, QB-01	**0.163**
Nickel	7440-02-0	0.385	U	0.612
Phosphorus	7723-14-0	303	ICS-01, LK, GC-BS, U	955
Potassium	7440-09-7	6.87	U	29.0
Rubidium		0.0103	QB-01, U	0.0140
Selenium	7782-49-2	0.00252	U	0.00841
Sodium	7440-23-5	729	ICS-01, LK, U	1530
Strontium	7440-24-6	0.354	QB-01, U	0.498
Thallium	7440-28-0	7.25E-5	U	3.84E-4
Thorium	7440-29-01	0.00222	U	0.00229
Uranium	NA	0.00126	U	0.0130
Vanadium	7440-62-2	0.0153	U	0.0376
Zinc	7440-66-6	8.88	U	74.7

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1777 Sentry Pkwy, Bldg 12
Blue Bell, PA 19422
ATTN: Ms. Chelsea Saber
PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 12/01/23 13:09
SUBMITTED: 11/24/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9541254 **Lab ID:** 3112732-14 **Sampled:** 11/19/23 23:59
Matrix: Air **Sample Volume:** 2173.355 m³ **Received:** 11/24/23 10:33
Filter ID: **Analysis Date:** 11/30/23 00:56
Comments: MFK-AM01-111923-HM

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	**7429-90-5**	**490**	ICS-01, LK	**24.0**
Antimony	**7440-36-0**	**0.0678**	GC-BS, SL	**0.0330**
Arsenic	**7440-38-2**	**0.177**		**0.00715**
Barium	**7440-39-3**	**4.59**		**0.710**
Beryllium	**7440-41-7**	**0.0138**		**0.00249**
Cadmium	7440-43-9	0.0124	U	0.0816
Calcium	**7440-70-2**	**361**	GC-BS, LJ, QB-01	**219**
Chromium	**7440-47-3**	**1.52**		**1.52**
Cobalt	**7440-48-4**	**0.217**	QB-01	**0.0117**
Copper	**7440-50-8**	**13.1**		**2.25**
Iron	**7439-89-6**	**507**	GC-BS	**18.1**
Lead	**7439-92-1**	**0.374**		**0.207**
Magnesium	**7439-95-4**	**222**	ICS-01, LK	**72.2**
Manganese	**7439-96-5**	**13.1**		**0.891**
Molybdenum	**7439-98-7**	**0.649**	QB-01	**0.159**
Nickel	7440-02-0	0.552	U	0.600
Phosphorus	7723-14-0	320	GC-BS, ICS-01, LK, U	936
Potassium	**7440-09-7**	**88.3**		**28.4**
Rubidium		**0.172**	QB-01	**0.0137**
Selenium	**7782-49-2**	**0.191**		**0.00823**
Sodium	**7440-23-5**	**1940**	ICS-01, LK	**1500**
Strontium	**7440-24-6**	**3.63**	QB-01	**0.488**
Thallium	**7440-28-0**	**0.00321**		**3.77E-4**
Thorium	**7440-29-01**	**0.0142**		**0.00225**
Uranium	NA	0.0109	U	0.0127
Vanadium	**7440-62-2**	**1.22**		**0.0368**
Zinc	7440-66-6	10.5	U	73.1

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Blue Bell, PA 19422
ATTN: Ms. Chelsea Saber
PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 12/01/23 13:09
SUBMITTED: 11/24/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9541283 **Lab ID:** 3112732-15 **Sampled:** 11/19/23 23:59
Matrix: Air **Sample Volume:** 2059.832 m³ **Received:** 11/24/23 10:33
Filter ID: **Analysis Date:** 11/30/23 01:11
Comments: MFK-AM02-111923-HM

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	**7429-90-5**	**3040**	ICS-01, LK	**25.4**
Antimony	**7440-36-0**	**0.0678**	SL, GC-BS	**0.0348**
Arsenic	**7440-38-2**	**0.874**		**0.00754**
Barium	**7440-39-3**	**21.4**		**0.749**
Beryllium	**7440-41-7**	**0.0845**		**0.00262**
Cadmium	7440-43-9	0.0666	U	0.0861
Calcium	**7440-70-2**	**1070**	GC-BS, LJ, QB-01	**231**
Chromium	**7440-47-3**	**3.09**		**1.60**
Cobalt	**7440-48-4**	**0.927**	QB-01	**0.0123**
Copper	**7440-50-8**	**13.7**		**2.37**
Lead	**7439-92-1**	**0.932**		**0.218**
Magnesium	**7439-95-4**	**385**	ICS-01, LK	**76.1**
Manganese	**7439-96-5**	**59.8**		**0.940**
Molybdenum	**7439-98-7**	**0.798**	QB-01	**0.168**
Nickel	**7440-02-0**	**1.69**		**0.633**
Phosphorus	7723-14-0	505	GC-BS, ICS-01, LK, U	987
Potassium	**7440-09-7**	**183**		**30.0**
Rubidium		**0.562**	QB-01	**0.0145**
Selenium	**7782-49-2**	**0.637**		**0.00869**
Sodium	**7440-23-5**	**2120**	ICS-01, LK	**1580**
Strontium	**7440-24-6**	**15.2**	QB-01	**0.515**
Thallium	**7440-28-0**	**0.00613**		**3.97E-4**
Thorium	**7440-29-01**	**0.117**		**0.00237**
Uranium	**NA**	**0.0624**		**0.0134**
Vanadium	**7440-62-2**	**6.28**		**0.0389**
Zinc	7440-66-6	15.5	U	77.2

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FILE #: 0000.00
REPORTED: 12/01/23 13:09
SUBMITTED: 11/24/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9541283
Matrix: Air
Comments: MFK-AM02-111923-HM

Lab ID: 3112732-15RE1
Sample Volume: 2059.832 m^3
Filter ID:

Sampled: 11/19/23 23:59
Received: 11/24/23 10:33
Analysis Date: 11/30/23 06:00

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Iron	7439-89-6	2610	D, GC-BS	191

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FILE #: 0000.00
REPORTED: 12/01/23 13:09
SUBMITTED: 11/24/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9541282 **Lab ID:** 3112732-16 **Sampled:** 11/19/23 23:59
Matrix: Air **Sample Volume:** 1405.224 m³ **Received:** 11/24/23 10:33
Filter ID: **Analysis Date:** 11/30/23 01:26
Comments: MFK-AM03-111923-HM - Requested to use for MS/MSD

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	**7429-90-5**	**362**	ICS-01, LK	**37.2**
Antimony	**7440-36-0**	**0.113**	GC-BS, SL	**0.0511**
Arsenic	**7440-38-2**	**0.620**		**0.0111**
Barium	**7440-39-3**	**8.72**		**1.10**
Beryllium	**7440-41-7**	**0.0141**		**0.00384**
Cadmium	7440-43-9	0.0159	U	0.126
Calcium	**7440-70-2**	**418**	GC-BS, LJ, QB-01	**338**
Chromium	7440-47-3	1.97	U	2.35
Cobalt	**7440-48-4**	**0.228**	QB-01	**0.0181**
Copper	**7440-50-8**	**19.4**		**3.47**
Iron	**7439-89-6**	**452**	GC-BS	**28.0**
Lead	**7439-92-1**	**0.376**		**0.320**
Magnesium	**7439-95-4**	**296**	ICS-01, LK	**112**
Manganese	**7439-96-5**	**11.3**		**1.38**
Molybdenum	**7439-98-7**	**1.30**	QB-01	**0.247**
Nickel	7440-02-0	0.633	U	0.927
Phosphorus	7723-14-0	476	GC-BS, ICS-01, LK, U	1450
Potassium	**7440-09-7**	**108**		**44.0**
Rubidium		**0.201**	QB-01	**0.0212**
Selenium	**7782-49-2**	**0.199**		**0.0127**
Sodium	**7440-23-5**	**2800**	ICS-01, LK	**2320**
Strontium	**7440-24-6**	**3.61**	QB-01	**0.755**
Thallium	**7440-28-0**	**0.00371**		**5.82E-4**
Thorium	**7440-29-01**	**0.0143**		**0.00347**
Uranium	NA	0.0107	U	0.0197
Vanadium	**7440-62-2**	**1.05**		**0.0570**
Zinc	7440-66-6	15.3	U	113

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ATTN: Ms. Chelsea Saber
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FILE #: 0000.00
REPORTED: 12/01/23 13:09
SUBMITTED: 11/24/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9541269 - FB **Lab ID:** 3112732-17 **Sampled:** 11/19/23 00:00
Matrix: Air **Sample Volume:** 2173.355 m³ **Received:** 11/24/23 10:33
Filter ID: **Analysis Date:** 11/30/23 01:39
Comments: Field Blank - MFK-FB01-111923-HM

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	7429-90-5	22.2	ICS-01, LK, U	24.0
Antimony	7440-36-0	0.0108	GC-BS, SL, U	0.0330
Arsenic	7440-38-2	0.00575	U	0.00715
Barium	7440-39-3	0.599	U	0.710
Beryllium	7440-41-7	0.00100	U	0.00249
Cadmium	7440-43-9	0.00118	U	0.0816
Calcium	7440-70-2	139	GC-BS, LJ, QB-01, U	219
Chromium	7440-47-3	1.03	U	1.52
Cobalt	**7440-48-4**	**0.0228**	FB-01, QB-01	**0.0117**
Copper	7440-50-8	0.255	U	2.25
Iron	**7439-89-6**	**18.4**	FB-01, GC-BS	**18.1**
Lead	7439-92-1	0.0362	U	0.207
Magnesium	7439-95-4	38.8	ICS-01, LK, U	72.2
Manganese	7439-96-5	0.315	U	0.891
Molybdenum	**7439-98-7**	**0.165**	FB-01, QB-01	**0.159**
Nickel	7440-02-0	0.306	U	0.600
Phosphorus	7723-14-0	292	GC-BS, ICS-01, LK, U	936
Potassium	7440-09-7	7.46	U	28.4
Rubidium		0.0125	QB-01, U	0.0137
Selenium	7782-49-2	0.00457	U	0.00823
Sodium	7440-23-5	717	ICS-01, LK, U	1500
Strontium	7440-24-6	0.381	QB-01, U	0.488
Thallium	7440-28-0	6.48E-5	U	3.77E-4
Thorium	**7440-29-01**	**0.00249**	FB-01	**0.00225**
Uranium	NA	0.00135	U	0.0127
Vanadium	7440-62-2	0.0287	U	0.0368
Zinc	7440-66-6	6.44	U	73.1

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FILE #: 0000.00
REPORTED: 12/01/23 13:09
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AQS SITE CODE:
SITE CODE: Maui fires

Inorganics by Compendium Method IO-3.5 - Quality Control

Batch 2311066 - B3K2802

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Calibration Blank (2311066-CCB1)				Prepared: 11/28/23 Analyzed: 11/29/23						
Aluminum	114		ng/l							
Antimony	1.04		ng/l							
Arsenic	8.21		ng/l							
Barium	3.04		ng/l							
Beryllium	1.29		ng/l							
Cadmium	0.620		ng/l							
Calcium	1270		ng/l							
Chromium	8.37		ng/l							
Cobalt	0.722		ng/l							
Copper	54.4		ng/l							
Iron	59.1		ng/l							
Lead	11.6		ng/l							
Magnesium	48.3		ng/l							
Manganese	1.93		ng/l							
Molybdenum	23.7		ng/l							
Nickel	-0.741		ng/l							U
Phosphorus	-11.5		ng/l							U
Potassium	2650		ng/l							
Rubidium	1.04		ng/l							
Selenium	-0.114		ng/l							U
Sodium	3500		ng/l							
Strontium	1.66		ng/l							
Thallium	0.499		ng/l							
Thorium	0.555		ng/l							
Uranium	0.00786		ng/l							
Vanadium	0.872		ng/l							
Zinc	11.6		ng/l							
Calibration Blank (2311066-CCB2)				Prepared: 11/28/23 Analyzed: 11/29/23						
Aluminum	24.2		ng/l							
Antimony	0.684		ng/l							
Arsenic	3.51		ng/l							
Barium	0.472		ng/l							
Beryllium	0.513		ng/l							
Cadmium	0.151		ng/l							
Calcium	400		ng/l							
Chromium	1.86		ng/l							
Cobalt	-0.136		ng/l							U
Copper	21.1		ng/l							

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Inorganics by Compendium Method IO-3.5 - Quality Control

Batch 2311066 - B3K2802

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Calibration Blank (2311066-CCB2) Contin				Prepared: 11/28/23 Analyzed: 11/29/23						
Iron	-31.2		ng/l							U
Lead	7.94		ng/l							
Magnesium	18.5		ng/l							
Manganese	-7.27		ng/l							U
Molybdenum	9.11		ng/l							
Nickel	-5.15		ng/l							U
Phosphorus	-593		ng/l							U
Potassium	1480		ng/l							
Rubidium	0.807		ng/l							
Selenium	1.62		ng/l							
Sodium	4600		ng/l							
Strontium	-1.17		ng/l							U
Thallium	0.325		ng/l							
Thorium	0.645		ng/l							
Uranium	0.00972		ng/l							
Vanadium	-11.1		ng/l							U
Zinc	-15.3		ng/l							U
Calibration Blank (2311066-CCB3)				Prepared: 11/28/23 Analyzed: 11/29/23						
Aluminum	53.4		ng/l							
Antimony	0.585		ng/l							
Arsenic	3.21		ng/l							
Barium	0.346		ng/l							
Beryllium	-0.362		ng/l							U
Cadmium	0.185		ng/l							
Calcium	-1180		ng/l							U
Chromium	1.26		ng/l							
Cobalt	-0.269		ng/l							U
Copper	15.7		ng/l							
Iron	-43.9		ng/l							U
Lead	6.34		ng/l							
Magnesium	1.74		ng/l							
Manganese	-8.49		ng/l							U
Molybdenum	8.54		ng/l							
Nickel	-5.45		ng/l							U
Phosphorus	-317		ng/l							U
Potassium	383		ng/l							
Rubidium	1.36		ng/l							
Selenium	5.79		ng/l							

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Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes

Inorganics by Compendium Method IO-3.5 - Quality Control

Batch 2311066 - B3K2802

Calibration Blank (2311066-CCB3) Contin Prepared: 11/28/23 Analyzed: 11/29/23

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Sodium	6050		ng/l							
Strontium	-2.56		ng/l							U
Thallium	0.342		ng/l							
Thorium	0.518		ng/l							
Uranium	-8.69E-4		ng/l							U
Vanadium	-17.9		ng/l							U
Zinc	-8.57		ng/l							U

Calibration Blank (2311066-CCB4) Prepared: 11/28/23 Analyzed: 11/30/23

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Aluminum	21.9		ng/l							
Antimony	0.791		ng/l							
Arsenic	1.89		ng/l							
Barium	-0.281		ng/l							U
Beryllium	-0.121		ng/l							U
Cadmium	0.327		ng/l							
Calcium	-212		ng/l							U
Chromium	0.942		ng/l							
Cobalt	-0.197		ng/l							U
Copper	22.4		ng/l							
Iron	-68.7		ng/l							U
Lead	7.10		ng/l							
Magnesium	27.7		ng/l							
Manganese	-7.80		ng/l							U
Molybdenum	11.0		ng/l							
Nickel	-3.84		ng/l							U
Phosphorus	-468		ng/l							U
Potassium	430		ng/l							
Rubidium	0.118		ng/l							
Selenium	-0.676		ng/l							U
Sodium	5630		ng/l							
Strontium	-1.61		ng/l							U
Thallium	0.344		ng/l							
Thorium	0.730		ng/l							
Uranium	-0.00892		ng/l							U
Vanadium	-20.4		ng/l							U
Zinc	-3.40		ng/l							U

Calibration Blank (2311066-CCB5) Prepared: 11/28/23 Analyzed: 11/30/23

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Aluminum	-13.1		ng/l							U
Antimony	0.431		ng/l							

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Inorganics by Compendium Method IO-3.5 - Quality Control

Batch 2311066 - B3K2802

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Calibration Blank (2311066-CCB5) Contin				Prepared: 11/28/23 Analyzed: 11/30/23						
Arsenic	-0.418		ng/l							U
Barium	1.08		ng/l							
Beryllium	0.100		ng/l							
Cadmium	0.230		ng/l							
Calcium	-1130		ng/l							U
Chromium	-0.343		ng/l							U
Cobalt	-0.400		ng/l							U
Copper	18.9		ng/l							
Iron	-123		ng/l							U
Lead	7.10		ng/l							
Magnesium	-12.7		ng/l							U
Manganese	-10.2		ng/l							U
Molybdenum	8.84		ng/l							
Nickel	-6.23		ng/l							U
Phosphorus	-1300		ng/l							U
Potassium	-567		ng/l							U
Rubidium	0.682		ng/l							
Selenium	-0.105		ng/l							U
Sodium	3700		ng/l							
Strontium	-1.30		ng/l							U
Thallium	0.376		ng/l							
Thorium	0.670		ng/l							
Uranium	0.0108		ng/l							
Vanadium	-23.0		ng/l							U
Zinc	-12.5		ng/l							U
Calibration Blank (2311066-CCB6)				Prepared: 11/28/23 Analyzed: 11/30/23						
Aluminum	-33.0		ng/l							U
Antimony	0.593		ng/l							
Arsenic	0.549		ng/l							
Barium	0.534		ng/l							
Beryllium	-0.310		ng/l							U
Cadmium	0.225		ng/l							
Calcium	-1410		ng/l							U
Chromium	1.31		ng/l							
Cobalt	-0.407		ng/l							U
Copper	19.3		ng/l							
Iron	-92.4		ng/l							U
Lead	7.53		ng/l							

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Batch 2311066 - B3K2802

Calibration Blank (2311066-CCB6) Contin Prepared: 11/28/23 Analyzed: 11/30/23

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Magnesium	25.7		ng/l							
Manganese	-9.27		ng/l							U
Molybdenum	9.37		ng/l							
Nickel	-6.94		ng/l							U
Phosphorus	-1470		ng/l							U
Potassium	-533		ng/l							U
Rubidium	0.299		ng/l							
Selenium	4.71		ng/l							
Sodium	3540		ng/l							
Strontium	-2.24		ng/l							U
Thallium	0.306		ng/l							
Thorium	0.576		ng/l							
Uranium	0.00541		ng/l							
Vanadium	-24.8		ng/l							U
Zinc	-1.17		ng/l							U

Calibration Check (2311066-CCV1) Prepared: 11/28/23 Analyzed: 11/29/23

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Aluminum	1.63E6		ng/l	1.5000E6		109	90-110			
Antimony	20300		ng/l	20000		102	90-110			
Arsenic	20100		ng/l	20000		101	90-110			
Barium	204000		ng/l	200000		102	90-110			
Beryllium	4960		ng/l	5000.0		99.3	90-110			
Cadmium	20600		ng/l	20000		103	90-110			
Calcium	2.58E7		ng/l	2.5000E7		103	90-110			
Chromium	231000		ng/l	240000		96.1	90-110			
Cobalt	52800		ng/l	50000		106	90-110			
Copper	2.08E6		ng/l	2.0000E6		104	90-110			
Iron	2.62E6		ng/l	2.5000E6		105	90-110			
Lead	201000		ng/l	200000		101	90-110			
Magnesium	1.11E6		ng/l	1.0000E6		111	90-110			QX
Manganese	525000		ng/l	500000		105	90-110			
Molybdenum	50300		ng/l	50000		101	90-110			
Nickel	125000		ng/l	120000		104	90-110			
Phosphorus	211000		ng/l	200000		105	90-110			
Potassium	2.59E6		ng/l	2.5000E6		103	90-110			
Rubidium	9930		ng/l	10000		99.3	90-110			
Selenium	19700		ng/l	20000		98.6	90-110			
Sodium	2.79E6		ng/l	2.5000E6		111	90-110			QX
Strontium	49900		ng/l	50000		99.8	90-110			

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Inorganics by Compendium Method IO-3.5 - Quality Control

Batch 2311066 - B3K2802

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Calibration Check (2311066-CCV1) Contin				Prepared: 11/28/23	Analyzed: 11/29/23					
Thallium	507		ng/l	500.00		101	90-110			
Thorium	509		ng/l	500.00		102	90-110			
Uranium	509		ng/l	500.00		102	90-110			
Vanadium	20100		ng/l	20000		100	90-110			
Zinc	525000		ng/l	500000		105	90-110			
Calibration Check (2311066-CCV2)				Prepared: 11/28/23	Analyzed: 11/29/23					
Aluminum	1.52E6		ng/l	1.5000E6		102	90-110			
Antimony	20300		ng/l	20000		101	90-110			
Arsenic	20000		ng/l	20000		100	90-110			
Barium	203000		ng/l	200000		102	90-110			
Beryllium	4730		ng/l	5000.0		94.5	90-110			
Cadmium	20500		ng/l	20000		102	90-110			
Calcium	2.52E7		ng/l	2.5000E7		101	90-110			
Chromium	232000		ng/l	240000		96.9	90-110			
Cobalt	51200		ng/l	50000		102	90-110			
Copper	2.04E6		ng/l	2.0000E6		102	90-110			
Iron	2.54E6		ng/l	2.5000E6		101	90-110			
Lead	200000		ng/l	200000		100	90-110			
Magnesium	1.05E6		ng/l	1.0000E6		105	90-110			
Manganese	508000		ng/l	500000		102	90-110			
Molybdenum	50000		ng/l	50000		100	90-110			
Nickel	122000		ng/l	120000		102	90-110			
Phosphorus	205000		ng/l	200000		103	90-110			
Potassium	2.51E6		ng/l	2.5000E6		101	90-110			
Rubidium	9940		ng/l	10000		99.4	90-110			
Selenium	19900		ng/l	20000		99.7	90-110			
Sodium	2.65E6		ng/l	2.5000E6		106	90-110			
Strontium	49700		ng/l	50000		99.3	90-110			
Thallium	500		ng/l	500.00		100	90-110			
Thorium	506		ng/l	500.00		101	90-110			
Uranium	503		ng/l	500.00		101	90-110			
Vanadium	19800		ng/l	20000		99.1	90-110			
Zinc	518000		ng/l	500000		104	90-110			
Calibration Check (2311066-CCV3)				Prepared: 11/28/23	Analyzed: 11/29/23					
Aluminum	1.49E6		ng/l	1.5000E6		99.0	90-110			
Antimony	20300		ng/l	20000		102	90-110			
Arsenic	20100		ng/l	20000		101	90-110			
Barium	202000		ng/l	200000		101	90-110			

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Batch 2311066 - B3K2802

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Calibration Check (2311066-CCV3) Contin				Prepared: 11/28/23	Analyzed: 11/29/23					
Beryllium	4980		ng/l	5000.0		99.6	90-110			
Cadmium	20600		ng/l	20000		103	90-110			
Calcium	2.50E7		ng/l	2.5000E7		99.8	90-110			
Chromium	231000		ng/l	240000		96.4	90-110			
Cobalt	50800		ng/l	50000		102	90-110			
Copper	2.04E6		ng/l	2.0000E6		102	90-110			
Iron	2.51E6		ng/l	2.5000E6		100	90-110			
Lead	201000		ng/l	200000		101	90-110			
Magnesium	1.03E6		ng/l	1.0000E6		103	90-110			
Manganese	505000		ng/l	500000		101	90-110			
Molybdenum	50100		ng/l	50000		100	90-110			
Nickel	121000		ng/l	120000		101	90-110			
Phosphorus	203000		ng/l	200000		101	90-110			
Potassium	2.48E6		ng/l	2.5000E6		99.1	90-110			
Rubidium	10100		ng/l	10000		101	90-110			
Selenium	19700		ng/l	20000		98.6	90-110			
Sodium	2.65E6		ng/l	2.5000E6		106	90-110			
Strontium	50200		ng/l	50000		100	90-110			
Thallium	499		ng/l	500.00		99.8	90-110			
Thorium	506		ng/l	500.00		101	90-110			
Uranium	507		ng/l	500.00		101	90-110			
Vanadium	19700		ng/l	20000		98.6	90-110			
Zinc	516000		ng/l	500000		103	90-110			
Calibration Check (2311066-CCV4)				Prepared: 11/28/23	Analyzed: 11/30/23					
Aluminum	1.43E6		ng/l	1.5000E6		95.0	90-110			
Antimony	20400		ng/l	20000		102	90-110			
Arsenic	19800		ng/l	20000		99.1	90-110			
Barium	200000		ng/l	200000		100	90-110			
Beryllium	4870		ng/l	5000.0		97.4	90-110			
Cadmium	20500		ng/l	20000		103	90-110			
Calcium	2.47E7		ng/l	2.5000E7		98.6	90-110			
Chromium	233000		ng/l	240000		96.9	90-110			
Cobalt	49700		ng/l	50000		99.3	90-110			
Copper	1.99E6		ng/l	2.0000E6		99.7	90-110			
Iron	2.46E6		ng/l	2.5000E6		98.4	90-110			
Lead	201000		ng/l	200000		100	90-110			
Magnesium	984000		ng/l	1.0000E6		98.4	90-110			
Manganese	497000		ng/l	500000		99.3	90-110			

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Batch 2311066 - B3K2802

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Calibration Check (2311066-CCV4) Contin				Prepared: 11/28/23 Analyzed: 11/30/23						
Molybdenum	49900		ng/l	50000		99.8	90-110			
Nickel	118000		ng/l	120000		98.3	90-110			
Phosphorus	186000		ng/l	200000		93.0	90-110			
Potassium	2.41E6		ng/l	2.5000E6		96.5	90-110			
Rubidium	9880		ng/l	10000		98.8	90-110			
Selenium	19800		ng/l	20000		98.8	90-110			
Sodium	2.46E6		ng/l	2.5000E6		98.4	90-110			
Strontium	49900		ng/l	50000		99.8	90-110			
Thallium	496		ng/l	500.00		99.2	90-110			
Thorium	508		ng/l	500.00		102	90-110			
Uranium	509		ng/l	500.00		102	90-110			
Vanadium	19900		ng/l	20000		99.6	90-110			
Zinc	512000		ng/l	500000		102	90-110			
Calibration Check (2311066-CCV5)				Prepared: 11/28/23 Analyzed: 11/30/23						
Aluminum	1.38E6		ng/l	1.5000E6		92.1	90-110			
Antimony	20500		ng/l	20000		102	90-110			
Arsenic	20000		ng/l	20000		100	90-110			
Barium	203000		ng/l	200000		101	90-110			
Beryllium	4980		ng/l	5000.0		99.6	90-110			
Cadmium	20600		ng/l	20000		103	90-110			
Calcium	2.46E7		ng/l	2.5000E7		98.2	90-110			
Chromium	236000		ng/l	240000		98.4	90-110			
Cobalt	49500		ng/l	50000		99.0	90-110			
Copper	2.00E6		ng/l	2.0000E6		100	90-110			
Iron	2.45E6		ng/l	2.5000E6		98.0	90-110			
Lead	202000		ng/l	200000		101	90-110			
Magnesium	957000		ng/l	1.0000E6		95.7	90-110			
Manganese	491000		ng/l	500000		98.1	90-110			
Molybdenum	50200		ng/l	50000		100	90-110			
Nickel	118000		ng/l	120000		98.1	90-110			
Phosphorus	183000		ng/l	200000		91.3	90-110			
Potassium	2.35E6		ng/l	2.5000E6		94.2	90-110			
Rubidium	10100		ng/l	10000		101	90-110			
Selenium	19600		ng/l	20000		98.1	90-110			
Sodium	2.43E6		ng/l	2.5000E6		97.3	90-110			
Strontium	50400		ng/l	50000		101	90-110			
Thallium	500		ng/l	500.00		100	90-110			
Thorium	516		ng/l	500.00		103	90-110			

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CERTIFICATE OF ANALYSIS

Tetra Tech, Inc.
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Blue Bell, PA 19422
ATTN: Ms. Chelsea Saber
PHONE: (703) 885-5495 **FAX:**

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Inorganics by Compendium Method IO-3.5 - Quality Control

Batch 2311066 - B3K2802

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Calibration Check (2311066-CCV5) Contin				Prepared: 11/28/23		Analyzed: 11/30/23				
Uranium	515		ng/l	500.00		103	90-110			
Vanadium	20200		ng/l	20000		101	90-110			
Zinc	516000		ng/l	500000		103	90-110			
Calibration Check (2311066-CCV6)				Prepared: 11/28/23		Analyzed: 11/30/23				
Aluminum	1.39E6		ng/l	1.5000E6		92.6	90-110			
Antimony	20600		ng/l	20000		103	90-110			
Arsenic	20200		ng/l	20000		101	90-110			
Barium	204000		ng/l	200000		102	90-110			
Beryllium	4780		ng/l	5000.0		95.5	90-110			
Cadmium	20700		ng/l	20000		103	90-110			
Calcium	2.48E7		ng/l	2.5000E7		99.0	90-110			
Chromium	237000		ng/l	240000		98.7	90-110			
Cobalt	49600		ng/l	50000		99.3	90-110			
Copper	2.00E6		ng/l	2.0000E6		100	90-110			
Iron	2.46E6		ng/l	2.5000E6		98.3	90-110			
Lead	202000		ng/l	200000		101	90-110			
Magnesium	958000		ng/l	1.0000E6		95.8	90-110			
Manganese	490000		ng/l	500000		98.1	90-110			
Molybdenum	50200		ng/l	50000		100	90-110			
Nickel	119000		ng/l	120000		98.8	90-110			
Phosphorus	188000		ng/l	200000		94.1	90-110			
Potassium	2.36E6		ng/l	2.5000E6		94.2	90-110			
Rubidium	10100		ng/l	10000		101	90-110			
Selenium	20300		ng/l	20000		102	90-110			
Sodium	2.42E6		ng/l	2.5000E6		96.9	90-110			
Strontium	50300		ng/l	50000		101	90-110			
Thallium	504		ng/l	500.00		101	90-110			
Thorium	520		ng/l	500.00		104	90-110			
Uranium	517		ng/l	500.00		103	90-110			
Vanadium	20200		ng/l	20000		101	90-110			
Zinc	516000		ng/l	500000		103	90-110			
High Cal Check (2311066-HCV1)				Prepared: 11/28/23		Analyzed: 11/29/23				
Aluminum	3.04E6		ng/l	3.0000E6		101	95-105			
Antimony	40300		ng/l	40000		101	95-105			
Arsenic	40300		ng/l	40000		101	95-105			
Barium	405000		ng/l	400000		101	95-105			
Beryllium	10200		ng/l	10000		102	95-105			
Cadmium	40000		ng/l	40000		100	95-105			

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Inorganics by Compendium Method IO-3.5 - Quality Control

Batch 2311066 - B3K2802

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
High Cal Check (2311066-HCV1) Continue				Prepared: 11/28/23		Analyzed: 11/29/23				
Calcium	5.04E7		ng/l	5.0000E7		101	95-105			
Chromium	477000		ng/l	480000		99.4	95-105			
Cobalt	100000		ng/l	100000		100	95-105			
Copper	3.99E6		ng/l	4.0000E6		99.9	95-105			
Iron	5.07E6		ng/l	5.0000E6		101	95-105			
Lead	400000		ng/l	400000		100	95-105			
Magnesium	2.04E6		ng/l	2.0000E6		102	95-105			
Manganese	1.01E6		ng/l	1.0000E6		101	95-105			
Molybdenum	100000		ng/l	100000		100	95-105			
Nickel	240000		ng/l	240000		99.8	95-105			
Phosphorus	409000		ng/l	400000		102	95-105			
Potassium	5.05E6		ng/l	5.0000E6		101	95-105			
Rubidium	20000		ng/l	20000		100	95-105			
Selenium	40500		ng/l	40000		101	95-105			
Sodium	5.11E6		ng/l	5.0000E6		102	95-105			
Strontium	101000		ng/l	100000		101	95-105			
Thallium	1000		ng/l	1000.0		100	95-105			
Thorium	1020		ng/l	1000.0		102	95-105			
Uranium	1020		ng/l	1000.0		102	95-105			
Vanadium	40300		ng/l	40000		101	95-105			
Zinc	998000		ng/l	1.0000E6		99.8	95-105			
Initial Cal Blank (2311066-ICB1)				Prepared: 11/28/23		Analyzed: 11/29/23				
Aluminum	-12.8		ng/l							U
Antimony	1.66		ng/l							
Arsenic	2.01		ng/l							
Barium	2.28		ng/l							
Beryllium	0.610		ng/l							
Cadmium	0.629		ng/l							
Calcium	916		ng/l							
Chromium	4.95		ng/l							
Cobalt	0.403		ng/l							
Copper	50.0		ng/l							
Iron	79.0		ng/l							
Lead	12.3		ng/l							
Magnesium	57.3		ng/l							
Manganese	5.65		ng/l							
Molybdenum	16.7		ng/l							
Nickel	-4.92		ng/l							U

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Inorganics by Compendium Method IO-3.5 - Quality Control

Batch 2311066 - B3K2802

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Initial Cal Blank (2311066-ICB1) Continu				Prepared: 11/28/23		Analyzed: 11/29/23				
Phosphorus	740		ng/l							
Potassium	975		ng/l							
Rubidium	1.12		ng/l							
Selenium	7.68		ng/l							
Sodium	690		ng/l							
Strontium	0.925		ng/l							
Thallium	0.447		ng/l							
Thorium	0.475		ng/l							
Uranium	0.0187		ng/l							
Vanadium	12.2		ng/l							
Zinc	-1.42		ng/l							U
Initial Cal Check (2311066-ICV1)				Prepared: 11/28/23		Analyzed: 11/29/23				
Aluminum	1.51E6		ng/l	1.5000E6		101	90-110			
Antimony	20000		ng/l	20000		99.8	90-110			
Arsenic	20100		ng/l	20000		100	90-110			
Barium	200000		ng/l	200000		100	90-110			
Beryllium	5130		ng/l	5000.0		103	90-110			
Cadmium	21000		ng/l	20000		105	90-110			
Calcium	2.52E7		ng/l	2.5000E7		101	90-110			
Chromium	236000		ng/l	240000		98.3	90-110			
Cobalt	51400		ng/l	50000		103	90-110			
Copper	2.03E6		ng/l	2.0000E6		102	90-110			
Iron	2.56E6		ng/l	2.5000E6		102	90-110			
Lead	198000		ng/l	200000		99.0	90-110			
Magnesium	1.03E6		ng/l	1.0000E6		103	90-110			
Manganese	503000		ng/l	500000		101	90-110			
Molybdenum	50100		ng/l	50000		100	90-110			
Nickel	122000		ng/l	120000		101	90-110			
Phosphorus	203000		ng/l	200000		101	90-110			
Potassium	2.54E6		ng/l	2.5000E6		101	90-110			
Rubidium	9740		ng/l	10000		97.4	90-110			
Selenium	20400		ng/l	20000		102	90-110			
Sodium	2.54E6		ng/l	2.5000E6		101	90-110			
Strontium	50400		ng/l	50000		101	90-110			
Thallium	483		ng/l	500.00		96.6	90-110			
Thorium	495		ng/l	500.00		99.0	90-110			
Uranium	496		ng/l	500.00		99.1	90-110			
Vanadium	20500		ng/l	20000		103	90-110			

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Inorganics by Compendium Method IO-3.5 - Quality Control

Batch 2311066 - B3K2802

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Initial Cal Check (2311066-ICV1) Continu				Prepared: 11/28/23 Analyzed: 11/29/23						
Zinc	523000		ng/l	500000		105	90-110			
Interference Check A (2311066-IFA1)				Prepared: 11/28/23 Analyzed: 11/29/23						
Aluminum	1.72E7		ng/l	1.5000E7		114	80-120			ICS-01, LK
Antimony	0.00		ng/l				80-120			U
Arsenic	0.00		ng/l				80-120			U
Barium	0.00		ng/l				80-120			U
Beryllium	0.00		ng/l				80-120			U
Cadmium	0.00		ng/l				80-120			U
Calcium	9.98E7		ng/l	1.0040E8		99.4	80-120			
Chromium	0.00		ng/l				80-120			U
Cobalt	0.00		ng/l				80-120			U
Copper	0.00		ng/l				80-120			U
Iron	1.57E7		ng/l	1.5000E7		105	80-120			
Lead	0.00		ng/l				80-120			U
Magnesium	1.72E7		ng/l	1.5000E7		115	80-120			ICS-01, LK
Manganese	0.00		ng/l				80-120			U
Molybdenum	303000		ng/l	300000		101	80-120			
Nickel	0.00		ng/l				80-120			U
Phosphorus	1.81E7		ng/l	1.5000E7		121	80-120			ICS-01, LK
Potassium	1.63E7		ng/l	1.5000E7		108	80-120			
Rubidium	0.00		ng/l				80-120			U
Selenium	0.00		ng/l				80-120			U
Sodium	1.73E7		ng/l	1.5000E7		115	80-120			ICS-01, LK
Strontium	0.00		ng/l				80-120			U
Thallium	0.00		ng/l				80-120			U
Thorium	0.00		ng/l				80-120			U
Uranium	0.00		ng/l				80-120			U
Vanadium	0.00		ng/l				80-120			U
Zinc	0.00		ng/l				80-120			U
Interference Check B (2311066-IFB1)				Prepared: 11/28/23 Analyzed: 11/29/23						
Aluminum	2.06E7		ng/l	1.6500E7		125	80-120			ICS-01, LK
Antimony	20600		ng/l	20000		103	80-120			
Arsenic	20400		ng/l	20000		102	80-120			
Barium	206000		ng/l	200000		103	80-120			
Beryllium	5400		ng/l	5000.0		108	80-120			
Cadmium	19800		ng/l	20000		98.8	80-120			
Calcium	1.29E8		ng/l	1.2540E8		103	80-120			
Chromium	231000		ng/l	240000		96.2	80-120			

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Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes

Inorganics by Compendium Method IO-3.5 - Quality Control

Batch 2311066 - B3K2802

Interference Check B (2311066-IFB1) Co Prepared: 11/28/23 Analyzed: 11/29/23

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Cobalt	52100		ng/l	50000		104	80-120			
Copper	1.92E6		ng/l	2.0000E6		96.0	80-120			
Iron	1.90E7		ng/l	1.7500E7		109	80-120			
Lead	206000		ng/l	200000		103	80-120			
Magnesium	1.98E7		ng/l	1.6000E7		124	80-120			ICS-01, LK
Manganese	564000		ng/l	500000		113	80-120			
Molybdenum	352000		ng/l	350000		101	80-120			
Nickel	119000		ng/l	120000		99.2	80-120			
Phosphorus	1.96E7		ng/l	1.5200E7		129	80-120			ICS-01, LK
Potassium	2.02E7		ng/l	1.7500E7		115	80-120			
Rubidium	10300		ng/l	10000		103	80-120			
Selenium	19400		ng/l	20000		97.1	80-120			
Sodium	2.21E7		ng/l	1.7500E7		126	80-120			ICS-01, LK
Strontium	51000		ng/l	50000		102	80-120			
Thallium	522		ng/l	500.00		104	80-120			
Thorium	550		ng/l	500.00		110	80-120			
Uranium	551		ng/l	500.00		110	80-120			
Vanadium	19300		ng/l	20000		96.7	80-120			
Zinc	478000		ng/l	500000		95.6	80-120			

Batch B3K2802 - ICP-MS Extraction

Blank (B3K2802-BLK1) Prepared: 11/28/23 Analyzed: 11/29/23

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Aluminum	ND	32.1	ng/m³ Air							ICS-01, LK, U
Antimony	ND	0.0441	ng/m³ Air							GC-BS, SL, U
Arsenic	ND	0.00955	ng/m³ Air							U
Barium	ND	0.948	ng/m³ Air							U
Beryllium	ND	0.00332	ng/m³ Air							U
Cadmium	ND	0.109	ng/m³ Air							U
Calcium	ND	292	ng/m³ Air							GC-BS, LJ, QB-01, U
Chromium	ND	2.03	ng/m³ Air							U
Cobalt	ND	0.0156	ng/m³ Air							QB-01, U
Copper	ND	3.00	ng/m³ Air							U
Iron	ND	24.2	ng/m³ Air							GC-BS, U
Lead	ND	0.276	ng/m³ Air							U
Magnesium	ND	96.4	ng/m³ Air							ICS-01, LK, QX, U
Manganese	ND	1.19	ng/m³ Air							U
Molybdenum	ND	0.213	ng/m³ Air							QB-01, U
Nickel	ND	0.801	ng/m³ Air							U

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Inorganics by Compendium Method IO-3.5 - Quality Control

Batch B3K2802 - ICP-MS Extraction

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (B3K2802-BLK1) Continued				Prepared: 11/28/23 Analyzed: 11/29/23						
Phosphorus	ND	1250	ng/m³ Air							GC-BS, ICS-01, LK, U
Potassium	ND	38.0	ng/m³ Air							U
Rubidium	ND	0.0183	ng/m³ Air							QB-01, U
Selenium	ND	0.0110	ng/m³ Air							U
Sodium	ND	2000	ng/m³ Air							ICS-01, LK, QX, U
Strontium	ND	0.652	ng/m³ Air							QB-01, U
Thallium	ND	5.03E-4	ng/m³ Air							U
Thorium	ND	0.00300	ng/m³ Air							U
Uranium	ND	0.0170	ng/m³ Air							U
Vanadium	ND	0.0492	ng/m³ Air							U
Zinc	ND	97.7	ng/m³ Air							U
LCS (B3K2802-BS1)				Prepared: 11/28/23 Analyzed: 11/29/23						
Aluminum	95.5	32.1	ng/m³ Air	82.975		115	80-120			ICS-01, LK
Antimony	0.540	0.0441	ng/m³ Air	1.3829		39.1	80-120			GC-BS, SL
Arsenic	2.79	0.00955	ng/m³ Air	2.7658		101	80-120			
Barium	29.0	0.948	ng/m³ Air	27.658		105	80-120			
Beryllium	1.31	0.00332	ng/m³ Air	1.3829		95.0	80-120			
Cadmium	1.45	0.109	ng/m³ Air	1.3829		105	80-120			
Calcium	585	292	ng/m³ Air	69.146		846	80-120			GC-BS, LJ, QB-01
Chromium	15.5	2.03	ng/m³ Air	13.829		112	80-120			
Cobalt	1.49	0.0156	ng/m³ Air	1.3829		107	80-120			QB-01
Copper	30.8	3.00	ng/m³ Air	27.658		111	80-120			
Iron	49.4	24.2	ng/m³ Air	27.658		178	80-120			GC-BS
Lead	14.1	0.276	ng/m³ Air	13.829		102	80-120			
Magnesium	ND	96.4	ng/m³ Air	27.658			80-120			ICS-01, LK, QX, U
Manganese	8.86	1.19	ng/m³ Air	8.2975		107	80-120			
Molybdenum	1.70	0.213	ng/m³ Air	1.3829		123	80-120			QB-01
Nickel	3.16	0.801	ng/m³ Air	2.7658		114	80-120			
Phosphorus	ND	1250	ng/m³ Air	13.829			80-120			GC-BS, ICS-01, LK, U
Potassium	73.4	38.0	ng/m³ Air	55.317		133	80-120			
Rubidium	1.37	0.0183	ng/m³ Air	1.3829		99.1	80-120			QB-01
Selenium	2.71	0.0110	ng/m³ Air	2.7658		98.0	80-120			
Sodium	ND	2000	ng/m³ Air	55.317			80-120			ICS-01, LK, QX, U
Strontium	2.30	0.652	ng/m³ Air	1.3829		166	80-120			QB-01

Inorganics by Compendium Method IO-3.5 - Quality Control

Batch B3K2802 - ICP-MS Extraction

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
LCS (B3K2802-BS1) Continued				Prepared: 11/28/23	Analyzed: 11/29/23					
Thallium	0.136	5.03E-4	ng/m³ Air	0.13829		98.1	80-120			
Thorium	0.139	0.00300	ng/m³ Air	0.13829		101	80-120			
Uranium	0.136	0.0170	ng/m³ Air	0.13829		98.2	80-120			
Vanadium	2.84	0.0492	ng/m³ Air	2.7658		103	80-120			
Zinc	111	97.7	ng/m³ Air	82.975		134	80-120			
Duplicate (B3K2802-DUP2)	**Source: 3112732-10**			Prepared: 11/28/23	Analyzed: 11/29/23					
Aluminum	594	24.5	ng/m³ Air		578			2.80	10	ICS-01, LK
Antimony	0.101	0.0337	ng/m³ Air		0.0990			1.91	10	GC-BS, SL
Arsenic	0.356	0.00730	ng/m³ Air		0.352			1.17	10	
Barium	6.33	0.725	ng/m³ Air		6.25			1.21	10	
Beryllium	0.0195	0.00254	ng/m³ Air		0.0195			0.0449	10	
Cadmium	ND	0.0833	ng/m³ Air		ND				10	U
Calcium	475	223	ng/m³ Air		473			0.549	10	GC-BS, LJ, QB-01
Chromium	1.85	1.55	ng/m³ Air		1.81			2.04	10	
Cobalt	0.327	0.0119	ng/m³ Air		0.320			2.14	10	QB-01
Copper	17.9	2.29	ng/m³ Air		17.7			1.53	10	
Iron	666	18.5	ng/m³ Air		652			2.16	10	GC-BS
Lead	0.890	0.211	ng/m³ Air		0.883			0.834	10	
Magnesium	353	73.7	ng/m³ Air		345			2.31	10	ICS-01, LK
Manganese	17.3	0.910	ng/m³ Air		17.1			1.42	10	
Molybdenum	0.611	0.163	ng/m³ Air		0.603			1.27	10	QB-01
Nickel	0.700	0.612	ng/m³ Air		0.691			1.32	10	
Phosphorus	ND	955	ng/m³ Air		ND				10	GC-BS, ICS-01, LK, U
Potassium	121	29.0	ng/m³ Air		120			1.01	10	
Rubidium	0.220	0.0140	ng/m³ Air		0.214			2.80	10	QB-01
Selenium	0.239	0.00841	ng/m³ Air		0.253			5.41	10	
Sodium	2920	1530	ng/m³ Air		2840			3.02	10	ICS-01, LK
Strontium	4.82	0.498	ng/m³ Air		4.75			1.39	10	QB-01
Thallium	0.00329	3.84E-4	ng/m³ Air		0.00336			2.35	10	
Thorium	0.0201	0.00229	ng/m³ Air		0.0198			1.19	10	
Uranium	0.0143	0.0130	ng/m³ Air		0.0140			1.45	10	
Vanadium	1.56	0.0376	ng/m³ Air		1.54			1.43	10	
Zinc	ND	74.7	ng/m³ Air		ND				10	U
Duplicate (B3K2802-DUP3)	**Source: 3112732-03R**			Prepared: 11/28/23	Analyzed: 11/30/23					
Aluminum	560	260	ng/m³ Air		613			9.01	10	D, ICS-01, LK
Antimony	ND	0.357	ng/m³ Air		ND				10	D, GC-BS, SL, U

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Inorganics by Compendium Method IO-3.5 - Quality Control

Batch B3K2802 - ICP-MS Extraction

Duplicate (B3K2802-DUP3) Continued **Source: 3112732-03R** Prepared: 11/28/23 Analyzed: 11/30/23

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Arsenic	0.131	0.0772	ng/m³ Air		0.129			1.27	10	D
Barium	7.69	7.67	ng/m³ Air		ND			1.65	10	D
Beryllium	ND	0.0268	ng/m³ Air		ND				10	D, U
Cadmium	ND	0.881	ng/m³ Air		ND				10	D, U
Calcium	ND	2360	ng/m³ Air		ND				10	D, GC-BS, LJ, QB-01, U
Chromium	ND	16.4	ng/m³ Air		ND				10	D, U
Cobalt	0.379	0.126	ng/m³ Air		0.451			17.5	10	QB-01, D
Copper	ND	24.3	ng/m³ Air		ND				10	D, U
Iron	738	196	ng/m³ Air		750			1.67	10	D, GC-BS
Lead	ND	2.23	ng/m³ Air		ND				10	D, U
Magnesium	ND	779	ng/m³ Air		ND				10	D, ICS-01, LK, U
Manganese	19.3	9.62	ng/m³ Air		20.1			3.69	10	D
Molybdenum	ND	1.72	ng/m³ Air		ND				10	D, QB-01, U
Nickel	ND	6.48	ng/m³ Air		ND				10	D, U
Phosphorus	ND	10100	ng/m³ Air		ND				10	D, GC-BS, ICS-01, LK, U
Potassium	ND	307	ng/m³ Air		ND				10	D, U
Rubidium	0.280	0.148	ng/m³ Air		0.258			8.14	10	D, QB-01
Selenium	0.228	0.0889	ng/m³ Air		0.235			3.15	10	D
Sodium	ND	16200	ng/m³ Air		ND				10	D, ICS-01, LK, U
Strontium	5.91	5.27	ng/m³ Air		5.62			5.10	10	D, QB-01
Thallium	ND	0.00407	ng/m³ Air		ND				10	D, U
Thorium	0.0266	0.0243	ng/m³ Air		0.0274			2.93	10	D
Uranium	ND	0.137	ng/m³ Air		ND				10	D, U
Vanadium	1.71	0.398	ng/m³ Air		1.65			3.50	10	D
Zinc	ND	790	ng/m³ Air		ND				10	D, U

Duplicate (B3K2802-DUP4) **Source: 3112732-10R** Prepared: 11/28/23 Analyzed: 11/30/23

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Aluminum	521	245	ng/m³ Air		578			10.4	10	D, ICS-01, LK
Antimony	ND	0.337	ng/m³ Air		ND				10	D, GC-BS, SL, U
Arsenic	0.336	0.0730	ng/m³ Air		0.352			4.60	10	D
Barium	ND	7.25	ng/m³ Air		ND				10	D, U
Beryllium	ND	0.0254	ng/m³ Air		ND				10	D, U
Cadmium	ND	0.833	ng/m³ Air		ND				10	D, U
Calcium	ND	2230	ng/m³ Air		ND				10	D, GC-BS, LJ, QB-01, U
Chromium	ND	15.5	ng/m³ Air		ND				10	D, U

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Inorganics by Compendium Method IO-3.5 - Quality Control

Batch B3K2802 - ICP-MS Extraction

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Duplicate (B3K2802-DUP4) Continued	**Source: 3112732-10R**		Prepared: 11/28/23 Analyzed: 11/30/23							
Cobalt	0.308	0.119	ng/m³ Air		0.320			3.82	10	D, QB-01
Copper	ND	22.9	ng/m³ Air		ND				10	D, U
Iron	626	185	ng/m³ Air		652			4.18	10	D, GC-BS
Lead	ND	2.11	ng/m³ Air		ND				10	D, U
Magnesium	ND	737	ng/m³ Air		ND				10	D, ICS-01, LK, U
Manganese	16.2	9.10	ng/m³ Air		17.1			5.43	10	D
Molybdenum	ND	1.63	ng/m³ Air		ND				10	D, QB-01, U
Nickel	ND	6.12	ng/m³ Air		ND				10	D, U
Phosphorus	ND	9550	ng/m³ Air		ND				10	D, GC-BS, ICS-01, LK, U
Potassium	ND	290	ng/m³ Air		ND				10	D, U
Rubidium	0.209	0.140	ng/m³ Air		0.214			2.23	10	D, QB-01
Selenium	0.247	0.0841	ng/m³ Air		0.253			2.21	10	D
Sodium	ND	15300	ng/m³ Air		ND				10	D, ICS-01, LK, U
Strontium	ND	4.98	ng/m³ Air		ND				10	D, QB-01, U
Thallium	ND	0.00384	ng/m³ Air		ND				10	D, U
Thorium	ND	0.0229	ng/m³ Air		ND				10	D, U
Uranium	ND	0.130	ng/m³ Air		ND				10	D, U
Vanadium	1.57	0.376	ng/m³ Air		1.54			2.34	10	D
Zinc	ND	747	ng/m³ Air		ND				10	D, U
Matrix Spike (B3K2802-MS1)	**Source: 3112732-03**		Prepared: 11/28/23 Analyzed: 11/29/23							
Aluminum	727	26.0	ng/m³ Air	67.091	613	169	80-120			ICS-01, LK, QM-4X
Antimony	0.637	0.0357	ng/m³ Air	1.1182	0.109	47.2	80-120			GC-BS, QM-07, SL
Arsenic	2.36	0.00772	ng/m³ Air	2.2364	0.129	99.8	80-120			
Barium	31.6	0.767	ng/m³ Air	22.364	7.56	107	80-120			
Beryllium	1.12	0.00268	ng/m³ Air	1.1182	0.0253	98.0	80-120			
Cadmium	1.21	0.0881	ng/m³ Air	1.1182	ND	108	80-120			
Calcium	657	236	ng/m³ Air	55.909	544	203	80-120			GC-BS, LJ, QB-01, QM-4X
Chromium	12.8	1.64	ng/m³ Air	11.182	1.72	99.1	80-120			
Cobalt	1.60	0.0126	ng/m³ Air	1.1182	0.451	103	80-120			QB-01
Copper	41.8	2.43	ng/m³ Air	22.364	15.9	116	80-120			
Iron	826	19.6	ng/m³ Air	22.364	750	338	80-120			GC-BS, QM-4X
Lead	11.8	0.223	ng/m³ Air	11.182	0.302	103	80-120			
Magnesium	455	77.9	ng/m³ Air	22.364	401	244	80-120			ICS-01, LK, QM-4X, QX

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Inorganics by Compendium Method IO-3.5 - Quality Control

Batch B3K2802 - ICP-MS Extraction

Matrix Spike (B3K2802-MS1) Continued Source: 3112732-03 Prepared: 11/28/23 Analyzed: 11/29/23

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Manganese	28.8	0.962	ng/m³ Air	6.7091	20.1	131	80-120			QM-07
Molybdenum	1.94	0.172	ng/m³ Air	1.1182	0.787	103	80-120			QB-01
Nickel	2.96	0.648	ng/m³ Air	2.2364	0.674	102	80-120			
Phosphorus	ND	1010	ng/m³ Air	11.182	ND		80-120			GC-BS, ICS-01, LK,
Potassium	208	30.7	ng/m³ Air	44.727	147	136	80-120			QM-07
Rubidium	1.33	0.0148	ng/m³ Air	1.1182	0.258	96.2	80-120			QB-01
Selenium	2.47	0.00889	ng/m³ Air	2.2364	0.235	99.8	80-120			
Sodium	3400	1620	ng/m³ Air	44.727	3150	551	80-120			ICS-01, LK, QM-4X, QX
Strontium	6.92	0.527	ng/m³ Air	1.1182	5.62	116	80-120			QB-01, QM-4X
Thallium	0.111	4.07E-4	ng/m³ Air	0.11182	0.00148	98.0	80-120			
Thorium	0.0900	0.00243	ng/m³ Air	0.11182	0.0274	56.0	80-120			QM-07
Uranium	0.127	0.0137	ng/m³ Air	0.11182	0.0147	101	80-120			
Vanadium	4.03	0.0398	ng/m³ Air	2.2364	1.65	106	80-120			
Zinc	91.0	79.0	ng/m³ Air	67.091	ND	136	80-120			

Matrix Spike Dup (B3K2802-MSD1) Source: 3112732-03 Prepared: 11/28/23 Analyzed: 11/29/23

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Aluminum	681	26.0	ng/m³ Air	67.091	613	101	80-120	6.50	20	ICS-01, LK, QM-4X
Antimony	0.656	0.0357	ng/m³ Air	1.1182	0.109	48.9	80-120	2.92	20	SL, GC-BS, QM-07
Arsenic	2.29	0.00772	ng/m³ Air	2.2364	0.129	96.8	80-120	2.85	20	
Barium	30.1	0.767	ng/m³ Air	22.364	7.56	101	80-120	4.65	20	
Beryllium	1.07	0.00268	ng/m³ Air	1.1182	0.0253	93.3	80-120	4.82	20	
Cadmium	1.16	0.0881	ng/m³ Air	1.1182	ND	103	80-120	4.28	20	
Calcium	599	236	ng/m³ Air	55.909	544	98.3	80-120	9.30	20	GC-BS, LJ, QB-01
Chromium	12.3	1.64	ng/m³ Air	11.182	1.72	95.1	80-120	3.56	20	
Cobalt	1.55	0.0126	ng/m³ Air	1.1182	0.451	98.4	80-120	3.33	20	QB-01
Copper	43.7	2.43	ng/m³ Air	22.364	15.9	124	80-120	4.37	20	QM-07
Iron	760	19.6	ng/m³ Air	22.364	750	45.3	80-120	8.24	20	GC-BS, QM-4X
Lead	11.6	0.223	ng/m³ Air	11.182	0.302	101	80-120	1.42	20	
Magnesium	427	77.9	ng/m³ Air	22.364	401	117	80-120	6.41	20	ICS-01, LK, QX
Manganese	27.2	0.962	ng/m³ Air	6.7091	20.1	107	80-120	5.77	20	
Molybdenum	1.88	0.172	ng/m³ Air	1.1182	0.787	97.7	80-120	3.32	20	QB-01
Nickel	2.85	0.648	ng/m³ Air	2.2364	0.674	97.2	80-120	3.73	20	
Phosphorus	ND	1010	ng/m³ Air	11.182	ND		80-120		20	GC-BS, ICS-01, LK,
Potassium	192	30.7	ng/m³ Air	44.727	147	99.3	80-120	8.20	20	

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Inorganics by Compendium Method IO-3.5 - Quality Control

Batch B3K2802 - ICP-MS Extraction

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Matrix Spike Dup (B3K2802-MSD1) Conti Source: 3112732-03				Prepared: 11/28/23		Analyzed: 11/29/23				
Rubidium	1.30	0.0148	ng/m³ Air	1.1182	0.258	92.8	80-120	2.87	20	QB-01
Selenium	2.39	0.00889	ng/m³ Air	2.2364	0.235	96.4	80-120	3.13	20	
Sodium	3230	1620	ng/m³ Air	44.727	3150	167	80-120	5.20	20	ICS-01, LK, QX
Strontium	6.58	0.527	ng/m³ Air	1.1182	5.62	86.2	80-120	5.00	20	QB-01
Thallium	0.107	4.07E-4	ng/m³ Air	0.11182	0.00148	94.6	80-120	3.53	20	QM-4X
Thorium	0.0818	0.00243	ng/m³ Air	0.11182	0.0274	48.7	80-120	9.54	20	QM-07
Uranium	0.122	0.0137	ng/m³ Air	0.11182	0.0147	95.9	80-120	4.30	20	
Vanadium	3.79	0.0398	ng/m³ Air	2.2364	1.65	96.0	80-120	5.93	20	
Zinc	89.0	79.0	ng/m³ Air	67.091	ND	133	80-120	2.19	20	
Post Spike (B3K2802-PS1) Source: 3112732-03				Prepared: 11/28/23		Analyzed: 11/29/23				
Aluminum	646	26.0	ng/m³ Air	22.364	613	149	75-125			A-01, ICS-01, LK
Antimony	0.326	0.0357	ng/m³ Air	0.22364	0.109	96.8	75-125			GC-BS, SL
Arsenic	1.19	0.00772	ng/m³ Air	1.1182	0.129	94.4	75-125			
Barium	9.61	0.767	ng/m³ Air	2.2364	7.56	91.8	75-125			
Beryllium	0.237	0.00268	ng/m³ Air	0.22364	0.0253	94.8	75-125			
Cadmium	0.121	0.0881	ng/m³ Air	0.11182	ND	108	75-125			
Calcium	578	236	ng/m³ Air	22.364	544	154	75-125			GC-BS, LJ, QB-01
Chromium	2.71	1.64	ng/m³ Air	1.1182	1.72	89.0	75-125			
Cobalt	0.678	0.0126	ng/m³ Air	0.22364	0.451	101	75-125			QB-01
Copper	27.5	2.43	ng/m³ Air	11.182	15.9	103	75-125			
Iron	775	19.6	ng/m³ Air	22.364	750	111	75-125			GC-BS
Lead	22.2	0.223	ng/m³ Air	22.364	0.302	98.1	75-125			
Magnesium	430	77.9	ng/m³ Air	22.364	401	132	75-125			A-01, ICS-01, LK, QX
Manganese	22.4	0.962	ng/m³ Air	2.2364	20.1	106	75-125			
Molybdenum	1.81	0.172	ng/m³ Air	1.1182	0.787	91.8	75-125			QB-01
Nickel	2.88	0.648	ng/m³ Air	2.2364	0.674	98.5	75-125			
Phosphorus	ND	1010	ng/m³ Air	4.4727	ND		75-125			A-01, GC-BS, ICS-01, LK, U
Potassium	171	30.7	ng/m³ Air	22.364	147	106	75-125			
Rubidium	0.358	0.0148	ng/m³ Air	0.11182	0.258	88.9	75-125			QB-01
Selenium	1.30	0.00889	ng/m³ Air	1.1182	0.235	95.1	75-125			
Sodium	3220	1620	ng/m³ Air	22.364	3150	298	75-125			A-01, ICS-01, LK, QX
Strontium	6.54	0.527	ng/m³ Air	1.1182	5.62	82.4	75-125			QB-01
Thallium	0.0536	4.07E-4	ng/m³ Air	5.5909E-2	0.00148	93.2	75-125			
Thorium	0.0801	0.00243	ng/m³ Air	5.5909E-2	0.0274	94.2	75-125			

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Inorganics by Compendium Method IO-3.5 - Quality Control

Batch B3K2802 - ICP-MS Extraction

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Post Spike (B3K2802-PS1) Continued		**Source: 3112732-03**		Prepared: 11/28/23		Analyzed: 11/29/23				
Uranium	0.0676	0.0137	ng/m³ Air	5.5909E-2	0.0147	94.6	75-125			
Vanadium	2.71	0.0398	ng/m³ Air	1.1182	1.65	95.3	75-125			
Zinc	ND	79.0	ng/m³ Air	22.364	ND		75-125			U
Dilution Check (B3K2802-SRL1)		**Source: 3112732-03**		Prepared: 11/28/23		Analyzed: 11/29/23				
Aluminum	622	130	ng/m³ Air		613			1.37	10	ICS-01, LK
Antimony	ND	0.178	ng/m³ Air		ND				10	GC-BS, SL, U
Arsenic	0.139	0.0386	ng/m³ Air		0.129			7.59	10	
Barium	7.59	3.83	ng/m³ Air		7.56			0.399	10	
Beryllium	0.0245	0.0134	ng/m³ Air		0.0253			3.27	10	
Cadmium	ND	0.441	ng/m³ Air		ND				10	U
Calcium	ND	1180	ng/m³ Air		ND				10	GC-BS, LJ, QB-01, U
Chromium	ND	8.21	ng/m³ Air		ND				10	U
Cobalt	0.467	0.0631	ng/m³ Air		0.451			3.55	10	QB-01
Copper	16.5	12.1	ng/m³ Air		15.9			3.77	10	
Iron	772	97.8	ng/m³ Air		750			2.90	10	GC-BS
Lead	ND	1.12	ng/m³ Air		ND				10	U
Magnesium	408	390	ng/m³ Air		401			1.82	10	ICS-01, LK, QX
Manganese	20.7	4.81	ng/m³ Air		20.1			3.19	10	
Molybdenum	ND	0.861	ng/m³ Air		ND				10	QB-01, U
Nickel	ND	3.24	ng/m³ Air		ND				10	U
Phosphorus	ND	5050	ng/m³ Air		ND				10	GC-BS, ICS-01, LK, U
Potassium	155	154	ng/m³ Air		ND			4.86	10	
Rubidium	0.269	0.0740	ng/m³ Air		0.258			4.20	10	QB-01
Selenium	0.249	0.0445	ng/m³ Air		0.235			5.88	10	
Sodium	ND	8090	ng/m³ Air		ND				10	QX, ICS-01, LK, U
Strontium	5.81	2.64	ng/m³ Air		5.62			3.33	10	QB-01
Thallium	ND	0.00203	ng/m³ Air		ND				10	U
Thorium	0.0264	0.0121	ng/m³ Air		0.0274			3.70	10	
Uranium	ND	0.0687	ng/m³ Air		ND				10	U
Vanadium	1.68	0.199	ng/m³ Air		1.65			1.74	10	
Zinc	ND	395	ng/m³ Air		ND				10	U
Dilution Check (B3K2802-SRL2)		**Source: 3112732-03R**		Prepared: 11/28/23		Analyzed: 11/30/23				
Aluminum	534	260	ng/m³ Air		613			13.8	10	D, ICS-01, LK
Antimony	ND	0.357	ng/m³ Air		ND				10	D, GC-BS, SL, U

CERTIFICATE OF ANALYSIS

Tetra Tech, Inc.
1777 Sentry Pkwy, Bldg 12
Blue Bell, PA 19422
ATTN: Ms. Chelsea Saber
PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 12/01/23 13:09
SUBMITTED: 11/24/23
AQS SITE CODE:
SITE CODE: Maui fires

Inorganics by Compendium Method IO-3.5 - Quality Control

Batch B3K2802 - ICP-MS Extraction

Dilution Check (B3K2802-SRL2) ContinueSource: 3112732-03R Prepared: 11/28/23 Analyzed: 11/30/23

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Arsenic	0.114	0.0772	ng/m³ Air		0.129			12.3	10	D
Barium	ND	7.67	ng/m³ Air		ND				10	D, U
Beryllium	ND	0.0268	ng/m³ Air		ND				10	D, U
Cadmium	ND	0.881	ng/m³ Air		ND				10	D, U
Calcium	ND	2360	ng/m³ Air		ND				10	D, GC-BS, LJ, QB-01, U
Chromium	ND	16.4	ng/m³ Air		ND				10	D, U
Cobalt	0.424	0.126	ng/m³ Air		0.451			6.29	10	D, QB-01
Copper	ND	24.3	ng/m³ Air		ND				10	D, U
Iron	694	196	ng/m³ Air		750			7.79	10	D, GC-BS
Lead	ND	2.23	ng/m³ Air		ND				10	D, U
Magnesium	ND	779	ng/m³ Air		ND				10	LK, D, ICS-01, U
Manganese	18.5	9.62	ng/m³ Air		20.1			8.26	10	D
Molybdenum	ND	1.72	ng/m³ Air		ND				10	D, QB-01, U
Nickel	ND	6.48	ng/m³ Air		ND				10	D, U
Phosphorus	ND	10100	ng/m³ Air		ND				10	D, GC-BS, ICS-01, LK, U
Potassium	ND	307	ng/m³ Air		ND				10	D, U
Rubidium	0.258	0.148	ng/m³ Air		0.258			0.107	10	D, QB-01
Selenium	0.197	0.0889	ng/m³ Air		0.235			17.5	10	D
Sodium	ND	16200	ng/m³ Air		ND				10	D, ICS-01, LK, U
Strontium	5.70	5.27	ng/m³ Air		5.62			1.44	10	D, QB-01
Thallium	ND	0.00407	ng/m³ Air		ND				10	D, U
Thorium	0.0258	0.0243	ng/m³ Air		0.0274			6.24	10	D
Uranium	ND	0.137	ng/m³ Air		ND				10	D, U
Vanadium	1.63	0.398	ng/m³ Air		1.65			0.856	10	D
Zinc	ND	790	ng/m³ Air		ND				10	D, U

The results in this report apply only to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

CERTIFICATE OF ANALYSIS

Tetra Tech, Inc.
1777 Sentry Pkwy, Bldg 12
Blue Bell, PA 19422
ATTN: Ms. Chelsea Saber
PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 12/01/23 13:09
SUBMITTED: 11/24/23
AQS SITE CODE:
SITE CODE: Maui fires

Notes and Definitions

U	Under Detection Limit
SL	The spike recovery was outside acceptance limits. Reported value may be biased low.
QX	Compound does not meet QC criteria. Results should be considered an estimate.
QM-4X	The MS/MSD recovery exceeds criteria because the parent sample concentration is greater than 4x the spike concentration. Sample results for the QC batch were accepted based on acceptable BS/BSD recoveries.
QM-07	The spike recovery was outside acceptance limits for the MS and/or MSD. The batch was accepted based on acceptable LCS recovery.
QB-01	Analyte exceeds method blank criteria
LK	Analyte identified; Reported value may be biased high.
LJ	Identification of analyte is acceptable; reported value is an estimate.
ICS-01	Interference check exceeds criteria.
GC-BS	Compound exceeds Blank Spike Criteria
FB-01	Analyte exceeds Field Blank criteria.
D	This result obtained by dilution.
A-01	parent sample >4x spike amount
ND	Analyte NOT DETECTED
NR	Not Reported
MDL	Method Detection Limit
RPD	Relative Percent Difference

Note: This test is accredited under the 2016 TNI Standard.

Eastern Research Group
601 Keystone Park Drive
Suite 700
Morrisville, NC 27560

December 04, 2023

Ms. Chelsea Saber
Tetra Tech, Inc.
1777 Sentry Pkwy, Bldg 12
Blue Bell, PA 19422
Project Name: Maui fires

Dear Ms. Chelsea Saber,

This report contains the analytical results for the sample(s) received under chain(s) of custody by Eastern Research Group on 11/27/23 11:25.

Values below the MDL for QC results in this report are recorded as ND, however the actual values are reported in the accompanying Excel report with a "U" flag (Under the detection limit). The actual values are reported in AQS.

This test is accredited under the 2016 TNI Standard for Environmental Laboratories (FL DOH Certification # E87673). All analyses were performed as described in the US EPA-approved QAPP, under the contract for National Hazardous Air Pollutant Support (US EPA Contract No. 68HERH22D0002). This cover page is an integral part of this report, and any exceptions or comments are noted on the last page.

Release of the data contained in this data package and in the data submitted in the electronic data deliverable, has been authorized by the Program Manager, or the Program Manager's designee as verified by the following signature.

The issuance of the final Certificate of Analysis takes precedence over any previous Report. If you have any questions, please contact me at 919-468-7924.

Sincerely,

Julie Swift
Program Manager
julie.swift@erg.com

The information contained in this report and its attachment(s) are intended only for the use of the individual to whom it is addressed and may contain information that is privileged, confidential, or exempt from disclosure. If the reader of this message is not the intended recipient, you are hereby notified that any dissemination, distribution, or copying of this report is strictly prohibited. If you have received this report in error, please notify julie.swift@erg.com and delete the report without retaining any copies.

CERTIFICATE OF ANALYSIS

Tetra Tech, Inc.
1777 Sentry Pkwy, Bldg 12
Blue Bell, PA 19422
ATTN: Ms. Chelsea Saber
PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 12/04/23 11:41
SUBMITTED: 11/27/23
AQS SITE CODE:
SITE CODE: Maui fires

ANALYTICAL REPORT FOR SAMPLES

SampleName	LabNumber	Matrix	Sampled	Received
TetraTech Q9541277	3112737-01	Air	11/20/23 23:59	11/27/23 11:25
TetraTech Q9541276	3112737-02	Air	11/20/23 23:59	11/27/23 11:25
TetraTech Q9541275	3112737-03	Air	11/20/23 23:59	11/27/23 11:25
TetraTech Q9541930 FB	3112737-04	Air	11/20/23 00:00	11/27/23 11:25
TetraTech Q9541268	3112737-05	Air	11/21/23 23:59	11/27/23 11:25
TetraTech Q9541266	3112737-06	Air	11/21/23 23:59	11/27/23 11:25
TetraTech Q9541932	3112737-07	Air	11/21/23 23:59	11/27/23 11:25
TetraTech Q9541926 - FB	3112737-08	Air	11/21/23 00:00	11/27/23 11:25
TetraTech Q9541929	3112737-09	Air	11/22/23 23:59	11/27/23 11:25
TetraTech Q9541928	3112737-10	Air	11/22/23 23:59	11/27/23 11:25
TetraTech Q9541290	3112737-11	Air	11/22/23 23:59	11/27/23 11:25
TetraTech Q9541285 - FB	3112737-12	Air	11/22/23 00:00	11/27/23 11:25
TetraTech Q9541288	3112737-13	Air	11/23/23 23:59	11/27/23 11:25
TetraTech Q9541287	3112737-14	Air	11/23/23 23:59	11/27/23 11:25
TetraTech Q9541284	3112737-15	Air	11/23/23 23:59	11/27/23 11:25
TetraTech Q9541913 FB	3112737-16	Air	11/23/23 00:00	11/27/23 11:25

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Tetra Tech, Inc.
1777 Sentry Pkwy, Bldg 12
Blue Bell, PA 19422
ATTN: Ms. Chelsea Saber
PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 12/04/23 11:41
SUBMITTED: 11/27/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9541277 **Lab ID:** 3112737-01 **Sampled:** 11/20/23 23:59
Matrix: Air **Sample Volume:** 2038.818 m³ **Received:** 11/27/23 11:25
Filter ID: **Analysis Date:** 11/30/23 21:47
Comments: MFK-AM01-112023-HM

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	**7429-90-5**	**404**	ICS-01, LK	**25.6**
Antimony	**7440-36-0**	**0.101**	SL	**0.0352**
Arsenic	**7440-38-2**	**0.156**		**0.00762**
Barium	**7440-39-3**	**4.78**		**0.757**
Beryllium	**7440-41-7**	**0.0126**		**0.00265**
Cadmium	7440-43-9	0.00937	U	0.0870
Calcium	**7440-70-2**	**328**	LJ, QB-01	**233**
Chromium	7440-47-3	1.61	U	1.62
Cobalt	**7440-48-4**	**0.220**	QB-01	**0.0124**
Copper	**7440-50-8**	**22.3**		**2.39**
Iron	**7439-89-6**	**410**	GC-BS	**19.3**
Lead	**7439-92-1**	**0.469**		**0.220**
Magnesium	**7439-95-4**	**150**	ICS-01, LK	**76.9**
Manganese	**7439-96-5**	**10.6**		**0.950**
Molybdenum	**7439-98-7**	**0.893**	QB-01	**0.170**
Nickel	7440-02-0	0.575	U	0.639
Phosphorus	7723-14-0	309	U, GC-BS, ICS-01, LK, QX	998
Potassium	**7440-09-7**	**63.1**	ICS-01, LK	**30.3**
Rubidium		**0.138**		**0.0146**
Selenium	**7782-49-2**	**0.175**	LJ, QX	**0.00878**
Sodium	7440-23-5	1350	U, ICS-01, LK	1600
Strontium	**7440-24-6**	**3.07**	QB-01	**0.520**
Thallium	**7440-28-0**	**0.00140**		**4.01E-4**
Thorium	**7440-29-01**	**0.0100**		**0.00239**
Uranium	NA	0.00929	U	0.0136
Vanadium	**7440-62-2**	**0.993**		**0.0393**
Zinc	7440-66-6	15.2	U	78.0

The results in this report apply only to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

CERTIFICATE OF ANALYSIS

Tetra Tech, Inc.
1777 Sentry Pkwy, Bldg 12
Blue Bell, PA 19422
ATTN: Ms. Chelsea Saber
PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 12/04/23 11:41
SUBMITTED: 11/27/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9541276 **Lab ID:** 3112737-02 **Sampled:** 11/20/23 23:59
Matrix: Air **Sample Volume:** 2026.064 m³ **Received:** 11/27/23 11:25
Filter ID: **Analysis Date:** 11/30/23 22:02
Comments: MFK-AM02-112023-HM

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	**7429-90-5**	**862**	E, ICS-01, LK	**25.8**
Antimony	**7440-36-0**	**0.138**	SL	**0.0354**
Arsenic	**7440-38-2**	**0.319**		**0.00767**
Barium	**7440-39-3**	**7.60**		**0.761**
Beryllium	**7440-41-7**	**0.0263**		**0.00267**
Cadmium	**7440-43-9**	**0.103**		**0.0875**
Calcium	**7440-70-2**	**429**	LJ, QB-01	**234**
Chromium	**7440-47-3**	**1.98**		**1.63**
Cobalt	**7440-48-4**	**0.314**	QB-01	**0.0125**
Copper	**7440-50-8**	**16.1**		**2.41**
Iron	**7439-89-6**	**786**	GC-BS	**19.4**
Lead	**7439-92-1**	**0.532**		**0.222**
Magnesium	**7439-95-4**	**174**	ICS-01, LK	**77.4**
Manganese	**7439-96-5**	**18.7**		**0.956**
Molybdenum	**7439-98-7**	**0.954**	QB-01	**0.171**
Nickel	**7440-02-0**	**0.716**		**0.643**
Phosphorus	7723-14-0	352	U, GC-BS, ICS-01, LK, QX	1000
Potassium	**7440-09-7**	**79.0**	ICS-01, LK	**30.5**
Rubidium		**0.211**		**0.0147**
Selenium	**7782-49-2**	**0.257**	LJ, QX	**0.00883**
Sodium	7440-23-5	1370	U, ICS-01, LK	1610
Strontium	**7440-24-6**	**4.83**	QB-01	**0.524**
Thallium	**7440-28-0**	**0.00192**		**4.04E-4**
Thorium	**7440-29-01**	**0.0243**		**0.00241**
Uranium	**NA**	**0.0195**		**0.0137**
Vanadium	**7440-62-2**	**1.91**		**0.0395**
Zinc	7440-66-6	12.1	U	78.5

CERTIFICATE OF ANALYSIS

Tetra Tech, Inc.
1777 Sentry Pkwy, Bldg 12
Blue Bell, PA 19422
ATTN: Ms. Chelsea Saber
PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 12/04/23 11:41
SUBMITTED: 11/27/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9541275 **Lab ID:** 3112737-03 **Sampled:** 11/20/23 23:59
Matrix: Air **Sample Volume:** 1752.065 m³ **Received:** 11/27/23 11:25
Filter ID: **Analysis Date:** 11/30/23 18:50
Comments: MFK-AM03-112023-HM

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	**7429-90-5**	**289**	D-F, ICS-01, LK	**29.8**
Antimony	**7440-36-0**	**0.132**	SL	**0.0410**
Arsenic	**7440-38-2**	**0.0874**		**0.00887**
Barium	**7440-39-3**	**5.18**		**0.880**
Beryllium	**7440-41-7**	**0.0130**		**0.00308**
Cadmium	7440-43-9	0.0130	U	0.101
Calcium	**7440-70-2**	**306**	LJ, QB-01, QM-4X	**271**
Chromium	7440-47-3	1.66	U	1.89
Cobalt	**7440-48-4**	**0.236**	D-F, QB-01	**0.0145**
Copper	**7440-50-8**	**27.6**		**2.79**
Iron	**7439-89-6**	**331**	GC-BS, QM-4X	**22.5**
Lead	7439-92-1	0.241	U	0.256
Magnesium	**7439-95-4**	**164**	ICS-01, LK, QM-4X	**89.5**
Manganese	**7439-96-5**	**9.40**		**1.11**
Molybdenum	**7439-98-7**	**0.945**	QB-01	**0.198**
Nickel	7440-02-0	0.534	U	0.744
Phosphorus	7723-14-0	354	U, GC-BS, ICS-01, LK, QM-4X, QX	1160
Potassium	**7440-09-7**	**76.1**	ICS-01, LK	**35.3**
Rubidium		**0.139**		**0.0170**
Selenium	**7782-49-2**	**0.152**	LJ, QX	**0.0102**
Sodium	7440-23-5	1550	ICS-01, LK, QM-4X, U	1860
Strontium	**7440-24-6**	**2.80**	QB-01	**0.605**
Thallium	**7440-28-0**	**0.00141**		**4.67E-4**
Thorium	**7440-29-01**	**0.00854**	QM-07	**0.00279**
Uranium	NA	0.00893	U	0.0158
Vanadium	**7440-62-2**	**0.761**		**0.0457**
Zinc	7440-66-6	14.1	U	90.7

CERTIFICATE OF ANALYSIS

Tetra Tech, Inc.
1777 Sentry Pkwy, Bldg 12
Blue Bell, PA 19422
ATTN: Ms. Chelsea Saber
PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 12/04/23 11:41
SUBMITTED: 11/27/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9541930 FB
Lab ID: 3112737-04
Sampled: 11/20/23 00:00
Matrix: Air
Sample Volume: 2038.818 m³
Received: 11/27/23 11:25
Filter ID:
Analysis Date: 11/30/23 22:17
Comments: Field Blank - MFK-FB01-112023-HM

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	7429-90-5	10.1	ICS-01, LK, U	25.6
Antimony	7440-36-0	0.00792	SL, U	0.0352
Arsenic	7440-38-2	0.00403	U	0.00762
Barium	7440-39-3	0.542	U	0.757
Beryllium	7440-41-7	0.00110	U	0.00265
Cadmium	7440-43-9	0.00234	U	0.0870
Calcium	**7440-70-2**	**380**	FB-01, LJ, QB-01	**233**
Chromium	7440-47-3	1.48	U	1.62
Cobalt	**7440-48-4**	**0.0221**	FB-01, QB-01	**0.0124**
Copper	7440-50-8	0.331	U	2.39
Iron	7439-89-6	12.5	GC-BS, U	19.3
Lead	7439-92-1	0.0582	U	0.220
Magnesium	7439-95-4	42.2	ICS-01, LK, U	76.9
Manganese	7439-96-5	0.175	U	0.950
Molybdenum	**7439-98-7**	**0.251**	FB-01, QB-01	**0.170**
Nickel	7440-02-0	0.304	U	0.639
Phosphorus	7723-14-0	337	GC-BS, ICS-01, LK, QX, U	998
Potassium	7440-09-7	12.1	ICS-01, LK, U	30.3
Rubidium		0.0136	U	0.0146
Selenium	7782-49-2	0.00208	LJ, QX, U	0.00878
Sodium	7440-23-5	693	ICS-01, LK, U	1600
Strontium	**7440-24-6**	**0.720**	FB-01, QB-01	**0.520**
Thallium	7440-28-0	6.72E-5	U	4.01E-4
Thorium	7440-29-01	0.00220	U	0.00239
Uranium	NA	0.00175	U	0.0136
Vanadium	7440-62-2	0.0170	U	0.0393
Zinc	7440-66-6	5.18	U	78.0

CERTIFICATE OF ANALYSIS

Tetra Tech, Inc.
1777 Sentry Pkwy, Bldg 12
Blue Bell, PA 19422
ATTN: Ms. Chelsea Saber
PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 12/04/23 11:41
SUBMITTED: 11/27/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9541268 **Lab ID:** 3112737-05 **Sampled:** 11/21/23 23:59
Matrix: Air **Sample Volume:** 2038.818 m^3 **Received:** 11/27/23 11:25
Filter ID: **Analysis Date:** 11/30/23 22:31
Comments: MFK-AM01-112123-HM

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	**7429-90-5**	**122**	ICS-01, LK	**25.6**
Antimony	**7440-36-0**	**0.0665**	SL	**0.0352**
Arsenic	**7440-38-2**	**0.130**		**0.00762**
Barium	**7440-39-3**	**2.43**		**0.757**
Beryllium	**7440-41-7**	**0.00442**		**0.00265**
Cadmium	7440-43-9	0.00545	U	0.0870
Calcium	7440-70-2	207	LJ, QB-01, U	233
Chromium	7440-47-3	1.39	U	1.62
Cobalt	**7440-48-4**	**0.0827**	QB-01	**0.0124**
Copper	**7440-50-8**	**18.9**		**2.39**
Iron	**7439-89-6**	**128**	GC-BS	**19.3**
Lead	7439-92-1	0.171	U	0.220
Magnesium	7439-95-4	72.1	ICS-01, LK, U	76.9
Manganese	**7439-96-5**	**3.37**		**0.950**
Molybdenum	**7439-98-7**	**1.09**	QB-01	**0.170**
Nickel	7440-02-0	0.482	U	0.639
Phosphorus	7723-14-0	310	GC-BS, ICS-01, LK, QX, U	998
Potassium	**7440-09-7**	**60.3**	ICS-01, LK	**30.3**
Rubidium		**0.0845**		**0.0146**
Selenium	**7782-49-2**	**0.0788**	LJ, QX	**0.00878**
Sodium	7440-23-5	871	ICS-01, LK, U	1600
Strontium	**7440-24-6**	**1.19**	QB-01	**0.520**
Thallium	**7440-28-0**	**4.22E-4**		**4.01E-4**
Thorium	**7440-29-01**	**0.00404**		**0.00239**
Uranium	NA	0.00351	U	0.0136
Vanadium	**7440-62-2**	**0.336**		**0.0393**
Zinc	7440-66-6	10.0	U	78.0

CERTIFICATE OF ANALYSIS

Tetra Tech, Inc.
1777 Sentry Pkwy, Bldg 12
Blue Bell, PA 19422
ATTN: Ms. Chelsea Saber
PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 12/04/23 11:41
SUBMITTED: 11/27/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9541266 **Lab ID:** 3112737-06 **Sampled:** 11/21/23 23:59
Matrix: Air **Sample Volume:** 2008.06 m³ **Received:** 11/27/23 11:25
Filter ID: **Analysis Date:** 11/30/23 22:45
Comments: MFK-AM02-112123-HM

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	**7429-90-5**	**180**	ICS-01, LK	**26.0**
Antimony	**7440-36-0**	**0.0734**	SL	**0.0357**
Arsenic	**7440-38-2**	**0.156**		**0.00774**
Barium	**7440-39-3**	**3.39**		**0.768**
Beryllium	**7440-41-7**	**0.00687**		**0.00269**
Cadmium	7440-43-9	0.00686	U	0.0883
Calcium	7440-70-2	228	LJ, QB-01, U	237
Chromium	7440-47-3	1.35	U	1.64
Cobalt	**7440-48-4**	**0.107**	QB-01	**0.0126**
Copper	**7440-50-8**	**17.9**		**2.43**
Iron	**7439-89-6**	**188**	GC-BS	**19.6**
Lead	7439-92-1	0.151	U	0.224
Magnesium	**7439-95-4**	**82.4**	ICS-01, LK	**78.1**
Manganese	**7439-96-5**	**4.55**		**0.964**
Molybdenum	**7439-98-7**	**1.06**	QB-01	**0.173**
Nickel	7440-02-0	0.484	U	0.649
Phosphorus	7723-14-0	327	GC-BS, ICS-01, LK, QX, U	1010
Potassium	**7440-09-7**	**70.2**	ICS-01, LK	**30.8**
Rubidium		**0.109**		**0.0148**
Selenium	**7782-49-2**	**0.100**	LJ, QX	**0.00891**
Sodium	7440-23-5	918	ICS-01, LK, U	1620
Strontium	**7440-24-6**	**1.53**	QB-01	**0.528**
Thallium	**7440-28-0**	**5.33E-4**		**4.08E-4**
Thorium	**7440-29-01**	**0.00593**		**0.00243**
Uranium	NA	0.00473	U	0.0138
Vanadium	**7440-62-2**	**0.473**		**0.0399**
Zinc	7440-66-6	11.4	U	79.2

CERTIFICATE OF ANALYSIS

Tetra Tech, Inc.
1777 Sentry Pkwy, Bldg 12
Blue Bell, PA 19422
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PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 12/04/23 11:41
SUBMITTED: 11/27/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9541932 **Lab ID:** 3112737-07 **Sampled:** 11/21/23 23:59
Matrix: Air **Sample Volume:** 1687.032 m³ **Received:** 11/27/23 11:25
Filter ID: **Analysis Date:** 11/30/23 23:14
Comments: MFK-AM03-112123-HM

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	**7429-90-5**	**106**	ICS-01, LK	**31.0**
Antimony	**7440-36-0**	**0.0652**	SL	**0.0425**
Arsenic	**7440-38-2**	**0.0869**		**0.00921**
Barium	**7440-39-3**	**2.96**		**0.914**
Beryllium	**7440-41-7**	**0.00579**		**0.00320**
Cadmium	7440-43-9	0.00886	U	0.105
Calcium	**7440-70-2**	**531**	LJ, QB-01	**282**
Chromium	7440-47-3	1.77	U	1.96
Cobalt	**7440-48-4**	**0.0968**	QB-01	**0.0150**
Copper	**7440-50-8**	**38.8**		**2.89**
Iron	**7439-89-6**	**132**	GC-BS	**23.3**
Lead	7439-92-1	0.236	U	0.266
Magnesium	**7439-95-4**	**101**	ICS-01, LK	**93.0**
Manganese	**7439-96-5**	**3.65**		**1.15**
Molybdenum	**7439-98-7**	**1.30**	QB-01	**0.205**
Nickel	7440-02-0	0.494	U	0.772
Phosphorus	7723-14-0	436	GC-BS, ICS-01, LK, QX, U	1210
Potassium	**7440-09-7**	**77.2**	ICS-01, LK	**36.6**
Rubidium		**0.0888**		**0.0176**
Selenium	**7782-49-2**	**0.103**	LJ, QX	**0.0106**
Sodium	7440-23-5	1100	ICS-01, LK, U	1930
Strontium	**7440-24-6**	**1.84**	QB-01	**0.629**
Thallium	7440-28-0	4.15E-4	U	4.85E-4
Thorium	**7440-29-01**	**0.00569**		**0.00289**
Uranium	NA	0.00435	U	0.0164
Vanadium	**7440-62-2**	**0.334**		**0.0474**
Zinc	7440-66-6	9.77	U	94.2

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Tetra Tech, Inc.	**FILE #:** 0000.00
1777 Sentry Pkwy, Bldg 12	**REPORTED:** 12/04/23 11:41
Blue Bell, PA 19422	**SUBMITTED:** 11/27/23
ATTN: Ms. Chelsea Saber	**AQS SITE CODE:**
PHONE: (703) 885-5495 **FAX:**	**SITE CODE:** Maui fires

Description:	TetraTech Q9541926 - FB	**Lab ID:**	3112737-08	**Sampled:**	11/21/23 00:00
Matrix:	Air	**Sample Volume:**	2038.818 m³	**Received:**	11/27/23 11:25
		Filter ID:		**Analysis Date:**	11/30/23 23:28
Comments:	Field Blank - MFK-FB01-112123-HM				

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	7429-90-5	9.14	ICS-01, LK, U	25.6
Antimony	7440-36-0	0.00661	SL, U	0.0352
Arsenic	7440-38-2	0.00502	U	0.00762
Barium	7440-39-3	0.540	U	0.757
Beryllium	7440-41-7	0.00106	U	0.00265
Cadmium	7440-43-9	0.00202	U	0.0870
Calcium	**7440-70-2**	**393**	FB-01, LJ, QB-01	**233**
Chromium	7440-47-3	1.56	U	1.62
Cobalt	**7440-48-4**	**0.0373**	FB-01, QB-01	**0.0124**
Copper	7440-50-8	0.226	U	2.39
Iron	7439-89-6	11.7	GC-BS, U	19.3
Lead	7439-92-1	0.0573	U	0.220
Magnesium	7439-95-4	43.7	ICS-01, LK, U	76.9
Manganese	7439-96-5	0.147	U	0.950
Molybdenum	**7439-98-7**	**0.279**	FB-01, QB-01	**0.170**
Nickel	7440-02-0	0.289	U	0.639
Phosphorus	7723-14-0	343	GC-BS, ICS-01, LK, QX, U	998
Potassium	7440-09-7	24.1	ICS-01, LK, U	30.3
Rubidium		**0.0157**	FB-01	**0.0146**
Selenium	7782-49-2	9.16E-4	LJ, QX, U	0.00878
Sodium	7440-23-5	701	ICS-01, LK, U	1600
Strontium	**7440-24-6**	**0.750**	FB-01, QB-01	**0.520**
Thallium	7440-28-0	6.64E-5	U	4.01E-4
Thorium	7440-29-01	0.00217	U	0.00239
Uranium	NA	0.00182	U	0.0136
Vanadium	7440-62-2	0.0163	U	0.0393
Zinc	7440-66-6	4.75	U	78.0

CERTIFICATE OF ANALYSIS

Tetra Tech, Inc.
1777 Sentry Pkwy, Bldg 12
Blue Bell, PA 19422
ATTN: Ms. Chelsea Saber
PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 12/04/23 11:41
SUBMITTED: 11/27/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9541929 **Lab ID:** 3112737-09 **Sampled:** 11/22/23 23:59
Matrix: Air **Sample Volume:** 2038.818 m³ **Received:** 11/27/23 11:25
Filter ID: **Analysis Date:** 12/01/23 00:16
Comments: MFK-AM01-112223-HM

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	**7429-90-5**	**441**	ICS-01, LK	**25.6**
Antimony	**7440-36-0**	**0.0846**	SL	**0.0352**
Arsenic	**7440-38-2**	**0.308**		**0.00762**
Barium	**7440-39-3**	**6.23**		**0.757**
Beryllium	**7440-41-7**	**0.0179**		**0.00265**
Cadmium	7440-43-9	0.00877	U	0.0870
Calcium	**7440-70-2**	**735**	LJ, QB-01	**233**
Chromium	**7440-47-3**	**1.92**		**1.62**
Cobalt	**7440-48-4**	**0.314**	QB-01	**0.0124**
Copper	**7440-50-8**	**23.8**		**2.39**
Iron	**7439-89-6**	**514**	GC-BS	**19.3**
Lead	**7439-92-1**	**0.443**		**0.220**
Magnesium	**7439-95-4**	**197**	ICS-01, LK	**76.9**
Manganese	**7439-96-5**	**13.8**		**0.950**
Molybdenum	**7439-98-7**	**1.39**	QB-01	**0.170**
Nickel	**7440-02-0**	**0.985**		**0.639**
Phosphorus	7723-14-0	369	GC-BS, ICS-01, LK, QX, U	998
Potassium	**7440-09-7**	**92.3**	ICS-01, LK	**30.3**
Rubidium		**0.179**		**0.0146**
Selenium	**7782-49-2**	**0.217**	LJ, QX	**0.00878**
Sodium	7440-23-5	1430	ICS-01, LK, U	1600
Strontium	**7440-24-6**	**4.40**	QB-01	**0.520**
Thallium	**7440-28-0**	**9.25E-4**		**4.01E-4**
Thorium	**7440-29-01**	**0.0131**		**0.00239**
Uranium	NA	0.0109	U	0.0136
Vanadium	**7440-62-2**	**2.00**		**0.0393**
Zinc	7440-66-6	12.2	U	78.0

CERTIFICATE OF ANALYSIS

Tetra Tech, Inc.
1777 Sentry Pkwy, Bldg 12
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PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 12/04/23 11:41
SUBMITTED: 11/27/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9541928
Matrix: Air
Comments: MFK-AM02-112223-HM

Lab ID: 3112737-10
Sample Volume: 2026.064 m³
Filter ID:

Sampled: 11/22/23 23:59
Received: 11/27/23 11:25
Analysis Date: 12/01/23 00:33

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	**7429-90-5**	**373**	ICS-01, LK	**25.8**
Antimony	**7440-36-0**	**0.0637**	SL	**0.0354**
Arsenic	**7440-38-2**	**0.239**		**0.00767**
Barium	**7440-39-3**	**4.87**		**0.761**
Beryllium	**7440-41-7**	**0.0149**		**0.00267**
Cadmium	7440-43-9	0.00779	U	0.0875
Calcium	**7440-70-2**	**700**	LJ, QB-01	**234**
Chromium	**7440-47-3**	**1.89**		**1.63**
Cobalt	**7440-48-4**	**0.280**	QB-01	**0.0125**
Copper	**7440-50-8**	**17.1**		**2.41**
Iron	**7439-89-6**	**446**	GC-BS	**19.4**
Lead	**7439-92-1**	**0.335**		**0.222**
Magnesium	**7439-95-4**	**206**	ICS-01, LK	**77.4**
Manganese	**7439-96-5**	**12.1**		**0.956**
Molybdenum	**7439-98-7**	**1.09**	QB-01	**0.171**
Nickel	**7440-02-0**	**1.02**		**0.643**
Phosphorus	7723-14-0	379	GC-BS, ICS-01, LK, QX, U	1000
Potassium	**7440-09-7**	**105**	ICS-01, LK	**30.5**
Rubidium		**0.168**		**0.0147**
Selenium	**7782-49-2**	**0.197**	LJ, QX	**0.00883**
Sodium	7440-23-5	1580	ICS-01, LK, U	1610
Strontium	**7440-24-6**	**3.95**	QB-01	**0.524**
Thallium	**7440-28-0**	**8.38E-4**		**4.04E-4**
Thorium	**7440-29-01**	**0.0118**		**0.00241**
Uranium	NA	0.00935	U	0.0137
Vanadium	**7440-62-2**	**2.16**		**0.0395**
Zinc	7440-66-6	9.01	U	78.5

CERTIFICATE OF ANALYSIS

Tetra Tech, Inc.
1777 Sentry Pkwy, Bldg 12
Blue Bell, PA 19422
ATTN: Ms. Chelsea Saber
PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 12/04/23 11:41
SUBMITTED: 11/27/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9541290
Matrix: Air
Lab ID: 3112737-11
Sample Volume: 2242.105 m^3
Filter ID:
Sampled: 11/22/23 23:59
Received: 11/27/23 11:25
Analysis Date: 12/01/23 00:48
Comments: MFK-AM03-112223-HM

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	**7429-90-5**	**291**	ICS-01, LK	**23.3**
Antimony	**7440-36-0**	**0.0998**	SL	**0.0320**
Arsenic	**7440-38-2**	**0.148**		**0.00693**
Barium	**7440-39-3**	**4.65**		**0.688**
Beryllium	**7440-41-7**	**0.0131**		**0.00241**
Cadmium	7440-43-9	0.00705	U	0.0791
Calcium	**7440-70-2**	**416**	LJ, QB-01	**212**
Chromium	**7440-47-3**	**1.61**		**1.47**
Cobalt	**7440-48-4**	**0.275**	QB-01	**0.0113**
Copper	**7440-50-8**	**28.0**		**2.18**
Iron	**7439-89-6**	**391**	GC-BS	**17.6**
Lead	**7439-92-1**	**0.257**		**0.200**
Magnesium	**7439-95-4**	**220**	ICS-01, LK	**70.0**
Manganese	**7439-96-5**	**11.0**		**0.864**
Molybdenum	**7439-98-7**	**0.934**	QB-01	**0.155**
Nickel	**7440-02-0**	**1.17**		**0.581**
Phosphorus	7723-14-0	310	GC-BS, ICS-01, LK, QX, U	907
Potassium	**7440-09-7**	**116**	ICS-01, LK	**27.6**
Rubidium		**0.140**		**0.0133**
Selenium	**7782-49-2**	**0.171**	LJ, QX	**0.00798**
Sodium	**7440-23-5**	**1760**	E, ICS-01, LK	**1450**
Strontium	**7440-24-6**	**3.24**	QB-01	**0.473**
Thallium	**7440-28-0**	**8.00E-4**		**3.65E-4**
Thorium	**7440-29-01**	**0.0107**		**0.00218**
Uranium	NA	0.00748	U	0.0123
Vanadium	**7440-62-2**	**2.23**		**0.0357**
Zinc	7440-66-6	8.98	U	70.9

CERTIFICATE OF ANALYSIS

Tetra Tech, Inc.
1777 Sentry Pkwy, Bldg 12
Blue Bell, PA 19422
ATTN: Ms. Chelsea Saber
PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 12/04/23 11:41
SUBMITTED: 11/27/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9541285 - FB **Lab ID:** 3112737-12 **Sampled:** 11/22/23 00:00
Matrix: Air **Sample Volume:** 2038.818 m³ **Received:** 11/27/23 11:25
Filter ID: **Analysis Date:** 12/01/23 01:03
Comments: Field Blank - MFK-FB01-112223-HM

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	7429-90-5	13.9	ICS-01, LK, U	25.6
Antimony	7440-36-0	0.0183	SL, U	0.0352
Arsenic	7440-38-2	0.00299	U	0.00762
Barium	**7440-39-3**	**1.10**	FB-01	**0.757**
Beryllium	7440-41-7	0.00102	U	0.00265
Cadmium	7440-43-9	0.00143	U	0.0870
Calcium	7440-70-2	136	LJ, QB-01, U	233
Chromium	7440-47-3	1.21	U	1.62
Cobalt	**7440-48-4**	**0.0367**	FB-01, QB-01	**0.0124**
Copper	7440-50-8	0.290	U	2.39
Iron	7439-89-6	13.8	GC-BS, U	19.3
Lead	7439-92-1	0.0406	U	0.220
Magnesium	7439-95-4	37.5	ICS-01, LK, U	76.9
Manganese	7439-96-5	0.172	U	0.950
Molybdenum	**7439-98-7**	**0.203**	FB-01, QB-01	**0.170**
Nickel	7440-02-0	0.340	U	0.639
Phosphorus	7723-14-0	301	GC-BS, ICS-01, LK, QX, U	998
Potassium	**7440-09-7**	**32.7**	FB-01, ICS-01, LK	**30.3**
Rubidium		0.0112	U	0.0146
Selenium	7782-49-2	0.00357	LJ, QX, U	0.00878
Sodium	7440-23-5	734	ICS-01, LK, U	1600
Strontium	7440-24-6	0.350	QB-01, U	0.520
Thallium	7440-28-0	6.21E-5	U	4.01E-4
Thorium	7440-29-01	0.00207	U	0.00239
Uranium	NA	0.00121	U	0.0136
Vanadium	7440-62-2	0.0151	U	0.0393
Zinc	7440-66-6	4.72	U	78.0

CERTIFICATE OF ANALYSIS

Tetra Tech, Inc.
1777 Sentry Pkwy, Bldg 12
Blue Bell, PA 19422
ATTN: Ms. Chelsea Saber
PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 12/04/23 11:41
SUBMITTED: 11/27/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9541288 **Lab ID:** 3112737-13 **Sampled:** 11/23/23 23:59
Matrix: Air **Sample Volume:** 2038.818 m³ **Received:** 11/27/23 11:25
Filter ID: **Analysis Date:** 12/01/23 01:17
Comments: MFK-AM01-112323-HM

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	**7429-90-5**	**226**	ICS-01, LK	**25.6**
Antimony	**7440-36-0**	**0.0869**	SL	**0.0352**
Arsenic	**7440-38-2**	**0.155**		**0.00762**
Barium	**7440-39-3**	**3.74**		**0.757**
Beryllium	**7440-41-7**	**0.00838**		**0.00265**
Cadmium	7440-43-9	0.00665	U	0.0870
Calcium	**7440-70-2**	**318**	LJ, QB-01	**233**
Chromium	7440-47-3	1.56	U	1.62
Cobalt	**7440-48-4**	**0.163**	QB-01	**0.0124**
Copper	**7440-50-8**	**17.4**		**2.39**
Iron	**7439-89-6**	**268**	GC-BS	**19.3**
Lead	**7439-92-1**	**0.232**		**0.220**
Magnesium	**7439-95-4**	**216**	ICS-01, LK	**76.9**
Manganese	**7439-96-5**	**7.06**		**0.950**
Molybdenum	**7439-98-7**	**1.25**	QB-01	**0.170**
Nickel	**7440-02-0**	**1.04**		**0.639**
Phosphorus	7723-14-0	332	GC-BS, ICS-01, LK, QX, U	998
Potassium	**7440-09-7**	**115**	ICS-01, LK	**30.3**
Rubidium		**0.125**		**0.0146**
Selenium	**7782-49-2**	**0.144**	LJ, QX	**0.00878**
Sodium	**7440-23-5**	**1980**	E, ICS-01, LK	**1600**
Strontium	**7440-24-6**	**2.65**	QB-01	**0.520**
Thallium	**7440-28-0**	**6.70E-4**		**4.01E-4**
Thorium	**7440-29-01**	**0.00679**		**0.00239**
Uranium	NA	0.00622	U	0.0136
Vanadium	**7440-62-2**	**1.89**		**0.0393**
Zinc	7440-66-6	9.10	U	78.0

CERTIFICATE OF ANALYSIS

Tetra Tech, Inc.
1777 Sentry Pkwy, Bldg 12
Blue Bell, PA 19422
ATTN: Ms. Chelsea Saber
PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 12/04/23 11:41
SUBMITTED: 11/27/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9541287 **Lab ID:** 3112737-14 **Sampled:** 11/23/23 23:59
Matrix: Air **Sample Volume:** 2026.064 m^3 **Received:** 11/27/23 11:25
Filter ID: **Analysis Date:** 12/01/23 01:31
Comments: MFK-AM02-112323-HM

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m^3 Air	Flag	MDL ng/m^3 Air
Aluminum	**7429-90-5**	**267**	ICS-01, LK	**25.8**
Antimony	**7440-36-0**	**0.0803**	SL	**0.0354**
Arsenic	**7440-38-2**	**0.174**		**0.00767**
Barium	**7440-39-3**	**4.00**		**0.761**
Beryllium	**7440-41-7**	**0.0105**		**0.00267**
Cadmium	7440-43-9	0.0111	U	0.0875
Calcium	**7440-70-2**	**332**	LJ, QB-01	**234**
Chromium	7440-47-3	1.44	U	1.63
Cobalt	**7440-48-4**	**0.182**	QB-01	**0.0125**
Copper	**7440-50-8**	**12.9**		**2.41**
Iron	**7439-89-6**	**317**	GC-BS	**19.4**
Lead	7439-92-1	0.219	U	0.222
Magnesium	**7439-95-4**	**217**	ICS-01, LK	**77.4**
Manganese	**7439-96-5**	**8.14**		**0.956**
Molybdenum	**7439-98-7**	**1.01**	QB-01	**0.171**
Nickel	**7440-02-0**	**0.940**		**0.643**
Phosphorus	7723-14-0	326	GC-BS, ICS-01, LK, QX, U	1000
Potassium	**7440-09-7**	**124**	ICS-01, LK	**30.5**
Rubidium		**0.154**		**0.0147**
Selenium	**7782-49-2**	**0.192**	LJ, QX	**0.00883**
Sodium	**7440-23-5**	**2000**	E, ICS-01, LK	**1610**
Strontium	**7440-24-6**	**3.22**	QB-01	**0.524**
Thallium	**7440-28-0**	**0.00146**		**4.04E-4**
Thorium	**7440-29-01**	**0.00917**		**0.00241**
Uranium	NA	0.00727	U	0.0137
Vanadium	**7440-62-2**	**1.88**		**0.0395**
Zinc	7440-66-6	8.40	U	78.5

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FILE #: 0000.00
REPORTED: 12/04/23 11:41
SUBMITTED: 11/27/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9541284 **Lab ID:** 3112737-15 **Sampled:** 11/23/23 23:59
Matrix: Air **Sample Volume:** 1882.131 m^3 **Received:** 11/27/23 11:25
Filter ID: **Analysis Date:** 12/01/23 01:45
Comments: MFK-AM03-112323-HM

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	**7429-90-5**	**192**	ICS-01, LK	**27.7**
Antimony	**7440-36-0**	**0.0883**	SL	**0.0381**
Arsenic	**7440-38-2**	**0.123**		**0.00826**
Barium	**7440-39-3**	**4.59**		**0.819**
Beryllium	**7440-41-7**	**0.00908**		**0.00287**
Cadmium	7440-43-9	0.00781	U	0.0942
Calcium	**7440-70-2**	**333**	LJ, QB-01	**252**
Chromium	7440-47-3	1.57	U	1.75
Cobalt	**7440-48-4**	**0.205**	QB-01	**0.0135**
Copper	**7440-50-8**	**41.8**		**2.59**
Iron	**7439-89-6**	**274**	GC-BS	**20.9**
Lead	7439-92-1	0.179	U	0.239
Magnesium	**7439-95-4**	**257**	ICS-01, LK	**83.3**
Manganese	**7439-96-5**	**7.82**		**1.03**
Molybdenum	**7439-98-7**	**1.38**	QB-01	**0.184**
Nickel	**7440-02-0**	**0.950**		**0.692**
Phosphorus	7723-14-0	346	LK, QX, GC-BS, ICS-01, U	1080
Potassium	**7440-09-7**	**119**	ICS-01, LK	**32.8**
Rubidium		**0.136**		**0.0158**
Selenium	**7782-49-2**	**0.153**	LJ, QX	**0.00951**
Sodium	**7440-23-5**	**2230**	E, ICS-01, LK	**1730**
Strontium	**7440-24-6**	**2.66**	QB-01	**0.564**
Thallium	**7440-28-0**	**7.76E-4**		**4.35E-4**
Thorium	**7440-29-01**	**0.00753**		**0.00259**
Uranium	NA	0.00665	U	0.0147
Vanadium	**7440-62-2**	**1.80**		**0.0425**
Zinc	7440-66-6	9.19	U	84.5

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FILE #: 0000.00
REPORTED: 12/04/23 11:41
SUBMITTED: 11/27/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9541913 FB **Lab ID:** 3112737-16 **Sampled:** 11/23/23 00:00
Matrix: Air **Sample Volume:** 2038.818 m³ **Received:** 11/27/23 11:25
Filter ID: **Analysis Date:** 12/01/23 02:00
Comments: Field Blank - MFK-FB01-112323-HM

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	7429-90-5	10.4	ICS-01, LK, U	25.6
Antimony	7440-36-0	0.00731	SL, U	0.0352
Arsenic	7440-38-2	0.00386	U	0.00762
Barium	7440-39-3	0.583	U	0.757
Beryllium	7440-41-7	9.66E-4	U	0.00265
Cadmium	7440-43-9	0.00184	U	0.0870
Calcium	**7440-70-2**	**337**	FB-01, LJ, QB-01	**233**
Chromium	7440-47-3	1.50	U	1.62
Cobalt	**7440-48-4**	**0.0331**	FB-01, QB-01	**0.0124**
Copper	7440-50-8	0.388	U	2.39
Iron	7439-89-6	13.5	GC-BS, U	19.3
Lead	7439-92-1	0.0516	U	0.220
Magnesium	7439-95-4	43.6	ICS-01, LK, U	76.9
Manganese	7439-96-5	0.166	U	0.950
Molybdenum	**7439-98-7**	**0.247**	FB-01, QB-01	**0.170**
Nickel	7440-02-0	0.270	U	0.639
Phosphorus	7723-14-0	336	GC-BS, ICS-01, LK, QX, U	998
Potassium	**7440-09-7**	**37.6**	FB-01, ICS-01, LK	**30.3**
Rubidium		**0.0156**	FB-01	**0.0146**
Selenium	7782-49-2	0.00169	LJ, QX, U	0.00878
Sodium	7440-23-5	726	ICS-01, LK, U	1600
Strontium	**7440-24-6**	**0.693**	FB-01, QB-01	**0.520**
Thallium	7440-28-0	5.36E-5	U	4.01E-4
Thorium	7440-29-01	0.00235	U	0.00239
Uranium	NA	0.00169	U	0.0136
Vanadium	7440-62-2	0.0175	U	0.0393
Zinc	7440-66-6	3.80	U	78.0

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REPORTED: 12/04/23 11:41
SUBMITTED: 11/27/23
AQS SITE CODE:
SITE CODE: Maui fires

Inorganics by Compendium Method IO-3.5 - Quality Control

Batch 2311075 - B3K2906

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Calibration Blank (2311075-CCB1)				Prepared & Analyzed: 11/30/23						
Aluminum	129		ng/l							
Antimony	0.882		ng/l							
Arsenic	5.57		ng/l							
Barium	1.18		ng/l							
Beryllium	0.635		ng/l							
Cadmium	0.196		ng/l							
Calcium	613		ng/l							
Chromium	6.32		ng/l							
Cobalt	0.487		ng/l							
Copper	23.7		ng/l							
Iron	113		ng/l							
Lead	6.51		ng/l							
Magnesium	22.5		ng/l							
Manganese	5.79		ng/l							
Molybdenum	20.1		ng/l							
Nickel	-3.14		ng/l							U
Phosphorus	213		ng/l							QX
Potassium	2710		ng/l							
Rubidium	1.06		ng/l							
Selenium	-6.78		ng/l							LJ, QX, U
Sodium	2830		ng/l							
Strontium	0.319		ng/l							
Thallium	0.445		ng/l							
Thorium	0.770		ng/l							
Uranium	-0.0127		ng/l							U
Vanadium	-24.6		ng/l							U
Zinc	-42.8		ng/l							U
Calibration Blank (2311075-CCB2)				Prepared & Analyzed: 11/30/23						
Aluminum	86.6		ng/l							
Antimony	0.856		ng/l							
Arsenic	0.629		ng/l							
Barium	2.60		ng/l							
Beryllium	0.486		ng/l							
Cadmium	0.598		ng/l							
Calcium	-77.0		ng/l							U
Chromium	6.84		ng/l							
Cobalt	1.06		ng/l							
Copper	49.7		ng/l							

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Inorganics by Compendium Method IO-3.5 - Quality Control

Batch 2311075 - B3K2906

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Calibration Blank (2311075-CCB2) Contin				Prepared & Analyzed: 11/30/23						
Iron	93.0		ng/l							
Lead	12.0		ng/l							
Magnesium	5.21		ng/l							
Manganese	10.7		ng/l							
Molybdenum	9.79		ng/l							
Nickel	2.02		ng/l							
Phosphorus	-60.5		ng/l							QX, U
Potassium	1270		ng/l							
Rubidium	1.04		ng/l							
Selenium	-4.69		ng/l							LJ, QX, U
Sodium	1520		ng/l							
Strontium	0.576		ng/l							
Thallium	0.442		ng/l							
Thorium	0.981		ng/l							
Uranium	0.00347		ng/l							
Vanadium	-26.4		ng/l							U
Zinc	-39.0		ng/l							U
Calibration Blank (2311075-CCB3)				Prepared: 11/30/23 Analyzed: 12/01/23						
Aluminum	64.2		ng/l							
Antimony	0.875		ng/l							
Arsenic	2.26		ng/l							
Barium	1.44		ng/l							
Beryllium	-0.363		ng/l							U
Cadmium	0.455		ng/l							
Calcium	-28.7		ng/l							U
Chromium	3.82		ng/l							
Cobalt	0.621		ng/l							
Copper	31.5		ng/l							
Iron	47.1		ng/l							
Lead	8.50		ng/l							
Magnesium	21.4		ng/l							
Manganese	4.79		ng/l							
Molybdenum	10.4		ng/l							
Nickel	-0.196		ng/l							U
Phosphorus	264		ng/l							QX
Potassium	1060		ng/l							
Rubidium	1.07		ng/l							
Selenium	-6.78		ng/l							LJ, QX, U

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AQS SITE CODE:
SITE CODE: Maui fires

Inorganics by Compendium Method IO-3.5 - Quality Control

Batch 2311075 - B3K2906

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Calibration Blank (2311075-CCB3) Contin				Prepared: 11/30/23 Analyzed: 12/01/23						
Sodium	1980		ng/l							
Strontium	-0.192		ng/l							U
Thallium	0.350		ng/l							
Thorium	0.469		ng/l							
Uranium	0.0232		ng/l							
Vanadium	-25.5		ng/l							U
Zinc	-38.7		ng/l							U
Calibration Blank (2311075-CCB4)				Prepared: 11/30/23 Analyzed: 12/01/23						
Aluminum	96.0		ng/l							
Antimony	1.22		ng/l							
Arsenic	7.55		ng/l							
Barium	2.61		ng/l							
Beryllium	-0.0913		ng/l							U
Cadmium	0.384		ng/l							
Calcium	-143		ng/l							U
Chromium	3.91		ng/l							
Cobalt	0.723		ng/l							
Copper	34.2		ng/l							
Iron	80.9		ng/l							
Lead	7.77		ng/l							
Magnesium	6.59		ng/l							
Manganese	6.16		ng/l							
Molybdenum	9.21		ng/l							
Nickel	1.66		ng/l							
Phosphorus	-185		ng/l							QX, U
Potassium	973		ng/l							
Rubidium	0.0776		ng/l							
Selenium	-3.34		ng/l							LJ, QX, U
Sodium	3490		ng/l							
Strontium	-1.23		ng/l							U
Thallium	0.366		ng/l							
Thorium	0.767		ng/l							
Uranium	-0.00956		ng/l							U
Vanadium	-25.2		ng/l							U
Zinc	-29.0		ng/l							U
Calibration Check (2311075-CCV1)				Prepared & Analyzed: 11/30/23						
Aluminum	1.61E6		ng/l	1.5000E6		107	90-110			
Antimony	20000		ng/l	20000		100	90-110			

Inorganics by Compendium Method IO-3.5 - Quality Control

Batch 2311075 - B3K2906

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Calibration Check (2311075-CCV1) Contir				Prepared & Analyzed: 11/30/23						
Arsenic	20100		ng/l	20000		100	90-110			
Barium	200000		ng/l	200000		99.9	90-110			
Beryllium	5090		ng/l	5000.0		102	90-110			
Cadmium	20400		ng/l	20000		102	90-110			
Calcium	2.54E7		ng/l	2.5000E7		102	90-110			
Chromium	235000		ng/l	240000		98.1	90-110			
Cobalt	53000		ng/l	50000		106	90-110			
Copper	2.09E6		ng/l	2.0000E6		104	90-110			
Iron	2.62E6		ng/l	2.5000E6		105	90-110			
Lead	200000		ng/l	200000		100	90-110			
Magnesium	1.09E6		ng/l	1.0000E6		109	90-110			
Manganese	520000		ng/l	500000		104	90-110			
Molybdenum	50800		ng/l	50000		102	90-110			
Nickel	126000		ng/l	120000		105	90-110			
Phosphorus	205000		ng/l	200000		102	90-110			QX
Potassium	2.61E6		ng/l	2.5000E6		105	90-110			
Rubidium	10000		ng/l	10000		100	90-110			
Selenium	20000		ng/l	20000		100	90-110			LJ, QX
Sodium	2.74E6		ng/l	2.5000E6		110	90-110			
Strontium	49900		ng/l	50000		99.8	90-110			
Thallium	505		ng/l	500.00		101	90-110			
Thorium	504		ng/l	500.00		101	90-110			
Uranium	502		ng/l	500.00		100	90-110			
Vanadium	20100		ng/l	20000		100	90-110			
Zinc	534000		ng/l	500000		107	90-110			
Calibration Check (2311075-CCV2)				Prepared & Analyzed: 11/30/23						
Aluminum	1.46E6		ng/l	1.5000E6		97.0	90-110			
Antimony	20000		ng/l	20000		100	90-110			
Arsenic	19900		ng/l	20000		99.6	90-110			
Barium	202000		ng/l	200000		101	90-110			
Beryllium	5480		ng/l	5000.0		110	90-110			
Cadmium	20400		ng/l	20000		102	90-110			
Calcium	2.47E7		ng/l	2.5000E7		98.8	90-110			
Chromium	241000		ng/l	240000		100	90-110			
Cobalt	51200		ng/l	50000		102	90-110			
Copper	2.05E6		ng/l	2.0000E6		103	90-110			
Iron	2.48E6		ng/l	2.5000E6		99.3	90-110			
Lead	200000		ng/l	200000		99.8	90-110			

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REPORTED: 12/04/23 11:41
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AQS SITE CODE:
SITE CODE: Maui fires

Inorganics by Compendium Method IO-3.5 - Quality Control

Batch 2311075 - B3K2906

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Calibration Check (2311075-CCV2) Contin				Prepared & Analyzed: 11/30/23						
Magnesium	1.01E6		ng/l	1.0000E6		101	90-110			
Manganese	491000		ng/l	500000		98.2	90-110			
Molybdenum	51400		ng/l	50000		103	90-110			
Nickel	122000		ng/l	120000		102	90-110			
Phosphorus	191000		ng/l	200000		95.6	90-110			QX
Potassium	2.47E6		ng/l	2.5000E6		98.8	90-110			
Rubidium	9860		ng/l	10000		98.6	90-110			
Selenium	19700		ng/l	20000		98.4	90-110			LJ, QX
Sodium	2.51E6		ng/l	2.5000E6		101	90-110			
Strontium	49300		ng/l	50000		98.6	90-110			
Thallium	505		ng/l	500.00		101	90-110			
Thorium	503		ng/l	500.00		101	90-110			
Uranium	504		ng/l	500.00		101	90-110			
Vanadium	20300		ng/l	20000		101	90-110			
Zinc	528000		ng/l	500000		106	90-110			
Calibration Check (2311075-CCV3)				Prepared & Analyzed: 11/30/23						
Aluminum	1.50E6		ng/l	1.5000E6		99.7	90-110			
Antimony	20900		ng/l	20000		104	90-110			
Arsenic	20500		ng/l	20000		103	90-110			
Barium	209000		ng/l	200000		104	90-110			
Beryllium	4950		ng/l	5000.0		99.0	90-110			
Cadmium	21400		ng/l	20000		107	90-110			
Calcium	2.56E7		ng/l	2.5000E7		102	90-110			
Chromium	254000		ng/l	240000		106	90-110			
Cobalt	52600		ng/l	50000		105	90-110			
Copper	2.12E6		ng/l	2.0000E6		106	90-110			
Iron	2.57E6		ng/l	2.5000E6		103	90-110			
Lead	208000		ng/l	200000		104	90-110			
Magnesium	1.03E6		ng/l	1.0000E6		103	90-110			
Manganese	508000		ng/l	500000		102	90-110			
Molybdenum	54300		ng/l	50000		109	90-110			
Nickel	126000		ng/l	120000		105	90-110			
Phosphorus	192000		ng/l	200000		96.0	90-110			QX
Potassium	2.49E6		ng/l	2.5000E6		99.6	90-110			
Rubidium	10200		ng/l	10000		102	90-110			
Selenium	20500		ng/l	20000		102	90-110			LJ, QX
Sodium	2.55E6		ng/l	2.5000E6		102	90-110			
Strontium	51700		ng/l	50000		103	90-110			

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FILE #: 0000.00
REPORTED: 12/04/23 11:41
SUBMITTED: 11/27/23
AQS SITE CODE:
SITE CODE: Maui fires

Inorganics by Compendium Method IO-3.5 - Quality Control

Batch 2311075 - B3K2906

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Calibration Check (2311075-CCV3) Contin				Prepared & Analyzed: 11/30/23						
Thallium	517		ng/l	500.00		103	90-110			
Thorium	522		ng/l	500.00		104	90-110			
Uranium	525		ng/l	500.00		105	90-110			
Vanadium	21300		ng/l	20000		106	90-110			
Zinc	543000		ng/l	500000		109	90-110			
Calibration Check (2311075-CCV4)				Prepared: 11/30/23 Analyzed: 12/01/23						
Aluminum	1.49E6		ng/l	1.5000E6		99.0	90-110			
Antimony	20600		ng/l	20000		103	90-110			
Arsenic	20300		ng/l	20000		101	90-110			
Barium	206000		ng/l	200000		103	90-110			
Beryllium	4880		ng/l	5000.0		97.5	90-110			
Cadmium	21100		ng/l	20000		105	90-110			
Calcium	2.51E7		ng/l	2.5000E7		100	90-110			
Chromium	249000		ng/l	240000		104	90-110			
Cobalt	52100		ng/l	50000		104	90-110			
Copper	2.09E6		ng/l	2.0000E6		105	90-110			
Iron	2.55E6		ng/l	2.5000E6		102	90-110			
Lead	206000		ng/l	200000		103	90-110			
Magnesium	1.03E6		ng/l	1.0000E6		103	90-110			
Manganese	507000		ng/l	500000		101	90-110			
Molybdenum	53600		ng/l	50000		107	90-110			
Nickel	124000		ng/l	120000		103	90-110			
Phosphorus	190000		ng/l	200000		95.1	90-110			QX
Potassium	2.49E6		ng/l	2.5000E6		99.7	90-110			
Rubidium	10100		ng/l	10000		101	90-110			
Selenium	20200		ng/l	20000		101	90-110			LJ, QX
Sodium	2.57E6		ng/l	2.5000E6		103	90-110			
Strontium	50800		ng/l	50000		102	90-110			
Thallium	520		ng/l	500.00		104	90-110			
Thorium	519		ng/l	500.00		104	90-110			
Uranium	520		ng/l	500.00		104	90-110			
Vanadium	20800		ng/l	20000		104	90-110			
Zinc	538000		ng/l	500000		108	90-110			
High Cal Check (2311075-HCV1)				Prepared & Analyzed: 11/30/23						
Aluminum	2.99E6		ng/l	3.0000E6		99.8	95-105			
Antimony	40500		ng/l	40000		101	95-105			
Arsenic	40300		ng/l	40000		101	95-105			
Barium	405000		ng/l	400000		101	95-105			

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REPORTED: 12/04/23 11:41
SUBMITTED: 11/27/23
AQS SITE CODE:
SITE CODE: Maui fires

Inorganics by Compendium Method IO-3.5 - Quality Control

Batch 2311075 - B3K2906

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
High Cal Check (2311075-HCV1) Continue				Prepared & Analyzed: 11/30/23						
Beryllium	10000		ng/l	10000		100	95-105			
Cadmium	40300		ng/l	40000		101	95-105			
Calcium	5.02E7		ng/l	5.0000E7		100	95-105			
Chromium	482000		ng/l	480000		100	95-105			
Cobalt	99600		ng/l	100000		99.6	95-105			
Copper	3.99E6		ng/l	4.0000E6		99.6	95-105			
Iron	5.01E6		ng/l	5.0000E6		100	95-105			
Lead	404000		ng/l	400000		101	95-105			
Magnesium	2.00E6		ng/l	2.0000E6		100	95-105			
Manganese	998000		ng/l	1.0000E6		99.8	95-105			
Molybdenum	102000		ng/l	100000		102	95-105			
Nickel	238000		ng/l	240000		99.3	95-105			
Phosphorus	407000		ng/l	400000		102	95-105			QX
Potassium	5.12E6		ng/l	5.0000E6		102	95-105			
Rubidium	20400		ng/l	20000		102	95-105			
Selenium	39900		ng/l	40000		99.7	95-105			LJ, QX
Sodium	5.00E6		ng/l	5.0000E6		100	95-105			
Strontium	102000		ng/l	100000		102	95-105			
Thallium	1020		ng/l	1000.0		102	95-105			
Thorium	1020		ng/l	1000.0		102	95-105			
Uranium	1020		ng/l	1000.0		102	95-105			
Vanadium	40300		ng/l	40000		101	95-105			
Zinc	993000		ng/l	1.0000E6		99.3	95-105			
Initial Cal Blank (2311075-ICB1)				Prepared & Analyzed: 11/30/23						
Aluminum	72.1		ng/l							
Antimony	0.969		ng/l							
Arsenic	2.05		ng/l							
Barium	1.73		ng/l							
Beryllium	0.663		ng/l							
Cadmium	0.447		ng/l							
Calcium	51.5		ng/l							
Chromium	4.86		ng/l							
Cobalt	0.381		ng/l							
Copper	27.8		ng/l							
Iron	61.9		ng/l							
Lead	6.23		ng/l							
Magnesium	7.16		ng/l							
Manganese	6.76		ng/l							

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Inorganics by Compendium Method IO-3.5 - Quality Control

Batch 2311075 - B3K2906

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Initial Cal Blank (2311075-ICB1) Continu				Prepared & Analyzed: 11/30/23						
Molybdenum	13.4		ng/l							
Nickel	-3.35		ng/l							U
Phosphorus	417		ng/l							QX
Potassium	1730		ng/l							
Rubidium	-0.114		ng/l							U
Selenium	0.518		ng/l							LJ, QX
Sodium	408		ng/l							
Strontium	-0.0745		ng/l							U
Thallium	0.478		ng/l							
Thorium	0.549		ng/l							
Uranium	-0.00599		ng/l							U
Vanadium	-21.3		ng/l							U
Zinc	-12.8		ng/l							U
Initial Cal Check (2311075-ICV1)				Prepared & Analyzed: 11/30/23						
Aluminum	1.46E6		ng/l	1.5000E6		97.7	90-110			
Antimony	20000		ng/l	20000		100	90-110			
Arsenic	20200		ng/l	20000		101	90-110			
Barium	200000		ng/l	200000		100	90-110			
Beryllium	4680		ng/l	5000.0		93.6	90-110			
Cadmium	21000		ng/l	20000		105	90-110			
Calcium	2.46E7		ng/l	2.5000E7		98.5	90-110			
Chromium	240000		ng/l	240000		100	90-110			
Cobalt	51700		ng/l	50000		103	90-110			
Copper	2.05E6		ng/l	2.0000E6		103	90-110			
Iron	2.52E6		ng/l	2.5000E6		101	90-110			
Lead	200000		ng/l	200000		100	90-110			
Magnesium	994000		ng/l	1.0000E6		99.4	90-110			
Manganese	495000		ng/l	500000		98.9	90-110			
Molybdenum	50800		ng/l	50000		102	90-110			
Nickel	123000		ng/l	120000		102	90-110			
Phosphorus	189000		ng/l	200000		94.3	90-110			QX
Potassium	2.50E6		ng/l	2.5000E6		99.9	90-110			
Rubidium	9660		ng/l	10000		96.6	90-110			
Selenium	20500		ng/l	20000		103	90-110			LJ, QX
Sodium	2.47E6		ng/l	2.5000E6		98.6	90-110			
Strontium	50900		ng/l	50000		102	90-110			
Thallium	485		ng/l	500.00		97.0	90-110			
Thorium	499		ng/l	500.00		99.9	90-110			

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Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes

Inorganics by Compendium Method IO-3.5 - Quality Control

Batch 2311075 - B3K2906

Initial Cal Check (2311075-ICV1) Continu Prepared & Analyzed: 11/30/23

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Uranium	503		ng/l	500.00		101	90-110			
Vanadium	20600		ng/l	20000		103	90-110			
Zinc	535000		ng/l	500000		107	90-110			

Interference Check A (2311075-IFA1) Prepared & Analyzed: 11/30/23

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Aluminum	1.69E7		ng/l	1.5000E7		112	80-120			ICS-01
Antimony	0.00		ng/l				80-120			U
Arsenic	0.00		ng/l				80-120			U
Barium	0.00		ng/l				80-120			U
Beryllium	0.00		ng/l				80-120			U
Cadmium	0.00		ng/l				80-120			U
Calcium	9.84E7		ng/l	1.0040E8		98.0	80-120			
Chromium	0.00		ng/l				80-120			U
Cobalt	0.00		ng/l				80-120			U
Copper	0.00		ng/l				80-120			U
Iron	1.57E7		ng/l	1.5000E7		104	80-120			
Lead	0.00		ng/l				80-120			U
Magnesium	1.74E7		ng/l	1.5000E7		116	80-120			ICS-01
Manganese	0.00		ng/l				80-120			U
Molybdenum	305000		ng/l	300000		102	80-120			
Nickel	0.00		ng/l				80-120			U
Phosphorus	1.84E7		ng/l	1.5000E7		123	80-120			ICS-01, QX
Potassium	1.65E7		ng/l	1.5000E7		110	80-120			ICS-01
Rubidium	0.00		ng/l				80-120			U
Selenium	0.00		ng/l				80-120			LJ, QX, U
Sodium	1.74E7		ng/l	1.5000E7		116	80-120			ICS-01
Strontium	0.00		ng/l				80-120			U
Thallium	0.00		ng/l				80-120			U
Thorium	0.00		ng/l				80-120			U
Uranium	0.00		ng/l				80-120			U
Vanadium	0.00		ng/l				80-120			U
Zinc	0.00		ng/l				80-120			U

Interference Check B (2311075-IFB1) Prepared & Analyzed: 11/30/23

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Aluminum	2.12E7		ng/l	1.6500E7		128	80-120			ICS-01, LK
Antimony	20500		ng/l	20000		103	80-120			
Arsenic	20900		ng/l	20000		105	80-120			
Barium	206000		ng/l	200000		103	80-120			
Beryllium	4970		ng/l	5000.0		99.3	80-120			
Cadmium	19900		ng/l	20000		99.4	80-120			

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Inorganics by Compendium Method IO-3.5 - Quality Control

Batch 2311075 - B3K2906

Interference Check B (2311075-IFB1) Co — Prepared & Analyzed: 11/30/23

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Calcium	1.32E8		ng/l	1.2540E8		105	80-120			
Chromium	237000		ng/l	240000		98.6	80-120			
Cobalt	54500		ng/l	50000		109	80-120			
Copper	2.00E6		ng/l	2.0000E6		100	80-120			
Iron	1.95E7		ng/l	1.7500E7		112	80-120			
Lead	208000		ng/l	200000		104	80-120			
Magnesium	2.10E7		ng/l	1.6000E7		131	80-120			ICS-01, LK
Manganese	586000		ng/l	500000		117	80-120			
Molybdenum	356000		ng/l	350000		102	80-120			
Nickel	125000		ng/l	120000		105	80-120			
Phosphorus	2.07E7		ng/l	1.5200E7		136	80-120			ICS-01, LK, QX
Potassium	2.11E7		ng/l	1.7500E7		121	80-120			ICS-01, LK
Rubidium	10400		ng/l	10000		104	80-120			
Selenium	19700		ng/l	20000		98.3	80-120			LJ, QX
Sodium	2.32E7		ng/l	1.7500E7		132	80-120			ICS-01, LK
Strontium	51100		ng/l	50000		102	80-120			
Thallium	536		ng/l	500.00		107	80-120			
Thorium	554		ng/l	500.00		111	80-120			
Uranium	563		ng/l	500.00		113	80-120			
Vanadium	19500		ng/l	20000		97.7	80-120			
Zinc	505000		ng/l	500000		101	80-120			

Batch B3K2906 - ICP-MS Extraction

Blank (B3K2906-BLK1) — Prepared: 11/29/23 Analyzed: 11/30/23

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Aluminum	ND	32.1	ng/m³ Air							ICS-01, LK, U
Antimony	ND	0.0441	ng/m³ Air							SL, U
Arsenic	ND	0.00955	ng/m³ Air							U
Barium	ND	0.948	ng/m³ Air							U
Beryllium	ND	0.00332	ng/m³ Air							U
Cadmium	ND	0.109	ng/m³ Air							U
Calcium	ND	292	ng/m³ Air							LJ, QB-01, U
Chromium	ND	2.03	ng/m³ Air							U
Cobalt	ND	0.0156	ng/m³ Air							QB-01, U
Copper	ND	3.00	ng/m³ Air							U
Iron	ND	24.2	ng/m³ Air							GC-BS, U
Lead	ND	0.276	ng/m³ Air							U
Magnesium	ND	96.4	ng/m³ Air							ICS-01, LK, U
Manganese	ND	1.19	ng/m³ Air							U

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Inorganics by Compendium Method IO-3.5 - Quality Control

Batch B3K2906 - ICP-MS Extraction

Blank (B3K2906-BLK1) Continued — Prepared: 11/29/23 Analyzed: 11/30/23

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Molybdenum	ND	0.213	ng/m³ Air							QB-01, U
Nickel	ND	0.801	ng/m³ Air							U
Phosphorus	ND	1250	ng/m³ Air							GC-BS, ICS-01, LK,
Potassium	ND	38.0	ng/m³ Air							ICS-01, LK, U
Rubidium	ND	0.0183	ng/m³ Air							U
Selenium	ND	0.0110	ng/m³ Air							LJ, QX, U
Sodium	ND	2000	ng/m³ Air							ICS-01, LK, U
Strontium	ND	0.652	ng/m³ Air							QB-01, U
Thallium	ND	5.03E-4	ng/m³ Air							U
Thorium	ND	0.00300	ng/m³ Air							U
Uranium	ND	0.0170	ng/m³ Air							U
Vanadium	ND	0.0492	ng/m³ Air							U
Zinc	ND	97.7	ng/m³ Air							U

LCS (B3K2906-BS1) — Prepared: 11/29/23 Analyzed: 11/30/23

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Aluminum	92.0	32.1	ng/m³ Air	82.975		111	80-120			ICS-01, LK
Antimony	0.526	0.0441	ng/m³ Air	1.3829		38.1	80-120			SL
Arsenic	2.73	0.00955	ng/m³ Air	2.7658		98.6	80-120			
Barium	28.2	0.948	ng/m³ Air	27.658		102	80-120			
Beryllium	1.48	0.00332	ng/m³ Air	1.3829		107	80-120			
Cadmium	1.43	0.109	ng/m³ Air	1.3829		104	80-120			
Calcium	527	292	ng/m³ Air	69.146		762	80-120			LJ, QB-01
Chromium	15.8	2.03	ng/m³ Air	13.829		114	80-120			
Cobalt	1.45	0.0156	ng/m³ Air	1.3829		105	80-120			QB-01
Copper	30.9	3.00	ng/m³ Air	27.658		112	80-120			
Iron	43.4	24.2	ng/m³ Air	27.658		157	80-120			GC-BS
Lead	13.8	0.276	ng/m³ Air	13.829		100	80-120			
Magnesium	ND	96.4	ng/m³ Air	27.658			80-120			ICS-01, LK, U
Manganese	8.66	1.19	ng/m³ Air	8.2975		104	80-120			
Molybdenum	1.71	0.213	ng/m³ Air	1.3829		124	80-120			QB-01
Nickel	3.14	0.801	ng/m³ Air	2.7658		114	80-120			
Phosphorus	ND	1250	ng/m³ Air	13.829			80-120			GC-BS, ICS-01, LK,
Potassium	64.7	38.0	ng/m³ Air	55.317		117	80-120			LK, ICS-01
Rubidium	1.36	0.0183	ng/m³ Air	1.3829		98.5	80-120			
Selenium	2.64	0.0110	ng/m³ Air	2.7658		95.4	80-120			LJ, QX
Sodium	ND	2000	ng/m³ Air	55.317			80-120			ICS-01, LK, U
Strontium	2.27	0.652	ng/m³ Air	1.3829		164	80-120			QB-01
Thallium	0.133	5.03E-4	ng/m³ Air	0.13829		95.9	80-120			

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Inorganics by Compendium Method IO-3.5 - Quality Control

Batch B3K2906 - ICP-MS Extraction

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
LCS (B3K2906-BS1) Continued				Prepared: 11/29/23 Analyzed: 11/30/23						
Thorium	0.137	0.00300	ng/m³ Air	0.13829		99.0	80-120			
Uranium	0.134	0.0170	ng/m³ Air	0.13829		96.6	80-120			
Vanadium	2.84	0.0492	ng/m³ Air	2.7658		103	80-120			
Zinc	104	97.7	ng/m³ Air	82.975		125	80-120			
Duplicate (B3K2906-DUP1)	**Source: 3112737-03**			Prepared: 11/29/23 Analyzed: 11/30/23						
Aluminum	296	29.8	ng/m³ Air		289			2.20	10	D-F, ICS-01, LK
Antimony	0.134	0.0410	ng/m³ Air		0.132			1.98	10	SL
Arsenic	0.0804	0.00887	ng/m³ Air		0.0874			8.33	10	
Barium	5.40	0.880	ng/m³ Air		5.18			4.11	10	
Beryllium	0.0128	0.00308	ng/m³ Air		0.0130			1.81	10	
Cadmium	ND	0.101	ng/m³ Air		ND				10	U
Calcium	318	271	ng/m³ Air		306			4.08	10	LJ, QB-01
Chromium	ND	1.89	ng/m³ Air		ND				10	U
Cobalt	0.172	0.0145	ng/m³ Air		0.236			31.6	10	D-F, QB-01
Copper	29.9	2.79	ng/m³ Air		27.6			7.70	10	
Iron	333	22.5	ng/m³ Air		331			0.438	10	GC-BS
Lead	0.314	0.256	ng/m³ Air		ND				10	
Magnesium	168	89.5	ng/m³ Air		164			1.88	10	ICS-01, LK
Manganese	9.42	1.11	ng/m³ Air		9.40			0.220	10	
Molybdenum	0.953	0.198	ng/m³ Air		0.945			0.804	10	QB-01
Nickel	ND	0.744	ng/m³ Air		ND				10	U
Phosphorus	ND	1160	ng/m³ Air		ND				10	GC-BS, ICS-01, LK,
Potassium	75.7	35.3	ng/m³ Air		76.1			0.558	10	ICS-01, LK
Rubidium	0.144	0.0170	ng/m³ Air		0.139			3.20	10	
Selenium	0.161	0.0102	ng/m³ Air		0.152			5.36	10	LJ, QX
Sodium	ND	1860	ng/m³ Air		ND				10	ICS-01, LK, U
Strontium	2.88	0.605	ng/m³ Air		2.80			2.57	10	QB-01
Thallium	0.00141	4.67E-4	ng/m³ Air		0.00141			0.0618	10	
Thorium	0.00880	0.00279	ng/m³ Air		0.00854			3.02	10	
Uranium	ND	0.0158	ng/m³ Air		ND				10	U
Vanadium	0.763	0.0457	ng/m³ Air		0.761			0.215	10	
Zinc	ND	90.7	ng/m³ Air		ND				10	U
Duplicate (B3K2906-DUP2)	**Source: 3112737-06**			Prepared: 11/29/23 Analyzed: 11/30/23						
Aluminum	179	26.0	ng/m³ Air		180			0.125	10	ICS-01, LK
Antimony	0.0722	0.0357	ng/m³ Air		0.0734			1.69	10	SL
Arsenic	0.157	0.00774	ng/m³ Air		0.156			1.15	10	

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CERTIFICATE OF ANALYSIS

Tetra Tech, Inc.
1777 Sentry Pkwy, Bldg 12
Blue Bell, PA 19422
ATTN: Ms. Chelsea Saber
PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 12/04/23 11:41
SUBMITTED: 11/27/23
AQS SITE CODE:
SITE CODE: Maui fires

Inorganics by Compendium Method IO-3.5 - Quality Control

Batch B3K2906 - ICP-MS Extraction

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Duplicate (B3K2906-DUP2) Continued		**Source: 3112737-06**		Prepared: 11/29/23	Analyzed: 11/30/23					
Barium	3.34	0.768	ng/m³ Air		3.39			1.34	10	
Beryllium	0.00650	0.00269	ng/m³ Air		0.00687			5.58	10	
Cadmium	ND	0.0883	ng/m³ Air		ND				10	U
Calcium	ND	237	ng/m³ Air		ND				10	LJ, QB-01, U
Chromium	ND	1.64	ng/m³ Air		ND				10	U
Cobalt	0.106	0.0126	ng/m³ Air		0.107			0.0428	10	QB-01
Copper	17.8	2.43	ng/m³ Air		17.9			0.549	10	
Iron	186	19.6	ng/m³ Air		188			0.749	10	GC-BS
Lead	ND	0.224	ng/m³ Air		ND				10	U
Magnesium	82.7	78.1	ng/m³ Air		82.4			0.355	10	ICS-01, LK
Manganese	4.54	0.964	ng/m³ Air		4.55			0.137	10	
Molybdenum	1.06	0.173	ng/m³ Air		1.06			0.505	10	QB-01
Nickel	ND	0.649	ng/m³ Air		ND				10	U
Phosphorus	ND	1010	ng/m³ Air		ND				10	GC-BS, ICS-01, LK,
Potassium	70.8	30.8	ng/m³ Air		70.2			0.909	10	ICS-01, LK
Rubidium	0.109	0.0148	ng/m³ Air		0.109			0.0834	10	
Selenium	0.104	0.00891	ng/m³ Air		0.100			3.52	10	LJ, QX
Sodium	ND	1620	ng/m³ Air		ND				10	ICS-01, LK, U
Strontium	1.52	0.528	ng/m³ Air		1.53			0.802	10	QB-01
Thallium	5.39E-4	4.08E-4	ng/m³ Air		5.33E-4			1.05	10	
Thorium	0.00589	0.00243	ng/m³ Air		0.00593			0.703	10	
Uranium	ND	0.0138	ng/m³ Air		ND				10	U
Vanadium	0.471	0.0399	ng/m³ Air		0.473			0.339	10	
Zinc	ND	79.2	ng/m³ Air		ND				10	U
Matrix Spike (B3K2906-MS1)		**Source: 3112737-03**		Prepared: 11/29/23	Analyzed: 11/30/23					
Aluminum	379	29.8	ng/m³ Air	77.052	289	116	80-120			ICS-01, LK
Antimony	0.874	0.0410	ng/m³ Air	1.2842	0.132	57.8	80-120			SL
Arsenic	2.63	0.00887	ng/m³ Air	2.5684	0.0874	99.1	80-120			
Barium	31.4	0.880	ng/m³ Air	25.684	5.18	102	80-120			
Beryllium	1.33	0.00308	ng/m³ Air	1.2842	0.0130	103	80-120			
Cadmium	1.35	0.101	ng/m³ Air	1.2842	ND	105	80-120			
Calcium	412	271	ng/m³ Air	64.210	306	165	80-120			LJ, QB-01, QM-4X
Chromium	14.6	1.89	ng/m³ Air	12.842	ND	113	80-120			
Cobalt	1.51	0.0145	ng/m³ Air	1.2842	0.236	98.8	80-120			QB-01
Copper	57.5	2.79	ng/m³ Air	25.684	27.6	116	80-120			
Iron	369	22.5	ng/m³ Air	25.684	331	146	80-120			GC-BS, QM-4X
Lead	13.2	0.256	ng/m³ Air	12.842	ND	103	80-120			

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AQS SITE CODE:
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Inorganics by Compendium Method IO-3.5 - Quality Control

Batch B3K2906 - ICP-MS Extraction

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Matrix Spike (B3K2906-MS1) Continued	**Source: 3112737-03**		Prepared: 11/29/23	Analyzed: 11/30/23						
Magnesium	199	89.5	ng/m³ Air	25.684	164	134	80-120			ICS-01, LK, QM-4X
Manganese	17.7	1.11	ng/m³ Air	7.7052	9.40	108	80-120			
Molybdenum	2.28	0.198	ng/m³ Air	1.2842	0.945	104	80-120			QB-01
Nickel	3.08	0.744	ng/m³ Air	2.5684	ND	120	80-120			
Phosphorus	ND	1160	ng/m³ Air	12.842	ND		80-120			GC-BS, ICS-01, LK,
Potassium	130	35.3	ng/m³ Air	51.368	76.1	106	80-120			ICS-01, LK
Rubidium	1.39	0.0170	ng/m³ Air	1.2842	0.139	97.2	80-120			
Selenium	2.62	0.0102	ng/m³ Air	2.5684	0.152	96.0	80-120			LJ, QX
Sodium	ND	1860	ng/m³ Air	51.368	ND		80-120			ICS-01, LK, QM-4X, U
Strontium	4.18	0.605	ng/m³ Air	1.2842	2.80	107	80-120			QB-01
Thallium	0.126	4.67E-4	ng/m³ Air	0.12842	0.00141	96.6	80-120			
Thorium	0.0566	0.00279	ng/m³ Air	0.12842	0.00854	37.4	80-120			QM-07
Uranium	0.133	0.0158	ng/m³ Air	0.12842	ND	104	80-120			
Vanadium	3.38	0.0457	ng/m³ Air	2.5684	0.761	102	80-120			
Zinc	102	90.7	ng/m³ Air	77.052	ND	133	80-120			
Matrix Spike Dup (B3K2906-MSD1)	**Source: 3112737-03**		Prepared: 11/29/23	Analyzed: 11/30/23						
Aluminum	381	29.8	ng/m³ Air	77.052	289	120	80-120	0.753	20	ICS-01, LK
Antimony	0.915	0.0410	ng/m³ Air	1.2842	0.132	61.0	80-120	4.56	20	SL
Arsenic	2.64	0.00887	ng/m³ Air	2.5684	0.0874	99.2	80-120	0.0995	20	
Barium	32.3	0.880	ng/m³ Air	25.684	5.18	105	80-120	2.77	20	
Beryllium	1.34	0.00308	ng/m³ Air	1.2842	0.0130	103	80-120	0.210	20	
Cadmium	1.36	0.101	ng/m³ Air	1.2842	ND	106	80-120	0.808	20	
Calcium	397	271	ng/m³ Air	64.210	306	142	80-120	3.75	20	LJ, QB-01, QM-4X
Chromium	14.7	1.89	ng/m³ Air	12.842	ND	115	80-120	1.04	20	
Cobalt	1.52	0.0145	ng/m³ Air	1.2842	0.236	99.8	80-120	0.804	20	QB-01
Copper	56.2	2.79	ng/m³ Air	25.684	27.6	111	80-120	2.22	20	
Iron	370	22.5	ng/m³ Air	25.684	331	153	80-120	0.504	20	GC-BS, QM-4X
Lead	13.3	0.256	ng/m³ Air	12.842	ND	103	80-120	0.667	20	
Magnesium	200	89.5	ng/m³ Air	25.684	164	136	80-120	0.340	20	ICS-01, LK, QM-4X
Manganese	17.7	1.11	ng/m³ Air	7.7052	9.40	108	80-120	0.372	20	
Molybdenum	2.30	0.198	ng/m³ Air	1.2842	0.945	106	80-120	1.06	20	QB-01
Nickel	3.22	0.744	ng/m³ Air	2.5684	ND	126	80-120	4.64	20	
Phosphorus	ND	1160	ng/m³ Air	12.842	ND		80-120		20	GC-BS, ICS-01, LK,
Potassium	124	35.3	ng/m³ Air	51.368	76.1	94.0	80-120	4.70	20	ICS-01, LK

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AQS SITE CODE:
SITE CODE: Maui fires

Inorganics by Compendium Method IO-3.5 - Quality Control

Batch B3K2906 - ICP-MS Extraction

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Matrix Spike Dup (B3K2906-MSD1) Conti Source: 3112737-03				Prepared: 11/29/23		Analyzed: 11/30/23				
Rubidium	1.37	0.0170	ng/m³ Air	1.2842	0.139	95.9	80-120	1.28	20	
Selenium	2.64	0.0102	ng/m³ Air	2.5684	0.152	97.0	80-120	0.982	20	QX, LJ
Sodium	ND	1860	ng/m³ Air	51.368	ND		80-120		20	ICS-01, LK, QM-4X, U
Strontium	4.11	0.605	ng/m³ Air	1.2842	2.80	101	80-120	1.72	20	QB-01
Thallium	0.127	4.67E-4	ng/m³ Air	0.12842	0.00141	97.6	80-120	0.946	20	
Thorium	0.0599	0.00279	ng/m³ Air	0.12842	0.00854	40.0	80-120	5.63	20	QM-07
Uranium	0.134	0.0158	ng/m³ Air	0.12842	ND	104	80-120	0.0599	20	
Vanadium	3.39	0.0457	ng/m³ Air	2.5684	0.761	102	80-120	0.318	20	
Zinc	98.3	90.7	ng/m³ Air	77.052	ND	128	80-120	4.03	20	
Post Spike (B3K2906-PS1) Source: 3112737-03				Prepared: 11/29/23		Analyzed: 11/30/23				
Aluminum	324	29.8	ng/m³ Air	25.684	289	134	75-125			A-01, ICS-01, LK
Antimony	0.385	0.0410	ng/m³ Air	0.25684	0.132	98.5	75-125			SL
Arsenic	1.31	0.00887	ng/m³ Air	1.2842	0.0874	95.4	75-125			
Barium	7.78	0.880	ng/m³ Air	2.5684	5.18	101	75-125			
Beryllium	0.274	0.00308	ng/m³ Air	0.25684	0.0130	102	75-125			
Cadmium	0.141	0.101	ng/m³ Air	0.12842	ND	110	75-125			
Calcium	351	271	ng/m³ Air	25.684	306	176	75-125			LJ, QB-01
Chromium	2.92	1.89	ng/m³ Air	1.2842	ND	227	75-125			
Cobalt	0.497	0.0145	ng/m³ Air	0.25684	0.236	101	75-125			QB-01
Copper	40.7	2.79	ng/m³ Air	12.842	27.6	102	75-125			
Iron	362	22.5	ng/m³ Air	25.684	331	119	75-125			GC-BS
Lead	25.2	0.256	ng/m³ Air	25.684	ND	98.3	75-125			
Magnesium	193	89.5	ng/m³ Air	25.684	164	112	75-125			ICS-01, LK
Manganese	12.1	1.11	ng/m³ Air	2.5684	9.40	106	75-125			
Molybdenum	2.22	0.198	ng/m³ Air	1.2842	0.945	99.3	75-125			QB-01
Nickel	3.07	0.744	ng/m³ Air	2.5684	ND	120	75-125			
Phosphorus	ND	1160	ng/m³ Air	5.1368	ND		75-125			A-01, GC-BS, ICS-01, LK,
Potassium	97.1	35.3	ng/m³ Air	25.684	76.1	81.7	75-125			ICS-01, LK
Rubidium	0.251	0.0170	ng/m³ Air	0.12842	0.139	87.1	75-125			
Selenium	1.39	0.0102	ng/m³ Air	1.2842	0.152	96.1	75-125			LJ, QX
Sodium	ND	1860	ng/m³ Air	25.684	ND		75-125			A-01, ICS-01, LK, U
Strontium	3.99	0.605	ng/m³ Air	1.2842	2.80	92.5	75-125			QB-01
Thallium	0.0611	4.67E-4	ng/m³ Air	6.4210E-2	0.00141	93.0	75-125			
Thorium	0.0681	0.00279	ng/m³ Air	6.4210E-2	0.00854	92.8	75-125			
Uranium	0.0691	0.0158	ng/m³ Air	6.4210E-2	ND	108	75-125			

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Inorganics by Compendium Method IO-3.5 - Quality Control

Batch B3K2906 - ICP-MS Extraction

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Post Spike (B3K2906-PS1) Continued		**Source: 3112737-03**		Prepared: 11/29/23	Analyzed: 11/30/23					
Vanadium	2.04	0.0457	ng/m³ Air	1.2842	0.761	99.2	75-125			
Zinc	ND	90.7	ng/m³ Air	25.684	ND		75-125			U
Dilution Check (B3K2906-SRL1)		**Source: 3112737-03**		Prepared: 11/29/23	Analyzed: 11/30/23					
Aluminum	293	149	ng/m³ Air		289			1.41	10	ICS-01, LK
Antimony	ND	0.205	ng/m³ Air		ND				10	SL, U
Arsenic	0.0934	0.0443	ng/m³ Air		0.0874			6.57	10	
Barium	5.26	4.40	ng/m³ Air		5.18			1.55	10	
Beryllium	ND	0.0154	ng/m³ Air		ND				10	U
Cadmium	ND	0.506	ng/m³ Air		ND				10	U
Calcium	ND	1360	ng/m³ Air		ND				10	LJ, QB-01, U
Chromium	ND	9.43	ng/m³ Air		ND				10	U
Cobalt	0.239	0.0724	ng/m³ Air		0.236			0.933	10	QB-01
Copper	28.1	13.9	ng/m³ Air		27.6			1.68	10	
Iron	336	112	ng/m³ Air		331			1.49	10	GC-BS
Lead	ND	1.28	ng/m³ Air		ND				10	U
Magnesium	ND	448	ng/m³ Air		ND				10	ICS-01, LK, U
Manganese	9.50	5.53	ng/m³ Air		9.40			1.03	10	
Molybdenum	ND	0.989	ng/m³ Air		ND				10	QB-01, U
Nickel	ND	3.72	ng/m³ Air		ND				10	U
Phosphorus	ND	5800	ng/m³ Air		ND				10	GC-BS, ICS-01, LK,
Potassium	ND	176	ng/m³ Air		ND				10	LK, ICS-01, U
Rubidium	0.141	0.0850	ng/m³ Air		0.139			1.05	10	
Selenium	0.150	0.0511	ng/m³ Air		0.152			1.26	10	LJ, QX
Sodium	ND	9290	ng/m³ Air		ND				10	ICS-01, LK, U
Strontium	ND	3.03	ng/m³ Air		ND				10	QB-01, U
Thallium	ND	0.00234	ng/m³ Air		ND				10	U
Thorium	ND	0.0139	ng/m³ Air		ND				10	U
Uranium	ND	0.0789	ng/m³ Air		ND				10	U
Vanadium	0.771	0.228	ng/m³ Air		0.761			1.26	10	
Zinc	ND	454	ng/m³ Air		ND				10	U

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Notes and Definitions

U	Under Detection Limit
SL	The spike recovery was outside acceptance limits. Reported value may be biased low.
QX	Compound does not meet QC criteria. Results should be considered an estimate.
QM-4X	The MS/MSD recovery exceeds criteria because the parent sample concentration is greater than 4x the spike concentration. Sample results for the QC batch were accepted based on acceptable BS/BSD recoveries.
QM-07	The spike recovery was outside acceptance limits for the MS and/or MSD. The batch was accepted based on acceptable LCS recovery.
QB-01	Analyte exceeds method blank criteria
LK	Analyte identified; Reported value may be biased high.
LJ	Identification of analyte is acceptable; reported value is an estimate.
ICS-01	Interference check exceeds criteria.
GC-BS	Compound exceeds Blank Spike Criteria
FB-01	Analyte exceeds Field Blank criteria.
E	The concentration indicated for this analyte is an estimated value above the calibration range of the instrument. This value is considered an estimate (CLP E-flag).
D-F	Duplicate exceeds DQO criteria.
A-01	Parent Sample >4x Spike amount
ND	Analyte NOT DETECTED
NR	Not Reported
MDL	Method Detection Limit
RPD	Relative Percent Difference

Note: This test is accredited under the 2016 TNI Standard.

Eastern Research Group
601 Keystone Park Drive
Suite 700
Morrisville, NC 27560

December 07, 2023

Ms. Chelsea Saber
Tetra Tech, Inc.
1777 Sentry Pkwy, Bldg 12
Blue Bell, PA 19422
Project Name: Maui fires

Dear Ms. Chelsea Saber,

This report contains the analytical results for the sample(s) received under chain(s) of custody by Eastern Research Group on 11/29/23 13:29.

Values below the MDL for QC results in this report are recorded as ND, however the actual values are reported in the accompanying Excel report with a "U" flag (Under the detection limit). The actual values are reported in AQS.

This test is accredited under the 2016 TNI Standard for Environmental Laboratories (FL DOH Certification # E87673). All analyses were performed as described in the US EPA-approved QAPP, under the contract for National Hazardous Air Pollutant Support (US EPA Contract No. 68HERH22D0002). This cover page is an integral part of this report, and any exceptions or comments are noted on the last page.

Release of the data contained in this data package and in the data submitted in the electronic data deliverable, has been authorized by the Program Manager, or the Program Manager's designee as verified by the following signature.

The issuance of the final Certificate of Analysis takes precedence over any previous Report. If you have any questions, please contact me at 919-468-7924.

Sincerely,

Julie Swift
Program Manager
julie.swift@erg.com

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FILE #: 0000.00
REPORTED: 12/07/23 08:11
SUBMITTED: 11/29/23
AQS SITE CODE:
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ANALYTICAL REPORT FOR SAMPLES

SampleName	LabNumber	Matrix	Sampled	Received
TetraTech Q9541917	3112929-01	Air	11/24/23 23:59	11/29/23 13:29
TetraTech Q9541914	3112929-02	Air	11/24/23 23:59	11/29/23 13:29
TetraTech Q9541912	3112929-03	Air	11/24/23 23:59	11/29/23 13:29
TetraTech Q9541940 FB	3112929-04	Air	11/24/23 00:00	11/29/23 13:29
TetraTech Q9541911	3112929-05	Air	11/25/23 23:59	11/29/23 13:29
TetraTech Q9541229	3112929-06	Air	11/25/23 23:59	11/29/23 13:29
TetraTech Q9541939	3112929-07	Air	11/25/23 23:59	11/29/23 13:29
TetraTech Q9541905 FB	3112929-08	Air	11/25/23 00:00	11/29/23 13:29
TetraTech Q9541938	3112929-09	Air	11/26/23 23:59	11/29/23 13:29
TetraTech Q9541937	3112929-10	Air	11/26/23 23:59	11/29/23 13:29
TetraTech Q9541903	3112929-11	Air	11/26/23 23:59	11/29/23 13:29
TetraTech Q9541228 FB	3112929-12	Air	11/26/23 00:00	11/29/23 13:29

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AQS SITE CODE:
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Description: TetraTech Q9541917
Matrix: Air
Comments: MFK-AM01-112423-HM

Lab ID: 3112929-01
Sample Volume: 2027.606 m³
Filter ID:

Sampled: 11/24/23 23:59
Received: 11/29/23 13:29
Analysis Date: 12/04/23 20:26

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	**7429-90-5**	**277**		**25.8**
Antimony	**7440-36-0**	**0.0530**	SL	**0.0354**
Arsenic	**7440-38-2**	**0.122**		**0.00766**
Barium	**7440-39-3**	**4.33**		**0.761**
Beryllium	**7440-41-7**	**0.0102**		**0.00266**
Cadmium	7440-43-9	0.00687	U	0.0875
Calcium	**7440-70-2**	**569**	GC-BS, LJ, QB-01	**234**
Chromium	**7440-47-3**	**1.71**		**1.63**
Cobalt	**7440-48-4**	**0.185**	QB-01	**0.0125**
Copper	**7440-50-8**	**22.6**		**2.41**
Iron	**7439-89-6**	**335**		**19.4**
Lead	**7439-92-1**	**0.423**		**0.221**
Magnesium	**7439-95-4**	**199**		**77.4**
Manganese	**7439-96-5**	**8.61**		**0.955**
Molybdenum	**7439-98-7**	**1.28**	QB-01	**0.171**
Nickel	**7440-02-0**	**3.39**		**0.643**
Phosphorus	7723-14-0	365	GC-BS, LJ, U	1000
Potassium	**7440-09-7**	**102**	LJ	**30.5**
Rubidium		**0.138**		**0.0147**
Selenium	**7782-49-2**	**0.133**		**0.00883**
Sodium	**7440-23-5**	**1750**	E	**1600**
Strontium	**7440-24-6**	**3.14**	QB-01	**0.523**
Thallium	**7440-28-0**	**8.04E-4**		**4.04E-4**
Thorium	**7440-29-01**	**0.00900**	LJ, QB-01	**0.00241**
Uranium	NA	0.00793	U	0.0136
Vanadium	**7440-62-2**	**1.44**		**0.0395**
Zinc	7440-66-6	19.5	U	78.4

CERTIFICATE OF ANALYSIS

Tetra Tech, Inc.
1777 Sentry Pkwy, Bldg 12
Blue Bell, FA 19422
ATTN: Ms. Chelsea Saber
PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 12/07/23 08:11
SUBMITTED: 11/29/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9541914
Matrix: Air
Comments: MFK-AM02-112423-HM

Lab ID: 3112929-02
Sample Volume: 2026.064 m³
Filter ID:

Sampled: 11/24/23 23:59
Received: 11/29/23 13:29
Analysis Date: 12/04/23 20:45

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	**7429-90-5**	**325**		**25.8**
Antimony	**7440-36-0**	**0.0525**	SL	**0.0354**
Arsenic	**7440-38-2**	**0.130**		**0.00767**
Barium	**7440-39-3**	**4.72**		**0.761**
Beryllium	**7440-41-7**	**0.0109**		**0.00267**
Cadmium	7440-43-9	0.00775	U	0.0875
Calcium	**7440-70-2**	**546**	GC-BS, LJ, QB-01	**234**
Chromium	**7440-47-3**	**1.69**		**1.63**
Cobalt	**7440-48-4**	**0.290**	QB-01	**0.0125**
Copper	**7440-50-8**	**11.7**		**2.41**
Iron	**7439-89-6**	**377**		**19.4**
Lead	7439-92-1	0.182	U	0.222
Magnesium	**7439-95-4**	**200**		**77.4**
Manganese	**7439-96-5**	**9.58**		**0.956**
Molybdenum	**7439-98-7**	**0.865**	QB-01	**0.171**
Nickel	**7440-02-0**	**0.717**		**0.643**
Phosphorus	7723-14-0	396	GC-BS, LJ, U	1000
Potassium	**7440-09-7**	**138**	LJ	**30.5**
Rubidium		**0.184**		**0.0147**
Selenium	**7782-49-2**	**0.144**		**0.00883**
Sodium	**7440-23-5**	**1750**	E	**1610**
Strontium	**7440-24-6**	**3.11**	QB-01	**0.524**
Thallium	**7440-28-0**	**9.16E-4**		**4.04E-4**
Thorium	**7440-29-01**	**0.0101**	LJ, QB-01	**0.00241**
Uranium	NA	0.00892	U	0.0137
Vanadium	**7440-62-2**	**1.52**		**0.0395**
Zinc	7440-66-6	13.3	U	78.5

CERTIFICATE OF ANALYSIS

Tetra Tech, Inc.
1777 Sentry Pkwy, Bldg 12
Blue Bell, FA 19422
ATTN: Ms. Chelsea Saber
PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 12/07/23 08:11
SUBMITTED: 11/29/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9541912
Matrix: Air
Lab ID: 3112929-03
Sample Volume: 1838.776 m^3
Filter ID:
Sampled: 11/24/23 23:59
Received: 11/29/23 13:29
Analysis Date: 12/04/23 21:04
Comments: MFK-AM03-112423-HM

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	**7429-90-5**	**205**		**28.4**
Antimony	**7440-36-0**	**0.0584**	SL	**0.0390**
Arsenic	**7440-38-2**	**0.105**		**0.00845**
Barium	**7440-39-3**	**4.19**		**0.839**
Beryllium	**7440-41-7**	**0.00925**		**0.00294**
Cadmium	7440-43-9	0.00637	U	0.0964
Calcium	**7440-70-2**	**616**	GC-BS, LJ, QB-01	**258**
Chromium	**7440-47-3**	**1.86**		**1.80**
Cobalt	**7440-48-4**	**0.178**	QB-01	**0.0138**
Copper	**7440-50-8**	**29.7**		**2.65**
Iron	**7439-89-6**	**288**		**21.4**
Lead	7439-92-1	0.182	U	0.244
Magnesium	**7439-95-4**	**246**		**85.3**
Manganese	**7439-96-5**	**8.04**		**1.05**
Molybdenum	**7439-98-7**	**1.11**	QB-01	**0.188**
Nickel	**7440-02-0**	**0.843**		**0.709**
Phosphorus	7723-14-0	426	GC-BS, LJ, U	1110
Potassium	**7440-09-7**	**162**	LJ	**33.6**
Rubidium		**0.146**		**0.0162**
Selenium	**7782-49-2**	**0.147**		**0.00973**
Sodium	**7440-23-5**	**2220**	E	**1770**
Strontium	**7440-24-6**	**3.20**	QB-01	**0.577**
Thallium	**7440-28-0**	**7.45E-4**		**4.45E-4**
Thorium	**7440-29-01**	**0.00800**	LJ, QB-01	**0.00265**
Uranium	NA	0.00731	U	0.0150
Vanadium	**7440-62-2**	**1.48**		**0.0435**
Zinc	7440-66-6	17.8	U	86.4

CERTIFICATE OF ANALYSIS

Tetra Tech, Inc.
1777 Sentry Pkwy, Bldg 12
Blue Bell, FA 19422
ATTN: Ms. Chelsea Saber
PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 12/07/23 08:11
SUBMITTED: 11/29/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9541940 FB
Matrix: Air
Lab ID: 3112929-04
Sample Volume: 2027.606 m³
Filter ID:
Sampled: 11/24/23 00:00
Received: 11/29/23 13:29
Analysis Date: 12/04/23 21:20
Comments: MFK-FB01-112423-HM Field Blank

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	7429-90-5	11.2	U	25.8
Antimony	7440-36-0	0.00794	SL, U	0.0354
Arsenic	7440-38-2	0.00648	U	0.00766
Barium	7440-39-3	0.606	U	0.761
Beryllium	7440-41-7	0.00106	U	0.00266
Cadmium	7440-43-9	0.00181	U	0.0875
Calcium	**7440-70-2**	**435**	FB-01, GC-BS, LJ, QB-01	**234**
Chromium	7440-47-3	1.45	U	1.63
Cobalt	**7440-48-4**	**0.0295**	FB-01, QB-01	**0.0125**
Copper	7440-50-8	0.310	U	2.41
Iron	7439-89-6	16.6	U	19.4
Lead	7439-92-1	0.0602	U	0.221
Magnesium	7439-95-4	43.8	U	77.4
Manganese	7439-96-5	0.242	U	0.955
Molybdenum	**7439-98-7**	**0.253**	FB-01, QB-01	**0.171**
Nickel	7440-02-0	0.454	U	0.643
Phosphorus	7723-14-0	345	GC-BS, LJ, U	1000
Potassium	**7440-09-7**	**39.9**	FB-01, LJ	**30.5**
Rubidium		**0.0176**	FB-01	**0.0147**
Selenium	7782-49-2	0.00526	U	0.00883
Sodium	7440-23-5	704	U	1600
Strontium	**7440-24-6**	**0.768**	FB-01, QB-01	**0.523**
Thallium	7440-28-0	7.92E-5	U	4.04E-4
Thorium	7440-29-01	0.00240	LJ, QB-01, U	0.00241
Uranium	NA	0.00170	U	0.0136
Vanadium	7440-62-2	0.0116	U	0.0395
Zinc	7440-66-6	11.3	U	78.4

CERTIFICATE OF ANALYSIS

Tetra Tech, Inc.
1777 Sentry Pkwy, Bldg 12
Blue Bell, FA 19422
ATTN: Ms. Chelsea Saber
PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 12/07/23 08:11
SUBMITTED: 11/29/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9541911
Matrix: Air
Comments: MFK-AM01-112523-HM

Lab ID: 3112929-05
Sample Volume: 1996.342 m³
Filter ID:

Sampled: 11/25/23 23:59
Received: 11/29/23 13:29
Analysis Date: 12/04/23 17:49

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	**7429-90-5**	**325**	QM-4X	**26.2**
Antimony	**7440-36-0**	**0.0515**	SL	**0.0359**
Arsenic	**7440-38-2**	**0.114**		**0.00778**
Barium	**7440-39-3**	**4.40**		**0.773**
Beryllium	**7440-41-7**	**0.0103**		**0.00271**
Cadmium	7440-43-9	0.00693	U	0.0888
Calcium	**7440-70-2**	**608**	GC-BS, LJ, QB-01, QM-4X	**238**
Chromium	**7440-47-3**	**1.81**		**1.65**
Cobalt	**7440-48-4**	**0.194**	QB-01	**0.0127**
Copper	**7440-50-8**	**21.0**		**2.44**
Iron	**7439-89-6**	**367**	QM-4X	**19.7**
Lead	**7439-92-1**	**0.369**		**0.225**
Magnesium	**7439-95-4**	**277**	QM-4X	**78.6**
Manganese	**7439-96-5**	**9.57**		**0.970**
Molybdenum	**7439-98-7**	**1.14**	QB-01	**0.174**
Nickel	**7440-02-0**	**1.07**		**0.653**
Phosphorus	7723-14-0	405	GC-BS, LJ, QM-4X, U	1020
Potassium	**7440-09-7**	**148**	LJ, QM-07	**31.0**
Rubidium		**0.148**		**0.0149**
Selenium	**7782-49-2**	**0.152**		**0.00896**
Sodium	**7440-23-5**	**2420**	E, QM-4X	**1630**
Strontium	**7440-24-6**	**3.77**	QB-01	**0.531**
Thallium	**7440-28-0**	**8.96E-4**		**4.10E-4**
Thorium	**7440-29-01**	**0.00827**	LJ, QB-01, QM-07	**0.00244**
Uranium	NA	0.00842	U	0.0139
Vanadium	**7440-62-2**	**1.68**		**0.0401**
Zinc	7440-66-6	18.7	U	79.6

CERTIFICATE OF ANALYSIS

ERG

Tetra Tech, Inc.
1777 Sentry Pkwy, Bldg 12
Blue Bell, FA 19422
ATTN: Ms. Chelsea Saber
PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 12/07/23 08:11
SUBMITTED: 11/29/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9541229
Matrix: Air
Comments: MFK-AM02-112523-HM

Lab ID: 3112929-06
Sample Volume: 2026.064 m^3
Filter ID:

Sampled: 11/25/23 23:59
Received: 11/29/23 13:29
Analysis Date: 12/04/23 21:35

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	**7429-90-5**	**438**		**25.8**
Antimony	**7440-36-0**	**0.0669**	SL	**0.0354**
Arsenic	**7440-38-2**	**0.153**		**0.00767**
Barium	**7440-39-3**	**5.67**		**0.761**
Beryllium	**7440-41-7**	**0.0136**		**0.00267**
Cadmium	7440-43-9	0.00810	U	0.0875
Calcium	**7440-70-2**	**391**	GC-BS, LJ, QB-01	**234**
Chromium	7440-47-3	1.57	U	1.63
Cobalt	**7440-48-4**	**0.225**	QB-01	**0.0125**
Copper	**7440-50-8**	**12.9**		**2.41**
Iron	**7439-89-6**	**476**		**19.4**
Lead	**7439-92-1**	**0.228**		**0.222**
Magnesium	**7439-95-4**	**294**		**77.4**
Manganese	**7439-96-5**	**11.9**		**0.956**
Molybdenum	**7439-98-7**	**0.813**	QB-01	**0.171**
Nickel	**7440-02-0**	**0.951**		**0.643**
Phosphorus	7723-14-0	381	GC-BS, LJ, U	1000
Potassium	**7440-09-7**	**159**	LJ	**30.5**
Rubidium		**0.172**		**0.0147**
Selenium	**7782-49-2**	**0.175**		**0.00883**
Sodium	**7440-23-5**	**2560**	E	**1610**
Strontium	**7440-24-6**	**3.72**	QB-01	**0.524**
Thallium	**7440-28-0**	**9.33E-4**		**4.04E-4**
Thorium	**7440-29-01**	**0.0115**	LJ, QB-01	**0.00241**
Uranium	NA	0.0105	U	0.0137
Vanadium	**7440-62-2**	**2.04**		**0.0395**
Zinc	7440-66-6	15.1	U	78.5

CERTIFICATE OF ANALYSIS

Tetra Tech, Inc.
1777 Sentry Pkwy, Bldg 12
Blue Bell, FA 19422
ATTN: Ms. Chelsea Saber
PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 12/07/23 08:11
SUBMITTED: 11/29/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9541939
Matrix: Air
Comments: MFK-AM03-112523-HM

Lab ID: 3112929-07
Sample Volume: 1882.131 m³
Filter ID:

Sampled: 11/25/23 23:59
Received: 11/29/23 13:29
Analysis Date: 12/04/23 21:49

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	**7429-90-5**	**295**		**27.7**
Antimony	**7440-36-0**	**0.0643**	SL	**0.0381**
Arsenic	**7440-38-2**	**0.125**		**0.00826**
Barium	**7440-39-3**	**5.53**		**0.819**
Beryllium	**7440-41-7**	**0.0128**		**0.00287**
Cadmium	7440-43-9	0.00703	U	0.0942
Calcium	**7440-70-2**	**681**	GC-BS, LJ, QB-01	**252**
Chromium	**7440-47-3**	**1.86**		**1.75**
Cobalt	**7440-48-4**	**0.208**	QB-01	**0.0135**
Copper	**7440-50-8**	**25.5**		**2.59**
Iron	**7439-89-6**	**389**		**20.9**
Lead	**7439-92-1**	**0.249**		**0.239**
Magnesium	**7439-95-4**	**337**		**83.3**
Manganese	**7439-96-5**	**10.8**		**1.03**
Molybdenum	**7439-98-7**	**0.981**	QB-01	**0.184**
Nickel	**7440-02-0**	**0.963**		**0.692**
Phosphorus	7723-14-0	440	GC-BS, LJ, U	1080
Potassium	**7440-09-7**	**161**	LJ	**32.8**
Rubidium		**0.165**		**0.0158**
Selenium	**7782-49-2**	**0.181**		**0.00951**
Sodium	**7440-23-5**	**2950**	E	**1730**
Strontium	**7440-24-6**	**4.18**	QB-01	**0.564**
Thallium	**7440-28-0**	**8.72E-4**		**4.35E-4**
Thorium	**7440-29-01**	**0.0125**	LJ, QB-01	**0.00259**
Uranium	NA	0.00943	U	0.0147
Vanadium	**7440-62-2**	**2.00**		**0.0425**
Zinc	7440-66-6	13.0	U	84.5

CERTIFICATE OF ANALYSIS

Tetra Tech, Inc.
1777 Sentry Pkwy, Bldg 12
Blue Bell, FA 19422
ATTN: Ms. Chelsea Saber
PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 12/07/23 08:11
SUBMITTED: 11/29/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9541905 FB
Matrix: Air
Lab ID: 3112929-08
Sample Volume: 1996.342 m³
Filter ID:
Sampled: 11/25/23 00:00
Received: 11/29/23 13:29
Analysis Date: 12/04/23 22:06

Comments: MFK-FB01-112523-HM Field Blank

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	7429-90-5	13.0	U	26.2
Antimony	7440-36-0	0.00648	SL, U	0.0359
Arsenic	7440-38-2	0.00585	U	0.00778
Barium	**7440-39-3**	**1.41**	FB-01	**0.773**
Beryllium	7440-41-7	9.25E-4	U	0.00271
Cadmium	7440-43-9	0.00176	U	0.0888
Calcium	**7440-70-2**	**392**	FB-01, GC-BS, LJ, QB-01	**238**
Chromium	7440-47-3	1.49	U	1.65
Cobalt	**7440-48-4**	**0.0271**	FB-01, QB-01	**0.0127**
Copper	7440-50-8	0.249	U	2.44
Iron	7439-89-6	14.7	U	19.7
Lead	7439-92-1	0.0531	U	0.225
Magnesium	7439-95-4	48.0	U	78.6
Manganese	7439-96-5	0.238	U	0.970
Molybdenum	**7439-98-7**	**0.267**	FB-01, QB-01	**0.174**
Nickel	7440-02-0	0.345	U	0.653
Phosphorus	7723-14-0	370	GC-BS, LJ, U	1020
Potassium	**7440-09-7**	**31.9**	FB-01, LJ	**31.0**
Rubidium		**0.0163**	FB-01	**0.0149**
Selenium	7782-49-2	0.00471	U	0.00896
Sodium	7440-23-5	752	U	1630
Strontium	**7440-24-6**	**0.781**	FB-01, QB-01	**0.531**
Thallium	7440-28-0	5.18E-5	U	4.10E-4
Thorium	**7440-29-01**	**0.00251**	FB-01, LJ, QB-01	**0.00244**
Uranium	NA	0.00176	U	0.0139
Vanadium	7440-62-2	0.0116	U	0.0401
Zinc	7440-66-6	7.42	U	79.6

CERTIFICATE OF ANALYSIS

Tetra Tech, Inc.
1777 Sentry Pkwy, Bldg 12
Blue Bell, FA 19422
ATTN: Ms. Chelsea Saber
PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 12/07/23 08:11
SUBMITTED: 11/29/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9541938
Matrix: Air
Comments: MFK-AM01-112623-HM

Lab ID: 3112929-09
Sample Volume: 1996.342 m³
Filter ID:

Sampled: 11/26/23 23:59
Received: 11/29/23 13:29
Analysis Date: 12/04/23 22:20

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	**7429-90-5**	**299**		**26.2**
Antimony	**7440-36-0**	**0.0636**	SL	**0.0359**
Arsenic	**7440-38-2**	**0.115**		**0.00778**
Barium	**7440-39-3**	**4.74**		**0.773**
Beryllium	**7440-41-7**	**0.0101**		**0.00271**
Cadmium	7440-43-9	0.00605	U	0.0888
Calcium	**7440-70-2**	**584**	GC-BS, LJ, QB-01	**238**
Chromium	**7440-47-3**	**1.70**		**1.65**
Cobalt	**7440-48-4**	**0.197**	QB-01	**0.0127**
Copper	**7440-50-8**	**20.0**		**2.44**
Iron	**7439-89-6**	**363**		**19.7**
Lead	**7439-92-1**	**0.288**		**0.225**
Magnesium	**7439-95-4**	**211**		**78.6**
Manganese	**7439-96-5**	**9.73**		**0.970**
Molybdenum	**7439-98-7**	**1.15**	QB-01	**0.174**
Nickel	**7440-02-0**	**0.655**		**0.653**
Phosphorus	7723-14-0	396	GC-BS, LJ, U	1020
Potassium	**7440-09-7**	**102**	LJ	**31.0**
Rubidium		**0.146**		**0.0149**
Selenium	**7782-49-2**	**0.157**		**0.00896**
Sodium	**7440-23-5**	**1920**	E	**1630**
Strontium	**7440-24-6**	**3.50**	QB-01	**0.531**
Thallium	**7440-28-0**	**8.29E-4**		**4.10E-4**
Thorium	**7440-29-01**	**0.00928**	LJ, QB-01	**0.00244**
Uranium	NA	0.00876	U	0.0139
Vanadium	**7440-62-2**	**1.11**		**0.0401**
Zinc	7440-66-6	10.3	U	79.6

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CERTIFICATE OF ANALYSIS

Tetra Tech, Inc.
1777 Sentry Pkwy, Bldg 12
Blue Bell, FA 19422
ATTN: Ms. Chelsea Saber
PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 12/07/23 08:11
SUBMITTED: 11/29/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9541937 **Lab ID:** 3112929-10 **Sampled:** 11/26/23 23:59
Matrix: Air **Sample Volume:** 1990.57 m³ **Received:** 11/29/23 13:29
Filter ID: **Analysis Date:** 12/04/23 22:37
Comments: MFK-AM02-112623-HM

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	**7429-90-5**	**578**		**26.2**
Antimony	**7440-36-0**	**0.0706**	SL	**0.0360**
Arsenic	**7440-38-2**	**0.219**		**0.00781**
Barium	**7440-39-3**	**7.77**		**0.775**
Beryllium	**7440-41-7**	**0.0165**		**0.00271**
Cadmium	7440-43-9	0.0124	U	0.0891
Calcium	**7440-70-2**	**787**	GC-BS, LJ, QB-01	**239**
Chromium	**7440-47-3**	**2.03**		**1.66**
Cobalt	**7440-48-4**	**0.276**	QB-01	**0.0128**
Copper	**7440-50-8**	**15.2**		**2.45**
Iron	**7439-89-6**	**606**		**19.8**
Lead	**7439-92-1**	**0.266**		**0.226**
Magnesium	**7439-95-4**	**237**		**78.8**
Manganese	**7439-96-5**	**15.8**		**0.973**
Molybdenum	**7439-98-7**	**0.967**	QB-01	**0.174**
Nickel	**7440-02-0**	**0.786**		**0.655**
Phosphorus	7723-14-0	454	GC-BS, LJ, U	1020
Potassium	**7440-09-7**	**175**	LJ	**31.1**
Rubidium		**0.253**		**0.0150**
Selenium	**7782-49-2**	**0.192**		**0.00899**
Sodium	**7440-23-5**	**1850**	E	**1630**
Strontium	**7440-24-6**	**6.02**	QB-01	**0.533**
Thallium	**7440-28-0**	**0.00139**		**4.11E-4**
Thorium	**7440-29-01**	**0.0163**	LJ, QB-01	**0.00245**
Uranium	**NA**	**0.0160**		**0.0139**
Vanadium	**7440-62-2**	**1.72**		**0.0402**
Zinc	7440-66-6	11.4	U	79.9

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Blue Bell, FA 19422
ATTN: Ms. Chelsea Saber
PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 12/07/23 08:11
SUBMITTED: 11/29/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9541903
Matrix: Air
Comments: MFK-AM03-112623-HM

Lab ID: 3112929-11
Sample Volume: 1665.355 m³
Filter ID:

Sampled: 11/26/23 23:59
Received: 11/29/23 13:29
Analysis Date: 12/04/23 23:48

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	**7429-90-5**	**260**		**31.4**
Antimony	**7440-36-0**	**0.0738**	SL	**0.0431**
Arsenic	**7440-38-2**	**0.100**		**0.00933**
Barium	**7440-39-3**	**4.54**		**0.926**
Beryllium	**7440-41-7**	**0.0122**		**0.00324**
Cadmium	7440-43-9	0.00706	U	0.106
Calcium	**7440-70-2**	**347**	GC-BS, LJ, QB-01	**285**
Chromium	7440-47-3	1.83	U	1.98
Cobalt	**7440-48-4**	**0.202**	QB-01	**0.0152**
Copper	**7440-50-8**	**33.2**		**2.93**
Iron	**7439-89-6**	**353**		**23.6**
Lead	7439-92-1	0.232	U	0.270
Magnesium	**7439-95-4**	**214**		**94.2**
Manganese	**7439-96-5**	**9.87**		**1.16**
Molybdenum	**7439-98-7**	**0.975**	QB-01	**0.208**
Nickel	7440-02-0	0.704	U	0.783
Phosphorus	7723-14-0	401	GC-BS, LJ, U	1220
Potassium	**7440-09-7**	**107**	LJ	**37.1**
Rubidium		**0.157**		**0.0179**
Selenium	**7782-49-2**	**0.164**		**0.0107**
Sodium	**7440-23-5**	**2080**	E	**1950**
Strontium	**7440-24-6**	**3.05**	QB-01	**0.637**
Thallium	**7440-28-0**	**9.15E-4**		**4.91E-4**
Thorium	**7440-29-01**	**0.00930**	LJ, QB-01	**0.00293**
Uranium	NA	0.00847	U	0.0166
Vanadium	**7440-62-2**	**1.23**		**0.0481**
Zinc	7440-66-6	12.1	U	95.4

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Blue Bell, FA 19422
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FILE #: 0000.00
REPORTED: 12/07/23 08:11
SUBMITTED: 11/29/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9541228 FB
Matrix: Air
Lab ID: 3112929-12
Sample Volume: 1996.342 m³
Filter ID:
Sampled: 11/26/23 00:00
Received: 11/29/23 13:29
Analysis Date: 12/05/23 00:05
Comments: MFK-FB01-112623-HM Field Blank

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	7429-90-5	11.7	U	26.2
Antimony	7440-36-0	0.0107	SL, U	0.0359
Arsenic	7440-38-2	0.00553	U	0.00778
Barium	7440-39-3	0.459	U	0.773
Beryllium	7440-41-7	6.80E-4	U	0.00271
Cadmium	7440-43-9	0.00147	U	0.0888
Calcium	7440-70-2	147	GC-BS, LJ, QB-01, U	238
Chromium	7440-47-3	1.37	U	1.65
Cobalt	**7440-48-4**	**0.0259**	FB-01, QB-01	**0.0127**
Copper	7440-50-8	0.266	U	2.44
Iron	7439-89-6	13.1	U	19.7
Lead	7439-92-1	0.0368	U	0.225
Magnesium	7439-95-4	37.1	U	78.6
Manganese	7439-96-5	0.152	U	0.970
Molybdenum	**7439-98-7**	**0.197**	FB-01, QB-01	**0.174**
Nickel	7440-02-0	0.308	U	0.653
Phosphorus	7723-14-0	307	GC-BS, LJ, U	1020
Potassium	**7440-09-7**	**55.5**	FB-01, LJ	**31.0**
Rubidium		0.00991	U	0.0149
Selenium	7782-49-2	0.00205	U	0.00896
Sodium	7440-23-5	738	U	1630
Strontium	7440-24-6	0.365	QB-01, U	0.531
Thallium	7440-28-0	5.73E-5	U	4.10E-4
Thorium	7440-29-01	0.00187	LJ, QB-01, U	0.00244
Uranium	NA	0.00117	U	0.0139
Vanadium	7440-62-2	5.03E-4	U	0.0401
Zinc	7440-66-6	7.43	U	79.6

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Blue Bell, FA 19422
ATTN: Ms. Chelsea Saber
PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 12/07/23 08:11
SUBMITTED: 11/29/23
AQS SITE CODE:
SITE CODE: Maui fires

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes

Inorganics by Compendium Method IO-3.5 - Quality Control

Batch 2312007 - B3L0101

Calibration Blank (2312007-CCB1) Prepared & Analyzed: 12/04/23

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Aluminum	72.8		ng/l							
Antimony	1.28		ng/l							
Arsenic	15.9		ng/l							
Barium	2.46		ng/l							
Beryllium	1.07		ng/l							
Cadmium	0.878		ng/l							
Calcium	496		ng/l							
Chromium	7.87		ng/l							
Cobalt	1.13		ng/l							
Copper	61.6		ng/l							
Iron	138		ng/l							
Lead	12.4		ng/l							
Magnesium	92.2		ng/l							
Manganese	15.2		ng/l							
Molybdenum	29.1		ng/l							
Nickel	0.382		ng/l							
Phosphorus	-196		ng/l							U
Potassium	3450		ng/l							
Rubidium	-0.595		ng/l							U
Selenium	-6.15		ng/l							U
Sodium	2280		ng/l							
Strontium	0.532		ng/l							
Thallium	0.397		ng/l							
Thorium	0.491		ng/l							
Uranium	0.00336		ng/l							
Vanadium	-47.7		ng/l							U
Zinc	-57.4		ng/l							U

Calibration Blank (2312007-CCB2) Prepared & Analyzed: 12/04/23

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Aluminum	-96.5		ng/l							U
Antimony	0.940		ng/l							
Arsenic	9.14		ng/l							
Barium	0.966		ng/l							
Beryllium	0.808		ng/l							
Cadmium	0.413		ng/l							
Calcium	-1280		ng/l							U
Chromium	2.85		ng/l							
Cobalt	0.509		ng/l							
Copper	34.7		ng/l							

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REPORTED: 12/07/23 08:11
SUBMITTED: 11/29/23
AQS SITE CODE:
SITE CODE: Maui fires

Inorganics by Compendium Method IO-3.5 - Quality Control

Batch 2312007 - B3L0101

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Calibration Blank (2312007-CCB2) Continued				Prepared & Analyzed: 12/04/23						
Iron	-10.9		ng/l							U
Lead	9.28		ng/l							
Magnesium	-42.5		ng/l							U
Manganese	9.66		ng/l							
Molybdenum	6.73		ng/l							
Nickel	-2.87		ng/l							U
Phosphorus	-516		ng/l							U
Potassium	1730		ng/l							
Rubidium	-0.482		ng/l							U
Selenium	-1.85		ng/l							U
Sodium	3880		ng/l							
Strontium	0.266		ng/l							
Thallium	0.246		ng/l							
Thorium	0.583		ng/l							
Uranium	-0.0295		ng/l							U
Vanadium	-53.5		ng/l							U
Zinc	-107		ng/l							U
Calibration Blank (2312007-CCB3)				Prepared & Analyzed: 12/04/23						
Aluminum	-109		ng/l							U
Antimony	0.523		ng/l							
Arsenic	14.0		ng/l							
Barium	-0.760		ng/l							U
Beryllium	-0.511		ng/l							U
Cadmium	0.150		ng/l							
Calcium	-1210		ng/l							U
Chromium	0.355		ng/l							
Cobalt	0.226		ng/l							
Copper	13.0		ng/l							
Iron	-47.6		ng/l							U
Lead	5.45		ng/l							
Magnesium	-21.0		ng/l							U
Manganese	3.68		ng/l							
Molybdenum	6.60		ng/l							
Nickel	-5.14		ng/l							U
Phosphorus	-1070		ng/l							U
Potassium	1960		ng/l							
Rubidium	-0.545		ng/l							U
Selenium	0.410		ng/l							

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AQS SITE CODE:
SITE CODE: Maui fires

Inorganics by Compendium Method IO-3.5 - Quality Control

Batch 2312007 - B3L0101

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Calibration Blank (2312007-CCB3) Continued				Prepared & Analyzed: 12/04/23						
Sodium	6960		ng/l							
Strontium	0.564		ng/l							
Thallium	0.266		ng/l							
Thorium	0.317		ng/l							
Uranium	-0.0387		ng/l							U
Vanadium	-62.0		ng/l							U
Zinc	20.6		ng/l							
Calibration Blank (2312007-CCB4)				Prepared: 12/04/23 Analyzed: 12/05/23						
Aluminum	-56.7		ng/l							U
Antimony	1.06		ng/l							
Arsenic	11.2		ng/l							
Barium	-0.220		ng/l							U
Beryllium	-0.287		ng/l							U
Cadmium	0.486		ng/l							
Calcium	-420		ng/l							U
Chromium	3.35		ng/l							
Cobalt	0.530		ng/l							
Copper	32.0		ng/l							
Iron	51.6		ng/l							
Lead	8.90		ng/l							
Magnesium	26.1		ng/l							
Manganese	6.81		ng/l							
Molybdenum	25.1		ng/l							
Nickel	-2.21		ng/l							U
Phosphorus	-63.5		ng/l							U
Potassium	2260		ng/l							
Rubidium	-0.338		ng/l							U
Selenium	-4.92		ng/l							U
Sodium	7750		ng/l							
Strontium	0.333		ng/l							
Thallium	0.358		ng/l							
Thorium	0.276		ng/l							
Uranium	-0.0530		ng/l							U
Vanadium	-60.5		ng/l							U
Zinc	-96.8		ng/l							U
Calibration Check (2312007-CCV1)				Prepared & Analyzed: 12/04/23						
Aluminum	1.60E6		ng/l	1.5000E6		106	90-110			
Antimony	20300		ng/l	20000		101	90-110			

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FILE #: 0000.00
REPORTED: 12/07/23 08:11
SUBMITTED: 11/29/23
AQS SITE CODE:
SITE CODE: Maui fires

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes

Inorganics by Compendium Method IO-3.5 - Quality Control

Batch 2312007 - B3L0101

Calibration Check (2312007-CCV1) Continued — Prepared & Analyzed: 12/04/23

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Arsenic	20400		ng/l	20000		102	90-110			
Barium	205000		ng/l	200000		103	90-110			
Beryllium	5150		ng/l	5000.0		103	90-110			
Cadmium	20500		ng/l	20000		103	90-110			
Calcium	2.62E7		ng/l	2.5000E7		105	90-110			
Chromium	230000		ng/l	240000		96.0	90-110			
Cobalt	53400		ng/l	50000		107	90-110			
Copper	2.10E6		ng/l	2.0000E6		105	90-110			
Iron	2.64E6		ng/l	2.5000E6		105	90-110			
Lead	203000		ng/l	200000		102	90-110			
Magnesium	1.08E6		ng/l	1.0000E6		108	90-110			
Manganese	509000		ng/l	500000		102	90-110			
Molybdenum	51200		ng/l	50000		102	90-110			
Nickel	129000		ng/l	120000		107	90-110			
Phosphorus	216000		ng/l	200000		108	90-110			
Potassium	2.61E6		ng/l	2.5000E6		104	90-110			
Rubidium	10100		ng/l	10000		101	90-110			
Selenium	20000		ng/l	20000		99.9	90-110			
Sodium	2.71E6		ng/l	2.5000E6		108	90-110			
Strontium	49900		ng/l	50000		99.7	90-110			
Thallium	512		ng/l	500.00		102	90-110			
Thorium	510		ng/l	500.00		102	90-110			
Uranium	502		ng/l	500.00		100	90-110			
Vanadium	18200		ng/l	20000		91.1	90-110			
Zinc	507000		ng/l	500000		101	90-110			

Calibration Check (2312007-CCV2) — Prepared & Analyzed: 12/04/23

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Aluminum	1.51E6		ng/l	1.5000E6		101	90-110			
Antimony	20200		ng/l	20000		101	90-110			
Arsenic	20300		ng/l	20000		101	90-110			
Barium	208000		ng/l	200000		104	90-110			
Beryllium	5010		ng/l	5000.0		100	90-110			
Cadmium	20500		ng/l	20000		103	90-110			
Calcium	2.57E7		ng/l	2.5000E7		103	90-110			
Chromium	240000		ng/l	240000		99.8	90-110			
Cobalt	52800		ng/l	50000		106	90-110			
Copper	2.11E6		ng/l	2.0000E6		106	90-110			
Iron	2.59E6		ng/l	2.5000E6		104	90-110			
Lead	202000		ng/l	200000		101	90-110			

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Blue Bell, FA 19422
ATTN: Ms. Chelsea Saber
PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 12/07/23 08:11
SUBMITTED: 11/29/23
AQS SITE CODE:
SITE CODE: Maui fires

Inorganics by Compendium Method IO-3.5 - Quality Control

Batch 2312007 - B3L0101

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Calibration Check (2312007-CCV2) Continued				Prepared & Analyzed: 12/04/23						
Magnesium	1.03E6		ng/l	1.0000E6		103	90-110			
Manganese	510000		ng/l	500000		102	90-110			
Molybdenum	52400		ng/l	50000		105	90-110			
Nickel	128000		ng/l	120000		107	90-110			
Phosphorus	201000		ng/l	200000		100	90-110			
Potassium	2.62E6		ng/l	2.5000E6		105	90-110			
Rubidium	10000		ng/l	10000		100	90-110			
Selenium	19900		ng/l	20000		99.6	90-110			
Sodium	2.59E6		ng/l	2.5000E6		103	90-110			
Strontium	49800		ng/l	50000		99.6	90-110			
Thallium	505		ng/l	500.00		101	90-110			
Thorium	503		ng/l	500.00		101	90-110			
Uranium	495		ng/l	500.00		99.1	90-110			
Vanadium	19600		ng/l	20000		98.2	90-110			
Zinc	534000		ng/l	500000		107	90-110			
Calibration Check (2312007-CCV3)				Prepared & Analyzed: 12/04/23						
Aluminum	1.51E6		ng/l	1.5000E6		101	90-110			
Antimony	20400		ng/l	20000		102	90-110			
Arsenic	20300		ng/l	20000		102	90-110			
Barium	210000		ng/l	200000		105	90-110			
Beryllium	4680		ng/l	5000.0		93.7	90-110			
Cadmium	20900		ng/l	20000		104	90-110			
Calcium	2.61E7		ng/l	2.5000E7		104	90-110			
Chromium	246000		ng/l	240000		102	90-110			
Cobalt	53300		ng/l	50000		107	90-110			
Copper	2.15E6		ng/l	2.0000E6		107	90-110			
Iron	2.61E6		ng/l	2.5000E6		104	90-110			
Lead	204000		ng/l	200000		102	90-110			
Magnesium	1.04E6		ng/l	1.0000E6		104	90-110			
Manganese	516000		ng/l	500000		103	90-110			
Molybdenum	53800		ng/l	50000		108	90-110			
Nickel	130000		ng/l	120000		108	90-110			
Phosphorus	201000		ng/l	200000		100	90-110			
Potassium	2.62E6		ng/l	2.5000E6		105	90-110			
Rubidium	10100		ng/l	10000		101	90-110			
Selenium	19900		ng/l	20000		99.6	90-110			
Sodium	2.64E6		ng/l	2.5000E6		105	90-110			
Strontium	50300		ng/l	50000		101	90-110			

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Blue Bell, FA 19422
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PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 12/07/23 08:11
SUBMITTED: 11/29/23
AQS SITE CODE:
SITE CODE: Maui fires

Inorganics by Compendium Method IO-3.5 - Quality Control

Batch 2312007 - B3L0101

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Calibration Check (2312007-CCV3) Continued				Prepared & Analyzed: 12/04/23						
Thallium	510		ng/l	500.00		102	90-110			
Thorium	504		ng/l	500.00		101	90-110			
Uranium	502		ng/l	500.00		100	90-110			
Vanadium	20100		ng/l	20000		101	90-110			
Zinc	540000		ng/l	500000		108	90-110			
Calibration Check (2312007-CCV4)				Prepared: 12/04/23 Analyzed: 12/05/23						
Aluminum	1.54E6		ng/l	1.5000E6		103	90-110			
Antimony	20500		ng/l	20000		102	90-110			
Arsenic	20400		ng/l	20000		102	90-110			
Barium	213000		ng/l	200000		106	90-110			
Beryllium	5190		ng/l	5000.0		104	90-110			
Cadmium	20800		ng/l	20000		104	90-110			
Calcium	2.63E7		ng/l	2.5000E7		105	90-110			
Chromium	240000		ng/l	240000		99.9	90-110			
Cobalt	53900		ng/l	50000		108	90-110			
Copper	2.13E6		ng/l	2.0000E6		107	90-110			
Iron	2.64E6		ng/l	2.5000E6		105	90-110			
Lead	203000		ng/l	200000		101	90-110			
Magnesium	1.05E6		ng/l	1.0000E6		105	90-110			
Manganese	513000		ng/l	500000		103	90-110			
Molybdenum	53200		ng/l	50000		106	90-110			
Nickel	131000		ng/l	120000		109	90-110			
Phosphorus	207000		ng/l	200000		103	90-110			
Potassium	2.65E6		ng/l	2.5000E6		106	90-110			
Rubidium	10100		ng/l	10000		101	90-110			
Selenium	20200		ng/l	20000		101	90-110			
Sodium	2.66E6		ng/l	2.5000E6		107	90-110			
Strontium	49700		ng/l	50000		99.4	90-110			
Thallium	514		ng/l	500.00		103	90-110			
Thorium	509		ng/l	500.00		102	90-110			
Uranium	510		ng/l	500.00		102	90-110			
Vanadium	19400		ng/l	20000		97.1	90-110			
Zinc	541000		ng/l	500000		108	90-110			
High Cal Check (2312007-HCV1)				Prepared & Analyzed: 12/04/23						
Aluminum	3.06E6		ng/l	3.0000E6		102	95-105			
Antimony	40800		ng/l	40000		102	95-105			
Arsenic	40700		ng/l	40000		102	95-105			
Barium	411000		ng/l	400000		103	95-105			

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Inorganics by Compendium Method IO-3.5 - Quality Control

Batch 2312007 - B3L0101

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
High Cal Check (2312007-HCV1) Continued				Prepared & Analyzed: 12/04/23						
Beryllium	9610		ng/l	10000		96.1	95-105			
Cadmium	40700		ng/l	40000		102	95-105			
Calcium	5.04E7		ng/l	5.0000E7		101	95-105			
Chromium	479000		ng/l	480000		99.9	95-105			
Cobalt	101000		ng/l	100000		101	95-105			
Copper	4.04E6		ng/l	4.0000E6		101	95-105			
Iron	5.07E6		ng/l	5.0000E6		101	95-105			
Lead	409000		ng/l	400000		102	95-105			
Magnesium	2.02E6		ng/l	2.0000E6		101	95-105			
Manganese	1.02E6		ng/l	1.0000E6		102	95-105			
Molybdenum	103000		ng/l	100000		103	95-105			
Nickel	240000		ng/l	240000		100	95-105			
Phosphorus	408000		ng/l	400000		102	95-105			
Potassium	4.99E6		ng/l	5.0000E6		99.9	95-105			
Rubidium	20200		ng/l	20000		101	95-105			
Selenium	40200		ng/l	40000		100	95-105			
Sodium	5.06E6		ng/l	5.0000E6		101	95-105			
Strontium	102000		ng/l	100000		102	95-105			
Thallium	1020		ng/l	1000.0		102	95-105			
Thorium	1040		ng/l	1000.0		104	95-105			
Uranium	1030		ng/l	1000.0		103	95-105			
Vanadium	39900		ng/l	40000		99.7	95-105			
Zinc	994000		ng/l	1.0000E6		99.4	95-105			
Initial Cal Blank (2312007-ICB1)				Prepared & Analyzed: 12/04/23						
Aluminum	75.4		ng/l							
Antimony	1.45		ng/l							
Arsenic	3.81		ng/l							
Barium	0.219		ng/l							
Beryllium	0.604		ng/l							
Cadmium	0.510		ng/l							
Calcium	605		ng/l							
Chromium	3.96		ng/l							
Cobalt	0.514		ng/l							
Copper	37.4		ng/l							
Iron	95.1		ng/l							
Lead	11.8		ng/l							
Magnesium	71.4		ng/l							
Manganese	9.09		ng/l							

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Inorganics by Compendium Method IO-3.5 - Quality Control

Batch 2312007 - B3L0101

Initial Cal Blank (2312007-ICB1) Continued — Prepared & Analyzed: 12/04/23

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Molybdenum	13.3		ng/l							
Nickel	1.36E-4		ng/l							
Phosphorus	-712		ng/l							U
Potassium	1690		ng/l							
Rubidium	-0.195		ng/l							U
Selenium	-6.80		ng/l							U
Sodium	423		ng/l							
Strontium	1.05		ng/l							
Thallium	0.379		ng/l							
Thorium	0.466		ng/l							
Uranium	-0.0197		ng/l							U
Vanadium	-46.2		ng/l							U
Zinc	-62.2		ng/l							U

Initial Cal Check (2312007-ICV1) — Prepared & Analyzed: 12/04/23

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Aluminum	1.48E6		ng/l	1.5000E6		99.0	90-110			
Antimony	19700		ng/l	20000		98.6	90-110			
Arsenic	19800		ng/l	20000		98.9	90-110			
Barium	197000		ng/l	200000		98.6	90-110			
Beryllium	4520		ng/l	5000.0		90.3	90-110			
Cadmium	20700		ng/l	20000		103	90-110			
Calcium	2.51E7		ng/l	2.5000E7		101	90-110			
Chromium	233000		ng/l	240000		97.1	90-110			
Cobalt	50900		ng/l	50000		102	90-110			
Copper	2.00E6		ng/l	2.0000E6		100	90-110			
Iron	2.55E6		ng/l	2.5000E6		102	90-110			
Lead	198000		ng/l	200000		98.8	90-110			
Magnesium	1.00E6		ng/l	1.0000E6		100	90-110			
Manganese	492000		ng/l	500000		98.5	90-110			
Molybdenum	49200		ng/l	50000		98.4	90-110			
Nickel	124000		ng/l	120000		103	90-110			
Phosphorus	197000		ng/l	200000		98.6	90-110			
Potassium	2.62E6		ng/l	2.5000E6		105	90-110			
Rubidium	9630		ng/l	10000		96.3	90-110			
Selenium	20500		ng/l	20000		102	90-110			
Sodium	2.48E6		ng/l	2.5000E6		99.3	90-110			
Strontium	49600		ng/l	50000		99.2	90-110			
Thallium	486		ng/l	500.00		97.1	90-110			
Thorium	486		ng/l	500.00		97.2	90-110			

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Inorganics by Compendium Method IO-3.5 - Quality Control

Batch 2312007 - B3L0101

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Initial Cal Check (2312007-ICV1) Continued				Prepared & Analyzed: 12/04/23						
Uranium	494		ng/l	500.00		98.9	90-110			
Vanadium	19700		ng/l	20000		98.6	90-110			
Zinc	531000		ng/l	500000		106	90-110			
Interference Check A (2312007-IFA1)				Prepared & Analyzed: 12/04/23						
Aluminum	1.61E7		ng/l	1.5000E7		108	80-120			
Antimony	0.00		ng/l				80-120			U
Arsenic	0.00		ng/l				80-120			U
Barium	0.00		ng/l				80-120			U
Beryllium	0.00		ng/l				80-120			U
Cadmium	0.00		ng/l				80-120			U
Calcium	9.84E7		ng/l	1.0040E8		98.0	80-120			
Chromium	0.00		ng/l				80-120			U
Cobalt	0.00		ng/l				80-120			U
Copper	0.00		ng/l				80-120			U
Iron	1.56E7		ng/l	1.5000E7		104	80-120			
Lead	0.00		ng/l				80-120			U
Magnesium	1.58E7		ng/l	1.5000E7		105	80-120			
Manganese	0.00		ng/l				80-120			U
Molybdenum	308000		ng/l	300000		103	80-120			
Nickel	0.00		ng/l				80-120			U
Phosphorus	1.77E7		ng/l	1.5000E7		118	80-120			
Potassium	1.61E7		ng/l	1.5000E7		107	80-120			
Rubidium	0.00		ng/l				80-120			U
Selenium	0.00		ng/l				80-120			U
Sodium	1.65E7		ng/l	1.5000E7		110	80-120			
Strontium	0.00		ng/l				80-120			U
Thallium	0.00		ng/l				80-120			U
Thorium	0.00		ng/l				80-120			U
Uranium	0.00		ng/l				80-120			U
Vanadium	0.00		ng/l				80-120			U
Zinc	0.00		ng/l				80-120			U
Interference Check A (2312007-IFA2)				Prepared: 12/04/23 Analyzed: 12/05/23						
Aluminum	1.53E7		ng/l	1.5000E7		102	80-120			
Antimony	0.00		ng/l				80-120			U
Arsenic	0.00		ng/l				80-120			U
Barium	0.00		ng/l				80-120			U
Beryllium	0.00		ng/l				80-120			U
Cadmium	0.00		ng/l				80-120			U

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Inorganics by Compendium Method IO-3.5 - Quality Control

Batch 2312007 - B3L0101

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Interference Check A (2312007-IFA2) Continued				Prepared: 12/04/23 Analyzed: 12/05/23						
Calcium	9.76E7		ng/l	1.0040E8		97.3	80-120			
Chromium	0.00		ng/l				80-120			U
Cobalt	0.00		ng/l				80-120			U
Copper	0.00		ng/l				80-120			U
Iron	1.56E7		ng/l	1.5000E7		104	80-120			
Lead	0.00		ng/l				80-120			U
Magnesium	1.55E7		ng/l	1.5000E7		103	80-120			
Manganese	0.00		ng/l				80-120			U
Molybdenum	326000		ng/l	300000		109	80-120			
Nickel	0.00		ng/l				80-120			U
Phosphorus	1.66E7		ng/l	1.5000E7		111	80-120			
Potassium	1.56E7		ng/l	1.5000E7		104	80-120			
Rubidium	0.00		ng/l				80-120			U
Selenium	0.00		ng/l				80-120			U
Sodium	1.63E7		ng/l	1.5000E7		109	80-120			
Strontium	0.00		ng/l				80-120			U
Thallium	0.00		ng/l				80-120			U
Thorium	0.00		ng/l				80-120			U
Uranium	0.00		ng/l				80-120			U
Vanadium	0.00		ng/l				80-120			U
Zinc	0.00		ng/l				80-120			U
Interference Check B (2312007-IFB1)				Prepared & Analyzed: 12/04/23						
Aluminum	1.84E7		ng/l	1.6500E7		112	80-120			
Antimony	20500		ng/l	20000		102	80-120			
Arsenic	20900		ng/l	20000		104	80-120			
Barium	207000		ng/l	200000		103	80-120			
Beryllium	5530		ng/l	5000.0		111	80-120			
Cadmium	19800		ng/l	20000		99.0	80-120			
Calcium	1.26E8		ng/l	1.2540E8		101	80-120			
Chromium	215000		ng/l	240000		89.6	80-120			
Cobalt	52400		ng/l	50000		105	80-120			
Copper	1.96E6		ng/l	2.0000E6		97.8	80-120			
Iron	1.85E7		ng/l	1.7500E7		106	80-120			
Lead	210000		ng/l	200000		105	80-120			
Magnesium	1.73E7		ng/l	1.6000E7		108	80-120			
Manganese	538000		ng/l	500000		108	80-120			
Molybdenum	360000		ng/l	350000		103	80-120			
Nickel	124000		ng/l	120000		103	80-120			

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Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes

Inorganics by Compendium Method IO-3.5 - Quality Control

Batch 2312007 - B3L0101

Interference Check B (2312007-IFB1) Continued — Prepared & Analyzed: 12/04/23

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Phosphorus	1.85E7		ng/l	1.5200E7		122	80-120			
Potassium	1.92E7		ng/l	1.7500E7		110	80-120			
Rubidium	10300		ng/l	10000		103	80-120			
Selenium	19400		ng/l	20000		96.8	80-120			
Sodium	2.02E7		ng/l	1.7500E7		115	80-120			
Strontium	51100		ng/l	50000		102	80-120			
Thallium	530		ng/l	500.00		106	80-120			
Thorium	556		ng/l	500.00		111	80-120			
Uranium	553		ng/l	500.00		111	80-120			
Vanadium	16400		ng/l	20000		81.9	80-120			
Zinc	468000		ng/l	500000		93.6	80-120			

Interference Check B (2312007-IFB2) — Prepared: 12/04/23 Analyzed: 12/05/23

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Aluminum	1.76E7		ng/l	1.6500E7		107	80-120			
Antimony	21100		ng/l	20000		105	80-120			
Arsenic	21100		ng/l	20000		105	80-120			
Barium	218000		ng/l	200000		109	80-120			
Beryllium	5310		ng/l	5000.0		106	80-120			
Cadmium	20300		ng/l	20000		102	80-120			
Calcium	1.25E8		ng/l	1.2540E8		99.4	80-120			
Chromium	224000		ng/l	240000		93.5	80-120			
Cobalt	52700		ng/l	50000		105	80-120			
Copper	2.00E6		ng/l	2.0000E6		99.9	80-120			
Iron	1.85E7		ng/l	1.7500E7		106	80-120			
Lead	215000		ng/l	200000		107	80-120			
Magnesium	1.68E7		ng/l	1.6000E7		105	80-120			
Manganese	537000		ng/l	500000		107	80-120			
Molybdenum	381000		ng/l	350000		109	80-120			
Nickel	124000		ng/l	120000		104	80-120			
Phosphorus	1.75E7		ng/l	1.5200E7		115	80-120			
Potassium	1.88E7		ng/l	1.7500E7		107	80-120			
Rubidium	10400		ng/l	10000		104	80-120			
Selenium	19300		ng/l	20000		96.4	80-120			
Sodium	1.97E7		ng/l	1.7500E7		112	80-120			
Strontium	51000		ng/l	50000		102	80-120			
Thallium	545		ng/l	500.00		109	80-120			
Thorium	568		ng/l	500.00		114	80-120			
Uranium	569		ng/l	500.00		114	80-120			
Vanadium	17700		ng/l	20000		88.7	80-120			

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Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Interference Check B (2312007-IFB2) Continued				Prepared: 12/04/23 Analyzed: 12/05/23						
Zinc	492000		ng/l	500000		98.5	80-120			
Batch B3L0101 - ICP-MS Extraction										
Blank (B3L0101-BLK1)				Prepared: 12/01/23 Analyzed: 12/04/23						
Aluminum	ND	32.1	ng/m³ Air							U
Antimony	ND	0.0441	ng/m³ Air							SL, U
Arsenic	ND	0.00955	ng/m³ Air							U
Barium	ND	0.948	ng/m³ Air							U
Beryllium	ND	0.00332	ng/m³ Air							U
Cadmium	ND	0.109	ng/m³ Air							U
Calcium	ND	292	ng/m³ Air							GC-BS, LJ, QB-01, U
Chromium	ND	2.03	ng/m³ Air							U
Cobalt	ND	0.0156	ng/m³ Air							QB-01, U
Copper	ND	3.00	ng/m³ Air							U
Iron	ND	24.2	ng/m³ Air							U
Lead	ND	0.276	ng/m³ Air							U
Magnesium	ND	96.4	ng/m³ Air							U
Manganese	ND	1.19	ng/m³ Air							U
Molybdenum	ND	0.213	ng/m³ Air							QB-01, U
Nickel	ND	0.801	ng/m³ Air							U
Phosphorus	ND	1250	ng/m³ Air							GC-BS, LJ, U
Potassium	ND	38.0	ng/m³ Air							LJ, U
Rubidium	ND	0.0183	ng/m³ Air							U
Selenium	ND	0.0110	ng/m³ Air							U
Sodium	ND	2000	ng/m³ Air							U
Strontium	ND	0.652	ng/m³ Air							QB-01, U
Thallium	ND	5.03E-4	ng/m³ Air							U
Thorium	ND	0.00300	ng/m³ Air							LJ, QB-01, U
Uranium	ND	0.0170	ng/m³ Air							U
Vanadium	ND	0.0492	ng/m³ Air							U
Zinc	ND	97.7	ng/m³ Air							U
LCS (B3L0101-BS1)				Prepared: 12/01/23 Analyzed: 12/04/23						
Aluminum	93.4	32.1	ng/m³ Air	82.975		113	80-120			
Antimony	0.534	0.0441	ng/m³ Air	1.3829		38.6	80-120			SL
Arsenic	2.75	0.00955	ng/m³ Air	2.7658		99.3	80-120			
Barium	28.2	0.948	ng/m³ Air	27.658		102	80-120			
Beryllium	1.35	0.00332	ng/m³ Air	1.3829		97.4	80-120			
Cadmium	1.43	0.109	ng/m³ Air	1.3829		103	80-120			

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Inorganics by Compendium Method IO-3.5 - Quality Control

Batch B3L0101 - ICP-MS Extraction

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
LCS (B3L0101-BS1) Continued				Prepared: 12/01/23 Analyzed: 12/04/23						
Calcium	616	292	ng/m³ Air	69.146		890	80-120			GC-BS, LJ, QB-01
Chromium	16.3	2.03	ng/m³ Air	13.829		118	80-120			
Cobalt	1.47	0.0156	ng/m³ Air	1.3829		106	80-120			QB-01
Copper	31.0	3.00	ng/m³ Air	27.658		112	80-120			
Iron	42.5	24.2	ng/m³ Air	27.658		154	80-120			
Lead	13.9	0.276	ng/m³ Air	13.829		100	80-120			
Magnesium	ND	96.4	ng/m³ Air	27.658			80-120			U
Manganese	8.75	1.19	ng/m³ Air	8.2975		105	80-120			
Molybdenum	1.72	0.213	ng/m³ Air	1.3829		125	80-120			QB-01
Nickel	3.41	0.801	ng/m³ Air	2.7658		123	80-120			
Phosphorus	ND	1250	ng/m³ Air	13.829			80-120			GC-BS, LJ, U
Potassium	70.5	38.0	ng/m³ Air	55.317		127	80-120			LJ
Rubidium	1.36	0.0183	ng/m³ Air	1.3829		98.3	80-120			
Selenium	2.66	0.0110	ng/m³ Air	2.7658		96.2	80-120			
Sodium	ND	2000	ng/m³ Air	55.317			80-120			U
Strontium	2.26	0.652	ng/m³ Air	1.3829		163	80-120			QB-01
Thallium	0.131	5.03E-4	ng/m³ Air	0.13829		95.0	80-120			
Thorium	0.135	0.00300	ng/m³ Air	0.13829		97.6	80-120			LJ, QB-01
Uranium	0.131	0.0170	ng/m³ Air	0.13829		95.1	80-120			
Vanadium	2.73	0.0492	ng/m³ Air	2.7658		98.8	80-120			
Zinc	124	97.7	ng/m³ Air	82.975		150	80-120			
Duplicate (B3L0101-DUP1)		**Source: 3112929-05**		Prepared: 12/01/23 Analyzed: 12/04/23						
Aluminum	324	26.2	ng/m³ Air		325			0.421	10	
Antimony	0.0493	0.0359	ng/m³ Air		0.0515			4.45	10	SL
Arsenic	0.100	0.00778	ng/m³ Air		0.114			12.7	10	
Barium	4.56	0.773	ng/m³ Air		4.40			3.51	10	
Beryllium	0.0105	0.00271	ng/m³ Air		0.0103			2.26	10	
Cadmium	ND	0.0888	ng/m³ Air		ND				10	U
Calcium	619	238	ng/m³ Air		608			1.86	10	GC-BS, LJ, QB-01
Chromium	1.84	1.65	ng/m³ Air		1.81			1.50	10	
Cobalt	0.190	0.0127	ng/m³ Air		0.194			1.83	10	QB-01
Copper	19.1	2.44	ng/m³ Air		21.0			9.22	10	
Iron	373	19.7	ng/m³ Air		367			1.53	10	
Lead	0.334	0.225	ng/m³ Air		0.369			10.1	10	
Magnesium	279	78.6	ng/m³ Air		277			0.677	10	
Manganese	9.45	0.970	ng/m³ Air		9.57			1.29	10	
Molybdenum	1.11	0.174	ng/m³ Air		1.14			2.43	10	QB-01

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Inorganics by Compendium Method IO-3.5 - Quality Control

Batch B3L0101 - ICP-MS Extraction

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Duplicate (B3L0101-DUP1) Continued		**Source: 3112929-05**		Prepared: 12/01/23 Analyzed: 12/04/23						
Nickel	0.870	0.653	ng/m³ Air		1.07			20.8	10	
Phosphorus	ND	1020	ng/m³ Air		ND				10	GC-BS, LJ, U
Potassium	132	31.0	ng/m³ Air		148			11.1	10	LJ
Rubidium	0.149	0.0149	ng/m³ Air		0.148			0.589	10	
Selenium	0.152	0.00896	ng/m³ Air		0.152			0.0617	10	
Sodium	2440	1630	ng/m³ Air		2420			0.598	10	E
Strontium	3.79	0.531	ng/m³ Air		3.77			0.562	10	QB-01
Thallium	8.47E-4	4.10E-4	ng/m³ Air		8.96E-4			5.57	10	
Thorium	0.00835	0.00244	ng/m³ Air		0.00827			0.958	10	LJ, QB-01
Uranium	ND	0.0139	ng/m³ Air		ND				10	U
Vanadium	1.65	0.0401	ng/m³ Air		1.68			1.79	10	
Zinc	ND	79.6	ng/m³ Air		ND				10	U
Duplicate (B3L0101-DUP2)		**Source: 3112929-10**		Prepared: 12/01/23 Analyzed: 12/04/23						
Aluminum	570	26.2	ng/m³ Air		578			1.54	10	
Antimony	0.0705	0.0361	ng/m³ Air		0.0706			0.142	10	SL
Arsenic	0.218	0.00781	ng/m³ Air		0.219			0.555	10	
Barium	7.72	0.775	ng/m³ Air		7.77			0.644	10	
Beryllium	0.0175	0.00271	ng/m³ Air		0.0165			5.50	10	
Cadmium	ND	0.0891	ng/m³ Air		ND				10	U
Calcium	782	239	ng/m³ Air		787			0.680	10	GC-BS, LJ, QB-01
Chromium	2.00	1.66	ng/m³ Air		2.03			1.80	10	
Cobalt	0.272	0.0128	ng/m³ Air		0.276			1.40	10	QB-01
Copper	14.9	2.45	ng/m³ Air		15.2			1.96	10	
Iron	594	19.8	ng/m³ Air		606			1.88	10	
Lead	0.263	0.226	ng/m³ Air		0.266			1.24	10	
Magnesium	234	78.8	ng/m³ Air		237			1.07	10	
Manganese	15.6	0.973	ng/m³ Air		15.8			0.981	10	
Molybdenum	0.966	0.174	ng/m³ Air		0.967			0.121	10	QB-01
Nickel	0.775	0.655	ng/m³ Air		0.786			1.32	10	
Phosphorus	ND	1020	ng/m³ Air		ND				10	GC-BS, LJ, U
Potassium	173	31.1	ng/m³ Air		175			1.09	10	LJ
Rubidium	0.254	0.0150	ng/m³ Air		0.253			0.178	10	
Selenium	0.185	0.00899	ng/m³ Air		0.192			3.25	10	
Sodium	1850	1640	ng/m³ Air		1850			0.355	10	E
Strontium	5.92	0.533	ng/m³ Air		6.02			1.67	10	QB-01
Thallium	0.00146	4.11E-4	ng/m³ Air		0.00139			5.23	10	
Thorium	0.0161	0.00245	ng/m³ Air		0.0163			1.10	10	LJ, QB-01

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Inorganics by Compendium Method IO-3.5 - Quality Control

Batch B3L0101 - ICP-MS Extraction

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Duplicate (B3L0101-DUP2) Continued	**Source: 3112929-10**			Prepared: 12/01/23 Analyzed: 12/04/23						
Uranium	0.0153	0.0139	ng/m³ Air		0.0160			4.12	10	
Vanadium	1.68	0.0402	ng/m³ Air		1.72			2.20	10	
Zinc	ND	79.9	ng/m³ Air		ND				10	U
Matrix Spike (B3L0101-MS1)	**Source: 3112929-05**			Prepared: 12/01/23 Analyzed: 12/04/23						
Aluminum	399	26.2	ng/m³ Air	67.624	325	109	80-120			
Antimony	0.488	0.0359	ng/m³ Air	1.1271	0.0515	38.7	80-120			SL
Arsenic	2.33	0.00778	ng/m³ Air	2.2541	0.114	98.1	80-120			
Barium	27.8	0.773	ng/m³ Air	22.541	4.40	104	80-120			
Beryllium	1.14	0.00271	ng/m³ Air	1.1271	0.0103	101	80-120			
Cadmium	1.17	0.0888	ng/m³ Air	1.1271	ND	104	80-120			
Calcium	684	238	ng/m³ Air	56.353	608	135	80-120			LJ, QB-01, QM-4X, GC-BS
Chromium	13.2	1.65	ng/m³ Air	11.271	1.81	101	80-120			
Cobalt	1.37	0.0127	ng/m³ Air	1.1271	0.194	105	80-120			QB-01
Copper	44.7	2.44	ng/m³ Air	22.541	21.0	105	80-120			
Iron	395	19.7	ng/m³ Air	22.541	367	125	80-120			QM-4X
Lead	11.7	0.225	ng/m³ Air	11.271	0.369	101	80-120			
Magnesium	302	78.6	ng/m³ Air	22.541	277	109	80-120			
Manganese	16.7	0.970	ng/m³ Air	6.7624	9.57	106	80-120			
Molybdenum	2.36	0.174	ng/m³ Air	1.1271	1.14	109	80-120			QB-01
Nickel	3.13	0.653	ng/m³ Air	2.2541	1.07	91.3	80-120			
Phosphorus	ND	1020	ng/m³ Air	11.271	ND		80-120			GC-BS, LJ, QM-4X, U
Potassium	171	31.0	ng/m³ Air	45.082	148	51.2	80-120			LJ, QM-07
Rubidium	1.23	0.0149	ng/m³ Air	1.1271	0.148	95.8	80-120			
Selenium	2.31	0.00896	ng/m³ Air	2.2541	0.152	95.6	80-120			
Sodium	2510	1630	ng/m³ Air	45.082	2420	198	80-120			QM-4X
Strontium	4.88	0.531	ng/m³ Air	1.1271	3.77	98.2	80-120			QB-01
Thallium	0.109	4.10E-4	ng/m³ Air	0.11271	8.96E-4	96.0	80-120			
Thorium	0.0521	0.00244	ng/m³ Air	0.11271	0.00827	38.9	80-120			LJ, QB-01, QM-07
Uranium	0.115	0.0139	ng/m³ Air	0.11271	ND	102	80-120			
Vanadium	3.79	0.0401	ng/m³ Air	2.2541	1.68	93.7	80-120			
Zinc	87.3	79.6	ng/m³ Air	67.624	ND	129	80-120			
Matrix Spike Dup (B3L0101-MSD1)	**Source: 3112929-05**			Prepared: 12/01/23 Analyzed: 12/04/23						
Aluminum	386	26.2	ng/m³ Air	67.624	325	89.3	80-120	3.32	20	
Antimony	0.448	0.0359	ng/m³ Air	1.1271	0.0515	35.2	80-120	8.37	20	SL
Arsenic	2.32	0.00778	ng/m³ Air	2.2541	0.114	97.9	80-120	0.190	20	
Barium	27.2	0.773	ng/m³ Air	22.541	4.40	101	80-120	2.45	20	

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Inorganics by Compendium Method IO-3.5 - Quality Control

Batch B3L0101 - ICP-MS Extraction

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Matrix Spike Dup (B3L0101-MSD1) Continued		**Source: 3112929-05**		Prepared: 12/01/23 Analyzed: 12/04/23						
Beryllium	1.21	0.00271	ng/m³ Air	1.1271	0.0103	107	80-120	6.01	20	
Cadmium	1.14	0.0888	ng/m³ Air	1.1271	ND	101	80-120	2.21	20	
Calcium	669	238	ng/m³ Air	56.353	608	109	80-120	2.15	20	QB-01, GC-BS, LJ
Chromium	12.8	1.65	ng/m³ Air	11.271	1.81	97.5	80-120	2.94	20	
Cobalt	1.35	0.0127	ng/m³ Air	1.1271	0.194	103	80-120	1.61	20	QB-01
Copper	46.1	2.44	ng/m³ Air	22.541	21.0	111	80-120	3.11	20	
Iron	385	19.7	ng/m³ Air	22.541	367	76.7	80-120	2.78	20	QM-4X
Lead	11.6	0.225	ng/m³ Air	11.271	0.369	99.9	80-120	0.640	20	
Magnesium	294	78.6	ng/m³ Air	22.541	277	73.7	80-120	2.69	20	QM-4X
Manganese	16.3	0.970	ng/m³ Air	6.7624	9.57	99.6	80-120	2.47	20	
Molybdenum	2.36	0.174	ng/m³ Air	1.1271	1.14	108	80-120	0.0773	20	QB-01
Nickel	3.11	0.653	ng/m³ Air	2.2541	1.07	90.3	80-120	0.728	20	
Phosphorus	ND	1020	ng/m³ Air	11.271	ND		80-120		20	GC-BS, LJ, QM-4X, U
Potassium	173	31.0	ng/m³ Air	45.082	148	55.6	80-120	1.15	20	LJ, QM-07
Rubidium	1.20	0.0149	ng/m³ Air	1.1271	0.148	93.4	80-120	2.19	20	
Selenium	2.27	0.00896	ng/m³ Air	2.2541	0.152	94.1	80-120	1.42	20	
Sodium	2450	1630	ng/m³ Air	45.082	2420	46.4	80-120	2.76	20	QM-4X
Strontium	4.78	0.531	ng/m³ Air	1.1271	3.77	89.6	80-120	2.02	20	QB-01
Thallium	0.108	4.10E-4	ng/m³ Air	0.11271	8.96E-4	94.8	80-120	1.22	20	
Thorium	0.0484	0.00244	ng/m³ Air	0.11271	0.00827	35.6	80-120	7.25	20	LJ, QB-01, QM-07
Uranium	0.114	0.0139	ng/m³ Air	0.11271	ND	101	80-120	1.37	20	
Vanadium	3.70	0.0401	ng/m³ Air	2.2541	1.68	89.8	80-120	2.36	20	
Zinc	88.8	79.6	ng/m³ Air	67.624	ND	131	80-120	1.74	20	
Post Spike (B3L0101-PS1)		**Source: 3112929-05**		Prepared: 12/01/23 Analyzed: 12/04/23						
Aluminum	347	26.2	ng/m³ Air	22.541	325	96.7	75-125			
Antimony	0.268	0.0359	ng/m³ Air	0.22541	0.0515	96.1	75-125			SL
Arsenic	1.18	0.00778	ng/m³ Air	1.1271	0.114	94.8	75-125			
Barium	6.72	0.773	ng/m³ Air	2.2541	4.40	103	75-125			
Beryllium	0.245	0.00271	ng/m³ Air	0.22541	0.0103	104	75-125			
Cadmium	0.118	0.0888	ng/m³ Air	0.11271	ND	105	75-125			
Calcium	648	238	ng/m³ Air	22.541	608	180	75-125			GC-BS, LJ, QB-01
Chromium	2.87	1.65	ng/m³ Air	1.1271	1.81	93.9	75-125			
Cobalt	0.426	0.0127	ng/m³ Air	0.22541	0.194	103	75-125			QB-01
Copper	32.7	2.44	ng/m³ Air	11.271	21.0	104	75-125			
Iron	395	19.7	ng/m³ Air	22.541	367	123	75-125			

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Inorganics by Compendium Method IO-3.5 - Quality Control

Batch B3L0101 - ICP-MS Extraction

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Post Spike (B3L0101-PS1) Continued		**Source: 3112929-05**		Prepared: 12/01/23 Analyzed: 12/04/23						
Lead	22.2	0.225	ng/m³ Air	22.541	0.369	97.0	75-125			
Magnesium	301	78.6	ng/m³ Air	22.541	277	107	75-125			
Manganese	11.9	0.970	ng/m³ Air	2.2541	9.57	102	75-125			
Molybdenum	2.28	0.174	ng/m³ Air	1.1271	1.14	101	75-125			QB-01
Nickel	3.37	0.653	ng/m³ Air	2.2541	1.07	102	75-125			
Phosphorus	ND	1020	ng/m³ Air	4.5082	ND		75-125			A-01, GC-BS, LJ, U
Potassium	171	31.0	ng/m³ Air	22.541	148	102	75-125			LJ
Rubidium	0.254	0.0149	ng/m³ Air	0.11271	0.148	93.7	75-125			
Selenium	1.23	0.00896	ng/m³ Air	1.1271	0.152	95.6	75-125			
Sodium	2470	1630	ng/m³ Air	22.541	2420	221	75-125			A-01
Strontium	4.80	0.531	ng/m³ Air	1.1271	3.77	91.8	75-125			QB-01
Thallium	0.0528	4.10E-4	ng/m³ Air	5.6353E-2	8.96E-4	92.0	75-125			
Thorium	0.0603	0.00244	ng/m³ Air	5.6353E-2	0.00827	92.4	75-125			LJ, QB-01
Uranium	0.0613	0.0139	ng/m³ Air	5.6353E-2	ND	109	75-125			
Vanadium	2.66	0.0401	ng/m³ Air	1.1271	1.68	87.4	75-125			
Zinc	ND	79.6	ng/m³ Air	22.541	ND		75-125			U
Dilution Check (B3L0101-SRL1)		**Source: 3112929-05**		Prepared: 12/01/23 Analyzed: 12/04/23						
Aluminum	321	131	ng/m³ Air		325			1.34	10	
Antimony	ND	0.180	ng/m³ Air		ND				10	SL, U
Arsenic	0.122	0.0389	ng/m³ Air		0.114			7.13	10	
Barium	4.42	3.86	ng/m³ Air		4.40			0.366	10	
Beryllium	ND	0.0135	ng/m³ Air		ND				10	U
Cadmium	ND	0.444	ng/m³ Air		ND				10	U
Calcium	ND	1190	ng/m³ Air		ND				10	GC-BS, LJ, QB-01, U
Chromium	ND	8.27	ng/m³ Air		ND				10	U
Cobalt	0.195	0.0636	ng/m³ Air		0.194			0.471	10	QB-01
Copper	21.4	12.2	ng/m³ Air		21.0			1.74	10	
Iron	365	98.6	ng/m³ Air		367			0.594	10	
Lead	ND	1.12	ng/m³ Air		ND				10	U
Magnesium	ND	393	ng/m³ Air		ND				10	U
Manganese	9.59	4.85	ng/m³ Air		9.57			0.204	10	
Molybdenum	1.16	0.868	ng/m³ Air		1.14			1.64	10	QB-01
Nickel	ND	3.26	ng/m³ Air		ND				10	U
Phosphorus	ND	5090	ng/m³ Air		ND				10	GC-BS, LJ, U
Potassium	ND	155	ng/m³ Air		ND				10	LJ, U
Rubidium	0.154	0.0746	ng/m³ Air		0.148			3.58	10	
Selenium	0.157	0.0448	ng/m³ Air		0.152			3.68	10	

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CERTIFICATE OF ANALYSIS

Tetra Tech, Inc.
1777 Sentry Pkwy, Bldg 12
Blue Bell, FA 19422
ATTN: Ms. Chelsea Saber
PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 12/07/23 08:11
SUBMITTED: 11/29/23
AQS SITE CODE:
SITE CODE: Maui fires

Inorganics by Compendium Method IO-3.5 - Quality Control

Batch B3L0101 - ICP-MS Extraction

Dilution Check (B3L0101-SRL1) Continued **Source: 3112929-05** Prepared: 12/01/23 Analyzed: 12/04/23

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Sodium	ND	8150	ng/m³ Air		ND				10	U
Strontium	3.76	2.66	ng/m³ Air		3.77			0.194	10	QB-01
Thallium	ND	0.00205	ng/m³ Air		ND				10	U
Thorium	ND	0.0122	ng/m³ Air		ND				10	LJ, QB-01, U
Uranium	ND	0.0693	ng/m³ Air		ND				10	U
Vanadium	1.62	0.200	ng/m³ Air		1.68			3.58	10	
Zinc	ND	398	ng/m³ Air		ND				10	U

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FILE #: 0000.00
REPORTED: 12/07/23 08:11
SUBMITTED: 11/29/23
AQS SITE CODE:
SITE CODE: Maui fires

Notes and Definitions

U	Under Detection Limit
SL	The spike recovery was outside acceptance limits. Reported value may be biased low.
QM-4X	The MS/MSD recovery exceeds criteria because the parent sample concentration is greater than 4x the spike concentration. Sample results for the QC batch were accepted based on acceptable BS/BSD recoveries.
QM-07	The spike recovery was outside acceptance limits for the MS and/or MSD. The batch was accepted based on acceptable LCS recovery.
QB-01	Analyte exceeds method blank criteria
LJ	Identification of analyte is acceptable; reported value is an estimate.
GC-BS	Compound exceeds Blank Spike Criteria
FB-01	Analyte exceeds Field Blank criteria.
E	The concentration indicated for this analyte is an estimated value above the calibration range of the instrument. This value is considered an estimate (CLP E-flag).
A-01	Parent Sample >4x spike amount
ND	Analyte NOT DETECTED
NR	Not Reported
MDL	Method Detection Limit
RPD	Relative Percent Difference

Note: This test is accredited under the 2016 TNI Standard.

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Eastern Research Group
601 Keystone Park Drive
Suite 700
Morrisville, NC 27560

December 14, 2023

Ms. Chelsea Saber
Tetra Tech, Inc.
1777 Sentry Pkwy, Bldg 12
Blue Bell, PA 19422
Project Name: Maui fires

Dear Ms. Chelsea Saber,

This report contains the analytical results for the sample(s) received under chain(s) of custody by Eastern Research Group on 12/04/23 12:47.

Values below the MDL for QC results in this report are recorded as ND, however the actual values are reported in the accompanying Excel report with a "U" flag (Under the detection limit). The actual values are reported in AQS.

This test is accredited under the 2016 TNI Standard for Environmental Laboratories (FL DOH Certification # E87673). All analyses were performed as described in the US EPA-approved QAPP, under the contract for National Hazardous Air Pollutant Support (US EPA Contract No. 68HERH22D0002). This cover page is an integral part of this report, and any exceptions or comments are noted on the last page.

Release of the data contained in this data package and in the data submitted in the electronic data deliverable, has been authorized by the Program Manager, or the Program Manager's designee as verified by the following signature.

The issuance of the final Certificate of Analysis takes precedence over any previous Report. If you have any questions, please contact me at 919-468-7924.

Sincerely,

Julie Swift
Program Manager
julie.swift@erg.com

The information contained in this report and its attachment(s) are intended only for the use of the individual to whom it is addressed and may contain information that is privileged, confidential, or exempt from disclosure. If the reader of this message is not the intended recipient, you are hereby notified that any dissemination, distribution, or copying of this report is strictly prohibited. If you have received this report in error, please notify julie.swift@erg.com and delete the report without retaining any copies.

CERTIFICATE OF ANALYSIS

Tetra Tech, Inc.
1777 Sentry Pkwy, Bldg 12
Blue Bell, PA 19422
ATTN: Ms. Chelsea Saber
PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 12/14/23 11:51
SUBMITTED: 12/04/23
AQS SITE CODE:
SITE CODE: Maui fires

ANALYTICAL REPORT FOR SAMPLES

SampleName	LabNumber	Matrix	Sampled	Received
TetraTech Q9541902	3120430-01	Air	11/27/23 23:59	12/04/23 12:47
TetraTech Q9541901	3120430-02	Air	11/27/23 23:59	12/04/23 12:47
TetraTech Q9541925	3120430-03	Air	11/27/23 23:59	12/04/23 12:47
TetraTech Q9541900 FB	3120430-04	Air	11/27/23 00:00	12/04/23 12:47
TetraTech Q9541923	3120430-05	Air	11/28/23 23:59	12/04/23 12:47
TetraTech Q9541921	3120430-06	Air	11/28/23 23:59	12/04/23 12:47
TetraTech Q9541920	3120430-07	Air	11/28/23 23:59	12/04/23 12:47
TetraTech Q9541919	3120430-08	Air	11/29/23 23:59	12/04/23 12:47
TetraTech Q9541227	3120430-09	Air	11/29/23 23:59	12/04/23 12:47
TetraTech Q9541899	3120430-10	Air	11/29/23 23:59	12/04/23 12:47
TetraTech Q9541909 FB	3120430-11	Air	11/29/23 00:00	12/04/23 12:47
TetraTech Q9541226 FB	3120430-12	Air	11/28/23 00:00	12/04/23 12:47

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Blue Bell, PA 19422
ATTN: Ms. Chelsea Saber
PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 12/14/23 11:51
SUBMITTED: 12/04/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9541902 **Lab ID:** 3120430-01 **Sampled:** 11/27/23 23:59
Matrix: Air **Sample Volume:** 2038.818 m³ **Received:** 12/04/23 12:47
Filter ID: **Analysis Date:** 12/08/23 21:29
Comments: MFK-AM01-112723-HM

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	**7429-90-5**	**6570**	E	**25.6**
Antimony	**7440-36-0**	**0.0770**	SL	**0.0352**
Barium	**7440-39-3**	**35.9**		**0.757**
Beryllium	**7440-41-7**	**0.187**		**0.00265**
Calcium	**7440-70-2**	**1260**	GC-BS, QB-01	**233**
Chromium	**7440-47-3**	**5.66**		**1.62**
Cobalt	**7440-48-4**	**2.20**	QB-01	**0.0124**
Copper	**7440-50-8**	**22.4**		**2.39**
Lead	**7439-92-1**	**1.18**		**0.220**
Magnesium	**7439-95-4**	**414**		**76.9**
Manganese	**7439-96-5**	**151**		**0.950**
Nickel	**7440-02-0**	**2.92**		**0.639**
Phosphorus	7723-14-0	677	U, GC-BS, LJ, QX	998
Potassium	**7440-09-7**	**175**		**30.3**
Sodium	7440-23-5	1510	U, GC-BS	1600
Thallium	**7440-28-0**	**0.00891**		**4.01E-4**
Thorium	**7440-29-01**	**0.162**		**0.00239**
Uranium	**7440-61-1**	**0.118**		**0.0136**
Vanadium	**7440-62-2**	**14.9**	E	**0.0393**
Zinc	7440-66-6	40.5	U	78.0

CERTIFICATE OF ANALYSIS

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Blue Bell, PA 19422
ATTN: Ms. Chelsea Saber
PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 12/14/23 11:51
SUBMITTED: 12/04/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9541902
Matrix: Air
Comments: MFK-AM01-112723-HM

Lab ID: 3120430-01RE1
Sample Volume: 2038.818 m^3
Filter ID:

Sampled: 11/27/23 23:59
Received: 12/04/23 12:47
Analysis Date: 12/11/23 22:57

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m^3 Air	Flag	MDL ng/m^3 Air
Arsenic	**7440-38-2**	**0.772**	D	**0.0381**
Cadmium	7440-43-9	0.0422	U, D	0.435
Molybdenum	**7439-98-7**	**1.19**	D, QB-01	**0.850**
Rubidium	**7440-17-7**	**1.00**	D	**0.0730**
Selenium	**7782-49-2**	**1.12**	D	**0.0439**
Strontium	**7440-24-6**	**23.2**	D, QB-01	**2.60**

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Tetra Tech, Inc.
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Blue Bell, PA 19422
ATTN: Ms. Chelsea Saber
PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 12/14/23 11:51
SUBMITTED: 12/04/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9541902
Lab ID: 3120430-01RE2
Sampled: 11/27/23 23:59
Matrix: Air
Sample Volume: 2038.818 m³
Received: 12/04/23 12:47
Filter ID:
Analysis Date: 12/11/23 23:12
Comments: MFK-AM01-112723-HM

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Iron	7439-89-6	6400	D	193

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Blue Bell, PA 19422
ATTN: Ms. Chelsea Saber
PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 12/14/23 11:51
SUBMITTED: 12/04/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9541901
Matrix: Air
Lab ID: 3120430-02
Sample Volume: 2026.064 m³
Filter ID:
Sampled: 11/27/23 23:59
Received: 12/04/23 12:47
Analysis Date: 12/08/23 21:47
Comments: MFK-AM02-112723-HM

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	**7429-90-5**	**707**	E	**25.8**
Antimony	**7440-36-0**	**0.0571**	SL	**0.0354**
Arsenic	**7440-38-2**	**0.457**		**0.00767**
Barium	**7440-39-3**	**7.09**		**0.761**
Beryllium	**7440-41-7**	**0.0213**		**0.00267**
Cadmium	7440-43-9	0.0147	U	0.0875
Calcium	**7440-70-2**	**498**	GC-BS, QB-01	**234**
Chromium	**7440-47-3**	**1.86**		**1.63**
Cobalt	**7440-48-4**	**0.347**	QB-01	**0.0125**
Copper	**7440-50-8**	**22.1**		**2.41**
Iron	**7439-89-6**	**757**	QB-01	**19.4**
Lead	**7439-92-1**	**0.294**		**0.222**
Magnesium	**7439-95-4**	**217**		**77.4**
Manganese	**7439-96-5**	**20.1**		**0.956**
Molybdenum	**7439-98-7**	**1.37**	QB-01	**0.171**
Nickel	**7440-02-0**	**0.939**		**0.643**
Phosphorus	7723-14-0	373	U, GC-BS, LJ, QX	1000
Potassium	**7440-09-7**	**125**		**30.5**
Rubidium	**7440-17-7**	**0.217**		**0.0147**
Selenium	**7782-49-2**	**0.200**		**0.00883**
Sodium	**7440-23-5**	**1700**	E, GC-BS	**1610**
Strontium	**7440-24-6**	**5.06**	QB-01	**0.524**
Thallium	**7440-28-0**	**0.00154**		**4.04E-4**
Thorium	**7440-29-01**	**0.0221**		**0.00241**
Uranium	**7440-61-1**	**0.0165**		**0.0137**
Vanadium	**7440-62-2**	**2.74**		**0.0395**
Zinc	7440-66-6	31.6	U	78.5

CERTIFICATE OF ANALYSIS

Tetra Tech, Inc.
1777 Sentry Pkwy, Bldg 12
Blue Bell, PA 19422
ATTN: Ms. Chelsea Saber
PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 12/14/23 11:51
SUBMITTED: 12/04/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9541925
Matrix: Air
Lab ID: 3120430-03
Sample Volume: 1925.486 m^3
Filter ID:
Sampled: 11/27/23 23:59
Received: 12/04/23 12:47
Analysis Date: 12/08/23 22:05
Comments: MFK-AM03-112723-HM

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	**7429-90-5**	**329**		**27.1**
Antimony	**7440-36-0**	**0.0715**	SL	**0.0373**
Arsenic	**7440-38-2**	**0.103**		**0.00807**
Barium	**7440-39-3**	**5.19**		**0.801**
Beryllium	**7440-41-7**	**0.0133**		**0.00281**
Cadmium	7440-43-9	0.00668	U	0.0921
Calcium	**7440-70-2**	**603**	GC-BS, QB-01	**247**
Chromium	**7440-47-3**	**1.96**		**1.72**
Cobalt	**7440-48-4**	**0.232**	QB-01	**0.0132**
Copper	**7440-50-8**	**39.5**		**2.53**
Iron	**7439-89-6**	**428**	QB-01	**20.4**
Lead	7439-92-1	0.227	U	0.233
Magnesium	**7439-95-4**	**226**		**81.5**
Manganese	**7439-96-5**	**11.8**		**1.01**
Molybdenum	**7439-98-7**	**1.39**	QB-01	**0.180**
Nickel	**7440-02-0**	**1.00**		**0.677**
Phosphorus	7723-14-0	401	U, GC-BS, LJ, QX	1060
Potassium	**7440-09-7**	**113**		**32.1**
Rubidium	**7440-17-7**	**0.158**		**0.0155**
Selenium	**7782-49-2**	**0.152**		**0.00929**
Sodium	**7440-23-5**	**1950**	E, GC-BS	**1690**
Strontium	**7440-24-6**	**3.52**	QB-01	**0.551**
Thallium	**7440-28-0**	**9.45E-4**		**4.25E-4**
Thorium	**7440-29-01**	**0.0137**		**0.00253**
Uranium	7440-61-1	0.00951	U	0.0144
Vanadium	**7440-62-2**	**2.21**		**0.0416**
Zinc	7440-66-6	30.6	U	82.6

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Tetra Tech, Inc.
1777 Sentry Pkwy, Bldg 12
Blue Bell, PA 19422
ATTN: Ms. Chelsea Saber
PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 12/14/23 11:51
SUBMITTED: 12/04/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9541900 FB
Matrix: Air
Lab ID: 3120430-04
Sample Volume: 2038.818 m³
Filter ID:
Sampled: 11/27/23 00:00
Received: 12/04/23 12:47
Analysis Date: 12/08/23 22:20
Comments: MFK-FB01-112723-HM Field Blank

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	7429-90-5	23.1	U	25.6
Antimony	7440-36-0	0.0100	U, SL	0.0352
Arsenic	7440-38-2	0.00478	U	0.00762
Barium	**7440-39-3**	**0.845**	FB-01	**0.757**
Beryllium	7440-41-7	0.00106	U	0.00265
Cadmium	7440-43-9	0.00145	U	0.0870
Calcium	7440-70-2	173	U, FB-01, GC-BS, QB-01	233
Chromium	7440-47-3	1.13	U	1.62
Cobalt	**7440-48-4**	**0.0292**	QB-01	**0.0124**
Copper	7440-50-8	0.256	U	2.39
Iron	**7439-89-6**	**21.4**	FB-01, QB-01	**19.3**
Lead	7439-92-1	0.0337	U	0.220
Magnesium	7439-95-4	37.8	U	76.9
Manganese	7439-96-5	0.391	U	0.950
Molybdenum	**7439-98-7**	**0.172**	FB-01, QB-01	**0.170**
Nickel	7440-02-0	0.219	U	0.639
Phosphorus	7723-14-0	298	U, GC-BS, LJ, QX	998
Potassium	**7440-09-7**	**43.4**	FB-01	**30.3**
Rubidium	7440-17-7	0.0131	U	0.0146
Selenium	7782-49-2	0.00482	U	0.00878
Sodium	7440-23-5	711	U, GC-BS	1600
Strontium	7440-24-6	0.381	U, QB-01	0.520
Thallium	7440-28-0	1.58E-4	U	4.01E-4
Thorium	7440-29-01	0.00213	U	0.00239
Uranium	7440-61-1	0.00131	U	0.0136
Vanadium	7440-62-2	0.0288	U	0.0393
Zinc	7440-66-6	18.7	U	78.0

CERTIFICATE OF ANALYSIS

Tetra Tech, Inc.
1777 Sentry Pkwy, Bldg 12
Blue Bell, PA 19422
ATTN: Ms. Chelsea Saber
PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 12/14/23 11:51
SUBMITTED: 12/04/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9541923 **Lab ID:** 3120430-05 **Sampled:** 11/28/23 23:59
Matrix: Air **Sample Volume:** 2018.075 m³ **Received:** 12/04/23 12:47
Filter ID: **Analysis Date:** 12/08/23 22:35
Comments: MFK-AM01-112823-HM

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	**7429-90-5**	**2970**	E	**25.9**
Antimony	**7440-36-0**	**0.0518**	SL	**0.0356**
Arsenic	**7440-38-2**	**0.377**		**0.00770**
Barium	**7440-39-3**	**20.3**		**0.764**
Beryllium	**7440-41-7**	**0.0795**		**0.00268**
Cadmium	7440-43-9	0.0212	U	0.0879
Calcium	**7440-70-2**	**984**	GC-BS, QB-01	**235**
Chromium	**7440-47-3**	**3.58**		**1.64**
Cobalt	**7440-48-4**	**1.12**	QB-01	**0.0126**
Copper	**7440-50-8**	**17.6**		**2.42**
Lead	**7439-92-1**	**0.620**		**0.223**
Magnesium	**7439-95-4**	**253**		**77.7**
Manganese	**7439-96-5**	**80.7**		**0.959**
Molybdenum	**7439-98-7**	**0.896**	QB-01	**0.172**
Nickel	**7440-02-0**	**1.61**		**0.646**
Phosphorus	7723-14-0	512	U, GC-BS, LJ, QX	1010
Potassium	**7440-09-7**	**128**		**30.6**
Rubidium	**7440-17-7**	**0.469**		**0.0148**
Selenium	**7782-49-2**	**0.469**		**0.00887**
Sodium	7440-23-5	1190	U, GC-BS	1610
Strontium	**7440-24-6**	**11.8**	QB-01	**0.526**
Thallium	**7440-28-0**	**0.00452**		**4.06E-4**
Thorium	**7440-29-01**	**0.0703**		**0.00242**
Uranium	**7440-61-1**	**0.0519**		**0.0137**
Vanadium	**7440-62-2**	**7.12**		**0.0397**
Zinc	7440-66-6	38.1	U	78.8

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CERTIFICATE OF ANALYSIS

Tetra Tech, Inc.
1777 Sentry Pkwy, Bldg 12
Blue Bell, PA 19422
ATTN: Ms. Chelsea Saber
PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 12/14/23 11:51
SUBMITTED: 12/04/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9541923 **Lab ID:** 3120430-05RE1 **Sampled:** 11/28/23 23:59
Matrix: Air **Sample Volume:** 2018.075 m³ **Received:** 12/04/23 12:47
Filter ID: **Analysis Date:** 12/11/23 23:25
Comments: MFK-AM01-112823-HM

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Iron	7439-89-6	2860	D	97.6

CERTIFICATE OF ANALYSIS

Tetra Tech, Inc.
1777 Sentry Pkwy, Bldg 12
Blue Bell, PA 19422
ATTN: Ms. Chelsea Saber
PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 12/14/23 11:51
SUBMITTED: 12/04/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9541921
Matrix: Air
Lab ID: 3120430-06
Sample Volume: 2026.064 m³
Filter ID:
Sampled: 11/28/23 23:59
Received: 12/04/23 12:47
Analysis Date: 12/08/23 18:52

Comments: MFK-AM02-112823-HM/MS/MSD

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	**7429-90-5**	**340**	A-01	**25.8**
Antimony	**7440-36-0**	**0.0483**	SL	**0.0354**
Arsenic	**7440-38-2**	**0.169**		**0.00767**
Barium	**7440-39-3**	**4.13**		**0.761**
Beryllium	**7440-41-7**	**0.0113**		**0.00267**
Cadmium	7440-43-9	0.00755	U	0.0875
Calcium	**7440-70-2**	**527**	GC-BS, QB-01	**234**
Chromium	**7440-47-3**	**1.70**		**1.63**
Cobalt	**7440-48-4**	**0.176**	QB-01	**0.0125**
Copper	**7440-50-8**	**13.2**		**2.41**
Iron	**7439-89-6**	**360**	QB-01, QM-4X	**19.4**
Lead	7439-92-1	0.173	U	0.222
Magnesium	**7439-95-4**	**158**		**77.4**
Manganese	**7439-96-5**	**9.44**		**0.956**
Molybdenum	**7439-98-7**	**0.960**	QB-01	**0.171**
Nickel	7440-02-0	0.556	U	0.643
Phosphorus	7723-14-0	384	A-01, GC-BS, LJ, QM-4X, QX, U	1000
Potassium	**7440-09-7**	**116**	QM-07	**30.5**
Rubidium	**7440-17-7**	**0.173**		**0.0147**
Selenium	**7782-49-2**	**0.115**		**0.00883**
Sodium	7440-23-5	1420	A-01, GC-BS, QM-4X, U	1610
Strontium	**7440-24-6**	**3.24**	QB-01	**0.524**
Thallium	**7440-28-0**	**8.68E-4**		**4.04E-4**
Thorium	**7440-29-01**	**0.0114**	QM-07	**0.00241**
Uranium	7440-61-1	0.00844	U	0.0137
Vanadium	**7440-62-2**	**1.20**		**0.0395**
Zinc	7440-66-6	20.8	U	78.5

CERTIFICATE OF ANALYSIS

Tetra Tech, Inc.
1777 Sentry Pkwy, Bldg 12
Blue Bell, PA 19422
ATTN: Ms. Chelsea Saber
PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 12/14/23 11:51
SUBMITTED: 12/04/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9541920 **Lab ID:** 3120430-07 **Sampled:** 11/28/23 23:59
Matrix: Air **Sample Volume:** 1892.969 m³ **Received:** 12/04/23 12:47
Filter ID: **Analysis Date:** 12/08/23 22:52
Comments: MFK-AM03-112823-HM

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	**7429-90-5**	**340**		**27.6**
Antimony	**7440-36-0**	**0.0727**	SL	**0.0379**
Arsenic	**7440-38-2**	**0.0950**		**0.00821**
Barium	**7440-39-3**	**6.24**		**0.815**
Beryllium	**7440-41-7**	**0.0148**		**0.00285**
Cadmium	7440-43-9	0.00721	U	0.0937
Calcium	**7440-70-2**	**566**	GC-BS, QB-01	**251**
Chromium	**7440-47-3**	**1.87**		**1.74**
Cobalt	**7440-48-4**	**0.220**	QB-01	**0.0134**
Copper	**7440-50-8**	**27.5**		**2.58**
Iron	**7439-89-6**	**420**	QB-01	**20.8**
Lead	**7439-92-1**	**0.457**		**0.237**
Magnesium	**7439-95-4**	**183**		**82.9**
Manganese	**7439-96-5**	**12.9**		**1.02**
Molybdenum	**7439-98-7**	**1.05**	QB-01	**0.183**
Nickel	7440-02-0	0.556	U	0.688
Phosphorus	7723-14-0	399	GC-BS, U, LJ, QX	1070
Potassium	**7440-09-7**	**101**		**32.7**
Rubidium	**7440-17-7**	**0.175**		**0.0157**
Selenium	**7782-49-2**	**0.132**		**0.00945**
Sodium	7440-23-5	1610	U, GC-BS	1720
Strontium	**7440-24-6**	**4.09**	QB-01	**0.560**
Thallium	**7440-28-0**	**0.00103**		**4.32E-4**
Thorium	**7440-29-01**	**0.0113**		**0.00258**
Uranium	7440-61-1	0.00963	U	0.0146
Vanadium	**7440-62-2**	**1.27**		**0.0423**
Zinc	7440-66-6	25.2	U	84.0

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Tetra Tech, Inc.
1777 Sentry Pkwy, Bldg 12
Blue Bell, PA 19422
ATTN: Ms. Chelsea Saber
PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 12/14/23 11:51
SUBMITTED: 12/04/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9541919
Matrix: Air
Comments: MFK-AM01-112923-HM

Lab ID: 3120430-08
Sample Volume: 2041.36(m³
Filter ID:

Sampled: 11/29/23 23:59
Received: 12/04/23 12:47
Analysis Date: 12/08/23 23:08

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	**7429-90-5**	**796**	E	**25.6**
Antimony	**7440-36-0**	**0.0435**	SL	**0.0351**
Arsenic	**7440-38-2**	**0.143**		**0.00761**
Barium	**7440-39-3**	**5.82**		**0.756**
Beryllium	**7440-41-7**	**0.0195**		**0.00265**
Cadmium	7440-43-9	0.00847	U	0.0869
Calcium	**7440-70-2**	**549**	GC-BS, QB-01	**233**
Chromium	**7440-47-3**	**1.93**		**1.62**
Cobalt	**7440-48-4**	**0.296**	QB-01	**0.0124**
Copper	**7440-50-8**	**19.5**		**2.39**
Iron	**7439-89-6**	**755**	QB-01	**19.3**
Lead	**7439-92-1**	**0.313**		**0.220**
Magnesium	**7439-95-4**	**145**		**76.8**
Manganese	**7439-96-5**	**19.8**		**0.948**
Molybdenum	**7439-98-7**	**1.13**	QB-01	**0.170**
Nickel	7440-02-0	0.593	U	0.638
Phosphorus	7723-14-0	402	U, GC-BS, LJ, QX	996
Potassium	**7440-09-7**	**122**		**30.3**
Rubidium	**7440-17-7**	**0.234**		**0.0146**
Selenium	**7782-49-2**	**0.176**		**0.00877**
Sodium	7440-23-5	1200	U, GC-BS	1590
Strontium	**7440-24-6**	**4.41**	QB-01	**0.520**
Thallium	**7440-28-0**	**0.00141**		**4.01E-4**
Thorium	**7440-29-01**	**0.0167**		**0.00239**
Uranium	**7440-61-1**	**0.0143**		**0.0135**
Vanadium	**7440-62-2**	**1.77**		**0.0392**
Zinc	7440-66-6	16.4	U	77.9

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Tetra Tech, Inc.
1777 Sentry Pkwy, Bldg 12
Blue Bell, PA 19422
ATTN: Ms. Chelsea Saber
PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 12/14/23 11:51
SUBMITTED: 12/04/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9541227
Matrix: Air
Lab ID: 3120430-09
Sample Volume: 2027.752 m³
Filter ID:
Sampled: 11/29/23 23:59
Received: 12/04/23 12:47
Analysis Date: 12/08/23 23:23
Comments: MFK-AM02-112923-HM

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	**7429-90-5**	**121**		**25.8**
Antimony	**7440-36-0**	**0.0488**	SL	**0.0354**
Arsenic	**7440-38-2**	**0.107**		**0.00766**
Barium	**7440-39-3**	**3.20**		**0.761**
Beryllium	**7440-41-7**	**0.00394**		**0.00266**
Cadmium	7440-43-9	0.00481	U	0.0875
Calcium	**7440-70-2**	**243**	GC-BS, QB-01	**234**
Chromium	7440-47-3	1.24	U	1.63
Cobalt	**7440-48-4**	**0.0699**	QB-01	**0.0125**
Copper	**7440-50-8**	**16.2**		**2.41**
Iron	**7439-89-6**	**129**	QB-01	**19.4**
Lead	7439-92-1	0.0826	U	0.221
Magnesium	**7439-95-4**	**120**		**77.3**
Manganese	**7439-96-5**	**3.02**		**0.955**
Molybdenum	**7439-98-7**	**1.15**	QB-01	**0.171**
Nickel	7440-02-0	0.344	U	0.643
Phosphorus	7723-14-0	332	U, LJ, QX, GC-BS	1000
Potassium	**7440-09-7**	**117**		**30.5**
Rubidium	**7440-17-7**	**0.120**		**0.0147**
Selenium	**7782-49-2**	**0.0881**		**0.00883**
Sodium	7440-23-5	1200	U, GC-BS	1600
Strontium	**7440-24-6**	**1.32**	QB-01	**0.523**
Thallium	**7440-28-0**	**5.22E-4**		**4.04E-4**
Thorium	**7440-29-01**	**0.00451**		**0.00241**
Uranium	7440-61-1	0.00337	U	0.0136
Vanadium	**7440-62-2**	**0.319**		**0.0395**
Zinc	7440-66-6	14.8	U	78.4

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Tetra Tech, Inc.
1777 Sentry Pkwy, Bldg 12
Blue Bell, PA 19422
ATTN: Ms. Chelsea Saber
PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 12/14/23 11:51
SUBMITTED: 12/04/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9541899
Matrix: Air
Lab ID: 3120430-10
Sample Volume: 1805.088 m³
Filter ID:
Sampled: 11/29/23 23:59
Received: 12/04/23 12:47
Analysis Date: 12/08/23 23:36

Comments: MFK-AM03-112923-HM

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	**7429-90-5**	**155**		**28.9**
Antimony	**7440-36-0**	**0.0878**	SL	**0.0397**
Arsenic	**7440-38-2**	**0.0858**		**0.00861**
Barium	**7440-39-3**	**4.18**		**0.854**
Beryllium	**7440-41-7**	**0.00633**		**0.00299**
Cadmium	7440-43-9	0.00512	U	0.0982
Calcium	**7440-70-2**	**279**	GC-BS, QB-01	**263**
Chromium	7440-47-3	1.49	U	1.83
Cobalt	**7440-48-4**	**0.0929**	QB-01	**0.0141**
Copper	**7440-50-8**	**38.2**		**2.70**
Iron	**7439-89-6**	**184**	QB-01	**21.8**
Lead	7439-92-1	0.157	U	0.249
Magnesium	**7439-95-4**	**135**		**86.9**
Manganese	**7439-96-5**	**4.78**		**1.07**
Molybdenum	**7439-98-7**	**1.20**	QB-01	**0.192**
Nickel	7440-02-0	0.448	U	0.722
Phosphorus	7723-14-0	377	U, GC-BS, LJ, QX	1130
Potassium	**7440-09-7**	**94.3**		**34.3**
Rubidium	**7440-17-7**	**0.103**		**0.0165**
Selenium	**7782-49-2**	**0.123**		**0.00991**
Sodium	7440-23-5	1470	U, GC-BS	1800
Strontium	**7440-24-6**	**1.75**	QB-01	**0.588**
Thallium	**7440-28-0**	**6.73E-4**		**4.53E-4**
Thorium	**7440-29-01**	**0.00607**		**0.00270**
Uranium	7440-61-1	0.00469	U	0.0153
Vanadium	**7440-62-2**	**0.496**		**0.0443**
Zinc	7440-66-6	22.3	U	88.1

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Tetra Tech, Inc.
1777 Sentry Pkwy, Bldg 12
Blue Bell, PA 19422
ATTN: Ms. Chelsea Saber
PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 12/14/23 11:51
SUBMITTED: 12/04/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9541909 FB
Lab ID: 3120430-11
Sampled: 11/29/23 00:00
Matrix: Air
Sample Volume: 2041.36(m³
Received: 12/04/23 12:47
Filter ID:
Analysis Date: 12/09/23 01:04
Comments: MFK-FB01-112923-HM Field Blank

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	7429-90-5	17.3	U	25.6
Antimony	7440-36-0	0.00602	U, SL	0.0351
Arsenic	7440-38-2	0.00518	U	0.00761
Barium	7440-39-3	0.626	U	0.756
Beryllium	7440-41-7	0.00115	U	0.00265
Cadmium	7440-43-9	0.00178	U	0.0869
Calcium	**7440-70-2**	**359**	FB-01, GC-BS, QB-01	**233**
Chromium	7440-47-3	1.36	U	1.62
Cobalt	**7440-48-4**	**0.0350**	FB-01, QB-01	**0.0124**
Copper	7440-50-8	0.313	U	2.39
Iron	**7439-89-6**	**21.6**	FB-01, QB-01	**19.3**
Lead	7439-92-1	0.0496	U	0.220
Magnesium	7439-95-4	44.1	U	76.8
Manganese	7439-96-5	0.301	U	0.948
Molybdenum	**7439-98-7**	**0.233**	QB-01, FB-01	**0.170**
Nickel	7440-02-0	0.234	U	0.638
Phosphorus	7723-14-0	348	U, GC-BS, LJ, QX	996
Potassium	7440-09-7	29.8	U	30.3
Rubidium	**7440-17-7**	**0.0165**	FB-01	**0.0146**
Selenium	7782-49-2	0.00728	U	0.00877
Sodium	7440-23-5	712	U, GC-BS	1590
Strontium	**7440-24-6**	**0.738**	FB-01, QB-01	**0.520**
Thallium	7440-28-0	1.21E-4	U	4.01E-4
Thorium	7440-29-01	0.00230	U	0.00239
Uranium	7440-61-1	0.00178	U	0.0135
Vanadium	7440-62-2	0.0147	U	0.0392
Zinc	7440-66-6	10.4	U	77.9

The results in this report apply only to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

CERTIFICATE OF ANALYSIS

Tetra Tech, Inc.
1777 Sentry Pkwy, Bldg 12
Blue Bell, PA 19422
ATTN: Ms. Chelsea Saber
PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 12/14/23 11:51
SUBMITTED: 12/04/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9541226 FB **Lab ID:** 3120430-12 **Sampled:** 11/28/23 00:00
Matrix: Air **Sample Volume:** 2018.075 m³ **Received:** 12/04/23 12:47
Filter ID: **Analysis Date:** 12/09/23 01:19
Comments: MFK-FB01-112823-HM Field Blank

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	7429-90-5	17.8	U	25.9
Antimony	7440-36-0	0.0117	U, SL	0.0356
Arsenic	7440-38-2	0.00456	U	0.00770
Barium	7440-39-3	0.580	U	0.764
Beryllium	7440-41-7	0.00101	U	0.00268
Cadmium	7440-43-9	0.00220	U	0.0879
Calcium	7440-70-2	169	GC-BS, QB-01, U	235
Chromium	7440-47-3	1.16	U	1.64
Cobalt	**7440-48-4**	**0.0316**	FB-01, QB-01	**0.0126**
Copper	7440-50-8	0.268	U	2.42
Iron	7439-89-6	18.5	QB-01, U	19.5
Lead	7439-92-1	0.0445	U	0.223
Magnesium	7439-95-4	36.6	U	77.7
Manganese	7439-96-5	0.351	U	0.959
Molybdenum	**7439-98-7**	**0.181**	FB-01, QB-01	**0.172**
Nickel	7440-02-0	0.273	U	0.646
Phosphorus	7723-14-0	305	GC-BS, LJ, QX, U	1010
Potassium	7440-09-7	14.5	U	30.6
Rubidium	7440-17-7	0.0115	U	0.0148
Selenium	7782-49-2	0.00469	U	0.00887
Sodium	7440-23-5	687	GC-BS, U	1610
Strontium	7440-24-6	0.400	QB-01, U	0.526
Thallium	7440-28-0	1.58E-4	U	4.06E-4
Thorium	7440-29-01	0.00200	U	0.00242
Uranium	7440-61-1	0.00131	U	0.0137
Vanadium	7440-62-2	0.0254	U	0.0397
Zinc	7440-66-6	13.0	U	78.8

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CERTIFICATE OF ANALYSIS

Tetra Tech, Inc.
1777 Sentry Pkwy, Bldg 12
Blue Bell, PA 19422
ATTN: Ms. Chelsea Saber
PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 12/14/23 11:51
SUBMITTED: 12/04/23
AQS SITE CODE:
SITE CODE: Maui fires

Inorganics by Compendium Method IO-3.5 - Quality Control

Batch 2312024 - B3L0605

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Calibration Blank (2312024-CCB1)				Prepared: 12/07/23 Analyzed: 12/08/23						
Aluminum	22.7		ng/l							
Antimony	1.43		ng/l							
Arsenic	2.60		ng/l							
Barium	2.14		ng/l							
Beryllium	1.30		ng/l							
Cadmium	0.788		ng/l							
Calcium	583		ng/l							
Chromium	3.60		ng/l							
Cobalt	0.421		ng/l							
Copper	114		ng/l							
Iron	120		ng/l							
Lead	3.23		ng/l							
Magnesium	22.4		ng/l							
Manganese	6.32		ng/l							
Molybdenum	26.6		ng/l							
Nickel	3.26		ng/l							
Phosphorus	118		ng/l							LJ, QX
Potassium	2310		ng/l							
Rubidium	0.519		ng/l							
Selenium	11.4		ng/l							
Sodium	107		ng/l							
Strontium	0.650		ng/l							
Thallium	0.403		ng/l							
Thorium	0.267		ng/l							
Uranium	-0.0238		ng/l							U
Vanadium	-48.3		ng/l							U
Zinc	16.1		ng/l							
Calibration Blank (2312024-CCB2)				Prepared: 12/07/23 Analyzed: 12/08/23						
Aluminum	-39.2		ng/l							U
Antimony	0.577		ng/l							
Arsenic	-2.80		ng/l							U
Barium	2.41		ng/l							
Beryllium	0.868		ng/l							
Cadmium	0.476		ng/l							
Calcium	409		ng/l							
Chromium	4.62		ng/l							
Cobalt	0.530		ng/l							
Copper	79.1		ng/l							

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1777 Sentry Pkwy, Bldg 12
Blue Bell, PA 19422
ATTN: Ms. Chelsea Saber
PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 12/14/23 11:51
SUBMITTED: 12/04/23
AQS SITE CODE:
SITE CODE: Maui fires

Inorganics by Compendium Method IO-3.5 - Quality Control

Batch 2312024 - B3L0605

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Calibration Blank (2312024-CCB2) Contin				Prepared: 12/07/23 Analyzed: 12/08/23						
Iron	90.1		ng/l							
Lead	3.54		ng/l							
Magnesium	57.3		ng/l							
Manganese	8.13		ng/l							
Molybdenum	11.8		ng/l							
Nickel	4.68		ng/l							
Phosphorus	-140		ng/l							LJ, QX, U
Potassium	1510		ng/l							
Rubidium	1.09		ng/l							
Selenium	17.4		ng/l							
Sodium	4.88		ng/l							
Strontium	1.49		ng/l							
Thallium	0.554		ng/l							
Thorium	0.228		ng/l							
Uranium	-0.0186		ng/l							U
Vanadium	-54.6		ng/l							U
Zinc	46.9		ng/l							
Calibration Blank (2312024-CCB3)				Prepared: 12/07/23 Analyzed: 12/09/23						
Aluminum	-29.2		ng/l							U
Antimony	0.769		ng/l							
Arsenic	3.29		ng/l							
Barium	4.74		ng/l							
Beryllium	0.638		ng/l							
Cadmium	0.435		ng/l							
Calcium	635		ng/l							
Chromium	8.92		ng/l							
Cobalt	0.938		ng/l							
Copper	83.1		ng/l							
Iron	306		ng/l							
Lead	4.48		ng/l							
Magnesium	12.0		ng/l							
Manganese	11.4		ng/l							
Molybdenum	13.0		ng/l							
Nickel	7.00		ng/l							
Phosphorus	448		ng/l							LJ, QX
Potassium	1370		ng/l							
Rubidium	1.34		ng/l							
Selenium	19.5		ng/l							

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CERTIFICATE OF ANALYSIS

Tetra Tech, Inc.
1777 Sentry Pkwy, Bldg 12
Blue Bell, PA 19422
ATTN: Ms. Chelsea Saber
PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 12/14/23 11:51
SUBMITTED: 12/04/23
AQS SITE CODE:
SITE CODE: Maui fires

Inorganics by Compendium Method IO-3.5 - Quality Control

Batch 2312024 - B3L0605

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Calibration Blank (2312024-CCB3) Contin				Prepared: 12/07/23	Analyzed: 12/09/23					
Sodium	-40.6		ng/l							U
Strontium	2.24		ng/l							
Thallium	0.478		ng/l							
Thorium	0.161		ng/l							
Uranium	-0.00840		ng/l							U
Vanadium	-63.5		ng/l							U
Zinc	8.53		ng/l							
Calibration Blank (2312024-CCB4)				Prepared: 12/07/23	Analyzed: 12/09/23					
Aluminum	-27.2		ng/l							U
Antimony	0.628		ng/l							
Arsenic	-1.84		ng/l							U
Barium	2.54		ng/l							
Beryllium	0.732		ng/l							
Cadmium	0.323		ng/l							
Calcium	497		ng/l							
Chromium	5.53		ng/l							
Cobalt	0.699		ng/l							
Copper	63.0		ng/l							
Iron	45.0		ng/l							
Lead	3.14		ng/l							
Magnesium	-3.93		ng/l							U
Manganese	8.06		ng/l							
Molybdenum	9.16		ng/l							
Nickel	3.98		ng/l							
Phosphorus	86.5		ng/l							LJ, QX
Potassium	840		ng/l							
Rubidium	0.219		ng/l							
Selenium	7.92		ng/l							
Sodium	-146		ng/l							U
Strontium	1.17		ng/l							
Thallium	0.405		ng/l							
Thorium	0.0532		ng/l							
Uranium	-0.0161		ng/l							U
Vanadium	-64.8		ng/l							U
Zinc	-5.55		ng/l							U
Calibration Check (2312024-CCV1)				Prepared: 12/07/23	Analyzed: 12/08/23					
Aluminum	1.55E6		ng/l	1.5000E6		103	90-110			
Antimony	20200		ng/l	20000		101	90-110			

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Inorganics by Compendium Method IO-3.5 - Quality Control

Batch 2312024 - B3L0605

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Calibration Check (2312024-CCV1) Contin				Prepared: 12/07/23	Analyzed: 12/08/23					
Arsenic	20200		ng/l	20000		101	90-110			
Barium	199000		ng/l	200000		99.4	90-110			
Beryllium	4820		ng/l	5000.0		96.3	90-110			
Cadmium	20400		ng/l	20000		102	90-110			
Calcium	2.49E7		ng/l	2.5000E7		99.8	90-110			
Chromium	237000		ng/l	240000		98.7	90-110			
Cobalt	50700		ng/l	50000		101	90-110			
Copper	2.02E6		ng/l	2.0000E6		101	90-110			
Iron	2.53E6		ng/l	2.5000E6		101	90-110			
Lead	198000		ng/l	200000		99.2	90-110			
Magnesium	1.04E6		ng/l	1.0000E6		104	90-110			
Manganese	499000		ng/l	500000		99.8	90-110			
Molybdenum	50000		ng/l	50000		100	90-110			
Nickel	123000		ng/l	120000		102	90-110			
Phosphorus	207000		ng/l	200000		104	90-110			LJ, QX
Potassium	2.52E6		ng/l	2.5000E6		101	90-110			
Rubidium	9990		ng/l	10000		99.9	90-110			
Selenium	20100		ng/l	20000		100	90-110			
Sodium	2.56E6		ng/l	2.5000E6		103	90-110			
Strontium	49800		ng/l	50000		99.6	90-110			
Thallium	483		ng/l	500.00		96.5	90-110			
Thorium	500		ng/l	500.00		99.9	90-110			
Uranium	489		ng/l	500.00		97.8	90-110			
Vanadium	19800		ng/l	20000		98.8	90-110			
Zinc	520000		ng/l	500000		104	90-110			
Calibration Check (2312024-CCV2)				Prepared: 12/07/23	Analyzed: 12/08/23					
Aluminum	1.50E6		ng/l	1.5000E6		99.9	90-110			
Antimony	20300		ng/l	20000		102	90-110			
Arsenic	19900		ng/l	20000		99.4	90-110			
Barium	196000		ng/l	200000		97.8	90-110			
Beryllium	4860		ng/l	5000.0		97.2	90-110			
Cadmium	20500		ng/l	20000		102	90-110			
Calcium	2.47E7		ng/l	2.5000E7		98.9	90-110			
Chromium	248000		ng/l	240000		103	90-110			
Cobalt	49500		ng/l	50000		99.0	90-110			
Copper	1.98E6		ng/l	2.0000E6		99.1	90-110			
Iron	2.48E6		ng/l	2.5000E6		99.3	90-110			
Lead	198000		ng/l	200000		98.8	90-110			

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Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes

Inorganics by Compendium Method IO-3.5 - Quality Control

Batch 2312024 - B3L0605

Calibration Check (2312024-CCV2) Contin Prepared: 12/07/23 Analyzed: 12/08/23

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Magnesium	1.02E6		ng/l	1.0000E6		102	90-110			
Manganese	492000		ng/l	500000		98.4	90-110			
Molybdenum	49500		ng/l	50000		98.9	90-110			
Nickel	121000		ng/l	120000		100	90-110			
Phosphorus	200000		ng/l	200000		99.8	90-110			LJ, QX
Potassium	2.47E6		ng/l	2.5000E6		99.0	90-110			
Rubidium	10000		ng/l	10000		100	90-110			
Selenium	19700		ng/l	20000		98.6	90-110			
Sodium	2.49E6		ng/l	2.5000E6		99.6	90-110			
Strontium	49400		ng/l	50000		98.8	90-110			
Thallium	479		ng/l	500.00		95.8	90-110			
Thorium	496		ng/l	500.00		99.2	90-110			
Uranium	485		ng/l	500.00		97.0	90-110			
Vanadium	20000		ng/l	20000		100	90-110			
Zinc	516000		ng/l	500000		103	90-110			

Calibration Check (2312024-CCV3) Prepared: 12/07/23 Analyzed: 12/09/23

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Aluminum	1.45E6		ng/l	1.5000E6		96.8	90-110			
Antimony	20200		ng/l	20000		101	90-110			
Arsenic	19800		ng/l	20000		99.1	90-110			
Barium	199000		ng/l	200000		99.4	90-110			
Beryllium	4530		ng/l	5000.0		90.7	90-110			
Cadmium	20400		ng/l	20000		102	90-110			
Calcium	2.43E7		ng/l	2.5000E7		97.0	90-110			
Chromium	242000		ng/l	240000		101	90-110			
Cobalt	48900		ng/l	50000		97.8	90-110			
Copper	1.98E6		ng/l	2.0000E6		98.9	90-110			
Iron	2.43E6		ng/l	2.5000E6		97.3	90-110			
Lead	195000		ng/l	200000		97.4	90-110			
Magnesium	998000		ng/l	1.0000E6		99.8	90-110			
Manganese	482000		ng/l	500000		96.5	90-110			
Molybdenum	50600		ng/l	50000		101	90-110			
Nickel	119000		ng/l	120000		99.5	90-110			
Phosphorus	195000		ng/l	200000		97.7	90-110			LJ, QX
Potassium	2.42E6		ng/l	2.5000E6		96.8	90-110			
Rubidium	9840		ng/l	10000		98.4	90-110			
Selenium	19700		ng/l	20000		98.7	90-110			
Sodium	2.46E6		ng/l	2.5000E6		98.5	90-110			
Strontium	48600		ng/l	50000		97.2	90-110			

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Inorganics by Compendium Method IO-3.5 - Quality Control

Batch 2312024 - B3L0605

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Calibration Check (2312024-CCV3) Contin				Prepared: 12/07/23			Analyzed: 12/09/23			
Thallium	473		ng/l	500.00		94.6	90-110			
Thorium	491		ng/l	500.00		98.2	90-110			
Uranium	485		ng/l	500.00		97.1	90-110			
Vanadium	19800		ng/l	20000		99.2	90-110			
Zinc	510000		ng/l	500000		102	90-110			
Calibration Check (2312024-CCV4)				Prepared: 12/07/23			Analyzed: 12/09/23			
Aluminum	1.44E6		ng/l	1.5000E6		96.3	90-110			
Antimony	19900		ng/l	20000		99.3	90-110			
Arsenic	19600		ng/l	20000		98.1	90-110			
Barium	198000		ng/l	200000		98.9	90-110			
Beryllium	4720		ng/l	5000.0		94.4	90-110			
Cadmium	20200		ng/l	20000		101	90-110			
Calcium	2.42E7		ng/l	2.5000E7		96.8	90-110			
Chromium	247000		ng/l	240000		103	90-110			
Cobalt	48800		ng/l	50000		97.7	90-110			
Copper	1.98E6		ng/l	2.0000E6		99.2	90-110			
Iron	2.43E6		ng/l	2.5000E6		97.2	90-110			
Lead	195000		ng/l	200000		97.4	90-110			
Magnesium	986000		ng/l	1.0000E6		98.6	90-110			
Manganese	485000		ng/l	500000		97.0	90-110			
Molybdenum	49900		ng/l	50000		99.9	90-110			
Nickel	120000		ng/l	120000		99.8	90-110			
Phosphorus	197000		ng/l	200000		98.6	90-110			LJ, QX
Potassium	2.41E6		ng/l	2.5000E6		96.4	90-110			
Rubidium	9830		ng/l	10000		98.3	90-110			
Selenium	19600		ng/l	20000		98.2	90-110			
Sodium	2.44E6		ng/l	2.5000E6		97.6	90-110			
Strontium	48100		ng/l	50000		96.3	90-110			
Thallium	469		ng/l	500.00		93.7	90-110			
Thorium	485		ng/l	500.00		97.0	90-110			
Uranium	481		ng/l	500.00		96.3	90-110			
Vanadium	19800		ng/l	20000		99.2	90-110			
Zinc	509000		ng/l	500000		102	90-110			
High Cal Check (2312024-HCV1)				Prepared: 12/07/23			Analyzed: 12/08/23			
Aluminum	2.93E6		ng/l	3.0000E6		97.7	95-105			
Antimony	39300		ng/l	40000		98.3	95-105			
Arsenic	39800		ng/l	40000		99.4	95-105			
Barium	393000		ng/l	400000		98.2	95-105			

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Inorganics by Compendium Method IO-3.5 - Quality Control

Batch 2312024 - B3L0605

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
High Cal Check (2312024-HCV1) Continue				Prepared: 12/07/23		Analyzed: 12/08/23				
Beryllium	10200		ng/l	10000		102	95-105			
Cadmium	39300		ng/l	40000		98.3	95-105			
Calcium	4.95E7		ng/l	5.0000E7		98.9	95-105			
Chromium	472000		ng/l	480000		98.3	95-105			
Cobalt	98600		ng/l	100000		98.6	95-105			
Copper	3.91E6		ng/l	4.0000E6		97.8	95-105			
Iron	4.94E6		ng/l	5.0000E6		98.9	95-105			
Lead	395000		ng/l	400000		98.9	95-105			
Magnesium	1.95E6		ng/l	2.0000E6		97.5	95-105			
Manganese	993000		ng/l	1.0000E6		99.3	95-105			
Molybdenum	98400		ng/l	100000		98.4	95-105			
Nickel	235000		ng/l	240000		98.0	95-105			
Phosphorus	397000		ng/l	400000		99.2	95-105			LJ, QX
Potassium	4.97E6		ng/l	5.0000E6		99.4	95-105			
Rubidium	19600		ng/l	20000		98.2	95-105			
Selenium	40000		ng/l	40000		100	95-105			
Sodium	4.91E6		ng/l	5.0000E6		98.3	95-105			
Strontium	98200		ng/l	100000		98.2	95-105			
Thallium	985		ng/l	1000.0		98.5	95-105			
Thorium	989		ng/l	1000.0		98.9	95-105			
Uranium	983		ng/l	1000.0		98.3	95-105			
Vanadium	39800		ng/l	40000		99.5	95-105			
Zinc	1.01E6		ng/l	1.0000E6		101	95-105			
Initial Cal Blank (2312024-ICB1)				Prepared: 12/07/23		Analyzed: 12/08/23				
Aluminum	-0.915		ng/l							U
Antimony	2.30		ng/l							
Arsenic	-2.34		ng/l							U
Barium	3.25		ng/l							
Beryllium	1.62		ng/l							
Cadmium	0.996		ng/l							
Calcium	684		ng/l							
Chromium	3.67		ng/l							
Cobalt	0.808		ng/l							
Copper	102		ng/l							
Iron	84.9		ng/l							
Lead	4.47		ng/l							
Magnesium	6.80		ng/l							
Manganese	9.90		ng/l							

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Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Initial Cal Blank (2312024-ICB1) Continu				Prepared: 12/07/23 Analyzed: 12/08/23						
Molybdenum	11.8		ng/l							
Nickel	-0.595		ng/l							U
Phosphorus	51.2		ng/l							LJ, QX
Potassium	1170		ng/l							
Rubidium	0.668		ng/l							
Selenium	15.6		ng/l							
Sodium	-118		ng/l							U
Strontium	1.84		ng/l							
Thallium	0.475		ng/l							
Thorium	0.354		ng/l							
Uranium	-0.00553		ng/l							U
Vanadium	-42.1		ng/l							U
Zinc	114		ng/l							
Initial Cal Check (2312024-ICV1)				Prepared: 12/07/23 Analyzed: 12/08/23						
Aluminum	1.46E6		ng/l	1.5000E6		97.2	90-110			
Antimony	19600		ng/l	20000		98.2	90-110			
Arsenic	19800		ng/l	20000		99.1	90-110			
Barium	197000		ng/l	200000		98.5	90-110			
Beryllium	4880		ng/l	5000.0		97.6	90-110			
Cadmium	20600		ng/l	20000		103	90-110			
Calcium	2.42E7		ng/l	2.5000E7		96.7	90-110			
Chromium	241000		ng/l	240000		100	90-110			
Cobalt	49800		ng/l	50000		99.6	90-110			
Copper	2.00E6		ng/l	2.0000E6		99.8	90-110			
Iron	2.50E6		ng/l	2.5000E6		100	90-110			
Lead	195000		ng/l	200000		97.7	90-110			
Magnesium	988000		ng/l	1.0000E6		98.8	90-110			
Manganese	489000		ng/l	500000		97.8	90-110			
Molybdenum	49600		ng/l	50000		99.2	90-110			
Nickel	119000		ng/l	120000		99.4	90-110			
Phosphorus	198000		ng/l	200000		99.2	90-110			LJ, QX
Potassium	2.48E6		ng/l	2.5000E6		99.2	90-110			
Rubidium	9590		ng/l	10000		95.9	90-110			
Selenium	20400		ng/l	20000		102	90-110			
Sodium	2.44E6		ng/l	2.5000E6		97.8	90-110			
Strontium	49300		ng/l	50000		98.7	90-110			
Thallium	474		ng/l	500.00		94.7	90-110			
Thorium	482		ng/l	500.00		96.4	90-110			

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Batch 2312024 - B3L0605

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Initial Cal Check (2312024-ICV1) Continu				Prepared: 12/07/23	Analyzed: 12/08/23					
Uranium	488		ng/l	500.00		97.5	90-110			
Vanadium	20100		ng/l	20000		100	90-110			
Zinc	518000		ng/l	500000		104	90-110			
Interference Check A (2312024-IFA1)				Prepared: 12/07/23	Analyzed: 12/08/23					
Aluminum	1.47E7		ng/l	1.5000E7		98.0	80-120			
Antimony	0.00		ng/l				80-120			U
Arsenic	0.00		ng/l				80-120			U
Barium	0.00		ng/l				80-120			U
Beryllium	0.00		ng/l				80-120			U
Cadmium	0.00		ng/l				80-120			U
Calcium	9.23E7		ng/l	1.0040E8		91.9	80-120			
Chromium	0.00		ng/l				80-120			U
Cobalt	0.00		ng/l				80-120			U
Copper	0.00		ng/l				80-120			U
Iron	1.47E7		ng/l	1.5000E7		98.1	80-120			
Lead	0.00		ng/l				80-120			U
Magnesium	1.51E7		ng/l	1.5000E7		101	80-120			
Manganese	0.00		ng/l				80-120			U
Molybdenum	301000		ng/l	300000		100	80-120			
Nickel	0.00		ng/l				80-120			U
Phosphorus	1.58E7		ng/l	1.5000E7		105	80-120			LJ, QX
Potassium	1.46E7		ng/l	1.5000E7		97.6	80-120			
Rubidium	0.00		ng/l				80-120			U
Selenium	0.00		ng/l				80-120			U
Sodium	1.51E7		ng/l	1.5000E7		101	80-120			
Strontium	0.00		ng/l				80-120			U
Thallium	0.00		ng/l				80-120			U
Thorium	0.00		ng/l				80-120			U
Uranium	0.00		ng/l				80-120			U
Vanadium	0.00		ng/l				80-120			U
Zinc	0.00		ng/l				80-120			U
Interference Check B (2312024-IFB1)				Prepared: 12/07/23	Analyzed: 12/08/23					
Aluminum	1.64E7		ng/l	1.6500E7		99.6	80-120			
Antimony	20200		ng/l	20000		101	80-120			
Arsenic	20700		ng/l	20000		103	80-120			
Barium	202000		ng/l	200000		101	80-120			
Beryllium	5080		ng/l	5000.0		102	80-120			
Cadmium	19600		ng/l	20000		98.0	80-120			

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CERTIFICATE OF ANALYSIS

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Blue Bell, PA 19422
ATTN: Ms. Chelsea Saber
PHONE: (703) 885-5495 **FAX:**

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AQS SITE CODE:
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Inorganics by Compendium Method IO-3.5 - Quality Control

Batch 2312024 - B3L0605

Interference Check B (2312024-IFB1) Co Prepared: 12/07/23 Analyzed: 12/08/23

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Calcium	1.17E8		ng/l	1.2540E8		93.3	80-120			
Chromium	233000		ng/l	240000		97.2	80-120			
Cobalt	49600		ng/l	50000		99.1	80-120			
Copper	1.91E6		ng/l	2.0000E6		95.6	80-120			
Iron	1.76E7		ng/l	1.7500E7		101	80-120			
Lead	207000		ng/l	200000		103	80-120			
Magnesium	1.64E7		ng/l	1.6000E7		102	80-120			
Manganese	521000		ng/l	500000		104	80-120			
Molybdenum	358000		ng/l	350000		102	80-120			
Nickel	116000		ng/l	120000		96.9	80-120			
Phosphorus	1.65E7		ng/l	1.5200E7		109	80-120			LJ, QX
Potassium	1.74E7		ng/l	1.7500E7		99.5	80-120			
Rubidium	10200		ng/l	10000		102	80-120			
Selenium	19100		ng/l	20000		95.6	80-120			
Sodium	1.84E7		ng/l	1.7500E7		105	80-120			
Strontium	50800		ng/l	50000		102	80-120			
Thallium	523		ng/l	500.00		105	80-120			
Thorium	541		ng/l	500.00		108	80-120			
Uranium	541		ng/l	500.00		108	80-120			
Vanadium	19500		ng/l	20000		97.5	80-120			
Zinc	476000		ng/l	500000		95.2	80-120			

Batch 2312031 - B3L0605

Calibration Blank (2312031-CCB1) Prepared & Analyzed: 12/11/23

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Aluminum	59.8		ng/l							
Antimony	1.50		ng/l							
Arsenic	3.31		ng/l							
Barium	1.64		ng/l							
Beryllium	1.03		ng/l							
Cadmium	0.307		ng/l							
Calcium	464		ng/l							
Chromium	3.37		ng/l							
Cobalt	0.408		ng/l							
Copper	131		ng/l							
Iron	26.4		ng/l							
Lead	6.23		ng/l							
Magnesium	19.6		ng/l							
Manganese	7.20		ng/l							
Molybdenum	29.3		ng/l							

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Inorganics by Compendium Method IO-3.5 - Quality Control

Batch 2312031 - B3L0605

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Calibration Blank (2312031-CCB1) Contin				Prepared & Analyzed: 12/11/23						
Nickel	0.370		ng/l							
Phosphorus	-845		ng/l							U
Potassium	-973		ng/l							U
Rubidium	0.315		ng/l							
Selenium	0.969		ng/l							
Sodium	-65.2		ng/l							U
Strontium	0.544		ng/l							
Thallium	0.487		ng/l							
Thorium	0.453		ng/l							
Uranium	-0.0185		ng/l							U
Vanadium	-34.9		ng/l							U
Zinc	-12.6		ng/l							U
Calibration Blank (2312031-CCB2)				Prepared & Analyzed: 12/11/23						
Aluminum	32.1		ng/l							
Antimony	0.841		ng/l							
Arsenic	1.40		ng/l							
Barium	5.28		ng/l							
Beryllium	0.261		ng/l							
Cadmium	0.590		ng/l							
Calcium	109		ng/l							
Chromium	6.86		ng/l							
Cobalt	1.31		ng/l							
Copper	78.1		ng/l							
Iron	116		ng/l							
Lead	6.09		ng/l							
Magnesium	29.2		ng/l							
Manganese	12.8		ng/l							
Molybdenum	6.48		ng/l							
Nickel	1.64		ng/l							
Phosphorus	-98.5		ng/l							U
Potassium	-2030		ng/l							U
Rubidium	-0.520		ng/l							U
Selenium	2.55		ng/l							
Sodium	-139		ng/l							U
Strontium	1.31		ng/l							
Thallium	0.342		ng/l							
Thorium	0.775		ng/l							
Uranium	0.00284		ng/l							

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Inorganics by Compendium Method IO-3.5 - Quality Control

Batch 2312031 - B3L0605

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Calibration Blank (2312031-CCB2) Contin				Prepared & Analyzed: 12/11/23						
Vanadium	-27.2		ng/l							U
Zinc	86.5		ng/l							
Calibration Blank (2312031-CCB3)				Prepared & Analyzed: 12/11/23						
Aluminum	93.4		ng/l							
Antimony	1.38		ng/l							
Arsenic	0.532		ng/l							
Barium	9.11		ng/l							
Beryllium	-0.404		ng/l							U
Cadmium	0.751		ng/l							
Calcium	1790		ng/l							
Chromium	8.74		ng/l							
Cobalt	2.10		ng/l							
Copper	103		ng/l							
Iron	89.9		ng/l							
Lead	9.51		ng/l							
Magnesium	57.1		ng/l							
Manganese	19.5		ng/l							
Molybdenum	7.67		ng/l							
Nickel	4.18		ng/l							
Phosphorus	240		ng/l							
Potassium	-1680		ng/l							U
Rubidium	0.833		ng/l							
Selenium	-5.47		ng/l							U
Sodium	35.1		ng/l							
Strontium	1.98		ng/l							
Thallium	0.377		ng/l							
Thorium	0.618		ng/l							
Uranium	0.00625		ng/l							
Vanadium	-34.9		ng/l							U
Zinc	36.8		ng/l							
Calibration Blank (2312031-CCB4)				Prepared: 12/11/23 Analyzed: 12/12/23						
Aluminum	89.9		ng/l							
Antimony	1.68		ng/l							
Arsenic	0.642		ng/l							
Barium	11.3		ng/l							
Beryllium	-0.336		ng/l							U
Cadmium	1.03		ng/l							
Calcium	1970		ng/l							

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Inorganics by Compendium Method IO-3.5 - Quality Control

Batch 2312031 - B3L0605

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Calibration Blank (2312031-CCB4) Contin				Prepared: 12/11/23 Analyzed: 12/12/23						
Chromium	14.4		ng/l							
Cobalt	2.56		ng/l							
Copper	124		ng/l							
Iron	168		ng/l							
Lead	11.5		ng/l							
Magnesium	77.9		ng/l							
Manganese	25.5		ng/l							
Molybdenum	8.01		ng/l							
Nickel	6.18		ng/l							
Phosphorus	-615		ng/l							U
Potassium	-1600		ng/l							U
Rubidium	0.323		ng/l							
Selenium	-2.85		ng/l							U
Sodium	122		ng/l							
Strontium	3.46		ng/l							
Thallium	0.497		ng/l							
Thorium	0.642		ng/l							
Uranium	0.0164		ng/l							
Vanadium	-34.0		ng/l							U
Zinc	38.0		ng/l							
Calibration Check (2312031-CCV1)				Prepared & Analyzed: 12/11/23						
Aluminum	1.53E6		ng/l	1.5000E6		102	90-110			
Antimony	20200		ng/l	20000		101	90-110			
Arsenic	19900		ng/l	20000		99.7	90-110			
Barium	200000		ng/l	200000		100	90-110			
Beryllium	4940		ng/l	5000.0		98.8	90-110			
Cadmium	20100		ng/l	20000		101	90-110			
Calcium	2.48E7		ng/l	2.5000E7		99.1	90-110			
Chromium	241000		ng/l	240000		101	90-110			
Cobalt	50300		ng/l	50000		101	90-110			
Copper	2.02E6		ng/l	2.0000E6		101	90-110			
Iron	2.49E6		ng/l	2.5000E6		99.7	90-110			
Lead	198000		ng/l	200000		98.8	90-110			
Magnesium	1.03E6		ng/l	1.0000E6		103	90-110			
Manganese	488000		ng/l	500000		97.6	90-110			
Molybdenum	49600		ng/l	50000		99.2	90-110			
Nickel	121000		ng/l	120000		101	90-110			
Phosphorus	198000		ng/l	200000		98.9	90-110			

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Inorganics by Compendium Method IO-3.5 - Quality Control

Batch 2312031 - B3L0605

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Calibration Check (2312031-CCV1) Contin				Prepared & Analyzed: 12/11/23						
Potassium	2.49E6		ng/l	2.5000E6		99.5	90-110			
Rubidium	9990		ng/l	10000		99.9	90-110			
Selenium	19900		ng/l	20000		99.7	90-110			
Sodium	2.61E6		ng/l	2.5000E6		104	90-110			
Strontium	49900		ng/l	50000		99.8	90-110			
Thallium	484		ng/l	500.00		96.8	90-110			
Thorium	496		ng/l	500.00		99.2	90-110			
Uranium	494		ng/l	500.00		98.9	90-110			
Vanadium	19800		ng/l	20000		99.2	90-110			
Zinc	519000		ng/l	500000		104	90-110			
Calibration Check (2312031-CCV2)				Prepared & Analyzed: 12/11/23						
Aluminum	1.47E6		ng/l	1.5000E6		98.2	90-110			
Antimony	19900		ng/l	20000		99.6	90-110			
Arsenic	19600		ng/l	20000		97.8	90-110			
Barium	198000		ng/l	200000		99.1	90-110			
Beryllium	4930		ng/l	5000.0		98.5	90-110			
Cadmium	19800		ng/l	20000		98.9	90-110			
Calcium	2.43E7		ng/l	2.5000E7		97.3	90-110			
Chromium	246000		ng/l	240000		103	90-110			
Cobalt	48800		ng/l	50000		97.6	90-110			
Copper	1.96E6		ng/l	2.0000E6		97.9	90-110			
Iron	2.42E6		ng/l	2.5000E6		96.8	90-110			
Lead	195000		ng/l	200000		97.3	90-110			
Magnesium	982000		ng/l	1.0000E6		98.2	90-110			
Manganese	477000		ng/l	500000		95.3	90-110			
Molybdenum	49000		ng/l	50000		98.1	90-110			
Nickel	118000		ng/l	120000		98.1	90-110			
Phosphorus	186000		ng/l	200000		93.1	90-110			
Potassium	2.42E6		ng/l	2.5000E6		96.7	90-110			
Rubidium	9860		ng/l	10000		98.6	90-110			
Selenium	20000		ng/l	20000		99.9	90-110			
Sodium	2.47E6		ng/l	2.5000E6		98.8	90-110			
Strontium	48800		ng/l	50000		97.6	90-110			
Thallium	471		ng/l	500.00		94.2	90-110			
Thorium	482		ng/l	500.00		96.4	90-110			
Uranium	477		ng/l	500.00		95.5	90-110			
Vanadium	19500		ng/l	20000		97.5	90-110			
Zinc	507000		ng/l	500000		101	90-110			

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Inorganics by Compendium Method IO-3.5 - Quality Control

Batch 2312031 - B3L0605

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Calibration Check (2312031-CCV3)				Prepared & Analyzed: 12/11/23						
Aluminum	1.49E6		ng/l	1.5000E6		99.5	90-110			
Antimony	20300		ng/l	20000		101	90-110			
Arsenic	19800		ng/l	20000		99.2	90-110			
Barium	199000		ng/l	200000		99.3	90-110			
Beryllium	4560		ng/l	5000.0		91.3	90-110			
Cadmium	20100		ng/l	20000		101	90-110			
Calcium	2.46E7		ng/l	2.5000E7		98.4	90-110			
Chromium	246000		ng/l	240000		103	90-110			
Cobalt	49400		ng/l	50000		98.8	90-110			
Copper	2.01E6		ng/l	2.0000E6		100	90-110			
Iron	2.46E6		ng/l	2.5000E6		98.6	90-110			
Lead	197000		ng/l	200000		98.7	90-110			
Magnesium	1.00E6		ng/l	1.0000E6		100	90-110			
Manganese	487000		ng/l	500000		97.3	90-110			
Molybdenum	49200		ng/l	50000		98.4	90-110			
Nickel	120000		ng/l	120000		99.7	90-110			
Phosphorus	197000		ng/l	200000		98.6	90-110			
Potassium	2.43E6		ng/l	2.5000E6		97.2	90-110			
Rubidium	9930		ng/l	10000		99.3	90-110			
Selenium	20000		ng/l	20000		100	90-110			
Sodium	2.54E6		ng/l	2.5000E6		102	90-110			
Strontium	49700		ng/l	50000		99.3	90-110			
Thallium	480		ng/l	500.00		96.0	90-110			
Thorium	496		ng/l	500.00		99.1	90-110			
Uranium	489		ng/l	500.00		97.7	90-110			
Vanadium	19900		ng/l	20000		99.6	90-110			
Zinc	517000		ng/l	500000		103	90-110			
Calibration Check (2312031-CCV4)				Prepared & Analyzed: 12/11/23						
Aluminum	1.50E6		ng/l	1.5000E6		100	90-110			
Antimony	20500		ng/l	20000		102	90-110			
Arsenic	20000		ng/l	20000		99.9	90-110			
Barium	202000		ng/l	200000		101	90-110			
Beryllium	4550		ng/l	5000.0		91.1	90-110			
Cadmium	20300		ng/l	20000		102	90-110			
Calcium	2.49E7		ng/l	2.5000E7		99.6	90-110			
Chromium	254000		ng/l	240000		106	90-110			
Cobalt	49700		ng/l	50000		99.4	90-110			
Copper	2.02E6		ng/l	2.0000E6		101	90-110			

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Inorganics by Compendium Method IO-3.5 - Quality Control

Batch 2312031 - B3L0605

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Calibration Check (2312031-CCV4) Contin				Prepared & Analyzed: 12/11/23						
Iron	2.48E6		ng/l	2.5000E6		99.2	90-110			
Lead	200000		ng/l	200000		99.9	90-110			
Magnesium	1.00E6		ng/l	1.0000E6		100	90-110			
Manganese	491000		ng/l	500000		98.2	90-110			
Molybdenum	50300		ng/l	50000		101	90-110			
Nickel	120000		ng/l	120000		99.8	90-110			
Phosphorus	193000		ng/l	200000		96.7	90-110			
Potassium	2.45E6		ng/l	2.5000E6		97.9	90-110			
Rubidium	10100		ng/l	10000		101	90-110			
Selenium	20200		ng/l	20000		101	90-110			
Sodium	2.55E6		ng/l	2.5000E6		102	90-110			
Strontium	50300		ng/l	50000		101	90-110			
Thallium	485		ng/l	500.00		97.0	90-110			
Thorium	500		ng/l	500.00		100	90-110			
Uranium	498		ng/l	500.00		99.7	90-110			
Vanadium	20200		ng/l	20000		101	90-110			
Zinc	523000		ng/l	500000		105	90-110			
High Cal Check (2312031-HCV1)				Prepared & Analyzed: 12/11/23						
Aluminum	2.93E6		ng/l	3.0000E6		97.6	95-105			
Antimony	39900		ng/l	40000		99.7	95-105			
Arsenic	39800		ng/l	40000		99.5	95-105			
Barium	400000		ng/l	400000		99.9	95-105			
Beryllium	10300		ng/l	10000		103	95-105			
Cadmium	39300		ng/l	40000		98.3	95-105			
Calcium	4.93E7		ng/l	5.0000E7		98.7	95-105			
Chromium	473000		ng/l	480000		98.5	95-105			
Cobalt	98300		ng/l	100000		98.3	95-105			
Copper	3.94E6		ng/l	4.0000E6		98.5	95-105			
Iron	4.94E6		ng/l	5.0000E6		98.8	95-105			
Lead	397000		ng/l	400000		99.2	95-105			
Magnesium	1.96E6		ng/l	2.0000E6		97.9	95-105			
Manganese	986000		ng/l	1.0000E6		98.6	95-105			
Molybdenum	99400		ng/l	100000		99.4	95-105			
Nickel	235000		ng/l	240000		98.0	95-105			
Phosphorus	394000		ng/l	400000		98.5	95-105			
Potassium	4.90E6		ng/l	5.0000E6		98.1	95-105			
Rubidium	19900		ng/l	20000		99.3	95-105			
Selenium	39600		ng/l	40000		99.0	95-105			

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Inorganics by Compendium Method IO-3.5 - Quality Control

Batch 2312031 - B3L0605

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
High Cal Check (2312031-HCV1) Continue				Prepared & Analyzed: 12/11/23						
Sodium	4.90E6		ng/l	5.0000E6		98.0	95-105			
Strontium	99600		ng/l	100000		99.6	95-105			
Thallium	995		ng/l	1000.0		99.5	95-105			
Thorium	990		ng/l	1000.0		99.0	95-105			
Uranium	996		ng/l	1000.0		99.6	95-105			
Vanadium	39600		ng/l	40000		99.1	95-105			
Zinc	1.02E6		ng/l	1.0000E6		102	95-105			
Initial Cal Blank (2312031-ICB1)				Prepared & Analyzed: 12/11/23						
Aluminum	61.1		ng/l							
Antimony	1.48		ng/l							
Arsenic	-0.519		ng/l							U
Barium	3.07		ng/l							
Beryllium	1.36		ng/l							
Cadmium	0.359		ng/l							
Calcium	888		ng/l							
Chromium	5.64		ng/l							
Cobalt	0.725		ng/l							
Copper	77.3		ng/l							
Iron	99.8		ng/l							
Lead	7.11		ng/l							
Magnesium	0.0695		ng/l							
Manganese	8.48		ng/l							
Molybdenum	13.3		ng/l							
Nickel	0.0933		ng/l							
Phosphorus	-217		ng/l							U
Potassium	-1150		ng/l							U
Rubidium	0.811		ng/l							
Selenium	-2.72		ng/l							U
Sodium	-108		ng/l							U
Strontium	0.976		ng/l							
Thallium	0.339		ng/l							
Thorium	0.469		ng/l							
Uranium	-0.00424		ng/l							U
Vanadium	-32.0		ng/l							U
Zinc	-15.8		ng/l							U
Initial Cal Check (2312031-ICV1)				Prepared & Analyzed: 12/11/23						
Aluminum	1.45E6		ng/l	1.5000E6		96.5	90-110			
Antimony	19500		ng/l	20000		97.3	90-110			

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CERTIFICATE OF ANALYSIS

Tetra Tech, Inc.
1777 Sentry Pkwy, Bldg 12
Blue Bell, PA 19422
ATTN: Ms. Chelsea Saber
PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 12/14/23 11:51
SUBMITTED: 12/04/23
AQS SITE CODE:
SITE CODE: Maui fires

Inorganics by Compendium Method IO-3.5 - Quality Control

Batch 2312031 - B3L0605

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Initial Cal Check (2312031-ICV1) Continu				Prepared & Analyzed: 12/11/23						
Arsenic	19500		ng/l	20000		97.5	90-110			
Barium	196000		ng/l	200000		98.0	90-110			
Beryllium	5090		ng/l	5000.0		102	90-110			
Cadmium	20100		ng/l	20000		101	90-110			
Calcium	2.40E7		ng/l	2.5000E7		96.1	90-110			
Chromium	246000		ng/l	240000		103	90-110			
Cobalt	49000		ng/l	50000		98.0	90-110			
Copper	1.97E6		ng/l	2.0000E6		98.6	90-110			
Iron	2.45E6		ng/l	2.5000E6		98.2	90-110			
Lead	193000		ng/l	200000		96.4	90-110			
Magnesium	967000		ng/l	1.0000E6		96.7	90-110			
Manganese	479000		ng/l	500000		95.9	90-110			
Molybdenum	48700		ng/l	50000		97.3	90-110			
Nickel	117000		ng/l	120000		97.8	90-110			
Phosphorus	190000		ng/l	200000		95.2	90-110			
Potassium	2.45E6		ng/l	2.5000E6		98.0	90-110			
Rubidium	9540		ng/l	10000		95.4	90-110			
Selenium	20200		ng/l	20000		101	90-110			
Sodium	2.48E6		ng/l	2.5000E6		99.2	90-110			
Strontium	49000		ng/l	50000		98.0	90-110			
Thallium	468		ng/l	500.00		93.7	90-110			
Thorium	474		ng/l	500.00		94.7	90-110			
Uranium	479		ng/l	500.00		95.8	90-110			
Vanadium	19700		ng/l	20000		98.3	90-110			
Zinc	515000		ng/l	500000		103	90-110			
Interference Check A (2312031-IFA1)				Prepared & Analyzed: 12/11/23						
Aluminum	1.45E7		ng/l	1.5000E7		96.4	80-120			
Antimony	0.00		ng/l				80-120			U
Arsenic	0.00		ng/l				80-120			U
Barium	0.00		ng/l				80-120			U
Beryllium	0.00		ng/l				80-120			U
Cadmium	0.00		ng/l				80-120			U
Calcium	9.11E7		ng/l	1.0040E8		90.8	80-120			
Chromium	0.00		ng/l				80-120			U
Cobalt	0.00		ng/l				80-120			U
Copper	0.00		ng/l				80-120			U
Iron	1.44E7		ng/l	1.5000E7		95.9	80-120			
Lead	0.00		ng/l				80-120			U

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Inorganics by Compendium Method IO-3.5 - Quality Control

Batch 2312031 - B3L0605

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Interference Check A (2312031-IFA1) Co				Prepared & Analyzed: 12/11/23						
Magnesium	1.50E7		ng/l	1.5000E7		99.9	80-120			
Manganese	0.00		ng/l				80-120			U
Molybdenum	293000		ng/l	300000		97.6	80-120			
Nickel	0.00		ng/l				80-120			U
Phosphorus	1.55E7		ng/l	1.5000E7		104	80-120			
Potassium	1.43E7		ng/l	1.5000E7		95.1	80-120			
Rubidium	0.00		ng/l				80-120			U
Selenium	0.00		ng/l				80-120			U
Sodium	1.51E7		ng/l	1.5000E7		101	80-120			
Strontium	0.00		ng/l				80-120			U
Thallium	0.00		ng/l				80-120			U
Thorium	0.00		ng/l				80-120			U
Uranium	0.00		ng/l				80-120			U
Vanadium	0.00		ng/l				80-120			U
Zinc	0.00		ng/l				80-120			U
Interference Check B (2312031-IFB1)				Prepared & Analyzed: 12/11/23						
Aluminum	1.58E7		ng/l	1.6500E7		96.0	80-120			
Antimony	19900		ng/l	20000		99.5	80-120			
Arsenic	20000		ng/l	20000		100	80-120			
Barium	202000		ng/l	200000		101	80-120			
Beryllium	4640		ng/l	5000.0		92.7	80-120			
Cadmium	19200		ng/l	20000		95.8	80-120			
Calcium	1.14E8		ng/l	1.2540E8		90.9	80-120			
Chromium	227000		ng/l	240000		94.4	80-120			
Cobalt	48200		ng/l	50000		96.4	80-120			
Copper	1.86E6		ng/l	2.0000E6		93.1	80-120			
Iron	1.66E7		ng/l	1.7500E7		95.1	80-120			
Lead	205000		ng/l	200000		102	80-120			
Magnesium	1.59E7		ng/l	1.6000E7		99.7	80-120			
Manganese	501000		ng/l	500000		100	80-120			
Molybdenum	341000		ng/l	350000		97.4	80-120			
Nickel	113000		ng/l	120000		93.8	80-120			
Phosphorus	1.58E7		ng/l	1.5200E7		104	80-120			
Potassium	1.69E7		ng/l	1.7500E7		96.3	80-120			
Rubidium	10100		ng/l	10000		101	80-120			
Selenium	18800		ng/l	20000		94.1	80-120			
Sodium	1.79E7		ng/l	1.7500E7		102	80-120			
Strontium	49900		ng/l	50000		99.9	80-120			

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Inorganics by Compendium Method IO-3.5 - Quality Control

Batch 2312031 - B3L0605

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Interference Check B (2312031-IFB1) Co				Prepared & Analyzed: 12/11/23						
Thallium	516		ng/l	500.00		103	80-120			
Thorium	530		ng/l	500.00		106	80-120			
Uranium	539		ng/l	500.00		108	80-120			
Vanadium	19000		ng/l	20000		95.2	80-120			
Zinc	469000		ng/l	500000		93.7	80-120			

Batch B3L0605 - ICP-MS Extraction

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (B3L0605-BLK1)				Prepared: 12/06/23 Analyzed: 12/08/23						
Aluminum	ND	32.1	ng/m³ Air							U
Antimony	ND	0.0441	ng/m³ Air							SL, U
Arsenic	ND	0.00955	ng/m³ Air							U
Barium	ND	0.948	ng/m³ Air							U
Beryllium	ND	0.00332	ng/m³ Air							U
Cadmium	ND	0.109	ng/m³ Air							U
Calcium	ND	292	ng/m³ Air							GC-BS, QB-01 U
Chromium	ND	2.03	ng/m³ Air							U
Cobalt	ND	0.0156	ng/m³ Air							QB-01, U
Copper	ND	3.00	ng/m³ Air							U
Iron	ND	24.2	ng/m³ Air							QB-01, U
Lead	ND	0.276	ng/m³ Air							U
Magnesium	ND	96.4	ng/m³ Air							U
Manganese	ND	1.19	ng/m³ Air							U
Molybdenum	ND	0.213	ng/m³ Air							QB-01, U
Nickel	ND	0.801	ng/m³ Air							U
Phosphorus	ND	1250	ng/m³ Air							GC-BS, LJ, QX U
Potassium	ND	38.0	ng/m³ Air							U
Rubidium	ND	0.0183	ng/m³ Air							U
Selenium	ND	0.0110	ng/m³ Air							U
Sodium	ND	2000	ng/m³ Air							GC-BS, U
Strontium	ND	0.652	ng/m³ Air							QB-01, U
Thallium	ND	5.03E-4	ng/m³ Air							U
Thorium	ND	0.00300	ng/m³ Air							U
Uranium	ND	0.0170	ng/m³ Air							U
Vanadium	ND	0.0492	ng/m³ Air							U
Zinc	ND	97.7	ng/m³ Air							U
LCS (B3L0605-BS1)				Prepared: 12/06/23 Analyzed: 12/08/23						
Aluminum	105	32.1	ng/m³ Air	82.975		126	80-120			

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Inorganics by Compendium Method IO-3.5 - Quality Control

Batch B3L0605 - ICP-MS Extraction

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
LCS (B3L0605-BS1) Continued				Prepared: 12/06/23	Analyzed: 12/08/23					
Antimony	0.541	0.0441	ng/m³ Air	1.3829		39.1	80-120			SL
Arsenic	2.72	0.00955	ng/m³ Air	2.7658		98.2	80-120			
Barium	27.9	0.948	ng/m³ Air	27.658		101	80-120			
Beryllium	1.31	0.00332	ng/m³ Air	1.3829		94.9	80-120			
Cadmium	1.39	0.109	ng/m³ Air	1.3829		101	80-120			
Calcium	580	292	ng/m³ Air	69.146		839	80-120			GC-BS, QB-01
Chromium	15.7	2.03	ng/m³ Air	13.829		114	80-120			
Cobalt	1.38	0.0156	ng/m³ Air	1.3829		99.8	80-120			QB-01
Copper	30.5	3.00	ng/m³ Air	27.658		110	80-120			QB-01
Iron	53.3	24.2	ng/m³ Air	27.658		193	80-120			QB-01
Lead	13.4	0.276	ng/m³ Air	13.829		96.6	80-120			
Magnesium	ND	96.4	ng/m³ Air	27.658			80-120			U
Manganese	8.80	1.19	ng/m³ Air	8.2975		106	80-120			
Molybdenum	1.69	0.213	ng/m³ Air	1.3829		122	80-120			QB-01
Nickel	3.05	0.801	ng/m³ Air	2.7658		110	80-120			
Phosphorus	ND	1250	ng/m³ Air	13.829			80-120			GC-BS, LJ, QX U
Potassium	70.6	38.0	ng/m³ Air	55.317		128	80-120			
Rubidium	1.33	0.0183	ng/m³ Air	1.3829		96.1	80-120			
Selenium	2.71	0.0110	ng/m³ Air	2.7658		97.9	80-120			
Sodium	ND	2000	ng/m³ Air	55.317			80-120			GC-BS, U
Strontium	2.32	0.652	ng/m³ Air	1.3829		168	80-120			QB-01
Thallium	0.129	5.03E-4	ng/m³ Air	0.13829		93.5	80-120			
Thorium	0.127	0.00300	ng/m³ Air	0.13829		91.8	80-120			
Uranium	0.130	0.0170	ng/m³ Air	0.13829		94.3	80-120			
Vanadium	2.75	0.0492	ng/m³ Air	2.7658		99.6	80-120			
Zinc	104	97.7	ng/m³ Air	82.975		125	80-120			
Duplicate (B3L0605-DUP1)		**Source: 3120430-06**		Prepared: 12/06/23	Analyzed: 12/08/23					
Aluminum	331	25.8	ng/m³ Air		340			2.71	10	
Antimony	0.0449	0.0354	ng/m³ Air		0.0483			7.27	10	SL
Arsenic	0.165	0.00767	ng/m³ Air		0.169			2.84	10	
Barium	4.42	0.761	ng/m³ Air		4.13			6.65	10	
Beryllium	0.0119	0.00267	ng/m³ Air		0.0113			4.73	10	
Cadmium	ND	0.0875	ng/m³ Air		ND				10	U
Calcium	525	234	ng/m³ Air		527			0.265	10	GC-BS, QB-01
Chromium	1.75	1.63	ng/m³ Air		1.70			2.73	10	
Cobalt	0.189	0.0125	ng/m³ Air		0.176			7.27	10	QB-01
Copper	13.2	2.41	ng/m³ Air		13.2			0.320	10	

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Inorganics by Compendium Method IO-3.5 - Quality Control

Batch B3L0605 - ICP-MS Extraction

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Duplicate (B3L0605-DUP1) Continued		**Source: 3120430-06**		Prepared: 12/06/23	Analyzed: 12/08/23					
Iron	352	19.4	ng/m³ Air		360			2.21	10	QB-01
Lead	ND	0.222	ng/m³ Air		ND				10	U
Magnesium	158	77.4	ng/m³ Air		158			0.0230	10	
Manganese	9.52	0.956	ng/m³ Air		9.44			0.883	10	
Molybdenum	0.964	0.171	ng/m³ Air		0.960			0.499	10	QB-01
Nickel	ND	0.643	ng/m³ Air		ND				10	U
Phosphorus	ND	1000	ng/m³ Air		ND				10	U, GC-BS, LJ, QX
Potassium	102	30.5	ng/m³ Air		116			12.1	10	
Rubidium	0.173	0.0147	ng/m³ Air		0.173			0.169	10	
Selenium	0.128	0.00883	ng/m³ Air		0.115			10.7	10	
Sodium	ND	1610	ng/m³ Air		ND				10	U, GC-BS
Strontium	3.24	0.524	ng/m³ Air		3.24			0.0620	10	QB-01
Thallium	7.75E-4	4.04E-4	ng/m³ Air		8.68E-4			11.2	10	
Thorium	0.00976	0.00241	ng/m³ Air		0.0114			15.2	10	
Uranium	ND	0.0137	ng/m³ Air		ND				10	U
Vanadium	1.20	0.0395	ng/m³ Air		1.20			0.623	10	
Zinc	ND	78.5	ng/m³ Air		ND				10	U
Duplicate (B3L0605-DUP2)		**Source: 3120430-10**		Prepared: 12/06/23	Analyzed: 12/08/23					
Aluminum	157	28.9	ng/m³ Air		155			1.57	10	
Antimony	0.0888	0.0397	ng/m³ Air		0.0878			1.04	10	SL
Arsenic	0.0872	0.00861	ng/m³ Air		0.0858			1.58	10	
Barium	4.20	0.854	ng/m³ Air		4.18			0.578	10	
Beryllium	0.00662	0.00299	ng/m³ Air		0.00633			4.49	10	
Cadmium	ND	0.0982	ng/m³ Air		ND				10	U
Calcium	286	263	ng/m³ Air		279			2.47	10	GC-BS, QB-01
Chromium	ND	1.83	ng/m³ Air		ND				10	U
Cobalt	0.0933	0.0141	ng/m³ Air		0.0929			0.444	10	QB-01
Copper	38.7	2.70	ng/m³ Air		38.2			1.41	10	
Iron	185	21.8	ng/m³ Air		184			0.540	10	QB-01
Lead	ND	0.249	ng/m³ Air		ND				10	U
Magnesium	135	86.9	ng/m³ Air		135			0.359	10	
Manganese	4.80	1.07	ng/m³ Air		4.78			0.399	10	
Molybdenum	1.20	0.192	ng/m³ Air		1.20			0.0441	10	QB-01
Nickel	ND	0.722	ng/m³ Air		ND				10	U
Phosphorus	ND	1130	ng/m³ Air		ND				10	U, GC-BS, LJ, QX
Potassium	94.6	34.3	ng/m³ Air		94.3			0.255	10	
Rubidium	0.108	0.0165	ng/m³ Air		0.103			4.97	10	

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Inorganics by Compendium Method IO-3.5 - Quality Control

Batch B3L0605 - ICP-MS Extraction

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Duplicate (B3L0605-DUP2) Continued		**Source: 3120430-10**		Prepared: 12/06/23	Analyzed: 12/08/23					
Selenium	0.117	0.00991	ng/m³ Air		0.123			4.38	10	
Sodium	ND	1800	ng/m³ Air		ND				10	U, GC-BS
Strontium	1.76	0.588	ng/m³ Air		1.75			0.505	10	QB-01
Thallium	7.31E-4	4.53E-4	ng/m³ Air		6.73E-4			8.25	10	
Thorium	0.00605	0.00270	ng/m³ Air		0.00607			0.298	10	
Uranium	ND	0.0153	ng/m³ Air		ND				10	U
Vanadium	0.499	0.0443	ng/m³ Air		0.496			0.696	10	
Zinc	ND	88.1	ng/m³ Air		ND				10	U
Matrix Spike (B3L0605-MS1)		**Source: 3120430-06**		Prepared: 12/06/23	Analyzed: 12/08/23					
Aluminum	409	25.8	ng/m³ Air	66.632	340	103	80-120			
Antimony	0.533	0.0354	ng/m³ Air	1.1105	0.0483	43.6	80-120			SL
Arsenic	2.35	0.00767	ng/m³ Air	2.2211	0.169	98.4	80-120			
Barium	25.5	0.761	ng/m³ Air	22.211	4.13	96.4	80-120			
Beryllium	1.04	0.00267	ng/m³ Air	1.1105	0.0113	92.3	80-120			
Cadmium	1.12	0.0875	ng/m³ Air	1.1105	ND	101	80-120			
Calcium	588	234	ng/m³ Air	55.526	527	111	80-120			GC-BS, QB-01
Chromium	13.1	1.63	ng/m³ Air	11.105	1.70	103	80-120			
Cobalt	1.24	0.0125	ng/m³ Air	1.1105	0.176	96.2	80-120			QB-01
Copper	37.1	2.41	ng/m³ Air	22.211	13.2	108	80-120			QB-01
Iron	383	19.4	ng/m³ Air	22.211	360	102	80-120			QB-01
Lead	10.9	0.222	ng/m³ Air	11.105	ND	98.1	80-120			
Magnesium	183	77.4	ng/m³ Air	22.211	158	111	80-120			
Manganese	16.4	0.956	ng/m³ Air	6.6632	9.44	104	80-120			
Molybdenum	2.04	0.171	ng/m³ Air	1.1105	0.960	97.5	80-120			QB-01
Nickel	2.80	0.643	ng/m³ Air	2.2211	ND	126	80-120			
Phosphorus	ND	1000	ng/m³ Air	11.105	ND		80-120			GC-BS, LJ, QM-4X, QX, U
Potassium	166	30.5	ng/m³ Air	44.421	116	113	80-120			
Rubidium	1.20	0.0147	ng/m³ Air	1.1105	0.173	92.6	80-120			
Selenium	2.26	0.00883	ng/m³ Air	2.2211	0.115	96.7	80-120			
Sodium	ND	1610	ng/m³ Air	44.421	ND		80-120			GC-BS, QM-4X, U
Strontium	4.29	0.524	ng/m³ Air	1.1105	3.24	94.9	80-120			QB-01
Thallium	0.103	4.04E-4	ng/m³ Air	0.11105	8.68E-4	91.7	80-120			
Thorium	0.0619	0.00241	ng/m³ Air	0.11105	0.0114	45.5	80-120			QM-07
Uranium	0.110	0.0137	ng/m³ Air	0.11105	ND	99.2	80-120			
Vanadium	3.42	0.0395	ng/m³ Air	2.2211	1.20	99.7	80-120			
Zinc	85.9	78.5	ng/m³ Air	66.632	ND	129	80-120			

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CERTIFICATE OF ANALYSIS

Tetra Tech, Inc.
1777 Sentry Pkwy, Bldg 12
Blue Bell, PA 19422
ATTN: Ms. Chelsea Saber
PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 12/14/23 11:51
SUBMITTED: 12/04/23
AQS SITE CODE:
SITE CODE: Maui fires

Inorganics by Compendium Method IO-3.5 - Quality Control

Batch B3L0605 - ICP-MS Extraction

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Matrix Spike Dup (B3L0605-MSD1)		**Source: 3120430-06**		Prepared: 12/06/23		Analyzed: 12/08/23				
Aluminum	403	25.8	ng/m³ Air	66.632	340	94.9	80-120	1.36	20	
Antimony	0.572	0.0354	ng/m³ Air	1.1105	0.0483	47.1	80-120	7.04	20	SL
Arsenic	2.36	0.00767	ng/m³ Air	2.2211	0.169	98.8	80-120	0.348	20	
Barium	25.8	0.761	ng/m³ Air	22.211	4.13	97.5	80-120	0.967	20	
Beryllium	1.02	0.00267	ng/m³ Air	1.1105	0.0113	90.5	80-120	1.94	20	
Cadmium	1.14	0.0875	ng/m³ Air	1.1105	ND	102	80-120	0.957	20	
Calcium	586	234	ng/m³ Air	55.526	527	106	80-120	0.459	20	GC-BS, QB-01
Chromium	12.9	1.63	ng/m³ Air	11.105	1.70	101	80-120	1.43	20	
Cobalt	1.25	0.0125	ng/m³ Air	1.1105	0.176	97.0	80-120	0.741	20	QB-01
Copper	38.5	2.41	ng/m³ Air	22.211	13.2	114	80-120	3.71	20	
Iron	376	19.4	ng/m³ Air	22.211	360	70.6	80-120	1.84	20	QB-01, QM-4X
Lead	11.0	0.222	ng/m³ Air	11.105	ND	99.3	80-120	1.20	20	
Magnesium	180	77.4	ng/m³ Air	22.211	158	98.9	80-120	1.53	20	
Manganese	16.2	0.956	ng/m³ Air	6.6632	9.44	101	80-120	0.981	20	
Molybdenum	2.05	0.171	ng/m³ Air	1.1105	0.960	98.5	80-120	0.530	20	QB-01
Nickel	2.85	0.643	ng/m³ Air	2.2211	ND	128	80-120	1.92	20	
Phosphorus	ND	1000	ng/m³ Air	11.105	ND		80-120		20	GC-BS, LJ, QM-4X, QX, U
Potassium	149	30.5	ng/m³ Air	44.421	116	74.4	80-120	10.8	20	QM-07
Rubidium	1.22	0.0147	ng/m³ Air	1.1105	0.173	94.3	80-120	1.53	20	
Selenium	2.27	0.00883	ng/m³ Air	2.2211	0.115	96.9	80-120	0.172	20	
Sodium	ND	1610	ng/m³ Air	44.421	ND		80-120		20	GC-BS, QM-4X, U
Strontium	4.24	0.524	ng/m³ Air	1.1105	3.24	90.2	80-120	1.21	20	QB-01
Thallium	0.105	4.04E-4	ng/m³ Air	0.11105	8.68E-4	93.8	80-120	2.28	20	
Thorium	0.0637	0.00241	ng/m³ Air	0.11105	0.0114	47.1	80-120	2.85	20	QM-07
Uranium	0.112	0.0137	ng/m³ Air	0.11105	ND	101	80-120	1.90	20	
Vanadium	3.39	0.0395	ng/m³ Air	2.2211	1.20	98.5	80-120	0.743	20	
Zinc	88.0	78.5	ng/m³ Air	66.632	ND	132	80-120	2.51	20	
Post Spike (B3L0605-PS1)		**Source: 3120430-06**		Prepared: 12/06/23		Analyzed: 12/08/23				
Aluminum	368	25.8	ng/m³ Air	22.211	340	125	75-125			A-01
Antimony	0.268	0.0354	ng/m³ Air	0.22211	0.0483	99.1	75-125			SL
Arsenic	1.25	0.00767	ng/m³ Air	1.1105	0.169	96.9	75-125			
Barium	6.28	0.761	ng/m³ Air	2.2211	4.13	96.7	75-125			
Beryllium	0.217	0.00267	ng/m³ Air	0.22211	0.0113	92.4	75-125			
Cadmium	0.119	0.0875	ng/m³ Air	0.11105	ND	108	75-125			
Calcium	565	234	ng/m³ Air	22.211	527	175	75-125			A-01, GC-BS, QB-01
Chromium	2.82	1.63	ng/m³ Air	1.1105	1.70	101	75-125			

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FILE #: 0000.00
REPORTED: 12/14/23 11:51
SUBMITTED: 12/04/23
AQS SITE CODE:
SITE CODE: Maui fires

Inorganics by Compendium Method IO-3.5 - Quality Control

Batch B3L0605 - ICP-MS Extraction

Post Spike (B3L0605-PS1) Continued **Source: 3120430-06** Prepared: 12/06/23 Analyzed: 12/08/23

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Cobalt	0.393	0.0125	ng/m³ Air	0.22211	0.176	97.9	75-125			QB-01
Copper	24.6	2.41	ng/m³ Air	11.105	13.2	103	75-125			
Iron	386	19.4	ng/m³ Air	22.211	360	117	75-125			QB-01
Lead	21.8	0.222	ng/m³ Air	22.211	ND	98.3	75-125			
Magnesium	182	77.4	ng/m³ Air	22.211	158	108	75-125			
Manganese	11.8	0.956	ng/m³ Air	2.2211	9.44	105	75-125			
Molybdenum	2.00	0.171	ng/m³ Air	1.1105	0.960	93.7	75-125			QB-01
Nickel	2.73	0.643	ng/m³ Air	2.2211	ND	123	75-125			
Phosphorus	ND	1000	ng/m³ Air	4.4421	ND		75-125			A-01, GC-BS, LJ, QX, U
Potassium	138	30.5	ng/m³ Air	22.211	116	101	75-125			
Rubidium	0.285	0.0147	ng/m³ Air	0.11105	0.173	101	75-125			
Selenium	1.22	0.00883	ng/m³ Air	1.1105	0.115	99.8	75-125			
Sodium	ND	1610	ng/m³ Air	22.211	ND		75-125			A-01, GC-BS, U
Strontium	4.31	0.524	ng/m³ Air	1.1105	3.24	96.1	75-125			QB-01
Thallium	0.0524	4.04E-4	ng/m³ Air	5.5526E-2	8.68E-4	92.8	75-125			
Thorium	0.0627	0.00241	ng/m³ Air	5.5526E-2	0.0114	92.5	75-125			
Uranium	0.0597	0.0137	ng/m³ Air	5.5526E-2	ND	107	75-125			
Vanadium	2.28	0.0395	ng/m³ Air	1.1105	1.20	97.1	75-125			
Zinc	ND	78.5	ng/m³ Air	22.211	ND		75-125			U

Dilution Check (B3L0605-SRL1) **Source: 3120430-06** Prepared: 12/06/23 Analyzed: 12/08/23

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Aluminum	341	129	ng/m³ Air		340			0.264	10	
Antimony	ND	0.177	ng/m³ Air		ND				10	SL, U
Arsenic	0.177	0.0383	ng/m³ Air		0.169			4.56	10	
Barium	4.10	3.81	ng/m³ Air		4.13			0.802	10	
Beryllium	ND	0.0133	ng/m³ Air		ND				10	U
Cadmium	ND	0.438	ng/m³ Air		ND				10	U
Calcium	ND	1170	ng/m³ Air		ND				10	QB-01, GC-BS U
Chromium	ND	8.15	ng/m³ Air		ND				10	U
Cobalt	0.175	0.0626	ng/m³ Air		0.176			0.381	10	QB-01
Copper	13.1	12.0	ng/m³ Air		13.2			0.144	10	
Iron	363	97.2	ng/m³ Air		360			0.707	10	QB-01
Lead	ND	1.11	ng/m³ Air		ND				10	U
Magnesium	ND	387	ng/m³ Air		ND				10	U
Manganese	9.48	4.78	ng/m³ Air		9.44			0.420	10	
Molybdenum	0.960	0.855	ng/m³ Air		0.960			2.48E-5	10	QB-01
Nickel	ND	3.22	ng/m³ Air		ND				10	U

CERTIFICATE OF ANALYSIS

Tetra Tech, Inc.
1777 Sentry Pkwy, Bldg 12
Blue Bell, PA 19422
ATTN: Ms. Chelsea Saber
PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 12/14/23 11:51
SUBMITTED: 12/04/23
AQS SITE CODE:
SITE CODE: Maui fires

Inorganics by Compendium Method IO-3.5 - Quality Control

Batch B3L0605 - ICP-MS Extraction

Dilution Check (B3L0605-SRL1) Continue Source: 3120430-06 Prepared: 12/06/23 Analyzed: 12/08/23

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Phosphorus	ND	5020	ng/m³ Air		ND				10	GC-BS, LJ, QX U
Potassium	ND	153	ng/m³ Air		ND				10	U
Rubidium	0.186	0.0735	ng/m³ Air		0.173			7.08	10	
Selenium	0.133	0.0442	ng/m³ Air		0.115			14.1	10	
Sodium	ND	8030	ng/m³ Air		ND				10	GC-BS, U
Strontium	3.29	2.62	ng/m³ Air		3.24			1.44	10	QB-01
Thallium	ND	0.00202	ng/m³ Air		ND				10	U
Thorium	ND	0.0120	ng/m³ Air		ND				10	U
Uranium	ND	0.0683	ng/m³ Air		ND				10	U
Vanadium	1.20	0.198	ng/m³ Air		1.20			0.651	10	
Zinc	ND	392	ng/m³ Air		ND				10	U

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REPORTED: 12/14/23 11:51
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AQS SITE CODE:
SITE CODE: Maui fires

Notes and Definitions

U	Under Detection Limit
SL	The spike recovery was outside acceptance limits. Reported value may be biased low.
QX	Compound does not meet QC criteria. Results should be considered an estimate.
QM-4X	The MS/MSD recovery exceeds criteria because the parent sample concentration is greater than 4x the spike concentration. Sample results for the QC batch were accepted based on acceptable BS/BSD recoveries.
QM-07	The spike recovery was outside acceptance limits for the MS and/or MSD. The batch was accepted based on acceptable LCS recovery.
QB-01	Analyte exceeds method blank criteria
LJ	Identification of analyte is acceptable; reported value is an estimate.
GC-BS	Compound exceeds Blank Spike Criteria
FB-01	Analyte exceeds Field Blank criteria.
E	The concentration indicated for this analyte is an estimated value above the calibration range of the instrument. This value is considered an estimate (CLP E-flag).
D	This result obtained by dilution.
A-01	Parent sample >4x spike amount
ND	Analyte NOT DETECTED
NR	Not Reported
MDL	Method Detection Limit
RPD	Relative Percent Difference

Note: This test is accredited under the 2016 TNI Standard.

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Eastern Research Group
601 Keystone Park Drive
Suite 700
Morrisville, NC 27560

December 14, 2023

Ms. Chelsea Saber
Tetra Tech, Inc.
1777 Sentry Pkwy, Bldg 12
Blue Bell, PA 19422
Project Name: Maui fires

Dear Ms. Chelsea Saber,

This report contains the analytical results for the sample(s) received under chain(s) of custody by Eastern Research Group on 12/06/23 12:52.

Values below the MDL for QC results in this report are recorded as ND, however the actual values are reported in the accompanying Excel report with a "U" flag (Under the detection limit). The actual values are reported in AQS.

This test is accredited under the 2016 TNI Standard for Environmental Laboratories (FL DOH Certification # E87673). All analyses were performed as described in the US EPA-approved QAPP, under the contract for National Hazardous Air Pollutant Support (US EPA Contract No. 68HERH22D0002). This cover page is an integral part of this report, and any exceptions or comments are noted on the last page.

Release of the data contained in this data package and in the data submitted in the electronic data deliverable, has been authorized by the Program Manager, or the Program Manager's designee as verified by the following signature.

The issuance of the final Certificate of Analysis takes precedence over any previous Report. If you have any questions, please contact me at 919-468-7924.

Sincerely,

Julie Swift
Program Manager
julie.swift@erg.com

The information contained in this report and its attachment(s) are intended only for the use of the individual to whom it is addressed and may contain information that is privileged, confidential, or exempt from disclosure. If the reader of this message is not the intended recipient, you are hereby notified that any dissemination, distribution, or copying of this report is strictly prohibited. If you have received this report in error, please notify julie.swift@erg.com and delete the report without retaining any copies.

CERTIFICATE OF ANALYSIS

Tetra Tech, Inc.
1777 Sentry Pkwy, Bldg 12
Blue Bell, PA 19422
ATTN: Ms. Chelsea Saber
PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 12/14/23 10:47
SUBMITTED: 12/06/23
AQS SITE CODE:
SITE CODE: Maui fires

ANALYTICAL REPORT FOR SAMPLES

SampleName	LabNumber	Matrix	Sampled	Received
TetraTech Q9541896	3120629-01	Air	11/30/23 23:59	12/06/23 12:52
TetraTech Q9541910	3120629-02	Air	11/30/23 23:59	12/06/23 12:52
TetraTech Q9541908	3120629-03	Air	11/30/23 23:59	12/06/23 12:52
TetraTech Q9543016 FB	3120629-04	Air	11/30/23 00:00	12/06/23 12:52
TetraTech Q9541907	3120629-05	Air	12/01/23 23:59	12/06/23 12:52
TetraTech Q9543019	3120629-06	Air	12/01/23 23:59	12/06/23 12:52
TetraTech Q9543017	3120629-07	Air	12/01/23 23:59	12/06/23 12:52
TetraTech Q9543012 FB	3120629-08	Air	12/01/23 00:00	12/06/23 12:52
TetraTech Q9543015	3120629-09	Air	12/02/23 23:59	12/06/23 12:52
TetraTech Q9543014	3120629-10	Air	12/02/23 23:59	12/06/23 12:52
TetraTech Q9543013	3120629-11	Air	12/02/23 23:59	12/06/23 12:52
TetraTech Q9543007 FB	3120629-12	Air	12/02/23 00:00	12/06/23 12:52
TetraTech Q9543010	3120629-13	Air	12/03/23 23:59	12/06/23 12:52
TetraTech Q9543009	3120629-14	Air	12/03/23 23:59	12/06/23 12:52
TetraTech Q9543008	3120629-15	Air	12/03/23 23:59	12/06/23 12:52
TetraTech Q9543000 FB	3120629-16	Air	12/03/23 00:00	12/06/23 12:52

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ERG

Tetra Tech, Inc.
1777 Sentry Pkwy, Bldg 12
Blue Bell, PA 19422
ATTN: Ms. Chelsea Saber
PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 12/14/23 10:47
SUBMITTED: 12/06/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9541896 **Lab ID:** 3120629-01 **Sampled:** 11/30/23 23:59
Matrix: Air **Sample Volume:** 1919.887 m³ **Received:** 12/06/23 12:52
Filter ID: **Analysis Date:** 12/11/23 18:26
Comments: MFK-AM01-113023-HM

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	**7429-90-5**	**549**		**27.2**
Antimony	**7440-36-0**	**0.0439**	SL	**0.0374**
Arsenic	**7440-38-2**	**0.124**		**0.00809**
Barium	**7440-39-3**	**3.77**		**0.803**
Beryllium	**7440-41-7**	**0.0142**		**0.00281**
Cadmium	7440-43-9	0.00628	U	0.0924
Calcium	**7440-70-2**	**277**	GC-BS, QB-01	**247**
Chromium	7440-47-3	1.58	U	1.72
Cobalt	**7440-48-4**	**0.209**	QB-01	**0.0132**
Copper	**7440-50-8**	**20.7**	QB-01	**2.54**
Iron	**7439-89-6**	**515**		**20.5**
Lead	**7439-92-1**	**0.264**		**0.234**
Magnesium	**7439-95-4**	**98.9**		**81.7**
Manganese	**7439-96-5**	**13.3**		**1.01**
Molybdenum	**7439-98-7**	**0.876**	QB-01	**0.181**
Nickel	**7440-02-0**	**0.870**	GC-BS, QB-01	**0.679**
Phosphorus	7723-14-0	339	GC-BS, U	1060
Potassium	**7440-09-7**	**92.8**		**32.2**
Rubidium	**7440-17-7**	**0.159**		**0.0155**
Selenium	**7782-49-2**	**0.161**		**0.00932**
Sodium	7440-23-5	1000	GC-BS, U	1690
Strontium	**7440-24-6**	**2.88**	QB-01	**0.553**
Thallium	**7440-28-0**	**9.67E-4**		**4.26E-4**
Thorium	**7440-29-01**	**0.0104**		**0.00254**
Uranium	7440-61-1	0.0104	U	0.0144
Vanadium	**7440-62-2**	**1.36**		**0.0417**
Zinc	7440-66-6	11.9	U	82.8

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Blue Bell, PA 19422
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PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 12/14/23 10:47
SUBMITTED: 12/06/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9541910
Lab ID: 3120629-02
Sampled: 11/30/23 23:59
Matrix: Air
Sample Volume: 1896.058 m^3
Received: 12/06/23 12:52
Filter ID:
Analysis Date: 12/11/23 18:42
Comments: MFK-AM02-113023-HM

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	**7429-90-5**	**178**		**27.5**
Antimony	7440-36-0	0.0325	SL, U	0.0378
Arsenic	**7440-38-2**	**0.151**		**0.00819**
Barium	**7440-39-3**	**2.17**		**0.813**
Beryllium	**7440-41-7**	**0.00544**		**0.00285**
Cadmium	7440-43-9	0.00609	U	0.0935
Calcium	**7440-70-2**	**431**	GC-BS, QB-01	**251**
Chromium	7440-47-3	1.56	U	1.74
Cobalt	**7440-48-4**	**0.0869**	QB-01	**0.0134**
Copper	**7440-50-8**	**13.4**	QB-01	**2.57**
Iron	**7439-89-6**	**181**		**20.8**
Lead	7439-92-1	0.111	U	0.237
Magnesium	**7439-95-4**	**95.7**		**82.7**
Manganese	**7439-96-5**	**4.00**		**1.02**
Molybdenum	**7439-98-7**	**0.937**	QB-01	**0.183**
Nickel	**7440-02-0**	**0.700**	GC-BS, QB-01	**0.687**
Phosphorus	7723-14-0	374	GC-BS, U	1070
Potassium	**7440-09-7**	**93.0**		**32.6**
Rubidium	**7440-17-7**	**0.118**		**0.0157**
Selenium	**7782-49-2**	**0.106**		**0.00944**
Sodium	7440-23-5	1010	GC-BS, U	1720
Strontium	**7440-24-6**	**1.87**	QB-01	**0.559**
Thallium	**7440-28-0**	**4.62E-4**		**4.32E-4**
Thorium	**7440-29-01**	**0.00601**		**0.00257**
Uranium	7440-61-1	0.00455	U	0.0146
Vanadium	**7440-62-2**	**0.582**		**0.0422**
Zinc	7440-66-6	11.4	U	83.8

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Blue Bell, PA 19422
ATTN: Ms. Chelsea Saber
PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 12/14/23 10:47
SUBMITTED: 12/06/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9541908 **Lab ID:** 3120629-03 **Sampled:** 11/30/23 23:59
Matrix: Air **Sample Volume:** 1686.199 m³ **Received:** 12/06/23 12:52
Filter ID: **Analysis Date:** 12/11/23 18:56
Comments: MFK-AM03-113023-HM

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	**7429-90-5**	**63.7**		**31.0**
Antimony	**7440-36-0**	**0.0499**	SL	**0.0426**
Arsenic	**7440-38-2**	**0.124**		**0.00921**
Barium	**7440-39-3**	**2.30**		**0.915**
Beryllium	7440-41-7	0.00285	U	0.00320
Cadmium	7440-43-9	0.00430	U	0.105
Calcium	**7440-70-2**	**460**	GC-BS, QB-01	**282**
Chromium	7440-47-3	1.73	U	1.96
Cobalt	**7440-48-4**	**0.0532**	QB-01	**0.0151**
Copper	**7440-50-8**	**40.1**	QB-01	**2.89**
Iron	**7439-89-6**	**72.2**		**23.4**
Lead	7439-92-1	0.116	U	0.266
Magnesium	**7439-95-4**	**103**		**93.0**
Manganese	**7439-96-5**	**1.87**		**1.15**
Molybdenum	**7439-98-7**	**1.30**	QB-01	**0.206**
Nickel	**7440-02-0**	**0.814**	GC-BS, QB-01	**0.773**
Phosphorus	7723-14-0	430	GC-BS, U	1210
Potassium	**7440-09-7**	**98.9**		**36.7**
Rubidium	**7440-17-7**	**0.0835**		**0.0177**
Selenium	**7782-49-2**	**0.0849**		**0.0106**
Sodium	7440-23-5	1150	GC-BS, U	1930
Strontium	**7440-24-6**	**1.51**	QB-01	**0.629**
Thallium	7440-28-0	2.93E-4	U	4.85E-4
Thorium	**7440-29-01**	**0.00301**		**0.00289**
Uranium	7440-61-1	0.00327	U	0.0164
Vanadium	**7440-62-2**	**0.324**		**0.0475**
Zinc	7440-66-6	12.9	U	94.3

The results in this report apply only to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

CERTIFICATE OF ANALYSIS

Tetra Tech, Inc.
1777 Sentry Pkwy, Bldg 12
Blue Bell, PA 19422
ATTN: Ms. Chelsea Saber
PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 12/14/23 10:47
SUBMITTED: 12/06/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9543016 FB **Lab ID:** 3120629-04 **Sampled:** 11/30/23 00:00
Matrix: Air **Sample Volume:** 1919.887 m³ **Received:** 12/06/23 12:52
Filter ID: **Analysis Date:** 12/11/23 19:10
Comments: MFK-FB01-113023-HM Field Blank

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	7429-90-5	9.66	U	27.2
Antimony	7440-36-0	0.00759	SL, U	0.0374
Arsenic	7440-38-2	0.00212	U	0.00809
Barium	7440-39-3	0.599	U	0.803
Beryllium	7440-41-7	8.01E-4	U	0.00281
Cadmium	7440-43-9	0.00209	U	0.0924
Calcium	**7440-70-2**	**360**	FB-01, GC-BS, QB-01	**247**
Chromium	7440-47-3	1.36	U	1.72
Cobalt	**7440-48-4**	**0.0201**	FB-01, QB-01	**0.0132**
Copper	7440-50-8	0.608	QB-01, U	2.54
Iron	7439-89-6	11.7	U	20.5
Lead	7439-92-1	0.0515	U	0.234
Magnesium	7439-95-4	42.8	U	81.7
Manganese	7439-96-5	0.142	U	1.01
Molybdenum	**7439-98-7**	**0.227**	FB-01, QB-01	**0.181**
Nickel	7440-02-0	0.479	GC-BS, QB-01, U	0.679
Phosphorus	7723-14-0	337	GC-BS, U	1060
Potassium	7440-09-7	24.6	U	32.2
Rubidium	7440-17-7	0.0144	U	0.0155
Selenium	7782-49-2	0.00181	U	0.00932
Sodium	7440-23-5	723	GC-BS, U	1690
Strontium	**7440-24-6**	**0.710**	FB-01, QB-01	**0.553**
Thallium	7440-28-0	8.16E-5	U	4.26E-4
Thorium	7440-29-01	0.00218	U	0.00254
Uranium	7440-61-1	0.00172	U	0.0144
Vanadium	7440-62-2	0.00346	U	0.0417
Zinc	7440-66-6	8.82	U	82.8

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FILE #: 0000.00
REPORTED: 12/14/23 10:47
SUBMITTED: 12/06/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9541907 **Lab ID:** 3120629-05 **Sampled:** 12/01/23 23:59
Matrix: Air **Sample Volume:** 2039.667 m³ **Received:** 12/06/23 12:52
Filter ID: **Analysis Date:** 12/11/23 19:23
Comments: MFK-AM01-120123-HM

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	**7429-90-5**	**668**	E	**25.6**
Antimony	7440-36-0	0.0323	SL, U	0.0352
Arsenic	**7440-38-2**	**0.143**		**0.00762**
Barium	**7440-39-3**	**4.55**		**0.756**
Beryllium	**7440-41-7**	**0.0166**		**0.00265**
Cadmium	7440-43-9	0.00964	U	0.0869
Calcium	**7440-70-2**	**500**	GC-BS, QB-01	**233**
Chromium	**7440-47-3**	**1.89**		**1.62**
Cobalt	**7440-48-4**	**0.244**	QB-01	**0.0124**
Copper	**7440-50-8**	**14.7**	QB-01	**2.39**
Iron	**7439-89-6**	**619**		**19.3**
Lead	**7439-92-1**	**0.393**		**0.220**
Magnesium	**7439-95-4**	**133**		**76.9**
Manganese	**7439-96-5**	**16.0**		**0.949**
Molybdenum	**7439-98-7**	**0.730**	QB-01	**0.170**
Nickel	**7440-02-0**	**0.883**	GC-BS, QB-01	**0.639**
Phosphorus	7723-14-0	373	GC-BS, U	997
Potassium	**7440-09-7**	**84.6**		**30.3**
Rubidium	**7440-17-7**	**0.181**		**0.0146**
Selenium	**7782-49-2**	**0.146**		**0.00877**
Sodium	7440-23-5	1170	GC-BS, U	1600
Strontium	**7440-24-6**	**3.68**	QB-01	**0.520**
Thallium	**7440-28-0**	**0.00108**		**4.01E-4**
Thorium	**7440-29-01**	**0.0130**		**0.00239**
Uranium	7440-61-1	0.0123	U	0.0136
Vanadium	**7440-62-2**	**1.85**		**0.0392**
Zinc	7440-66-6	13.5	U	77.9

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FILE #: 0000.00
REPORTED: 12/14/23 10:47
SUBMITTED: 12/06/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9543019 **Lab ID:** 3120629-06 **Sampled:** 12/01/23 23:59
Matrix: Air **Sample Volume:** 2026.064 m³ **Received:** 12/06/23 12:52
Filter ID: **Analysis Date:** 12/11/23 19:38
Comments: MFK-AM02-120123-HM

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	**7429-90-5**	**120**		**25.8**
Antimony	**7440-36-0**	**0.0390**	SL	**0.0354**
Arsenic	**7440-38-2**	**0.102**		**0.00767**
Barium	**7440-39-3**	**2.09**		**0.761**
Beryllium	**7440-41-7**	**0.00358**		**0.00267**
Cadmium	7440-43-9	0.00790	U	0.0875
Calcium	**7440-70-2**	**391**	GC-BS, QB-01	**234**
Chromium	**7440-47-3**	**1.67**		**1.63**
Cobalt	**7440-48-4**	**0.108**	QB-01	**0.0125**
Copper	**7440-50-8**	**12.0**	QB-01	**2.41**
Iron	**7439-89-6**	**122**		**19.4**
Lead	7439-92-1	0.138	U	0.222
Magnesium	**7439-95-4**	**118**		**77.4**
Manganese	**7439-96-5**	**2.75**		**0.956**
Molybdenum	**7439-98-7**	**0.835**	QB-01	**0.171**
Nickel	**7440-02-0**	**0.831**	GC-BS, QB-01	**0.643**
Phosphorus	7723-14-0	341	GC-BS, U	1000
Potassium	**7440-09-7**	**89.7**		**30.5**
Rubidium	**7440-17-7**	**0.122**		**0.0147**
Selenium	**7782-49-2**	**0.0721**		**0.00883**
Sodium	7440-23-5	1210	GC-BS, U	1610
Strontium	**7440-24-6**	**1.69**	QB-01	**0.524**
Thallium	**7440-28-0**	**4.94E-4**		**4.04E-4**
Thorium	**7440-29-01**	**0.00450**		**0.00241**
Uranium	7440-61-1	0.00379	U	0.0137
Vanadium	**7440-62-2**	**0.878**		**0.0395**
Zinc	7440-66-6	10.4	U	78.5

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FILE #: 0000.00
REPORTED: 12/14/23 10:47
SUBMITTED: 12/06/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9543017 **Lab ID:** 3120629-07 **Sampled:** 12/01/23 23:59
Matrix: Air **Sample Volume:** 1925.486 m³ **Received:** 12/06/23 12:52
Filter ID: **Analysis Date:** 12/11/23 19:51
Comments: MFK-AM03-120123-HM

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	**7429-90-5**	**73.1**		**27.1**
Antimony	**7440-36-0**	**0.0576**	SL	**0.0373**
Arsenic	**7440-38-2**	**0.0833**		**0.00807**
Barium	**7440-39-3**	**2.53**		**0.801**
Beryllium	**7440-41-7**	**0.00337**		**0.00281**
Cadmium	7440-43-9	0.00531	U	0.0921
Calcium	**7440-70-2**	**425**	GC-BS, QB-01	**247**
Chromium	7440-47-3	1.53	U	1.72
Cobalt	**7440-48-4**	**0.0600**	QB-01	**0.0132**
Copper	**7440-50-8**	**28.3**	QB-01	**2.53**
Iron	**7439-89-6**	**91.9**		**20.4**
Lead	7439-92-1	0.131	U	0.233
Magnesium	**7439-95-4**	**134**		**81.5**
Manganese	**7439-96-5**	**2.44**		**1.01**
Molybdenum	**7439-98-7**	**1.09**	QB-01	**0.180**
Nickel	7440-02-0	0.672	GC-BS, QB-01, U	0.677
Phosphorus	7723-14-0	377	GC-BS, U	1060
Potassium	**7440-09-7**	**90.7**		**32.1**
Rubidium	**7440-17-7**	**0.0924**		**0.0155**
Selenium	**7782-49-2**	**0.0840**		**0.00929**
Sodium	7440-23-5	1380	GC-BS, U	1690
Strontium	**7440-24-6**	**1.70**	QB-01	**0.551**
Thallium	7440-28-0	2.92E-4	U	4.25E-4
Thorium	**7440-29-01**	**0.00363**		**0.00253**
Uranium	7440-61-1	0.00348	U	0.0144
Vanadium	**7440-62-2**	**0.970**		**0.0416**
Zinc	7440-66-6	8.89	U	82.6

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FILE #: 0000.00
REPORTED: 12/14/23 10:47
SUBMITTED: 12/06/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9543012 FB **Lab ID:** 3120629-08 **Sampled:** 12/01/23 00:00
Matrix: Air **Sample Volume:** 2039.667 m³ **Received:** 12/06/23 12:52
Filter ID: **Analysis Date:** 12/11/23 20:05
Comments: MFK-FB01-120123-HM Field Blank

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	7429-90-5	9.25	U	25.6
Antimony	7440-36-0	0.00646	SL, U	0.0352
Arsenic	7440-38-2	0.00171	U	0.00762
Barium	7440-39-3	0.556	U	0.756
Beryllium	7440-41-7	8.02E-4	U	0.00265
Cadmium	7440-43-9	0.00249	U	0.0869
Calcium	**7440-70-2**	**334**	FB-01, GC-BS, QB-01	**233**
Chromium	7440-47-3	1.41	U	1.62
Cobalt	**7440-48-4**	**0.0373**	FB-01, QB-01	**0.0124**
Copper	7440-50-8	0.514	QB-01, U	2.39
Iron	7439-89-6	10.1	U	19.3
Lead	7439-92-1	0.0506	U	0.220
Magnesium	7439-95-4	42.0	U	76.9
Manganese	7439-96-5	0.122	U	0.949
Molybdenum	**7439-98-7**	**0.232**	FB-01, QB-01	**0.170**
Nickel	7440-02-0	0.393	GC-BS, QB-01, U	0.639
Phosphorus	7723-14-0	335	GC-BS, U	997
Potassium	7440-09-7	19.8	U	30.3
Rubidium	**7440-17-7**	**0.0153**	FB-01	**0.0146**
Selenium	7782-49-2	0.00238	U	0.00877
Sodium	7440-23-5	697	GC-BS, U	1600
Strontium	**7440-24-6**	**0.683**	FB-01, QB-01	**0.520**
Thallium	7440-28-0	5.67E-5	U	4.01E-4
Thorium	7440-29-01	0.00202	U	0.00239
Uranium	7440-61-1	0.00166	U	0.0136
Vanadium	7440-62-2	0.0150	U	0.0392
Zinc	7440-66-6	5.95	U	77.9

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FILE #: 0000.00
REPORTED: 12/14/23 10:47
SUBMITTED: 12/06/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9543015 **Lab ID:** 3120629-09 **Sampled:** 12/02/23 23:59
Matrix: Air **Sample Volume:** 2038.818 m³ **Received:** 12/06/23 12:52
Filter ID: **Analysis Date:** 12/11/23 16:00
Comments: MFK-AM01-120223-HM

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	**7429-90-5**	**177**	QM-07	**25.6**
Antimony	7440-36-0	0.0266	SL, U	0.0352
Arsenic	**7440-38-2**	**0.0771**	D-F	**0.00762**
Barium	**7440-39-3**	**2.65**		**0.757**
Beryllium	**7440-41-7**	**0.00589**		**0.00265**
Cadmium	7440-43-9	0.00843	U	0.0870
Calcium	**7440-70-2**	**436**	GC-BS, QB-01	**233**
Chromium	7440-47-3	1.52	U	1.62
Cobalt	**7440-48-4**	**0.0953**	QB-01	**0.0124**
Copper	**7440-50-8**	**17.8**	QB-01, QM-07	**2.39**
Iron	**7439-89-6**	**175**	QM-4X	**19.3**
Lead	7439-92-1	0.186	U	0.220
Magnesium	**7439-95-4**	**121**		**76.9**
Manganese	**7439-96-5**	**4.80**		**0.950**
Molybdenum	**7439-98-7**	**0.962**	QB-01	**0.170**
Nickel	**7440-02-0**	**1.13**	GC-BS, QB-01	**0.639**
Phosphorus	7723-14-0	354	A-01, GC-BS, QM-4X, U	998
Potassium	**7440-09-7**	**74.0**		**30.3**
Rubidium	**7440-17-7**	**0.0850**		**0.0146**
Selenium	**7782-49-2**	**0.0985**		**0.00878**
Sodium	7440-23-5	1230	A-01, GC-BS, QM-4X, U	1600
Strontium	**7440-24-6**	**2.04**	QB-01	**0.520**
Thallium	**7440-28-0**	**4.58E-4**		**4.01E-4**
Thorium	**7440-29-01**	**0.00469**	QM-07	**0.00239**
Uranium	7440-61-1	0.00474	U	0.0136
Vanadium	**7440-62-2**	**0.531**		**0.0393**
Zinc	7440-66-6	13.2	U	78.0

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FILE #: 0000.00
REPORTED: 12/14/23 10:47
SUBMITTED: 12/06/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9543014 **Lab ID:** 3120629-10 **Sampled:** 12/02/23 23:59
Matrix: Air **Sample Volume:** 2031.129 m³ **Received:** 12/06/23 12:52
Filter ID: **Analysis Date:** 12/11/23 20:19
Comments: MFK-AM02-120223-HM

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	**7429-90-5**	**103**		**25.7**
Antimony	7440-36-0	0.0314	SL, U	0.0353
Arsenic	**7440-38-2**	**0.104**		**0.00765**
Barium	**7440-39-3**	**1.97**		**0.759**
Beryllium	**7440-41-7**	**0.00349**		**0.00266**
Cadmium	7440-43-9	0.00561	U	0.0873
Calcium	**7440-70-2**	**419**	GC-BS, QB-01	**234**
Chromium	7440-47-3	1.58	U	1.63
Cobalt	**7440-48-4**	**0.0634**	QB-01	**0.0125**
Copper	**7440-50-8**	**18.2**	QB-01	**2.40**
Iron	**7439-89-6**	**113**		**19.4**
Lead	7439-92-1	0.114	U	0.221
Magnesium	**7439-95-4**	**133**		**77.2**
Manganese	**7439-96-5**	**2.65**		**0.953**
Molybdenum	**7439-98-7**	**1.14**	QB-01	**0.171**
Nickel	7440-02-0	0.536	GC-BS, QB-01, U	0.642
Phosphorus	7723-14-0	370	GC-BS, U	1000
Potassium	**7440-09-7**	**108**		**30.4**
Rubidium	**7440-17-7**	**0.159**		**0.0147**
Selenium	**7782-49-2**	**0.0912**		**0.00881**
Sodium	7440-23-5	1330	GC-BS, U	1600
Strontium	**7440-24-6**	**1.83**	QB-01	**0.522**
Thallium	7440-28-0	3.77E-4	U	4.03E-4
Thorium	**7440-29-01**	**0.00470**		**0.00240**
Uranium	7440-61-1	0.00382	U	0.0136
Vanadium	**7440-62-2**	**0.441**		**0.0394**
Zinc	7440-66-6	9.11	U	78.3

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FILE #: 0000.00
REPORTED: 12/14/23 10:47
SUBMITTED: 12/06/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9543013 **Lab ID:** 3120629-11 **Sampled:** 12/02/23 23:59
Matrix: Air **Sample Volume:** 1822.686 m³ **Received:** 12/06/23 12:52
Filter ID: **Analysis Date:** 12/11/23 20:33
Comments: MFK-AM03-120223-HM

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	**7429-90-5**	**83.9**		**28.7**
Antimony	**7440-36-0**	**0.0802**	SL	**0.0394**
Arsenic	**7440-38-2**	**0.0814**		**0.00852**
Barium	**7440-39-3**	**3.11**		**0.846**
Beryllium	**7440-41-7**	**0.00399**		**0.00296**
Cadmium	7440-43-9	0.00704	U	0.0973
Calcium	**7440-70-2**	**473**	GC-BS, QB-01	**261**
Chromium	7440-47-3	1.63	U	1.81
Cobalt	**7440-48-4**	**0.0758**	QB-01	**0.0139**
Copper	**7440-50-8**	**39.4**	QB-01	**2.68**
Iron	**7439-89-6**	**115**		**21.6**
Lead	7439-92-1	0.129	U	0.246
Magnesium	**7439-95-4**	**185**		**86.1**
Manganese	**7439-96-5**	**3.11**		**1.06**
Molybdenum	**7439-98-7**	**1.23**	QB-01	**0.190**
Nickel	7440-02-0	0.581	GC-BS, QB-01, U	0.715
Phosphorus	7723-14-0	394	GC-BS, U	1120
Potassium	**7440-09-7**	**109**		**33.9**
Rubidium	**7440-17-7**	**0.0908**		**0.0163**
Selenium	**7782-49-2**	**0.146**		**0.00982**
Sodium	**7440-23-5**	**1800**	E, GC-BS	**1790**
Strontium	**7440-24-6**	**2.07**	QB-01	**0.582**
Thallium	7440-28-0	4.10E-4	U	4.49E-4
Thorium	**7440-29-01**	**0.00491**		**0.00268**
Uranium	7440-61-1	0.00423	U	0.0152
Vanadium	**7440-62-2**	**0.634**		**0.0439**
Zinc	7440-66-6	15.0	U	87.2

CERTIFICATE OF ANALYSIS

Tetra Tech, Inc.
1777 Sentry Pkwy, Bldg 12
Blue Bell, PA 19422
ATTN: Ms. Chelsea Saber
PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 12/14/23 10:47
SUBMITTED: 12/06/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9543007 FB
Matrix: Air
Lab ID: 3120629-12
Sample Volume: 2038.818 m³
Filter ID:
Sampled: 12/02/23 00:00
Received: 12/06/23 12:52
Analysis Date: 12/11/23 21:34
Comments: MFK-FB01-120223-HM Field Blank

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	7429-90-5	9.50	U	25.6
Antimony	7440-36-0	0.00689	SL, U	0.0352
Arsenic	7440-38-2	0.00323	U	0.00762
Barium	7440-39-3	0.543	U	0.757
Beryllium	7440-41-7	6.11E-4	U	0.00265
Cadmium	7440-43-9	0.00233	U	0.0870
Calcium	**7440-70-2**	**349**	FB-01, GC-BS, QB-01	**233**
Chromium	7440-47-3	1.37	U	1.62
Cobalt	**7440-48-4**	**0.0420**	FB-01, QB-01	**0.0124**
Copper	7440-50-8	0.368	QB-01, U	2.39
Iron	7439-89-6	16.7	U	19.3
Lead	7439-92-1	0.0472	U	0.220
Magnesium	7439-95-4	41.3	U	76.9
Manganese	7439-96-5	0.156	U	0.950
Molybdenum	**7439-98-7**	**0.234**	FB-01, QB-01	**0.170**
Nickel	7440-02-0	0.302	GC-BS, QB-01, U	0.639
Phosphorus	7723-14-0	330	GC-BS, U	998
Potassium	7440-09-7	13.2	U	30.3
Rubidium	7440-17-7	0.0132	U	0.0146
Selenium	7782-49-2	0.00245	U	0.00878
Sodium	7440-23-5	694	GC-BS, U	1600
Strontium	**7440-24-6**	**0.694**	FB-01, QB-01	**0.520**
Thallium	7440-28-0	6.88E-5	U	4.01E-4
Thorium	7440-29-01	0.00205	U	0.00239
Uranium	7440-61-1	0.00170	U	0.0136
Vanadium	7440-62-2	0.00786	U	0.0393
Zinc	7440-66-6	6.46	U	78.0

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FILE #: 0000.00
REPORTED: 12/14/23 10:47
SUBMITTED: 12/06/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9543010 **Lab ID:** 3120629-13 **Sampled:** 12/03/23 23:59
Matrix: Air **Sample Volume:** 2038.818 m^3 **Received:** 12/06/23 12:52
Filter ID: **Analysis Date:** 12/11/23 21:48
Comments: MFK-AM01-120323-HM

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m^3 Air	Flag	MDL ng/m^3 Air
Aluminum	**7429-90-5**	**686**	E	**25.6**
Antimony	**7440-36-0**	**0.0384**	SL	**0.0352**
Arsenic	**7440-38-2**	**0.118**		**0.00762**
Barium	**7440-39-3**	**5.56**		**0.757**
Beryllium	**7440-41-7**	**0.0170**		**0.00265**
Cadmium	7440-43-9	0.00887	U	0.0870
Calcium	**7440-70-2**	**503**	QB-01, GC-BS	**233**
Chromium	**7440-47-3**	**1.87**		**1.62**
Cobalt	**7440-48-4**	**0.277**	QB-01	**0.0124**
Copper	**7440-50-8**	**18.6**	QB-01	**2.39**
Iron	**7439-89-6**	**668**		**19.3**
Lead	**7439-92-1**	**0.300**		**0.220**
Magnesium	**7439-95-4**	**193**		**76.9**
Manganese	**7439-96-5**	**19.0**		**0.950**
Molybdenum	**7439-98-7**	**0.877**	QB-01	**0.170**
Nickel	**7440-02-0**	**0.650**	GC-BS, QB-01	**0.639**
Phosphorus	7723-14-0	373	GC-BS, U	998
Potassium	**7440-09-7**	**85.4**		**30.3**
Rubidium	**7440-17-7**	**0.178**		**0.0146**
Selenium	**7782-49-2**	**0.221**		**0.00878**
Sodium	**7440-23-5**	**1660**	E, GC-BS	**1600**
Strontium	**7440-24-6**	**3.98**	QB-01	**0.520**
Thallium	**7440-28-0**	**0.00137**		**4.01E-4**
Thorium	**7440-29-01**	**0.0156**		**0.00239**
Uranium	**7440-61-1**	**0.0136**		**0.0136**
Vanadium	**7440-62-2**	**1.85**		**0.0393**
Zinc	7440-66-6	8.61	U	78.0

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Tetra Tech, Inc.
1777 Sentry Pkwy, Bldg 12
Blue Bell, PA 19422
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PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 12/14/23 10:47
SUBMITTED: 12/06/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9543009 **Lab ID:** 3120629-14 **Sampled:** 12/03/23 23:59
Matrix: Air **Sample Volume:** 2026.064 m³ **Received:** 12/06/23 12:52
Filter ID: **Analysis Date:** 12/11/23 22:02
Comments: MFK-AM02-120323-HM

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	**7429-90-5**	**117**		**25.8**
Antimony	**7440-36-0**	**0.0517**	SL	**0.0354**
Arsenic	**7440-38-2**	**0.0999**		**0.00767**
Barium	**7440-39-3**	**2.80**		**0.761**
Beryllium	**7440-41-7**	**0.00444**		**0.00267**
Cadmium	7440-43-9	0.00692	U	0.0875
Calcium	**7440-70-2**	**440**	GC-BS, QB-01	**234**
Chromium	7440-47-3	1.52	U	1.63
Cobalt	**7440-48-4**	**0.0810**	QB-01	**0.0125**
Copper	**7440-50-8**	**17.1**	QB-01	**2.41**
Iron	**7439-89-6**	**141**		**19.4**
Lead	7439-92-1	0.144	U	0.222
Magnesium	**7439-95-4**	**167**		**77.4**
Manganese	**7439-96-5**	**3.65**		**0.956**
Molybdenum	**7439-98-7**	**0.866**	QB-01	**0.171**
Nickel	7440-02-0	0.525	GC-BS, QB-01, U	0.643
Phosphorus	7723-14-0	371	GC-BS, U	1000
Potassium	**7440-09-7**	**124**		**30.5**
Rubidium	**7440-17-7**	**0.176**		**0.0147**
Selenium	**7782-49-2**	**0.123**		**0.00883**
Sodium	**7440-23-5**	**1620**	E, GC-BS	**1610**
Strontium	**7440-24-6**	**2.14**	QB-01	**0.524**
Thallium	**7440-28-0**	**6.30E-4**		**4.04E-4**
Thorium	**7440-29-01**	**0.00569**		**0.00241**
Uranium	7440-61-1	0.00464	U	0.0137
Vanadium	**7440-62-2**	**0.672**		**0.0395**
Zinc	7440-66-6	8.56	U	78.5

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Tetra Tech, Inc.
1777 Sentry Pkwy, Bldg 12
Blue Bell, PA 19422
ATTN: Ms. Chelsea Saber
PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 12/14/23 10:47
SUBMITTED: 12/06/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9543008 **Lab ID:** 3120629-15 **Sampled:** 12/03/23 23:59
Matrix: Air **Sample Volume:** 1842.60€ m³ **Received:** 12/06/23 12:52
Filter ID: **Analysis Date:** 12/11/23 22:16
Comments: MFK-AM03-120323-HM

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	**7429-90-5**	**97.2**		**28.3**
Antimony	**7440-36-0**	**0.0558**	SL	**0.0389**
Arsenic	**7440-38-2**	**0.0799**		**0.00843**
Barium	**7440-39-3**	**2.88**		**0.837**
Beryllium	**7440-41-7**	**0.00439**		**0.00293**
Cadmium	7440-43-9	0.00582	U	0.0962
Calcium	**7440-70-2**	**471**	GC-BS, QB-01	**258**
Chromium	**7440-47-3**	**1.91**		**1.79**
Cobalt	**7440-48-4**	**0.0855**	QB-01	**0.0138**
Copper	**7440-50-8**	**34.3**	QB-01	**2.65**
Iron	**7439-89-6**	**135**		**21.4**
Lead	7439-92-1	0.155	U	0.244
Magnesium	**7439-95-4**	**184**		**85.1**
Manganese	**7439-96-5**	**3.84**		**1.05**
Molybdenum	**7439-98-7**	**1.17**	QB-01	**0.188**
Nickel	**7440-02-0**	**0.713**	GC-BS, QB-01	**0.707**
Phosphorus	7723-14-0	395	GC-BS, U	1100
Potassium	**7440-09-7**	**84.0**		**33.6**
Rubidium	**7440-17-7**	**0.0903**		**0.0162**
Selenium	**7782-49-2**	**0.135**		**0.00971**
Sodium	**7440-23-5**	**1790**	E, GC-BS	**1770**
Strontium	**7440-24-6**	**2.12**	QB-01	**0.576**
Thallium	**7440-28-0**	**6.27E-4**		**4.44E-4**
Thorium	**7440-29-01**	**0.00530**		**0.00265**
Uranium	7440-61-1	0.00463	U	0.0150
Vanadium	**7440-62-2**	**0.704**		**0.0434**
Zinc	7440-66-6	10.1	U	86.3

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Tetra Tech, Inc.
1777 Sentry Pkwy, Bldg 12
Blue Bell, PA 19422
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PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 12/14/23 10:47
SUBMITTED: 12/06/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9543000 FB **Lab ID:** 3120629-16 **Sampled:** 12/03/23 00:00
Matrix: Air **Sample Volume:** 2038.818 m³ **Received:** 12/06/23 12:52
Filter ID: **Analysis Date:** 12/11/23 22:44
Comments: MFK-FB01-120323-HM Field Blank

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	7429-90-5	8.62	U	25.6
Antimony	7440-36-0	0.00636	SL, U	0.0352
Arsenic	7440-38-2	0.00210	U	0.00762
Barium	7440-39-3	0.550	U	0.757
Beryllium	7440-41-7	6.25E-4	U	0.00265
Cadmium	7440-43-9	0.00220	U	0.0870
Calcium	**7440-70-2**	**325**	FB-01, GC-BS, QB-01	**233**
Chromium	7440-47-3	1.41	U	1.62
Cobalt	**7440-48-4**	**0.0233**	FB-01, QB-01	**0.0124**
Copper	7440-50-8	0.364	QB-01, U	2.39
Iron	7439-89-6	11.4	U	19.3
Lead	7439-92-1	0.0480	U	0.220
Magnesium	7439-95-4	40.4	U	76.9
Manganese	7439-96-5	0.123	U	0.950
Molybdenum	**7439-98-7**	**0.230**	FB-01, QB-01	**0.170**
Nickel	7440-02-0	0.289	GC-BS, QB-01, U	0.639
Phosphorus	7723-14-0	334	GC-BS, U	998
Potassium	7440-09-7	11.9	U	30.3
Rubidium	7440-17-7	0.0128	U	0.0146
Selenium	7782-49-2	0.00240	U	0.00878
Sodium	7440-23-5	695	GC-BS, U	1600
Strontium	**7440-24-6**	**0.671**	FB-01, QB-01	**0.520**
Thallium	7440-28-0	3.85E-5	U	4.01E-4
Thorium	7440-29-01	0.00204	U	0.00239
Uranium	7440-61-1	0.00164	U	0.0136
Vanadium	7440-62-2	0.0132	U	0.0393
Zinc	7440-66-6	5.51	U	78.0

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Tetra Tech, Inc.
1777 Sentry Pkwy, Bldg 12
Blue Bell, PA 19422
ATTN: Ms. Chelsea Saber
PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 12/14/23 10:47
SUBMITTED: 12/06/23
AQS SITE CODE:
SITE CODE: Maui fires

Inorganics by Compendium Method IO-3.5 - Quality Control

Batch 2312031 - B3L0605

Calibration Blank (2312031-CCB1) Prepared & Analyzed: 12/11/23

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Aluminum	59.8		ng/l							
Antimony	1.50		ng/l							
Arsenic	3.31		ng/l							
Barium	1.64		ng/l							
Beryllium	1.03		ng/l							
Cadmium	0.307		ng/l							
Calcium	464		ng/l							
Chromium	3.37		ng/l							
Cobalt	0.408		ng/l							
Copper	131		ng/l							
Iron	26.4		ng/l							
Lead	6.23		ng/l							
Magnesium	19.6		ng/l							
Manganese	7.20		ng/l							
Molybdenum	29.3		ng/l							
Nickel	0.370		ng/l							
Phosphorus	-845		ng/l							U
Potassium	-973		ng/l							U
Rubidium	0.315		ng/l							
Selenium	0.969		ng/l							
Sodium	-65.2		ng/l							U
Strontium	0.544		ng/l							
Thallium	0.487		ng/l							
Thorium	0.453		ng/l							
Uranium	-0.0185		ng/l							U
Vanadium	-34.9		ng/l							U
Zinc	-12.6		ng/l							U

Calibration Blank (2312031-CCB2) Prepared & Analyzed: 12/11/23

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Aluminum	32.1		ng/l							
Antimony	0.841		ng/l							
Arsenic	1.40		ng/l							
Barium	5.28		ng/l							
Beryllium	0.261		ng/l							
Cadmium	0.590		ng/l							
Calcium	109		ng/l							
Chromium	6.86		ng/l							
Cobalt	1.31		ng/l							
Copper	78.1		ng/l							

The results in this report apply only to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

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FILE #: 0000.00
REPORTED: 12/14/23 10:47
SUBMITTED: 12/06/23
AQS SITE CODE:
SITE CODE: Maui fires

Inorganics by Compendium Method IO-3.5 - Quality Control

Batch 2312031 - B3L0605

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Calibration Blank (2312031-CCB2) Contin				Prepared & Analyzed: 12/11/23						
Iron	116		ng/l							
Lead	6.09		ng/l							
Magnesium	29.2		ng/l							
Manganese	12.8		ng/l							
Molybdenum	6.48		ng/l							
Nickel	1.64		ng/l							
Phosphorus	-98.5		ng/l							U
Potassium	-2030		ng/l							U
Rubidium	-0.520		ng/l							U
Selenium	2.55		ng/l							
Sodium	-139		ng/l							U
Strontium	1.31		ng/l							
Thallium	0.342		ng/l							
Thorium	0.775		ng/l							
Uranium	0.00284		ng/l							
Vanadium	-27.2		ng/l							U
Zinc	86.5		ng/l							
Calibration Blank (2312031-CCB3)				Prepared & Analyzed: 12/11/23						
Aluminum	93.4		ng/l							
Antimony	1.38		ng/l							
Arsenic	0.532		ng/l							
Barium	9.11		ng/l							
Beryllium	-0.404		ng/l							U
Cadmium	0.751		ng/l							
Calcium	1790		ng/l							
Chromium	8.74		ng/l							
Cobalt	2.10		ng/l							
Copper	103		ng/l							
Iron	89.9		ng/l							
Lead	9.51		ng/l							
Magnesium	57.1		ng/l							
Manganese	19.5		ng/l							
Molybdenum	7.67		ng/l							
Nickel	4.18		ng/l							
Phosphorus	240		ng/l							
Potassium	-1680		ng/l							U
Rubidium	0.833		ng/l							
Selenium	-5.47		ng/l							U

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FILE #: 0000.00
REPORTED: 12/14/23 10:47
SUBMITTED: 12/06/23
AQS SITE CODE:
SITE CODE: Maui fires

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes

Inorganics by Compendium Method IO-3.5 - Quality Control

Batch 2312031 - B3L0605

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Calibration Blank (2312031-CCB3) Contin				Prepared & Analyzed: 12/11/23						
Sodium	35.1		ng/l							
Strontium	1.98		ng/l							
Thallium	0.377		ng/l							
Thorium	0.618		ng/l							
Uranium	0.00625		ng/l							
Vanadium	-34.9		ng/l							U
Zinc	36.8		ng/l							
Calibration Blank (2312031-CCB4)				Prepared: 12/11/23 Analyzed: 12/12/23						
Aluminum	89.9		ng/l							
Antimony	1.68		ng/l							
Arsenic	0.642		ng/l							
Barium	11.3		ng/l							
Beryllium	-0.336		ng/l							U
Cadmium	1.03		ng/l							
Calcium	1970		ng/l							
Chromium	14.4		ng/l							
Cobalt	2.56		ng/l							
Copper	124		ng/l							
Iron	168		ng/l							
Lead	11.5		ng/l							
Magnesium	77.9		ng/l							
Manganese	25.5		ng/l							
Molybdenum	8.01		ng/l							
Nickel	6.18		ng/l							
Phosphorus	-615		ng/l							U
Potassium	-1600		ng/l							U
Rubidium	0.323		ng/l							
Selenium	-2.85		ng/l							U
Sodium	122		ng/l							
Strontium	3.46		ng/l							
Thallium	0.497		ng/l							
Thorium	0.642		ng/l							
Uranium	0.0164		ng/l							
Vanadium	-34.0		ng/l							U
Zinc	38.0		ng/l							
Calibration Check (2312031-CCV1)				Prepared & Analyzed: 12/11/23						
Aluminum	1.53E6		ng/l	1.5000E6		102	90-110			
Antimony	20200		ng/l	20000		101	90-110			

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Tetra Tech, Inc.
1777 Sentry Pkwy, Bldg 12
Blue Bell, PA 19422
ATTN: Ms. Chelsea Saber
PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 12/14/23 10:47
SUBMITTED: 12/06/23
AQS SITE CODE:
SITE CODE: Maui fires

Inorganics by Compendium Method IO-3.5 - Quality Control

Batch 2312031 - B3L0605

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Calibration Check (2312031-CCV1) Contin				Prepared & Analyzed: 12/11/23						
Arsenic	19900		ng/l	20000		99.7	90-110			
Barium	200000		ng/l	200000		100	90-110			
Beryllium	4940		ng/l	5000.0		98.8	90-110			
Cadmium	20100		ng/l	20000		101	90-110			
Calcium	2.48E7		ng/l	2.5000E7		99.1	90-110			
Chromium	241000		ng/l	240000		101	90-110			
Cobalt	50300		ng/l	50000		101	90-110			
Copper	2.02E6		ng/l	2.0000E6		101	90-110			
Iron	2.49E6		ng/l	2.5000E6		99.7	90-110			
Lead	198000		ng/l	200000		98.8	90-110			
Magnesium	1.03E6		ng/l	1.0000E6		103	90-110			
Manganese	488000		ng/l	500000		97.6	90-110			
Molybdenum	49600		ng/l	50000		99.2	90-110			
Nickel	121000		ng/l	120000		101	90-110			
Phosphorus	198000		ng/l	200000		98.9	90-110			
Potassium	2.49E6		ng/l	2.5000E6		99.5	90-110			
Rubidium	9990		ng/l	10000		99.9	90-110			
Selenium	19900		ng/l	20000		99.7	90-110			
Sodium	2.61E6		ng/l	2.5000E6		104	90-110			
Strontium	49900		ng/l	50000		99.8	90-110			
Thallium	484		ng/l	500.00		96.8	90-110			
Thorium	496		ng/l	500.00		99.2	90-110			
Uranium	494		ng/l	500.00		98.9	90-110			
Vanadium	19800		ng/l	20000		99.2	90-110			
Zinc	519000		ng/l	500000		104	90-110			
Calibration Check (2312031-CCV2)				Prepared & Analyzed: 12/11/23						
Aluminum	1.47E6		ng/l	1.5000E6		98.2	90-110			
Antimony	19900		ng/l	20000		99.6	90-110			
Arsenic	19600		ng/l	20000		97.8	90-110			
Barium	198000		ng/l	200000		99.1	90-110			
Beryllium	4930		ng/l	5000.0		98.5	90-110			
Cadmium	19800		ng/l	20000		98.9	90-110			
Calcium	2.43E7		ng/l	2.5000E7		97.3	90-110			
Chromium	246000		ng/l	240000		103	90-110			
Cobalt	48800		ng/l	50000		97.6	90-110			
Copper	1.96E6		ng/l	2.0000E6		97.9	90-110			
Iron	2.42E6		ng/l	2.5000E6		96.8	90-110			
Lead	195000		ng/l	200000		97.3	90-110			

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CERTIFICATE OF ANALYSIS

Tetra Tech, Inc.
1777 Sentry Pkwy, Bldg 12
Blue Bell, PA 19422
ATTN: Ms. Chelsea Saber
PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 12/14/23 10:47
SUBMITTED: 12/06/23
AQS SITE CODE:
SITE CODE: Maui fires

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes

Inorganics by Compendium Method IO-3.5 - Quality Control

Batch 2312031 - B3L0605

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Calibration Check (2312031-CCV2) Contin				Prepared & Analyzed: 12/11/23						
Magnesium	982000		ng/l	1.0000E6		98.2	90-110			
Manganese	477000		ng/l	500000		95.3	90-110			
Molybdenum	49000		ng/l	50000		98.1	90-110			
Nickel	118000		ng/l	120000		98.1	90-110			
Phosphorus	186000		ng/l	200000		93.1	90-110			
Potassium	2.42E6		ng/l	2.5000E6		96.7	90-110			
Rubidium	9860		ng/l	10000		98.6	90-110			
Selenium	20000		ng/l	20000		99.9	90-110			
Sodium	2.47E6		ng/l	2.5000E6		98.8	90-110			
Strontium	48800		ng/l	50000		97.6	90-110			
Thallium	471		ng/l	500.00		94.2	90-110			
Thorium	482		ng/l	500.00		96.4	90-110			
Uranium	477		ng/l	500.00		95.5	90-110			
Vanadium	19500		ng/l	20000		97.5	90-110			
Zinc	507000		ng/l	500000		101	90-110			
Calibration Check (2312031-CCV3)				Prepared & Analyzed: 12/11/23						
Aluminum	1.49E6		ng/l	1.5000E6		99.5	90-110			
Antimony	20300		ng/l	20000		101	90-110			
Arsenic	19800		ng/l	20000		99.2	90-110			
Barium	199000		ng/l	200000		99.3	90-110			
Beryllium	4560		ng/l	5000.0		91.3	90-110			
Cadmium	20100		ng/l	20000		101	90-110			
Calcium	2.46E7		ng/l	2.5000E7		98.4	90-110			
Chromium	246000		ng/l	240000		103	90-110			
Cobalt	49400		ng/l	50000		98.8	90-110			
Copper	2.01E6		ng/l	2.0000E6		100	90-110			
Iron	2.46E6		ng/l	2.5000E6		98.6	90-110			
Lead	197000		ng/l	200000		98.7	90-110			
Magnesium	1.00E6		ng/l	1.0000E6		100	90-110			
Manganese	487000		ng/l	500000		97.3	90-110			
Molybdenum	49200		ng/l	50000		98.4	90-110			
Nickel	120000		ng/l	120000		99.7	90-110			
Phosphorus	197000		ng/l	200000		98.6	90-110			
Potassium	2.43E6		ng/l	2.5000E6		97.2	90-110			
Rubidium	9930		ng/l	10000		99.3	90-110			
Selenium	20000		ng/l	20000		100	90-110			
Sodium	2.54E6		ng/l	2.5000E6		102	90-110			
Strontium	49700		ng/l	50000		99.3	90-110			

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Inorganics by Compendium Method IO-3.5 - Quality Control

Batch 2312031 - B3L0605

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Calibration Check (2312031-CCV3) Contin				Prepared & Analyzed: 12/11/23						
Thallium	480		ng/l	500.00		96.0	90-110			
Thorium	496		ng/l	500.00		99.1	90-110			
Uranium	489		ng/l	500.00		97.7	90-110			
Vanadium	19900		ng/l	20000		99.6	90-110			
Zinc	517000		ng/l	500000		103	90-110			
Calibration Check (2312031-CCV4)				Prepared & Analyzed: 12/11/23						
Aluminum	1.50E6		ng/l	1.5000E6		100	90-110			
Antimony	20500		ng/l	20000		102	90-110			
Arsenic	20000		ng/l	20000		99.9	90-110			
Barium	202000		ng/l	200000		101	90-110			
Beryllium	4550		ng/l	5000.0		91.1	90-110			
Cadmium	20300		ng/l	20000		102	90-110			
Calcium	2.49E7		ng/l	2.5000E7		99.6	90-110			
Chromium	254000		ng/l	240000		106	90-110			
Cobalt	49700		ng/l	50000		99.4	90-110			
Copper	2.02E6		ng/l	2.0000E6		101	90-110			
Iron	2.48E6		ng/l	2.5000E6		99.2	90-110			
Lead	200000		ng/l	200000		99.9	90-110			
Magnesium	1.00E6		ng/l	1.0000E6		100	90-110			
Manganese	491000		ng/l	500000		98.2	90-110			
Molybdenum	50300		ng/l	50000		101	90-110			
Nickel	120000		ng/l	120000		99.8	90-110			
Phosphorus	193000		ng/l	200000		96.7	90-110			
Potassium	2.45E6		ng/l	2.5000E6		97.9	90-110			
Rubidium	10100		ng/l	10000		101	90-110			
Selenium	20200		ng/l	20000		101	90-110			
Sodium	2.55E6		ng/l	2.5000E6		102	90-110			
Strontium	50300		ng/l	50000		101	90-110			
Thallium	485		ng/l	500.00		97.0	90-110			
Thorium	500		ng/l	500.00		100	90-110			
Uranium	498		ng/l	500.00		99.7	90-110			
Vanadium	20200		ng/l	20000		101	90-110			
Zinc	523000		ng/l	500000		105	90-110			
High Cal Check (2312031-HCV1)				Prepared & Analyzed: 12/11/23						
Aluminum	2.93E6		ng/l	3.0000E6		97.6	95-105			
Antimony	39900		ng/l	40000		99.7	95-105			
Arsenic	39800		ng/l	40000		99.5	95-105			
Barium	400000		ng/l	400000		99.9	95-105			

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Inorganics by Compendium Method IO-3.5 - Quality Control

Batch 2312031 - B3L0605

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
High Cal Check (2312031-HCV1) Continue				Prepared & Analyzed: 12/11/23						
Beryllium	10300		ng/l	10000		103	95-105			
Cadmium	39300		ng/l	40000		98.3	95-105			
Calcium	4.93E7		ng/l	5.0000E7		98.7	95-105			
Chromium	473000		ng/l	480000		98.5	95-105			
Cobalt	98300		ng/l	100000		98.3	95-105			
Copper	3.94E6		ng/l	4.0000E6		98.5	95-105			
Iron	4.94E6		ng/l	5.0000E6		98.8	95-105			
Lead	397000		ng/l	400000		99.2	95-105			
Magnesium	1.96E6		ng/l	2.0000E6		97.9	95-105			
Manganese	986000		ng/l	1.0000E6		98.6	95-105			
Molybdenum	99400		ng/l	100000		99.4	95-105			
Nickel	235000		ng/l	240000		98.0	95-105			
Phosphorus	394000		ng/l	400000		98.5	95-105			
Potassium	4.90E6		ng/l	5.0000E6		98.1	95-105			
Rubidium	19900		ng/l	20000		99.3	95-105			
Selenium	39600		ng/l	40000		99.0	95-105			
Sodium	4.90E6		ng/l	5.0000E6		98.0	95-105			
Strontium	99600		ng/l	100000		99.6	95-105			
Thallium	995		ng/l	1000.0		99.5	95-105			
Thorium	990		ng/l	1000.0		99.0	95-105			
Uranium	996		ng/l	1000.0		99.6	95-105			
Vanadium	39600		ng/l	40000		99.1	95-105			
Zinc	1.02E6		ng/l	1.0000E6		102	95-105			
Initial Cal Blank (2312031-ICB1)				Prepared & Analyzed: 12/11/23						
Aluminum	61.1		ng/l							
Antimony	1.48		ng/l							
Arsenic	-0.519		ng/l							U
Barium	3.07		ng/l							
Beryllium	1.36		ng/l							
Cadmium	0.359		ng/l							
Calcium	888		ng/l							
Chromium	5.64		ng/l							
Cobalt	0.725		ng/l							
Copper	77.3		ng/l							
Iron	99.8		ng/l							
Lead	7.11		ng/l							
Magnesium	0.0695		ng/l							
Manganese	8.48		ng/l							

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Inorganics by Compendium Method IO-3.5 - Quality Control

Batch 2312031 - B3L0605

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Initial Cal Blank (2312031-ICB1) Continu				Prepared & Analyzed: 12/11/23						
Molybdenum	13.3		ng/l							
Nickel	0.0933		ng/l							
Phosphorus	-217		ng/l							U
Potassium	-1150		ng/l							U
Rubidium	0.811		ng/l							
Selenium	-2.72		ng/l							U
Sodium	-108		ng/l							U
Strontium	0.976		ng/l							
Thallium	0.339		ng/l							
Thorium	0.469		ng/l							
Uranium	-0.00424		ng/l							U
Vanadium	-32.0		ng/l							U
Zinc	-15.8		ng/l							U
Initial Cal Check (2312031-ICV1)				Prepared & Analyzed: 12/11/23						
Aluminum	1.45E6		ng/l	1.5000E6		96.5	90-110			
Antimony	19500		ng/l	20000		97.3	90-110			
Arsenic	19500		ng/l	20000		97.5	90-110			
Barium	196000		ng/l	200000		98.0	90-110			
Beryllium	5090		ng/l	5000.0		102	90-110			
Cadmium	20100		ng/l	20000		101	90-110			
Calcium	2.40E7		ng/l	2.5000E7		96.1	90-110			
Chromium	246000		ng/l	240000		103	90-110			
Cobalt	49000		ng/l	50000		98.0	90-110			
Copper	1.97E6		ng/l	2.0000E6		98.6	90-110			
Iron	2.45E6		ng/l	2.5000E6		98.2	90-110			
Lead	193000		ng/l	200000		96.4	90-110			
Magnesium	967000		ng/l	1.0000E6		96.7	90-110			
Manganese	479000		ng/l	500000		95.9	90-110			
Molybdenum	48700		ng/l	50000		97.3	90-110			
Nickel	117000		ng/l	120000		97.8	90-110			
Phosphorus	190000		ng/l	200000		95.2	90-110			
Potassium	2.45E6		ng/l	2.5000E6		98.0	90-110			
Rubidium	9540		ng/l	10000		95.4	90-110			
Selenium	20200		ng/l	20000		101	90-110			
Sodium	2.48E6		ng/l	2.5000E6		99.2	90-110			
Strontium	49000		ng/l	50000		98.0	90-110			
Thallium	468		ng/l	500.00		93.7	90-110			
Thorium	474		ng/l	500.00		94.7	90-110			

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Inorganics by Compendium Method IO-3.5 - Quality Control

Batch 2312031 - B3L0605

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Initial Cal Check (2312031-ICV1) Continu				Prepared & Analyzed: 12/11/23						
Uranium	479		ng/l	500.00		95.8	90-110			
Vanadium	19700		ng/l	20000		98.3	90-110			
Zinc	515000		ng/l	500000		103	90-110			
Interference Check A (2312031-IFA1)				Prepared & Analyzed: 12/11/23						
Aluminum	1.45E7		ng/l	1.5000E7		96.4	80-120			
Antimony	0.00		ng/l				80-120			U
Arsenic	0.00		ng/l				80-120			U
Barium	0.00		ng/l				80-120			U
Beryllium	0.00		ng/l				80-120			U
Cadmium	0.00		ng/l				80-120			U
Calcium	9.11E7		ng/l	1.0040E8		90.8	80-120			
Chromium	0.00		ng/l				80-120			U
Cobalt	0.00		ng/l				80-120			U
Copper	0.00		ng/l				80-120			U
Iron	1.44E7		ng/l	1.5000E7		95.9	80-120			
Lead	0.00		ng/l				80-120			U
Magnesium	1.50E7		ng/l	1.5000E7		99.9	80-120			
Manganese	0.00		ng/l				80-120			U
Molybdenum	293000		ng/l	300000		97.6	80-120			
Nickel	0.00		ng/l				80-120			U
Phosphorus	1.55E7		ng/l	1.5000E7		104	80-120			
Potassium	1.43E7		ng/l	1.5000E7		95.1	80-120			
Rubidium	0.00		ng/l				80-120			U
Selenium	0.00		ng/l				80-120			U
Sodium	1.51E7		ng/l	1.5000E7		101	80-120			
Strontium	0.00		ng/l				80-120			U
Thallium	0.00		ng/l				80-120			U
Thorium	0.00		ng/l				80-120			U
Uranium	0.00		ng/l				80-120			U
Vanadium	0.00		ng/l				80-120			U
Zinc	0.00		ng/l				80-120			U
Interference Check B (2312031-IFB1)				Prepared & Analyzed: 12/11/23						
Aluminum	1.58E7		ng/l	1.6500E7		96.0	80-120			
Antimony	19900		ng/l	20000		99.5	80-120			
Arsenic	20000		ng/l	20000		100	80-120			
Barium	202000		ng/l	200000		101	80-120			
Beryllium	4640		ng/l	5000.0		92.7	80-120			
Cadmium	19200		ng/l	20000		95.8	80-120			

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Inorganics by Compendium Method IO-3.5 - Quality Control

Batch 2312031 - B3L0605

Interference Check B (2312031-IFB1) Co — Prepared & Analyzed: 12/11/23

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Calcium	1.14E8		ng/l	1.2540E8		90.9	80-120			
Chromium	227000		ng/l	240000		94.4	80-120			
Cobalt	48200		ng/l	50000		96.4	80-120			
Copper	1.86E6		ng/l	2.0000E6		93.1	80-120			
Iron	1.66E7		ng/l	1.7500E7		95.1	80-120			
Lead	205000		ng/l	200000		102	80-120			
Magnesium	1.59E7		ng/l	1.6000E7		99.7	80-120			
Manganese	501000		ng/l	500000		100	80-120			
Molybdenum	341000		ng/l	350000		97.4	80-120			
Nickel	113000		ng/l	120000		93.8	80-120			
Phosphorus	1.58E7		ng/l	1.5200E7		104	80-120			
Potassium	1.69E7		ng/l	1.7500E7		96.3	80-120			
Rubidium	10100		ng/l	10000		101	80-120			
Selenium	18800		ng/l	20000		94.1	80-120			
Sodium	1.79E7		ng/l	1.7500E7		102	80-120			
Strontium	49900		ng/l	50000		99.9	80-120			
Thallium	516		ng/l	500.00		103	80-120			
Thorium	530		ng/l	500.00		106	80-120			
Uranium	539		ng/l	500.00		108	80-120			
Vanadium	19000		ng/l	20000		95.2	80-120			
Zinc	469000		ng/l	500000		93.7	80-120			

Batch B3L0804 - ICP-MS Extraction

Blank (B3L0804-BLK1) — Prepared: 12/08/23 Analyzed: 12/11/23

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Aluminum	ND	32.1	ng/m³ Air							U
Antimony	ND	0.0441	ng/m³ Air							SL, U
Arsenic	ND	0.00955	ng/m³ Air							U
Barium	ND	0.948	ng/m³ Air							U
Beryllium	ND	0.00332	ng/m³ Air							U
Cadmium	ND	0.109	ng/m³ Air							U
Calcium	ND	292	ng/m³ Air							GC-BS, QB-01 U
Chromium	ND	2.03	ng/m³ Air							U
Cobalt	ND	0.0156	ng/m³ Air							QB-01, U
Copper	ND	3.00	ng/m³ Air							QB-01, U
Iron	ND	24.2	ng/m³ Air							U
Lead	ND	0.276	ng/m³ Air							U
Magnesium	ND	96.4	ng/m³ Air							U
Manganese	ND	1.19	ng/m³ Air							U

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Inorganics by Compendium Method IO-3.5 - Quality Control

Batch B3L0804 - ICP-MS Extraction

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (B3L0804-BLK1) Continued				Prepared: 12/08/23 Analyzed: 12/11/23						
Molybdenum	ND	0.213	ng/m³ Air							QB-01, U
Nickel	ND	0.801	ng/m³ Air							GC-BS, QB-01 U
Phosphorus	ND	1250	ng/m³ Air							GC-BS, U
Potassium	ND	38.0	ng/m³ Air							U
Rubidium	ND	0.0183	ng/m³ Air							U
Selenium	ND	0.0110	ng/m³ Air							U
Sodium	ND	2000	ng/m³ Air							GC-BS, U
Strontium	ND	0.652	ng/m³ Air							QB-01, U
Thallium	ND	5.03E-4	ng/m³ Air							U
Thorium	ND	0.00300	ng/m³ Air							U
Uranium	ND	0.0170	ng/m³ Air							U
Vanadium	ND	0.0492	ng/m³ Air							U
Zinc	ND	97.7	ng/m³ Air							U
LCS (B3L0804-BS1)				Prepared: 12/08/23 Analyzed: 12/11/23						
Aluminum	95.3	32.1	ng/m³ Air	82.975		115	80-120			
Antimony	0.546	0.0441	ng/m³ Air	1.3829		39.5	80-120			SL
Arsenic	2.75	0.00955	ng/m³ Air	2.7658		99.6	80-120			
Barium	28.5	0.948	ng/m³ Air	27.658		103	80-120			
Beryllium	1.33	0.00332	ng/m³ Air	1.3829		95.9	80-120			
Cadmium	1.40	0.109	ng/m³ Air	1.3829		102	80-120			
Calcium	528	292	ng/m³ Air	69.146		764	80-120			GC-BS, QB-01
Chromium	16.4	2.03	ng/m³ Air	13.829		118	80-120			
Cobalt	1.38	0.0156	ng/m³ Air	1.3829		99.7	80-120			QB-01
Copper	34.2	3.00	ng/m³ Air	27.658		124	80-120			QB-01
Iron	40.0	24.2	ng/m³ Air	27.658		145	80-120			
Lead	13.7	0.276	ng/m³ Air	13.829		98.9	80-120			
Magnesium	ND	96.4	ng/m³ Air	27.658			80-120			U
Manganese	8.72	1.19	ng/m³ Air	8.2975		105	80-120			
Molybdenum	1.67	0.213	ng/m³ Air	1.3829		121	80-120			QB-01
Nickel	4.91	0.801	ng/m³ Air	2.7658		178	80-120			GC-BS, QB-01
Phosphorus	ND	1250	ng/m³ Air	13.829			80-120			GC-BS, U
Potassium	70.4	38.0	ng/m³ Air	55.317		127	80-120			
Rubidium	1.35	0.0183	ng/m³ Air	1.3829		97.4	80-120			
Selenium	2.78	0.0110	ng/m³ Air	2.7658		100	80-120			
Sodium	ND	2000	ng/m³ Air	55.317			80-120			GC-BS, U
Strontium	2.22	0.652	ng/m³ Air	1.3829		160	80-120			QB-01
Thallium	0.131	5.03E-4	ng/m³ Air	0.13829		94.7	80-120			

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Tetra Tech, Inc.
1777 Sentry Pkwy, Bldg 12
Blue Bell, PA 19422
ATTN: Ms. Chelsea Saber
PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 12/14/23 10:47
SUBMITTED: 12/06/23
AQS SITE CODE:
SITE CODE: Maui fires

Inorganics by Compendium Method IO-3.5 - Quality Control

Batch B3L0804 - ICP-MS Extraction

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
LCS (B3L0804-BS1) Continued				Prepared: 12/08/23		Analyzed: 12/11/23				
Thorium	0.135	0.00300	ng/m³ Air	0.13829		97.3	80-120			
Uranium	0.131	0.0170	ng/m³ Air	0.13829		94.4	80-120			
Vanadium	2.80	0.0492	ng/m³ Air	2.7658		101	80-120			
Zinc	108	97.7	ng/m³ Air	82.975		130	80-120			
Duplicate (B3L0804-DUP1)		**Source: 3120629-09**		Prepared: 12/08/23		Analyzed: 12/11/23				
Aluminum	178	25.6	ng/m³ Air		177			0.500	10	
Antimony	ND	0.0352	ng/m³ Air		ND				10	SL, U
Arsenic	0.0622	0.00762	ng/m³ Air		0.0771			21.3	10	D-F
Barium	2.24	0.757	ng/m³ Air		2.65			17.0	10	
Beryllium	0.00559	0.00265	ng/m³ Air		0.00589			5.13	10	
Cadmium	ND	0.0870	ng/m³ Air		ND				10	U
Calcium	435	233	ng/m³ Air		436			0.314	10	GC-BS, QB-01
Chromium	ND	1.62	ng/m³ Air		ND				10	U
Cobalt	0.0922	0.0124	ng/m³ Air		0.0953			3.27	10	QB-01
Copper	18.7	2.39	ng/m³ Air		17.8			4.65	10	QB-01
Iron	176	19.3	ng/m³ Air		175			0.313	10	
Lead	ND	0.220	ng/m³ Air		ND				10	U
Magnesium	122	76.9	ng/m³ Air		121			0.736	10	
Manganese	4.84	0.950	ng/m³ Air		4.80			0.838	10	
Molybdenum	0.964	0.170	ng/m³ Air		0.962			0.154	10	QB-01
Nickel	1.67	0.639	ng/m³ Air		1.13			38.4	10	GC-BS, QB-01
Phosphorus	ND	998	ng/m³ Air		ND				10	GC-BS, U
Potassium	75.5	30.3	ng/m³ Air		74.0			1.89	10	
Rubidium	0.0823	0.0146	ng/m³ Air		0.0850			3.28	10	
Selenium	0.0966	0.00878	ng/m³ Air		0.0985			1.94	10	
Sodium	ND	1600	ng/m³ Air		ND				10	GC-BS, U
Strontium	2.08	0.520	ng/m³ Air		2.04			2.00	10	QB-01
Thallium	4.50E-4	4.01E-4	ng/m³ Air		4.58E-4			1.78	10	
Thorium	0.00460	0.00239	ng/m³ Air		0.00469			2.00	10	
Uranium	ND	0.0136	ng/m³ Air		ND				10	U
Vanadium	0.536	0.0393	ng/m³ Air		0.531			1.03	10	
Zinc	ND	78.0	ng/m³ Air		ND				10	U
Duplicate (B3L0804-DUP2)		**Source: 3120629-15**		Prepared: 12/08/23		Analyzed: 12/11/23				
Aluminum	98.3	28.3	ng/m³ Air		97.2			1.09	10	
Antimony	0.0549	0.0389	ng/m³ Air		0.0558			1.55	10	SL
Arsenic	0.0783	0.00843	ng/m³ Air		0.0799			2.05	10	
Barium	2.88	0.837	ng/m³ Air		2.88			0.121	10	
Beryllium	0.00428	0.00293	ng/m³ Air		0.00439			2.43	10	

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Inorganics by Compendium Method IO-3.5 - Quality Control

Batch B3L0804 - ICP-MS Extraction

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Duplicate (B3L0804-DUP2) Continued	**Source: 3120629-15**		Prepared: 12/08/23 Analyzed: 12/11/23							
Cadmium	ND	0.0962	ng/m³ Air		ND				10	U
Calcium	466	258	ng/m³ Air		471			1.12	10	GC-BS, QB-01
Chromium	1.91	1.79	ng/m³ Air		1.91			0.0787	10	
Cobalt	0.0853	0.0138	ng/m³ Air		0.0855			0.310	10	QB-01
Copper	35.0	2.65	ng/m³ Air		34.3			2.04	10	QB-01
Iron	135	21.4	ng/m³ Air		135			0.0815	10	
Lead	ND	0.244	ng/m³ Air		ND				10	U
Magnesium	183	85.1	ng/m³ Air		184			0.324	10	
Manganese	3.86	1.05	ng/m³ Air		3.84			0.405	10	
Molybdenum	1.18	0.188	ng/m³ Air		1.17			0.980	10	QB-01
Nickel	0.721	0.707	ng/m³ Air		0.713			1.12	10	GC-BS, QB-01
Phosphorus	ND	1100	ng/m³ Air		ND				10	GC-BS, U
Potassium	84.2	33.6	ng/m³ Air		84.0			0.286	10	
Rubidium	0.0909	0.0162	ng/m³ Air		0.0903			0.746	10	
Selenium	0.135	0.00971	ng/m³ Air		0.135			0.472	10	
Sodium	1800	1770	ng/m³ Air		1790			0.532	10	E, GC-BS
Strontium	2.12	0.576	ng/m³ Air		2.12			0.113	10	QB-01
Thallium	5.96E-4	4.44E-4	ng/m³ Air		6.27E-4			5.10	10	
Thorium	0.00520	0.00265	ng/m³ Air		0.00530			1.99	10	
Uranium	ND	0.0150	ng/m³ Air		ND				10	U
Vanadium	0.711	0.0434	ng/m³ Air		0.704			0.916	10	
Zinc	ND	86.3	ng/m³ Air		ND				10	U
Matrix Spike (B3L0804-MS1)	**Source: 3120629-09**		Prepared: 12/08/23 Analyzed: 12/11/23							
Aluminum	259	25.6	ng/m³ Air	66.215	177	124	80-120			QM-07
Antimony	0.490	0.0352	ng/m³ Air	1.1036	ND	44.4	80-120			SL
Arsenic	2.24	0.00762	ng/m³ Air	2.2072	0.0771	98.2	80-120			
Barium	24.5	0.757	ng/m³ Air	22.072	2.65	98.8	80-120			
Beryllium	1.06	0.00265	ng/m³ Air	1.1036	0.00589	95.9	80-120			
Cadmium	1.11	0.0870	ng/m³ Air	1.1036	ND	100	80-120			
Calcium	501	233	ng/m³ Air	55.179	436	117	80-120			GC-BS, QB-01
Chromium	13.0	1.62	ng/m³ Air	11.036	ND	118	80-120			
Cobalt	1.17	0.0124	ng/m³ Air	1.1036	0.0953	97.3	80-120			QB-01
Copper	44.0	2.39	ng/m³ Air	22.072	17.8	119	80-120			QB-01
Iron	211	19.3	ng/m³ Air	22.072	175	159	80-120			QM-4X
Lead	11.0	0.220	ng/m³ Air	11.036	ND	100	80-120			
Magnesium	148	76.9	ng/m³ Air	22.072	121	119	80-120			
Manganese	12.1	0.950	ng/m³ Air	6.6215	4.80	110	80-120			
Molybdenum	2.09	0.170	ng/m³ Air	1.1036	0.962	102	80-120			QB-01

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Inorganics by Compendium Method IO-3.5 - Quality Control

Batch B3L0804 - ICP-MS Extraction

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Matrix Spike (B3L0804-MS1) Continued	**Source: 3120629-09**			Prepared: 12/08/23	Analyzed: 12/11/23					
Nickel	3.08	0.639	ng/m³ Air	2.2072	1.13	88.4	80-120			GC-BS, QB-01
Phosphorus	ND	998	ng/m³ Air	11.036	ND		80-120			GC-BS, QM-4X, U
Potassium	118	30.3	ng/m³ Air	44.143	74.0	100	80-120			
Rubidium	1.14	0.0146	ng/m³ Air	1.1036	0.0850	95.7	80-120			
Selenium	2.30	0.00878	ng/m³ Air	2.2072	0.0985	99.6	80-120			
Sodium	ND	1600	ng/m³ Air	44.143	ND		80-120			GC-BS, QM-4X, U
Strontium	3.25	0.520	ng/m³ Air	1.1036	2.04	110	80-120			QB-01
Thallium	0.105	4.01E-4	ng/m³ Air	0.11036	4.58E-4	94.7	80-120			
Thorium	0.0518	0.00239	ng/m³ Air	0.11036	0.00469	42.7	80-120			QM-07
Uranium	0.109	0.0136	ng/m³ Air	0.11036	ND	98.5	80-120			
Vanadium	2.76	0.0393	ng/m³ Air	2.2072	0.531	101	80-120			
Zinc	82.4	78.0	ng/m³ Air	66.215	ND	124	80-120			
Matrix Spike Dup (B3L0804-MSD1)	**Source: 3120629-09**			Prepared: 12/08/23	Analyzed: 12/11/23					
Aluminum	254	25.6	ng/m³ Air	66.215	177	116	80-120	2.14	20	
Antimony	0.493	0.0352	ng/m³ Air	1.1036	ND	44.7	80-120	0.512	20	SL
Arsenic	2.22	0.00762	ng/m³ Air	2.2072	0.0771	96.9	80-120	1.27	20	
Barium	24.3	0.757	ng/m³ Air	22.072	2.65	97.9	80-120	0.852	20	
Beryllium	1.05	0.00265	ng/m³ Air	1.1036	0.00589	94.7	80-120	1.23	20	
Cadmium	1.10	0.0870	ng/m³ Air	1.1036	ND	100	80-120	0.197	20	
Calcium	496	233	ng/m³ Air	55.179	436	109	80-120	0.986	20	GC-BS, QB-01
Chromium	12.8	1.62	ng/m³ Air	11.036	ND	116	80-120	1.51	20	
Cobalt	1.16	0.0124	ng/m³ Air	1.1036	0.0953	96.8	80-120	0.547	20	QB-01
Copper	44.4	2.39	ng/m³ Air	22.072	17.8	120	80-120	0.771	20	QB-01, QM-07
Iron	208	19.3	ng/m³ Air	22.072	175	147	80-120	1.20	20	QM-4X
Lead	10.9	0.220	ng/m³ Air	11.036	ND	99.0	80-120	1.05	20	
Magnesium	142	76.9	ng/m³ Air	22.072	121	94.5	80-120	3.69	20	
Manganese	11.9	0.950	ng/m³ Air	6.6215	4.80	107	80-120	1.61	20	
Molybdenum	2.09	0.170	ng/m³ Air	1.1036	0.962	102	80-120	0.172	20	QB-01
Nickel	2.96	0.639	ng/m³ Air	2.2072	1.13	82.7	80-120	4.22	20	GC-BS, QB-01
Phosphorus	ND	998	ng/m³ Air	11.036	ND		80-120		20	GC-BS, QM-4X, U
Potassium	117	30.3	ng/m³ Air	44.143	74.0	97.2	80-120	1.07	20	
Rubidium	1.12	0.0146	ng/m³ Air	1.1036	0.0850	93.8	80-120	1.90	20	
Selenium	2.24	0.00878	ng/m³ Air	2.2072	0.0985	96.9	80-120	2.63	20	
Sodium	ND	1600	ng/m³ Air	44.143	ND		80-120		20	GC-BS, U
Strontium	3.18	0.520	ng/m³ Air	1.1036	2.04	104	80-120	2.13	20	QB-01
Thallium	0.104	4.01E-4	ng/m³ Air	0.11036	4.58E-4	93.4	80-120	1.40	20	

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Inorganics by Compendium Method IO-3.5 - Quality Control

Batch B3L0804 - ICP-MS Extraction

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Matrix Spike Dup (B3L0804-MSD1) Contir	**Source: 3120629-09**			Prepared: 12/08/23	Analyzed: 12/11/23					
Thorium	0.0515	0.00239	ng/m³ Air	0.11036	0.00469	42.4	80-120	0.583	20	QM-07
Uranium	0.107	0.0136	ng/m³ Air	0.11036	ND	96.8	80-120	1.73	20	
Vanadium	2.72	0.0393	ng/m³ Air	2.2072	0.531	99.3	80-120	1.29	20	
Zinc	81.7	78.0	ng/m³ Air	66.215	ND	123	80-120	0.879	20	
Post Spike (B3L0804-PS1)	**Source: 3120629-09**			Prepared: 12/08/23	Analyzed: 12/11/23					
Aluminum	199	25.6	ng/m³ Air	22.072	177	97.9	75-125			
Antimony	0.241	0.0352	ng/m³ Air	0.22072	ND	109	75-125			SL
Arsenic	1.13	0.00762	ng/m³ Air	1.1036	0.0771	95.5	75-125			
Barium	4.84	0.757	ng/m³ Air	2.2072	2.65	98.9	75-125			
Beryllium	0.204	0.00265	ng/m³ Air	0.22072	0.00589	89.6	75-125			
Cadmium	0.117	0.0870	ng/m³ Air	0.11036	ND	106	75-125			
Calcium	467	233	ng/m³ Air	22.072	436	141	75-125			A-01, GC-BS, QB-01
Chromium	2.62	1.62	ng/m³ Air	1.1036	ND	237	75-125			
Cobalt	0.306	0.0124	ng/m³ Air	0.22072	0.0953	95.6	75-125			QB-01
Copper	29.5	2.39	ng/m³ Air	11.036	17.8	106	75-125			QB-01
Iron	197	19.3	ng/m³ Air	22.072	175	97.2	75-125			
Lead	21.4	0.220	ng/m³ Air	22.072	ND	96.9	75-125			
Magnesium	143	76.9	ng/m³ Air	22.072	121	95.5	75-125			
Manganese	6.98	0.950	ng/m³ Air	2.2072	4.80	98.5	75-125			
Molybdenum	2.02	0.170	ng/m³ Air	1.1036	0.962	96.3	75-125			QB-01
Nickel	3.24	0.639	ng/m³ Air	2.2072	1.13	95.4	75-125			GC-BS, QB-01
Phosphorus	ND	998	ng/m³ Air	4.4143	ND		75-125			A-01, GC-BS, U
Potassium	93.9	30.3	ng/m³ Air	22.072	74.0	90.1	75-125			
Rubidium	0.184	0.0146	ng/m³ Air	0.11036	0.0850	89.8	75-125			
Selenium	1.17	0.00878	ng/m³ Air	1.1036	0.0985	97.0	75-125			
Sodium	ND	1600	ng/m³ Air	22.072	ND		75-125			A-01, GC-BS, U
Strontium	3.10	0.520	ng/m³ Air	1.1036	2.04	95.8	75-125			QB-01
Thallium	0.0512	4.01E-4	ng/m³ Air	5.5179E-2	4.58E-4	91.9	75-125			
Thorium	0.0525	0.00239	ng/m³ Air	5.5179E-2	0.00469	86.7	75-125			
Uranium	0.0548	0.0136	ng/m³ Air	5.5179E-2	ND	99.3	75-125			
Vanadium	1.59	0.0393	ng/m³ Air	1.1036	0.531	96.2	75-125			
Zinc	ND	78.0	ng/m³ Air	22.072	ND		75-125			U
Dilution Check (B3L0804-SRL1)	**Source: 3120629-09**			Prepared: 12/08/23	Analyzed: 12/11/23					
Aluminum	175	128	ng/m³ Air		177			1.43	10	
Antimony	ND	0.176	ng/m³ Air		ND				10	SL, U
Arsenic	0.0812	0.0381	ng/m³ Air		0.0771			5.23	10	

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Inorganics by Compendium Method IO-3.5 - Quality Control

Batch B3L0804 - ICP-MS Extraction

Dilution Check (B3L0804-SRL1) Continued **Source: 3120629-09** Prepared: 12/08/23 Analyzed: 12/11/23

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Barium	ND	3.78	ng/m³ Air		ND				10	U
Beryllium	0.0138	0.0132	ng/m³ Air		ND			80.2	10	
Cadmium	ND	0.435	ng/m³ Air		ND				10	U
Calcium	ND	1170	ng/m³ Air		ND				10	GC-BS, QB-01 U
Chromium	ND	8.10	ng/m³ Air		ND				10	U
Cobalt	0.0955	0.0622	ng/m³ Air		0.0953			0.247	10	QB-01
Copper	17.9	12.0	ng/m³ Air		17.8			0.483	10	QB-01
Iron	172	96.6	ng/m³ Air		175			1.77	10	
Lead	ND	1.10	ng/m³ Air		ND				10	U
Magnesium	ND	385	ng/m³ Air		ND				10	U
Manganese	4.75	4.75	ng/m³ Air		4.80			1.13	10	
Molybdenum	0.965	0.850	ng/m³ Air		0.962			0.292	10	QB-01
Nickel	ND	3.20	ng/m³ Air		ND				10	GC-BS, QB-01 U
Phosphorus	ND	4990	ng/m³ Air		ND				10	GC-BS, U
Potassium	ND	152	ng/m³ Air		ND				10	U
Rubidium	0.0825	0.0730	ng/m³ Air		0.0850			2.95	10	
Selenium	0.0910	0.0439	ng/m³ Air		0.0985			7.87	10	
Sodium	ND	7980	ng/m³ Air		ND				10	GC-BS, U
Strontium	ND	2.60	ng/m³ Air		ND				10	QB-01, U
Thallium	0.00209	0.00201	ng/m³ Air		ND			128	10	
Thorium	ND	0.0120	ng/m³ Air		ND				10	U
Uranium	ND	0.0678	ng/m³ Air		ND				10	U
Vanadium	0.532	0.196	ng/m³ Air		0.531			0.290	10	
Zinc	ND	390	ng/m³ Air		ND				10	U

CERTIFICATE OF ANALYSIS

Tetra Tech, Inc.
1777 Sentry Pkwy, Bldg 12
Blue Bell, PA 19422
ATTN: Ms. Chelsea Saber
PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 12/14/23 10:47
SUBMITTED: 12/06/23
AQS SITE CODE:
SITE CODE: Maui fires

Notes and Definitions

U	Under Detection Limit
SL	The spike recovery was outside acceptance limits. Reported value may be biased low.
QM-4X	The MS/MSD recovery exceeds criteria because the parent sample concentration is greater than 4x the spike concentration. Sample results for the QC batch were accepted based on acceptable BS/BSD recoveries.
QM-07	The spike recovery was outside acceptance limits for the MS and/or MSD. The batch was accepted based on acceptable LCS recovery.
QB-01	Analyte exceeds method blank criteria
GC-BS	Compound exceeds Blank Spike Criteria
FB-01	Analyte exceeds Field Blank criteria.
E	The concentration indicated for this analyte is an estimated value above the calibration range of the instrument. This value is considered an estimate (CLP E-flag).
D-F	Duplicate exceeds DQO criteria.
A-01	Parent sample >4x spike amount
ND	Analyte NOT DETECTED
NR	Not Reported
MDL	Method Detection Limit
RPD	Relative Percent Difference

Note: This test is accredited under the 2016 TNI Standard.

Eastern Research Group
601 Keystone Park Drive
Suite 700
Morrisville, NC 27560

December 19, 2023

Ms. Chelsea Saber
Tetra Tech, Inc.
1777 Sentry Pkwy, Bldg 12
Blue Bell, PA 19422
Project Name: Maui fires

Dear Ms. Chelsea Saber,

This report contains the analytical results for the sample(s) received under chain(s) of custody by Eastern Research Group on 12/11/23 11:34 through 12/13/23 13:27.

Values below the MDL for QC results in this report are recorded as ND, however the actual values are reported in the accompanying Excel report with a "U" flag (Under the detection limit). The actual values are reported in AQS.

This test is accredited under the 2016 TNI Standard for Environmental Laboratories (FL DOH Certification # E87673). All analyses were performed as described in the US EPA-approved QAPP, under the contract for National Hazardous Air Pollutant Support (US EPA Contract No. 68HERH22D0002). This cover page is an integral part of this report, and any exceptions or comments are noted on the last page.

Release of the data contained in this data package and in the data submitted in the electronic data deliverable, has been authorized by the Program Manager, or the Program Manager's designee as verified by the following signature.

The issuance of the final Certificate of Analysis takes precedence over any previous Report. If you have any questions, please contact me at 919-468-7924.

Sincerely,

Julie Swift
Program Manager
julie.swift@erg.com

The information contained in this report and its attachment(s) are intended only for the use of the individual to whom it is addressed and may contain information that is privileged, confidential, or exempt from disclosure. If the reader of this message is not the intended recipient, you are hereby notified that any dissemination, distribution, or copying of this report is strictly prohibited. If you have received this report in error, please notify julie.swift@erg.com and delete the report without retaining any copies.

CERTIFICATE OF ANALYSIS

Tetra Tech, Inc.
1777 Sentry Pkwy, Bldg 12
Blue Bell, PA 19422
ATTN: Ms. Chelsea Saber
PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 12/19/23 10:54
SUBMITTED: 12/11/23 to 12/13/23
AQS SITE CODE:
SITE CODE: Maui fires

ANALYTICAL REPORT FOR SAMPLES

SampleName	LabNumber	Matrix	Sampled	Received
TetraTech Q9543005	3121111-01	Air	12/04/23 23:59	12/11/23 11:34
TetraTech Q9543004	3121111-02	Air	12/04/23 23:59	12/11/23 11:34
TetraTech Q9543002	3121111-03	Air	12/04/23 23:59	12/11/23 11:34
TetraTech Q9542995 FB	3121111-04	Air	12/04/23 00:00	12/11/23 11:34
TetraTech Q9542999	3121111-05	Air	12/05/23 23:59	12/11/23 11:34
TetraTech Q9542997	3121111-06	Air	12/05/23 23:59	12/11/23 11:34
TetraTech Q9542996	3121111-07	Air	12/05/23 23:59	12/11/23 11:34
TetraTech Q9542989 FB	3121111-08	Air	12/05/23 00:00	12/11/23 11:34
TetraTech Q9542993	3121111-09	Air	12/06/23 23:59	12/11/23 11:34
TetraTech Q9542992	3121111-10	Air	12/06/23 23:59	12/11/23 11:34
TetraTech Q9542991	3121111-11	Air	12/06/23 23:59	12/11/23 11:34
TetraTech Q9542984 FB	3121111-12	Air	12/06/23 00:00	12/11/23 11:34
TetraTech Q9542988	3121332-01	Air	12/07/23 23:59	12/13/23 13:27
TetraTech Q9542986	3121332-02	Air	12/07/23 23:59	12/13/23 13:27
TetraTech Q9542985	3121332-03	Air	12/07/23 23:59	12/13/23 13:27
TetraTech Q9541906	3121332-04	Air	12/08/23 23:59	12/13/23 13:27
TetraTech Q9542982	3121332-05	Air	12/08/23 23:59	12/13/23 13:27
TetraTech Q9542983	3121332-06	Air	12/08/23 23:59	12/13/23 13:27
TetraTech Q9533914	3121332-07	Air	12/09/23 23:59	12/13/23 13:27
TetraTech Q9533913	3121332-08	Air	12/09/23 23:59	12/13/23 13:27
TetraTech Q9533928	3121332-09	Air	12/09/23 23:59	12/13/23 13:27

The results in this report apply only to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

CERTIFICATE OF ANALYSIS

Tetra Tech, Inc.
1777 Sentry Pkwy, Bldg 12
Blue Bell, PA 19422
ATTN: Ms. Chelsea Saber
PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 12/19/23 10:54
SUBMITTED: 12/11/23 to 12/13/23
AQS SITE CODE:
SITE CODE: Maui fires

TetraTech Q9533920 FB	3121332-10	Air	12/09/23 00:00	12/13/23 13:27
TetraTech Q9533933 LB	3121332-11	Air	12/09/23 00:00	12/13/23 13:27
TetraTech Q9533927	3121332-12	Air	12/10/23 23:59	12/13/23 13:27
TetraTech Q9533925	3121332-13	Air	12/10/23 23:59	12/13/23 13:27
TetraTech Q9533924	3121332-14	Air	12/10/23 23:59	12/13/23 13:27
TetraTech Q9533929 FB	3121332-15	Air	12/10/23 00:00	12/13/23 13:27

CERTIFICATE OF ANALYSIS

Tetra Tech, Inc.
1777 Sentry Pkwy, Bldg 12
Blue Bell, PA 19422
ATTN: Ms. Chelsea Saber
PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 12/19/23 10:54
SUBMITTED: 12/11/23 to 12/13/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9543005
Matrix: Air
Lab ID: 3121111-01
Sample Volume: 1913.94 m^3
Filter ID:
Sampled: 12/04/23 23:59
Received: 12/11/23 11:34
Analysis Date: 12/13/23 19:38
Comments: MFK-AM01-120423-HM

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	**7429-90-5**	**1420**	E	**27.3**
Antimony	**7440-36-0**	**0.0524**	SL	**0.0375**
Arsenic	**7440-38-2**	**0.208**		**0.00812**
Barium	**7440-39-3**	**9.54**		**0.806**
Beryllium	**7440-41-7**	**0.0381**		**0.00282**
Cadmium	7440-43-9	0.0134	U	0.0927
Calcium	**7440-70-2**	**701**	LJ, QB-01	**248**
Chromium	**7440-47-3**	**2.45**		**1.73**
Cobalt	**7440-48-4**	**0.474**	QB-01	**0.0133**
Copper	**7440-50-8**	**18.4**		**2.55**
Lead	**7439-92-1**	**0.417**		**0.235**
Magnesium	**7439-95-4**	**186**		**81.9**
Manganese	**7439-96-5**	**32.9**	QB-01	**1.01**
Molybdenum	**7439-98-7**	**0.975**	QB-01	**0.181**
Nickel	**7440-02-0**	**0.915**		**0.681**
Phosphorus	7723-14-0	440	U, GC-BS	1060
Potassium	**7440-09-7**	**136**		**32.3**
Rubidium	**7440-17-7**	**0.332**		**0.0156**
Selenium	**7782-49-2**	**0.268**		**0.00935**
Sodium	7440-23-5	1240	GC-BS, U	1700
Strontium	**7440-24-6**	**6.96**	QB-01	**0.554**
Thallium	**7440-28-0**	**0.00204**		**4.28E-4**
Thorium	**7440-29-01**	**0.0308**		**0.00255**
Uranium	**7440-61-1**	**0.0257**		**0.0145**
Vanadium	**7440-62-2**	**3.37**	QB-01	**0.0418**
Zinc	7440-66-6	13.5	U	83.1

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CERTIFICATE OF ANALYSIS

Tetra Tech, Inc.
1777 Sentry Pkwy, Bldg 12
Blue Bell, PA 19422
ATTN: Ms. Chelsea Saber
PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 12/19/23 10:54
SUBMITTED: 12/11/23 to 12/13/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9543005
Matrix: Air
Comments: MFK-AM01-120423-HM

Lab ID: 3121111-01RE1
Sample Volume: 1913.94 m^3
Filter ID:

Sampled: 12/04/23 23:59
Received: 12/11/23 11:34
Analysis Date: 12/15/23 02:50

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m^3 Air	Flag	MDL ng/m^3 Air
Iron	7439-89-6	1380	D	41.1

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CERTIFICATE OF ANALYSIS

Tetra Tech, Inc.
1777 Sentry Pkwy, Bldg 12
Blue Bell, PA 19422
ATTN: Ms. Chelsea Saber
PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 12/19/23 10:54
SUBMITTED: 12/11/23 to 12/13/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9543004 **Lab ID:** 3121111-02 **Sampled:** 12/04/23 23:59
Matrix: Air **Sample Volume:** 1968.659 m³ **Received:** 12/11/23 11:34
Filter ID: **Analysis Date:** 12/13/23 16:53
Comments: MFK-AM02-120423-HM/MS/MSD

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	**7429-90-5**	**159**		**26.5**
Antimony	**7440-36-0**	**0.0779**	SL	**0.0364**
Arsenic	**7440-38-2**	**0.176**		**0.00789**
Barium	**7440-39-3**	**3.44**		**0.783**
Beryllium	**7440-41-7**	**0.00625**		**0.00274**
Cadmium	7440-43-9	0.0118	U	0.0901
Calcium	**7440-70-2**	**467**	LJ, QB-01	**241**
Chromium	7440-47-3	1.65	U	1.68
Cobalt	**7440-48-4**	**0.117**	QB-01	**0.0129**
Copper	**7440-50-8**	**18.5**		**2.48**
Iron	**7439-89-6**	**185**	GC-BS, QM-4X	**20.0**
Lead	7439-92-1	0.202	U	0.228
Magnesium	**7439-95-4**	**136**		**79.7**
Manganese	**7439-96-5**	**5.13**	QB-01	**0.983**
Molybdenum	**7439-98-7**	**0.890**	QB-01	**0.176**
Nickel	7440-02-0	0.533	U, LJ, QX	0.662
Phosphorus	7723-14-0	370	U, GC-BS, QM-4X	1030
Potassium	**7440-09-7**	**85.5**		**31.4**
Rubidium	**7440-17-7**	**0.112**		**0.0151**
Selenium	**7782-49-2**	**0.104**		**0.00909**
Sodium	7440-23-5	1340	U, GC-BS, QM-4X	1650
Strontium	**7440-24-6**	**2.18**	QB-01	**0.539**
Thallium	**7440-28-0**	**6.19E-4**		**4.16E-4**
Thorium	**7440-29-01**	**0.00662**	QM-07	**0.00248**
Uranium	7440-61-1	0.00526	U	0.0140
Vanadium	**7440-62-2**	**0.660**	QB-01	**0.0407**
Zinc	7440-66-6	18.1	U	80.7

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CERTIFICATE OF ANALYSIS

Tetra Tech, Inc.
1777 Sentry Pkwy, Bldg 12
Blue Bell, PA 19422
ATTN: Ms. Chelsea Saber
PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 12/19/23 10:54
SUBMITTED: 12/11/23 to 12/13/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9543002
Matrix: Air
Lab ID: 3121111-03
Sample Volume: 1668.824 m³
Filter ID:
Sampled: 12/04/23 23:59
Received: 12/11/23 11:34
Analysis Date: 12/13/23 19:52
Comments: MFK-AM03-120423-HM

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	**7429-90-5**	**148**		**31.3**
Antimony	**7440-36-0**	**0.0734**	SL	**0.0430**
Arsenic	**7440-38-2**	**0.114**		**0.00931**
Barium	**7440-39-3**	**3.93**		**0.924**
Beryllium	**7440-41-7**	**0.00722**		**0.00324**
Cadmium	7440-43-9	0.00793	U	0.106
Calcium	**7440-70-2**	**521**	LJ, QB-01	**285**
Chromium	7440-47-3	1.91	U	1.98
Cobalt	**7440-48-4**	**0.111**	QB-01	**0.0152**
Copper	**7440-50-8**	**33.1**		**2.92**
Iron	**7439-89-6**	**195**	GC-BS	**23.6**
Lead	7439-92-1	0.211	U	0.269
Magnesium	**7439-95-4**	**166**		**94.0**
Manganese	**7439-96-5**	**5.87**	QB-01	**1.16**
Molybdenum	**7439-98-7**	**1.05**	QB-01	**0.208**
Nickel	7440-02-0	0.538	U	0.781
Phosphorus	7723-14-0	441	U, GC-BS	1220
Potassium	**7440-09-7**	**92.1**		**37.0**
Rubidium	**7440-17-7**	**0.114**		**0.0178**
Selenium	**7782-49-2**	**0.115**		**0.0107**
Sodium	7440-23-5	1610	U, GC-BS	1950
Strontium	**7440-24-6**	**2.44**	QB-01	**0.636**
Thallium	**7440-28-0**	**5.76E-4**		**4.90E-4**
Thorium	**7440-29-01**	**0.00695**		**0.00292**
Uranium	7440-61-1	0.00587	U	0.0166
Vanadium	**7440-62-2**	**0.688**	QB-01	**0.0480**
Zinc	7440-66-6	16.0	U	95.3

CERTIFICATE OF ANALYSIS

Tetra Tech, Inc.
1777 Sentry Pkwy, Bldg 12
Blue Bell, PA 19422
ATTN: Ms. Chelsea Saber
PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 12/19/23 10:54
SUBMITTED: 12/11/23 to 12/13/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9542995 FB
Matrix: Air
Lab ID: 3121111-04
Sample Volume: 1913.94 m³
Filter ID:
Sampled: 12/04/23 00:00
Received: 12/11/23 11:34
Analysis Date: 12/13/23 20:06
Comments: MFK-FB01-120423-HM Field blank

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	7429-90-5	9.28	U	27.3
Antimony	7440-36-0	0.00725	SL, U	0.0375
Arsenic	7440-38-2	0.00186	U	0.00812
Barium	7440-39-3	0.609	U	0.806
Beryllium	7440-41-7	9.42E-4	U	0.00282
Cadmium	7440-43-9	0.00239	U	0.0927
Calcium	**7440-70-2**	**344**	FB-01, LJ, QB-01	**248**
Chromium	7440-47-3	1.50	U	1.73
Cobalt	**7440-48-4**	**0.0265**	FB-01, QB-01	**0.0133**
Copper	7440-50-8	0.296	U	2.55
Iron	7439-89-6	15.9	GC-BS, U	20.6
Lead	7439-92-1	0.0553	U	0.235
Magnesium	7439-95-4	42.8	U	81.9
Manganese	7439-96-5	0.900	QB-01, U	1.01
Molybdenum	**7439-98-7**	**0.245**	FB-01, QB-01	**0.181**
Nickel	7440-02-0	0.309	U	0.681
Phosphorus	7723-14-0	337	GC-BS, U	1060
Potassium	7440-09-7	11.6	U	32.3
Rubidium	7440-17-7	0.0141	U	0.0156
Selenium	7782-49-2	0.00358	U	0.00935
Sodium	7440-23-5	699	GC-BS, U	1700
Strontium	**7440-24-6**	**0.698**	FB-01, QB-01	**0.554**
Thallium	7440-28-0	6.24E-5	U	4.28E-4
Thorium	7440-29-01	0.00219	U	0.00255
Uranium	7440-61-1	0.00171	U	0.0145
Vanadium	**7440-62-2**	**0.0433**	FB-01, QB-01	**0.0418**
Zinc	7440-66-6	8.64	U	83.1

CERTIFICATE OF ANALYSIS

Tetra Tech, Inc.
1777 Sentry Pkwy, Bldg 12
Blue Bell, PA 19422
ATTN: Ms. Chelsea Saber
PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 12/19/23 10:54
SUBMITTED: 12/11/23 to 12/13/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9542999 **Lab ID:** 3121111-05 **Sampled:** 12/05/23 23:59
Matrix: Air **Sample Volume:** 1986.678 m³ **Received:** 12/11/23 11:34
Filter ID: **Analysis Date:** 12/13/23 20:20
Comments: MFK-AM01-120523-HM

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	**7429-90-5**	**1900**	E	**26.3**
Antimony	**7440-36-0**	**0.0469**	SL	**0.0361**
Arsenic	**7440-38-2**	**0.212**		**0.00782**
Barium	**7440-39-3**	**11.9**		**0.776**
Beryllium	**7440-41-7**	**0.0514**		**0.00272**
Cadmium	7440-43-9	0.0174	U	0.0893
Calcium	**7440-70-2**	**664**	LJ, QB-01	**239**
Chromium	**7440-47-3**	**2.87**		**1.66**
Cobalt	**7440-48-4**	**0.689**	QB-01	**0.0128**
Copper	**7440-50-8**	**20.0**		**2.46**
Lead	**7439-92-1**	**0.539**		**0.226**
Magnesium	**7439-95-4**	**178**		**78.9**
Manganese	**7439-96-5**	**49.3**	QB-01	**0.975**
Molybdenum	**7439-98-7**	**0.702**	QB-01	**0.174**
Nickel	**7440-02-0**	**0.973**		**0.656**
Phosphorus	7723-14-0	439	GC-BS, U	1020
Potassium	**7440-09-7**	**87.0**		**31.1**
Rubidium	**7440-17-7**	**0.339**		**0.0150**
Selenium	**7782-49-2**	**0.305**		**0.00901**
Sodium	7440-23-5	1150	GC-BS, U	1640
Strontium	**7440-24-6**	**7.08**	QB-01	**0.534**
Thallium	**7440-28-0**	**0.00261**		**4.12E-4**
Thorium	**7440-29-01**	**0.0389**		**0.00246**
Uranium	**7440-61-1**	**0.0334**		**0.0139**
Vanadium	**7440-62-2**	**4.23**	QB-01	**0.0403**
Zinc	7440-66-6	15.2	U	80.0

CERTIFICATE OF ANALYSIS

Tetra Tech, Inc.
1777 Sentry Pkwy, Bldg 12
Blue Bell, PA 19422
ATTN: Ms. Chelsea Saber
PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 12/19/23 10:54
SUBMITTED: 12/11/23 to 12/13/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9542999
Matrix: Air
Lab ID: 3121111-05RE1
Sample Volume: 1986.678 m³
Filter ID:
Sampled: 12/05/23 23:59
Received: 12/11/23 11:34
Analysis Date: 12/15/23 03:04
Comments: MFK-AM01-120523-HM

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Iron	7439-89-6	1790	D	99.1

CERTIFICATE OF ANALYSIS

Tetra Tech, Inc.
1777 Sentry Pkwy, Bldg 12
Blue Bell, PA 19422
ATTN: Ms. Chelsea Saber
PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 12/19/23 10:54
SUBMITTED: 12/11/23 to 12/13/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9542997
Matrix: Air
Lab ID: 3121111-06
Sample Volume: 1973.767 m^3
Filter ID:
Sampled: 12/05/23 23:59
Received: 12/11/23 11:34
Analysis Date: 12/13/23 20:34
Comments: MFK-AM02-120523-HM

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	**7429-90-5**	**263**		**26.5**
Antimony	**7440-36-0**	**0.0570**	SL	**0.0364**
Arsenic	**7440-38-2**	**0.137**		**0.00787**
Barium	**7440-39-3**	**4.16**		**0.781**
Beryllium	**7440-41-7**	**0.00921**		**0.00274**
Cadmium	7440-43-9	0.00868	U	0.0899
Calcium	**7440-70-2**	**480**	LJ, QB-01	**241**
Chromium	**7440-47-3**	**1.72**		**1.67**
Cobalt	**7440-48-4**	**0.157**	QB-01	**0.0129**
Copper	**7440-50-8**	**13.9**		**2.47**
Iron	**7439-89-6**	**303**	GC-BS	**19.9**
Lead	**7439-92-1**	**0.298**		**0.228**
Magnesium	**7439-95-4**	**146**		**79.5**
Manganese	**7439-96-5**	**8.07**	QB-01	**0.981**
Molybdenum	**7439-98-7**	**0.615**	QB-01	**0.176**
Nickel	7440-02-0	0.511	U	0.660
Phosphorus	7723-14-0	355	GC-BS, U	1030
Potassium	**7440-09-7**	**93.9**		**31.3**
Rubidium	**7440-17-7**	**0.149**		**0.0151**
Selenium	**7782-49-2**	**0.120**		**0.00907**
Sodium	7440-23-5	1330	GC-BS, U	1650
Strontium	**7440-24-6**	**2.82**	QB-01	**0.537**
Thallium	**7440-28-0**	**6.72E-4**		**4.15E-4**
Thorium	**7440-29-01**	**0.00836**		**0.00247**
Uranium	7440-61-1	0.00746	U	0.0140
Vanadium	**7440-62-2**	**0.807**	QB-01	**0.0406**
Zinc	7440-66-6	14.3	U	80.5

The results in this report apply only to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

CERTIFICATE OF ANALYSIS

Tetra Tech, Inc.
1777 Sentry Pkwy, Bldg 12
Blue Bell, PA 19422
ATTN: Ms. Chelsea Saber
PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 12/19/23 10:54
SUBMITTED: 12/11/23 to 12/13/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9542996 **Lab ID:** 3121111-07 **Sampled:** 12/05/23 23:59
Matrix: Air **Sample Volume:** 1619.558 m³ **Received:** 12/11/23 11:34
Filter ID: **Analysis Date:** 12/13/23 20:48
Comments: MFK-AM03-120523-HM

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	**7429-90-5**	**283**		**32.2**
Antimony	**7440-36-0**	**0.0723**	SL	**0.0443**
Arsenic	**7440-38-2**	**0.0999**		**0.00959**
Barium	**7440-39-3**	**5.72**		**0.952**
Beryllium	**7440-41-7**	**0.0121**		**0.00334**
Cadmium	7440-43-9	0.00759	U	0.110
Calcium	**7440-70-2**	**559**	LJ, QB-01	**293**
Chromium	7440-47-3	2.01	U	2.04
Cobalt	**7440-48-4**	**0.171**	QB-01	**0.0157**
Copper	**7440-50-8**	**50.5**		**3.01**
Iron	**7439-89-6**	**347**	GC-BS	**24.3**
Lead	**7439-92-1**	**0.563**		**0.277**
Magnesium	**7439-95-4**	**170**		**96.8**
Manganese	**7439-96-5**	**9.64**	QB-01	**1.20**
Molybdenum	**7439-98-7**	**1.20**	QB-01	**0.214**
Nickel	7440-02-0	0.494	U	0.805
Phosphorus	7723-14-0	415	GC-BS, U	1260
Potassium	**7440-09-7**	**90.6**		**38.2**
Rubidium	**7440-17-7**	**0.160**		**0.0184**
Selenium	**7782-49-2**	**0.127**		**0.0111**
Sodium	7440-23-5	1510	GC-BS, U	2010
Strontium	**7440-24-6**	**3.18**	QB-01	**0.655**
Thallium	**7440-28-0**	**7.06E-4**		**5.05E-4**
Thorium	**7440-29-01**	**0.0112**		**0.00301**
Uranium	7440-61-1	0.00846	U	0.0171
Vanadium	**7440-62-2**	**0.887**	QB-01	**0.0494**
Zinc	7440-66-6	18.8	U	98.1

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Tetra Tech, Inc.
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Blue Bell, PA 19422
ATTN: Ms. Chelsea Saber
PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 12/19/23 10:54
SUBMITTED: 12/11/23 to 12/13/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9542989 FB **Lab ID:** 3121111-08 **Sampled:** 12/05/23 00:00
Matrix: Air **Sample Volume:** 1986.678 m³ **Received:** 12/11/23 11:34
Filter ID: **Analysis Date:** 12/13/23 21:02
Comments: MFK-FB01-120523-HM Field Blank

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	7429-90-5	10.4	U	26.3
Antimony	7440-36-0	0.00607	SL, U	0.0361
Arsenic	7440-38-2	0.00236	U	0.00782
Barium	7440-39-3	0.604	U	0.776
Beryllium	7440-41-7	9.08E-4	U	0.00272
Cadmium	7440-43-9	0.00221	U	0.0893
Calcium	**7440-70-2**	**343**	FB-01, LJ, QB-01	**239**
Chromium	7440-47-3	1.49	U	1.66
Cobalt	**7440-48-4**	**0.0276**	FB-01, QB-01	**0.0128**
Copper	7440-50-8	0.282	U	2.46
Iron	7439-89-6	11.2	GC-BS, U	19.8
Lead	7439-92-1	0.0523	U	0.226
Magnesium	7439-95-4	42.8	U	78.9
Manganese	7439-96-5	0.237	QB-01, U	0.975
Molybdenum	**7439-98-7**	**0.240**	FB-01, QB-01	**0.174**
Nickel	7440-02-0	0.282	U	0.656
Phosphorus	7723-14-0	350	GC-BS, U	1020
Potassium	7440-09-7	10.8	U	31.1
Rubidium	7440-17-7	0.0123	U	0.0150
Selenium	7782-49-2	0.00312	U	0.00901
Sodium	7440-23-5	716	GC-BS, U	1640
Strontium	**7440-24-6**	**0.722**	FB-01, QB-01	**0.534**
Thallium	7440-28-0	5.29E-5	U	4.12E-4
Thorium	7440-29-01	0.00225	U	0.00246
Uranium	7440-61-1	0.00183	U	0.0139
Vanadium	7440-62-2	0.0289	QB-01, U	0.0403
Zinc	7440-66-6	8.58	U	80.0

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1777 Sentry Pkwy, Bldg 12
Blue Bell, PA 19422
ATTN: Ms. Chelsea Saber
PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 12/19/23 10:54
SUBMITTED: 12/11/23 to 12/13/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9542993 **Lab ID:** 3121111-09 **Sampled:** 12/06/23 23:59
Matrix: Air **Sample Volume:** 2026.096 m³ **Received:** 12/11/23 11:34
Filter ID: **Analysis Date:** 12/13/23 21:16
Comments: MFK-AM01-120623-HM

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	**7429-90-5**	**2620**	E	**25.8**
Antimony	**7440-36-0**	**0.0603**	SL	**0.0354**
Arsenic	**7440-38-2**	**0.345**		**0.00767**
Barium	**7440-39-3**	**16.1**		**0.761**
Beryllium	**7440-41-7**	**0.0706**		**0.00267**
Cadmium	7440-43-9	0.0255	U	0.0875
Calcium	**7440-70-2**	**1030**	LJ, QB-01	**234**
Chromium	**7440-47-3**	**3.62**		**1.63**
Cobalt	**7440-48-4**	**1.05**	QB-01	**0.0125**
Copper	**7440-50-8**	**21.2**		**2.41**
Lead	**7439-92-1**	**0.857**		**0.222**
Magnesium	**7439-95-4**	**366**		**77.4**
Manganese	**7439-96-5**	**69.2**	QB-01	**0.956**
Molybdenum	**7439-98-7**	**0.715**	QB-01	**0.171**
Nickel	**7440-02-0**	**1.68**		**0.643**
Phosphorus	7723-14-0	484	GC-BS, U	1000
Potassium	**7440-09-7**	**156**		**30.5**
Rubidium	**7440-17-7**	**0.455**		**0.0147**
Selenium	**7782-49-2**	**0.438**		**0.00883**
Sodium	**7440-23-5**	**2170**	E, GC-BS	**1610**
Strontium	**7440-24-6**	**10.4**	QB-01	**0.524**
Thallium	**7440-28-0**	**0.00381**		**4.04E-4**
Thorium	**7440-29-01**	**0.0602**		**0.00241**
Uranium	**7440-61-1**	**0.0492**		**0.0137**
Vanadium	**7440-62-2**	**6.53**	QB-01	**0.0395**
Zinc	7440-66-6	15.9	U	78.5

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Tetra Tech, Inc.
1777 Sentry Pkwy, Bldg 12
Blue Bell, PA 19422
ATTN: Ms. Chelsea Saber
PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 12/19/23 10:54
SUBMITTED: 12/11/23 to 12/13/23
AQS SITE CODE:
SITE CODE: Maui fires

Description:	TetraTech Q9542993	**Lab ID:**	3121111-09RE1	**Sampled:**	12/06/23 23:59
Matrix:	Air	**Sample Volume:**	2026.096 m³	**Received:**	12/11/23 11:34
		Filter ID:		**Analysis Date:**	12/15/23 03:17
Comments:	MFK-AM01-120623-HM				

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Iron	7439-89-6	2630	D	97.2

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Blue Bell, PA 19422
ATTN: Ms. Chelsea Saber
PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 12/19/23 10:54
SUBMITTED: 12/11/23 to 12/13/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9542992
Matrix: Air
Lab ID: 3121111-10
Sample Volume: 2035.303 m³
Filter ID:
Sampled: 12/06/23 23:59
Received: 12/11/23 11:34
Analysis Date: 12/13/23 22:05

Comments: MFK-AM02-120623-HM

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	**7429-90-5**	**509**		**25.7**
Antimony	**7440-36-0**	**0.0558**	SL	**0.0353**
Arsenic	**7440-38-2**	**0.188**		**0.00763**
Barium	**7440-39-3**	**5.74**		**0.758**
Beryllium	**7440-41-7**	**0.0181**		**0.00265**
Cadmium	7440-43-9	0.0203	U	0.0871
Calcium	**7440-70-2**	**747**	LJ, QB-01	**233**
Chromium	**7440-47-3**	**2.16**		**1.62**
Cobalt	**7440-48-4**	**0.343**	QB-01	**0.0125**
Copper	**7440-50-8**	**14.9**		**2.40**
Iron	**7439-89-6**	**611**	GC-BS	**19.3**
Lead	**7439-92-1**	**0.879**		**0.221**
Magnesium	**7439-95-4**	**294**		**77.1**
Manganese	**7439-96-5**	**18.8**	QB-01	**0.951**
Molybdenum	**7439-98-7**	**0.652**	QB-01	**0.170**
Nickel	**7440-02-0**	**1.22**		**0.640**
Phosphorus	7723-14-0	367	GC-BS, U	999
Potassium	**7440-09-7**	**134**		**30.4**
Rubidium	**7440-17-7**	**0.209**		**0.0146**
Selenium	**7782-49-2**	**0.183**		**0.00879**
Sodium	**7440-23-5**	**2240**	E, GC-BS	**1600**
Strontium	**7440-24-6**	**5.23**	QB-01	**0.521**
Thallium	**7440-28-0**	**0.00118**		**4.02E-4**
Thorium	**7440-29-01**	**0.0151**		**0.00240**
Uranium	**7440-61-1**	**0.0136**		**0.0136**
Vanadium	**7440-62-2**	**1.94**	QB-01	**0.0393**
Zinc	7440-66-6	13.7	U	78.1

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Tetra Tech, Inc.
1777 Sentry Pkwy, Bldg 12
Blue Bell, PA 19422
ATTN: Ms. Chelsea Saber
PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 12/19/23 10:54
SUBMITTED: 12/11/23 to 12/13/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9542991 **Lab ID:** 3121111-11 **Sampled:** 12/06/23 23:59
Matrix: Air **Sample Volume:** 1665.355 m³ **Received:** 12/11/23 11:34
Filter ID: **Analysis Date:** 12/13/23 22:20
Comments: MFK-AM03-120623-HM

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	**7429-90-5**	**441**		**31.4**
Antimony	**7440-36-0**	**0.0719**	SL	**0.0431**
Arsenic	**7440-38-2**	**0.151**		**0.00933**
Barium	**7440-39-3**	**6.85**		**0.926**
Beryllium	**7440-41-7**	**0.0196**		**0.00324**
Cadmium	7440-43-9	0.0101	U	0.106
Calcium	**7440-70-2**	**798**	LJ, QB-01	**285**
Chromium	**7440-47-3**	**2.53**		**1.98**
Cobalt	**7440-48-4**	**0.334**	QB-01	**0.0152**
Copper	**7440-50-8**	**30.1**		**2.93**
Iron	**7439-89-6**	**584**	GC-BS	**23.6**
Lead	**7439-92-1**	**0.418**		**0.270**
Magnesium	**7439-95-4**	**317**		**94.2**
Manganese	**7439-96-5**	**17.4**	QB-01	**1.16**
Molybdenum	**7439-98-7**	**0.892**	QB-01	**0.208**
Nickel	**7440-02-0**	**1.26**		**0.783**
Phosphorus	7723-14-0	438	GC-BS, U	1220
Potassium	**7440-09-7**	**133**		**37.1**
Rubidium	**7440-17-7**	**0.208**		**0.0179**
Selenium	**7782-49-2**	**0.178**		**0.0107**
Sodium	**7440-23-5**	**2500**	E, GC-BS	**1950**
Strontium	**7440-24-6**	**5.38**	QB-01	**0.637**
Thallium	**7440-28-0**	**0.00103**		**4.91E-4**
Thorium	**7440-29-01**	**0.0153**		**0.00293**
Uranium	7440-61-1	0.0128	U	0.0166
Vanadium	**7440-62-2**	**1.86**	QB-01	**0.0481**
Zinc	7440-66-6	15.1	U	95.4

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Tetra Tech, Inc.
1777 Sentry Pkwy, Bldg 12
Blue Bell, PA 19422
ATTN: Ms. Chelsea Saber
PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 12/19/23 10:54
SUBMITTED: 12/11/23 to 12/13/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9542984 FB **Lab ID:** 3121111-12 **Sampled:** 12/06/23 00:00
Matrix: Air **Sample Volume:** 2026.096 m³ **Received:** 12/11/23 11:34
Filter ID: **Analysis Date:** 12/13/23 22:34
Comments: MFK-FB01-120623-HM Field Blank

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	7429-90-5	10.2	U	25.8
Antimony	7440-36-0	0.00667	SL, U	0.0354
Arsenic	7440-38-2	0.00157	U	0.00767
Barium	7440-39-3	0.598	U	0.761
Beryllium	7440-41-7	8.35E-4	U	0.00267
Cadmium	7440-43-9	0.00205	U	0.0875
Calcium	**7440-70-2**	**333**	FB-01, LJ, QB-01	**234**
Chromium	7440-47-3	1.41	U	1.63
Cobalt	**7440-48-4**	**0.0229**	FB-01, QB-01	**0.0125**
Copper	7440-50-8	0.331	U	2.41
Iron	7439-89-6	10.9	GC-BS, U	19.4
Lead	7439-92-1	0.0493	U	0.222
Magnesium	7439-95-4	41.3	U	77.4
Manganese	7439-96-5	0.285	QB-01, U	0.956
Molybdenum	**7439-98-7**	**0.234**	FB-01, QB-01	**0.171**
Nickel	7440-02-0	0.262	U	0.643
Phosphorus	7723-14-0	337	GC-BS, U	1000
Potassium	7440-09-7	9.45	U	30.5
Rubidium	7440-17-7	0.0135	U	0.0147
Selenium	7782-49-2	0.00412	U	0.00883
Sodium	7440-23-5	692	GC-BS, U	1610
Strontium	**7440-24-6**	**0.714**	FB-01, QB-01	**0.524**
Thallium	7440-28-0	4.18E-5	U	4.04E-4
Thorium	7440-29-01	0.00219	U	0.00241
Uranium	7440-61-1	0.00179	U	0.0137
Vanadium	7440-62-2	0.0234	QB-01, U	0.0395
Zinc	7440-66-6	6.27	U	78.5

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CERTIFICATE OF ANALYSIS

ERG

Tetra Tech, Inc.
1777 Sentry Pkwy, Bldg 12
Blue Bell, PA 19422
ATTN: Ms. Chelsea Saber
PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 12/19/23 10:54
SUBMITTED: 12/11/23 to 12/13/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9542988 **Lab ID:** 3121332-01 **Sampled:** 12/07/23 23:59
Matrix: Air **Sample Volume:** 1968.546 m^3 **Received:** 12/13/23 13:27
Filter ID: **Analysis Date:** 12/14/23 22:37
Comments: MFK-AM01-120723-HM

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	**7429-90-5**	**885**	E	**26.5**
Antimony	**7440-36-0**	**0.0502**	SL	**0.0364**
Arsenic	**7440-38-2**	**0.160**		**0.00789**
Barium	**7440-39-3**	**6.61**		**0.784**
Beryllium	**7440-41-7**	**0.0252**		**0.00274**
Cadmium	7440-43-9	0.0113	U	0.0901
Calcium	**7440-70-2**	**680**	LJ, QB-01	**241**
Chromium	**7440-47-3**	**2.29**		**1.68**
Cobalt	**7440-48-4**	**0.391**	QB-01	**0.0129**
Copper	**7440-50-8**	**26.5**		**2.48**
Iron	**7439-89-6**	**883**		**20.0**
Lead	**7439-92-1**	**0.804**		**0.228**
Magnesium	**7439-95-4**	**365**		**79.7**
Manganese	**7439-96-5**	**23.4**		**0.984**
Molybdenum	**7439-98-7**	**0.845**	B, QB-01	**0.176**
Nickel	**7440-02-0**	**0.996**		**0.662**
Phosphorus	7723-14-0	415	U	1030
Potassium	**7440-09-7**	**144**	B	**31.4**
Rubidium	**7440-17-7**	**0.229**		**0.0151**
Selenium	**7782-49-2**	**0.239**		**0.00909**
Sodium	**7440-23-5**	**2950**	E	**1650**
Strontium	**7440-24-6**	**5.61**	QB-01	**0.539**
Thallium	**7440-28-0**	**0.00154**		**4.16E-4**
Thorium	**7440-29-01**	**0.0206**		**0.00248**
Uranium	**7440-61-1**	**0.0180**		**0.0141**
Vanadium	**7440-62-2**	**2.47**		**0.0407**
Zinc	7440-66-6	25.5	U	80.7

CERTIFICATE OF ANALYSIS

Tetra Tech, Inc.
1777 Sentry Pkwy, Bldg 12
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ATTN: Ms. Chelsea Saber
PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 12/19/23 10:54
SUBMITTED: 12/11/23 to 12/13/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9542986 **Lab ID:** 3121332-02 **Sampled:** 12/07/23 23:59
Matrix: Air **Sample Volume:** 2068.806 m³ **Received:** 12/13/23 13:27
Filter ID: **Analysis Date:** 12/14/23 22:52
Comments: MFK-AM02-120723-HM

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	**7429-90-5**	**300**		**25.2**
Antimony	**7440-36-0**	**0.0469**	SL	**0.0347**
Arsenic	**7440-38-2**	**0.121**		**0.00751**
Barium	**7440-39-3**	**3.85**		**0.746**
Beryllium	**7440-41-7**	**0.0109**		**0.00261**
Cadmium	7440-43-9	0.0103	U	0.0857
Calcium	**7440-70-2**	**601**	LJ, QB-01	**230**
Chromium	**7440-47-3**	**1.85**		**1.60**
Cobalt	**7440-48-4**	**0.187**	QB-01	**0.0123**
Copper	**7440-50-8**	**35.2**		**2.36**
Iron	**7439-89-6**	**348**		**19.0**
Lead	**7439-92-1**	**0.871**		**0.217**
Magnesium	**7439-95-4**	**384**		**75.8**
Manganese	**7439-96-5**	**9.12**		**0.936**
Molybdenum	**7439-98-7**	**0.939**	B, QB-01	**0.168**
Nickel	**7440-02-0**	**0.737**		**0.630**
Phosphorus	7723-14-0	384	U	983
Potassium	**7440-09-7**	**155**	B	**29.9**
Rubidium	**7440-17-7**	**0.143**		**0.0144**
Selenium	**7782-49-2**	**0.186**		**0.00865**
Sodium	**7440-23-5**	**3300**	E	**1570**
Strontium	**7440-24-6**	**4.29**	QB-01	**0.513**
Thallium	**7440-28-0**	**7.03E-4**		**3.96E-4**
Thorium	**7440-29-01**	**0.0119**		**0.00236**
Uranium	7440-61-1	0.00886	U	0.0134
Vanadium	**7440-62-2**	**1.26**		**0.0387**
Zinc	7440-66-6	23.8	U	76.8

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FILE #: 0000.00
REPORTED: 12/19/23 10:54
SUBMITTED: 12/11/23 to 12/13/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9542985 **Lab ID:** 3121332-03 **Sampled:** 12/07/23 23:59
Matrix: Air **Sample Volume:** 1666.743 m³ **Received:** 12/13/23 13:27
Filter ID: **Analysis Date:** 12/14/23 23:07
Comments: MFK-AM03-120723-HM

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	**7429-90-5**	**464**		**31.3**
Antimony	**7440-36-0**	**0.0784**	SL	**0.0430**
Arsenic	**7440-38-2**	**0.147**		**0.00932**
Barium	**7440-39-3**	**7.34**		**0.925**
Beryllium	**7440-41-7**	**0.0211**		**0.00324**
Cadmium	7440-43-9	0.00886	U	0.106
Calcium	**7440-70-2**	**750**	LJ, QB-01	**285**
Chromium	**7440-47-3**	**2.34**		**1.98**
Cobalt	**7440-48-4**	**0.290**	QB-01	**0.0152**
Copper	**7440-50-8**	**62.9**		**2.93**
Iron	**7439-89-6**	**559**		**23.6**
Lead	**7439-92-1**	**0.618**		**0.269**
Magnesium	**7439-95-4**	**453**		**94.1**
Manganese	**7439-96-5**	**16.6**		**1.16**
Molybdenum	**7439-98-7**	**1.65**	B, QB-01	**0.208**
Nickel	**7440-02-0**	**0.936**		**0.782**
Phosphorus	7723-14-0	485	U	1220
Potassium	**7440-09-7**	**162**	B	**37.1**
Rubidium	**7440-17-7**	**0.205**		**0.0179**
Selenium	**7782-49-2**	**0.207**		**0.0107**
Sodium	**7440-23-5**	**3830**	E	**1950**
Strontium	**7440-24-6**	**5.91**	QB-01	**0.636**
Thallium	**7440-28-0**	**0.00126**		**4.91E-4**
Thorium	**7440-29-01**	**0.0191**		**0.00293**
Uranium	7440-61-1	0.0130	U	0.0166
Vanadium	**7440-62-2**	**1.79**		**0.0480**
Zinc	7440-66-6	22.6	U	95.4

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FILE #: 0000.00
REPORTED: 12/19/23 10:54
SUBMITTED: 12/11/23 to 12/13/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9541906 **Lab ID:** 3121332-04 **Sampled:** 12/08/23 23:59
Matrix: Air **Sample Volume:** 2028.629 m³ **Received:** 12/13/23 13:27
Filter ID: **Analysis Date:** 12/14/23 23:21
Comments: MFK-AM01-120823-HM

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	**7429-90-5**	**601**		**25.7**
Antimony	**7440-36-0**	**0.0440**	SL	**0.0354**
Arsenic	**7440-38-2**	**0.119**		**0.00766**
Barium	**7440-39-3**	**5.40**		**0.760**
Beryllium	**7440-41-7**	**0.0175**		**0.00266**
Cadmium	7440-43-9	0.00818	U	0.0874
Calcium	**7440-70-2**	**590**	LJ, QB-01	**234**
Chromium	**7440-47-3**	**2.06**		**1.63**
Cobalt	**7440-48-4**	**0.260**	QB-01	**0.0125**
Copper	**7440-50-8**	**14.8**		**2.41**
Iron	**7439-89-6**	**594**		**19.4**
Lead	**7439-92-1**	**0.454**		**0.221**
Magnesium	**7439-95-4**	**228**		**77.3**
Manganese	**7439-96-5**	**16.0**		**0.954**
Molybdenum	**7439-98-7**	**0.740**	B, QB-01	**0.171**
Nickel	**7440-02-0**	**0.792**		**0.642**
Phosphorus	7723-14-0	403	U	1000
Potassium	**7440-09-7**	**96.6**	B	**30.5**
Rubidium	**7440-17-7**	**0.172**		**0.0147**
Selenium	**7782-49-2**	**0.193**		**0.00882**
Sodium	**7440-23-5**	**1940**	E	**1600**
Strontium	**7440-24-6**	**4.19**	QB-01	**0.523**
Thallium	**7440-28-0**	**0.00114**		**4.03E-4**
Thorium	**7440-29-01**	**0.0136**		**0.00241**
Uranium	7440-61-1	0.0129	U	0.0136
Vanadium	**7440-62-2**	**1.53**		**0.0395**
Zinc	7440-66-6	16.9	U	78.4

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FILE #: 0000.00
REPORTED: 12/19/23 10:54
SUBMITTED: 12/11/23 to 12/13/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9542982 **Lab ID:** 3121332-05 **Sampled:** 12/08/23 23:59
Matrix: Air **Sample Volume:** 2051.566 m³ **Received:** 12/13/23 13:27
Filter ID: **Analysis Date:** 12/14/23 23:37
Comments: MFK-AM02-120823-HM

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	**7429-90-5**	**381**		**25.5**
Antimony	**7440-36-0**	**0.0722**	SL	**0.0350**
Arsenic	**7440-38-2**	**0.194**		**0.00757**
Barium	**7440-39-3**	**5.41**		**0.752**
Beryllium	**7440-41-7**	**0.0131**		**0.00263**
Cadmium	7440-43-9	0.0186	U	0.0864
Calcium	**7440-70-2**	**574**	LJ, QB-01	**232**
Chromium	**7440-47-3**	**1.83**		**1.61**
Cobalt	**7440-48-4**	**0.189**	QB-01	**0.0124**
Copper	**7440-50-8**	**15.5**		**2.38**
Iron	**7439-89-6**	**388**		**19.2**
Lead	**7439-92-1**	**0.337**		**0.219**
Magnesium	**7439-95-4**	**227**		**76.5**
Manganese	**7439-96-5**	**10.6**		**0.944**
Molybdenum	**7439-98-7**	**0.720**	B, QB-01	**0.169**
Nickel	**7440-02-0**	**0.878**		**0.635**
Phosphorus	7723-14-0	404	U	991
Potassium	**7440-09-7**	**122**	B	**30.1**
Rubidium	**7440-17-7**	**0.163**		**0.0145**
Selenium	**7782-49-2**	**0.157**		**0.00872**
Sodium	**7440-23-5**	**1990**	E	**1590**
Strontium	**7440-24-6**	**4.21**	QB-01	**0.517**
Thallium	**7440-28-0**	**9.26E-4**		**3.99E-4**
Thorium	**7440-29-01**	**0.0118**		**0.00238**
Uranium	7440-61-1	0.0101	U	0.0135
Vanadium	**7440-62-2**	**1.18**		**0.0390**
Zinc	7440-66-6	15.3	U	77.5

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FILE #: 0000.00
REPORTED: 12/19/23 10:54
SUBMITTED: 12/11/23 to 12/13/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9542983 **Lab ID:** 3121332-06 **Sampled:** 12/08/23 23:59
Matrix: Air **Sample Volume:** 1734.714 m³ **Received:** 12/13/23 13:27
Filter ID: **Analysis Date:** 12/14/23 19:58
Comments: MFK-AM03-120823-HM

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	**7429-90-5**	**383**		**30.1**
Antimony	**7440-36-0**	**0.0839**	SL	**0.0414**
Arsenic	**7440-38-2**	**0.101**		**0.00896**
Barium	**7440-39-3**	**7.62**		**0.889**
Beryllium	**7440-41-7**	**0.0182**		**0.00311**
Cadmium	7440-43-9	0.00833	U	0.102
Calcium	**7440-70-2**	**623**	A-01, LJ, QB-01	**274**
Chromium	**7440-47-3**	**2.10**		**1.90**
Cobalt	**7440-48-4**	**0.237**	QB-01	**0.0146**
Copper	**7440-50-8**	**34.8**		**2.81**
Iron	**7439-89-6**	**478**	QM-4X	**22.7**
Lead	**7439-92-1**	**0.343**		**0.259**
Magnesium	**7439-95-4**	**254**		**90.4**
Manganese	**7439-96-5**	**15.1**		**1.12**
Molybdenum	**7439-98-7**	**1.05**	B, QB-01	**0.200**
Nickel	7440-02-0	0.621	U	0.751
Phosphorus	7723-14-0	461	QM-4X, U	1170
Potassium	**7440-09-7**	**105**	B, QM-07	**35.6**
Rubidium	**7440-17-7**	**0.185**		**0.0172**
Selenium	**7782-49-2**	**0.162**		**0.0103**
Sodium	**7440-23-5**	**2200**	A-01, E, QM-4X	**1880**
Strontium	**7440-24-6**	**4.71**	QB-01	**0.612**
Thallium	**7440-28-0**	**0.00143**		**4.72E-4**
Thorium	**7440-29-01**	**0.0143**	QM-07	**0.00281**
Uranium	7440-61-1	0.0119	U	0.0159
Vanadium	**7440-62-2**	**1.36**		**0.0461**
Zinc	7440-66-6	30.0	U	91.6

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FILE #: 0000.00
REPORTED: 12/19/23 10:54
SUBMITTED: 12/11/23 to 12/13/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9533914 **Lab ID:** 3121332-07 **Sampled:** 12/09/23 23:59
Matrix: Air **Sample Volume:** 2065.514 m³ **Received:** 12/13/23 13:27
Filter ID: **Analysis Date:** 12/14/23 23:52
Comments: MFK-AM01-120923-HM

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	**7429-90-5**	**484**		**25.3**
Antimony	**7440-36-0**	**0.0404**	SL	**0.0347**
Arsenic	**7440-38-2**	**0.204**		**0.00752**
Barium	**7440-39-3**	**5.01**		**0.747**
Beryllium	**7440-41-7**	**0.0154**		**0.00262**
Cadmium	7440-43-9	0.00852	U	0.0859
Calcium	**7440-70-2**	**437**	QB-01, LJ	**230**
Chromium	**7440-47-3**	**2.02**		**1.60**
Cobalt	**7440-48-4**	**0.238**	QB-01	**0.0123**
Copper	**7440-50-8**	**16.8**		**2.36**
Iron	**7439-89-6**	**517**		**19.1**
Lead	**7439-92-1**	**0.429**		**0.217**
Magnesium	**7439-95-4**	**161**		**75.9**
Manganese	**7439-96-5**	**14.3**		**0.937**
Molybdenum	**7439-98-7**	**0.763**	B, QB-01	**0.168**
Nickel	**7440-02-0**	**0.631**		**0.631**
Phosphorus	7723-14-0	331	U	985
Potassium	**7440-09-7**	**71.2**	B	**29.9**
Rubidium	**7440-17-7**	**0.149**		**0.0144**
Selenium	**7782-49-2**	**0.146**		**0.00866**
Sodium	7440-23-5	1380	U	1580
Strontium	**7440-24-6**	**3.22**	QB-01	**0.514**
Thallium	**7440-28-0**	**9.93E-4**		**3.96E-4**
Thorium	**7440-29-01**	**0.0126**		**0.00236**
Uranium	7440-61-1	0.0110	U	0.0134
Vanadium	**7440-62-2**	**1.40**		**0.0388**
Zinc	7440-66-6	15.2	U	77.0

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FILE #: 0000.00
REPORTED: 12/19/23 10:54
SUBMITTED: 12/11/23 to 12/13/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9533913 **Lab ID:** 3121332-08 **Sampled:** 12/09/23 23:59
Matrix: Air **Sample Volume:** 2068.80€ m³ **Received:** 12/13/23 13:27
Filter ID: **Analysis Date:** 12/15/23 00:06
Comments: MFK-AM02-120923-HM

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	**7429-90-5**	**605**		**25.2**
Antimony	**7440-36-0**	**0.0532**	SL	**0.0347**
Arsenic	**7440-38-2**	**0.385**		**0.00751**
Barium	**7440-39-3**	**6.35**		**0.746**
Beryllium	**7440-41-7**	**0.0202**		**0.00261**
Cadmium	7440-43-9	0.0186	U	0.0857
Calcium	**7440-70-2**	**481**	LJ, QB-01	**230**
Chromium	**7440-47-3**	**2.07**		**1.60**
Cobalt	**7440-48-4**	**0.288**	QB-01	**0.0123**
Copper	**7440-50-8**	**15.9**		**2.36**
Iron	**7439-89-6**	**633**		**19.0**
Lead	**7439-92-1**	**0.440**		**0.217**
Magnesium	**7439-95-4**	**174**		**75.8**
Manganese	**7439-96-5**	**16.6**		**0.936**
Molybdenum	**7439-98-7**	**0.721**	B, QB-01	**0.168**
Nickel	**7440-02-0**	**0.649**		**0.630**
Phosphorus	7723-14-0	334	U	983
Potassium	**7440-09-7**	**136**	B	**29.9**
Rubidium	**7440-17-7**	**0.253**		**0.0144**
Selenium	**7782-49-2**	**0.146**		**0.00865**
Sodium	7440-23-5	1370	U	1570
Strontium	**7440-24-6**	**3.98**	QB-01	**0.513**
Thallium	**7440-28-0**	**0.00117**		**3.96E-4**
Thorium	**7440-29-01**	**0.0185**		**0.00236**
Uranium	**7440-61-1**	**0.0138**		**0.0134**
Vanadium	**7440-62-2**	**1.68**		**0.0387**
Zinc	7440-66-6	14.8	U	76.8

The results in this report apply only to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

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FILE #: 0000.00
REPORTED: 12/19/23 10:54
SUBMITTED: 12/11/23 to 12/13/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9533928 **Lab ID:** 3121332-09 **Sampled:** 12/09/23 23:59
Matrix: Air **Sample Volume:** 1795.42 m³ **Received:** 12/13/23 13:27
Filter ID: **Analysis Date:** 12/15/23 00:20
Comments: MFK-AM03-120923-HM

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	**7429-90-5**	**720**		**29.1**
Antimony	**7440-36-0**	**0.0890**	SL	**0.0400**
Arsenic	**7440-38-2**	**0.239**		**0.00865**
Barium	**7440-39-3**	**11.2**		**0.859**
Beryllium	**7440-41-7**	**0.0343**		**0.00301**
Cadmium	7440-43-9	0.0151	U	0.0988
Calcium	**7440-70-2**	**585**	LJ, QB-01	**265**
Chromium	**7440-47-3**	**2.88**		**1.84**
Cobalt	**7440-48-4**	**0.429**	QB-01	**0.0141**
Copper	**7440-50-8**	**34.5**		**2.72**
Iron	**7439-89-6**	**881**		**21.9**
Lead	**7439-92-1**	**0.686**		**0.250**
Magnesium	**7439-95-4**	**207**		**87.4**
Manganese	**7439-96-5**	**28.1**		**1.08**
Molybdenum	**7439-98-7**	**0.978**	B, QB-01	**0.193**
Nickel	**7440-02-0**	**0.803**		**0.726**
Phosphorus	7723-14-0	387	U	1130
Potassium	**7440-09-7**	**115**	B	**34.4**
Rubidium	**7440-17-7**	**0.289**		**0.0166**
Selenium	**7782-49-2**	**0.178**		**0.00997**
Sodium	7440-23-5	1450	U	1810
Strontium	**7440-24-6**	**6.70**	QB-01	**0.591**
Thallium	**7440-28-0**	**0.00192**		**4.56E-4**
Thorium	**7440-29-01**	**0.0250**		**0.00272**
Uranium	**7440-61-1**	**0.0186**		**0.0154**
Vanadium	**7440-62-2**	**2.14**		**0.0446**
Zinc	7440-66-6	20.9	U	88.5

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FILE #: 0000.00
REPORTED: 12/19/23 10:54
SUBMITTED: 12/11/23 to 12/13/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9533920 FB **Lab ID:** 3121332-10 **Sampled:** 12/09/23 00:00
Matrix: Air **Sample Volume:** 2065.514 m³ **Received:** 12/13/23 13:27
Filter ID: **Analysis Date:** 12/15/23 00:35
Comments: MFK-FB01-120923-HM Field Blank

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	7429-90-5	9.67	U	25.3
Antimony	7440-36-0	0.00576	SL, U	0.0347
Arsenic	**7440-38-2**	**0.00973**	FB-01	**0.00752**
Barium	7440-39-3	0.561	U	0.747
Beryllium	7440-41-7	8.68E-4	U	0.00262
Cadmium	7440-43-9	0.00230	U	0.0859
Calcium	**7440-70-2**	**235**	FB-01, LJ, QB-01	**230**
Chromium	7440-47-3	1.45	U	1.60
Cobalt	**7440-48-4**	**0.0498**	FB-01, QB-01	**0.0123**
Copper	7440-50-8	0.548	U	2.36
Iron	7439-89-6	10.7	U	19.1
Lead	7439-92-1	0.0515	U	0.217
Magnesium	7439-95-4	36.9	U	75.9
Manganese	7439-96-5	0.156	U	0.937
Molybdenum	**7439-98-7**	**0.222**	B, FB-01, QB-01	**0.168**
Nickel	7440-02-0	0.306	U	0.631
Phosphorus	7723-14-0	275	U	985
Potassium	7440-09-7	12.0	B, U	29.9
Rubidium	7440-17-7	0.0103	U	0.0144
Selenium	7782-49-2	0.00248	U	0.00866
Sodium	7440-23-5	636	U	1580
Strontium	7440-24-6	0.499	QB-01, U	0.514
Thallium	7440-28-0	7.26E-5	U	3.96E-4
Thorium	7440-29-01	0.00189	U	0.00236
Uranium	7440-61-1	0.00145	U	0.0134
Vanadium	7440-62-2	0.00206	U	0.0388
Zinc	7440-66-6	7.69	U	77.0

CERTIFICATE OF ANALYSIS

Tetra Tech, Inc.
1777 Sentry Pkwy, Bldg 12
Blue Bell, PA 19422
ATTN: Ms. Chelsea Saber
PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 12/19/23 10:54
SUBMITTED: 12/11/23 to 12/13/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9533933 LB
Lab ID: 3121332-11
Sampled: 12/09/23 00:00
Matrix: Air
Sample Volume: 2065.514 m³
Received: 12/13/23 13:27
Filter ID:
Analysis Date: 12/15/23 00:49
Comments: MFK-LB01-120923-HM Lot Blank

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	7429-90-5	9.32	U	25.3
Antimony	7440-36-0	0.00651	SL, U	0.0347
Arsenic	7440-38-2	0.00347	U	0.00752
Barium	**7440-39-3**	**0.815**	FB-01	**0.747**
Beryllium	7440-41-7	8.58E-4	U	0.00262
Cadmium	7440-43-9	0.00271	U	0.0859
Calcium	**7440-70-2**	**238**	FB-01, LJ, QB-01	**230**
Chromium	7440-47-3	1.56	U	1.60
Cobalt	**7440-48-4**	**0.0438**	FB-01, QB-01	**0.0123**
Copper	7440-50-8	0.297	U	2.36
Iron	7439-89-6	10.9	U	19.1
Lead	7439-92-1	0.0467	U	0.217
Magnesium	7439-95-4	38.0	U	75.9
Manganese	7439-96-5	0.136	U	0.937
Molybdenum	**7439-98-7**	**0.231**	B, FB-01, QB-01	**0.168**
Nickel	7440-02-0	0.308	U	0.631
Phosphorus	7723-14-0	282	U	985
Potassium	7440-09-7	12.7	B, U	29.9
Rubidium	7440-17-7	0.0109	U	0.0144
Selenium	7782-49-2	0.00146	U	0.00866
Sodium	7440-23-5	649	U	1580
Strontium	**7440-24-6**	**0.514**	QB-01	**0.514**
Thallium	7440-28-0	7.54E-5	U	3.96E-4
Thorium	7440-29-01	0.00192	U	0.00236
Uranium	7440-61-1	0.00144	U	0.0134
Vanadium	7440-62-2	0.00378	U	0.0388
Zinc	7440-66-6	7.94	U	77.0

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Blue Bell, PA 19422
ATTN: Ms. Chelsea Saber
PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 12/19/23 10:54
SUBMITTED: 12/11/23 to 12/13/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9533927 **Lab ID:** 3121332-12 **Sampled:** 12/10/23 23:59
Matrix: Air **Sample Volume:** 2056.907 m³ **Received:** 12/13/23 13:27
Filter ID: **Analysis Date:** 12/15/23 01:36
Comments: MFK-AM01-121023-HM

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	**7429-90-5**	**528**		**25.4**
Antimony	**7440-36-0**	**0.0546**	SL	**0.0349**
Arsenic	**7440-38-2**	**0.143**		**0.00755**
Barium	**7440-39-3**	**5.17**		**0.750**
Beryllium	**7440-41-7**	**0.0186**		**0.00263**
Cadmium	7440-43-9	0.00883	U	0.0862
Calcium	**7440-70-2**	**424**	LJ, QB-01	**231**
Chromium	**7440-47-3**	**1.97**		**1.61**
Cobalt	**7440-48-4**	**0.293**	QB-01	**0.0123**
Copper	**7440-50-8**	**22.7**		**2.37**
Iron	**7439-89-6**	**586**		**19.1**
Lead	**7439-92-1**	**0.697**		**0.218**
Magnesium	**7439-95-4**	**134**		**76.3**
Manganese	**7439-96-5**	**16.6**		**0.941**
Molybdenum	**7439-98-7**	**0.723**	B, QB-01	**0.168**
Nickel	7440-02-0	0.592	U	0.634
Phosphorus	7723-14-0	309	U	989
Potassium	**7440-09-7**	**65.5**	B	**30.1**
Rubidium	**7440-17-7**	**0.173**		**0.0145**
Selenium	**7782-49-2**	**0.137**		**0.00870**
Sodium	7440-23-5	1050	U	1580
Strontium	**7440-24-6**	**3.37**	QB-01	**0.516**
Thallium	**7440-28-0**	**0.00110**		**3.98E-4**
Thorium	**7440-29-01**	**0.0158**		**0.00237**
Uranium	7440-61-1	0.0123	U	0.0134
Vanadium	**7440-62-2**	**1.48**		**0.0389**
Zinc	7440-66-6	15.5	U	77.3

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Tetra Tech, Inc.
1777 Sentry Pkwy, Bldg 12
Blue Bell, PA 19422
ATTN: Ms. Chelsea Saber
PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 12/19/23 10:54
SUBMITTED: 12/11/23 to 12/13/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9533925 **Lab ID:** 3121332-13 **Sampled:** 12/10/23 23:59
Matrix: Air **Sample Volume:** 2040.36 m³ **Received:** 12/13/23 13:27
Filter ID: **Analysis Date:** 12/15/23 02:06
Comments: MFK-AM02-121023-HM

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	**7429-90-5**	**522**		**25.6**
Antimony	**7440-36-0**	**0.0710**	SL	**0.0352**
Arsenic	**7440-38-2**	**0.150**		**0.00762**
Barium	**7440-39-3**	**7.24**		**0.756**
Beryllium	**7440-41-7**	**0.0180**		**0.00265**
Cadmium	7440-43-9	0.0113	U	0.0869
Calcium	**7440-70-2**	**447**	LJ, QB-01	**233**
Chromium	**7440-47-3**	**2.01**		**1.62**
Cobalt	**7440-48-4**	**0.288**	QB-01	**0.0124**
Copper	**7440-50-8**	**12.7**		**2.39**
Iron	**7439-89-6**	**601**		**19.3**
Lead	**7439-92-1**	**0.344**		**0.220**
Magnesium	**7439-95-4**	**146**		**76.9**
Manganese	**7439-96-5**	**16.6**		**0.949**
Molybdenum	**7439-98-7**	**0.692**	B, QB-01	**0.170**
Nickel	**7440-02-0**	**0.732**		**0.639**
Phosphorus	7723-14-0	322	U	997
Potassium	**7440-09-7**	**92.9**	B	**30.3**
Rubidium	**7440-17-7**	**0.190**		**0.0146**
Selenium	**7782-49-2**	**0.138**		**0.00877**
Sodium	7440-23-5	1140	U	1590
Strontium	**7440-24-6**	**4.30**	QB-01	**0.520**
Thallium	**7440-28-0**	**0.00105**		**4.01E-4**
Thorium	**7440-29-01**	**0.0179**		**0.00239**
Uranium	7440-61-1	0.0121	U	0.0136
Vanadium	**7440-62-2**	**1.51**		**0.0392**
Zinc	7440-66-6	13.0	U	77.9

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1777 Sentry Pkwy, Bldg 12
Blue Bell, PA 19422
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PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 12/19/23 10:54
SUBMITTED: 12/11/23 to 12/13/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9533924
Matrix: Air
Lab ID: 3121332-14
Sample Volume: 1713.084 m³
Filter ID:
Sampled: 12/10/23 23:59
Received: 12/13/23 13:27
Analysis Date: 12/15/23 02:22
Comments: MFK-AM03-121023-HM

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	**7429-90-5**	**416**		**30.5**
Antimony	**7440-36-0**	**0.0885**	SL	**0.0419**
Arsenic	**7440-38-2**	**0.124**		**0.00907**
Barium	**7440-39-3**	**7.17**		**0.900**
Beryllium	**7440-41-7**	**0.0195**		**0.00315**
Cadmium	7440-43-9	0.00875	U	0.104
Calcium	**7440-70-2**	**488**	LJ, QB-01	**277**
Chromium	**7440-47-3**	**2.21**		**1.93**
Cobalt	**7440-48-4**	**0.282**	QB-01	**0.0148**
Copper	**7440-50-8**	**27.4**		**2.85**
Iron	**7439-89-6**	**530**		**23.0**
Lead	**7439-92-1**	**0.366**		**0.262**
Magnesium	**7439-95-4**	**168**		**91.6**
Manganese	**7439-96-5**	**16.5**		**1.13**
Molybdenum	**7439-98-7**	**0.819**	B, QB-01	**0.202**
Nickel	7440-02-0	0.720	U	0.761
Phosphorus	7723-14-0	373	U	1190
Potassium	**7440-09-7**	**83.5**	B	**36.1**
Rubidium	**7440-17-7**	**0.185**		**0.0174**
Selenium	**7782-49-2**	**0.141**		**0.0104**
Sodium	7440-23-5	1380	U	1900
Strontium	**7440-24-6**	**4.00**	QB-01	**0.619**
Thallium	**7440-28-0**	**0.00103**		**4.78E-4**
Thorium	**7440-29-01**	**0.0166**		**0.00285**
Uranium	7440-61-1	0.0118	U	0.0161
Vanadium	**7440-62-2**	**1.34**		**0.0467**
Zinc	7440-66-6	13.2	U	92.8

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Blue Bell, PA 19422
ATTN: Ms. Chelsea Saber
PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 12/19/23 10:54
SUBMITTED: 12/11/23 to 12/13/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9533929 FB **Lab ID:** 3121332-15 **Sampled:** 12/10/23 00:00
Matrix: Air **Sample Volume:** 2056.907 m³ **Received:** 12/13/23 13:27
Filter ID: **Analysis Date:** 12/15/23 02:36
Comments: MFK-FB01-121023-HM Field Blank

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	7429-90-5	11.5	U	25.4
Antimony	7440-36-0	0.00721	SL, U	0.0349
Arsenic	7440-38-2	0.00711	U	0.00755
Barium	**7440-39-3**	**1.10**	FB-01	**0.750**
Beryllium	7440-41-7	9.75E-4	U	0.00263
Cadmium	7440-43-9	0.0297	U	0.0862
Calcium	**7440-70-2**	**250**	FB-01, LJ, QB-01	**231**
Chromium	**7440-47-3**	**3.16**	FB-01	**1.61**
Cobalt	**7440-48-4**	**0.0617**	FB-01, QB-01	**0.0123**
Copper	7440-50-8	1.24	U	2.37
Iron	7439-89-6	13.7	U	19.1
Lead	7439-92-1	0.111	U	0.218
Magnesium	7439-95-4	38.6	U	76.3
Manganese	7439-96-5	0.407	U	0.941
Molybdenum	**7439-98-7**	**1.44**	B, FB-01, QB-01	**0.168**
Nickel	7440-02-0	0.391	U	0.634
Phosphorus	7723-14-0	286	U	989
Potassium	7440-09-7	11.1	B, U	30.1
Rubidium	7440-17-7	0.0129	U	0.0145
Selenium	7782-49-2	0.00512	U	0.00870
Sodium	7440-23-5	657	U	1580
Strontium	**7440-24-6**	**0.548**	FB-01, QB-01	**0.516**
Thallium	7440-28-0	8.27E-5	U	3.98E-4
Thorium	7440-29-01	0.00234	U	0.00237
Uranium	7440-61-1	0.00174	U	0.0134
Vanadium	7440-62-2	0.0132	U	0.0389
Zinc	7440-66-6	9.52	U	77.3

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Tetra Tech, Inc.
1777 Sentry Pkwy, Bldg 12
Blue Bell, PA 19422
ATTN: Ms. Chelsea Saber
PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 12/19/23 10:54
SUBMITTED: 12/11/23 to 12/13/23
AQS SITE CODE:
SITE CODE: Maui fires

Inorganics by Compendium Method IO-3.5 - Quality Control

Batch 2312039 - B3L1203

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Calibration Blank (2312039-CCB1)				Prepared & Analyzed: 12/13/23						
Aluminum	25.4		ng/l							
Antimony	1.30		ng/l							
Arsenic	-1.44		ng/l							U
Barium	-1.73		ng/l							U
Beryllium	1.11		ng/l							
Cadmium	1.09		ng/l							
Calcium	1190		ng/l							
Chromium	6.40		ng/l							
Cobalt	0.872		ng/l							
Copper	171		ng/l							
Iron	117		ng/l							
Lead	8.89		ng/l							
Magnesium	61.3		ng/l							
Manganese	18.9		ng/l							
Molybdenum	26.2		ng/l							
Nickel	1.67		ng/l							
Phosphorus	-373		ng/l							U
Potassium	694		ng/l							
Rubidium	1.66		ng/l							
Selenium	6.80		ng/l							
Sodium	18.6		ng/l							
Strontium	0.978		ng/l							
Thallium	0.600		ng/l							
Thorium	0.426		ng/l							
Uranium	0.00938		ng/l							
Vanadium	66.0		ng/l							
Zinc	-23.7		ng/l							U
Calibration Blank (2312039-CCB2)				Prepared & Analyzed: 12/13/23						
Aluminum	-57.6		ng/l							U
Antimony	0.943		ng/l							
Arsenic	-3.91		ng/l							U
Barium	-3.39		ng/l							U
Beryllium	0.580		ng/l							LJ, QX
Cadmium	0.559		ng/l							
Calcium	960		ng/l							
Chromium	5.15		ng/l							
Cobalt	0.778		ng/l							
Copper	59.8		ng/l							

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FILE #: 0000.00
REPORTED: 12/19/23 10:54
SUBMITTED: 12/11/23 to 12/13/23
AQS SITE CODE:
SITE CODE: Maui fires

Inorganics by Compendium Method IO-3.5 - Quality Control

Batch 2312039 - B3L1203

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Calibration Blank (2312039-CCB2) Contin				Prepared & Analyzed: 12/13/23						
Iron	-10.2		ng/l							U
Lead	4.27		ng/l							
Magnesium	-12.6		ng/l							U
Manganese	10.5		ng/l							
Molybdenum	10.0		ng/l							
Nickel	2.29		ng/l							
Phosphorus	-455		ng/l							U
Potassium	67.4		ng/l							
Rubidium	0.856		ng/l							
Selenium	4.40		ng/l							
Sodium	-288		ng/l							U
Strontium	2.23		ng/l							
Thallium	0.468		ng/l							
Thorium	0.305		ng/l							
Uranium	0.00576		ng/l							
Vanadium	31.9		ng/l							
Zinc	-35.0		ng/l							U
Calibration Blank (2312039-CCB3)				Prepared & Analyzed: 12/13/23						
Aluminum	-21.7		ng/l							U
Antimony	1.02		ng/l							
Arsenic	-1.85		ng/l							U
Barium	-4.22		ng/l							U
Beryllium	-0.196		ng/l							U
Cadmium	0.261		ng/l							
Calcium	622		ng/l							
Chromium	0.812		ng/l							
Cobalt	0.202		ng/l							
Copper	36.0		ng/l							
Iron	22.7		ng/l							
Lead	2.44		ng/l							
Magnesium	-14.0		ng/l							U
Manganese	4.54		ng/l							
Molybdenum	9.03		ng/l							
Nickel	2.52		ng/l							
Phosphorus	-831		ng/l							U
Potassium	-626		ng/l							U
Rubidium	0.575		ng/l							
Selenium	15.1		ng/l							

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Tetra Tech, Inc.
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Blue Bell, PA 19422
ATTN: Ms. Chelsea Saber
PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 12/19/23 10:54
SUBMITTED: 12/11/23 to 12/13/23
AQS SITE CODE:
SITE CODE: Maui fires

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes

Inorganics by Compendium Method IO-3.5 - Quality Control

Batch 2312039 - B3L1203

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Calibration Blank (2312039-CCB3) Contin				Prepared & Analyzed: 12/13/23						
Sodium	-255		ng/l							U
Strontium	0.470		ng/l							
Thallium	0.374		ng/l							
Thorium	0.255		ng/l							
Uranium	0.00335		ng/l							
Vanadium	2.19		ng/l							
Zinc	-45.0		ng/l							U
Calibration Blank (2312039-CCB4)				Prepared & Analyzed: 12/13/23						
Aluminum	-65.9		ng/l							U
Antimony	0.696		ng/l							
Arsenic	-2.29		ng/l							U
Barium	-5.77		ng/l							U
Beryllium	-0.0548		ng/l							LJ, QX, U
Cadmium	0.189		ng/l							
Calcium	985		ng/l							
Chromium	1.11		ng/l							
Cobalt	0.302		ng/l							
Copper	25.5		ng/l							
Iron	-32.4		ng/l							U
Lead	2.01		ng/l							
Magnesium	-47.8		ng/l							U
Manganese	3.62		ng/l							
Molybdenum	8.33		ng/l							
Nickel	3.02		ng/l							
Phosphorus	-513		ng/l							U
Potassium	-432		ng/l							U
Rubidium	0.791		ng/l							
Selenium	-0.974		ng/l							U
Sodium	-292		ng/l							U
Strontium	1.09		ng/l							
Thallium	0.336		ng/l							
Thorium	0.384		ng/l							
Uranium	0.00637		ng/l							
Vanadium	3.02		ng/l							
Zinc	-64.3		ng/l							U
Calibration Check (2312039-CCV1)				Prepared & Analyzed: 12/13/23						
Aluminum	1.51E6		ng/l	1.5000E6		100	90-110			
Antimony	20200		ng/l	20000		101	90-110			

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CERTIFICATE OF ANALYSIS

Tetra Tech, Inc.
1777 Sentry Pkwy, Bldg 12
Blue Bell, PA 19422
ATTN: Ms. Chelsea Saber
PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 12/19/23 10:54
SUBMITTED: 12/11/23 to 12/13/23
AQS SITE CODE:
SITE CODE: Maui fires

Inorganics by Compendium Method IO-3.5 - Quality Control

Batch 2312039 - B3L1203

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Calibration Check (2312039-CCV1) Contir				Prepared & Analyzed: 12/13/23						
Arsenic	19700		ng/l	20000		98.6	90-110			
Barium	197000		ng/l	200000		98.7	90-110			
Beryllium	4910		ng/l	5000.0		98.3	90-110			
Cadmium	20100		ng/l	20000		101	90-110			
Calcium	2.49E7		ng/l	2.5000E7		99.8	90-110			
Chromium	234000		ng/l	240000		97.4	90-110			
Cobalt	49300		ng/l	50000		98.6	90-110			
Copper	1.98E6		ng/l	2.0000E6		98.8	90-110			
Iron	2.47E6		ng/l	2.5000E6		98.8	90-110			
Lead	198000		ng/l	200000		98.8	90-110			
Magnesium	1.01E6		ng/l	1.0000E6		101	90-110			
Manganese	492000		ng/l	500000		98.4	90-110			
Molybdenum	49100		ng/l	50000		98.1	90-110			
Nickel	119000		ng/l	120000		99.6	90-110			
Phosphorus	201000		ng/l	200000		101	90-110			
Potassium	2.59E6		ng/l	2.5000E6		104	90-110			
Rubidium	9990		ng/l	10000		99.9	90-110			
Selenium	19900		ng/l	20000		99.5	90-110			
Sodium	2.48E6		ng/l	2.5000E6		99.2	90-110			
Strontium	49800		ng/l	50000		99.5	90-110			
Thallium	484		ng/l	500.00		96.9	90-110			
Thorium	501		ng/l	500.00		100	90-110			
Uranium	492		ng/l	500.00		98.4	90-110			
Vanadium	19700		ng/l	20000		98.4	90-110			
Zinc	521000		ng/l	500000		104	90-110			
Calibration Check (2312039-CCV2)				Prepared & Analyzed: 12/13/23						
Aluminum	1.45E6		ng/l	1.5000E6		96.8	90-110			
Antimony	20000		ng/l	20000		100	90-110			
Arsenic	19500		ng/l	20000		97.7	90-110			
Barium	202000		ng/l	200000		101	90-110			
Beryllium	5030		ng/l	5000.0		101	90-110			
Cadmium	19900		ng/l	20000		99.5	90-110			
Calcium	2.43E7		ng/l	2.5000E7		97.3	90-110			
Chromium	233000		ng/l	240000		97.0	90-110			
Cobalt	48300		ng/l	50000		96.6	90-110			
Copper	1.95E6		ng/l	2.0000E6		97.6	90-110			
Iron	2.42E6		ng/l	2.5000E6		96.9	90-110			
Lead	195000		ng/l	200000		97.6	90-110			

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Inorganics by Compendium Method IO-3.5 - Quality Control

Batch 2312039 - B3L1203

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Calibration Check (2312039-CCV2) Contin				Prepared & Analyzed: 12/13/23						
Magnesium	974000		ng/l	1.0000E6		97.4	90-110			
Manganese	483000		ng/l	500000		96.6	90-110			
Molybdenum	49400		ng/l	50000		98.8	90-110			
Nickel	117000		ng/l	120000		97.8	90-110			
Phosphorus	183000		ng/l	200000		91.6	90-110			
Potassium	2.50E6		ng/l	2.5000E6		99.9	90-110			
Rubidium	9970		ng/l	10000		99.7	90-110			
Selenium	19900		ng/l	20000		99.5	90-110			
Sodium	2.40E6		ng/l	2.5000E6		96.2	90-110			
Strontium	49500		ng/l	50000		99.0	90-110			
Thallium	479		ng/l	500.00		95.8	90-110			
Thorium	488		ng/l	500.00		97.6	90-110			
Uranium	482		ng/l	500.00		96.3	90-110			
Vanadium	19600		ng/l	20000		97.9	90-110			
Zinc	516000		ng/l	500000		103	90-110			
Calibration Check (2312039-CCV3)				Prepared & Analyzed: 12/13/23						
Aluminum	1.45E6		ng/l	1.5000E6		97.0	90-110			
Antimony	20200		ng/l	20000		101	90-110			
Arsenic	19700		ng/l	20000		98.4	90-110			
Barium	204000		ng/l	200000		102	90-110			
Beryllium	5150		ng/l	5000.0		103	90-110			
Cadmium	20200		ng/l	20000		101	90-110			
Calcium	2.45E7		ng/l	2.5000E7		98.2	90-110			
Chromium	239000		ng/l	240000		99.6	90-110			
Cobalt	48800		ng/l	50000		97.6	90-110			
Copper	1.98E6		ng/l	2.0000E6		99.2	90-110			
Iron	2.45E6		ng/l	2.5000E6		97.9	90-110			
Lead	199000		ng/l	200000		99.7	90-110			
Magnesium	976000		ng/l	1.0000E6		97.6	90-110			
Manganese	489000		ng/l	500000		97.9	90-110			
Molybdenum	50500		ng/l	50000		101	90-110			
Nickel	119000		ng/l	120000		99.1	90-110			
Phosphorus	190000		ng/l	200000		94.8	90-110			
Potassium	2.51E6		ng/l	2.5000E6		100	90-110			
Rubidium	10000		ng/l	10000		100	90-110			
Selenium	20200		ng/l	20000		101	90-110			
Sodium	2.41E6		ng/l	2.5000E6		96.6	90-110			
Strontium	50100		ng/l	50000		100	90-110			

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SITE CODE: Maui fires

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes

Inorganics by Compendium Method IO-3.5 - Quality Control

Batch 2312039 - B3L1203

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Calibration Check (2312039-CCV3) Contin			Prepared & Analyzed: 12/13/23							
Thallium	483		ng/l	500.00		96.6	90-110			
Thorium	496		ng/l	500.00		99.1	90-110			
Uranium	493		ng/l	500.00		98.5	90-110			
Vanadium	20000		ng/l	20000		99.9	90-110			
Zinc	525000		ng/l	500000		105	90-110			
Calibration Check (2312039-CCV4)			Prepared & Analyzed: 12/13/23							
Aluminum	1.47E6		ng/l	1.5000E6		97.8	90-110			
Antimony	20500		ng/l	20000		102	90-110			
Arsenic	20000		ng/l	20000		100	90-110			
Barium	208000		ng/l	200000		104	90-110			
Beryllium	5280		ng/l	5000.0		106	90-110			
Cadmium	20500		ng/l	20000		102	90-110			
Calcium	2.47E7		ng/l	2.5000E7		99.0	90-110			
Chromium	239000		ng/l	240000		99.7	90-110			
Cobalt	49400		ng/l	50000		98.9	90-110			
Copper	2.01E6		ng/l	2.0000E6		101	90-110			
Iron	2.47E6		ng/l	2.5000E6		98.7	90-110			
Lead	202000		ng/l	200000		101	90-110			
Magnesium	979000		ng/l	1.0000E6		97.9	90-110			
Manganese	491000		ng/l	500000		98.1	90-110			
Molybdenum	50900		ng/l	50000		102	90-110			
Nickel	121000		ng/l	120000		100	90-110			
Phosphorus	193000		ng/l	200000		96.4	90-110			
Potassium	2.51E6		ng/l	2.5000E6		100	90-110			
Rubidium	10100		ng/l	10000		101	90-110			
Selenium	20200		ng/l	20000		101	90-110			
Sodium	2.42E6		ng/l	2.5000E6		97.0	90-110			
Strontium	50600		ng/l	50000		101	90-110			
Thallium	489		ng/l	500.00		97.8	90-110			
Thorium	505		ng/l	500.00		101	90-110			
Uranium	496		ng/l	500.00		99.1	90-110			
Vanadium	19900		ng/l	20000		99.6	90-110			
Zinc	530000		ng/l	500000		106	90-110			
High Cal Check (2312039-HCV1)			Prepared & Analyzed: 12/13/23							
Aluminum	2.91E6		ng/l	3.0000E6		97.0	95-105			
Antimony	39700		ng/l	40000		99.2	95-105			
Arsenic	39200		ng/l	40000		98.1	95-105			
Barium	399000		ng/l	400000		99.8	95-105			

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Inorganics by Compendium Method IO-3.5 - Quality Control

Batch 2312039 - B3L1203

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
High Cal Check (2312039-HCV1) Continue				Prepared & Analyzed: 12/13/23						
Beryllium	9560		ng/l	10000		95.6	95-105			
Cadmium	39300		ng/l	40000		98.2	95-105			
Calcium	4.96E7		ng/l	5.0000E7		99.1	95-105			
Chromium	471000		ng/l	480000		98.2	95-105			
Cobalt	97400		ng/l	100000		97.4	95-105			
Copper	3.88E6		ng/l	4.0000E6		97.0	95-105			
Iron	4.91E6		ng/l	5.0000E6		98.2	95-105			
Lead	399000		ng/l	400000		99.8	95-105			
Magnesium	1.94E6		ng/l	2.0000E6		96.9	95-105			
Manganese	981000		ng/l	1.0000E6		98.1	95-105			
Molybdenum	98300		ng/l	100000		98.3	95-105			
Nickel	233000		ng/l	240000		97.0	95-105			
Phosphorus	386000		ng/l	400000		96.4	95-105			
Potassium	4.85E6		ng/l	5.0000E6		97.0	95-105			
Rubidium	19900		ng/l	20000		99.5	95-105			
Selenium	39700		ng/l	40000		99.3	95-105			
Sodium	4.88E6		ng/l	5.0000E6		97.5	95-105			
Strontium	99900		ng/l	100000		99.9	95-105			
Thallium	1000		ng/l	1000.0		100	95-105			
Thorium	1000		ng/l	1000.0		100	95-105			
Uranium	1000		ng/l	1000.0		100	95-105			
Vanadium	39500		ng/l	40000		98.7	95-105			
Zinc	966000		ng/l	1.0000E6		96.6	95-105			
Initial Cal Blank (2312039-ICB1)				Prepared & Analyzed: 12/13/23						
Aluminum	-33.9		ng/l							U
Antimony	5.72		ng/l							
Arsenic	-4.22		ng/l							U
Barium	-5.71		ng/l							U
Beryllium	0.926		ng/l							
Cadmium	0.334		ng/l							
Calcium	967		ng/l							
Chromium	2.07		ng/l							
Cobalt	0.293		ng/l							
Copper	58.2		ng/l							
Iron	-70.6		ng/l							U
Lead	4.98		ng/l							
Magnesium	-8.64		ng/l							U
Manganese	7.96		ng/l							

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Inorganics by Compendium Method IO-3.5 - Quality Control

Batch 2312039 - B3L1203

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Initial Cal Blank (2312039-ICB1) Continu				Prepared & Analyzed: 12/13/23						
Molybdenum	14.5		ng/l							
Nickel	-2.26		ng/l							U
Phosphorus	-347		ng/l							U
Potassium	274		ng/l							
Rubidium	0.773		ng/l							
Selenium	20.9		ng/l							
Sodium	-230		ng/l							U
Strontium	0.119		ng/l							
Thallium	0.445		ng/l							
Thorium	0.576		ng/l							
Uranium	0.0124		ng/l							
Vanadium	71.4		ng/l							
Zinc	-25.0		ng/l							U
Initial Cal Check (2312039-ICV1)				Prepared & Analyzed: 12/13/23						
Aluminum	1.43E6		ng/l	1.5000E6		95.6	90-110			
Antimony	19400		ng/l	20000		97.2	90-110			
Arsenic	19500		ng/l	20000		97.4	90-110			
Barium	196000		ng/l	200000		97.8	90-110			
Beryllium	4970		ng/l	5000.0		99.3	90-110			
Cadmium	20300		ng/l	20000		101	90-110			
Calcium	2.41E7		ng/l	2.5000E7		96.4	90-110			
Chromium	231000		ng/l	240000		96.4	90-110			
Cobalt	48900		ng/l	50000		97.9	90-110			
Copper	1.98E6		ng/l	2.0000E6		98.8	90-110			
Iron	2.45E6		ng/l	2.5000E6		97.8	90-110			
Lead	195000		ng/l	200000		97.6	90-110			
Magnesium	963000		ng/l	1.0000E6		96.3	90-110			
Manganese	485000		ng/l	500000		97.1	90-110			
Molybdenum	48800		ng/l	50000		97.7	90-110			
Nickel	118000		ng/l	120000		98.1	90-110			
Phosphorus	191000		ng/l	200000		95.3	90-110			
Potassium	2.54E6		ng/l	2.5000E6		102	90-110			
Rubidium	9650		ng/l	10000		96.5	90-110			
Selenium	20500		ng/l	20000		102	90-110			
Sodium	2.40E6		ng/l	2.5000E6		96.0	90-110			
Strontium	49500		ng/l	50000		99.1	90-110			
Thallium	480		ng/l	500.00		96.0	90-110			
Thorium	487		ng/l	500.00		97.5	90-110			

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Inorganics by Compendium Method IO-3.5 - Quality Control

Batch 2312039 - B3L1203

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Initial Cal Check (2312039-ICV1) Continu				Prepared & Analyzed: 12/13/23						
Uranium	483		ng/l	500.00		96.7	90-110			
Vanadium	19700		ng/l	20000		98.4	90-110			
Zinc	522000		ng/l	500000		104	90-110			
Interference Check A (2312039-IFA1)				Prepared & Analyzed: 12/13/23						
Aluminum	1.45E7		ng/l	1.5000E7		96.5	80-120			
Antimony	0.00		ng/l				80-120			U
Arsenic	0.00		ng/l				80-120			U
Barium	0.00		ng/l				80-120			U
Beryllium	0.00		ng/l				80-120			U
Cadmium	0.00		ng/l				80-120			U
Calcium	9.27E7		ng/l	1.0040E8		92.4	80-120			
Chromium	0.00		ng/l				80-120			U
Cobalt	0.00		ng/l				80-120			U
Copper	0.00		ng/l				80-120			U
Iron	1.45E7		ng/l	1.5000E7		96.4	80-120			
Lead	0.00		ng/l				80-120			U
Magnesium	1.50E7		ng/l	1.5000E7		99.8	80-120			
Manganese	0.00		ng/l				80-120			U
Molybdenum	293000		ng/l	300000		97.7	80-120			
Nickel	0.00		ng/l				80-120			U
Phosphorus	1.54E7		ng/l	1.5000E7		102	80-120			
Potassium	1.49E7		ng/l	1.5000E7		99.2	80-120			
Rubidium	0.00		ng/l				80-120			U
Selenium	0.00		ng/l				80-120			U
Sodium	1.50E7		ng/l	1.5000E7		99.7	80-120			
Strontium	0.00		ng/l				80-120			U
Thallium	0.00		ng/l				80-120			U
Thorium	0.00		ng/l				80-120			U
Uranium	0.00		ng/l				80-120			U
Vanadium	0.00		ng/l				80-120			U
Zinc	0.00		ng/l				80-120			U
Interference Check B (2312039-IFB1)				Prepared & Analyzed: 12/13/23						
Aluminum	1.61E7		ng/l	1.6500E7		97.7	80-120			
Antimony	20000		ng/l	20000		100	80-120			
Arsenic	20200		ng/l	20000		101	80-120			
Barium	199000		ng/l	200000		99.4	80-120			
Beryllium	4790		ng/l	5000.0		95.9	80-120			
Cadmium	19300		ng/l	20000		96.7	80-120			

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Inorganics by Compendium Method IO-3.5 - Quality Control

Batch 2312039 - B3L1203

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Interference Check B (2312039-IFB1) Co				Prepared & Analyzed: 12/13/23						
Calcium	1.16E8		ng/l	1.2540E8		92.6	80-120			
Chromium	226000		ng/l	240000		94.3	80-120			
Cobalt	48500		ng/l	50000		97.1	80-120			
Copper	1.85E6		ng/l	2.0000E6		92.4	80-120			
Iron	1.69E7		ng/l	1.7500E7		96.4	80-120			
Lead	203000		ng/l	200000		102	80-120			
Magnesium	1.60E7		ng/l	1.6000E7		99.7	80-120			
Manganese	504000		ng/l	500000		101	80-120			
Molybdenum	339000		ng/l	350000		96.9	80-120			
Nickel	114000		ng/l	120000		95.4	80-120			
Phosphorus	1.57E7		ng/l	1.5200E7		103	80-120			
Potassium	1.77E7		ng/l	1.7500E7		101	80-120			
Rubidium	10100		ng/l	10000		101	80-120			
Selenium	19000		ng/l	20000		94.8	80-120			
Sodium	1.78E7		ng/l	1.7500E7		102	80-120			
Strontium	50200		ng/l	50000		100	80-120			
Thallium	506		ng/l	500.00		101	80-120			
Thorium	539		ng/l	500.00		108	80-120			
Uranium	534		ng/l	500.00		107	80-120			
Vanadium	19100		ng/l	20000		95.6	80-120			
Zinc	473000		ng/l	500000		94.7	80-120			
Serial Dilution (2312039-SRD1)		**Source: 3121111-02**		Prepared: 12/12/23		Analyzed: 12/13/23				
Aluminum	159	133	ng/m³ Air		159			0.182	10	
Antimony	ND	0.182	ng/m³ Air		ND				10	SL, U
Arsenic	0.167	0.0395	ng/m³ Air		0.176			4.76	10	
Barium	ND	3.92	ng/m³ Air		ND				10	U
Beryllium	ND	0.0137	ng/m³ Air		ND				10	U
Cadmium	ND	0.450	ng/m³ Air		ND				10	U
Calcium	ND	1210	ng/m³ Air		ND				10	LJ, QB-01, U
Chromium	ND	8.39	ng/m³ Air		ND				10	U
Cobalt	0.115	0.0645	ng/m³ Air		0.117			1.93	10	QB-01
Copper	18.5	12.4	ng/m³ Air		18.5			0.259	10	
Iron	184	100	ng/m³ Air		185			0.398	10	GC-BS
Lead	ND	1.14	ng/m³ Air		ND				10	U
Magnesium	ND	398	ng/m³ Air		ND				10	U
Manganese	5.10	4.92	ng/m³ Air		5.13			0.542	10	QB-01
Molybdenum	0.891	0.880	ng/m³ Air		0.890			0.109	10	QB-01
Nickel	ND	3.31	ng/m³ Air		ND				10	U

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AQS SITE CODE:
SITE CODE: Maui fires

Inorganics by Compendium Method IO-3.5 - Quality Control

Batch 2312039 - B3L1203

Serial Dilution (2312039-SRD1) Continued Source: 3121111-02 Prepared: 12/12/23 Analyzed: 12/13/23

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Phosphorus	ND	5170	ng/m³ Air		ND				10	GC-BS, U
Potassium	ND	157	ng/m³ Air		ND				10	U
Rubidium	0.110	0.0756	ng/m³ Air		0.112			1.84	10	
Selenium	0.0986	0.0455	ng/m³ Air		0.104			5.10	10	
Sodium	ND	8260	ng/m³ Air		ND				10	GC-BS, U
Strontium	ND	2.69	ng/m³ Air		ND				10	QB-01, U
Thallium	ND	0.00208	ng/m³ Air		ND				10	U
Thorium	ND	0.0124	ng/m³ Air		ND				10	U
Uranium	ND	0.0702	ng/m³ Air		ND				10	U
Vanadium	0.722	0.203	ng/m³ Air		0.660			9.05	10	QB-01
Zinc	ND	404	ng/m³ Air		ND				10	U

Batch 2312044 - B3L1203

Calibration Blank (2312044-CCB1) Prepared & Analyzed: 12/14/23

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Aluminum	125		ng/l							
Antimony	1.21		ng/l							
Arsenic	6.90		ng/l							
Barium	0.658		ng/l							
Beryllium	0.347		ng/l							
Cadmium	0.268		ng/l							
Calcium	294		ng/l							
Chromium	3.74		ng/l							
Cobalt	0.565		ng/l							
Copper	252		ng/l							
Iron	12.8		ng/l							
Lead	5.89		ng/l							
Magnesium	57.2		ng/l							
Manganese	9.93		ng/l							
Molybdenum	16.7		ng/l							
Nickel	30.3		ng/l							
Phosphorus	227		ng/l							
Potassium	1970		ng/l							
Rubidium	1.31		ng/l							
Selenium	6.84		ng/l							
Sodium	118		ng/l							
Strontium	-0.106		ng/l							U
Thallium	0.632		ng/l							
Thorium	0.212		ng/l							
Uranium	0.00146		ng/l							

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Inorganics by Compendium Method IO-3.5 - Quality Control

Batch 2312044 - B3L1203

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Calibration Blank (2312044-CCB1) Contin				Prepared & Analyzed: 12/14/23						
Vanadium	-88.1		ng/l							U
Zinc	-215		ng/l							U
Calibration Blank (2312044-CCB2)				Prepared & Analyzed: 12/14/23						
Aluminum	28.6		ng/l							
Antimony	0.958		ng/l							
Arsenic	3.58		ng/l							
Barium	0.565		ng/l							
Beryllium	0.395		ng/l							
Cadmium	0.145		ng/l							
Calcium	471		ng/l							
Chromium	5.52		ng/l							
Cobalt	0.567		ng/l							
Copper	98.6		ng/l							
Iron	161		ng/l							
Lead	3.82		ng/l							
Magnesium	5.49		ng/l							
Manganese	8.99		ng/l							
Molybdenum	8.90		ng/l							
Nickel	39.6		ng/l							
Phosphorus	598		ng/l							
Potassium	552		ng/l							
Rubidium	1.25		ng/l							
Selenium	1.74		ng/l							
Sodium	-175		ng/l							U
Strontium	-0.333		ng/l							U
Thallium	0.764		ng/l							
Thorium	0.530		ng/l							
Uranium	0.0223		ng/l							
Vanadium	-92.8		ng/l							U
Zinc	-229		ng/l							U
Calibration Blank (2312044-CCB3)				Prepared: 12/14/23 Analyzed: 12/15/23						
Aluminum	113		ng/l							
Antimony	1.22		ng/l							
Arsenic	3.82		ng/l							
Barium	2.58		ng/l							
Beryllium	0.113		ng/l							
Cadmium	0.0243		ng/l							
Calcium	159		ng/l							

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Inorganics by Compendium Method IO-3.5 - Quality Control

Batch 2312044 - B3L1203

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Calibration Blank (2312044-CCB3) Contin				Prepared: 12/14/23 Analyzed: 12/15/23						
Chromium	8.72		ng/l							
Cobalt	1.10		ng/l							
Copper	94.3		ng/l							
Iron	78.3		ng/l							
Lead	4.12		ng/l							
Magnesium	21.9		ng/l							
Manganese	14.8		ng/l							
Molybdenum	6.10		ng/l							
Nickel	42.1		ng/l							
Phosphorus	588		ng/l							
Potassium	964		ng/l							
Rubidium	1.07		ng/l							
Selenium	7.11		ng/l							
Sodium	110		ng/l							
Strontium	0.747		ng/l							
Thallium	0.433		ng/l							
Thorium	0.133		ng/l							
Uranium	-0.0128		ng/l							U
Vanadium	-94.8		ng/l							U
Zinc	-203		ng/l							U
Calibration Blank (2312044-CCB4)				Prepared: 12/14/23 Analyzed: 12/15/23						
Aluminum	91.9		ng/l							
Antimony	0.652		ng/l							
Arsenic	5.24		ng/l							
Barium	0.957		ng/l							
Beryllium	0.201		ng/l							
Cadmium	-0.0525		ng/l							U
Calcium	-200		ng/l							U
Chromium	7.02		ng/l							
Cobalt	0.754		ng/l							
Copper	73.9		ng/l							
Iron	61.0		ng/l							
Lead	3.30		ng/l							
Magnesium	19.8		ng/l							
Manganese	11.1		ng/l							
Molybdenum	6.84		ng/l							
Nickel	39.8		ng/l							
Phosphorus	-289		ng/l							U

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Inorganics by Compendium Method IO-3.5 - Quality Control

Batch 2312044 - B3L1203

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Calibration Blank (2312044-CCB4) Contin				Prepared: 12/14/23 Analyzed: 12/15/23						
Potassium	1150		ng/l							
Rubidium	0.262		ng/l							
Selenium	8.49		ng/l							
Sodium	106		ng/l							
Strontium	1.09		ng/l							
Thallium	0.382		ng/l							
Thorium	0.117		ng/l							
Uranium	0.00185		ng/l							
Vanadium	-95.5		ng/l							U
Zinc	-226		ng/l							U
Calibration Check (2312044-CCV1)				Prepared & Analyzed: 12/14/23						
Aluminum	1.54E6		ng/l	1.5000E6		103	90-110			
Antimony	20300		ng/l	20000		102	90-110			
Arsenic	20100		ng/l	20000		100	90-110			
Barium	202000		ng/l	200000		101	90-110			
Beryllium	4790		ng/l	5000.0		95.8	90-110			
Cadmium	20500		ng/l	20000		103	90-110			
Calcium	2.50E7		ng/l	2.5000E7		100	90-110			
Chromium	238000		ng/l	240000		99.2	90-110			
Cobalt	51300		ng/l	50000		103	90-110			
Copper	2.04E6		ng/l	2.0000E6		102	90-110			
Iron	2.56E6		ng/l	2.5000E6		102	90-110			
Lead	198000		ng/l	200000		99.0	90-110			
Magnesium	1.05E6		ng/l	1.0000E6		105	90-110			
Manganese	494000		ng/l	500000		98.8	90-110			
Molybdenum	51000		ng/l	50000		102	90-110			
Nickel	123000		ng/l	120000		102	90-110			
Phosphorus	207000		ng/l	200000		103	90-110			
Potassium	2.64E6		ng/l	2.5000E6		106	90-110			
Rubidium	10100		ng/l	10000		101	90-110			
Selenium	20000		ng/l	20000		100	90-110			
Sodium	2.60E6		ng/l	2.5000E6		104	90-110			
Strontium	49900		ng/l	50000		99.9	90-110			
Thallium	485		ng/l	500.00		97.0	90-110			
Thorium	503		ng/l	500.00		101	90-110			
Uranium	492		ng/l	500.00		98.4	90-110			
Vanadium	19600		ng/l	20000		97.9	90-110			
Zinc	531000		ng/l	500000		106	90-110			

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Inorganics by Compendium Method IO-3.5 - Quality Control

Batch 2312044 - B3L1203

Calibration Check (2312044-CCV2) Prepared & Analyzed: 12/14/23

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Aluminum	1.52E6		ng/l	1.5000E6		101	90-110			
Antimony	20400		ng/l	20000		102	90-110			
Arsenic	20300		ng/l	20000		101	90-110			
Barium	201000		ng/l	200000		101	90-110			
Beryllium	5520		ng/l	5000.0		110	90-110			
Cadmium	20800		ng/l	20000		104	90-110			
Calcium	2.51E7		ng/l	2.5000E7		100	90-110			
Chromium	240000		ng/l	240000		100	90-110			
Cobalt	51000		ng/l	50000		102	90-110			
Copper	2.05E6		ng/l	2.0000E6		103	90-110			
Iron	2.55E6		ng/l	2.5000E6		102	90-110			
Lead	201000		ng/l	200000		100	90-110			
Magnesium	1.04E6		ng/l	1.0000E6		104	90-110			
Manganese	496000		ng/l	500000		99.1	90-110			
Molybdenum	51600		ng/l	50000		103	90-110			
Nickel	123000		ng/l	120000		103	90-110			
Phosphorus	208000		ng/l	200000		104	90-110			
Potassium	2.63E6		ng/l	2.5000E6		105	90-110			
Rubidium	10100		ng/l	10000		101	90-110			
Selenium	20100		ng/l	20000		101	90-110			
Sodium	2.60E6		ng/l	2.5000E6		104	90-110			
Strontium	49700		ng/l	50000		99.3	90-110			
Thallium	491		ng/l	500.00		98.2	90-110			
Thorium	504		ng/l	500.00		101	90-110			
Uranium	496		ng/l	500.00		99.1	90-110			
Vanadium	19900		ng/l	20000		99.5	90-110			
Zinc	534000		ng/l	500000		107	90-110			

Calibration Check (2312044-CCV3) Prepared: 12/14/23 Analyzed: 12/15/23

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Aluminum	1.48E6		ng/l	1.5000E6		99.0	90-110			
Antimony	20200		ng/l	20000		101	90-110			
Arsenic	19900		ng/l	20000		99.6	90-110			
Barium	198000		ng/l	200000		99.2	90-110			
Beryllium	5330		ng/l	5000.0		107	90-110			
Cadmium	20500		ng/l	20000		103	90-110			
Calcium	2.47E7		ng/l	2.5000E7		98.8	90-110			
Chromium	241000		ng/l	240000		101	90-110			
Cobalt	50500		ng/l	50000		101	90-110			
Copper	2.06E6		ng/l	2.0000E6		103	90-110			

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Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes

Inorganics by Compendium Method IO-3.5 - Quality Control

Batch 2312044 - B3L1203

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Calibration Check (2312044-CCV3) Contin				Prepared: 12/14/23	Analyzed: 12/15/23					
Iron	2.52E6		ng/l	2.5000E6		101	90-110			
Lead	198000		ng/l	200000		99.2	90-110			
Magnesium	1.03E6		ng/l	1.0000E6		103	90-110			
Manganese	494000		ng/l	500000		98.8	90-110			
Molybdenum	51000		ng/l	50000		102	90-110			
Nickel	123000		ng/l	120000		103	90-110			
Phosphorus	205000		ng/l	200000		102	90-110			
Potassium	2.62E6		ng/l	2.5000E6		105	90-110			
Rubidium	10000		ng/l	10000		100	90-110			
Selenium	20000		ng/l	20000		99.8	90-110			
Sodium	2.61E6		ng/l	2.5000E6		105	90-110			
Strontium	48900		ng/l	50000		97.8	90-110			
Thallium	480		ng/l	500.00		95.9	90-110			
Thorium	491		ng/l	500.00		98.2	90-110			
Uranium	478		ng/l	500.00		95.7	90-110			
Vanadium	19800		ng/l	20000		99.1	90-110			
Zinc	528000		ng/l	500000		106	90-110			
Calibration Check (2312044-CCV4)				Prepared: 12/14/23	Analyzed: 12/15/23					
Aluminum	1.50E6		ng/l	1.5000E6		100	90-110			
Antimony	20400		ng/l	20000		102	90-110			
Arsenic	20200		ng/l	20000		101	90-110			
Barium	198000		ng/l	200000		98.9	90-110			
Beryllium	5320		ng/l	5000.0		106	90-110			
Cadmium	20500		ng/l	20000		102	90-110			
Calcium	2.49E7		ng/l	2.5000E7		99.5	90-110			
Chromium	242000		ng/l	240000		101	90-110			
Cobalt	50900		ng/l	50000		102	90-110			
Copper	2.08E6		ng/l	2.0000E6		104	90-110			
Iron	2.53E6		ng/l	2.5000E6		101	90-110			
Lead	199000		ng/l	200000		99.4	90-110			
Magnesium	1.04E6		ng/l	1.0000E6		104	90-110			
Manganese	498000		ng/l	500000		99.7	90-110			
Molybdenum	50900		ng/l	50000		102	90-110			
Nickel	124000		ng/l	120000		103	90-110			
Phosphorus	206000		ng/l	200000		103	90-110			
Potassium	2.64E6		ng/l	2.5000E6		106	90-110			
Rubidium	10100		ng/l	10000		101	90-110			
Selenium	19800		ng/l	20000		99.2	90-110			

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Inorganics by Compendium Method IO-3.5 - Quality Control

Batch 2312044 - B3L1203

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Calibration Check (2312044-CCV4) Contin				Prepared: 12/14/23 Analyzed: 12/15/23						
Sodium	2.61E6		ng/l	2.5000E6		104	90-110			
Strontium	49300		ng/l	50000		98.5	90-110			
Thallium	474		ng/l	500.00		94.9	90-110			
Thorium	493		ng/l	500.00		98.5	90-110			
Uranium	486		ng/l	500.00		97.2	90-110			
Vanadium	19900		ng/l	20000		99.5	90-110			
Zinc	533000		ng/l	500000		107	90-110			
High Cal Check (2312044-HCV1)				Prepared & Analyzed: 12/14/23						
Aluminum	2.93E6		ng/l	3.0000E6		97.5	95-105			
Antimony	39300		ng/l	40000		98.4	95-105			
Arsenic	39500		ng/l	40000		98.9	95-105			
Barium	398000		ng/l	400000		99.5	95-105			
Beryllium	10300		ng/l	10000		103	95-105			
Cadmium	39100		ng/l	40000		97.7	95-105			
Calcium	4.93E7		ng/l	5.0000E7		98.6	95-105			
Chromium	464000		ng/l	480000		96.6	95-105			
Cobalt	98500		ng/l	100000		98.5	95-105			
Copper	3.88E6		ng/l	4.0000E6		97.1	95-105			
Iron	4.95E6		ng/l	5.0000E6		98.9	95-105			
Lead	393000		ng/l	400000		98.3	95-105			
Magnesium	1.97E6		ng/l	2.0000E6		98.3	95-105			
Manganese	971000		ng/l	1.0000E6		97.1	95-105			
Molybdenum	99100		ng/l	100000		99.1	95-105			
Nickel	235000		ng/l	240000		97.8	95-105			
Phosphorus	401000		ng/l	400000		100	95-105			
Potassium	4.87E6		ng/l	5.0000E6		97.4	95-105			
Rubidium	19600		ng/l	20000		98.0	95-105			
Selenium	39100		ng/l	40000		97.7	95-105			
Sodium	4.95E6		ng/l	5.0000E6		99.1	95-105			
Strontium	96500		ng/l	100000		96.5	95-105			
Thallium	987		ng/l	1000.0		98.7	95-105			
Thorium	988		ng/l	1000.0		98.8	95-105			
Uranium	993		ng/l	1000.0		99.3	95-105			
Vanadium	39200		ng/l	40000		98.0	95-105			
Zinc	953000		ng/l	1.0000E6		95.3	95-105			
Initial Cal Blank (2312044-ICB1)				Prepared & Analyzed: 12/14/23						
Aluminum	49.1		ng/l							
Antimony	1.91		ng/l							

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CERTIFICATE OF ANALYSIS

Tetra Tech, Inc.
1777 Sentry Pkwy, Bldg 12
Blue Bell, PA 19422
ATTN: Ms. Chelsea Saber
PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 12/19/23 10:54
SUBMITTED: 12/11/23 to 12/13/23
AQS SITE CODE:
SITE CODE: Maui fires

Inorganics by Compendium Method IO-3.5 - Quality Control

Batch 2312044 - B3L1203

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Initial Cal Blank (2312044-ICB1) Continu				Prepared & Analyzed: 12/14/23						
Arsenic	1.34		ng/l							
Barium	5.75		ng/l							
Beryllium	0.590		ng/l							
Cadmium	0.717		ng/l							
Calcium	152		ng/l							
Chromium	6.75		ng/l							
Cobalt	1.19		ng/l							
Copper	197		ng/l							
Iron	5.45		ng/l							
Lead	8.67		ng/l							
Magnesium	41.8		ng/l							
Manganese	16.5		ng/l							
Molybdenum	13.6		ng/l							
Nickel	63.6		ng/l							
Phosphorus	233		ng/l							
Potassium	729		ng/l							
Rubidium	0.939		ng/l							
Selenium	4.77		ng/l							
Sodium	-153		ng/l							U
Strontium	-0.858		ng/l							U
Thallium	0.602		ng/l							
Thorium	0.506		ng/l							
Uranium	0.0195		ng/l							
Vanadium	-88.2		ng/l							U
Zinc	-216		ng/l							U
Initial Cal Check (2312044-ICV1)				Prepared & Analyzed: 12/14/23						
Aluminum	1.45E6		ng/l	1.5000E6		96.7	90-110			
Antimony	19500		ng/l	20000		97.6	90-110			
Arsenic	19600		ng/l	20000		97.8	90-110			
Barium	195000		ng/l	200000		97.7	90-110			
Beryllium	4610		ng/l	5000.0		92.2	90-110			
Cadmium	20300		ng/l	20000		101	90-110			
Calcium	2.40E7		ng/l	2.5000E7		96.0	90-110			
Chromium	231000		ng/l	240000		96.1	90-110			
Cobalt	49200		ng/l	50000		98.4	90-110			
Copper	1.97E6		ng/l	2.0000E6		98.5	90-110			
Iron	2.46E6		ng/l	2.5000E6		98.3	90-110			
Lead	194000		ng/l	200000		96.9	90-110			

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Inorganics by Compendium Method IO-3.5 - Quality Control

Batch 2312044 - B3L1203

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Initial Cal Check (2312044-ICV1) Continu				Prepared & Analyzed: 12/14/23						
Magnesium	980000		ng/l	1.0000E6		98.0	90-110			
Manganese	481000		ng/l	500000		96.1	90-110			
Molybdenum	49000		ng/l	50000		98.0	90-110			
Nickel	118000		ng/l	120000		98.3	90-110			
Phosphorus	196000		ng/l	200000		97.9	90-110			
Potassium	2.62E6		ng/l	2.5000E6		105	90-110			
Rubidium	9560		ng/l	10000		95.6	90-110			
Selenium	20200		ng/l	20000		101	90-110			
Sodium	2.46E6		ng/l	2.5000E6		98.5	90-110			
Strontium	48900		ng/l	50000		97.8	90-110			
Thallium	470		ng/l	500.00		93.9	90-110			
Thorium	487		ng/l	500.00		97.4	90-110			
Uranium	475		ng/l	500.00		95.1	90-110			
Vanadium	19700		ng/l	20000		98.7	90-110			
Zinc	523000		ng/l	500000		105	90-110			
Interference Check A (2312044-IFA1)				Prepared & Analyzed: 12/14/23						
Aluminum	1.49E7		ng/l	1.5000E7		99.4	80-120			
Antimony	0.00		ng/l				80-120			U
Arsenic	0.00		ng/l				80-120			U
Barium	0.00		ng/l				80-120			U
Beryllium	0.00		ng/l				80-120			U
Cadmium	0.00		ng/l				80-120			U
Calcium	9.35E7		ng/l	1.0040E8		93.1	80-120			
Chromium	0.00		ng/l				80-120			U
Cobalt	0.00		ng/l				80-120			U
Copper	0.00		ng/l				80-120			U
Iron	1.50E7		ng/l	1.5000E7		99.7	80-120			
Lead	0.00		ng/l				80-120			U
Magnesium	1.59E7		ng/l	1.5000E7		106	80-120			
Manganese	0.00		ng/l				80-120			U
Molybdenum	296000		ng/l	300000		98.7	80-120			
Nickel	0.00		ng/l				80-120			U
Phosphorus	1.64E7		ng/l	1.5000E7		109	80-120			
Potassium	1.55E7		ng/l	1.5000E7		103	80-120			
Rubidium	0.00		ng/l				80-120			U
Selenium	0.00		ng/l				80-120			U
Sodium	1.59E7		ng/l	1.5000E7		106	80-120			
Strontium	0.00		ng/l				80-120			U

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Inorganics by Compendium Method IO-3.5 - Quality Control

Batch 2312044 - B3L1203

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Interference Check A (2312044-IFA1) Co				Prepared & Analyzed: 12/14/23						
Thallium	0.00		ng/l				80-120			U
Thorium	0.00		ng/l				80-120			U
Uranium	0.00		ng/l				80-120			U
Vanadium	0.00		ng/l				80-120			U
Zinc	0.00		ng/l				80-120			U
Interference Check B (2312044-IFB1)				Prepared & Analyzed: 12/14/23						
Aluminum	1.65E7		ng/l	1.6500E7		99.8	80-120			
Antimony	19800		ng/l	20000		98.9	80-120			
Arsenic	20200		ng/l	20000		101	80-120			
Barium	198000		ng/l	200000		99.1	80-120			
Beryllium	5010		ng/l	5000.0		100	80-120			
Cadmium	19300		ng/l	20000		96.5	80-120			
Calcium	1.16E8		ng/l	1.2540E8		92.3	80-120			
Chromium	228000		ng/l	240000		95.1	80-120			
Cobalt	50000		ng/l	50000		100	80-120			
Copper	1.90E6		ng/l	2.0000E6		95.2	80-120			
Iron	1.72E7		ng/l	1.7500E7		98.4	80-120			
Lead	203000		ng/l	200000		101	80-120			
Magnesium	1.69E7		ng/l	1.6000E7		106	80-120			
Manganese	512000		ng/l	500000		102	80-120			
Molybdenum	339000		ng/l	350000		96.7	80-120			
Nickel	117000		ng/l	120000		97.2	80-120			
Phosphorus	1.67E7		ng/l	1.5200E7		110	80-120			
Potassium	1.82E7		ng/l	1.7500E7		104	80-120			
Rubidium	10100		ng/l	10000		101	80-120			
Selenium	18700		ng/l	20000		93.3	80-120			
Sodium	1.89E7		ng/l	1.7500E7		108	80-120			
Strontium	49400		ng/l	50000		98.8	80-120			
Thallium	500		ng/l	500.00		100	80-120			
Thorium	534		ng/l	500.00		107	80-120			
Uranium	527		ng/l	500.00		105	80-120			
Vanadium	18300		ng/l	20000		91.4	80-120			
Zinc	484000		ng/l	500000		96.8	80-120			
Serial Dilution (2312044-SRD1)	**Source: 3121332-06**			Prepared & Analyzed: 12/14/23						
Aluminum	380	151	ng/m³ Air		383			0.776	10	
Antimony	ND	0.207	ng/m³ Air		ND				10	SL, U
Arsenic	0.107	0.0448	ng/m³ Air		0.101			5.31	10	
Barium	7.41	4.45	ng/m³ Air		7.62			2.74	10	

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Inorganics by Compendium Method IO-3.5 - Quality Control

Batch 2312044 - B3L1203

Serial Dilution (2312044-SRD1) Continued Source: 3121332-06 — Prepared & Analyzed: 12/14/23

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Beryllium	0.0187	0.0156	ng/m³ Air		0.0182			2.23	10	
Cadmium	ND	0.511	ng/m³ Air		ND				10	U
Calcium	ND	1370	ng/m³ Air		ND				10	LJ, QB-01, U
Chromium	ND	9.52	ng/m³ Air		ND				10	U
Cobalt	0.234	0.0732	ng/m³ Air		0.237			1.26	10	QB-01
Copper	34.6	14.1	ng/m³ Air		34.8			0.687	10	
Iron	471	113	ng/m³ Air		478			1.46	10	
Lead	ND	1.29	ng/m³ Air		ND				10	U
Magnesium	ND	452	ng/m³ Air		ND				10	U
Manganese	15.0	5.58	ng/m³ Air		15.1			0.897	10	
Molybdenum	1.04	0.999	ng/m³ Air		1.05			0.734	10	B, QB-01
Nickel	ND	3.76	ng/m³ Air		ND				10	U
Phosphorus	ND	5860	ng/m³ Air		ND				10	U
Potassium	ND	178	ng/m³ Air		ND				10	B, U
Rubidium	0.175	0.0858	ng/m³ Air		0.185			5.24	10	
Selenium	0.155	0.0516	ng/m³ Air		0.162			4.42	10	
Sodium	ND	9380	ng/m³ Air		ND				10	U
Strontium	4.62	3.06	ng/m³ Air		4.71			1.97	10	QB-01
Thallium	ND	0.00236	ng/m³ Air		ND				10	U
Thorium	ND	0.0141	ng/m³ Air		0.0143				10	U
Uranium	ND	0.0797	ng/m³ Air		ND				10	U
Vanadium	1.30	0.231	ng/m³ Air		1.36			4.18	10	
Zinc	ND	458	ng/m³ Air		ND				10	U

Batch B3L1203 - ICP-MS Extraction

Blank (B3L1203-BLK1) — Prepared: 12/12/23 Analyzed: 12/13/23

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Aluminum	ND	32.1	ng/m³ Air							U
Antimony	ND	0.0441	ng/m³ Air							SL, U
Arsenic	ND	0.00955	ng/m³ Air							U
Barium	ND	0.948	ng/m³ Air							U
Beryllium	ND	0.00332	ng/m³ Air							U
Cadmium	ND	0.109	ng/m³ Air							U
Calcium	ND	292	ng/m³ Air							LJ, QB-01, U
Chromium	ND	2.03	ng/m³ Air							U
Cobalt	ND	0.0156	ng/m³ Air							QB-01, U
Copper	ND	3.00	ng/m³ Air							U
Iron	ND	24.2	ng/m³ Air							GC-BS, U
Lead	ND	0.276	ng/m³ Air							U
Magnesium	ND	96.4	ng/m³ Air							U

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Inorganics by Compendium Method IO-3.5 - Quality Control

Batch B3L1203 - ICP-MS Extraction

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (B3L1203-BLK1) Continued				Prepared: 12/12/23 Analyzed: 12/13/23						
Manganese	ND	1.19	ng/m³ Air							QB-01, U
Molybdenum	ND	0.213	ng/m³ Air							QB-01, U
Nickel	ND	0.801	ng/m³ Air							U
Phosphorus	ND	1250	ng/m³ Air							GC-BS, U
Potassium	ND	38.0	ng/m³ Air							U
Rubidium	ND	0.0183	ng/m³ Air							U
Selenium	ND	0.0110	ng/m³ Air							U
Sodium	ND	2000	ng/m³ Air							GC-BS, U
Strontium	ND	0.652	ng/m³ Air							QB-01, U
Thallium	ND	5.03E-4	ng/m³ Air							U
Thorium	ND	0.00300	ng/m³ Air							U
Uranium	ND	0.0170	ng/m³ Air							U
Vanadium	ND	0.0492	ng/m³ Air							QB-01, U
Zinc	ND	97.7	ng/m³ Air							U
LCS (B3L1203-BS1)				Prepared: 12/12/23 Analyzed: 12/13/23						
Aluminum	92.8	32.1	ng/m³ Air	82.975		112	80-120			
Antimony	0.550	0.0441	ng/m³ Air	1.3829		39.8	80-120			SL
Arsenic	2.72	0.00955	ng/m³ Air	2.7658		98.3	80-120			
Barium	28.2	0.948	ng/m³ Air	27.658		102	80-120			
Beryllium	1.37	0.00332	ng/m³ Air	1.3829		98.8	80-120			
Cadmium	1.39	0.109	ng/m³ Air	1.3829		101	80-120			
Calcium	547	292	ng/m³ Air	69.146		791	80-120			LJ, QB-01
Chromium	15.7	2.03	ng/m³ Air	13.829		113	80-120			
Cobalt	1.35	0.0156	ng/m³ Air	1.3829		97.6	80-120			QB-01
Copper	31.0	3.00	ng/m³ Air	27.658		112	80-120			
Iron	42.9	24.2	ng/m³ Air	27.658		155	80-120			GC-BS
Lead	13.5	0.276	ng/m³ Air	13.829		98.0	80-120			
Magnesium	ND	96.4	ng/m³ Air	27.658			80-120			U
Manganese	9.10	1.19	ng/m³ Air	8.2975		110	80-120			QB-01
Molybdenum	1.59	0.213	ng/m³ Air	1.3829		115	80-120			B, QB-01
Nickel	3.09	0.801	ng/m³ Air	2.7658		112	80-120			
Phosphorus	ND	1250	ng/m³ Air	13.829			80-120			GC-BS, U
Potassium	73.3	38.0	ng/m³ Air	55.317		132	80-120			B
Rubidium	1.35	0.0183	ng/m³ Air	1.3829		97.9	80-120			
Selenium	2.74	0.0110	ng/m³ Air	2.7658		99.1	80-120			
Sodium	ND	2000	ng/m³ Air	55.317			80-120			GC-BS, U
Strontium	2.24	0.652	ng/m³ Air	1.3829		162	80-120			QB-01
Thallium	0.132	5.03E-4	ng/m³ Air	0.13829		95.6	80-120			

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Inorganics by Compendium Method IO-3.5 - Quality Control

Batch B3L1203 - ICP-MS Extraction

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
LCS (B3L1203-BS1) Continued				Prepared: 12/12/23	Analyzed: 12/13/23					
Thorium	0.133	0.00300	ng/m³ Air	0.13829		96.0	80-120			
Uranium	0.130	0.0170	ng/m³ Air	0.13829		93.9	80-120			
Vanadium	2.75	0.0492	ng/m³ Air	2.7658		99.4	80-120			QB-01
Zinc	113	97.7	ng/m³ Air	82.975		137	80-120			
Duplicate (B3L1203-DUP1)		**Source: 3121111-02**		Prepared: 12/12/23	Analyzed: 12/13/23					
Aluminum	159	26.5	ng/m³ Air		159			0.260	10	
Antimony	0.0878	0.0364	ng/m³ Air		0.0779			12.0	10	SL
Arsenic	0.195	0.00789	ng/m³ Air		0.176			10.5	10	
Barium	3.11	0.783	ng/m³ Air		3.44			10.0	10	
Beryllium	0.00599	0.00274	ng/m³ Air		0.00625			4.26	10	
Cadmium	ND	0.0901	ng/m³ Air		ND				10	U
Calcium	477	241	ng/m³ Air		467			2.19	10	LJ, QB-01
Chromium	1.71	1.68	ng/m³ Air		ND				10	
Cobalt	0.116	0.0129	ng/m³ Air		0.117			1.07	10	QB-01
Copper	19.4	2.48	ng/m³ Air		18.5			4.71	10	
Iron	179	20.0	ng/m³ Air		185			3.25	10	GC-BS
Lead	ND	0.228	ng/m³ Air		ND				10	U
Magnesium	140	79.7	ng/m³ Air		136			2.74	10	
Manganese	5.33	0.983	ng/m³ Air		5.13			3.92	10	QB-01
Molybdenum	0.892	0.176	ng/m³ Air		0.890			0.233	10	QB-01
Nickel	ND	0.662	ng/m³ Air		ND				10	U
Phosphorus	ND	1030	ng/m³ Air		ND				10	GC-BS, U
Potassium	87.0	31.4	ng/m³ Air		85.5			1.70	10	
Rubidium	0.110	0.0151	ng/m³ Air		0.112			2.37	10	
Selenium	0.0963	0.00909	ng/m³ Air		0.104			7.50	10	
Sodium	ND	1650	ng/m³ Air		ND				10	GC-BS, U
Strontium	2.21	0.539	ng/m³ Air		2.18			1.28	10	QB-01
Thallium	5.94E-4	4.16E-4	ng/m³ Air		6.19E-4			4.10	10	
Thorium	0.00600	0.00248	ng/m³ Air		0.00662			9.77	10	
Uranium	ND	0.0140	ng/m³ Air		ND				10	U
Vanadium	0.670	0.0407	ng/m³ Air		0.660			1.52	10	QB-01
Zinc	ND	80.7	ng/m³ Air		ND				10	U
Matrix Spike (B3L1203-MS1)		**Source: 3121111-02**		Prepared: 12/12/23	Analyzed: 12/13/23					
Aluminum	225	26.5	ng/m³ Air	68.575	159	95.6	80-120			
Antimony	0.569	0.0364	ng/m³ Air	1.1429	0.0779	42.9	80-120			SL
Arsenic	2.39	0.00789	ng/m³ Air	2.2858	0.176	97.0	80-120			
Barium	26.2	0.783	ng/m³ Air	22.858	3.44	99.8	80-120			
Beryllium	1.12	0.00274	ng/m³ Air	1.1429	0.00625	97.9	80-120			

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Inorganics by Compendium Method IO-3.5 - Quality Control

Batch B3L1203 - ICP-MS Extraction

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Matrix Spike (B3L1203-MS1) Continued	**Source: 3121111-02**		Prepared: 12/12/23	Analyzed: 12/13/23						
Cadmium	1.16	0.0901	ng/m³ Air	1.1429	ND	101	80-120			
Calcium	533	241	ng/m³ Air	57.146	467	115	80-120			LJ, QB-01
Chromium	13.2	1.68	ng/m³ Air	11.429	ND	116	80-120			
Cobalt	1.20	0.0129	ng/m³ Air	1.1429	0.117	94.7	80-120			QB-01
Copper	45.1	2.48	ng/m³ Air	22.858	18.5	116	80-120			
Iron	201	20.0	ng/m³ Air	22.858	185	70.5	80-120			GC-BS, QM-4X
Lead	11.4	0.228	ng/m³ Air	11.429	ND	99.4	80-120			
Magnesium	160	79.7	ng/m³ Air	22.858	136	108	80-120			
Manganese	12.2	0.983	ng/m³ Air	6.8575	5.13	104	80-120			QB-01
Molybdenum	1.98	0.176	ng/m³ Air	1.1429	0.890	95.1	80-120			B, QB-01
Nickel	2.73	0.662	ng/m³ Air	2.2858	ND	119	80-120			
Phosphorus	ND	1030	ng/m³ Air	11.429	ND		80-120			GC-BS, U
Potassium	130	31.4	ng/m³ Air	45.716	85.5	96.7	80-120			B
Rubidium	1.20	0.0151	ng/m³ Air	1.1429	0.112	94.9	80-120			
Selenium	2.38	0.00909	ng/m³ Air	2.2858	0.104	99.5	80-120			
Sodium	ND	1650	ng/m³ Air	45.716	ND		80-120			GC-BS, U
Strontium	3.30	0.539	ng/m³ Air	1.1429	2.18	98.1	80-120			QB-01
Thallium	0.109	4.16E-4	ng/m³ Air	0.11429	6.19E-4	94.9	80-120			
Thorium	0.0575	0.00248	ng/m³ Air	0.11429	0.00662	44.5	80-120			QM-07
Uranium	0.112	0.0140	ng/m³ Air	0.11429	ND	97.7	80-120			
Vanadium	2.90	0.0407	ng/m³ Air	2.2858	0.660	98.2	80-120			QB-01
Zinc	88.0	80.7	ng/m³ Air	68.575	ND	128	80-120			
Matrix Spike Dup (B3L1203-MSD1)	**Source: 3121111-02**		Prepared: 12/12/23	Analyzed: 12/13/23						
Aluminum	226	26.5	ng/m³ Air	68.575	159	97.0	80-120	0.432	20	
Antimony	0.568	0.0364	ng/m³ Air	1.1429	0.0779	42.9	80-120	0.0979	20	SL
Arsenic	2.43	0.00789	ng/m³ Air	2.2858	0.176	98.4	80-120	1.37	20	
Barium	26.1	0.783	ng/m³ Air	22.858	3.44	99.3	80-120	0.414	20	
Beryllium	1.13	0.00274	ng/m³ Air	1.1429	0.00625	98.4	80-120	0.509	20	
Cadmium	1.16	0.0901	ng/m³ Air	1.1429	ND	102	80-120	0.445	20	
Calcium	523	241	ng/m³ Air	57.146	467	99.1	80-120	1.77	20	LJ, QB-01
Chromium	14.5	1.68	ng/m³ Air	11.429	ND	127	80-120	9.47	20	
Cobalt	1.22	0.0129	ng/m³ Air	1.1429	0.117	96.8	80-120	2.00	20	QB-01
Copper	45.5	2.48	ng/m³ Air	22.858	18.5	118	80-120	0.813	20	
Iron	209	20.0	ng/m³ Air	22.858	185	106	80-120	4.00	20	GC-BS
Lead	11.5	0.228	ng/m³ Air	11.429	ND	101	80-120	1.33	20	
Magnesium	160	79.7	ng/m³ Air	22.858	136	105	80-120	0.409	20	
Manganese	12.3	0.983	ng/m³ Air	6.8575	5.13	105	80-120	0.443	20	QB-01
Molybdenum	2.17	0.176	ng/m³ Air	1.1429	0.890	112	80-120	9.29	20	QB-01

Tetra Tech, Inc.
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REPORTED: 12/19/23 10:54
SUBMITTED: 12/11/23 to 12/13/23
AQS SITE CODE:
SITE CODE: Maui fires

Inorganics by Compendium Method IO-3.5 - Quality Control

Batch B3L1203 - ICP-MS Extraction

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Matrix Spike Dup (B3L1203-MSD1) ContirSource: 3121111-02				Prepared: 12/12/23	Analyzed: 12/13/23					
Nickel	3.60	0.662	ng/m³ Air	2.2858	ND	158	80-120	27.7	20	LJ, QM-06, Q
Phosphorus	ND	1030	ng/m³ Air	11.429	ND		80-120		20	GC-BS, QM-4X, U
Potassium	131	31.4	ng/m³ Air	45.716	85.5	99.7	80-120	1.03	20	
Rubidium	1.23	0.0151	ng/m³ Air	1.1429	0.112	98.0	80-120	2.90	20	
Selenium	2.39	0.00909	ng/m³ Air	2.2858	0.104	100	80-120	0.674	20	
Sodium	ND	1650	ng/m³ Air	45.716	ND		80-120		20	GC-BS, QM-4X, U
Strontium	3.38	0.539	ng/m³ Air	1.1429	2.18	105	80-120	2.33	20	QB-01
Thallium	0.110	4.16E-4	ng/m³ Air	0.11429	6.19E-4	95.5	80-120	0.633	20	
Thorium	0.0641	0.00248	ng/m³ Air	0.11429	0.00662	50.3	80-120	10.9	20	QM-07
Uranium	0.114	0.0140	ng/m³ Air	0.11429	ND	99.5	80-120	1.76	20	
Vanadium	2.92	0.0407	ng/m³ Air	2.2858	0.660	98.7	80-120	0.363	20	QB-01
Zinc	87.4	80.7	ng/m³ Air	68.575	ND	127	80-120	0.668	20	
Post Spike (B3L1203-PS1)		**Source: 3121111-02**		Prepared: 12/12/23	Analyzed: 12/13/23					
Aluminum	179	26.5	ng/m³ Air	22.858	159	89.0	75-125			
Antimony	0.304	0.0364	ng/m³ Air	0.22858	0.0779	98.8	75-125			SL
Arsenic	1.27	0.00789	ng/m³ Air	1.1429	0.176	96.2	75-125			
Barium	5.73	0.783	ng/m³ Air	2.2858	3.44	101	75-125			
Beryllium	0.220	0.00274	ng/m³ Air	0.22858	0.00625	93.4	75-125			
Cadmium	0.126	0.0901	ng/m³ Air	0.11429	ND	110	75-125			
Calcium	497	241	ng/m³ Air	22.858	467	132	75-125			A-01a, LJ, QB-01
Chromium	2.77	1.68	ng/m³ Air	1.1429	ND	243	75-125			
Cobalt	0.337	0.0129	ng/m³ Air	0.22858	0.117	96.2	75-125			QB-01
Copper	30.5	2.48	ng/m³ Air	11.429	18.5	105	75-125			
Iron	208	20.0	ng/m³ Air	22.858	185	98.2	75-125			GC-BS
Lead	22.5	0.228	ng/m³ Air	22.858	ND	98.4	75-125			
Magnesium	158	79.7	ng/m³ Air	22.858	136	97.1	75-125			
Manganese	7.38	0.983	ng/m³ Air	2.2858	5.13	98.7	75-125			QB-01
Molybdenum	1.98	0.176	ng/m³ Air	1.1429	0.890	95.1	75-125			QB-01
Nickel	2.73	0.662	ng/m³ Air	2.2858	ND	119	75-125			
Phosphorus	ND	1030	ng/m³ Air	4.5716	ND		75-125			A-01a, GC-BS U
Potassium	107	31.4	ng/m³ Air	22.858	85.5	96.0	75-125			
Rubidium	0.217	0.0151	ng/m³ Air	0.11429	0.112	91.4	75-125			
Selenium	1.24	0.00909	ng/m³ Air	1.1429	0.104	99.1	75-125			
Sodium	ND	1650	ng/m³ Air	22.858	ND		75-125			A-01a, GC-BS U

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Inorganics by Compendium Method IO-3.5 - Quality Control

Batch B3L1203 - ICP-MS Extraction

Post Spike (B3L1203-PS1) Continued **Source: 3121111-02** Prepared: 12/12/23 Analyzed: 12/13/23

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Strontium	3.31	0.539	ng/m³ Air	1.1429	2.18	98.7	75-125			QB-01
Thallium	0.0542	4.16E-4	ng/m³ Air	5.7146E-2	6.19E-4	93.8	75-125			
Thorium	0.0584	0.00248	ng/m³ Air	5.7146E-2	0.00662	90.6	75-125			
Uranium	0.0582	0.0140	ng/m³ Air	5.7146E-2	ND	102	75-125			
Vanadium	1.78	0.0407	ng/m³ Air	1.1429	0.660	97.6	75-125			QB-01
Zinc	ND	80.7	ng/m³ Air	22.858	ND		75-125			U

Batch B3L1403 - ICP-MS Extraction

Blank (B3L1403-BLK1) Prepared & Analyzed: 12/14/23

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Aluminum	ND	32.1	ng/m³ Air							U
Antimony	ND	0.0441	ng/m³ Air							SL, U
Arsenic	ND	0.00955	ng/m³ Air							U
Barium	ND	0.948	ng/m³ Air							U
Beryllium	ND	0.00332	ng/m³ Air							U
Cadmium	ND	0.109	ng/m³ Air							U
Calcium	ND	292	ng/m³ Air							LJ, QB-01, U
Chromium	ND	2.03	ng/m³ Air							U
Cobalt	ND	0.0156	ng/m³ Air							QB-01, U
Copper	ND	3.00	ng/m³ Air							U
Iron	ND	24.2	ng/m³ Air							U
Lead	ND	0.276	ng/m³ Air							U
Magnesium	ND	96.4	ng/m³ Air							U
Manganese	ND	1.19	ng/m³ Air							U
Molybdenum	ND	0.213	ng/m³ Air							B, QB-01, U
Nickel	ND	0.801	ng/m³ Air							U
Phosphorus	ND	1250	ng/m³ Air							U
Potassium	ND	38.0	ng/m³ Air							B, U
Rubidium	ND	0.0183	ng/m³ Air							U
Selenium	ND	0.0110	ng/m³ Air							U
Sodium	ND	2000	ng/m³ Air							U
Strontium	ND	0.652	ng/m³ Air							QB-01, U
Thallium	ND	5.03E-4	ng/m³ Air							U
Thorium	ND	0.00300	ng/m³ Air							U
Uranium	ND	0.0170	ng/m³ Air							U
Vanadium	ND	0.0492	ng/m³ Air							U
Zinc	ND	97.7	ng/m³ Air							U

LCS (B3L1403-BS1) Prepared & Analyzed: 12/14/23

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Aluminum	94.6	32.1	ng/m³ Air	82.975		114	80-120			
Antimony	0.539	0.0441	ng/m³ Air	1.3829		39.0	80-120			SL

Tetra Tech, Inc.
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REPORTED: 12/19/23 10:54
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SITE CODE: Maui fires

Inorganics by Compendium Method IO-3.5 - Quality Control

Batch B3L1403 - ICP-MS Extraction

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
LCS (B3L1403-BS1) Continued					Prepared & Analyzed: 12/14/23					
Arsenic	2.74	0.00955	ng/m³ Air	2.7658		99.0	80-120			
Barium	28.0	0.948	ng/m³ Air	27.658		101	80-120			
Beryllium	1.35	0.00332	ng/m³ Air	1.3829		97.7	80-120			
Cadmium	1.41	0.109	ng/m³ Air	1.3829		102	80-120			
Calcium	564	292	ng/m³ Air	69.146		815	80-120			LJ, QB-01
Chromium	16.3	2.03	ng/m³ Air	13.829		118	80-120			
Cobalt	1.40	0.0156	ng/m³ Air	1.3829		101	80-120			QB-01
Copper	32.3	3.00	ng/m³ Air	27.658		117	80-120			
Iron	41.9	24.2	ng/m³ Air	27.658		152	80-120			
Lead	13.6	0.276	ng/m³ Air	13.829		98.2	80-120			
Magnesium	ND	96.4	ng/m³ Air	27.658			80-120			U
Manganese	8.80	1.19	ng/m³ Air	8.2975		106	80-120			
Molybdenum	1.66	0.213	ng/m³ Air	1.3829		120	80-120			B, QB-01
Nickel	3.19	0.801	ng/m³ Air	2.7658		115	80-120			
Phosphorus	ND	1250	ng/m³ Air	13.829			80-120			U
Potassium	72.6	38.0	ng/m³ Air	55.317		131	80-120			B
Rubidium	1.32	0.0183	ng/m³ Air	1.3829		95.5	80-120			
Selenium	2.72	0.0110	ng/m³ Air	2.7658		98.3	80-120			
Sodium	ND	2000	ng/m³ Air	55.317			80-120			U
Strontium	2.19	0.652	ng/m³ Air	1.3829		158	80-120			QB-01
Thallium	0.132	5.03E-4	ng/m³ Air	0.13829		95.3	80-120			
Thorium	0.132	0.00300	ng/m³ Air	0.13829		95.3	80-120			
Uranium	0.130	0.0170	ng/m³ Air	0.13829		94.2	80-120			
Vanadium	2.75	0.0492	ng/m³ Air	2.7658		99.3	80-120			
Zinc	125	97.7	ng/m³ Air	82.975		151	80-120			
Duplicate (B3L1403-DUP1)		**Source: 3121332-06**			Prepared & Analyzed: 12/14/23					
Aluminum	378	30.1	ng/m³ Air		383			1.17	10	
Antimony	0.0764	0.0414	ng/m³ Air		0.0839			9.31	10	SL
Arsenic	0.101	0.00896	ng/m³ Air		0.101			0.656	10	
Barium	7.37	0.889	ng/m³ Air		7.62			3.28	10	
Beryllium	0.0206	0.00311	ng/m³ Air		0.0182			12.3	10	
Cadmium	ND	0.102	ng/m³ Air		ND				10	U
Calcium	628	274	ng/m³ Air		623			0.807	10	LJ, QB-01
Chromium	2.18	1.90	ng/m³ Air		2.10			3.88	10	
Cobalt	0.238	0.0146	ng/m³ Air		0.237			0.384	10	QB-01
Copper	34.4	2.81	ng/m³ Air		34.8			1.14	10	
Iron	475	22.7	ng/m³ Air		478			0.780	10	
Lead	0.363	0.259	ng/m³ Air		0.343			5.71	10	

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CERTIFICATE OF ANALYSIS

Tetra Tech, Inc.
1777 Sentry Pkwy, Bldg 12
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FILE #: 0000.00
REPORTED: 12/19/23 10:54
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AQS SITE CODE:
SITE CODE: Maui fires

Inorganics by Compendium Method IO-3.5 - Quality Control

Batch B3L1403 - ICP-MS Extraction

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Duplicate (B3L1403-DUP1) Continued		**Source: 3121332-06**		Prepared & Analyzed: 12/14/23						
Magnesium	250	90.4	ng/m³ Air		254			1.26	10	
Manganese	15.1	1.12	ng/m³ Air		15.1			0.186	10	
Molybdenum	1.04	0.200	ng/m³ Air		1.05			0.480	10	B, QB-01
Nickel	ND	0.751	ng/m³ Air		ND				10	U
Phosphorus	ND	1170	ng/m³ Air		ND				10	U
Potassium	108	35.6	ng/m³ Air		105			2.78	10	B
Rubidium	0.183	0.0172	ng/m³ Air		0.185			1.18	10	
Selenium	0.168	0.0103	ng/m³ Air		0.162			3.77	10	
Sodium	2170	1880	ng/m³ Air		2200			1.32	10	E
Strontium	4.65	0.612	ng/m³ Air		4.71			1.32	10	QB-01
Thallium	0.00135	4.72E-4	ng/m³ Air		0.00143			5.78	10	
Thorium	0.0137	0.00281	ng/m³ Air		0.0143			4.60	10	
Uranium	ND	0.0159	ng/m³ Air		ND				10	U
Vanadium	1.32	0.0461	ng/m³ Air		1.36			2.65	10	
Zinc	ND	91.6	ng/m³ Air		ND				10	U
Duplicate (B3L1403-DUP2)		**Source: 3121332-12**		Prepared: 12/14/23 Analyzed: 12/15/23						
Aluminum	531	25.4	ng/m³ Air		528			0.675	10	
Antimony	0.0541	0.0349	ng/m³ Air		0.0546			0.953	10	SL
Arsenic	0.141	0.00755	ng/m³ Air		0.143			1.23	10	
Barium	5.12	0.750	ng/m³ Air		5.17			0.912	10	
Beryllium	0.0179	0.00263	ng/m³ Air		0.0186			3.68	10	
Cadmium	ND	0.0862	ng/m³ Air		ND				10	U
Calcium	419	231	ng/m³ Air		424			1.14	10	LJ, QB-01
Chromium	1.98	1.61	ng/m³ Air		1.97			0.508	10	
Cobalt	0.295	0.0123	ng/m³ Air		0.293			0.697	10	QB-01
Copper	22.8	2.37	ng/m³ Air		22.7			0.602	10	
Iron	590	19.1	ng/m³ Air		586			0.594	10	
Lead	0.691	0.218	ng/m³ Air		0.697			1.00	10	
Magnesium	135	76.3	ng/m³ Air		134			0.571	10	
Manganese	16.5	0.941	ng/m³ Air		16.6			0.215	10	
Molybdenum	0.723	0.168	ng/m³ Air		0.723			0.0941	10	B, QB-01
Nickel	ND	0.634	ng/m³ Air		ND				10	U
Phosphorus	ND	989	ng/m³ Air		ND				10	U
Potassium	65.2	30.1	ng/m³ Air		65.5			0.549	10	B
Rubidium	0.171	0.0145	ng/m³ Air		0.173			1.00	10	
Selenium	0.131	0.00870	ng/m³ Air		0.137			4.96	10	
Sodium	ND	1580	ng/m³ Air		ND				10	U
Strontium	3.34	0.516	ng/m³ Air		3.37			1.01	10	QB-01

Inorganics by Compendium Method IO-3.5 - Quality Control

Batch B3L1403 - ICP-MS Extraction

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Duplicate (B3L1403-DUP2) Continued		**Source: 3121332-12**		Prepared: 12/14/23 Analyzed: 12/15/23						
Thallium	0.00110	3.98E-4	ng/m³ Air		0.00110			0.0815	10	
Thorium	0.0158	0.00237	ng/m³ Air		0.0158			0.0139	10	
Uranium	ND	0.0134	ng/m³ Air		ND				10	U
Vanadium	1.48	0.0389	ng/m³ Air		1.48			0.242	10	
Zinc	ND	77.3	ng/m³ Air		ND				10	U
Matrix Spike (B3L1403-MS1)		**Source: 3121332-06**		Prepared & Analyzed: 12/14/23						
Aluminum	463	30.1	ng/m³ Air	77.823	383	103	80-120			
Antimony	0.652	0.0414	ng/m³ Air	1.2970	0.0839	43.8	80-120			SL
Arsenic	2.64	0.00896	ng/m³ Air	2.5941	0.101	97.7	80-120			
Barium	33.3	0.889	ng/m³ Air	25.941	7.62	98.8	80-120			
Beryllium	1.27	0.00311	ng/m³ Air	1.2970	0.0182	96.1	80-120			
Cadmium	1.33	0.102	ng/m³ Air	1.2970	ND	102	80-120			
Calcium	688	274	ng/m³ Air	64.852	623	100	80-120			LJ, QB-01
Chromium	15.7	1.90	ng/m³ Air	12.970	2.10	105	80-120			
Cobalt	1.53	0.0146	ng/m³ Air	1.2970	0.237	99.8	80-120			QB-01
Copper	62.8	2.81	ng/m³ Air	25.941	34.8	108	80-120			
Iron	512	22.7	ng/m³ Air	25.941	478	129	80-120			QM-4X
Lead	13.2	0.259	ng/m³ Air	12.970	0.343	98.9	80-120			
Magnesium	278	90.4	ng/m³ Air	25.941	254	96.0	80-120			
Manganese	23.1	1.12	ng/m³ Air	7.7823	15.1	103	80-120			
Molybdenum	2.41	0.200	ng/m³ Air	1.2970	1.05	105	80-120			B, QB-01
Nickel	3.33	0.751	ng/m³ Air	2.5941	ND	128	80-120			
Phosphorus	ND	1170	ng/m³ Air	12.970	ND		80-120			QM-4X, U
Potassium	171	35.6	ng/m³ Air	51.882	105	127	80-120			B, QM-07
Rubidium	1.38	0.0172	ng/m³ Air	1.2970	0.185	91.8	80-120			
Selenium	2.68	0.0103	ng/m³ Air	2.5941	0.162	97.1	80-120			
Sodium	2280	1880	ng/m³ Air	51.882	2200	155	80-120			QM-4X
Strontium	5.83	0.612	ng/m³ Air	1.2970	4.71	86.3	80-120			QB-01
Thallium	0.125	4.72E-4	ng/m³ Air	0.12970	0.00143	95.0	80-120			
Thorium	0.0695	0.00281	ng/m³ Air	0.12970	0.0143	42.5	80-120			QM-07
Uranium	0.134	0.0159	ng/m³ Air	0.12970	ND	103	80-120			
Vanadium	3.90	0.0461	ng/m³ Air	2.5941	1.36	97.8	80-120			
Zinc	109	91.6	ng/m³ Air	77.823	ND	140	80-120			
Matrix Spike Dup (B3L1403-MSD1)		**Source: 3121332-06**		Prepared & Analyzed: 12/14/23						
Aluminum	465	30.1	ng/m³ Air	77.823	383	106	80-120	0.629	20	
Antimony	0.642	0.0414	ng/m³ Air	1.2970	0.0839	43.0	80-120	1.59	20	SL
Arsenic	2.64	0.00896	ng/m³ Air	2.5941	0.101	97.8	80-120	0.0407	20	
Barium	32.8	0.889	ng/m³ Air	25.941	7.62	97.1	80-120	1.35	20	

CERTIFICATE OF ANALYSIS

Tetra Tech, Inc.
1777 Sentry Pkwy, Bldg 12
Blue Bell, PA 19422
ATTN: Ms. Chelsea Saber
PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 12/19/23 10:54
SUBMITTED: 12/11/23 to 12/13/23
AQS SITE CODE:
SITE CODE: Maui fires

Inorganics by Compendium Method IO-3.5 - Quality Control

Batch B3L1403 - ICP-MS Extraction

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Matrix Spike Dup (B3L1403-MSD1) ContirSource: 3121332-06				Prepared & Analyzed: 12/14/23						
Beryllium	1.21	0.00311	ng/m³ Air	1.2970	0.0182	92.1	80-120	4.19	20	
Cadmium	1.33	0.102	ng/m³ Air	1.2970	ND	103	80-120	0.534	20	
Calcium	682	274	ng/m³ Air	64.852	623	92.2	80-120	0.754	20	LJ, QB-01
Chromium	15.6	1.90	ng/m³ Air	12.970	2.10	104	80-120	0.875	20	
Cobalt	1.52	0.0146	ng/m³ Air	1.2970	0.237	99.2	80-120	0.505	20	QB-01
Copper	63.2	2.81	ng/m³ Air	25.941	34.8	109	80-120	0.672	20	
Iron	506	22.7	ng/m³ Air	25.941	478	107	80-120	1.14	20	
Lead	13.1	0.259	ng/m³ Air	12.970	0.343	98.6	80-120	0.278	20	
Magnesium	279	90.4	ng/m³ Air	25.941	254	96.4	80-120	0.0399	20	
Manganese	23.1	1.12	ng/m³ Air	7.7823	15.1	103	80-120	0.0337	20	
Molybdenum	2.30	0.200	ng/m³ Air	1.2970	1.05	96.3	80-120	4.98	20	B, QB-01
Nickel	3.34	0.751	ng/m³ Air	2.5941	ND	129	80-120	0.377	20	
Phosphorus	ND	1170	ng/m³ Air	12.970	ND		80-120		20	QM-4X, U
Potassium	154	35.6	ng/m³ Air	51.882	105	94.0	80-120	10.5	20	B
Rubidium	1.40	0.0172	ng/m³ Air	1.2970	0.185	93.7	80-120	1.74	20	
Selenium	2.72	0.0103	ng/m³ Air	2.5941	0.162	98.5	80-120	1.35	20	
Sodium	2240	1880	ng/m³ Air	51.882	2200	87.3	80-120	1.54	20	
Strontium	5.89	0.612	ng/m³ Air	1.2970	4.71	90.8	80-120	0.998	20	QB-01
Thallium	0.125	4.72E-4	ng/m³ Air	0.12970	0.00143	95.7	80-120	0.649	20	
Thorium	0.0709	0.00281	ng/m³ Air	0.12970	0.0143	43.7	80-120	2.11	20	QM-07
Uranium	0.134	0.0159	ng/m³ Air	0.12970	ND	103	80-120	0.230	20	
Vanadium	3.91	0.0461	ng/m³ Air	2.5941	1.36	98.2	80-120	0.257	20	
Zinc	105	91.6	ng/m³ Air	77.823	ND	135	80-120	3.71	20	
Post Spike (B3L1403-PS1)	**Source: 3121332-06**			Prepared & Analyzed: 12/14/23						
Aluminum	406	30.1	ng/m³ Air	25.941	383	89.1	75-125			
Antimony	0.334	0.0414	ng/m³ Air	0.25941	0.0839	96.4	75-125			SL
Arsenic	1.32	0.00896	ng/m³ Air	1.2970	0.101	94.1	75-125			
Barium	9.88	0.889	ng/m³ Air	2.5941	7.62	87.2	75-125			
Beryllium	0.265	0.00311	ng/m³ Air	0.25941	0.0182	95.0	75-125			
Cadmium	0.137	0.102	ng/m³ Air	0.12970	ND	106	75-125			
Calcium	660	274	ng/m³ Air	25.941	623	143	75-125			A-01, LJ, QB-01
Chromium	3.37	1.90	ng/m³ Air	1.2970	2.10	98.2	75-125			
Cobalt	0.492	0.0146	ng/m³ Air	0.25941	0.237	98.3	75-125			QB-01
Copper	48.5	2.81	ng/m³ Air	12.970	34.8	105	75-125			
Iron	504	22.7	ng/m³ Air	25.941	478	99.9	75-125			
Lead	25.3	0.259	ng/m³ Air	25.941	0.343	96.3	75-125			
Magnesium	281	90.4	ng/m³ Air	25.941	254	105	75-125			

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Blue Bell, PA 19422
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PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 12/19/23 10:54
SUBMITTED: 12/11/23 to 12/13/23
AQS SITE CODE:
SITE CODE: Maui fires

Inorganics by Compendium Method IO-3.5 - Quality Control

Batch B3L1403 - ICP-MS Extraction

Post Spike (B3L1403-PS1) Continued **Source: 3121332-06** Prepared & Analyzed: 12/14/23

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Manganese	17.7	1.12	ng/m³ Air	2.5941	15.1	99.6	75-125			
Molybdenum	2.26	0.200	ng/m³ Air	1.2970	1.05	93.0	75-125			B, QB-01
Nickel	3.17	0.751	ng/m³ Air	2.5941	ND	122	75-125			
Phosphorus	ND	1170	ng/m³ Air	5.1882	ND		75-125			U
Potassium	132	35.6	ng/m³ Air	25.941	105	104	75-125			B
Rubidium	0.295	0.0172	ng/m³ Air	0.12970	0.185	85.1	75-125			
Selenium	1.37	0.0103	ng/m³ Air	1.2970	0.162	93.3	75-125			
Sodium	2260	1880	ng/m³ Air	25.941	2200	232	75-125			A-01
Strontium	5.78	0.612	ng/m³ Air	1.2970	4.71	82.7	75-125			QB-01
Thallium	0.0611	4.72E-4	ng/m³ Air	6.4852E-2	0.00143	92.0	75-125			
Thorium	0.0728	0.00281	ng/m³ Air	6.4852E-2	0.0143	90.1	75-125			
Uranium	0.0704	0.0159	ng/m³ Air	6.4852E-2	ND	109	75-125			
Vanadium	2.58	0.0461	ng/m³ Air	1.2970	1.36	94.5	75-125			
Zinc	ND	91.6	ng/m³ Air	25.941	ND		75-125			U

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AQS SITE CODE:
SITE CODE: Maui fires

Notes and Definitions

U	Under Detection Limit
SL	The spike recovery was outside acceptance limits. Reported value may be biased low.
QX	Compound does not meet QC criteria. Results should be considered an estimate.
QM-4X	The MS/MSD recovery exceeds criteria because the parent sample concentration is greater than 4x the spike concentration. Sample results for the QC batch were accepted based on acceptable BS/BSD recoveries.
QM-07	The spike recovery was outside acceptance limits for the MS and/or MSD. The batch was accepted based on acceptable LCS recovery.
QM-06	Due to noted non-homogeneity of the QC sample matrix, the MS/MSD did not provide reliable results for accuracy and precision. Sample results for the QC batch were accepted based on LCS/LCSD percent recoveries and RPD values.
QB-01	Analyte exceeds method blank criteria
LJ	Identification of analyte is acceptable; reported value is an estimate.
GC-BS	Compound exceeds Blank Spike Criteria
FB-01	Analyte exceeds Field Blank criteria.
E	The concentration indicated for this analyte is an estimated value above the calibration range of the instrument. This value is considered an estimate (CLP E-flag).
D	This result obtained by dilution.
B	Analyte is found in the associated blank as well as in the sample (CLP B-flag).
A-01a	Parent sample >4x spike amount
A-01	Parent sample >4x spike
ND	Analyte NOT DETECTED
NR	Not Reported
MDL	Method Detection Limit
RPD	Relative Percent Difference

Note: This test is accredited under the 2016 TNI Standard.

ERG

Eastern Research Group
601 Keystone Park Drive
Suite 700
Morrisville, NC 27560

December 21, 2023

Ms. Chelsea Saber
Tetra Tech, Inc.
1777 Sentry Pkwy, Bldg 12
Blue Bell, PA 19422
Project Name: Maui fires

Dear Ms. Chelsea Saber,

This report contains the analytical results for the sample(s) received under chain(s) of custody by Eastern Research Group on 12/18/23 12:00.

Values below the MDL for QC results in this report are recorded as ND, however the actual values are reported in the accompanying Excel report with a "U" flag (Under the detection limit). The actual values are reported in AQS.

This test is accredited under the 2016 TNI Standard for Environmental Laboratories (FL DOH Certification # E87673). All analyses were performed as described in the US EPA-approved QAPP, under the contract for National Hazardous Air Pollutant Support (US EPA Contract No. 68HERH22D0002). This cover page is an integral part of this report, and any exceptions or comments are noted on the last page.

Release of the data contained in this data package and in the data submitted in the electronic data deliverable, has been authorized by the Program Manager, or the Program Manager's designee as verified by the following signature.

The issuance of the final Certificate of Analysis takes precedence over any previous Report. If you have any questions, please contact me at 919-468-7924.

Sincerely,

Julie Swift
Program Manager
julie.swift@erg.com

The information contained in this report and its attachment(s) are intended only for the use of the individual to whom it is addressed and may contain information that is privileged, confidential, or exempt from disclosure. If the reader of this message is not the intended recipient, you are hereby notified that any dissemination, distribution, or copying of this report is strictly prohibited. If you have received this report in error, please notify julie.swift@erg.com and delete the report without retaining any copies.

CERTIFICATE OF ANALYSIS

Tetra Tech, Inc.
1777 Sentry Pkwy, Bldg 12
Blue Bell, PA 19422
ATTN: Ms. Chelsea Saber
PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 12/21/23 13:36
SUBMITTED: 12/18/23
AQS SITE CODE:
SITE CODE: Maui fires

ANALYTICAL REPORT FOR SAMPLES

SampleName	LabNumber	Matrix	Sampled	Received
TetraTech Q9533919	3121831-01	Air	12/11/23 23:59	12/18/23 12:00
TetraTech Q9533918	3121831-02	Air	12/11/23 23:59	12/18/23 12:00
TetraTech Q9533916	3121831-03	Air	12/11/23 23:59	12/18/23 12:00
TetraTech Q9533945 FB	3121831-04	Air	12/11/23 00:00	12/18/23 12:00
TetraTech Q9533932	3121831-05	Air	12/12/23 23:59	12/18/23 12:00
TetraTech Q9533931	3121831-06	Air	12/12/23 23:59	12/18/23 12:00
TetraTech Q9533930	3121831-07	Air	12/12/23 23:59	12/18/23 12:00
TetraTech Q9533939 FB	3121831-08	Air	12/12/23 00:00	12/18/23 12:00
TetraTech Q9533944	3121831-09	Air	12/13/23 23:59	12/18/23 12:00
TetraTech Q9533943	3121831-10	Air	12/13/23 23:59	12/18/23 12:00
TetraTech Q9533941	3121831-11	Air	12/13/23 23:59	12/18/23 12:00
TetraTech Q9533936 FB	3121831-12	Air	12/13/23 00:00	12/18/23 12:00

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Blue Bell, PA 19422
ATTN: Ms. Chelsea Saber
PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 12/21/23 13:36
SUBMITTED: 12/18/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9533919 **Lab ID:** 3121831-01 **Sampled:** 12/11/23 23:59
Matrix: Air **Sample Volume:** 2024.203 m³ **Received:** 12/18/23 12:00
Filter ID: **Analysis Date:** 12/19/23 22:16
Comments: MFK-AM01-121123-HM

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	**7429-90-5**	**620**		**25.8**
Antimony	**7440-36-0**	**0.0624**	SL	**0.0354**
Arsenic	**7440-38-2**	**0.204**		**0.00768**
Barium	**7440-39-3**	**5.38**		**0.762**
Beryllium	**7440-41-7**	**0.0190**		**0.00267**
Cadmium	7440-43-9	0.0102	U	0.0876
Calcium	**7440-70-2**	**531**	QB-01	**235**
Chromium	**7440-47-3**	**2.14**		**1.63**
Cobalt	**7440-48-4**	**0.268**	QB-01	**0.0125**
Copper	**7440-50-8**	**15.7**		**2.41**
Iron	**7439-89-6**	**615**		**19.5**
Lead	**7439-92-1**	**0.471**		**0.222**
Magnesium	**7439-95-4**	**203**		**77.5**
Manganese	**7439-96-5**	**16.3**		**0.956**
Molybdenum	**7439-98-7**	**0.721**	QB-01	**0.171**
Nickel	**7440-02-0**	**0.820**		**0.644**
Phosphorus	7723-14-0	328	U, GC-BS, LJ, QX	1000
Potassium	**7440-09-7**	**94.0**		**30.5**
Rubidium	**7440-17-7**	**0.185**		**0.0147**
Selenium	**7782-49-2**	**0.193**	LJ, QX	**0.00884**
Sodium	**7440-23-5**	**1670**	E, GC-BS	**1610**
Strontium	**7440-24-6**	**3.86**	QB-01	**0.524**
Thallium	**7440-28-0**	**0.00127**		**4.04E-4**
Thorium	**7440-29-01**	**0.0152**		**0.00241**
Uranium	7440-61-1	0.0128	U	0.0137
Vanadium	**7440-62-2**	**2.00**		**0.0395**
Zinc	7440-66-6	38.1	U	78.5

CERTIFICATE OF ANALYSIS

Tetra Tech, Inc.
1777 Sentry Pkwy, Bldg 12
Blue Bell, PA 19422
ATTN: Ms. Chelsea Saber
PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 12/21/23 13:36
SUBMITTED: 12/18/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9533918 **Lab ID:** 3121831-02 **Sampled:** 12/11/23 23:59
Matrix: Air **Sample Volume:** 2036.912 m³ **Received:** 12/18/23 12:00
Filter ID: **Analysis Date:** 12/19/23 22:32
Comments: MFK-AM02-121123-HM

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	**7429-90-5**	**899**	E	**25.6**
Antimony	**7440-36-0**	**0.0913**	SL	**0.0352**
Arsenic	**7440-38-2**	**0.360**		**0.00763**
Barium	**7440-39-3**	**11.3**		**0.757**
Beryllium	**7440-41-7**	**0.0263**		**0.00265**
Cadmium	7440-43-9	0.0511	U	0.0871
Calcium	**7440-70-2**	**741**	QB-01	**233**
Chromium	**7440-47-3**	**2.24**		**1.62**
Cobalt	**7440-48-4**	**0.374**	QB-01	**0.0125**
Copper	**7440-50-8**	**16.7**		**2.40**
Iron	**7439-89-6**	**867**		**19.3**
Lead	**7439-92-1**	**0.400**		**0.220**
Magnesium	**7439-95-4**	**284**		**77.0**
Manganese	**7439-96-5**	**25.2**		**0.951**
Molybdenum	**7439-98-7**	**1.01**	QB-01	**0.170**
Nickel	**7440-02-0**	**0.947**		**0.640**
Phosphorus	7723-14-0	395	U, GC-BS, LJ, QX	998
Potassium	**7440-09-7**	**172**		**30.4**
Rubidium	**7440-17-7**	**0.311**		**0.0146**
Selenium	**7782-49-2**	**0.247**	LJ, QX	**0.00879**
Sodium	**7440-23-5**	**1950**	E, GC-BS	**1600**
Strontium	**7440-24-6**	**7.71**	QB-01	**0.521**
Thallium	**7440-28-0**	**0.00179**		**4.02E-4**
Thorium	**7440-29-01**	**0.0215**		**0.00240**
Uranium	**7440-61-1**	**0.0201**		**0.0136**
Vanadium	**7440-62-2**	**2.69**		**0.0393**
Zinc	7440-66-6	33.0	U	78.0

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Tetra Tech, Inc.
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Blue Bell, PA 19422
ATTN: Ms. Chelsea Saber
PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 12/21/23 13:36
SUBMITTED: 12/18/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9533916 **Lab ID:** 3121831-03 **Sampled:** 12/11/23 23:59
Matrix: Air **Sample Volume:** 1628.578 m³ **Received:** 12/18/23 12:00
Filter ID: **Analysis Date:** 12/19/23 22:48
Comments: MFK-AM03-121123-HM

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	**7429-90-5**	**331**		**32.1**
Antimony	**7440-36-0**	**0.131**	SL	**0.0441**
Arsenic	**7440-38-2**	**0.105**		**0.00954**
Barium	**7440-39-3**	**5.99**		**0.947**
Beryllium	**7440-41-7**	**0.0144**		**0.00332**
Cadmium	7440-43-9	0.00875	U	0.109
Calcium	**7440-70-2**	**584**	QB-01	**292**
Chromium	**7440-47-3**	**2.20**		**2.03**
Cobalt	**7440-48-4**	**0.222**	QB-01	**0.0156**
Copper	**7440-50-8**	**59.3**		**3.00**
Iron	**7439-89-6**	**421**		**24.2**
Lead	**7439-92-1**	**0.358**		**0.276**
Magnesium	**7439-95-4**	**282**		**96.3**
Manganese	**7439-96-5**	**11.9**		**1.19**
Molybdenum	**7439-98-7**	**1.60**	QB-01	**0.213**
Nickel	7440-02-0	0.798	U	0.800
Phosphorus	7723-14-0	404	U, GC-BS, LJ, QX	1250
Potassium	**7440-09-7**	**114**		**38.0**
Rubidium	**7440-17-7**	**0.159**		**0.0183**
Selenium	**7782-49-2**	**0.197**	LJ, QX	**0.0110**
Sodium	**7440-23-5**	**2470**	E, GC-BS	**2000**
Strontium	**7440-24-6**	**3.63**	QB-01	**0.651**
Thallium	**7440-28-0**	**9.24E-4**		**5.03E-4**
Thorium	**7440-29-01**	**0.0131**		**0.00300**
Uranium	7440-61-1	0.00947	U	0.0170
Vanadium	**7440-62-2**	**1.77**		**0.0492**
Zinc	7440-66-6	34.7	U	97.6

CERTIFICATE OF ANALYSIS

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FILE #: 0000.00
REPORTED: 12/21/23 13:36
SUBMITTED: 12/18/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9533945 FB **Lab ID:** 3121831-04 **Sampled:** 12/11/23 00:00
Matrix: Air **Sample Volume:** 2024.203 m³ **Received:** 12/18/23 12:00
Filter ID: **Analysis Date:** 12/19/23 23:03
Comments: MFK-FB01-121123-HM Field Blank

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	7429-90-5	9.90	U	25.8
Antimony	7440-36-0	0.00736	U, SL	0.0354
Arsenic	7440-38-2	0.00599	U	0.00768
Barium	7440-39-3	0.635	U	0.762
Beryllium	7440-41-7	8.48E-4	U	0.00267
Cadmium	7440-43-9	0.00291	U	0.0876
Calcium	**7440-70-2**	**305**	FB-01, QB-01	**235**
Chromium	7440-47-3	1.49	U	1.63
Cobalt	**7440-48-4**	**0.0286**	FB-01, QB-01	**0.0125**
Copper	7440-50-8	0.409	U	2.41
Iron	7439-89-6	13.6	U	19.5
Lead	7439-92-1	0.0542	U	0.222
Magnesium	7439-95-4	36.7	U	77.5
Manganese	7439-96-5	0.211	U	0.956
Molybdenum	**7439-98-7**	**0.239**	FB-01, QB-01	**0.171**
Nickel	7440-02-0	0.269	U	0.644
Phosphorus	7723-14-0	294	U, GC-BS, LJ, QX	1000
Potassium	7440-09-7	12.7	U	30.5
Rubidium	7440-17-7	0.0118	U	0.0147
Selenium	7782-49-2	0.00367	U, LJ, QX	0.00884
Sodium	7440-23-5	638	U, GC-BS	1610
Strontium	**7440-24-6**	**0.549**	FB-01, QB-01	**0.524**
Thallium	7440-28-0	1.23E-4	U	4.04E-4
Thorium	7440-29-01	0.00172	U	0.00241
Uranium	7440-61-1	0.00151	U	0.0137
Vanadium	7440-62-2	0.0100	U	0.0395
Zinc	7440-66-6	22.3	U	78.5

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Tetra Tech, Inc.
1777 Sentry Pkwy, Bldg 12
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PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 12/21/23 13:36
SUBMITTED: 12/18/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9533932 **Lab ID:** 3121831-05 **Sampled:** 12/12/23 23:59
Matrix: Air **Sample Volume:** 2065.514 m³ **Received:** 12/18/23 12:00
Filter ID: **Analysis Date:** 12/19/23 23:17
Comments: MFK-AM01-121223-HM

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	**7429-90-5**	**1090**	E	**25.3**
Antimony	**7440-36-0**	**0.0606**	SL	**0.0347**
Arsenic	**7440-38-2**	**0.564**		**0.00752**
Barium	**7440-39-3**	**7.59**		**0.747**
Beryllium	**7440-41-7**	**0.0320**		**0.00262**
Cadmium	7440-43-9	0.0124	U	0.0859
Calcium	**7440-70-2**	**619**	QB-01	**230**
Chromium	**7440-47-3**	**2.42**		**1.60**
Cobalt	**7440-48-4**	**0.437**	QB-01	**0.0123**
Copper	**7440-50-8**	**14.6**		**2.36**
Iron	**7439-89-6**	**1050**		**19.1**
Lead	**7439-92-1**	**0.527**		**0.217**
Magnesium	**7439-95-4**	**233**		**75.9**
Manganese	**7439-96-5**	**27.6**		**0.937**
Molybdenum	**7439-98-7**	**0.813**	QB-01	**0.168**
Nickel	**7440-02-0**	**1.14**		**0.631**
Phosphorus	7723-14-0	351	GC-BS, LJ, QX, U	985
Potassium	**7440-09-7**	**106**		**29.9**
Rubidium	**7440-17-7**	**0.236**		**0.0144**
Selenium	**7782-49-2**	**0.235**	LJ, QX	**0.00866**
Sodium	**7440-23-5**	**1680**	E, GC-BS	**1580**
Strontium	**7440-24-6**	**5.17**	QB-01	**0.514**
Thallium	**7440-28-0**	**0.00162**		**3.96E-4**
Thorium	**7440-29-01**	**0.0243**		**0.00236**
Uranium	**7440-61-1**	**0.0204**		**0.0134**
Vanadium	**7440-62-2**	**2.84**		**0.0388**
Zinc	7440-66-6	23.8	U	77.0

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FILE #: 0000.00
REPORTED: 12/21/23 13:36
SUBMITTED: 12/18/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9533931 **Lab ID:** 3121831-06 **Sampled:** 12/12/23 23:59
Matrix: Air **Sample Volume:** 2068.806 m³ **Received:** 12/18/23 12:00
Filter ID: **Analysis Date:** 12/19/23 19:57
Comments: MFK-AM02-121223-HM/MS/MSD

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	**7429-90-5**	**768**	E, QM-4X	**25.2**
Antimony	**7440-36-0**	**0.0597**	SL	**0.0347**
Arsenic	**7440-38-2**	**0.326**		**0.00751**
Barium	**7440-39-3**	**7.09**		**0.746**
Beryllium	**7440-41-7**	**0.0257**		**0.00261**
Cadmium	**7440-43-9**	**0.191**	LJ, QX	**0.0857**
Calcium	**7440-70-2**	**652**	QB-01, QM-4X	**230**
Chromium	**7440-47-3**	**2.08**		**1.60**
Cobalt	**7440-48-4**	**0.361**	QB-01	**0.0123**
Copper	**7440-50-8**	**16.1**	QM-07	**2.36**
Iron	**7439-89-6**	**777**	QM-4X	**19.0**
Lead	**7439-92-1**	**0.423**		**0.217**
Magnesium	**7439-95-4**	**242**		**75.8**
Manganese	**7439-96-5**	**19.6**		**0.936**
Molybdenum	**7439-98-7**	**0.987**	QB-01	**0.168**
Nickel	**7440-02-0**	**0.887**		**0.630**
Phosphorus	7723-14-0	336	GC-BS, LJ, QX, U	983
Potassium	**7440-09-7**	**119**		**29.9**
Rubidium	**7440-17-7**	**0.222**		**0.0144**
Selenium	**7782-49-2**	**0.197**	LJ, QX	**0.00865**
Sodium	**7440-23-5**	**1750**	E, GC-BS, QM-4X	**1570**
Strontium	**7440-24-6**	**4.93**	QB-01	**0.513**
Thallium	**7440-28-0**	**0.00139**		**3.96E-4**
Thorium	**7440-29-01**	**0.0213**	QM-07	**0.00236**
Uranium	**7440-61-1**	**0.0168**		**0.0134**
Vanadium	**7440-62-2**	**2.42**		**0.0387**
Zinc	7440-66-6	35.3	U	76.8

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FILE #: 0000.00
REPORTED: 12/21/23 13:36
SUBMITTED: 12/18/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9533930 **Lab ID:** 3121831-07 **Sampled:** 12/12/23 23:59
Matrix: Air **Sample Volume:** 1969.662 m³ **Received:** 12/18/23 12:00
Filter ID: **Analysis Date:** 12/19/23 23:31
Comments: MFK-AM03-121223-HM

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	**7429-90-5**	**593**		**26.5**
Antimony	**7440-36-0**	**0.0915**	SL	**0.0364**
Arsenic	**7440-38-2**	**0.166**		**0.00789**
Barium	**7440-39-3**	**7.93**		**0.783**
Beryllium	**7440-41-7**	**0.0262**		**0.00274**
Cadmium	7440-43-9	0.0108	U	0.0900
Calcium	**7440-70-2**	**792**	QB-01	**241**
Chromium	**7440-47-3**	**2.12**		**1.68**
Cobalt	**7440-48-4**	**0.353**	QB-01	**0.0129**
Copper	**7440-50-8**	**37.4**		**2.48**
Iron	**7439-89-6**	**682**		**20.0**
Lead	**7439-92-1**	**0.576**		**0.228**
Magnesium	**7439-95-4**	**268**		**79.6**
Manganese	**7439-96-5**	**21.1**		**0.983**
Molybdenum	**7439-98-7**	**0.908**	QB-01	**0.176**
Nickel	**7440-02-0**	**0.881**		**0.662**
Phosphorus	7723-14-0	362	GC-BS, LJ, QX, U	1030
Potassium	**7440-09-7**	**120**		**31.4**
Rubidium	**7440-17-7**	**0.222**		**0.0151**
Selenium	**7782-49-2**	**0.179**	LJ, QX	**0.00909**
Sodium	**7440-23-5**	**1980**	E, GC-BS	**1650**
Strontium	**7440-24-6**	**5.37**	QB-01	**0.539**
Thallium	**7440-28-0**	**0.00138**		**4.15E-4**
Thorium	**7440-29-01**	**0.0179**		**0.00248**
Uranium	**7440-61-1**	**0.0154**		**0.0140**
Vanadium	**7440-62-2**	**2.10**		**0.0406**
Zinc	7440-66-6	35.4	U	80.7

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FILE #: 0000.00
REPORTED: 12/21/23 13:36
SUBMITTED: 12/18/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9533939 FB **Lab ID:** 3121831-08 **Sampled:** 12/12/23 00:00
Matrix: Air **Sample Volume:** 2065.514 m³ **Received:** 12/18/23 12:00
Filter ID: **Analysis Date:** 12/19/23 23:47
Comments: MFK-FB01-121223-HM Field Blank

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	7429-90-5	14.7	U	25.3
Antimony	7440-36-0	0.00728	SL, U	0.0347
Arsenic	7440-38-2	0.00532	U	0.00752
Barium	**7440-39-3**	**0.813**	FB-01	**0.747**
Beryllium	7440-41-7	0.00106	U	0.00262
Cadmium	7440-43-9	0.00293	U	0.0859
Calcium	**7440-70-2**	**279**	FB-01, QB-01	**230**
Chromium	7440-47-3	1.47	U	1.60
Cobalt	**7440-48-4**	**0.0239**	FB-01, QB-01	**0.0123**
Copper	7440-50-8	0.662	U	2.36
Iron	7439-89-6	16.8	U	19.1
Lead	7439-92-1	0.0590	U	0.217
Magnesium	7439-95-4	39.6	U	75.9
Manganese	7439-96-5	0.278	U	0.937
Molybdenum	**7439-98-7**	**0.231**	FB-01, QB-01	**0.168**
Nickel	7440-02-0	0.314	U	0.631
Phosphorus	7723-14-0	290	GC-BS, LJ, QX, U	985
Potassium	**7440-09-7**	**41.8**	FB-01	**29.9**
Rubidium	**7440-17-7**	**0.0161**	FB-01	**0.0144**
Selenium	7782-49-2	0.00478	LJ, QX, U	0.00866
Sodium	7440-23-5	675	GC-BS, U	1580
Strontium	**7440-24-6**	**0.549**	FB-01, QB-01	**0.514**
Thallium	7440-28-0	1.13E-4	U	3.96E-4
Thorium	7440-29-01	0.00210	U	0.00236
Uranium	7440-61-1	0.00160	U	0.0134
Vanadium	7440-62-2	0.0181	U	0.0388
Zinc	7440-66-6	19.5	U	77.0

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FILE #: 0000.00
REPORTED: 12/21/23 13:36
SUBMITTED: 12/18/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9533944 **Lab ID:** 3121831-09 **Sampled:** 12/13/23 23:59
Matrix: Air **Sample Volume:** 2065.514 m^3 **Received:** 12/18/23 12:00
Filter ID: **Analysis Date:** 12/20/23 00:01
Comments: MFK-AM01-121323-HM

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m^3 Air	Flag	MDL ng/m^3 Air
Aluminum	**7429-90-5**	**1390**	E	**25.3**
Antimony	**7440-36-0**	**0.0688**	SL	**0.0347**
Arsenic	**7440-38-2**	**0.318**		**0.00752**
Barium	**7440-39-3**	**10.3**		**0.747**
Beryllium	**7440-41-7**	**0.0448**	R-F	**0.00262**
Cadmium	7440-43-9	0.0169	U	0.0859
Calcium	**7440-70-2**	**808**	QB-01	**230**
Chromium	**7440-47-3**	**2.60**		**1.60**
Cobalt	**7440-48-4**	**0.636**	QB-01	**0.0123**
Copper	**7440-50-8**	**18.1**		**2.36**
Lead	**7439-92-1**	**0.625**		**0.217**
Magnesium	**7439-95-4**	**293**		**75.9**
Manganese	**7439-96-5**	**38.8**		**0.937**
Molybdenum	**7439-98-7**	**0.994**	QB-01	**0.168**
Nickel	**7440-02-0**	**1.22**		**0.631**
Phosphorus	7723-14-0	382	GC-BS, LJ, QX, U	985
Potassium	**7440-09-7**	**142**		**29.9**
Rubidium	**7440-17-7**	**0.315**		**0.0144**
Selenium	**7782-49-2**	**0.253**	LJ, QX	**0.00866**
Sodium	**7440-23-5**	**1910**	E, GC-BS	**1580**
Strontium	**7440-24-6**	**7.35**	QB-01	**0.514**
Thallium	**7440-28-0**	**0.00218**		**3.96E-4**
Thorium	**7440-29-01**	**0.0369**		**0.00236**
Uranium	**7440-61-1**	**0.0273**		**0.0134**
Vanadium	**7440-62-2**	**3.57**		**0.0388**
Zinc	7440-66-6	26.8	U	77.0

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PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 12/21/23 13:36
SUBMITTED: 12/18/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9533944 **Lab ID:** 3121831-09RE1 **Sampled:** 12/13/23 23:59
Matrix: Air **Sample Volume:** 2065.514 m^3 **Received:** 12/18/23 12:00
Filter ID: **Analysis Date:** 12/21/23 00:16
Comments: MFK-AM01-121323-HM

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m^3 Air	Flag	MDL ng/m^3 Air
Iron	7439-89-6	1330	D	38.1

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FILE #: 0000.00
REPORTED: 12/21/23 13:36
SUBMITTED: 12/18/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9533943 **Lab ID:** 3121831-10 **Sampled:** 12/13/23 23:59
Matrix: Air **Sample Volume:** 2070.53 m³ **Received:** 12/18/23 12:00
Filter ID: **Analysis Date:** 12/20/23 00:32
Comments: MFK-AM02-121323-HM

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	**7429-90-5**	**832**	E	**25.2**
Antimony	**7440-36-0**	**0.0454**	SL	**0.0347**
Arsenic	**7440-38-2**	**0.254**		**0.00750**
Barium	**7440-39-3**	**7.08**		**0.745**
Beryllium	**7440-41-7**	**0.0268**		**0.00261**
Cadmium	7440-43-9	0.0258	U	0.0857
Calcium	**7440-70-2**	**659**	QB-01	**229**
Chromium	**7440-47-3**	**2.19**		**1.60**
Cobalt	**7440-48-4**	**0.421**	QB-01	**0.0123**
Copper	**7440-50-8**	**23.8**		**2.36**
Iron	**7439-89-6**	**896**		**19.0**
Lead	**7439-92-1**	**0.519**		**0.217**
Magnesium	**7439-95-4**	**279**		**75.8**
Manganese	**7439-96-5**	**23.5**		**0.935**
Molybdenum	**7439-98-7**	**1.21**	QB-01	**0.167**
Nickel	**7440-02-0**	**0.920**		**0.629**
Phosphorus	7723-14-0	341	GC-BS, LJ, QX, U	982
Potassium	**7440-09-7**	**139**		**29.9**
Rubidium	**7440-17-7**	**0.269**		**0.0144**
Selenium	**7782-49-2**	**0.194**	LJ, QX	**0.00864**
Sodium	**7440-23-5**	**1990**	E, GC-BS	**1570**
Strontium	**7440-24-6**	**5.46**	QB-01	**0.512**
Thallium	**7440-28-0**	**0.00132**		**3.95E-4**
Thorium	**7440-29-01**	**0.0259**		**0.00236**
Uranium	**7440-61-1**	**0.0177**		**0.0134**
Vanadium	**7440-62-2**	**2.52**		**0.0387**
Zinc	7440-66-6	20.4	U	76.8

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Blue Bell, PA 19422
ATTN: Ms. Chelsea Saber
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FILE #: 0000.00
REPORTED: 12/21/23 13:36
SUBMITTED: 12/18/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9533941 **Lab ID:** 3121831-11 **Sampled:** 12/13/23 23:59
Matrix: Air **Sample Volume:** 1791.68 m^3 **Received:** 12/18/23 12:00
Filter ID: **Analysis Date:** 12/20/23 01:20
Comments: MFK-AM03-121323-HM

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	**7429-90-5**	**811**	E	**29.1**
Antimony	**7440-36-0**	**0.0871**	SL	**0.0400**
Arsenic	**7440-38-2**	**0.163**		**0.00867**
Barium	**7440-39-3**	**10.3**		**0.861**
Beryllium	**7440-41-7**	**0.0340**		**0.00301**
Cadmium	7440-43-9	0.0133	U	0.0990
Calcium	**7440-70-2**	**714**	QB-01	**265**
Chromium	**7440-47-3**	**2.62**		**1.84**
Cobalt	**7440-48-4**	**0.472**	QB-01	**0.0142**
Copper	**7440-50-8**	**41.8**		**2.72**
Iron	**7439-89-6**	**978**		**22.0**
Lead	**7439-92-1**	**0.464**		**0.251**
Magnesium	**7439-95-4**	**302**		**87.5**
Manganese	**7439-96-5**	**30.1**		**1.08**
Molybdenum	**7439-98-7**	**1.14**	QB-01	**0.193**
Nickel	**7440-02-0**	**1.02**		**0.727**
Phosphorus	7723-14-0	391	QX, GC-BS, LJ, U	1140
Potassium	**7440-09-7**	**152**		**34.5**
Rubidium	**7440-17-7**	**0.286**		**0.0166**
Selenium	**7782-49-2**	**0.208**	LJ, QX	**0.00999**
Sodium	**7440-23-5**	**2150**	E, GC-BS	**1820**
Strontium	**7440-24-6**	**6.11**	QB-01	**0.592**
Thallium	**7440-28-0**	**0.00180**		**4.57E-4**
Thorium	**7440-29-01**	**0.0350**		**0.00272**
Uranium	**7440-61-1**	**0.0213**		**0.0154**
Vanadium	**7440-62-2**	**2.55**		**0.0447**
Zinc	7440-66-6	26.9	U	88.7

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PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 12/21/23 13:36
SUBMITTED: 12/18/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9533936 FB **Lab ID:** 3121831-12 **Sampled:** 12/13/23 00:00
Matrix: Air **Sample Volume:** 2065.514 m³ **Received:** 12/18/23 12:00
Filter ID: **Analysis Date:** 12/20/23 01:38
Comments: MFK-FB01-121323-HM Field Blank

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	7429-90-5	14.2	U	25.3
Antimony	7440-36-0	0.00651	SL, U	0.0347
Arsenic	7440-38-2	0.00618	U	0.00752
Barium	7440-39-3	0.631	U	0.747
Beryllium	7440-41-7	9.55E-4	U	0.00262
Cadmium	7440-43-9	0.00268	U	0.0859
Calcium	**7440-70-2**	**269**	FB-01, QB-01	**230**
Chromium	7440-47-3	1.44	U	1.60
Cobalt	**7440-48-4**	**0.0277**	FB-01, QB-01	**0.0123**
Copper	7440-50-8	1.76	U	2.36
Iron	7439-89-6	16.5	U	19.1
Lead	7439-92-1	0.0979	U	0.217
Magnesium	7439-95-4	39.5	U	75.9
Manganese	7439-96-5	0.260	U	0.937
Molybdenum	**7439-98-7**	**0.249**	FB-01, QB-01	**0.168**
Nickel	7440-02-0	0.269	U	0.631
Phosphorus	7723-14-0	292	GC-BS, LJ, QX, U	985
Potassium	**7440-09-7**	**36.8**	FB-01	**29.9**
Rubidium	7440-17-7	0.0140	U	0.0144
Selenium	7782-49-2	0.00248	LJ, QX, U	0.00866
Sodium	7440-23-5	651	GC-BS, U	1580
Strontium	**7440-24-6**	**0.563**	FB-01, QB-01	**0.514**
Thallium	7440-28-0	7.40E-5	U	3.96E-4
Thorium	7440-29-01	0.00212	U	0.00236
Uranium	7440-61-1	0.00161	U	0.0134
Vanadium	7440-62-2	0.0103	U	0.0388
Zinc	7440-66-6	14.4	U	77.0

CERTIFICATE OF ANALYSIS

Tetra Tech, Inc.
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Blue Bell, PA 19422
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FILE #: 0000.00
REPORTED: 12/21/23 13:36
SUBMITTED: 12/18/23
AQS SITE CODE:
SITE CODE: Maui fires

Inorganics by Compendium Method IO-3.5 - Quality Control

Batch 2312060 - B3L1903

Calibration Blank (2312060-CCB1) Prepared & Analyzed: 12/19/23

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Aluminum	41.9		ng/l							
Antimony	1.56		ng/l							
Arsenic	5.70		ng/l							
Barium	3.15		ng/l							
Beryllium	0.236		ng/l							
Cadmium	0.292		ng/l							
Calcium	628		ng/l							
Chromium	5.59		ng/l							
Cobalt	0.468		ng/l							
Copper	41.3		ng/l							
Iron	149		ng/l							
Lead	11.3		ng/l							
Magnesium	68.9		ng/l							
Manganese	7.99		ng/l							
Molybdenum	21.6		ng/l							
Nickel	-3.11		ng/l							U
Phosphorus	556		ng/l							LJ, QX
Potassium	579		ng/l							
Rubidium	-0.331		ng/l							U
Selenium	-4.19		ng/l							LJ, QX, U
Sodium	84.5		ng/l							
Strontium	0.0166		ng/l							
Thallium	0.459		ng/l							
Thorium	0.354		ng/l							
Uranium	-0.00917		ng/l							U
Vanadium	-70.5		ng/l							U
Zinc	-10.6		ng/l							U

Calibration Blank (2312060-CCB2) Prepared & Analyzed: 12/19/23

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Aluminum	8.82		ng/l							
Antimony	0.743		ng/l							
Arsenic	8.28		ng/l							
Barium	2.83		ng/l							
Beryllium	0.0551		ng/l							
Cadmium	0.396		ng/l							
Calcium	228		ng/l							
Chromium	5.08		ng/l							
Cobalt	0.647		ng/l							
Copper	38.4		ng/l							

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Inorganics by Compendium Method IO-3.5 - Quality Control

Batch 2312060 - B3L1903

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Calibration Blank (2312060-CCB2) Contin				Prepared & Analyzed: 12/19/23						
Iron	104		ng/l							
Lead	8.82		ng/l							
Magnesium	50.5		ng/l							
Manganese	6.55		ng/l							
Molybdenum	7.15		ng/l							
Nickel	-7.16		ng/l							U
Phosphorus	46.4		ng/l							LJ, QX
Potassium	1010		ng/l							
Rubidium	0.614		ng/l							
Selenium	8.87		ng/l							LJ, QX
Sodium	168		ng/l							
Strontium	-0.374		ng/l							U
Thallium	0.446		ng/l							
Thorium	0.619		ng/l							
Uranium	-0.0147		ng/l							U
Vanadium	-80.3		ng/l							U
Zinc	-19.9		ng/l							U
Calibration Blank (2312060-CCB3)				Prepared: 12/19/23 Analyzed: 12/20/23						
Aluminum	70.7		ng/l							
Antimony	0.629		ng/l							
Arsenic	7.63		ng/l							
Barium	2.65		ng/l							
Beryllium	0.0865		ng/l							
Cadmium	0.428		ng/l							
Calcium	502		ng/l							
Chromium	4.16		ng/l							
Cobalt	0.379		ng/l							
Copper	28.8		ng/l							
Iron	208		ng/l							
Lead	8.29		ng/l							
Magnesium	47.3		ng/l							
Manganese	6.04		ng/l							
Molybdenum	7.64		ng/l							
Nickel	-0.814		ng/l							U
Phosphorus	241		ng/l							LJ, QX
Potassium	1570		ng/l							
Rubidium	-0.0825		ng/l							U
Selenium	-4.95		ng/l							LJ, QX, U

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Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Calibration Blank (2312060-CCB3) Contin				Prepared: 12/19/23 Analyzed: 12/20/23						
Sodium	524		ng/l							
Strontium	-0.403		ng/l							U
Thallium	0.345		ng/l							
Thorium	0.410		ng/l							
Uranium	0.0103		ng/l							
Vanadium	-76.4		ng/l							U
Zinc	6.16		ng/l							
Calibration Blank (2312060-CCB4)				Prepared: 12/19/23 Analyzed: 12/20/23						
Aluminum	23.5		ng/l							
Antimony	1.24		ng/l							
Arsenic	5.78		ng/l							
Barium	3.58		ng/l							
Beryllium	0.222		ng/l							
Cadmium	0.561		ng/l							
Calcium	1170		ng/l							
Chromium	5.06		ng/l							
Cobalt	0.711		ng/l							
Copper	33.3		ng/l							
Iron	157		ng/l							
Lead	7.96		ng/l							
Magnesium	37.5		ng/l							
Manganese	6.86		ng/l							
Molybdenum	7.18		ng/l							
Nickel	-1.39		ng/l							U
Phosphorus	58.9		ng/l							LJ, QX
Potassium	1830		ng/l							
Rubidium	0.0329		ng/l							
Selenium	-1.43		ng/l							LJ, QX, U
Sodium	345		ng/l							
Strontium	0.234		ng/l							
Thallium	0.419		ng/l							
Thorium	0.187		ng/l							
Uranium	-0.0332		ng/l							U
Vanadium	-82.0		ng/l							U
Zinc	-14.0		ng/l							U
Calibration Check (2312060-CCV1)				Prepared & Analyzed: 12/19/23						
Aluminum	1.61E6		ng/l	1.5000E6		107	90-110			
Antimony	20300		ng/l	20000		101	90-110			

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Inorganics by Compendium Method IO-3.5 - Quality Control

Batch 2312060 - B3L1903

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Calibration Check (2312060-CCV1) Contin				Prepared & Analyzed: 12/19/23						
Arsenic	20100		ng/l	20000		100	90-110			
Barium	201000		ng/l	200000		101	90-110			
Beryllium	5180		ng/l	5000.0		104	90-110			
Cadmium	20400		ng/l	20000		102	90-110			
Calcium	2.58E7		ng/l	2.5000E7		103	90-110			
Chromium	240000		ng/l	240000		99.8	90-110			
Cobalt	51900		ng/l	50000		104	90-110			
Copper	2.07E6		ng/l	2.0000E6		104	90-110			
Iron	2.60E6		ng/l	2.5000E6		104	90-110			
Lead	202000		ng/l	200000		101	90-110			
Magnesium	1.08E6		ng/l	1.0000E6		108	90-110			
Manganese	519000		ng/l	500000		104	90-110			
Molybdenum	50100		ng/l	50000		100	90-110			
Nickel	125000		ng/l	120000		104	90-110			
Phosphorus	213000		ng/l	200000		107	90-110			LJ, QX
Potassium	2.64E6		ng/l	2.5000E6		105	90-110			
Rubidium	9980		ng/l	10000		99.8	90-110			
Selenium	20100		ng/l	20000		101	90-110			LJ, QX
Sodium	2.69E6		ng/l	2.5000E6		108	90-110			
Strontium	49800		ng/l	50000		99.6	90-110			
Thallium	504		ng/l	500.00		101	90-110			
Thorium	496		ng/l	500.00		99.2	90-110			
Uranium	500		ng/l	500.00		100	90-110			
Vanadium	19900		ng/l	20000		99.5	90-110			
Zinc	535000		ng/l	500000		107	90-110			
Calibration Check (2312060-CCV2)				Prepared & Analyzed: 12/19/23						
Aluminum	1.51E6		ng/l	1.5000E6		101	90-110			
Antimony	19600		ng/l	20000		98.1	90-110			
Arsenic	19700		ng/l	20000		98.6	90-110			
Barium	195000		ng/l	200000		97.7	90-110			
Beryllium	5060		ng/l	5000.0		101	90-110			
Cadmium	19900		ng/l	20000		99.3	90-110			
Calcium	2.45E7		ng/l	2.5000E7		97.9	90-110			
Chromium	236000		ng/l	240000		98.2	90-110			
Cobalt	50100		ng/l	50000		100	90-110			
Copper	2.01E6		ng/l	2.0000E6		100	90-110			
Iron	2.52E6		ng/l	2.5000E6		101	90-110			
Lead	197000		ng/l	200000		98.3	90-110			

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Inorganics by Compendium Method IO-3.5 - Quality Control

Batch 2312060 - B3L1903

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Calibration Check (2312060-CCV2) Contin				Prepared & Analyzed: 12/19/23						
Magnesium	1.03E6		ng/l	1.0000E6		103	90-110			
Manganese	507000		ng/l	500000		101	90-110			
Molybdenum	48600		ng/l	50000		97.1	90-110			
Nickel	120000		ng/l	120000		100	90-110			
Phosphorus	204000		ng/l	200000		102	90-110			LJ, QX
Potassium	2.52E6		ng/l	2.5000E6		101	90-110			
Rubidium	9800		ng/l	10000		98.0	90-110			
Selenium	19800		ng/l	20000		99.2	90-110			LJ, QX
Sodium	2.59E6		ng/l	2.5000E6		104	90-110			
Strontium	48500		ng/l	50000		97.0	90-110			
Thallium	488		ng/l	500.00		97.6	90-110			
Thorium	477		ng/l	500.00		95.4	90-110			
Uranium	478		ng/l	500.00		95.6	90-110			
Vanadium	19500		ng/l	20000		97.3	90-110			
Zinc	520000		ng/l	500000		104	90-110			
Calibration Check (2312060-CCV3)				Prepared: 12/19/23 Analyzed: 12/20/23						
Aluminum	1.57E6		ng/l	1.5000E6		105	90-110			
Antimony	20200		ng/l	20000		101	90-110			
Arsenic	20200		ng/l	20000		101	90-110			
Barium	199000		ng/l	200000		99.4	90-110			
Beryllium	4720		ng/l	5000.0		94.4	90-110			
Cadmium	20500		ng/l	20000		102	90-110			
Calcium	2.54E7		ng/l	2.5000E7		102	90-110			
Chromium	243000		ng/l	240000		101	90-110			
Cobalt	51400		ng/l	50000		103	90-110			
Copper	2.07E6		ng/l	2.0000E6		104	90-110			
Iron	2.59E6		ng/l	2.5000E6		104	90-110			
Lead	201000		ng/l	200000		101	90-110			
Magnesium	1.07E6		ng/l	1.0000E6		107	90-110			
Manganese	520000		ng/l	500000		104	90-110			
Molybdenum	50600		ng/l	50000		101	90-110			
Nickel	124000		ng/l	120000		103	90-110			
Phosphorus	209000		ng/l	200000		105	90-110			LJ, QX
Potassium	2.61E6		ng/l	2.5000E6		104	90-110			
Rubidium	10000		ng/l	10000		100	90-110			
Selenium	20100		ng/l	20000		101	90-110			LJ, QX
Sodium	2.69E6		ng/l	2.5000E6		108	90-110			
Strontium	49900		ng/l	50000		99.7	90-110			

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Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes

Inorganics by Compendium Method IO-3.5 - Quality Control

Batch 2312060 - B3L1903

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Calibration Check (2312060-CCV3) Contin				Prepared: 12/19/23 Analyzed: 12/20/23						
Thallium	490		ng/l	500.00		98.0	90-110			
Thorium	488		ng/l	500.00		97.6	90-110			
Uranium	486		ng/l	500.00		97.1	90-110			
Vanadium	20000		ng/l	20000		99.8	90-110			
Zinc	533000		ng/l	500000		107	90-110			
Calibration Check (2312060-CCV4)				Prepared: 12/19/23 Analyzed: 12/20/23						
Aluminum	1.55E6		ng/l	1.5000E6		103	90-110			
Antimony	20100		ng/l	20000		101	90-110			
Arsenic	20000		ng/l	20000		100	90-110			
Barium	197000		ng/l	200000		98.7	90-110			
Beryllium	5010		ng/l	5000.0		100	90-110			
Cadmium	20300		ng/l	20000		102	90-110			
Calcium	2.52E7		ng/l	2.5000E7		101	90-110			
Chromium	240000		ng/l	240000		99.8	90-110			
Cobalt	50600		ng/l	50000		101	90-110			
Copper	2.04E6		ng/l	2.0000E6		102	90-110			
Iron	2.55E6		ng/l	2.5000E6		102	90-110			
Lead	199000		ng/l	200000		99.7	90-110			
Magnesium	1.04E6		ng/l	1.0000E6		104	90-110			
Manganese	514000		ng/l	500000		103	90-110			
Molybdenum	49800		ng/l	50000		99.6	90-110			
Nickel	122000		ng/l	120000		102	90-110			
Phosphorus	201000		ng/l	200000		101	90-110			LJ, QX
Potassium	2.60E6		ng/l	2.5000E6		104	90-110			
Rubidium	9980		ng/l	10000		99.8	90-110			
Selenium	20100		ng/l	20000		101	90-110			LJ, QX
Sodium	2.62E6		ng/l	2.5000E6		105	90-110			
Strontium	49700		ng/l	50000		99.3	90-110			
Thallium	497		ng/l	500.00		99.4	90-110			
Thorium	483		ng/l	500.00		96.7	90-110			
Uranium	487		ng/l	500.00		97.4	90-110			
Vanadium	19800		ng/l	20000		99.0	90-110			
Zinc	528000		ng/l	500000		106	90-110			
High Cal Check (2312060-HCV1)				Prepared & Analyzed: 12/19/23						
Aluminum	3.00E6		ng/l	3.0000E6		99.9	95-105			
Antimony	40300		ng/l	40000		101	95-105			
Arsenic	40200		ng/l	40000		101	95-105			
Barium	405000		ng/l	400000		101	95-105			

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Batch 2312060 - B3L1903

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
High Cal Check (2312060-HCV1) Continue				Prepared & Analyzed: 12/19/23						
Beryllium	10100		ng/l	10000		101	95-105			
Cadmium	40000		ng/l	40000		100	95-105			
Calcium	5.01E7		ng/l	5.0000E7		100	95-105			
Chromium	478000		ng/l	480000		99.7	95-105			
Cobalt	100000		ng/l	100000		100	95-105			
Copper	3.95E6		ng/l	4.0000E6		98.8	95-105			
Iron	5.02E6		ng/l	5.0000E6		100	95-105			
Lead	403000		ng/l	400000		101	95-105			
Magnesium	1.98E6		ng/l	2.0000E6		98.9	95-105			
Manganese	998000		ng/l	1.0000E6		99.8	95-105			
Molybdenum	100000		ng/l	100000		100	95-105			
Nickel	239000		ng/l	240000		99.6	95-105			
Phosphorus	404000		ng/l	400000		101	95-105			LJ, QX
Potassium	4.99E6		ng/l	5.0000E6		99.8	95-105			
Rubidium	20100		ng/l	20000		101	95-105			
Selenium	40400		ng/l	40000		101	95-105			LJ, QX
Sodium	4.96E6		ng/l	5.0000E6		99.2	95-105			
Strontium	101000		ng/l	100000		101	95-105			
Thallium	1010		ng/l	1000.0		101	95-105			
Thorium	1010		ng/l	1000.0		101	95-105			
Uranium	1010		ng/l	1000.0		101	95-105			
Vanadium	40200		ng/l	40000		101	95-105			
Zinc	985000		ng/l	1.0000E6		98.5	95-105			
Initial Cal Blank (2312060-ICB1)				Prepared & Analyzed: 12/19/23						
Aluminum	-20.4		ng/l							U
Antimony	1.24		ng/l							
Arsenic	1.64		ng/l							
Barium	2.18		ng/l							
Beryllium	0.178		ng/l							
Cadmium	0.347		ng/l							
Calcium	47.8		ng/l							
Chromium	5.14		ng/l							
Cobalt	0.579		ng/l							
Copper	57.7		ng/l							
Iron	81.0		ng/l							
Lead	18.7		ng/l							
Magnesium	13.3		ng/l							
Manganese	10.1		ng/l							

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Inorganics by Compendium Method IO-3.5 - Quality Control

Batch 2312060 - B3L1903

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Initial Cal Blank (2312060-ICB1) Continu				Prepared & Analyzed: 12/19/23						
Molybdenum	11.4		ng/l							
Nickel	-3.89		ng/l							U
Phosphorus	-179		ng/l							LJ, QX, U
Potassium	789		ng/l							
Rubidium	0.0415		ng/l							
Selenium	-4.31		ng/l							LJ, QX, U
Sodium	-174		ng/l							U
Strontium	-0.619		ng/l							U
Thallium	0.459		ng/l							
Thorium	0.532		ng/l							
Uranium	-0.0217		ng/l							U
Vanadium	-78.9		ng/l							U
Zinc	14.9		ng/l							
Initial Cal Check (2312060-ICV1)				Prepared & Analyzed: 12/19/23						
Aluminum	1.43E6		ng/l	1.5000E6		95.6	90-110			
Antimony	19300		ng/l	20000		96.7	90-110			
Arsenic	19700		ng/l	20000		98.6	90-110			
Barium	197000		ng/l	200000		98.4	90-110			
Beryllium	4840		ng/l	5000.0		96.8	90-110			
Cadmium	20100		ng/l	20000		101	90-110			
Calcium	2.42E7		ng/l	2.5000E7		96.9	90-110			
Chromium	233000		ng/l	240000		97.1	90-110			
Cobalt	49500		ng/l	50000		99.1	90-110			
Copper	1.99E6		ng/l	2.0000E6		99.7	90-110			
Iron	2.48E6		ng/l	2.5000E6		99.0	90-110			
Lead	195000		ng/l	200000		97.7	90-110			
Magnesium	972000		ng/l	1.0000E6		97.2	90-110			
Manganese	489000		ng/l	500000		97.8	90-110			
Molybdenum	48800		ng/l	50000		97.6	90-110			
Nickel	118000		ng/l	120000		98.3	90-110			
Phosphorus	200000		ng/l	200000		99.9	90-110			LJ, QX
Potassium	2.51E6		ng/l	2.5000E6		101	90-110			
Rubidium	9700		ng/l	10000		97.0	90-110			
Selenium	20500		ng/l	20000		103	90-110			LJ, QX
Sodium	2.44E6		ng/l	2.5000E6		97.7	90-110			
Strontium	49400		ng/l	50000		98.8	90-110			
Thallium	485		ng/l	500.00		97.0	90-110			
Thorium	476		ng/l	500.00		95.3	90-110			

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Tetra Tech, Inc.
1777 Sentry Pkwy, Bldg 12
Blue Bell, PA 19422
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PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 12/21/23 13:36
SUBMITTED: 12/18/23
AQS SITE CODE:
SITE CODE: Maui fires

Inorganics by Compendium Method IO-3.5 - Quality Control

Batch 2312060 - B3L1903

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Initial Cal Check (2312060-ICV1) Continu				Prepared & Analyzed: 12/19/23						
Uranium	483		ng/l	500.00		96.6	90-110			
Vanadium	20000		ng/l	20000		99.8	90-110			
Zinc	522000		ng/l	500000		104	90-110			
Interference Check A (2312060-IFA1)				Prepared & Analyzed: 12/19/23						
Aluminum	1.52E7		ng/l	1.5000E7		101	80-120			
Antimony	0.00		ng/l				80-120			U
Arsenic	0.00		ng/l				80-120			U
Barium	0.00		ng/l				80-120			U
Beryllium	0.00		ng/l				80-120			U
Cadmium	0.00		ng/l				80-120			U
Calcium	9.41E7		ng/l	1.0040E8		93.7	80-120			
Chromium	0.00		ng/l				80-120			U
Cobalt	0.00		ng/l				80-120			U
Copper	0.00		ng/l				80-120			U
Iron	1.50E7		ng/l	1.5000E7		99.9	80-120			
Lead	0.00		ng/l				80-120			U
Magnesium	1.57E7		ng/l	1.5000E7		105	80-120			
Manganese	0.00		ng/l				80-120			U
Molybdenum	298000		ng/l	300000		99.3	80-120			
Nickel	0.00		ng/l				80-120			U
Phosphorus	1.65E7		ng/l	1.5000E7		110	80-120			LJ, QX
Potassium	1.51E7		ng/l	1.5000E7		101	80-120			
Rubidium	0.00		ng/l				80-120			U
Selenium	0.00		ng/l				80-120			LJ, QX, U
Sodium	1.60E7		ng/l	1.5000E7		107	80-120			
Strontium	0.00		ng/l				80-120			U
Thallium	0.00		ng/l				80-120			U
Thorium	0.00		ng/l				80-120			U
Uranium	0.00		ng/l				80-120			U
Vanadium	0.00		ng/l				80-120			U
Zinc	0.00		ng/l				80-120			U
Interference Check B (2312060-IFB1)				Prepared & Analyzed: 12/19/23						
Aluminum	1.77E7		ng/l	1.6500E7		107	80-120			
Antimony	20500		ng/l	20000		102	80-120			
Arsenic	20500		ng/l	20000		103	80-120			
Barium	202000		ng/l	200000		101	80-120			
Beryllium	4910		ng/l	5000.0		98.1	80-120			
Cadmium	19700		ng/l	20000		98.6	80-120			

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Inorganics by Compendium Method IO-3.5 - Quality Control

Batch 2312060 - B3L1903

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Interference Check B (2312060-IFB1) Co				Prepared & Analyzed: 12/19/23						
Calcium	1.23E8		ng/l	1.2540E8		97.7	80-120			
Chromium	237000		ng/l	240000		98.7	80-120			
Cobalt	50900		ng/l	50000		102	80-120			
Copper	1.93E6		ng/l	2.0000E6		96.4	80-120			
Iron	1.81E7		ng/l	1.7500E7		104	80-120			
Lead	206000		ng/l	200000		103	80-120			
Magnesium	1.78E7		ng/l	1.6000E7		111	80-120			
Manganese	544000		ng/l	500000		109	80-120			
Molybdenum	346000		ng/l	350000		99.0	80-120			
Nickel	120000		ng/l	120000		99.7	80-120			
Phosphorus	1.79E7		ng/l	1.5200E7		118	80-120			LJ, QX
Potassium	1.85E7		ng/l	1.7500E7		106	80-120			
Rubidium	10200		ng/l	10000		102	80-120			
Selenium	19200		ng/l	20000		96.2	80-120			LJ, QX
Sodium	2.01E7		ng/l	1.7500E7		115	80-120			
Strontium	50500		ng/l	50000		101	80-120			
Thallium	519		ng/l	500.00		104	80-120			
Thorium	544		ng/l	500.00		109	80-120			
Uranium	548		ng/l	500.00		110	80-120			
Vanadium	19500		ng/l	20000		97.3	80-120			
Zinc	494000		ng/l	500000		98.9	80-120			
Serial Dilution (2312060-SRD1)		**Source: 3121831-06**		Prepared & Analyzed: 12/19/23						
Aluminum	772	126	ng/m³ Air		768			0.494	10	
Antimony	ND	0.173	ng/m³ Air		ND				10	SL, U
Arsenic	0.330	0.0376	ng/m³ Air		0.326			1.46	10	
Barium	7.06	3.73	ng/m³ Air		7.09			0.432	10	
Beryllium	0.0272	0.0131	ng/m³ Air		0.0257			5.86	10	
Cadmium	ND	0.429	ng/m³ Air		ND				10	U
Calcium	ND	1150	ng/m³ Air		ND				10	QB-01, U
Chromium	ND	7.98	ng/m³ Air		ND				10	U
Cobalt	0.368	0.0613	ng/m³ Air		0.361			1.80	10	QB-01
Copper	16.5	11.8	ng/m³ Air		16.1			2.87	10	
Iron	788	95.2	ng/m³ Air		777			1.40	10	
Lead	ND	1.09	ng/m³ Air		ND				10	U
Magnesium	ND	379	ng/m³ Air		ND				10	U
Manganese	20.0	4.68	ng/m³ Air		19.6			1.84	10	
Molybdenum	0.992	0.838	ng/m³ Air		0.987			0.415	10	QB-01
Nickel	ND	3.15	ng/m³ Air		ND				10	U

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Inorganics by Compendium Method IO-3.5 - Quality Control

Batch 2312060 - B3L1903

Serial Dilution (2312060-SRD1) Continued **Source: 3121831-06** Prepared & Analyzed: 12/19/23

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Phosphorus	ND	4920	ng/m³ Air		ND				10	GC-BS, LJ, QX U
Potassium	ND	149	ng/m³ Air		ND				10	U
Rubidium	0.223	0.0720	ng/m³ Air		0.222			0.354	10	
Selenium	0.193	0.0433	ng/m³ Air		0.197			2.00	10	LJ, QX
Sodium	ND	7860	ng/m³ Air		ND				10	GC-BS, U
Strontium	5.06	2.56	ng/m³ Air		4.93			2.74	10	QB-01
Thallium	ND	0.00198	ng/m³ Air		ND				10	U
Thorium	0.0207	0.0118	ng/m³ Air		0.0213			2.75	10	
Uranium	ND	0.0668	ng/m³ Air		ND				10	U
Vanadium	2.40	0.193	ng/m³ Air		2.42			1.15	10	
Zinc	ND	384	ng/m³ Air		ND				10	U

Batch 2312062 - B3L1903

Calibration Blank (2312062-CCB1) Prepared & Analyzed: 12/20/23

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Aluminum	-41.2		ng/l							U
Antimony	1.23		ng/l							
Arsenic	-2.22		ng/l							U
Barium	0.571		ng/l							
Beryllium	0.0232		ng/l							
Cadmium	0.565		ng/l							
Calcium	1040		ng/l							
Chromium	8.80		ng/l							
Cobalt	0.403		ng/l							
Copper	13.5		ng/l							
Iron	124		ng/l							
Lead	10.2		ng/l							
Magnesium	6.91		ng/l							
Manganese	7.23		ng/l							
Molybdenum	24.6		ng/l							
Nickel	-0.971		ng/l							U
Phosphorus	-101		ng/l							U
Potassium	-1750		ng/l							U
Rubidium	-0.246		ng/l							U
Selenium	-3.73		ng/l							U
Sodium	-167		ng/l							U
Strontium	1.32		ng/l							
Thallium	0.680		ng/l							
Thorium	0.375		ng/l							

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Inorganics by Compendium Method IO-3.5 - Quality Control

Batch 2312062 - B3L1903

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Calibration Blank (2312062-CCB1) Contin				Prepared & Analyzed: 12/20/23						
Uranium	0.0155		ng/l							
Vanadium	-50.8		ng/l							U
Zinc	-12.2		ng/l							U
Calibration Blank (2312062-CCB2)				Prepared & Analyzed: 12/20/23						
Aluminum	-53.2		ng/l							U
Antimony	1.10		ng/l							
Arsenic	-2.80		ng/l							U
Barium	1.87		ng/l							
Beryllium	-0.0766		ng/l							U
Cadmium	0.387		ng/l							
Calcium	648		ng/l							
Chromium	3.35		ng/l							
Cobalt	0.551		ng/l							
Copper	10.0		ng/l							
Iron	-30.8		ng/l							U
Lead	8.05		ng/l							
Magnesium	-46.8		ng/l							U
Manganese	5.50		ng/l							
Molybdenum	9.41		ng/l							
Nickel	-1.04		ng/l							U
Phosphorus	-67.8		ng/l							U
Potassium	-1790		ng/l							U
Rubidium	0.0293		ng/l							
Selenium	2.64		ng/l							
Sodium	-238		ng/l							U
Strontium	1.39		ng/l							
Thallium	1.18		ng/l							
Thorium	0.353		ng/l							
Uranium	0.0209		ng/l							
Vanadium	-56.7		ng/l							U
Zinc	-9.96		ng/l							U
Calibration Blank (2312062-CCB3)				Prepared & Analyzed: 12/20/23						
Aluminum	-86.6		ng/l							U
Antimony	1.25		ng/l							
Arsenic	-3.85		ng/l							U
Barium	2.48		ng/l							
Beryllium	0.268		ng/l							
Cadmium	0.661		ng/l							

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Inorganics by Compendium Method IO-3.5 - Quality Control

Batch 2312062 - B3L1903

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Calibration Blank (2312062-CCB3) Contin				Prepared & Analyzed: 12/20/23						
Calcium	1910		ng/l							
Chromium	3.48		ng/l							
Cobalt	0.658		ng/l							
Copper	22.5		ng/l							
Iron	-29.5		ng/l							U
Lead	8.45		ng/l							
Magnesium	-32.3		ng/l							U
Manganese	6.14		ng/l							
Molybdenum	9.11		ng/l							
Nickel	0.280		ng/l							
Phosphorus	194		ng/l							
Potassium	-2010		ng/l							U
Rubidium	0.517		ng/l							
Selenium	-6.17		ng/l							U
Sodium	-104		ng/l							U
Strontium	1.33		ng/l							
Thallium	0.582		ng/l							
Thorium	0.377		ng/l							
Uranium	0.00318		ng/l							
Vanadium	-58.4		ng/l							U
Zinc	-31.9		ng/l							U
Calibration Blank (2312062-CCB4)				Prepared: 12/20/23 Analyzed: 12/21/23						
Aluminum	1.73		ng/l							
Antimony	1.71		ng/l							
Arsenic	-4.57		ng/l							U
Barium	2.60		ng/l							
Beryllium	0.103		ng/l							
Cadmium	0.589		ng/l							
Calcium	667		ng/l							
Chromium	3.52		ng/l							
Cobalt	0.872		ng/l							
Copper	20.2		ng/l							
Iron	-1.24		ng/l							U
Lead	10.2		ng/l							
Magnesium	-16.5		ng/l							U
Manganese	7.78		ng/l							
Molybdenum	11.6		ng/l							
Nickel	0.149		ng/l							

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Inorganics by Compendium Method IO-3.5 - Quality Control

Batch 2312062 - B3L1903

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Calibration Blank (2312062-CCB4) Contin				Prepared: 12/20/23 Analyzed: 12/21/23						
Phosphorus	51.0		ng/l							
Potassium	-2400		ng/l							U
Rubidium	-0.213		ng/l							U
Selenium	0.720		ng/l							
Sodium	-77.4		ng/l							U
Strontium	0.961		ng/l							
Thallium	0.680		ng/l							
Thorium	0.247		ng/l							
Uranium	0.0205		ng/l							
Vanadium	-60.5		ng/l							U
Zinc	-14.0		ng/l							U
Calibration Check (2312062-CCV1)				Prepared & Analyzed: 12/20/23						
Aluminum	1.49E6		ng/l	1.5000E6		99.4	90-110			
Antimony	19300		ng/l	20000		96.7	90-110			
Arsenic	19600		ng/l	20000		97.8	90-110			
Barium	194000		ng/l	200000		96.8	90-110			
Beryllium	5140		ng/l	5000.0		103	90-110			
Cadmium	19400		ng/l	20000		97.2	90-110			
Calcium	2.43E7		ng/l	2.5000E7		97.2	90-110			
Chromium	227000		ng/l	240000		94.7	90-110			
Cobalt	49100		ng/l	50000		98.3	90-110			
Copper	1.97E6		ng/l	2.0000E6		98.7	90-110			
Iron	2.45E6		ng/l	2.5000E6		98.2	90-110			
Lead	193000		ng/l	200000		96.7	90-110			
Magnesium	1.01E6		ng/l	1.0000E6		101	90-110			
Manganese	484000		ng/l	500000		96.8	90-110			
Molybdenum	48400		ng/l	50000		96.7	90-110			
Nickel	118000		ng/l	120000		98.4	90-110			
Phosphorus	195000		ng/l	200000		97.4	90-110			
Potassium	2.49E6		ng/l	2.5000E6		99.7	90-110			
Rubidium	9790		ng/l	10000		97.9	90-110			
Selenium	19700		ng/l	20000		98.5	90-110			
Sodium	2.50E6		ng/l	2.5000E6		99.9	90-110			
Strontium	48000		ng/l	50000		96.0	90-110			
Thallium	488		ng/l	500.00		97.6	90-110			
Thorium	478		ng/l	500.00		95.6	90-110			
Uranium	482		ng/l	500.00		96.5	90-110			
Vanadium	19100		ng/l	20000		95.6	90-110			

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Batch 2312062 - B3L1903

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Calibration Check (2312062-CCV1) Contin				Prepared & Analyzed: 12/20/23						
Zinc	512000		ng/l	500000		102	90-110			
Calibration Check (2312062-CCV2)				Prepared & Analyzed: 12/20/23						
Aluminum	1.48E6		ng/l	1.5000E6		98.8	90-110			
Antimony	19800		ng/l	20000		99.2	90-110			
Arsenic	20000		ng/l	20000		99.9	90-110			
Barium	198000		ng/l	200000		98.9	90-110			
Beryllium	5370		ng/l	5000.0		107	90-110			
Cadmium	20100		ng/l	20000		101	90-110			
Calcium	2.44E7		ng/l	2.5000E7		97.7	90-110			
Chromium	236000		ng/l	240000		98.2	90-110			
Cobalt	49600		ng/l	50000		99.2	90-110			
Copper	2.03E6		ng/l	2.0000E6		102	90-110			
Iron	2.47E6		ng/l	2.5000E6		98.9	90-110			
Lead	197000		ng/l	200000		98.3	90-110			
Magnesium	1.02E6		ng/l	1.0000E6		102	90-110			
Manganese	492000		ng/l	500000		98.4	90-110			
Molybdenum	49700		ng/l	50000		99.3	90-110			
Nickel	120000		ng/l	120000		99.9	90-110			
Phosphorus	196000		ng/l	200000		97.9	90-110			
Potassium	2.50E6		ng/l	2.5000E6		100	90-110			
Rubidium	9880		ng/l	10000		98.8	90-110			
Selenium	20100		ng/l	20000		100	90-110			
Sodium	2.53E6		ng/l	2.5000E6		101	90-110			
Strontium	49000		ng/l	50000		98.0	90-110			
Thallium	491		ng/l	500.00		98.1	90-110			
Thorium	480		ng/l	500.00		96.1	90-110			
Uranium	484		ng/l	500.00		96.8	90-110			
Vanadium	19600		ng/l	20000		98.1	90-110			
Zinc	527000		ng/l	500000		105	90-110			
Calibration Check (2312062-CCV3)				Prepared & Analyzed: 12/20/23						
Aluminum	1.53E6		ng/l	1.5000E6		102	90-110			
Antimony	20200		ng/l	20000		101	90-110			
Arsenic	20200		ng/l	20000		101	90-110			
Barium	198000		ng/l	200000		99.2	90-110			
Beryllium	5220		ng/l	5000.0		104	90-110			
Cadmium	20600		ng/l	20000		103	90-110			
Calcium	2.51E7		ng/l	2.5000E7		100	90-110			
Chromium	245000		ng/l	240000		102	90-110			

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PHONE: (703) 885-5495 **FAX:**

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REPORTED: 12/21/23 13:36
SUBMITTED: 12/18/23
AQS SITE CODE:
SITE CODE: Maui fires

Inorganics by Compendium Method IO-3.5 - Quality Control

Batch 2312062 - B3L1903

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Calibration Check (2312062-CCV3) Contin				Prepared & Analyzed: 12/20/23						
Cobalt	50800		ng/l	50000		102	90-110			
Copper	2.11E6		ng/l	2.0000E6		106	90-110			
Iron	2.55E6		ng/l	2.5000E6		102	90-110			
Lead	200000		ng/l	200000		100	90-110			
Magnesium	1.05E6		ng/l	1.0000E6		105	90-110			
Manganese	516000		ng/l	500000		103	90-110			
Molybdenum	51300		ng/l	50000		103	90-110			
Nickel	123000		ng/l	120000		103	90-110			
Phosphorus	201000		ng/l	200000		100	90-110			
Potassium	2.57E6		ng/l	2.5000E6		103	90-110			
Rubidium	10000		ng/l	10000		100	90-110			
Selenium	20200		ng/l	20000		101	90-110			
Sodium	2.68E6		ng/l	2.5000E6		107	90-110			
Strontium	49400		ng/l	50000		98.8	90-110			
Thallium	482		ng/l	500.00		96.4	90-110			
Thorium	479		ng/l	500.00		95.8	90-110			
Uranium	486		ng/l	500.00		97.3	90-110			
Vanadium	20000		ng/l	20000		99.9	90-110			
Zinc	538000		ng/l	500000		108	90-110			
Calibration Check (2312062-CCV4)				Prepared: 12/20/23 Analyzed: 12/21/23						
Aluminum	1.53E6		ng/l	1.5000E6		102	90-110			
Antimony	20700		ng/l	20000		103	90-110			
Arsenic	20400		ng/l	20000		102	90-110			
Barium	203000		ng/l	200000		101	90-110			
Beryllium	4860		ng/l	5000.0		97.2	90-110			
Cadmium	21000		ng/l	20000		105	90-110			
Calcium	2.53E7		ng/l	2.5000E7		101	90-110			
Chromium	248000		ng/l	240000		103	90-110			
Cobalt	51100		ng/l	50000		102	90-110			
Copper	2.10E6		ng/l	2.0000E6		105	90-110			
Iron	2.55E6		ng/l	2.5000E6		102	90-110			
Lead	205000		ng/l	200000		102	90-110			
Magnesium	1.04E6		ng/l	1.0000E6		104	90-110			
Manganese	510000		ng/l	500000		102	90-110			
Molybdenum	52400		ng/l	50000		105	90-110			
Nickel	124000		ng/l	120000		103	90-110			
Phosphorus	204000		ng/l	200000		102	90-110			
Potassium	2.55E6		ng/l	2.5000E6		102	90-110			

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Inorganics by Compendium Method IO-3.5 - Quality Control

Batch 2312062 - B3L1903

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Calibration Check (2312062-CCV4) Contin				Prepared: 12/20/23 Analyzed: 12/21/23						
Rubidium	10200		ng/l	10000		102	90-110			
Selenium	20800		ng/l	20000		104	90-110			
Sodium	2.62E6		ng/l	2.5000E6		105	90-110			
Strontium	51000		ng/l	50000		102	90-110			
Thallium	506		ng/l	500.00		101	90-110			
Thorium	502		ng/l	500.00		100	90-110			
Uranium	505		ng/l	500.00		101	90-110			
Vanadium	20400		ng/l	20000		102	90-110			
Zinc	545000		ng/l	500000		109	90-110			
High Cal Check (2312062-HCV1)				Prepared & Analyzed: 12/20/23						
Aluminum	2.91E6		ng/l	3.0000E6		97.2	95-105			
Antimony	39700		ng/l	40000		99.3	95-105			
Arsenic	39700		ng/l	40000		99.3	95-105			
Barium	401000		ng/l	400000		100	95-105			
Beryllium	10200		ng/l	10000		102	95-105			
Cadmium	39300		ng/l	40000		98.3	95-105			
Calcium	4.89E7		ng/l	5.0000E7		97.8	95-105			
Chromium	463000		ng/l	480000		96.5	95-105			
Cobalt	97500		ng/l	100000		97.5	95-105			
Copper	3.85E6		ng/l	4.0000E6		96.2	95-105			
Iron	4.86E6		ng/l	5.0000E6		97.1	95-105			
Lead	396000		ng/l	400000		98.9	95-105			
Magnesium	1.92E6		ng/l	2.0000E6		96.2	95-105			
Manganese	958000		ng/l	1.0000E6		95.8	95-105			
Molybdenum	99300		ng/l	100000		99.3	95-105			
Nickel	233000		ng/l	240000		97.0	95-105			
Phosphorus	384000		ng/l	400000		96.0	95-105			
Potassium	4.88E6		ng/l	5.0000E6		97.6	95-105			
Rubidium	20000		ng/l	20000		100	95-105			
Selenium	40400		ng/l	40000		101	95-105			
Sodium	4.76E6		ng/l	5.0000E6		95.3	95-105			
Strontium	99100		ng/l	100000		99.1	95-105			
Thallium	1000		ng/l	1000.0		100	95-105			
Thorium	1010		ng/l	1000.0		101	95-105			
Uranium	1010		ng/l	1000.0		101	95-105			
Vanadium	39500		ng/l	40000		98.7	95-105			
Zinc	964000		ng/l	1.0000E6		96.4	95-105			
Initial Cal Blank (2312062-ICB1)				Prepared & Analyzed: 12/20/23						

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Inorganics by Compendium Method IO-3.5 - Quality Control

Batch 2312062 - B3L1903

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Initial Cal Blank (2312062-ICB1) Continu				Prepared & Analyzed: 12/20/23						
Aluminum	-70.8		ng/l							U
Antimony	0.816		ng/l							
Arsenic	-4.35		ng/l							U
Barium	2.03		ng/l							
Beryllium	0.0294		ng/l							
Cadmium	0.350		ng/l							
Calcium	1620		ng/l							
Chromium	5.43		ng/l							
Cobalt	0.688		ng/l							
Copper	35.5		ng/l							
Iron	-57.2		ng/l							U
Lead	14.0		ng/l							
Magnesium	-9.61		ng/l							U
Manganese	10.9		ng/l							
Molybdenum	13.0		ng/l							
Nickel	-0.0216		ng/l							U
Phosphorus	-16.3		ng/l							U
Potassium	-2040		ng/l							U
Rubidium	-0.0358		ng/l							U
Selenium	-3.80		ng/l							U
Sodium	-487		ng/l							U
Strontium	1.13		ng/l							
Thallium	0.563		ng/l							
Thorium	0.446		ng/l							
Uranium	0.0299		ng/l							
Vanadium	-55.2		ng/l							U
Zinc	-16.2		ng/l							U
Initial Cal Check (2312062-ICV1)				Prepared & Analyzed: 12/20/23						
Aluminum	1.46E6		ng/l	1.5000E6		97.6	90-110			
Antimony	19900		ng/l	20000		99.4	90-110			
Arsenic	20000		ng/l	20000		100	90-110			
Barium	203000		ng/l	200000		102	90-110			
Beryllium	5220		ng/l	5000.0		104	90-110			
Cadmium	20700		ng/l	20000		103	90-110			
Calcium	2.47E7		ng/l	2.5000E7		98.7	90-110			
Chromium	236000		ng/l	240000		98.5	90-110			
Cobalt	49800		ng/l	50000		99.6	90-110			
Copper	2.03E6		ng/l	2.0000E6		101	90-110			

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Inorganics by Compendium Method IO-3.5 - Quality Control

Batch 2312062 - B3L1903

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Initial Cal Check (2312062-ICV1) Continu				Prepared & Analyzed: 12/20/23						
Iron	2.50E6		ng/l	2.5000E6		99.9	90-110			
Lead	200000		ng/l	200000		99.8	90-110			
Magnesium	990000		ng/l	1.0000E6		99.0	90-110			
Manganese	494000		ng/l	500000		98.7	90-110			
Molybdenum	50100		ng/l	50000		100	90-110			
Nickel	119000		ng/l	120000		99.3	90-110			
Phosphorus	194000		ng/l	200000		96.8	90-110			
Potassium	2.57E6		ng/l	2.5000E6		103	90-110			
Rubidium	9850		ng/l	10000		98.5	90-110			
Selenium	20800		ng/l	20000		104	90-110			
Sodium	2.49E6		ng/l	2.5000E6		99.4	90-110			
Strontium	50200		ng/l	50000		100	90-110			
Thallium	495		ng/l	500.00		99.0	90-110			
Thorium	491		ng/l	500.00		98.3	90-110			
Uranium	500		ng/l	500.00		100	90-110			
Vanadium	20300		ng/l	20000		101	90-110			
Zinc	527000		ng/l	500000		105	90-110			
Interference Check A (2312062-IFA1)				Prepared & Analyzed: 12/20/23						
Aluminum	1.47E7		ng/l	1.5000E7		97.8	80-120			
Antimony	0.00		ng/l				80-120			U
Arsenic	0.00		ng/l				80-120			U
Barium	0.00		ng/l				80-120			U
Beryllium	0.00		ng/l				80-120			U
Cadmium	0.00		ng/l				80-120			U
Calcium	9.27E7		ng/l	1.0040E8		92.3	80-120			
Chromium	0.00		ng/l				80-120			U
Cobalt	0.00		ng/l				80-120			U
Copper	0.00		ng/l				80-120			U
Iron	1.46E7		ng/l	1.5000E7		97.4	80-120			
Lead	0.00		ng/l				80-120			U
Magnesium	1.53E7		ng/l	1.5000E7		102	80-120			
Manganese	0.00		ng/l				80-120			U
Molybdenum	299000		ng/l	300000		99.8	80-120			
Nickel	0.00		ng/l				80-120			U
Phosphorus	1.60E7		ng/l	1.5000E7		106	80-120			
Potassium	1.49E7		ng/l	1.5000E7		99.3	80-120			
Rubidium	0.00		ng/l				80-120			U
Selenium	0.00		ng/l				80-120			U

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Inorganics by Compendium Method IO-3.5 - Quality Control

Batch 2312062 - B3L1903

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Interference Check A (2312062-IFA1) Co				Prepared & Analyzed: 12/20/23						
Sodium	1.53E7		ng/l	1.5000E7		102	80-120			
Strontium	0.00		ng/l				80-120			U
Thallium	0.00		ng/l				80-120			U
Thorium	0.00		ng/l				80-120			U
Uranium	0.00		ng/l				80-120			U
Vanadium	0.00		ng/l				80-120			U
Zinc	0.00		ng/l				80-120			U
Interference Check B (2312062-IFB1)				Prepared & Analyzed: 12/20/23						
Aluminum	1.66E7		ng/l	1.6500E7		101	80-120			
Antimony	20000		ng/l	20000		99.9	80-120			
Arsenic	20000		ng/l	20000		100	80-120			
Barium	201000		ng/l	200000		100	80-120			
Beryllium	4780		ng/l	5000.0		95.7	80-120			
Cadmium	19300		ng/l	20000		96.3	80-120			
Calcium	1.17E8		ng/l	1.2540E8		93.1	80-120			
Chromium	229000		ng/l	240000		95.6	80-120			
Cobalt	49300		ng/l	50000		98.6	80-120			
Copper	1.88E6		ng/l	2.0000E6		94.1	80-120			
Iron	1.73E7		ng/l	1.7500E7		98.8	80-120			
Lead	203000		ng/l	200000		102	80-120			
Magnesium	1.67E7		ng/l	1.6000E7		104	80-120			
Manganese	516000		ng/l	500000		103	80-120			
Molybdenum	337000		ng/l	350000		96.2	80-120			
Nickel	116000		ng/l	120000		96.3	80-120			
Phosphorus	1.65E7		ng/l	1.5200E7		108	80-120			
Potassium	1.77E7		ng/l	1.7500E7		101	80-120			
Rubidium	10100		ng/l	10000		101	80-120			
Selenium	19200		ng/l	20000		95.8	80-120			
Sodium	1.88E7		ng/l	1.7500E7		108	80-120			
Strontium	49600		ng/l	50000		99.3	80-120			
Thallium	519		ng/l	500.00		104	80-120			
Thorium	539		ng/l	500.00		108	80-120			
Uranium	543		ng/l	500.00		109	80-120			
Vanadium	19100		ng/l	20000		95.3	80-120			
Zinc	484000		ng/l	500000		96.7	80-120			

Batch B3L1903 - ICP-MS Extraction

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (B3L1903-BLK1)				Prepared & Analyzed: 12/19/23						
Aluminum	ND	32.1	ng/m³ Air							U

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Inorganics by Compendium Method IO-3.5 - Quality Control

Batch B3L1903 - ICP-MS Extraction

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (B3L1903-BLK1) Continued				Prepared & Analyzed: 12/19/23						
Antimony	ND	0.0441	ng/m³ Air							SL, U
Arsenic	ND	0.00955	ng/m³ Air							U
Barium	ND	0.948	ng/m³ Air							U
Beryllium	ND	0.00332	ng/m³ Air							U
Cadmium	ND	0.109	ng/m³ Air							U
Calcium	ND	292	ng/m³ Air							QB-01, U
Chromium	ND	2.03	ng/m³ Air							U
Cobalt	ND	0.0156	ng/m³ Air							QB-01, U
Copper	ND	3.00	ng/m³ Air							U
Iron	ND	24.2	ng/m³ Air							U
Lead	ND	0.276	ng/m³ Air							U
Magnesium	ND	96.4	ng/m³ Air							U
Manganese	ND	1.19	ng/m³ Air							U
Molybdenum	ND	0.213	ng/m³ Air							QB-01, U
Nickel	ND	0.801	ng/m³ Air							U
Phosphorus	ND	1250	ng/m³ Air							GC-BS, LJ, QX U
Potassium	ND	38.0	ng/m³ Air							U
Rubidium	ND	0.0183	ng/m³ Air							U
Selenium	ND	0.0110	ng/m³ Air							LJ, QX, U
Sodium	ND	2000	ng/m³ Air							GC-BS, U
Strontium	ND	0.652	ng/m³ Air							QB-01, U
Thallium	ND	5.03E-4	ng/m³ Air							U
Thorium	ND	0.00300	ng/m³ Air							U
Uranium	ND	0.0170	ng/m³ Air							U
Vanadium	ND	0.0492	ng/m³ Air							U
Zinc	ND	97.7	ng/m³ Air							U
LCS (B3L1903-BS1)				Prepared & Analyzed: 12/19/23						
Aluminum	95.4	32.1	ng/m³ Air	82.975		115	80-120			
Antimony	0.473	0.0441	ng/m³ Air	1.3829		34.2	80-120			SL
Arsenic	2.67	0.00955	ng/m³ Air	2.7658		96.7	80-120			
Barium	27.5	0.948	ng/m³ Air	27.658		99.6	80-120			
Beryllium	1.38	0.00332	ng/m³ Air	1.3829		99.7	80-120			
Cadmium	1.37	0.109	ng/m³ Air	1.3829		99.1	80-120			
Calcium	669	292	ng/m³ Air	69.146		968	80-120			QB-01
Chromium	15.9	2.03	ng/m³ Air	13.829		115	80-120			
Cobalt	1.37	0.0156	ng/m³ Air	1.3829		99.1	80-120			QB-01
Copper	31.3	3.00	ng/m³ Air	27.658		113	80-120			

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Inorganics by Compendium Method IO-3.5 - Quality Control

Batch B3L1903 - ICP-MS Extraction

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
LCS (B3L1903-BS1) Continued				Prepared & Analyzed: 12/19/23						
Iron	41.7	24.2	ng/m³ Air	27.658		151	80-120			
Lead	13.4	0.276	ng/m³ Air	13.829		97.1	80-120			
Magnesium	ND	96.4	ng/m³ Air	27.658			80-120			U
Manganese	8.90	1.19	ng/m³ Air	8.2975		107	80-120			
Molybdenum	1.62	0.213	ng/m³ Air	1.3829		117	80-120			QB-01
Nickel	3.17	0.801	ng/m³ Air	2.7658		115	80-120			
Phosphorus	ND	1250	ng/m³ Air	13.829			80-120			GC-BS, LJ, QX, U
Potassium	71.1	38.0	ng/m³ Air	55.317		129	80-120			
Rubidium	1.30	0.0183	ng/m³ Air	1.3829		94.3	80-120			
Selenium	2.68	0.0110	ng/m³ Air	2.7658		97.1	80-120			LJ, QX
Sodium	ND	2000	ng/m³ Air	55.317			80-120			GC-BS, U
Strontium	2.24	0.652	ng/m³ Air	1.3829		162	80-120			QB-01
Thallium	0.132	5.03E-4	ng/m³ Air	0.13829		95.1	80-120			
Thorium	0.129	0.00300	ng/m³ Air	0.13829		93.3	80-120			
Uranium	0.129	0.0170	ng/m³ Air	0.13829		93.2	80-120			
Vanadium	2.72	0.0492	ng/m³ Air	2.7658		98.2	80-120			
Zinc	137	97.7	ng/m³ Air	82.975		166	80-120			
Duplicate (B3L1903-DUP1)		**Source: 3121831-06**		Prepared & Analyzed: 12/19/23						
Aluminum	722	25.2	ng/m³ Air		768			6.18	10	E
Antimony	0.0543	0.0347	ng/m³ Air		0.0597			9.36	10	SL
Arsenic	0.320	0.00751	ng/m³ Air		0.326			1.64	10	
Barium	6.86	0.746	ng/m³ Air		7.09			3.24	10	
Beryllium	0.0242	0.00261	ng/m³ Air		0.0257			5.66	10	
Cadmium	ND	0.0857	ng/m³ Air		0.191				10	U
Calcium	631	230	ng/m³ Air		652			3.19	10	QB-01
Chromium	2.00	1.60	ng/m³ Air		2.08			3.83	10	
Cobalt	0.340	0.0123	ng/m³ Air		0.361			6.04	10	QB-01
Copper	15.3	2.36	ng/m³ Air		16.1			5.16	10	
Iron	723	19.0	ng/m³ Air		777			7.17	10	
Lead	0.422	0.217	ng/m³ Air		0.423			0.289	10	
Magnesium	238	75.8	ng/m³ Air		242			1.99	10	
Manganese	18.7	0.936	ng/m³ Air		19.6			4.66	10	
Molybdenum	0.968	0.168	ng/m³ Air		0.987			1.94	10	QB-01
Nickel	0.989	0.630	ng/m³ Air		0.887			10.9	10	
Phosphorus	ND	983	ng/m³ Air		ND				10	GC-BS, LJ, QX, U
Potassium	123	29.9	ng/m³ Air		119			3.32	10	
Rubidium	0.208	0.0144	ng/m³ Air		0.222			6.28	10	

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1777 Sentry Pkwy, Bldg 12
Blue Bell, PA 19422
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PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 12/21/23 13:36
SUBMITTED: 12/18/23
AQS SITE CODE:
SITE CODE: Maui fires

Inorganics by Compendium Method IO-3.5 - Quality Control

Batch B3L1903 - ICP-MS Extraction

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Duplicate (B3L1903-DUP1) Continued		**Source: 3121831-06**		Prepared & Analyzed: 12/19/23						
Selenium	0.191	0.00865	ng/m³ Air		0.197			2.87	10	LJ, QX
Sodium	1750	1570	ng/m³ Air		1750			0.361	10	E, GC-BS
Strontium	4.70	0.513	ng/m³ Air		4.93			4.71	10	QB-01
Thallium	0.00130	3.96E-4	ng/m³ Air		0.00139			7.18	10	
Thorium	0.0185	0.00236	ng/m³ Air		0.0213			14.0	10	
Uranium	0.0157	0.0134	ng/m³ Air		0.0168			7.12	10	
Vanadium	2.30	0.0387	ng/m³ Air		2.42			5.06	10	
Zinc	ND	76.8	ng/m³ Air		ND				10	U
Duplicate (B3L1903-DUP2)		**Source: 3121831-09**		Prepared: 12/19/23 Analyzed: 12/20/23						
Aluminum	1380	25.3	ng/m³ Air		1390			0.487	10	E
Antimony	0.0680	0.0347	ng/m³ Air		0.0688			1.16	10	SL
Arsenic	0.321	0.00752	ng/m³ Air		0.318			0.671	10	
Barium	10.2	0.747	ng/m³ Air		10.3			0.737	10	
Beryllium	0.0379	0.00262	ng/m³ Air		0.0448			16.7	10	R-F
Cadmium	ND	0.0859	ng/m³ Air		ND				10	U
Calcium	809	230	ng/m³ Air		808			0.0881	10	QB-01
Chromium	2.59	1.60	ng/m³ Air		2.60			0.253	10	
Cobalt	0.634	0.0123	ng/m³ Air		0.636			0.235	10	QB-01
Copper	18.1	2.36	ng/m³ Air		18.1			0.168	10	
Iron	1390	19.1	ng/m³ Air		1400			0.897	10	
Lead	0.623	0.217	ng/m³ Air		0.625			0.308	10	
Magnesium	293	75.9	ng/m³ Air		293			0.121	10	
Manganese	38.3	0.937	ng/m³ Air		38.8			1.33	10	
Molybdenum	0.985	0.168	ng/m³ Air		0.994			0.852	10	QB-01
Nickel	1.21	0.631	ng/m³ Air		1.22			0.988	10	
Phosphorus	ND	985	ng/m³ Air		ND				10	GC-BS, LJ, QX U
Potassium	142	29.9	ng/m³ Air		142			0.139	10	
Rubidium	0.317	0.0144	ng/m³ Air		0.315			0.539	10	
Selenium	0.253	0.00866	ng/m³ Air		0.253			0.0290	10	LJ, QX
Sodium	1920	1580	ng/m³ Air		1910			0.573	10	E, GC-BS
Strontium	7.45	0.514	ng/m³ Air		7.35			1.26	10	QB-01
Thallium	0.00209	3.96E-4	ng/m³ Air		0.00218			4.42	10	
Thorium	0.0368	0.00236	ng/m³ Air		0.0369			0.0698	10	
Uranium	0.0272	0.0134	ng/m³ Air		0.0273			0.118	10	
Vanadium	3.55	0.0388	ng/m³ Air		3.57			0.592	10	
Zinc	ND	77.0	ng/m³ Air		ND				10	U
Matrix Spike (B3L1903-MS1)		**Source: 3121831-06**		Prepared & Analyzed: 12/19/23						

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Inorganics by Compendium Method IO-3.5 - Quality Control

Batch B3L1903 - ICP-MS Extraction

Matrix Spike (B3L1903-MS1) Continued **Source: 3121831-06** Prepared & Analyzed: 12/19/23

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Aluminum	819	25.2	ng/m³ Air	65.255	768	78.7	80-120			QM-4X
Antimony	0.541	0.0347	ng/m³ Air	1.0876	0.0597	44.2	80-120			SL
Arsenic	2.35	0.00751	ng/m³ Air	2.1752	0.326	92.9	80-120			
Barium	28.0	0.746	ng/m³ Air	21.752	7.09	96.0	80-120			
Beryllium	1.18	0.00261	ng/m³ Air	1.0876	0.0257	107	80-120			
Cadmium	2.05	0.0857	ng/m³ Air	1.0876	0.191	171	80-120			QM-07
Calcium	689	230	ng/m³ Air	54.379	652	69.0	80-120			QB-01, QM-4X
Chromium	12.9	1.60	ng/m³ Air	10.876	2.08	99.8	80-120			
Cobalt	1.41	0.0123	ng/m³ Air	1.0876	0.361	96.5	80-120			QB-01
Copper	42.5	2.36	ng/m³ Air	21.752	16.1	121	80-120			QM-07
Iron	776	19.0	ng/m³ Air	21.752	777	NR	80-120			QM-4X
Lead	10.9	0.217	ng/m³ Air	10.876	0.423	96.4	80-120			
Magnesium	267	75.8	ng/m³ Air	21.752	242	113	80-120			
Manganese	26.3	0.936	ng/m³ Air	6.5255	19.6	101	80-120			
Molybdenum	1.98	0.168	ng/m³ Air	1.0876	0.987	91.1	80-120			QB-01
Nickel	3.24	0.630	ng/m³ Air	2.1752	0.887	108	80-120			
Phosphorus	ND	983	ng/m³ Air	10.876	ND		80-120			GC-BS, LJ, QX U
Potassium	163	29.9	ng/m³ Air	43.503	119	99.8	80-120			
Rubidium	1.18	0.0144	ng/m³ Air	1.0876	0.222	88.4	80-120			
Selenium	2.24	0.00865	ng/m³ Air	2.1752	0.197	93.8	80-120			QX, LJ
Sodium	1850	1570	ng/m³ Air	43.503	1750	218	80-120			GC-BS, QM-4X
Strontium	5.85	0.513	ng/m³ Air	1.0876	4.93	84.6	80-120			QB-01
Thallium	0.104	3.96E-4	ng/m³ Air	0.10876	0.00139	94.5	80-120			
Thorium	0.0607	0.00236	ng/m³ Air	0.10876	0.0213	36.2	80-120			QM-07
Uranium	0.117	0.0134	ng/m³ Air	0.10876	0.0168	91.8	80-120			
Vanadium	4.47	0.0387	ng/m³ Air	2.1752	2.42	93.9	80-120			
Zinc	96.9	76.8	ng/m³ Air	65.255	ND	149	80-120			

Matrix Spike Dup (B3L1903-MSD1) **Source: 3121831-06** Prepared & Analyzed: 12/19/23

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Aluminum	887	25.2	ng/m³ Air	65.255	768	182	80-120	7.90	20	QM-4X
Antimony	0.542	0.0347	ng/m³ Air	1.0876	0.0597	44.4	80-120	0.315	20	SL
Arsenic	2.41	0.00751	ng/m³ Air	2.1752	0.326	95.7	80-120	2.49	20	
Barium	28.5	0.746	ng/m³ Air	21.752	7.09	98.7	80-120	2.02	20	
Beryllium	1.07	0.00261	ng/m³ Air	1.0876	0.0257	96.4	80-120	9.79	20	
Cadmium	1.12	0.0857	ng/m³ Air	1.0876	0.191	85.6	80-120	58.5	20	LJ, QX
Calcium	719	230	ng/m³ Air	54.379	652	123	80-120	4.17	20	QB-01, QM-4X
Chromium	13.2	1.60	ng/m³ Air	10.876	2.08	102	80-120	1.83	20	
Cobalt	1.42	0.0123	ng/m³ Air	1.0876	0.361	97.5	80-120	0.799	20	QB-01

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Inorganics by Compendium Method IO-3.5 - Quality Control

Batch B3L1903 - ICP-MS Extraction

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Matrix Spike Dup (B3L1903-MSD1) ContirSource: 3121831-06				Prepared & Analyzed: 12/19/23						
Copper	44.9	2.36	ng/m³ Air	21.752	16.1	132	80-120	5.50	20	QM-07
Iron	835	19.0	ng/m³ Air	21.752	777	268	80-120	7.35	20	QM-4X
Lead	11.2	0.217	ng/m³ Air	10.876	0.423	98.9	80-120	2.40	20	
Magnesium	273	75.8	ng/m³ Air	21.752	242	142	80-120	2.34	20	QM-4X
Manganese	27.2	0.936	ng/m³ Air	6.5255	19.6	116	80-120	3.55	20	
Molybdenum	2.04	0.168	ng/m³ Air	1.0876	0.987	96.5	80-120	2.93	20	QB-01
Nickel	3.11	0.630	ng/m³ Air	2.1752	0.887	102	80-120	3.85	20	
Phosphorus	ND	983	ng/m³ Air	10.876	ND		80-120		20	QM-4X, QX, GC-BS, LJ, U
Potassium	168	29.9	ng/m³ Air	43.503	119	112	80-120	3.31	20	
Rubidium	1.19	0.0144	ng/m³ Air	1.0876	0.222	89.0	80-120	0.503	20	
Selenium	2.26	0.00865	ng/m³ Air	2.1752	0.197	94.9	80-120	1.07	20	LJ, QX
Sodium	1870	1570	ng/m³ Air	43.503	1750	268	80-120	1.18	20	GC-BS, QM-4)
Strontium	5.94	0.513	ng/m³ Air	1.0876	4.93	93.0	80-120	1.56	20	QB-01
Thallium	0.105	3.96E-4	ng/m³ Air	0.10876	0.00139	95.3	80-120	0.868	20	
Thorium	0.0687	0.00236	ng/m³ Air	0.10876	0.0213	43.6	80-120	12.3	20	QM-07
Uranium	0.118	0.0134	ng/m³ Air	0.10876	0.0168	93.1	80-120	1.20	20	
Vanadium	4.62	0.0387	ng/m³ Air	2.1752	2.42	101	80-120	3.28	20	
Zinc	99.4	76.8	ng/m³ Air	65.255	ND	152	80-120	2.49	20	
Post Spike (B3L1903-PS1)		**Source: 3121831-06**		Prepared & Analyzed: 12/19/23						
Aluminum	812	25.2	ng/m³ Air	21.752	768	204	75-125			A-01
Antimony	0.265	0.0347	ng/m³ Air	0.21752	0.0597	94.4	75-125			SL
Arsenic	1.33	0.00751	ng/m³ Air	1.0876	0.326	92.3	75-125			
Barium	9.10	0.746	ng/m³ Air	2.1752	7.09	92.5	75-125			
Beryllium	0.244	0.00261	ng/m³ Air	0.21752	0.0257	100	75-125			
Cadmium	0.298	0.0857	ng/m³ Air	0.10876	0.191	98.0	75-125			
Calcium	685	230	ng/m³ Air	21.752	652	154	75-125			A-01, QB-01
Chromium	3.16	1.60	ng/m³ Air	1.0876	2.08	99.2	75-125			
Cobalt	0.578	0.0123	ng/m³ Air	0.21752	0.361	99.8	75-125			QB-01
Copper	27.5	2.36	ng/m³ Air	10.876	16.1	105	75-125			
Iron	812	19.0	ng/m³ Air	21.752	777	160	75-125			A-01
Lead	21.2	0.217	ng/m³ Air	21.752	0.423	95.5	75-125			
Magnesium	273	75.8	ng/m³ Air	21.752	242	140	75-125			A-01
Manganese	22.4	0.936	ng/m³ Air	2.1752	19.6	126	75-125			A-01
Molybdenum	1.96	0.168	ng/m³ Air	1.0876	0.987	89.1	75-125			QB-01
Nickel	2.99	0.630	ng/m³ Air	2.1752	0.887	96.6	75-125			
Phosphorus	ND	983	ng/m³ Air	4.3503	ND		75-125			A-01, GC-BS, LJ, QX, U
Potassium	141	29.9	ng/m³ Air	21.752	119	102	75-125			

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Inorganics by Compendium Method IO-3.5 - Quality Control

Batch B3L1903 - ICP-MS Extraction

Post Spike (B3L1903-PS1) Continued **Source: 3121831-06** Prepared & Analyzed: 12/19/23

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Rubidium	0.315	0.0144	ng/m³ Air	0.10876	0.222	85.5	75-125			
Selenium	1.20	0.00865	ng/m³ Air	1.0876	0.197	91.9	75-125			LJ, QX
Sodium	1860	1570	ng/m³ Air	21.752	1750	480	75-125			A-01, GC-BS
Strontium	5.93	0.513	ng/m³ Air	1.0876	4.93	91.9	75-125			QB-01
Thallium	0.0514	3.96E-4	ng/m³ Air	5.4379E-2	0.00139	91.9	75-125			
Thorium	0.0703	0.00236	ng/m³ Air	5.4379E-2	0.0213	90.1	75-125			
Uranium	0.0663	0.0134	ng/m³ Air	5.4379E-2	0.0168	90.9	75-125			
Vanadium	3.47	0.0387	ng/m³ Air	1.0876	2.42	96.5	75-125			
Zinc	ND	76.8	ng/m³ Air	21.752	ND		75-125			U

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Notes and Definitions

U	Under Detection Limit
SL	The spike recovery was outside acceptance limits. Reported value may be biased low.
R-F	Replicate exceeds DQO criteria.
QX	Compound does not meet QC criteria. Results should be considered an estimate.
QM-4X	The MS/MSD recovery exceeds criteria because the parent sample concentration is greater than 4x the spike concentration. Sample results for the QC batch were accepted based on acceptable BS/BSD recoveries.
QM-07	The spike recovery was outside acceptance limits for the MS and/or MSD. The batch was accepted based on acceptable LCS recovery.
QB-01	Analyte exceeds method blank criteria
LJ	Identification of analyte is acceptable; reported value is an estimate.
GC-BS	Compound exceeds Blank Spike Criteria
FB-01	Analyte exceeds Field Blank criteria.
E	The concentration indicated for this analyte is an estimated value above the calibration range of the instrument. This value is considered an estimate (CLP E-flag).
D	This result obtained by dilution.
A-01	Parent sample >4x spike amount
ND	Analyte NOT DETECTED
NR	Not Reported
MDL	Method Detection Limit
RPD	Relative Percent Difference

Note: This test is accredited under the 2016 TNI Standard.

Eastern Research Group
601 Keystone Park Drive
Suite 700
Morrisville, NC 27560

December 28, 2023

Ms. Chelsea Saber
Tetra Tech, Inc.
1777 Sentry Pkwy, Bldg 12
Blue Bell, PA 19422
Project Name: Maui fires

Dear Ms. Chelsea Saber,

This report contains the analytical results for the sample(s) received under chain(s) of custody by Eastern Research Group on 12/20/23 13:27.

Values below the MDL for QC results in this report are recorded as ND, however the actual values are reported in the accompanying Excel report with a "U" flag (Under the detection limit). The actual values are reported in AQS.

This test is accredited under the 2016 TNI Standard for Environmental Laboratories (FL DOH Certification # E87673). All analyses were performed as described in the US EPA-approved QAPP, under the contract for National Hazardous Air Pollutant Support (US EPA Contract No. 68HERH22D0002). This cover page is an integral part of this report, and any exceptions or comments are noted on the last page.

Release of the data contained in this data package and in the data submitted in the electronic data deliverable, has been authorized by the Program Manager, or the Program Manager's designee as verified by the following signature.

The issuance of the final Certificate of Analysis takes precedence over any previous Report. If you have any questions, please contact me at 919-468-7924.

Sincerely,

Julie Swift
Program Manager
julie.swift@erg.com

The information contained in this report and its attachment(s) are intended only for the use of the individual to whom it is addressed and may contain information that is privileged, confidential, or exempt from disclosure. If the reader of this message is not the intended recipient, you are hereby notified that any dissemination, distribution, or copying of this report is strictly prohibited. If you have received this report in error, please notify julie.swift@erg.com and delete the report without retaining any copies.

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FILE #: 0000.00
REPORTED: 12/28/23 10:10
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AQS SITE CODE:
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ANALYTICAL REPORT FOR SAMPLES

SampleName	LabNumber	Matrix	Sampled	Received
TetraTech Q9533938	3122052-01	Air	12/14/23 23:59	12/20/23 13:27
TetraTech Q9533937	3122052-02	Air	12/14/23 23:59	12/20/23 13:27
TetraTech Q9533935	3122052-03	Air	12/14/23 23:59	12/20/23 13:27
TetraTech Q9533934 FB	3122052-04	Air	12/14/23 00:00	12/20/23 13:27
TetraTech Q9543029	3122052-05	Air	12/15/23 23:59	12/20/23 13:27
TetraTech Q9533895	3122052-06	Air	12/15/23 23:59	12/20/23 13:27
TetraTech Q9533893	3122052-07	Air	12/15/23 23:59	12/20/23 13:27
TetraTech Q9533890 FB	3122052-08	Air	12/15/23 00:00	12/20/23 13:27
TetraTech Q9533892	3122052-09	Air	12/16/23 23:59	12/20/23 13:27
TetraTech Q9533888	3122052-10	Air	12/16/23 23:59	12/20/23 13:27
TetraTech Q9533885	3122052-11	Air	12/16/23 23:59	12/20/23 13:27
TetraTech Q9533884 FB	3122052-12	Air	12/16/23 00:00	12/20/23 13:27
TetraTech Q9533883	3122052-13	Air	12/17/23 23:59	12/20/23 13:27
TetraTech Q9533881	3122052-14	Air	12/17/23 23:59	12/20/23 13:27
TetraTech Q9533910	3122052-15	Air	12/17/23 23:59	12/20/23 13:27
TetraTech Q9533908 FB	3122052-16	Air	12/17/23 00:00	12/20/23 13:27

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AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9533938 **Lab ID:** 3122052-01 **Sampled:** 12/14/23 23:59
Matrix: Air **Sample Volume:** 2222.14? m³ **Received:** 12/20/23 13:27
Filter ID: **Analysis Date:** 12/21/23 19:16
Comments: MFK-AM01-121423-HM

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	**7429-90-5**	**567**		**23.5**
Antimony	7440-36-0	0.0243	SL, U	0.0323
Arsenic	**7440-38-2**	**0.158**		**0.00699**
Barium	**7440-39-3**	**4.17**		**0.694**
Beryllium	**7440-41-7**	**0.0164**		**0.00243**
Cadmium	7440-43-9	0.0132	U	0.0798
Calcium	**7440-70-2**	**474**	LJ, QB-01	**214**
Chromium	**7440-47-3**	**1.81**		**1.49**
Cobalt	**7440-48-4**	**0.216**	QB-01	**0.0114**
Copper	**7440-50-8**	**14.1**		**2.20**
Iron	**7439-89-6**	**532**		**17.7**
Lead	**7439-92-1**	**0.769**		**0.202**
Magnesium	**7439-95-4**	**134**		**70.6**
Manganese	**7439-96-5**	**14.0**		**0.871**
Molybdenum	**7439-98-7**	**0.630**	QB-01	**0.156**
Nickel	7440-02-0	0.548	U	0.586
Phosphorus	7723-14-0	302	GC-BS, U	915
Potassium	**7440-09-7**	**118**		**27.8**
Rubidium	**7440-17-7**	**0.163**		**0.0134**
Selenium	**7782-49-2**	**0.109**		**0.00805**
Sodium	7440-23-5	1130	GC-BS, U	1460
Strontium	**7440-24-6**	**3.67**	QB-01	**0.477**
Thallium	**7440-28-0**	**0.00188**		**3.68E-4**
Thorium	**7440-29-01**	**0.0135**		**0.00220**
Uranium	**7440-61-1**	**0.0128**		**0.0124**
Vanadium	**7440-62-2**	**1.26**		**0.0360**
Zinc	7440-66-6	24.5	U	71.5

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AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9533937 **Lab ID:** 3122052-02 **Sampled:** 12/14/23 23:59
Matrix: Air **Sample Volume:** 2205.002 m³ **Received:** 12/20/23 13:27
Filter ID: **Analysis Date:** 12/21/23 19:34
Comments: MFK-AM02-121423-HM

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	**7429-90-5**	**318**		**23.7**
Antimony	7440-36-0	0.0257	SL, U	0.0325
Arsenic	**7440-38-2**	**0.0912**		**0.00705**
Barium	**7440-39-3**	**3.48**		**0.699**
Beryllium	**7440-41-7**	**0.0111**		**0.00245**
Cadmium	7440-43-9	0.0226	U	0.0804
Calcium	**7440-70-2**	**389**	LJ, QB-01	**215**
Chromium	**7440-47-3**	**1.62**		**1.50**
Cobalt	**7440-48-4**	**0.140**	QB-01	**0.0115**
Copper	**7440-50-8**	**10.9**		**2.21**
Iron	**7439-89-6**	**322**		**17.9**
Lead	**7439-92-1**	**0.435**		**0.204**
Magnesium	**7439-95-4**	**150**		**71.1**
Manganese	**7439-96-5**	**7.95**		**0.878**
Molybdenum	**7439-98-7**	**0.560**	QB-01	**0.157**
Nickel	**7440-02-0**	**0.623**		**0.591**
Phosphorus	7723-14-0	285	GC-BS, U	922
Potassium	**7440-09-7**	**82.6**		**28.0**
Rubidium	**7440-17-7**	**0.121**		**0.0135**
Selenium	**7782-49-2**	**0.0965**		**0.00812**
Sodium	7440-23-5	1300	GC-BS, U	1480
Strontium	**7440-24-6**	**2.48**	QB-01	**0.481**
Thallium	**7440-28-0**	**0.00191**		**3.71E-4**
Thorium	**7440-29-01**	**0.00974**		**0.00221**
Uranium	7440-61-1	0.00798	U	0.0125
Vanadium	**7440-62-2**	**0.756**		**0.0363**
Zinc	7440-66-6	19.8	U	72.1

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AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9533935 **Lab ID:** 3122052-03 **Sampled:** 12/14/23 23:59
Matrix: Air **Sample Volume:** 1852.809 m³ **Received:** 12/20/23 13:27
Filter ID: **Analysis Date:** 12/21/23 19:49
Comments: MFK-AM03-121423-HM

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	**7429-90-5**	**381**		**28.2**
Antimony	**7440-36-0**	**0.0462**	SL	**0.0387**
Arsenic	**7440-38-2**	**0.142**		**0.00839**
Barium	**7440-39-3**	**5.48**		**0.832**
Beryllium	**7440-41-7**	**0.0171**		**0.00292**
Cadmium	7440-43-9	0.0129	U	0.0957
Calcium	**7440-70-2**	**488**	LJ, QB-01	**256**
Chromium	**7440-47-3**	**2.14**		**1.78**
Cobalt	**7440-48-4**	**0.203**	QB-01	**0.0137**
Copper	**7440-50-8**	**17.6**		**2.63**
Iron	**7439-89-6**	**438**		**21.3**
Lead	**7439-92-1**	**0.488**		**0.242**
Magnesium	**7439-95-4**	**207**		**84.7**
Manganese	**7439-96-5**	**14.2**		**1.04**
Molybdenum	**7439-98-7**	**0.565**	QB-01	**0.187**
Nickel	**7440-02-0**	**0.761**		**0.703**
Phosphorus	7723-14-0	342	GC-BS, U	1100
Potassium	**7440-09-7**	**106**		**33.4**
Rubidium	**7440-17-7**	**0.177**		**0.0161**
Selenium	**7782-49-2**	**0.130**		**0.00966**
Sodium	7440-23-5	1680	GC-BS, U	1760
Strontium	**7440-24-6**	**3.89**	QB-01	**0.573**
Thallium	**7440-28-0**	**0.00265**		**4.42E-4**
Thorium	**7440-29-01**	**0.0134**		**0.00263**
Uranium	7440-61-1	0.0107	U	0.0149
Vanadium	**7440-62-2**	**0.942**		**0.0432**
Zinc	7440-66-6	22.7	U	85.8

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AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9533934 FB **Lab ID:** 3122052-04 **Sampled:** 12/14/23 00:00
Matrix: Air **Sample Volume:** 2222.149 m³ **Received:** 12/20/23 13:27
Filter ID: **Analysis Date:** 12/21/23 20:04
Comments: MFK-FB01-121423-HM Field Blank

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	7429-90-5	10.5	U	23.5
Antimony	7440-36-0	0.00714	SL, U	0.0323
Arsenic	7440-38-2	0.00231	U	0.00699
Barium	7440-39-3	0.608	U	0.694
Beryllium	7440-41-7	9.04E-4	U	0.00243
Cadmium	7440-43-9	0.00346	U	0.0798
Calcium	**7440-70-2**	**294**	FB-01, LJ, QB-01	**214**
Chromium	7440-47-3	1.38	U	1.49
Cobalt	**7440-48-4**	**0.0240**	FB-01, QB-01	**0.0114**
Copper	7440-50-8	0.833	U	2.20
Iron	7439-89-6	14.5	U	17.7
Lead	7439-92-1	0.0590	U	0.202
Magnesium	7439-95-4	34.9	U	70.6
Manganese	7439-96-5	0.195	U	0.871
Molybdenum	**7439-98-7**	**0.213**	FB-01, QB-01	**0.156**
Nickel	7440-02-0	0.231	U	0.586
Phosphorus	7723-14-0	256	GC-BS, U	915
Potassium	**7440-09-7**	**35.3**	FB-01	**27.8**
Rubidium	7440-17-7	0.0131	U	0.0134
Selenium	7782-49-2	0.00599	U	0.00805
Sodium	7440-23-5	568	GC-BS, U	1460
Strontium	**7440-24-6**	**0.542**	FB-01, QB-01	**0.477**
Thallium	7440-28-0	1.34E-4	U	3.68E-4
Thorium	7440-29-01	0.00200	U	0.00220
Uranium	7440-61-1	0.00146	U	0.0124
Vanadium	7440-62-2	0.0180	U	0.0360
Zinc	7440-66-6	19.4	U	71.5

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AQS SITE CODE:
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Description: TetraTech Q9543029 **Lab ID:** 3122052-05 **Sampled:** 12/15/23 23:59
Matrix: Air **Sample Volume:** 1884.781 m³ **Received:** 12/20/23 13:27
Filter ID: **Analysis Date:** 12/21/23 20:18
Comments: MFK-AM01-121523-HM

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	**7429-90-5**	**197**		**27.7**
Antimony	7440-36-0	0.0313	SL, U	0.0381
Arsenic	**7440-38-2**	**0.0956**		**0.00824**
Barium	**7440-39-3**	**2.82**		**0.818**
Beryllium	**7440-41-7**	**0.00639**		**0.00287**
Cadmium	7440-43-9	0.00835	U	0.0941
Calcium	**7440-70-2**	**617**	LJ, QB-01	**252**
Chromium	**7440-47-3**	**1.80**		**1.75**
Cobalt	**7440-48-4**	**0.121**	QB-01	**0.0135**
Copper	**7440-50-8**	**16.5**		**2.59**
Iron	**7439-89-6**	**217**		**20.9**
Lead	**7439-92-1**	**0.460**		**0.238**
Magnesium	**7439-95-4**	**351**		**83.2**
Manganese	**7439-96-5**	**5.48**		**1.03**
Molybdenum	**7439-98-7**	**0.880**	QB-01	**0.184**
Nickel	7440-02-0	0.611	U	0.691
Phosphorus	7723-14-0	408	GC-BS, U	1080
Potassium	**7440-09-7**	**129**		**32.8**
Rubidium	**7440-17-7**	**0.118**		**0.0158**
Selenium	**7782-49-2**	**0.117**		**0.00950**
Sodium	**7440-23-5**	**3180**	E, GC-BS	**1730**
Strontium	**7440-24-6**	**3.49**	QB-01	**0.563**
Thallium	**7440-28-0**	**0.00157**		**4.34E-4**
Thorium	**7440-29-01**	**0.00641**		**0.00259**
Uranium	7440-61-1	0.00671	U	0.0147
Vanadium	**7440-62-2**	**0.492**		**0.0425**
Zinc	7440-66-6	22.8	U	84.3

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FILE #: 0000.00
REPORTED: 12/28/23 10:10
SUBMITTED: 12/20/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9533895 **Lab ID:** 3122052-06 **Sampled:** 12/15/23 23:59
Matrix: Air **Sample Volume:** 1899.853 m³ **Received:** 12/20/23 13:27
Filter ID: **Analysis Date:** 12/21/23 20:49
Comments: MFK-AM02-121523-HM

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	**7429-90-5**	**212**		**27.5**
Antimony	7440-36-0	0.0370	SL, U	0.0378
Arsenic	**7440-38-2**	**0.100**		**0.00818**
Barium	**7440-39-3**	**3.08**		**0.812**
Beryllium	**7440-41-7**	**0.00691**		**0.00284**
Cadmium	7440-43-9	0.0254	U	0.0933
Calcium	**7440-70-2**	**486**	LJ, QB-01	**250**
Chromium	**7440-47-3**	**1.85**		**1.74**
Cobalt	**7440-48-4**	**0.117**	QB-01	**0.0134**
Copper	**7440-50-8**	**10.0**		**2.57**
Iron	**7439-89-6**	**228**		**20.7**
Lead	**7439-92-1**	**0.296**		**0.236**
Magnesium	**7439-95-4**	**362**		**82.6**
Manganese	**7439-96-5**	**5.37**		**1.02**
Molybdenum	**7439-98-7**	**0.698**	QB-01	**0.182**
Nickel	7440-02-0	0.560	U	0.686
Phosphorus	7723-14-0	319	GC-BS, U	1070
Potassium	**7440-09-7**	**135**		**32.5**
Rubidium	**7440-17-7**	**0.126**		**0.0157**
Selenium	**7782-49-2**	**0.127**		**0.00942**
Sodium	**7440-23-5**	**3210**	E, GC-BS	**1710**
Strontium	**7440-24-6**	**3.39**	QB-01	**0.558**
Thallium	**7440-28-0**	**0.00162**		**4.31E-4**
Thorium	**7440-29-01**	**0.00856**		**0.00257**
Uranium	7440-61-1	0.00650	U	0.0146
Vanadium	**7440-62-2**	**0.522**		**0.0421**
Zinc	7440-66-6	17.2	U	83.7

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REPORTED: 12/28/23 10:10
SUBMITTED: 12/20/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9533893 **Lab ID:** 3122052-07 **Sampled:** 12/15/23 23:59
Matrix: Air **Sample Volume:** 1569.877 m^3 **Received:** 12/20/23 13:27
Filter ID: **Analysis Date:** 12/21/23 21:03
Comments: MFK-AM03-121523-HM

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	**7429-90-5**	**259**		**33.3**
Antimony	**7440-36-0**	**0.0633**	SL	**0.0457**
Arsenic	**7440-38-2**	**0.105**		**0.00990**
Barium	**7440-39-3**	**4.78**		**0.982**
Beryllium	**7440-41-7**	**0.0119**		**0.00344**
Cadmium	7440-43-9	0.0104	U	0.113
Calcium	**7440-70-2**	**578**	LJ, QB-01	**303**
Chromium	**7440-47-3**	**2.14**		**2.10**
Cobalt	**7440-48-4**	**0.177**	QB-01	**0.0162**
Copper	**7440-50-8**	**27.2**		**3.11**
Iron	**7439-89-6**	**316**		**25.1**
Lead	**7439-92-1**	**0.435**		**0.286**
Magnesium	**7439-95-4**	**418**		**99.9**
Manganese	**7439-96-5**	**9.78**		**1.23**
Molybdenum	**7439-98-7**	**0.798**	QB-01	**0.221**
Nickel	**7440-02-0**	**0.940**		**0.830**
Phosphorus	7723-14-0	394	GC-BS, U	1300
Potassium	**7440-09-7**	**194**		**39.4**
Rubidium	**7440-17-7**	**0.157**		**0.0190**
Selenium	**7782-49-2**	**0.127**		**0.0114**
Sodium	**7440-23-5**	**3630**	E, GC-BS	**2070**
Strontium	**7440-24-6**	**4.52**	QB-01	**0.676**
Thallium	**7440-28-0**	**0.00190**		**5.21E-4**
Thorium	**7440-29-01**	**0.0107**		**0.00311**
Uranium	7440-61-1	0.00854	U	0.0176
Vanadium	**7440-62-2**	**0.683**		**0.0510**
Zinc	7440-66-6	21.6	U	101

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FILE #: 0000.00
REPORTED: 12/28/23 10:10
SUBMITTED: 12/20/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9533890 FB **Lab ID:** 3122052-08 **Sampled:** 12/15/23 00:00
Matrix: Air **Sample Volume:** 1884.781 m³ **Received:** 12/20/23 13:27
Filter ID: **Analysis Date:** 12/21/23 21:18
Comments: MFK-FB01-121523-HM Field Blank

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	7429-90-5	12.3	U	27.7
Antimony	7440-36-0	0.00847	SL, U	0.0381
Arsenic	7440-38-2	0.00475	U	0.00824
Barium	7440-39-3	0.676	U	0.818
Beryllium	7440-41-7	0.00108	U	0.00287
Cadmium	7440-43-9	0.00276	U	0.0941
Calcium	**7440-70-2**	**311**	FB-01, LJ, QB-01	**252**
Chromium	7440-47-3	1.68	U	1.75
Cobalt	**7440-48-4**	**0.0276**	FB-01, QB-01	**0.0135**
Copper	7440-50-8	0.826	U	2.59
Iron	7439-89-6	15.6	U	20.9
Lead	7439-92-1	0.0631	U	0.238
Magnesium	7439-95-4	40.3	U	83.2
Manganese	7439-96-5	0.245	U	1.03
Molybdenum	**7439-98-7**	**0.282**	FB-01, QB-01	**0.184**
Nickel	7440-02-0	0.360	U	0.691
Phosphorus	7723-14-0	309	GC-BS, U	1080
Potassium	**7440-09-7**	**40.1**	FB-01	**32.8**
Rubidium	**7440-17-7**	**0.0166**	FB-01	**0.0158**
Selenium	7782-49-2	0.00488	U	0.00950
Sodium	7440-23-5	707	GC-BS, U	1730
Strontium	**7440-24-6**	**0.609**	FB-01, QB-01	**0.563**
Thallium	7440-28-0	1.03E-4	U	4.34E-4
Thorium	7440-29-01	0.00232	U	0.00259
Uranium	7440-61-1	0.00177	U	0.0147
Vanadium	7440-62-2	0.0282	U	0.0425
Zinc	7440-66-6	16.7	U	84.3

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FILE #: 0000.00
REPORTED: 12/28/23 10:10
SUBMITTED: 12/20/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9533892
Matrix: Air
Lab ID: 3122052-09
Sample Volume: 2060.35 m³
Filter ID:
Sampled: 12/16/23 23:59
Received: 12/20/23 13:27
Analysis Date: 12/21/23 21:32
Comments: MFK-AM01-121623-HM

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	**7429-90-5**	**254**		**25.3**
Antimony	**7440-36-0**	**0.0604**	SL	**0.0348**
Arsenic	**7440-38-2**	**0.0980**		**0.00754**
Barium	**7440-39-3**	**4.03**		**0.749**
Beryllium	**7440-41-7**	**0.00826**		**0.00262**
Cadmium	7440-43-9	0.0229	U	0.0861
Calcium	**7440-70-2**	**476**	LJ, QB-01	**231**
Chromium	**7440-47-3**	**1.65**		**1.60**
Cobalt	**7440-48-4**	**0.158**	QB-01	**0.0123**
Copper	**7440-50-8**	**16.6**		**2.37**
Iron	**7439-89-6**	**308**		**19.1**
Lead	**7439-92-1**	**0.305**		**0.218**
Magnesium	**7439-95-4**	**282**		**76.1**
Manganese	**7439-96-5**	**8.03**		**0.940**
Molybdenum	**7439-98-7**	**1.05**	QB-01	**0.168**
Nickel	**7440-02-0**	**0.713**		**0.633**
Phosphorus	7723-14-0	307	GC-BS, U	987
Potassium	**7440-09-7**	**130**		**30.0**
Rubidium	**7440-17-7**	**0.149**		**0.0145**
Selenium	**7782-49-2**	**0.105**		**0.00869**
Sodium	**7440-23-5**	**2500**	E, GC-BS	**1580**
Strontium	**7440-24-6**	**3.36**	QB-01	**0.515**
Thallium	**7440-28-0**	**0.00121**		**3.97E-4**
Thorium	**7440-29-01**	**0.00841**		**0.00237**
Uranium	7440-61-1	0.00716	U	0.0134
Vanadium	**7440-62-2**	**0.712**		**0.0389**
Zinc	7440-66-6	18.9	U	77.2

CERTIFICATE OF ANALYSIS

Tetra Tech, Inc.
1777 Sentry Pkwy, Bldg 12
Blue Bell, PA 19422
ATTN: Ms. Chelsea Saber
PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 12/28/23 10:10
SUBMITTED: 12/20/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9533888 **Lab ID:** 3122052-10 **Sampled:** 12/16/23 23:59
Matrix: Air **Sample Volume:** 2057.6 m³ **Received:** 12/20/23 13:27
Filter ID: **Analysis Date:** 12/21/23 22:26
Comments: MFK-AM02-121623-HM

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	**7429-90-5**	**246**		**25.4**
Antimony	**7440-36-0**	**0.0588**	SL	**0.0349**
Arsenic	**7440-38-2**	**0.0969**		**0.00755**
Barium	**7440-39-3**	**3.93**		**0.750**
Beryllium	**7440-41-7**	**0.00857**		**0.00263**
Cadmium	7440-43-9	0.0181	U	0.0862
Calcium	**7440-70-2**	**443**	LJ, QB-01	**231**
Chromium	**7440-47-3**	**1.67**		**1.61**
Cobalt	**7440-48-4**	**0.169**	QB-01	**0.0123**
Copper	**7440-50-8**	**13.7**		**2.37**
Iron	**7439-89-6**	**287**		**19.1**
Lead	**7439-92-1**	**0.290**		**0.218**
Magnesium	**7439-95-4**	**250**		**76.2**
Manganese	**7439-96-5**	**7.42**		**0.941**
Molybdenum	**7439-98-7**	**0.855**	QB-01	**0.168**
Nickel	7440-02-0	0.631	U	0.633
Phosphorus	7723-14-0	294	GC-BS, U	988
Potassium	**7440-09-7**	**126**		**30.0**
Rubidium	**7440-17-7**	**0.166**		**0.0145**
Selenium	**7782-49-2**	**0.0989**		**0.00870**
Sodium	**7440-23-5**	**2230**	E, GC-BS	**1580**
Strontium	**7440-24-6**	**3.27**	QB-01	**0.516**
Thallium	**7440-28-0**	**0.00132**		**3.98E-4**
Thorium	**7440-29-01**	**0.00831**		**0.00237**
Uranium	7440-61-1	0.00701	U	0.0134
Vanadium	**7440-62-2**	**0.665**		**0.0389**
Zinc	7440-66-6	15.5	U	77.3

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Tetra Tech, Inc.
1777 Sentry Pkwy, Bldg 12
Blue Bell, PA 19422
ATTN: Ms. Chelsea Saber
PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 12/28/23 10:10
SUBMITTED: 12/20/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9533885 **Lab ID:** 3122052-11 **Sampled:** 12/16/23 23:59
Matrix: Air **Sample Volume:** 1753.525 m³ **Received:** 12/20/23 13:27
Filter ID: **Analysis Date:** 12/21/23 22:42
Comments: MFK-AM03-121623-HM

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	**7429-90-5**	**224**		**29.8**
Antimony	**7440-36-0**	**0.0535**	SL	**0.0409**
Arsenic	**7440-38-2**	**0.0708**		**0.00886**
Barium	**7440-39-3**	**4.34**		**0.880**
Beryllium	**7440-41-7**	**0.00989**		**0.00308**
Cadmium	7440-43-9	0.00832	U	0.101
Calcium	**7440-70-2**	**485**	LJ, QB-01	**271**
Chromium	**7440-47-3**	**1.97**		**1.88**
Cobalt	**7440-48-4**	**0.142**	QB-01	**0.0145**
Copper	**7440-50-8**	**36.6**		**2.78**
Iron	**7439-89-6**	**279**		**22.5**
Lead	**7439-92-1**	**0.403**		**0.256**
Magnesium	**7439-95-4**	**239**		**89.4**
Manganese	**7439-96-5**	**8.25**		**1.10**
Molybdenum	**7439-98-7**	**0.935**	QB-01	**0.198**
Nickel	7440-02-0	0.530	U	0.743
Phosphorus	7723-14-0	364	GC-BS, U	1160
Potassium	**7440-09-7**	**132**		**35.3**
Rubidium	**7440-17-7**	**0.138**		**0.0170**
Selenium	**7782-49-2**	**0.0987**		**0.0102**
Sodium	**7440-23-5**	**2170**	E, GC-BS	**1860**
Strontium	**7440-24-6**	**3.21**	QB-01	**0.605**
Thallium	**7440-28-0**	**0.00154**		**4.67E-4**
Thorium	**7440-29-01**	**0.00832**		**0.00278**
Uranium	7440-61-1	0.00757	U	0.0158
Vanadium	**7440-62-2**	**0.604**		**0.0456**
Zinc	7440-66-6	23.1	U	90.7

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Blue Bell, PA 19422
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PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 12/28/23 10:10
SUBMITTED: 12/20/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9533884 FB
Matrix: Air
Lab ID: 3122052-12
Sample Volume: 2060.35 m^3
Filter ID:
Sampled: 12/16/23 00:00
Received: 12/20/23 13:27
Analysis Date: 12/21/23 22:56

Comments: MFK-FB01-121623-HM Field Blank

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	7429-90-5	7.84	U	25.3
Antimony	7440-36-0	0.00608	SL, U	0.0348
Arsenic	7440-38-2	0.00157	U	0.00754
Barium	7440-39-3	0.564	U	0.749
Beryllium	7440-41-7	6.98E-4	U	0.00262
Cadmium	7440-43-9	0.00253	U	0.0861
Calcium	**7440-70-2**	**279**	FB-01, LJ, QB-01	**231**
Chromium	7440-47-3	1.44	U	1.60
Cobalt	**7440-48-4**	**0.0316**	FB-01, QB-01	**0.0123**
Copper	7440-50-8	0.245	U	2.37
Iron	7439-89-6	11.1	U	19.1
Lead	7439-92-1	0.0512	U	0.218
Magnesium	7439-95-4	34.3	U	76.1
Manganese	7439-96-5	0.139	U	0.940
Molybdenum	**7439-98-7**	**0.246**	FB-01, QB-01	**0.168**
Nickel	7440-02-0	0.258	U	0.633
Phosphorus	7723-14-0	274	GC-BS, U	987
Potassium	**7440-09-7**	**32.4**	FB-01	**30.0**
Rubidium	7440-17-7	0.0114	U	0.0145
Selenium	7782-49-2	0.00294	U	0.00869
Sodium	7440-23-5	612	GC-BS, U	1580
Strontium	**7440-24-6**	**0.540**	FB-01, QB-01	**0.515**
Thallium	7440-28-0	8.30E-5	U	3.97E-4
Thorium	7440-29-01	0.00183	U	0.00237
Uranium	7440-61-1	0.00146	U	0.0134
Vanadium	7440-62-2	0.00830	U	0.0389
Zinc	7440-66-6	14.3	U	77.2

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Tetra Tech, Inc.
1777 Sentry Pkwy, Bldg 12
Blue Bell, PA 19422
ATTN: Ms. Chelsea Saber
PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 12/28/23 10:10
SUBMITTED: 12/20/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9533883 **Lab ID:** 3122052-13 **Sampled:** 12/17/23 23:59
Matrix: Air **Sample Volume:** 2065.514 m³ **Received:** 12/20/23 13:27
Filter ID: **Analysis Date:** 12/21/23 23:10
Comments: MFK-AM01-121723-HM

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	**7429-90-5**	**266**		**25.3**
Antimony	**7440-36-0**	**0.0496**	SL	**0.0347**
Arsenic	**7440-38-2**	**0.0803**		**0.00752**
Barium	**7440-39-3**	**3.97**		**0.747**
Beryllium	**7440-41-7**	**0.00861**		**0.00262**
Cadmium	7440-43-9	0.00920	U	0.0859
Calcium	**7440-70-2**	**420**	LJ, QB-01	**230**
Chromium	**7440-47-3**	**1.64**		**1.60**
Cobalt	**7440-48-4**	**0.140**	QB-01	**0.0123**
Copper	**7440-50-8**	**19.9**		**2.36**
Iron	**7439-89-6**	**299**		**19.1**
Lead	**7439-92-1**	**0.442**		**0.217**
Magnesium	**7439-95-4**	**195**		**75.9**
Manganese	**7439-96-5**	**7.42**		**0.937**
Molybdenum	**7439-98-7**	**0.976**	QB-01	**0.168**
Nickel	7440-02-0	0.437	U	0.631
Phosphorus	7723-14-0	311	GC-BS, U	985
Potassium	**7440-09-7**	**81.7**		**29.9**
Rubidium	**7440-17-7**	**0.128**		**0.0144**
Selenium	**7782-49-2**	**0.107**		**0.00866**
Sodium	**7440-23-5**	**1780**	E, GC-BS	**1580**
Strontium	**7440-24-6**	**2.63**	QB-01	**0.514**
Thallium	**7440-28-0**	**0.00419**		**3.96E-4**
Thorium	**7440-29-01**	**0.00770**		**0.00236**
Uranium	7440-61-1	0.00765	U	0.0134
Vanadium	**7440-62-2**	**0.714**		**0.0388**
Zinc	7440-66-6	15.7	U	77.0

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Tetra Tech, Inc.
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Blue Bell, PA 19422
ATTN: Ms. Chelsea Saber
PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 12/28/23 10:10
SUBMITTED: 12/20/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9533881 **Lab ID:** 3122052-14 **Sampled:** 12/17/23 23:59
Matrix: Air **Sample Volume:** 2070.53 m^3 **Received:** 12/20/23 13:27
Filter ID: **Analysis Date:** 12/21/23 23:25
Comments: MFK-AM02-121723-HM

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	**7429-90-5**	**268**		**25.2**
Antimony	**7440-36-0**	**0.0631**	SL	**0.0347**
Arsenic	**7440-38-2**	**0.0900**		**0.00750**
Barium	**7440-39-3**	**3.77**		**0.745**
Beryllium	**7440-41-7**	**0.00921**		**0.00261**
Cadmium	7440-43-9	0.0412	U	0.0857
Calcium	**7440-70-2**	**466**	LJ, QB-01	**229**
Chromium	**7440-47-3**	**1.67**		**1.60**
Cobalt	**7440-48-4**	**0.141**	QB-01	**0.0123**
Copper	**7440-50-8**	**16.8**		**2.36**
Iron	**7439-89-6**	**282**		**19.0**
Lead	**7439-92-1**	**0.289**		**0.217**
Magnesium	**7439-95-4**	**181**		**75.8**
Manganese	**7439-96-5**	**7.14**		**0.935**
Molybdenum	**7439-98-7**	**0.893**	QB-01	**0.167**
Nickel	7440-02-0	0.452	U	0.629
Phosphorus	7723-14-0	303	GC-BS, U	982
Potassium	**7440-09-7**	**162**		**29.9**
Rubidium	**7440-17-7**	**0.271**		**0.0144**
Selenium	**7782-49-2**	**0.103**		**0.00864**
Sodium	**7440-23-5**	**1640**	E, GC-BS	**1570**
Strontium	**7440-24-6**	**2.63**	QB-01	**0.512**
Thallium	**7440-28-0**	**0.00462**		**3.95E-4**
Thorium	**7440-29-01**	**0.00777**		**0.00236**
Uranium	7440-61-1	0.00722	U	0.0134
Vanadium	**7440-62-2**	**0.655**		**0.0387**
Zinc	7440-66-6	14.8	U	76.8

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Tetra Tech, Inc.
1777 Sentry Pkwy, Bldg 12
Blue Bell, PA 19422
ATTN: Ms. Chelsea Saber
PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 12/28/23 10:10
SUBMITTED: 12/20/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9533910
Matrix: Air
Lab ID: 3122052-15
Sample Volume: 1578.644 m^3
Filter ID:
Sampled: 12/17/23 23:59
Received: 12/20/23 13:27
Analysis Date: 12/21/23 16:50
Comments: MFK-AM03-121723-HM/MS/MSD

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	**7429-90-5**	**223**	QM-07	**33.1**
Antimony	7440-36-0	0.0451	SL, U	0.0455
Arsenic	**7440-38-2**	**0.0661**		**0.00984**
Barium	**7440-39-3**	**3.62**		**0.977**
Beryllium	**7440-41-7**	**0.00964**		**0.00342**
Cadmium	7440-43-9	0.00845	U	0.112
Calcium	**7440-70-2**	**492**	LJ, QB-01	**301**
Chromium	7440-47-3	2.07	U	2.09
Cobalt	**7440-48-4**	**0.142**	QB-01	**0.0161**
Copper	**7440-50-8**	**21.8**		**3.09**
Iron	**7439-89-6**	**259**	QM-4X	**24.9**
Lead	**7439-92-1**	**0.350**		**0.284**
Magnesium	**7439-95-4**	**163**	QM-4X	**99.4**
Manganese	**7439-96-5**	**7.96**		**1.23**
Molybdenum	**7439-98-7**	**0.802**	QB-01	**0.220**
Nickel	7440-02-0	0.479	U	0.826
Phosphorus	7723-14-0	378	A-01, GC-BS, QM-4X, U	1290
Potassium	**7440-09-7**	**81.5**		**39.2**
Rubidium	**7440-17-7**	**0.127**		**0.0189**
Selenium	**7782-49-2**	**0.0804**		**0.0113**
Sodium	7440-23-5	1580	A-01, GC-BS, QM-4X, U	2060
Strontium	**7440-24-6**	**2.75**	QB-01	**0.672**
Thallium	**7440-28-0**	**0.00377**		**5.18E-4**
Thorium	**7440-29-01**	**0.00878**	QM-07	**0.00309**
Uranium	7440-61-1	0.00688	U	0.0175
Vanadium	**7440-62-2**	**0.545**		**0.0507**
Zinc	7440-66-6	26.5	U	101

CERTIFICATE OF ANALYSIS

Tetra Tech, Inc.
1777 Sentry Pkwy, Bldg 12
Blue Bell, PA 19422
ATTN: Ms. Chelsea Saber
PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 12/28/23 10:10
SUBMITTED: 12/20/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9533908 FB **Lab ID:** 3122052-16 **Sampled:** 12/17/23 00:00
Matrix: Air **Sample Volume:** 2065.514 m³ **Received:** 12/20/23 13:27
Filter ID: **Analysis Date:** 12/21/23 23:39
Comments: MFK-FB01-121723-HM Field Blank

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	7429-90-5	10.2	U	25.3
Antimony	7440-36-0	0.00651	SL, U	0.0347
Arsenic	7440-38-2	0.00254	U	0.00752
Barium	**7440-39-3**	**0.761**	FB-01	**0.747**
Beryllium	7440-41-7	7.84E-4	U	0.00262
Cadmium	7440-43-9	0.00231	U	0.0859
Calcium	**7440-70-2**	**268**	FB-01, LJ, QB-01	**230**
Chromium	7440-47-3	1.46	U	1.60
Cobalt	**7440-48-4**	**0.0986**	FB-01, QB-01	**0.0123**
Copper	7440-50-8	0.511	U	2.36
Iron	7439-89-6	12.9	U	19.1
Lead	7439-92-1	0.0569	U	0.217
Magnesium	7439-95-4	37.0	U	75.9
Manganese	7439-96-5	0.173	U	0.937
Molybdenum	**7439-98-7**	**0.229**	FB-01, QB-01	**0.168**
Nickel	7440-02-0	0.281	U	0.631
Phosphorus	7723-14-0	276	GC-BS, U	985
Potassium	**7440-09-7**	**34.0**	FB-01	**29.9**
Rubidium	7440-17-7	0.0127	U	0.0144
Selenium	7782-49-2	0.00276	U	0.00866
Sodium	7440-23-5	637	GC-BS, U	1580
Strontium	**7440-24-6**	**0.543**	FB-01, QB-01	**0.514**
Thallium	7440-28-0	8.47E-5	U	3.96E-4
Thorium	7440-29-01	0.00215	U	0.00236
Uranium	7440-61-1	0.00153	U	0.0134
Vanadium	7440-62-2	0.0207	U	0.0388
Zinc	7440-66-6	13.0	U	77.0

CERTIFICATE OF ANALYSIS

Tetra Tech, Inc.
1777 Sentry Pkwy, Bldg 12
Blue Bell, PA 19422
ATTN: Ms. Chelsea Saber
PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 12/28/23 10:10
SUBMITTED: 12/20/23
AQS SITE CODE:
SITE CODE: Maui fires

Inorganics by Compendium Method IO-3.5 - Quality Control

Batch 2312067 - B3L2101

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Calibration Blank (2312067-CCB1)				Prepared & Analyzed: 12/21/23						
Aluminum	-63.3		ng/l							U
Antimony	1.23		ng/l							
Arsenic	0.586		ng/l							
Barium	1.05		ng/l							
Beryllium	0.227		ng/l							
Cadmium	0.562		ng/l							
Calcium	723		ng/l							
Chromium	9.03		ng/l							
Cobalt	1.14		ng/l							
Copper	61.5		ng/l							
Iron	51.2		ng/l							
Lead	9.43		ng/l							
Magnesium	44.6		ng/l							
Manganese	11.2		ng/l							
Molybdenum	25.6		ng/l							
Nickel	2.94		ng/l							
Phosphorus	380		ng/l							
Potassium	17.1		ng/l							
Rubidium	-0.627		ng/l							U
Selenium	13.9		ng/l							
Sodium	-348		ng/l							U
Strontium	1.64		ng/l							
Thallium	0.561		ng/l							
Thorium	0.549		ng/l							
Uranium	0.0219		ng/l							
Vanadium	-35.3		ng/l							U
Zinc	-32.9		ng/l							U
Calibration Blank (2312067-CCB2)				Prepared & Analyzed: 12/21/23						
Aluminum	-35.7		ng/l							U
Antimony	0.966		ng/l							
Arsenic	0.728		ng/l							
Barium	1.78		ng/l							
Beryllium	0.204		ng/l							
Cadmium	0.562		ng/l							
Calcium	702		ng/l							
Chromium	3.79		ng/l							
Cobalt	1.18		ng/l							
Copper	57.1		ng/l							

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Tetra Tech, Inc.
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Blue Bell, PA 19422
ATTN: Ms. Chelsea Saber
PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 12/28/23 10:10
SUBMITTED: 12/20/23
AQS SITE CODE:
SITE CODE: Maui fires

Inorganics by Compendium Method IO-3.5 - Quality Control

Batch 2312067 - B3L2101

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Calibration Blank (2312067-CCB2) Contin				Prepared & Analyzed: 12/21/23						
Iron	94.6		ng/l							
Lead	11.4		ng/l							
Magnesium	8.41		ng/l							
Manganese	10.1		ng/l							
Molybdenum	10.2		ng/l							
Nickel	1.39		ng/l							
Phosphorus	500		ng/l							
Potassium	-429		ng/l							U
Rubidium	-0.707		ng/l							U
Selenium	3.96		ng/l							
Sodium	-486		ng/l							U
Strontium	2.19		ng/l							
Thallium	0.509		ng/l							
Thorium	0.906		ng/l							
Uranium	0.0222		ng/l							
Vanadium	-40.7		ng/l							U
Zinc	-13.4		ng/l							U
Calibration Blank (2312067-CCB3)				Prepared & Analyzed: 12/21/23						
Aluminum	-29.3		ng/l							U
Antimony	1.55		ng/l							
Arsenic	-0.712		ng/l							U
Barium	-0.769		ng/l							U
Beryllium	0.127		ng/l							
Cadmium	0.432		ng/l							
Calcium	-249		ng/l							U
Chromium	0.776		ng/l							
Cobalt	0.447		ng/l							
Copper	26.8		ng/l							
Iron	110		ng/l							
Lead	7.00		ng/l							
Magnesium	4.29		ng/l							
Manganese	3.75		ng/l							
Molybdenum	7.72		ng/l							
Nickel	-0.135		ng/l							U
Phosphorus	-504		ng/l							U
Potassium	-1080		ng/l							U
Rubidium	-1.08		ng/l							U
Selenium	14.4		ng/l							

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Inorganics by Compendium Method IO-3.5 - Quality Control

Batch 2312067 - B3L2101

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Calibration Blank (2312067-CCB3) Contin				Prepared & Analyzed: 12/21/23						
Sodium	-288		ng/l							U
Strontium	0.752		ng/l							
Thallium	0.407		ng/l							
Thorium	0.391		ng/l							
Uranium	0.0162		ng/l							
Vanadium	-43.0		ng/l							U
Zinc	-33.5		ng/l							U
Calibration Blank (2312067-CCB4)				Prepared: 12/21/23 Analyzed: 12/22/23						
Aluminum	-86.4		ng/l							U
Antimony	1.63		ng/l							
Arsenic	0.473		ng/l							
Barium	-0.969		ng/l							U
Beryllium	0.165		ng/l							
Cadmium	0.624		ng/l							
Calcium	926		ng/l							
Chromium	1.34		ng/l							
Cobalt	0.500		ng/l							
Copper	28.3		ng/l							
Iron	81.5		ng/l							
Lead	7.97		ng/l							
Magnesium	39.7		ng/l							
Manganese	3.53		ng/l							
Molybdenum	8.48		ng/l							
Nickel	-0.729		ng/l							U
Phosphorus	-435		ng/l							U
Potassium	-772		ng/l							U
Rubidium	0.184		ng/l							
Selenium	-0.0424		ng/l							U
Sodium	-251		ng/l							U
Strontium	0.0686		ng/l							
Thallium	0.429		ng/l							
Thorium	0.820		ng/l							
Uranium	0.0267		ng/l							
Vanadium	-43.6		ng/l							U
Zinc	-30.6		ng/l							U
Calibration Check (2312067-CCV1)				Prepared & Analyzed: 12/21/23						
Aluminum	1.53E6		ng/l	1.5000E6		102	90-110			
Antimony	19900		ng/l	20000		99.4	90-110			

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Inorganics by Compendium Method IO-3.5 - Quality Control

Batch 2312067 - B3L2101

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Calibration Check (2312067-CCV1) Contir				Prepared & Analyzed: 12/21/23						
Arsenic	19800		ng/l	20000		98.9	90-110			
Barium	199000		ng/l	200000		99.6	90-110			
Beryllium	5030		ng/l	5000.0		101	90-110			
Cadmium	19700		ng/l	20000		98.7	90-110			
Calcium	2.51E7		ng/l	2.5000E7		101	90-110			
Chromium	234000		ng/l	240000		97.6	90-110			
Cobalt	50400		ng/l	50000		101	90-110			
Copper	2.03E6		ng/l	2.0000E6		102	90-110			
Iron	2.52E6		ng/l	2.5000E6		101	90-110			
Lead	197000		ng/l	200000		98.6	90-110			
Magnesium	1.02E6		ng/l	1.0000E6		102	90-110			
Manganese	505000		ng/l	500000		101	90-110			
Molybdenum	49000		ng/l	50000		98.0	90-110			
Nickel	122000		ng/l	120000		101	90-110			
Phosphorus	203000		ng/l	200000		101	90-110			
Potassium	2.52E6		ng/l	2.5000E6		101	90-110			
Rubidium	9930		ng/l	10000		99.3	90-110			
Selenium	20000		ng/l	20000		99.9	90-110			
Sodium	2.52E6		ng/l	2.5000E6		101	90-110			
Strontium	49500		ng/l	50000		99.0	90-110			
Thallium	496		ng/l	500.00		99.2	90-110			
Thorium	488		ng/l	500.00		97.6	90-110			
Uranium	497		ng/l	500.00		99.4	90-110			
Vanadium	19700		ng/l	20000		98.6	90-110			
Zinc	523000		ng/l	500000		105	90-110			
Calibration Check (2312067-CCV2)				Prepared & Analyzed: 12/21/23						
Aluminum	1.49E6		ng/l	1.5000E6		99.6	90-110			
Antimony	20100		ng/l	20000		100	90-110			
Arsenic	20200		ng/l	20000		101	90-110			
Barium	206000		ng/l	200000		103	90-110			
Beryllium	5040		ng/l	5000.0		101	90-110			
Cadmium	20200		ng/l	20000		101	90-110			
Calcium	2.50E7		ng/l	2.5000E7		100	90-110			
Chromium	238000		ng/l	240000		99.1	90-110			
Cobalt	50100		ng/l	50000		100	90-110			
Copper	2.04E6		ng/l	2.0000E6		102	90-110			
Iron	2.50E6		ng/l	2.5000E6		100	90-110			
Lead	200000		ng/l	200000		100	90-110			

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Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes

Inorganics by Compendium Method IO-3.5 - Quality Control

Batch 2312067 - B3L2101

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Calibration Check (2312067-CCV2) Contin				Prepared & Analyzed: 12/21/23						
Magnesium	1.01E6		ng/l	1.0000E6		101	90-110			
Manganese	501000		ng/l	500000		100	90-110			
Molybdenum	50600		ng/l	50000		101	90-110			
Nickel	122000		ng/l	120000		101	90-110			
Phosphorus	199000		ng/l	200000		99.7	90-110			
Potassium	2.48E6		ng/l	2.5000E6		99.0	90-110			
Rubidium	10000		ng/l	10000		100	90-110			
Selenium	20300		ng/l	20000		102	90-110			
Sodium	2.49E6		ng/l	2.5000E6		99.7	90-110			
Strontium	50100		ng/l	50000		100	90-110			
Thallium	503		ng/l	500.00		101	90-110			
Thorium	492		ng/l	500.00		98.4	90-110			
Uranium	493		ng/l	500.00		98.5	90-110			
Vanadium	19900		ng/l	20000		99.3	90-110			
Zinc	529000		ng/l	500000		106	90-110			
Calibration Check (2312067-CCV3)				Prepared & Analyzed: 12/21/23						
Aluminum	1.53E6		ng/l	1.5000E6		102	90-110			
Antimony	20800		ng/l	20000		104	90-110			
Arsenic	20700		ng/l	20000		103	90-110			
Barium	213000		ng/l	200000		107	90-110			
Beryllium	4820		ng/l	5000.0		96.4	90-110			
Cadmium	20800		ng/l	20000		104	90-110			
Calcium	2.57E7		ng/l	2.5000E7		103	90-110			
Chromium	248000		ng/l	240000		103	90-110			
Cobalt	51500		ng/l	50000		103	90-110			
Copper	2.11E6		ng/l	2.0000E6		105	90-110			
Iron	2.58E6		ng/l	2.5000E6		103	90-110			
Lead	205000		ng/l	200000		103	90-110			
Magnesium	1.04E6		ng/l	1.0000E6		104	90-110			
Manganese	515000		ng/l	500000		103	90-110			
Molybdenum	52400		ng/l	50000		105	90-110			
Nickel	125000		ng/l	120000		104	90-110			
Phosphorus	201000		ng/l	200000		101	90-110			
Potassium	2.53E6		ng/l	2.5000E6		101	90-110			
Rubidium	10100		ng/l	10000		101	90-110			
Selenium	20900		ng/l	20000		104	90-110			
Sodium	2.58E6		ng/l	2.5000E6		103	90-110			
Strontium	51100		ng/l	50000		102	90-110			

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Inorganics by Compendium Method IO-3.5 - Quality Control

Batch 2312067 - B3L2101

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Calibration Check (2312067-CCV3) Contir				Prepared & Analyzed: 12/21/23						
Thallium	510		ng/l	500.00		102	90-110			
Thorium	506		ng/l	500.00		101	90-110			
Uranium	506		ng/l	500.00		101	90-110			
Vanadium	20600		ng/l	20000		103	90-110			
Zinc	546000		ng/l	500000		109	90-110			
Calibration Check (2312067-CCV4)				Prepared & Analyzed: 12/21/23						
Aluminum	1.52E6		ng/l	1.5000E6		101	90-110			
Antimony	20500		ng/l	20000		103	90-110			
Arsenic	20500		ng/l	20000		102	90-110			
Barium	212000		ng/l	200000		106	90-110			
Beryllium	4740		ng/l	5000.0		94.9	90-110			
Cadmium	20700		ng/l	20000		104	90-110			
Calcium	2.54E7		ng/l	2.5000E7		102	90-110			
Chromium	246000		ng/l	240000		102	90-110			
Cobalt	51100		ng/l	50000		102	90-110			
Copper	2.10E6		ng/l	2.0000E6		105	90-110			
Iron	2.55E6		ng/l	2.5000E6		102	90-110			
Lead	204000		ng/l	200000		102	90-110			
Magnesium	1.03E6		ng/l	1.0000E6		103	90-110			
Manganese	512000		ng/l	500000		102	90-110			
Molybdenum	52100		ng/l	50000		104	90-110			
Nickel	125000		ng/l	120000		104	90-110			
Phosphorus	204000		ng/l	200000		102	90-110			
Potassium	2.51E6		ng/l	2.5000E6		101	90-110			
Rubidium	10200		ng/l	10000		102	90-110			
Selenium	20600		ng/l	20000		103	90-110			
Sodium	2.56E6		ng/l	2.5000E6		103	90-110			
Strontium	50700		ng/l	50000		101	90-110			
Thallium	512		ng/l	500.00		102	90-110			
Thorium	504		ng/l	500.00		101	90-110			
Uranium	510		ng/l	500.00		102	90-110			
Vanadium	20500		ng/l	20000		102	90-110			
Zinc	541000		ng/l	500000		108	90-110			
High Cal Check (2312067-HCV1)				Prepared & Analyzed: 12/21/23						
Aluminum	2.95E6		ng/l	3.0000E6		98.3	95-105			
Antimony	40100		ng/l	40000		100	95-105			
Arsenic	40100		ng/l	40000		100	95-105			
Barium	405000		ng/l	400000		101	95-105			

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Inorganics by Compendium Method IO-3.5 - Quality Control

Batch 2312067 - B3L2101

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
High Cal Check (2312067-HCV1) Continue				Prepared & Analyzed: 12/21/23						
Beryllium	9970		ng/l	10000		99.7	95-105			
Cadmium	39600		ng/l	40000		98.9	95-105			
Calcium	4.98E7		ng/l	5.0000E7		99.5	95-105			
Chromium	471000		ng/l	480000		98.0	95-105			
Cobalt	98500		ng/l	100000		98.5	95-105			
Copper	3.95E6		ng/l	4.0000E6		98.7	95-105			
Iron	4.93E6		ng/l	5.0000E6		98.6	95-105			
Lead	396000		ng/l	400000		99.0	95-105			
Magnesium	1.96E6		ng/l	2.0000E6		97.9	95-105			
Manganese	989000		ng/l	1.0000E6		98.9	95-105			
Molybdenum	99500		ng/l	100000		99.5	95-105			
Nickel	237000		ng/l	240000		98.6	95-105			
Phosphorus	395000		ng/l	400000		98.8	95-105			
Potassium	4.94E6		ng/l	5.0000E6		98.7	95-105			
Rubidium	20000		ng/l	20000		100	95-105			
Selenium	40000		ng/l	40000		99.9	95-105			
Sodium	4.87E6		ng/l	5.0000E6		97.4	95-105			
Strontium	100000		ng/l	100000		100	95-105			
Thallium	994		ng/l	1000.0		99.4	95-105			
Thorium	1010		ng/l	1000.0		101	95-105			
Uranium	999		ng/l	1000.0		99.9	95-105			
Vanadium	39600		ng/l	40000		98.9	95-105			
Zinc	981000		ng/l	1.0000E6		98.1	95-105			
Initial Cal Blank (2312067-ICB1)				Prepared & Analyzed: 12/21/23						
Aluminum	-116		ng/l							U
Antimony	1.65		ng/l							
Arsenic	-0.499		ng/l							U
Barium	-2.96		ng/l							U
Beryllium	0.0160		ng/l							
Cadmium	0.0948		ng/l							
Calcium	-251		ng/l							U
Chromium	4.68		ng/l							
Cobalt	0.234		ng/l							
Copper	27.7		ng/l							
Iron	38.5		ng/l							
Lead	11.2		ng/l							
Magnesium	-27.2		ng/l							U
Manganese	5.81		ng/l							

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Inorganics by Compendium Method IO-3.5 - Quality Control

Batch 2312067 - B3L2101

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Initial Cal Blank (2312067-ICB1) Continu				Prepared & Analyzed: 12/21/23						
Molybdenum	14.1		ng/l							
Nickel	-0.342		ng/l							U
Phosphorus	-367		ng/l							U
Potassium	-168		ng/l							U
Rubidium	-0.297		ng/l							U
Selenium	12.8		ng/l							
Sodium	-470		ng/l							U
Strontium	0.815		ng/l							
Thallium	0.425		ng/l							
Thorium	0.580		ng/l							
Uranium	0.00926		ng/l							
Vanadium	-37.4		ng/l							U
Zinc	-14.0		ng/l							U
Initial Cal Check (2312067-ICV1)				Prepared & Analyzed: 12/21/23						
Aluminum	1.45E6		ng/l	1.5000E6		96.8	90-110			
Antimony	19500		ng/l	20000		97.7	90-110			
Arsenic	19700		ng/l	20000		98.6	90-110			
Barium	200000		ng/l	200000		99.9	90-110			
Beryllium	4980		ng/l	5000.0		99.6	90-110			
Cadmium	20200		ng/l	20000		101	90-110			
Calcium	2.43E7		ng/l	2.5000E7		97.3	90-110			
Chromium	231000		ng/l	240000		96.2	90-110			
Cobalt	49100		ng/l	50000		98.1	90-110			
Copper	2.00E6		ng/l	2.0000E6		99.9	90-110			
Iron	2.47E6		ng/l	2.5000E6		98.7	90-110			
Lead	196000		ng/l	200000		97.8	90-110			
Magnesium	971000		ng/l	1.0000E6		97.1	90-110			
Manganese	489000		ng/l	500000		97.7	90-110			
Molybdenum	48700		ng/l	50000		97.4	90-110			
Nickel	118000		ng/l	120000		97.9	90-110			
Phosphorus	193000		ng/l	200000		96.5	90-110			
Potassium	2.48E6		ng/l	2.5000E6		99.2	90-110			
Rubidium	9650		ng/l	10000		96.5	90-110			
Selenium	20400		ng/l	20000		102	90-110			
Sodium	2.43E6		ng/l	2.5000E6		97.4	90-110			
Strontium	49700		ng/l	50000		99.4	90-110			
Thallium	484		ng/l	500.00		96.8	90-110			
Thorium	481		ng/l	500.00		96.3	90-110			

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Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes

Inorganics by Compendium Method IO-3.5 - Quality Control

Batch 2312067 - B3L2101

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Initial Cal Check (2312067-ICV1) Continu				Prepared & Analyzed: 12/21/23						
Uranium	492		ng/l	500.00		98.4	90-110			
Vanadium	19900		ng/l	20000		99.4	90-110			
Zinc	522000		ng/l	500000		104	90-110			
Interference Check A (2312067-IFA1)				Prepared & Analyzed: 12/21/23						
Aluminum	1.45E7		ng/l	1.5000E7		96.8	80-120			
Antimony	0.00		ng/l				80-120			U
Arsenic	0.00		ng/l				80-120			U
Barium	0.00		ng/l				80-120			U
Beryllium	0.00		ng/l				80-120			U
Cadmium	0.00		ng/l				80-120			U
Calcium	9.26E7		ng/l	1.0040E8		92.2	80-120			
Chromium	0.00		ng/l				80-120			U
Cobalt	0.00		ng/l				80-120			U
Copper	0.00		ng/l				80-120			U
Iron	1.44E7		ng/l	1.5000E7		95.9	80-120			
Lead	0.00		ng/l				80-120			U
Magnesium	1.49E7		ng/l	1.5000E7		99.4	80-120			
Manganese	0.00		ng/l				80-120			U
Molybdenum	291000		ng/l	300000		97.0	80-120			
Nickel	0.00		ng/l				80-120			U
Phosphorus	1.60E7		ng/l	1.5000E7		106	80-120			
Potassium	1.45E7		ng/l	1.5000E7		96.7	80-120			
Rubidium	0.00		ng/l				80-120			U
Selenium	0.00		ng/l				80-120			U
Sodium	1.52E7		ng/l	1.5000E7		101	80-120			
Strontium	0.00		ng/l				80-120			U
Thallium	0.00		ng/l				80-120			U
Thorium	0.00		ng/l				80-120			U
Uranium	0.00		ng/l				80-120			U
Vanadium	0.00		ng/l				80-120			U
Zinc	0.00		ng/l				80-120			U
Interference Check B (2312067-IFB1)				Prepared & Analyzed: 12/21/23						
Aluminum	1.72E7		ng/l	1.6500E7		104	80-120			
Antimony	20800		ng/l	20000		104	80-120			
Arsenic	20700		ng/l	20000		103	80-120			
Barium	208000		ng/l	200000		104	80-120			
Beryllium	4660		ng/l	5000.0		93.3	80-120			
Cadmium	19700		ng/l	20000		98.3	80-120			

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ERG

Tetra Tech, Inc.
1777 Sentry Pkwy, Bldg 12
Blue Bell, PA 19422
ATTN: Ms. Chelsea Saber
PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 12/28/23 10:10
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AQS SITE CODE:
SITE CODE: Maui fires

Inorganics by Compendium Method IO-3.5 - Quality Control

Batch 2312067 - B3L2101

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Interference Check B (2312067-IFB1) Co				Prepared & Analyzed: 12/21/23						
Calcium	1.23E8		ng/l	1.2540E8		97.8	80-120			
Chromium	234000		ng/l	240000		97.4	80-120			
Cobalt	50100		ng/l	50000		100	80-120			
Copper	1.93E6		ng/l	2.0000E6		96.3	80-120			
Iron	1.77E7		ng/l	1.7500E7		101	80-120			
Lead	207000		ng/l	200000		103	80-120			
Magnesium	1.69E7		ng/l	1.6000E7		106	80-120			
Manganese	530000		ng/l	500000		106	80-120			
Molybdenum	349000		ng/l	350000		99.8	80-120			
Nickel	118000		ng/l	120000		98.2	80-120			
Phosphorus	1.74E7		ng/l	1.5200E7		114	80-120			
Potassium	1.80E7		ng/l	1.7500E7		103	80-120			
Rubidium	10200		ng/l	10000		102	80-120			
Selenium	19700		ng/l	20000		98.6	80-120			
Sodium	1.91E7		ng/l	1.7500E7		109	80-120			
Strontium	51100		ng/l	50000		102	80-120			
Thallium	523		ng/l	500.00		105	80-120			
Thorium	553		ng/l	500.00		111	80-120			
Uranium	550		ng/l	500.00		110	80-120			
Vanadium	19500		ng/l	20000		97.6	80-120			
Zinc	492000		ng/l	500000		98.5	80-120			
Serial Dilution (2312067-SRD1)		**Source: 3122052-15**		Prepared & Analyzed: 12/21/23						
Aluminum	222	165	ng/m³ Air		223			0.415	10	
Antimony	ND	0.227	ng/m³ Air		ND				10	SL, U
Arsenic	0.0602	0.0492	ng/m³ Air		0.0661			9.31	10	
Barium	ND	4.89	ng/m³ Air		ND				10	U
Beryllium	ND	0.0171	ng/m³ Air		ND				10	U
Cadmium	ND	0.562	ng/m³ Air		ND				10	U
Calcium	ND	1500	ng/m³ Air		ND				10	LJ, QB-01, U
Chromium	ND	10.5	ng/m³ Air		ND				10	U
Cobalt	0.146	0.0804	ng/m³ Air		0.142			2.48	10	QB-01
Copper	22.1	15.5	ng/m³ Air		21.8			1.68	10	
Iron	260	125	ng/m³ Air		259			0.456	10	
Lead	ND	1.42	ng/m³ Air		ND				10	U
Magnesium	ND	497	ng/m³ Air		ND				10	U
Manganese	8.05	6.13	ng/m³ Air		7.96			1.07	10	
Molybdenum	ND	1.10	ng/m³ Air		ND				10	QB-01, U
Nickel	ND	4.13	ng/m³ Air		ND				10	U

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Inorganics by Compendium Method IO-3.5 - Quality Control

Batch 2312067 - B3L2101

Serial Dilution (2312067-SRD1) Continue Source: 3122052-15 Prepared & Analyzed: 12/21/23

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Phosphorus	ND	6440	ng/m³ Air		ND				10	GC-BS, U
Potassium	ND	196	ng/m³ Air		ND				10	U
Rubidium	0.120	0.0943	ng/m³ Air		0.127			5.57	10	
Selenium	0.0877	0.0567	ng/m³ Air		0.0804			8.61	10	
Sodium	ND	10300	ng/m³ Air		ND				10	GC-BS, U
Strontium	ND	3.36	ng/m³ Air		ND				10	QB-01, U
Thallium	0.00383	0.00259	ng/m³ Air		0.00377			1.54	10	
Thorium	ND	0.0155	ng/m³ Air		ND				10	U
Uranium	ND	0.0876	ng/m³ Air		ND				10	U
Vanadium	0.567	0.254	ng/m³ Air		0.545			4.01	10	
Zinc	ND	503	ng/m³ Air		ND				10	U

Batch B3L2101 - ICP-MS Extraction

Blank (B3L2101-BLK1) Prepared & Analyzed: 12/21/23

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Aluminum	ND	32.1	ng/m³ Air							U
Antimony	ND	0.0441	ng/m³ Air							SL, U
Arsenic	ND	0.00955	ng/m³ Air							U
Barium	ND	0.948	ng/m³ Air							U
Beryllium	ND	0.00332	ng/m³ Air							U
Cadmium	ND	0.109	ng/m³ Air							U
Calcium	ND	292	ng/m³ Air							LJ, QB-01, U
Chromium	ND	2.03	ng/m³ Air							U
Cobalt	ND	0.0156	ng/m³ Air							QB-01, U
Copper	ND	3.00	ng/m³ Air							U
Iron	ND	24.2	ng/m³ Air							U
Lead	ND	0.276	ng/m³ Air							U
Magnesium	ND	96.4	ng/m³ Air							U
Manganese	ND	1.19	ng/m³ Air							U
Molybdenum	ND	0.213	ng/m³ Air							QB-01, U
Nickel	ND	0.801	ng/m³ Air							U
Phosphorus	ND	1250	ng/m³ Air							GC-BS, U
Potassium	ND	38.0	ng/m³ Air							U
Rubidium	ND	0.0183	ng/m³ Air							U
Selenium	ND	0.0110	ng/m³ Air							U
Sodium	ND	2000	ng/m³ Air							GC-BS, U
Strontium	ND	0.652	ng/m³ Air							QB-01, U
Thallium	ND	5.03E-4	ng/m³ Air							U
Thorium	ND	0.00300	ng/m³ Air							U
Uranium	ND	0.0170	ng/m³ Air							U

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Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes

Inorganics by Compendium Method IO-3.5 - Quality Control

Batch B3L2101 - ICP-MS Extraction

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (B3L2101-BLK1) Continued				Prepared & Analyzed: 12/21/23						
Vanadium	ND	0.0492	ng/m³ Air							U
Zinc	ND	97.7	ng/m³ Air							U
LCS (B3L2101-BS1)				Prepared & Analyzed: 12/21/23						
Aluminum	94.5	32.1	ng/m³ Air	82.975		114	80-120			
Antimony	0.533	0.0441	ng/m³ Air	1.3829		38.5	80-120			SL
Arsenic	2.75	0.00955	ng/m³ Air	2.7658		99.4	80-120			
Barium	28.4	0.948	ng/m³ Air	27.658		103	80-120			
Beryllium	1.31	0.00332	ng/m³ Air	1.3829		94.7	80-120			
Cadmium	1.38	0.109	ng/m³ Air	1.3829		100	80-120			
Calcium	607	292	ng/m³ Air	69.146		878	80-120			LJ, QB-01
Chromium	16.2	2.03	ng/m³ Air	13.829		117	80-120			
Cobalt	1.41	0.0156	ng/m³ Air	1.3829		102	80-120			QB-01
Copper	31.6	3.00	ng/m³ Air	27.658		114	80-120			
Iron	41.8	24.2	ng/m³ Air	27.658		151	80-120			
Lead	13.7	0.276	ng/m³ Air	13.829		99.2	80-120			
Magnesium	ND	96.4	ng/m³ Air	27.658			80-120			U
Manganese	8.82	1.19	ng/m³ Air	8.2975		106	80-120			
Molybdenum	1.67	0.213	ng/m³ Air	1.3829		121	80-120			QB-01
Nickel	3.17	0.801	ng/m³ Air	2.7658		115	80-120			
Phosphorus	ND	1250	ng/m³ Air	13.829			80-120			GC-BS, U
Potassium	66.2	38.0	ng/m³ Air	55.317		120	80-120			
Rubidium	1.36	0.0183	ng/m³ Air	1.3829		98.3	80-120			
Selenium	2.81	0.0110	ng/m³ Air	2.7658		102	80-120			
Sodium	ND	2000	ng/m³ Air	55.317			80-120			GC-BS, U
Strontium	2.30	0.652	ng/m³ Air	1.3829		166	80-120			QB-01
Thallium	0.136	5.03E-4	ng/m³ Air	0.13829		98.5	80-120			
Thorium	0.134	0.00300	ng/m³ Air	0.13829		96.7	80-120			
Uranium	0.133	0.0170	ng/m³ Air	0.13829		96.2	80-120			
Vanadium	2.79	0.0492	ng/m³ Air	2.7658		101	80-120			
Zinc	116	97.7	ng/m³ Air	82.975		139	80-120			
Duplicate (B3L2101-DUP1)		**Source: 3122052-15**		Prepared & Analyzed: 12/21/23						
Aluminum	224	33.1	ng/m³ Air		223			0.408	10	
Antimony	ND	0.0455	ng/m³ Air		ND				10	SL, U
Arsenic	0.0722	0.00984	ng/m³ Air		0.0661			8.90	10	
Barium	3.61	0.977	ng/m³ Air		3.62			0.208	10	
Beryllium	0.00979	0.00342	ng/m³ Air		0.00964			1.56	10	
Cadmium	ND	0.112	ng/m³ Air		ND				10	U
Calcium	496	301	ng/m³ Air		492			0.697	10	LJ, QB-01

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AQS SITE CODE:
SITE CODE: Maui fires

Inorganics by Compendium Method IO-3.5 - Quality Control

Batch B3L2101 - ICP-MS Extraction

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Duplicate (B3L2101-DUP1) Continued		**Source: 3122052-15**		Prepared & Analyzed: 12/21/23						
Chromium	ND	2.09	ng/m³ Air		ND				10	U
Cobalt	0.135	0.0161	ng/m³ Air		0.142			5.60	10	QB-01
Copper	20.4	3.09	ng/m³ Air		21.8			6.31	10	
Iron	257	24.9	ng/m³ Air		259			0.795	10	
Lead	ND	0.284	ng/m³ Air		0.350				10	U
Magnesium	164	99.4	ng/m³ Air		163			0.972	10	
Manganese	7.93	1.23	ng/m³ Air		7.96			0.426	10	
Molybdenum	0.786	0.220	ng/m³ Air		0.802			1.99	10	QB-01
Nickel	ND	0.826	ng/m³ Air		ND				10	U
Phosphorus	ND	1290	ng/m³ Air		ND				10	GC-BS, U
Potassium	77.3	39.2	ng/m³ Air		81.5			5.32	10	
Rubidium	0.127	0.0189	ng/m³ Air		0.127			0.533	10	
Selenium	0.0894	0.0113	ng/m³ Air		0.0804			10.5	10	
Sodium	ND	2060	ng/m³ Air		ND				10	GC-BS, U
Strontium	2.78	0.672	ng/m³ Air		2.75			1.37	10	QB-01
Thallium	0.00355	5.18E-4	ng/m³ Air		0.00377			5.85	10	
Thorium	0.00868	0.00309	ng/m³ Air		0.00878			1.14	10	
Uranium	ND	0.0175	ng/m³ Air		ND				10	U
Vanadium	0.550	0.0507	ng/m³ Air		0.545			0.970	10	
Zinc	ND	101	ng/m³ Air		ND				10	U
Duplicate (B3L2101-DUP2)		**Source: 3122052-05**		Prepared & Analyzed: 12/21/23						
Aluminum	195	27.7	ng/m³ Air		197			0.675	10	
Antimony	ND	0.0381	ng/m³ Air		ND				10	SL, U
Arsenic	0.0955	0.00824	ng/m³ Air		0.0956			0.166	10	
Barium	2.82	0.818	ng/m³ Air		2.82			0.298	10	
Beryllium	0.00640	0.00287	ng/m³ Air		0.00639			0.0497	10	
Cadmium	ND	0.0941	ng/m³ Air		ND				10	U
Calcium	610	252	ng/m³ Air		617			1.10	10	LJ, QB-01
Chromium	1.78	1.75	ng/m³ Air		1.80			1.08	10	
Cobalt	0.121	0.0135	ng/m³ Air		0.121			0.265	10	QB-01
Copper	16.5	2.59	ng/m³ Air		16.5			0.135	10	
Iron	216	20.9	ng/m³ Air		217			0.450	10	
Lead	0.459	0.238	ng/m³ Air		0.460			0.270	10	
Magnesium	350	83.2	ng/m³ Air		351			0.408	10	
Manganese	5.45	1.03	ng/m³ Air		5.48			0.618	10	
Molybdenum	0.878	0.184	ng/m³ Air		0.880			0.312	10	QB-01
Nickel	ND	0.691	ng/m³ Air		ND				10	U
Phosphorus	ND	1080	ng/m³ Air		ND				10	GC-BS, U

Inorganics by Compendium Method IO-3.5 - Quality Control

Batch B3L2101 - ICP-MS Extraction

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Duplicate (B3L2101-DUP2) Continued		**Source: 3122052-05**		Prepared & Analyzed: 12/21/23						
Potassium	127	32.8	ng/m³ Air		129			1.12	10	
Rubidium	0.117	0.0158	ng/m³ Air		0.118			0.751	10	
Selenium	0.108	0.00950	ng/m³ Air		0.117			7.59	10	
Sodium	3170	1730	ng/m³ Air		3180			0.314	10	E, GC-BS
Strontium	3.47	0.563	ng/m³ Air		3.49			0.466	10	QB-01
Thallium	0.00154	4.34E-4	ng/m³ Air		0.00157			1.91	10	
Thorium	0.00662	0.00259	ng/m³ Air		0.00641			3.24	10	
Uranium	ND	0.0147	ng/m³ Air		ND				10	U
Vanadium	0.485	0.0425	ng/m³ Air		0.492			1.40	10	
Zinc	ND	84.3	ng/m³ Air		ND				10	U
Matrix Spike (B3L2101-MS1)		**Source: 3122052-15**		Prepared & Analyzed: 12/21/23						
Aluminum	299	33.1	ng/m³ Air	85.516	223	88.7	80-120			
Antimony	0.641	0.0455	ng/m³ Air	1.4253	ND	45.0	80-120			SL
Arsenic	2.86	0.00984	ng/m³ Air	2.8505	0.0661	97.9	80-120			
Barium	31.7	0.977	ng/m³ Air	28.505	3.62	98.6	80-120			
Beryllium	1.44	0.00342	ng/m³ Air	1.4253	0.00964	100	80-120			
Cadmium	1.42	0.112	ng/m³ Air	1.4253	ND	99.6	80-120			
Calcium	555	301	ng/m³ Air	71.264	492	88.2	80-120			LJ, QB-01
Chromium	16.5	2.09	ng/m³ Air	14.253	ND	116	80-120			
Cobalt	1.50	0.0161	ng/m³ Air	1.4253	0.142	95.3	80-120			QB-01
Copper	51.8	3.09	ng/m³ Air	28.505	21.8	105	80-120			
Iron	276	24.9	ng/m³ Air	28.505	259	61.3	80-120			QM-4X
Lead	14.1	0.284	ng/m³ Air	14.253	0.350	96.7	80-120			
Magnesium	190	99.4	ng/m³ Air	28.505	163	96.7	80-120			
Manganese	16.4	1.23	ng/m³ Air	8.5516	7.96	98.6	80-120			
Molybdenum	2.14	0.220	ng/m³ Air	1.4253	0.802	93.6	80-120			QB-01
Nickel	3.26	0.826	ng/m³ Air	2.8505	ND	115	80-120			
Phosphorus	ND	1290	ng/m³ Air	14.253	ND		80-120			GC-BS, U
Potassium	130	39.2	ng/m³ Air	57.011	81.5	85.6	80-120			
Rubidium	1.46	0.0189	ng/m³ Air	1.4253	0.127	93.8	80-120			
Selenium	2.93	0.0113	ng/m³ Air	2.8505	0.0804	99.9	80-120			
Sodium	ND	2060	ng/m³ Air	57.011	ND		80-120			GC-BS, U
Strontium	4.07	0.672	ng/m³ Air	1.4253	2.75	93.0	80-120			QB-01
Thallium	0.142	5.18E-4	ng/m³ Air	0.14253	0.00377	96.8	80-120			
Thorium	0.0747	0.00309	ng/m³ Air	0.14253	0.00878	46.2	80-120			QM-07
Uranium	0.140	0.0175	ng/m³ Air	0.14253	ND	98.3	80-120			
Vanadium	3.33	0.0507	ng/m³ Air	2.8505	0.545	97.6	80-120			
Zinc	112	101	ng/m³ Air	85.516	ND	131	80-120			

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Inorganics by Compendium Method IO-3.5 - Quality Control

Batch B3L2101 - ICP-MS Extraction

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Matrix Spike Dup (B3L2101-MSD1)	**Source: 3122052-15**		Prepared & Analyzed: 12/21/23							
Aluminum	330	33.1	ng/m³ Air	85.516	223	125	80-120	9.82	20	QM-07
Antimony	0.634	0.0455	ng/m³ Air	1.4253	ND	44.5	80-120	1.13	20	SL
Arsenic	2.83	0.00984	ng/m³ Air	2.8505	0.0661	97.0	80-120	0.838	20	
Barium	32.3	0.977	ng/m³ Air	28.505	3.62	100	80-120	1.63	20	
Beryllium	1.38	0.00342	ng/m³ Air	1.4253	0.00964	96.4	80-120	3.88	20	
Cadmium	1.41	0.112	ng/m³ Air	1.4253	ND	98.7	80-120	0.886	20	
Calcium	574	301	ng/m³ Air	71.264	492	114	80-120	3.26	20	LJ, QB-01
Chromium	16.4	2.09	ng/m³ Air	14.253	ND	115	80-120	0.297	20	
Cobalt	1.50	0.0161	ng/m³ Air	1.4253	0.142	95.6	80-120	0.234	20	QB-01
Copper	54.1	3.09	ng/m³ Air	28.505	21.8	113	80-120	4.33	20	
Iron	297	24.9	ng/m³ Air	28.505	259	133	80-120	7.14	20	QM-4X
Lead	14.1	0.284	ng/m³ Air	14.253	0.350	96.4	80-120	0.333	20	
Magnesium	198	99.4	ng/m³ Air	28.505	163	124	80-120	4.08	20	QM-4X
Manganese	17.4	1.23	ng/m³ Air	8.5516	7.96	110	80-120	5.86	20	
Molybdenum	2.17	0.220	ng/m³ Air	1.4253	0.802	96.2	80-120	1.69	20	QB-01
Nickel	3.46	0.826	ng/m³ Air	2.8505	ND	121	80-120	5.79	20	
Phosphorus	ND	1290	ng/m³ Air	14.253	ND		80-120		20	GC-BS, QM-4X, U
Potassium	136	39.2	ng/m³ Air	57.011	81.5	95.0	80-120	4.00	20	
Rubidium	1.44	0.0189	ng/m³ Air	1.4253	0.127	92.1	80-120	1.68	20	
Selenium	2.89	0.0113	ng/m³ Air	2.8505	0.0804	98.7	80-120	1.26	20	
Sodium	ND	2060	ng/m³ Air	57.011	ND		80-120		20	GC-BS, QM-4X, U
Strontium	4.20	0.672	ng/m³ Air	1.4253	2.75	102	80-120	3.23	20	QB-01
Thallium	0.141	5.18E-4	ng/m³ Air	0.14253	0.00377	96.5	80-120	0.335	20	
Thorium	0.0746	0.00309	ng/m³ Air	0.14253	0.00878	46.2	80-120	0.0972	20	QM-07
Uranium	0.140	0.0175	ng/m³ Air	0.14253	ND	98.3	80-120	0.0457	20	
Vanadium	3.38	0.0507	ng/m³ Air	2.8505	0.545	99.3	80-120	1.48	20	
Zinc	112	101	ng/m³ Air	85.516	ND	131	80-120	0.540	20	
Post Spike (B3L2101-PS1)	**Source: 3122052-15**		Prepared & Analyzed: 12/21/23							
Aluminum	247	33.1	ng/m³ Air	28.505	223	83.5	75-125			
Antimony	0.321	0.0455	ng/m³ Air	0.28505	ND	112	75-125			SL
Arsenic	1.42	0.00984	ng/m³ Air	1.4253	0.0661	94.9	75-125			
Barium	6.54	0.977	ng/m³ Air	2.8505	3.62	102	75-125			
Beryllium	0.293	0.00342	ng/m³ Air	0.28505	0.00964	99.3	75-125			
Cadmium	0.147	0.112	ng/m³ Air	0.14253	ND	103	75-125			
Calcium	525	301	ng/m³ Air	28.505	492	114	75-125			LJ, QB-01
Chromium	3.44	2.09	ng/m³ Air	1.4253	ND	241	75-125			
Cobalt	0.418	0.0161	ng/m³ Air	0.28505	0.142	96.7	75-125			QB-01

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CERTIFICATE OF ANALYSIS

Tetra Tech, Inc.
1777 Sentry Pkwy, Bldg 12
Blue Bell, PA 19422
ATTN: Ms. Chelsea Saber
PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 12/28/23 10:10
SUBMITTED: 12/20/23
AQS SITE CODE:
SITE CODE: Maui fires

Inorganics by Compendium Method IO-3.5 - Quality Control

Batch B3L2101 - ICP-MS Extraction

Post Spike (B3L2101-PS1) Continued **Source: 3122052-15** Prepared & Analyzed: 12/21/23

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Copper	36.7	3.09	ng/m³ Air	14.253	21.8	105	75-125			
Iron	283	24.9	ng/m³ Air	28.505	259	84.1	75-125			
Lead	28.0	0.284	ng/m³ Air	28.505	0.350	96.9	75-125			
Magnesium	189	99.4	ng/m³ Air	28.505	163	91.0	75-125			
Manganese	10.8	1.23	ng/m³ Air	2.8505	7.96	99.5	75-125			
Molybdenum	2.16	0.220	ng/m³ Air	1.4253	0.802	95.3	75-125			QB-01
Nickel	3.22	0.826	ng/m³ Air	2.8505	ND	113	75-125			
Phosphorus	ND	1290	ng/m³ Air	5.7011	ND		75-125			A-01, GC-BS, U
Potassium	108	39.2	ng/m³ Air	28.505	81.5	93.1	75-125			
Rubidium	0.258	0.0189	ng/m³ Air	0.14253	0.127	91.4	75-125			
Selenium	1.46	0.0113	ng/m³ Air	1.4253	0.0804	96.6	75-125			
Sodium	ND	2060	ng/m³ Air	28.505	ND		75-125			A-01, GC-BS, U
Strontium	4.03	0.672	ng/m³ Air	1.4253	2.75	89.9	75-125			QB-01
Thallium	0.0712	5.18E-4	ng/m³ Air	7.1264E-2	0.00377	94.6	75-125			
Thorium	0.0716	0.00309	ng/m³ Air	7.1264E-2	0.00878	88.1	75-125			
Uranium	0.0731	0.0175	ng/m³ Air	7.1264E-2	ND	103	75-125			
Vanadium	1.93	0.0507	ng/m³ Air	1.4253	0.545	97.3	75-125			
Zinc	ND	101	ng/m³ Air	28.505	ND		75-125			U

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SITE CODE: Maui fires

Notes and Definitions

U	Under Detection Limit
SL	The spike recovery was outside acceptance limits. Reported value may be biased low.
QM-4X	The MS/MSD recovery exceeds criteria because the parent sample concentration is greater than 4x the spike concentration. Sample results for the QC batch were accepted based on acceptable BS/BSD recoveries.
QM-07	The spike recovery was outside acceptance limits for the MS and/or MSD. The batch was accepted based on acceptable LCS recovery.
QB-01	Analyte exceeds method blank criteria
LJ	Identification of analyte is acceptable; reported value is an estimate.
GC-BS	Compound exceeds Blank Spike Criteria
FB-01	Analyte exceeds Field Blank criteria.
E	The concentration indicated for this analyte is an estimated value above the calibration range of the instrument. This value is considered an estimate (CLP E-flag).
A-01	Parent sample >4x spike
ND	Analyte NOT DETECTED
NR	Not Reported
MDL	Method Detection Limit
RPD	Relative Percent Difference

Note: This test is accredited under the 2016 TNI Standard.

Eastern Research Group
601 Keystone Park Drive
Suite 700
Morrisville, NC 27560

January 03, 2024

Ms. Chelsea Saber
Tetra Tech, Inc.
1777 Sentry Pkwy, Bldg 12
Blue Bell, PA 19422
Project Name: Maui fires

Dear Ms. Chelsea Saber,

This report contains the analytical results for the sample(s) received under chain(s) of custody by Eastern Research Group on 12/26/23 12:07.

Values below the MDL for QC results in this report are recorded as ND, however the actual values are reported in the accompanying Excel report with a "U" flag (Under the detection limit). The actual values are reported in AQS.

This test is accredited under the 2016 TNI Standard for Environmental Laboratories (FL DOH Certification # E87673). All analyses were performed as described in the US EPA-approved QAPP, under the contract for National Hazardous Air Pollutant Support (US EPA Contract No. 68HERH22D0002). This cover page is an integral part of this report, and any exceptions or comments are noted on the last page.

Release of the data contained in this data package and in the data submitted in the electronic data deliverable, has been authorized by the Program Manager, or the Program Manager's designee as verified by the following signature.

The issuance of the final Certificate of Analysis takes precedence over any previous Report. If you have any questions, please contact me at 919-468-7924.

Sincerely,

Julie Swift
Program Manager
julie.swift@erg.com

The information contained in this report and its attachment(s) are intended only for the use of the individual to whom it is addressed and may contain information that is privileged, confidential, or exempt from disclosure. If the reader of this message is not the intended recipient, you are hereby notified that any dissemination, distribution, or copying of this report is strictly prohibited. If you have received this report in error, please notify julie.swift@erg.com and delete the report without retaining any copies.

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ATTN: Ms. Chelsea Saber
PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 01/03/24 09:12
SUBMITTED: 12/26/23
AQS SITE CODE:
SITE CODE: Maui fires

ANALYTICAL REPORT FOR SAMPLES

SampleName	LabNumber	Matrix	Sampled	Received
TetraTech Q9533907	3122607-01	Air	12/18/23 23:59	12/26/23 12:07
TetraTech Q9533906	3122607-02	Air	12/18/23 23:59	12/26/23 12:07
TetraTech Q9533904	3122607-03	Air	12/18/23 23:59	12/26/23 12:07
TetraTech Q9533903 FB	3122607-04	Air	12/18/23 00:00	12/26/23 12:07
TetraTech Q9533902	3122607-05	Air	12/19/23 23:59	12/26/23 12:07
TetraTech Q9533901	3122607-06	Air	12/19/23 23:59	12/26/23 12:07
TetraTech Q9533899	3122607-07	Air	12/19/23 23:59	12/26/23 12:07
TetraTech Q9533897 FB	3122607-08	Air	12/19/23 00:00	12/26/23 12:07
TetraTech Q9524476	3122607-09	Air	12/20/23 23:59	12/26/23 12:07
TetraTech Q9551127	3122607-10	Air	12/20/23 23:59	12/26/23 12:07
TetraTech Q9524475	3122607-11	Air	12/20/23 23:59	12/26/23 12:07
TetraTech Q9524488 FB	3122607-12	Air	12/20/23 00:00	12/26/23 12:07

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FILE #: 0000.00
REPORTED: 01/03/24 09:12
SUBMITTED: 12/26/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9533907 **Lab ID:** 3122607-01 **Sampled:** 12/18/23 23:59
Matrix: Air **Sample Volume:** 2014.265 m³ **Received:** 12/26/23 12:07
Filter ID: **Analysis Date:** 12/27/23 22:09
Comments: MFK-AM01-121823-HM

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	**7429-90-5**	**221**		**25.9**
Antimony	**7440-36-0**	**0.0709**	SL	**0.0356**
Arsenic	**7440-38-2**	**0.156**		**0.00771**
Barium	**7440-39-3**	**3.76**		**0.766**
Beryllium	**7440-41-7**	**0.00765**		**0.00268**
Cadmium	7440-43-9	0.00600	U	0.0880
Calcium	**7440-70-2**	**415**	LJ, QB-01	**236**
Chromium	7440-47-3	1.62	U	1.64
Cobalt	**7440-48-4**	**0.118**	QB-01	**0.0126**
Copper	**7440-50-8**	**19.1**		**2.42**
Iron	**7439-89-6**	**236**		**19.5**
Lead	**7439-92-1**	**0.313**		**0.223**
Magnesium	**7439-95-4**	**110**		**77.9**
Manganese	**7439-96-5**	**6.15**		**0.961**
Molybdenum	**7439-98-7**	**1.06**	QB-01	**0.172**
Nickel	7440-02-0	0.486	U	0.647
Phosphorus	7723-14-0	297	GC-BS, U	1010
Potassium	**7440-09-7**	**71.9**		**30.7**
Rubidium	**7440-17-7**	**0.108**		**0.0148**
Selenium	**7782-49-2**	**0.0676**		**0.00889**
Sodium	7440-23-5	1080	U	1620
Strontium	**7440-24-6**	**2.07**	QB-01	**0.527**
Thallium	**7440-28-0**	**0.00116**		**4.06E-4**
Thorium	**7440-29-01**	**0.00571**		**0.00242**
Uranium	7440-61-1	0.00591	U	0.0137
Vanadium	**7440-62-2**	**0.543**		**0.0397**
Zinc	7440-66-6	30.5	U	78.9

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ATTN: Ms. Chelsea Saber
PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 01/03/24 09:12
SUBMITTED: 12/26/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9533906 **Lab ID:** 3122607-02 **Sampled:** 12/18/23 23:59
Matrix: Air **Sample Volume:** 2035.188 m³ **Received:** 12/26/23 12:07
Filter ID: **Analysis Date:** 12/27/23 22:27
Comments: MFK-AM02-121823-HM

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	**7429-90-5**	**219**		**25.7**
Antimony	**7440-36-0**	**0.0642**	SL	**0.0353**
Arsenic	**7440-38-2**	**0.216**		**0.00763**
Barium	**7440-39-3**	**3.78**		**0.758**
Beryllium	**7440-41-7**	**0.00747**		**0.00265**
Cadmium	7440-43-9	0.00904	U	0.0871
Calcium	**7440-70-2**	**426**	LJ, QB-01	**233**
Chromium	**7440-47-3**	**1.81**		**1.62**
Cobalt	**7440-48-4**	**0.116**	QB-01	**0.0125**
Copper	**7440-50-8**	**16.2**		**2.40**
Iron	**7439-89-6**	**239**		**19.3**
Lead	7439-92-1	0.201	U	0.221
Magnesium	**7439-95-4**	**109**		**77.1**
Manganese	**7439-96-5**	**5.88**		**0.951**
Molybdenum	**7439-98-7**	**0.991**	QB-01	**0.170**
Nickel	7440-02-0	0.597	U	0.640
Phosphorus	7723-14-0	291	GC-BS, U	999
Potassium	**7440-09-7**	**104**		**30.4**
Rubidium	**7440-17-7**	**0.190**		**0.0146**
Selenium	**7782-49-2**	**0.0741**		**0.00879**
Sodium	7440-23-5	1090	U	1600
Strontium	**7440-24-6**	**2.08**	QB-01	**0.521**
Thallium	**7440-28-0**	**0.00111**		**4.02E-4**
Thorium	**7440-29-01**	**0.00702**		**0.00240**
Uranium	7440-61-1	0.00590	U	0.0136
Vanadium	**7440-62-2**	**0.558**		**0.0393**
Zinc	7440-66-6	23.4	U	78.1

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FILE #: 0000.00
REPORTED: 01/03/24 09:12
SUBMITTED: 12/26/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9533904 **Lab ID:** 3122607-03 **Sampled:** 12/18/23 23:59
Matrix: Air **Sample Volume:** 1629.96(m³ **Received:** 12/26/23 12:07
Filter ID: **Analysis Date:** 12/27/23 22:45
Comments: MFK-AM03-121823-HM

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	**7429-90-5**	**160**		**32.0**
Antimony	**7440-36-0**	**0.0650**	SL	**0.0440**
Arsenic	**7440-38-2**	**0.171**		**0.00953**
Barium	**7440-39-3**	**3.62**		**0.946**
Beryllium	**7440-41-7**	**0.00772**		**0.00331**
Cadmium	7440-43-9	0.00650	U	0.109
Calcium	**7440-70-2**	**488**	LJ, QB-01	**291**
Chromium	**7440-47-3**	**2.35**		**2.03**
Cobalt	**7440-48-4**	**0.149**	QB-01	**0.0156**
Copper	**7440-50-8**	**24.4**		**2.99**
Iron	**7439-89-6**	**200**		**24.2**
Lead	7439-92-1	0.250	U	0.275
Magnesium	**7439-95-4**	**118**		**96.2**
Manganese	**7439-96-5**	**5.46**		**1.19**
Molybdenum	**7439-98-7**	**1.29**	QB-01	**0.213**
Nickel	7440-02-0	0.702	U	0.800
Phosphorus	7723-14-0	355	GC-BS, U	1250
Potassium	**7440-09-7**	**69.2**		**37.9**
Rubidium	**7440-17-7**	**0.110**		**0.0183**
Selenium	**7782-49-2**	**0.0622**		**0.0110**
Sodium	7440-23-5	1260	U	2000
Strontium	**7440-24-6**	**2.00**	QB-01	**0.651**
Thallium	**7440-28-0**	**8.96E-4**		**5.02E-4**
Thorium	**7440-29-01**	**0.00650**		**0.00299**
Uranium	7440-61-1	0.00532	U	0.0170
Vanadium	**7440-62-2**	**0.441**		**0.0491**
Zinc	7440-66-6	33.2	U	97.5

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FILE #: 0000.00
REPORTED: 01/03/24 09:12
SUBMITTED: 12/26/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9533903 FB
Lab ID: 3122607-04
Sampled: 12/18/23 00:00
Matrix: Air
Sample Volume: 2014.265 m³
Received: 12/26/23 12:07
Filter ID:
Analysis Date: 12/27/23 23:01
Comments: MFK-FB01-121823-HM Field Blank

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	7429-90-5	10.4	U	25.9
Antimony	7440-36-0	0.00680	SL, U	0.0356
Arsenic	7440-38-2	0.00249	U	0.00771
Barium	7440-39-3	0.589	U	0.766
Beryllium	7440-41-7	0.00104	U	0.00268
Cadmium	7440-43-9	0.00271	U	0.0880
Calcium	**7440-70-2**	**364**	FB-01, LJ, QB-01	**236**
Chromium	7440-47-3	1.50	U	1.64
Cobalt	**7440-48-4**	**0.0228**	FB-01, QB-01	**0.0126**
Copper	7440-50-8	0.487	U	2.42
Iron	7439-89-6	11.7	U	19.5
Lead	7439-92-1	0.0511	U	0.223
Magnesium	7439-95-4	38.7	U	77.9
Manganese	7439-96-5	0.162	U	0.961
Molybdenum	**7439-98-7**	**0.240**	FB-01, QB-01	**0.172**
Nickel	7440-02-0	0.279	U	0.647
Phosphorus	7723-14-0	283	GC-BS, U	1010
Potassium	**7440-09-7**	**36.5**	FB-01	**30.7**
Rubidium	7440-17-7	0.0143	U	0.0148
Selenium	7782-49-2	0.00562	U	0.00889
Sodium	7440-23-5	665	U	1620
Strontium	**7440-24-6**	**0.554**	FB-01, QB-01	**0.527**
Thallium	7440-28-0	1.78E-4	U	4.06E-4
Thorium	7440-29-01	0.00197	U	0.00242
Uranium	7440-61-1	0.00171	U	0.0137
Vanadium	7440-62-2	0.0121	U	0.0397
Zinc	7440-66-6	22.0	U	78.9

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FILE #: 0000.00
REPORTED: 01/03/24 09:12
SUBMITTED: 12/26/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9533902 **Lab ID:** 3122607-05 **Sampled:** 12/19/23 23:59
Matrix: Air **Sample Volume:** 1946.945 m³ **Received:** 12/26/23 12:07
Filter ID: **Analysis Date:** 12/27/23 19:12
Comments: MFK-AM01-121923-HM

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	**7429-90-5**	**477**	QM-4X	**26.8**
Antimony	**7440-36-0**	**0.0598**	SL	**0.0369**
Arsenic	**7440-38-2**	**0.208**		**0.00798**
Barium	**7440-39-3**	**5.22**		**0.792**
Beryllium	**7440-41-7**	**0.0156**		**0.00277**
Cadmium	7440-43-9	0.00878	U	0.0911
Calcium	**7440-70-2**	**551**	A-01, LJ, QB-01, QM-4X	**244**
Chromium	**7440-47-3**	**1.95**		**1.70**
Cobalt	**7440-48-4**	**0.249**	QB-01	**0.0130**
Copper	**7440-50-8**	**20.0**	QM-07	**2.51**
Iron	**7439-89-6**	**516**	QM-4X	**20.2**
Lead	**7439-92-1**	**0.312**		**0.231**
Magnesium	**7439-95-4**	**267**	QM-4X	**80.6**
Manganese	**7439-96-5**	**13.5**		**0.994**
Molybdenum	**7439-98-7**	**1.11**	QB-01	**0.178**
Nickel	7440-02-0	0.597	U	0.669
Phosphorus	7723-14-0	317	A-01, GC-BS, QM-4X, U	1040
Potassium	**7440-09-7**	**118**	QM-07	**31.8**
Rubidium	**7440-17-7**	**0.168**		**0.0153**
Selenium	**7782-49-2**	**0.137**		**0.00919**
Sodium	**7440-23-5**	**2190**	A-01, E, QM-4X	**1670**
Strontium	**7440-24-6**	**3.96**	QB-01	**0.545**
Thallium	**7440-28-0**	**0.00111**		**4.20E-4**
Thorium	**7440-29-01**	**0.0117**	QM-07	**0.00251**
Uranium	7440-61-1	0.0108	U	0.0142
Vanadium	**7440-62-2**	**1.26**		**0.0411**
Zinc	7440-66-6	32.8	U	81.6

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Tetra Tech, Inc.
1777 Sentry Pkwy, Bldg 12
Blue Bell, PA 19422
ATTN: Ms. Chelsea Saber
PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 01/03/24 09:12
SUBMITTED: 12/26/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9533901 **Lab ID:** 3122607-06 **Sampled:** 12/19/23 23:59
Matrix: Air **Sample Volume:** 2090.356 m³ **Received:** 12/26/23 12:07
Filter ID: **Analysis Date:** 12/27/23 23:15
Comments: MFK-AM02-121923-HM

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	**7429-90-5**	**418**		**25.0**
Antimony	**7440-36-0**	**0.0613**	SL	**0.0343**
Arsenic	**7440-38-2**	**0.167**		**0.00743**
Barium	**7440-39-3**	**5.28**		**0.738**
Beryllium	**7440-41-7**	**0.0156**		**0.00258**
Cadmium	7440-43-9	0.0103	U	0.0848
Calcium	**7440-70-2**	**502**	LJ, QB-01	**227**
Chromium	**7440-47-3**	**1.82**		**1.58**
Cobalt	**7440-48-4**	**0.216**	QB-01	**0.0121**
Copper	**7440-50-8**	**24.2**		**2.34**
Iron	**7439-89-6**	**440**		**18.8**
Lead	**7439-92-1**	**0.360**		**0.215**
Magnesium	**7439-95-4**	**262**		**75.0**
Manganese	**7439-96-5**	**11.5**		**0.926**
Molybdenum	**7439-98-7**	**1.23**	QB-01	**0.166**
Nickel	7440-02-0	0.594	U	0.623
Phosphorus	7723-14-0	311	GC-BS, U	973
Potassium	**7440-09-7**	**133**		**29.6**
Rubidium	**7440-17-7**	**0.199**		**0.0142**
Selenium	**7782-49-2**	**0.134**		**0.00856**
Sodium	**7440-23-5**	**2170**	E	**1560**
Strontium	**7440-24-6**	**3.93**	QB-01	**0.507**
Thallium	**7440-28-0**	**9.53E-4**		**3.92E-4**
Thorium	**7440-29-01**	**0.0121**		**0.00234**
Uranium	7440-61-1	0.0103	U	0.0132
Vanadium	**7440-62-2**	**1.11**		**0.0383**
Zinc	7440-66-6	23.3	U	76.0

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1777 Sentry Pkwy, Bldg 12
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ATTN: Ms. Chelsea Saber
PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 01/03/24 09:12
SUBMITTED: 12/26/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9533899
Matrix: Air
Lab ID: 3122607-07
Sample Volume: 1814.848 m³
Filter ID:
Sampled: 12/19/23 23:59
Received: 12/26/23 12:07
Analysis Date: 12/27/23 23:30
Comments: MFK-AM03-121923-HM

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	**7429-90-5**	**319**		**28.8**
Antimony	**7440-36-0**	**0.0801**	SL	**0.0395**
Arsenic	**7440-38-2**	**0.151**		**0.00856**
Barium	**7440-39-3**	**5.68**		**0.850**
Beryllium	**7440-41-7**	**0.0145**		**0.00298**
Cadmium	7440-43-9	0.00900	U	0.0977
Calcium	**7440-70-2**	**538**	LJ, QB-01	**262**
Chromium	**7440-47-3**	**1.97**		**1.82**
Cobalt	**7440-48-4**	**0.201**	QB-01	**0.0140**
Copper	**7440-50-8**	**35.9**		**2.69**
Iron	**7439-89-6**	**380**		**21.7**
Lead	**7439-92-1**	**0.623**		**0.247**
Magnesium	**7439-95-4**	**278**		**86.4**
Manganese	**7439-96-5**	**11.2**		**1.07**
Molybdenum	**7439-98-7**	**1.26**	QB-01	**0.191**
Nickel	**7440-02-0**	**0.771**		**0.718**
Phosphorus	7723-14-0	344	GC-BS, U	1120
Potassium	**7440-09-7**	**128**		**34.1**
Rubidium	**7440-17-7**	**0.164**		**0.0164**
Selenium	**7782-49-2**	**0.139**		**0.00986**
Sodium	**7440-23-5**	**2340**	E	**1790**
Strontium	**7440-24-6**	**3.87**	QB-01	**0.585**
Thallium	**7440-28-0**	**9.10E-4**		**4.51E-4**
Thorium	**7440-29-01**	**0.0112**		**0.00269**
Uranium	7440-61-1	0.00899	U	0.0152
Vanadium	**7440-62-2**	**0.937**		**0.0441**
Zinc	7440-66-6	31.3	U	87.6

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Blue Bell, PA 19422
ATTN: Ms. Chelsea Saber
PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 01/03/24 09:12
SUBMITTED: 12/26/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9533897 FB
Matrix: Air
Lab ID: 3122607-08
Sample Volume: 1946.945 m³
Filter ID:
Sampled: 12/19/23 00:00
Received: 12/26/23 12:07
Analysis Date: 12/27/23 23:46
Comments: MFK-FB01-121923-HM Field Blank

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	7429-90-5	9.58	U	26.8
Antimony	7440-36-0	0.00728	SL, U	0.0369
Arsenic	7440-38-2	0.00254	U	0.00798
Barium	**7440-39-3**	**0.898**	FB-01	**0.792**
Beryllium	7440-41-7	9.11E-4	U	0.00277
Cadmium	7440-43-9	0.00279	U	0.0911
Calcium	**7440-70-2**	**310**	FB-01, LJ, QB-01	**244**
Chromium	7440-47-3	1.48	U	1.70
Cobalt	**7440-48-4**	**0.0259**	FB-01, QB-01	**0.0130**
Copper	7440-50-8	0.435	U	2.51
Iron	7439-89-6	10.7	U	20.2
Lead	7439-92-1	0.0554	U	0.231
Magnesium	7439-95-4	39.6	U	80.6
Manganese	7439-96-5	0.150	U	0.994
Molybdenum	**7439-98-7**	**0.237**	FB-01, QB-01	**0.178**
Nickel	7440-02-0	0.258	U	0.669
Phosphorus	7723-14-0	288	GC-BS, U	1040
Potassium	7440-09-7	27.8	U	31.8
Rubidium	7440-17-7	0.0135	U	0.0153
Selenium	7782-49-2	0.00264	U	0.00919
Sodium	7440-23-5	672	U	1670
Strontium	**7440-24-6**	**0.561**	FB-01, QB-01	**0.545**
Thallium	7440-28-0	1.23E-4	U	4.20E-4
Thorium	7440-29-01	0.00204	U	0.00251
Uranium	7440-61-1	0.00157	U	0.0142
Vanadium	7440-62-2	0.0203	U	0.0411
Zinc	7440-66-6	19.2	U	81.6

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Blue Bell, PA 19422
ATTN: Ms. Chelsea Saber
PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 01/03/24 09:12
SUBMITTED: 12/26/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9524476
Matrix: Air
Lab ID: 3122607-09
Sample Volume: 1858.198 m³
Filter ID:
Sampled: 12/20/23 23:59
Received: 12/26/23 12:07
Analysis Date: 12/28/23 00:00
Comments: MFK-AM01-122023-HM

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	**7429-90-5**	**533**		**28.1**
Antimony	**7440-36-0**	**0.104**	SL	**0.0386**
Arsenic	**7440-38-2**	**0.303**		**0.00836**
Barium	**7440-39-3**	**6.05**		**0.830**
Beryllium	**7440-41-7**	**0.0189**		**0.00291**
Cadmium	7440-43-9	0.00886	U	0.0954
Calcium	**7440-70-2**	**488**	LJ, QB-01	**256**
Chromium	7440-47-3	1.26	U	1.78
Cobalt	**7440-48-4**	**0.300**	QB-01	**0.0137**
Copper	**7440-50-8**	**25.0**		**2.63**
Iron	**7439-89-6**	**599**		**21.2**
Lead	**7439-92-1**	**0.423**		**0.242**
Magnesium	**7439-95-4**	**301**		**84.4**
Manganese	**7439-96-5**	**16.7**		**1.04**
Molybdenum	**7439-98-7**	**0.771**	QB-01	**0.186**
Nickel	7440-02-0	0.600	U	0.701
Phosphorus	7723-14-0	230	GC-BS, U	1090
Potassium	**7440-09-7**	**114**		**33.3**
Rubidium	**7440-17-7**	**0.195**		**0.0160**
Selenium	**7782-49-2**	**0.173**		**0.00963**
Sodium	**7440-23-5**	**2360**	E	**1750**
Strontium	**7440-24-6**	**4.47**	QB-01	**0.571**
Thallium	**7440-28-0**	**0.00128**		**4.40E-4**
Thorium	**7440-29-01**	**0.0163**		**0.00263**
Uranium	7440-61-1	0.0112	U	0.0149
Vanadium	**7440-62-2**	**1.53**		**0.0431**
Zinc	7440-66-6	28.5	U	85.5

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Tetra Tech, Inc.
1777 Sentry Pkwy, Bldg 12
Blue Bell, PA 19422
ATTN: Ms. Chelsea Saber
PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 01/03/24 09:12
SUBMITTED: 12/26/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9551127 **Lab ID:** 3122607-10 **Sampled:** 12/20/23 23:59
Matrix: Air **Sample Volume:** 1997.516 m³ **Received:** 12/26/23 12:07
Filter ID: **Analysis Date:** 12/28/23 00:14
Comments: MFK-AM02-122023-HM

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	**7429-90-5**	**473**		**26.1**
Antimony	**7440-36-0**	**0.0535**	SL	**0.0359**
Arsenic	**7440-38-2**	**0.139**		**0.00778**
Barium	**7440-39-3**	**5.40**		**0.772**
Beryllium	**7440-41-7**	**0.0184**		**0.00270**
Cadmium	7440-43-9	0.00646	U	0.0888
Calcium	**7440-70-2**	**706**	LJ, QB-01	**238**
Chromium	**7440-47-3**	**1.77**		**1.65**
Cobalt	**7440-48-4**	**0.275**	QB-01	**0.0127**
Copper	**7440-50-8**	**15.5**		**2.44**
Iron	**7439-89-6**	**525**		**19.7**
Lead	**7439-92-1**	**0.347**		**0.225**
Magnesium	**7439-95-4**	**307**		**78.5**
Manganese	**7439-96-5**	**14.6**		**0.969**
Molybdenum	**7439-98-7**	**0.974**	QB-01	**0.173**
Nickel	**7440-02-0**	**0.670**		**0.652**
Phosphorus	7723-14-0	476	GC-BS, U	1020
Potassium	**7440-09-7**	**111**		**31.0**
Rubidium	**7440-17-7**	**0.189**		**0.0149**
Selenium	**7782-49-2**	**0.183**		**0.00896**
Sodium	**7440-23-5**	**2480**	E	**1630**
Strontium	**7440-24-6**	**4.57**	QB-01	**0.531**
Thallium	**7440-28-0**	**0.00104**		**4.10E-4**
Thorium	**7440-29-01**	**0.0150**		**0.00244**
Uranium	7440-61-1	0.0111	U	0.0138
Vanadium	**7440-62-2**	**1.40**		**0.0401**
Zinc	7440-66-6	19.6	U	79.6

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Tetra Tech, Inc.
1777 Sentry Pkwy, Bldg 12
Blue Bell, PA 19422
ATTN: Ms. Chelsea Saber
PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 01/03/24 09:12
SUBMITTED: 12/26/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9524475 **Lab ID:** 3122607-11 **Sampled:** 12/20/23 23:59
Matrix: Air **Sample Volume:** 2229.577 m^3 **Received:** 12/26/23 12:07
Filter ID: **Analysis Date:** 12/28/23 01:38
Comments: MFK-AM03-122023-HM

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	**7429-90-5**	**388**		**23.4**
Antimony	**7440-36-0**	**0.130**	SL	**0.0322**
Arsenic	**7440-38-2**	**0.111**		**0.00697**
Barium	**7440-39-3**	**6.50**		**0.692**
Beryllium	**7440-41-7**	**0.0178**		**0.00242**
Cadmium	7440-43-9	0.00679	U	0.0795
Calcium	**7440-70-2**	**405**	LJ, QB-01	**213**
Chromium	7440-47-3	0.988	U	1.48
Cobalt	**7440-48-4**	**0.249**	QB-01	**0.0114**
Copper	**7440-50-8**	**17.9**		**2.19**
Iron	**7439-89-6**	**480**		**17.7**
Lead	**7439-92-1**	**0.212**		**0.201**
Magnesium	**7439-95-4**	**278**		**70.3**
Manganese	**7439-96-5**	**14.1**		**0.868**
Molybdenum	**7439-98-7**	**0.702**	QB-01	**0.155**
Nickel	7440-02-0	0.528	U	0.585
Phosphorus	7723-14-0	183	GC-BS, U	912
Potassium	**7440-09-7**	**110**		**27.7**
Rubidium	**7440-17-7**	**0.172**		**0.0134**
Selenium	**7782-49-2**	**0.171**		**0.00803**
Sodium	**7440-23-5**	**2140**	E	**1460**
Strontium	**7440-24-6**	**4.12**	QB-01	**0.476**
Thallium	**7440-28-0**	**0.00104**		**3.67E-4**
Thorium	**7440-29-01**	**0.0142**		**0.00219**
Uranium	7440-61-1	0.00948	U	0.0124
Vanadium	**7440-62-2**	**1.34**		**0.0359**
Zinc	7440-66-6	19.3	U	71.3

CERTIFICATE OF ANALYSIS

Tetra Tech, Inc.
1777 Sentry Pkwy, Bldg 12
Blue Bell, PA 19422
ATTN: Ms. Chelsea Saber
PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 01/03/24 09:12
SUBMITTED: 12/26/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9524488 FB **Lab ID:** 3122607-12 **Sampled:** 12/20/23 00:00
Matrix: Air **Sample Volume:** 1858.198 m³ **Received:** 12/26/23 12:07
Filter ID: **Analysis Date:** 12/28/23 01:56
Comments: MFK-FB01-122023-HM - Field Blank

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	7429-90-5	9.27	U	28.1
Antimony	7440-36-0	0.0147	SL, U	0.0386
Arsenic	7440-38-2	0.00233	U	0.00836
Barium	7440-39-3	0.678	U	0.830
Beryllium	7440-41-7	5.23E-4	U	0.00291
Cadmium	7440-43-9	4.59E-4	U	0.0954
Calcium	7440-70-2	112	LJ, QB-01, U	256
Chromium	7440-47-3	0.634	U	1.78
Cobalt	7440-48-4	0.00449	QB-01, U	0.0137
Copper	7440-50-8	0.203	U	2.63
Iron	7439-89-6	6.22	U	21.2
Lead	7439-92-1	0.0286	U	0.242
Magnesium	7439-95-4	22.9	U	84.4
Manganese	7439-96-5	0.104	U	1.04
Molybdenum	7439-98-7	0.0847	QB-01, U	0.186
Nickel	7440-02-0	0.180	U	0.701
Phosphorus	7723-14-0	171	GC-BS, U	1090
Potassium	7440-09-7	13.1	U	33.3
Rubidium	7440-17-7	0.00758	U	0.0160
Selenium	7782-49-2	3.99E-4	U	0.00963
Sodium	7440-23-5	567	U	1750
Strontium	7440-24-6	0.231	QB-01, U	0.571
Thallium	7440-28-0	1.64E-4	U	4.40E-4
Thorium	7440-29-01	0.00222	U	0.00263
Uranium	7440-61-1	7.30E-4	U	0.0149
Vanadium	7440-62-2	0.0102	U	0.0431
Zinc	7440-66-6	15.5	U	85.5

CERTIFICATE OF ANALYSIS

Tetra Tech, Inc.
1777 Sentry Pkwy, Bldg 12
Blue Bell, PA 19422
ATTN: Ms. Chelsea Saber
PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 01/03/24 09:12
SUBMITTED: 12/26/23
AQS SITE CODE:
SITE CODE: Maui fires

Inorganics by Compendium Method IO-3.5 - Quality Control

Batch 2312074 - B3K2705

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Calibration Blank (2312074-CCB1)				Prepared & Analyzed: 12/27/23						
Aluminum	-4.37		ng/l							U
Antimony	1.09		ng/l							
Arsenic	3.89		ng/l							
Barium	1.50		ng/l							
Beryllium	0.0904		ng/l							
Cadmium	0.319		ng/l							
Calcium	530		ng/l							
Chromium	4.99		ng/l							
Cobalt	0.249		ng/l							
Copper	24.0		ng/l							
Iron	-8.19		ng/l							U
Lead	6.35		ng/l							
Magnesium	25.9		ng/l							
Manganese	3.81		ng/l							
Molybdenum	13.4		ng/l							
Nickel	0.213		ng/l							
Phosphorus	-199		ng/l							U
Potassium	805		ng/l							
Rubidium	-0.0276		ng/l							U
Selenium	0.319		ng/l							
Sodium	109		ng/l							
Strontium	1.30		ng/l							
Thallium	0.518		ng/l							
Thorium	0.0273		ng/l							
Uranium	0.0171		ng/l							
Vanadium	-16.4		ng/l							U
Zinc	-65.5		ng/l							U
Calibration Blank (2312074-CCB2)				Prepared & Analyzed: 12/27/23						
Aluminum	-25.1		ng/l							U
Antimony	0.303		ng/l							
Arsenic	1.90		ng/l							
Barium	0.735		ng/l							
Beryllium	0.114		ng/l							
Cadmium	0.123		ng/l							
Calcium	31.4		ng/l							
Chromium	3.94		ng/l							
Cobalt	0.140		ng/l							
Copper	10.1		ng/l							

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Tetra Tech, Inc.
1777 Sentry Pkwy, Bldg 12
Blue Bell, PA 19422
ATTN: Ms. Chelsea Saber
PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 01/03/24 09:12
SUBMITTED: 12/26/23
AQS SITE CODE:
SITE CODE: Maui fires

Inorganics by Compendium Method IO-3.5 - Quality Control

Batch 2312074 - B3K2705

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Calibration Blank (2312074-CCB2) Contin				Prepared & Analyzed: 12/27/23						
Iron	59.5		ng/l							
Lead	3.86		ng/l							
Magnesium	2.32		ng/l							
Manganese	1.07		ng/l							
Molybdenum	3.22		ng/l							
Nickel	-0.833		ng/l							U
Phosphorus	210		ng/l							
Potassium	105		ng/l							
Rubidium	-9.30E-4		ng/l							U
Selenium	3.37		ng/l							
Sodium	-6.40		ng/l							U
Strontium	0.672		ng/l							
Thallium	0.523		ng/l							
Thorium	0.518		ng/l							
Uranium	0.0101		ng/l							
Vanadium	-20.6		ng/l							U
Zinc	-89.6		ng/l							U
Calibration Blank (2312074-CCB3)				Prepared: 12/27/23 Analyzed: 12/28/23						
Aluminum	42.4		ng/l							
Antimony	0.286		ng/l							
Arsenic	-0.929		ng/l							U
Barium	1.99		ng/l							
Beryllium	0.135		ng/l							
Cadmium	-0.0538		ng/l							U
Calcium	205		ng/l							
Chromium	2.35		ng/l							
Cobalt	0.0790		ng/l							
Copper	7.30		ng/l							
Iron	41.9		ng/l							
Lead	2.55		ng/l							
Magnesium	23.0		ng/l							
Manganese	2.05		ng/l							
Molybdenum	2.92		ng/l							
Nickel	-0.270		ng/l							U
Phosphorus	-148		ng/l							U
Potassium	-145		ng/l							U
Rubidium	-0.575		ng/l							U
Selenium	-1.33		ng/l							U

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Tetra Tech, Inc.
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Blue Bell, PA 19422
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PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
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Inorganics by Compendium Method IO-3.5 - Quality Control

Batch 2312074 - B3K2705

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Calibration Blank (2312074-CCB3) Contin				Prepared: 12/27/23 Analyzed: 12/28/23						
Sodium	78.7		ng/l							
Strontium	0.729		ng/l							
Thallium	0.608		ng/l							
Thorium	0.329		ng/l							
Uranium	0.00407		ng/l							
Vanadium	-24.9		ng/l							U
Zinc	-87.9		ng/l							U
Calibration Blank (2312074-CCB4)				Prepared: 12/27/23 Analyzed: 12/28/23						
Aluminum	-47.6		ng/l							U
Antimony	0.275		ng/l							
Arsenic	-1.11		ng/l							U
Barium	1.47		ng/l							
Beryllium	0.0825		ng/l							
Cadmium	0.0851		ng/l							
Calcium	149		ng/l							
Chromium	2.52		ng/l							
Cobalt	0.0894		ng/l							
Copper	8.42		ng/l							
Iron	191		ng/l							
Lead	2.80		ng/l							
Magnesium	-0.551		ng/l							U
Manganese	1.26		ng/l							
Molybdenum	2.95		ng/l							
Nickel	-0.314		ng/l							U
Phosphorus	534		ng/l							
Potassium	408		ng/l							
Rubidium	0.276		ng/l							
Selenium	4.67		ng/l							
Sodium	-2.48		ng/l							U
Strontium	0.260		ng/l							
Thallium	0.484		ng/l							
Thorium	0.346		ng/l							
Uranium	-0.00811		ng/l							U
Vanadium	-29.1		ng/l							U
Zinc	-93.5		ng/l							U
Calibration Check (2312074-CCV1)				Prepared & Analyzed: 12/27/23						
Aluminum	1.55E6		ng/l	1.5000E6		103	90-110			
Antimony	19800		ng/l	20000		99.0	90-110			

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Inorganics by Compendium Method IO-3.5 - Quality Control

Batch 2312074 - B3K2705

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Calibration Check (2312074-CCV1) Contin				Prepared & Analyzed: 12/27/23						
Arsenic	19900		ng/l	20000		99.4	90-110			
Barium	199000		ng/l	200000		99.3	90-110			
Beryllium	5100		ng/l	5000.0		102	90-110			
Cadmium	19900		ng/l	20000		99.3	90-110			
Calcium	2.52E7		ng/l	2.5000E7		101	90-110			
Chromium	235000		ng/l	240000		97.7	90-110			
Cobalt	51000		ng/l	50000		102	90-110			
Copper	2.04E6		ng/l	2.0000E6		102	90-110			
Iron	2.54E6		ng/l	2.5000E6		102	90-110			
Lead	196000		ng/l	200000		98.2	90-110			
Magnesium	1.04E6		ng/l	1.0000E6		104	90-110			
Manganese	506000		ng/l	500000		101	90-110			
Molybdenum	50100		ng/l	50000		100	90-110			
Nickel	123000		ng/l	120000		102	90-110			
Phosphorus	202000		ng/l	200000		101	90-110			
Potassium	2.55E6		ng/l	2.5000E6		102	90-110			
Rubidium	10000		ng/l	10000		100	90-110			
Selenium	19800		ng/l	20000		99.1	90-110			
Sodium	2.63E6		ng/l	2.5000E6		105	90-110			
Strontium	49500		ng/l	50000		99.1	90-110			
Thallium	485		ng/l	500.00		97.1	90-110			
Thorium	488		ng/l	500.00		97.6	90-110			
Uranium	486		ng/l	500.00		97.2	90-110			
Vanadium	19700		ng/l	20000		98.3	90-110			
Zinc	512000		ng/l	500000		102	90-110			
Calibration Check (2312074-CCV2)				Prepared & Analyzed: 12/27/23						
Aluminum	1.55E6		ng/l	1.5000E6		103	90-110			
Antimony	20500		ng/l	20000		102	90-110			
Arsenic	20400		ng/l	20000		102	90-110			
Barium	205000		ng/l	200000		102	90-110			
Beryllium	5400		ng/l	5000.0		108	90-110			
Cadmium	20500		ng/l	20000		102	90-110			
Calcium	2.59E7		ng/l	2.5000E7		103	90-110			
Chromium	249000		ng/l	240000		104	90-110			
Cobalt	51700		ng/l	50000		103	90-110			
Copper	2.09E6		ng/l	2.0000E6		105	90-110			
Iron	2.58E6		ng/l	2.5000E6		103	90-110			
Lead	203000		ng/l	200000		101	90-110			

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Inorganics by Compendium Method IO-3.5 - Quality Control

Batch 2312074 - B3K2705

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Calibration Check (2312074-CCV2) Contir				Prepared & Analyzed: 12/27/23						
Magnesium	1.05E6		ng/l	1.0000E6		105	90-110			
Manganese	513000		ng/l	500000		103	90-110			
Molybdenum	51200		ng/l	50000		102	90-110			
Nickel	125000		ng/l	120000		104	90-110			
Phosphorus	203000		ng/l	200000		102	90-110			
Potassium	2.56E6		ng/l	2.5000E6		102	90-110			
Rubidium	10200		ng/l	10000		102	90-110			
Selenium	20500		ng/l	20000		102	90-110			
Sodium	2.63E6		ng/l	2.5000E6		105	90-110			
Strontium	51200		ng/l	50000		102	90-110			
Thallium	491		ng/l	500.00		98.2	90-110			
Thorium	500		ng/l	500.00		99.9	90-110			
Uranium	501		ng/l	500.00		100	90-110			
Vanadium	20600		ng/l	20000		103	90-110			
Zinc	525000		ng/l	500000		105	90-110			
Calibration Check (2312074-CCV3)				Prepared: 12/27/23 Analyzed: 12/28/23						
Aluminum	1.53E6		ng/l	1.5000E6		102	90-110			
Antimony	20100		ng/l	20000		101	90-110			
Arsenic	20000		ng/l	20000		100	90-110			
Barium	201000		ng/l	200000		101	90-110			
Beryllium	5120		ng/l	5000.0		102	90-110			
Cadmium	20300		ng/l	20000		101	90-110			
Calcium	2.54E7		ng/l	2.5000E7		102	90-110			
Chromium	245000		ng/l	240000		102	90-110			
Cobalt	50800		ng/l	50000		102	90-110			
Copper	2.07E6		ng/l	2.0000E6		103	90-110			
Iron	2.53E6		ng/l	2.5000E6		101	90-110			
Lead	201000		ng/l	200000		101	90-110			
Magnesium	1.03E6		ng/l	1.0000E6		103	90-110			
Manganese	508000		ng/l	500000		102	90-110			
Molybdenum	50400		ng/l	50000		101	90-110			
Nickel	123000		ng/l	120000		102	90-110			
Phosphorus	199000		ng/l	200000		99.6	90-110			
Potassium	2.52E6		ng/l	2.5000E6		101	90-110			
Rubidium	10100		ng/l	10000		101	90-110			
Selenium	20200		ng/l	20000		101	90-110			
Sodium	2.61E6		ng/l	2.5000E6		104	90-110			
Strontium	50200		ng/l	50000		100	90-110			

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Inorganics by Compendium Method IO-3.5 - Quality Control

Batch 2312074 - B3K2705

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Calibration Check (2312074-CCV3) Contin				Prepared: 12/27/23 Analyzed: 12/28/23						
Thallium	486		ng/l	500.00		97.2	90-110			
Thorium	491		ng/l	500.00		98.2	90-110			
Uranium	498		ng/l	500.00		99.6	90-110			
Vanadium	20200		ng/l	20000		101	90-110			
Zinc	518000		ng/l	500000		104	90-110			
Calibration Check (2312074-CCV4)				Prepared: 12/27/23 Analyzed: 12/28/23						
Aluminum	1.55E6		ng/l	1.5000E6		103	90-110			
Antimony	20400		ng/l	20000		102	90-110			
Arsenic	20200		ng/l	20000		101	90-110			
Barium	204000		ng/l	200000		102	90-110			
Beryllium	5260		ng/l	5000.0		105	90-110			
Cadmium	20400		ng/l	20000		102	90-110			
Calcium	2.54E7		ng/l	2.5000E7		102	90-110			
Chromium	246000		ng/l	240000		103	90-110			
Cobalt	51100		ng/l	50000		102	90-110			
Copper	2.07E6		ng/l	2.0000E6		103	90-110			
Iron	2.55E6		ng/l	2.5000E6		102	90-110			
Lead	203000		ng/l	200000		101	90-110			
Magnesium	1.04E6		ng/l	1.0000E6		104	90-110			
Manganese	510000		ng/l	500000		102	90-110			
Molybdenum	50600		ng/l	50000		101	90-110			
Nickel	124000		ng/l	120000		103	90-110			
Phosphorus	199000		ng/l	200000		99.7	90-110			
Potassium	2.54E6		ng/l	2.5000E6		102	90-110			
Rubidium	10000		ng/l	10000		100	90-110			
Selenium	20300		ng/l	20000		101	90-110			
Sodium	2.62E6		ng/l	2.5000E6		105	90-110			
Strontium	50500		ng/l	50000		101	90-110			
Thallium	494		ng/l	500.00		98.9	90-110			
Thorium	498		ng/l	500.00		99.6	90-110			
Uranium	499		ng/l	500.00		99.8	90-110			
Vanadium	20300		ng/l	20000		102	90-110			
Zinc	520000		ng/l	500000		104	90-110			
High Cal Check (2312074-HCV1)				Prepared & Analyzed: 12/27/23						
Aluminum	3.05E6		ng/l	3.0000E6		102	95-105			
Antimony	40600		ng/l	40000		102	95-105			
Arsenic	40300		ng/l	40000		101	95-105			
Barium	409000		ng/l	400000		102	95-105			

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Batch 2312074 - B3K2705

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
High Cal Check (2312074-HCV1) Continue				Prepared & Analyzed: 12/27/23						
Beryllium	9780		ng/l	10000		97.8	95-105			
Cadmium	40000		ng/l	40000		100	95-105			
Calcium	5.08E7		ng/l	5.0000E7		102	95-105			
Chromium	474000		ng/l	480000		98.8	95-105			
Cobalt	101000		ng/l	100000		101	95-105			
Copper	3.97E6		ng/l	4.0000E6		99.2	95-105			
Iron	5.05E6		ng/l	5.0000E6		101	95-105			
Lead	400000		ng/l	400000		100	95-105			
Magnesium	2.03E6		ng/l	2.0000E6		102	95-105			
Manganese	997000		ng/l	1.0000E6		99.7	95-105			
Molybdenum	102000		ng/l	100000		102	95-105			
Nickel	241000		ng/l	240000		100	95-105			
Phosphorus	397000		ng/l	400000		99.2	95-105			
Potassium	5.03E6		ng/l	5.0000E6		101	95-105			
Rubidium	20200		ng/l	20000		101	95-105			
Selenium	40600		ng/l	40000		101	95-105			
Sodium	4.98E6		ng/l	5.0000E6		99.7	95-105			
Strontium	101000		ng/l	100000		101	95-105			
Thallium	1010		ng/l	1000.0		101	95-105			
Thorium	1020		ng/l	1000.0		102	95-105			
Uranium	1010		ng/l	1000.0		101	95-105			
Vanadium	40400		ng/l	40000		101	95-105			
Zinc	1.02E6		ng/l	1.0000E6		102	95-105			
Initial Cal Blank (2312074-ICB1)				Prepared & Analyzed: 12/27/23						
Aluminum	-47.0		ng/l							U
Antimony	1.39		ng/l							
Arsenic	-0.839		ng/l							U
Barium	3.81		ng/l							
Beryllium	0.356		ng/l							
Cadmium	0.458		ng/l							
Calcium	22.6		ng/l							
Chromium	9.66		ng/l							
Cobalt	0.835		ng/l							
Copper	61.5		ng/l							
Iron	92.2		ng/l							
Lead	13.7		ng/l							
Magnesium	26.7		ng/l							
Manganese	11.1		ng/l							

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Batch 2312074 - B3K2705

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Initial Cal Blank (2312074-ICB1) Continu				Prepared & Analyzed: 12/27/23						
Molybdenum	15.1		ng/l							
Nickel	1.37		ng/l							
Phosphorus	-403		ng/l							U
Potassium	35.2		ng/l							
Rubidium	0.602		ng/l							
Selenium	-0.0289		ng/l							U
Sodium	-68.5		ng/l							U
Strontium	1.77		ng/l							
Thallium	0.459		ng/l							
Thorium	0.687		ng/l							
Uranium	0.0112		ng/l							
Vanadium	-25.5		ng/l							U
Zinc	-41.9		ng/l							U
Initial Cal Check (2312074-ICV1)				Prepared & Analyzed: 12/27/23						
Aluminum	1.46E6		ng/l	1.5000E6		97.5	90-110			
Antimony	19400		ng/l	20000		97.2	90-110			
Arsenic	19800		ng/l	20000		99.1	90-110			
Barium	197000		ng/l	200000		98.7	90-110			
Beryllium	5370		ng/l	5000.0		107	90-110			
Cadmium	20300		ng/l	20000		101	90-110			
Calcium	2.44E7		ng/l	2.5000E7		97.7	90-110			
Chromium	234000		ng/l	240000		97.4	90-110			
Cobalt	49600		ng/l	50000		99.1	90-110			
Copper	2.01E6		ng/l	2.0000E6		100	90-110			
Iron	2.50E6		ng/l	2.5000E6		99.9	90-110			
Lead	195000		ng/l	200000		97.7	90-110			
Magnesium	986000		ng/l	1.0000E6		98.6	90-110			
Manganese	491000		ng/l	500000		98.2	90-110			
Molybdenum	49400		ng/l	50000		98.8	90-110			
Nickel	118000		ng/l	120000		98.7	90-110			
Phosphorus	189000		ng/l	200000		94.7	90-110			
Potassium	2.51E6		ng/l	2.5000E6		100	90-110			
Rubidium	9610		ng/l	10000		96.1	90-110			
Selenium	20500		ng/l	20000		102	90-110			
Sodium	2.50E6		ng/l	2.5000E6		100	90-110			
Strontium	49400		ng/l	50000		98.8	90-110			
Thallium	483		ng/l	500.00		96.6	90-110			
Thorium	474		ng/l	500.00		94.7	90-110			

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Batch 2312074 - B3K2705

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Initial Cal Check (2312074-ICV1) Continu				Prepared & Analyzed: 12/27/23						
Uranium	484		ng/l	500.00		96.8	90-110			
Vanadium	19900		ng/l	20000		99.7	90-110			
Zinc	511000		ng/l	500000		102	90-110			
Interference Check A (2312074-IFA1)				Prepared & Analyzed: 12/27/23						
Aluminum	1.45E7		ng/l	1.5000E7		96.5	80-120			
Antimony	0.00		ng/l				80-120			U
Arsenic	0.00		ng/l				80-120			U
Barium	0.00		ng/l				80-120			U
Beryllium	0.00		ng/l				80-120			U
Cadmium	0.00		ng/l				80-120			U
Calcium	9.91E7		ng/l	1.0040E8		98.7	80-120			
Chromium	0.00		ng/l				80-120			U
Cobalt	0.00		ng/l				80-120			U
Copper	0.00		ng/l				80-120			U
Iron	1.43E7		ng/l	1.5000E7		95.4	80-120			
Lead	0.00		ng/l				80-120			U
Magnesium	1.50E7		ng/l	1.5000E7		100	80-120			
Manganese	0.00		ng/l				80-120			U
Molybdenum	291000		ng/l	300000		97.1	80-120			
Nickel	0.00		ng/l				80-120			U
Phosphorus	1.57E7		ng/l	1.5000E7		104	80-120			
Potassium	1.44E7		ng/l	1.5000E7		96.2	80-120			
Rubidium	0.00		ng/l				80-120			U
Selenium	0.00		ng/l				80-120			U
Sodium	1.51E7		ng/l	1.5000E7		101	80-120			
Strontium	0.00		ng/l				80-120			U
Thallium	0.00		ng/l				80-120			U
Thorium	0.00		ng/l				80-120			U
Uranium	0.00		ng/l				80-120			U
Vanadium	0.00		ng/l				80-120			U
Zinc	0.00		ng/l				80-120			U
Interference Check B (2312074-IFB1)				Prepared & Analyzed: 12/27/23						
Aluminum	1.60E7		ng/l	1.6500E7		97.1	80-120			
Antimony	19700		ng/l	20000		98.4	80-120			
Arsenic	19800		ng/l	20000		99.2	80-120			
Barium	197000		ng/l	200000		98.6	80-120			
Beryllium	5600		ng/l	5000.0		112	80-120			
Cadmium	18900		ng/l	20000		94.4	80-120			

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FILE #: 0000.00
REPORTED: 01/03/24 09:12
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AQS SITE CODE:
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Inorganics by Compendium Method IO-3.5 - Quality Control

Batch 2312074 - B3K2705

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Interference Check B (2312074-IFB1) Co				Prepared & Analyzed: 12/27/23						
Calcium	1.15E8		ng/l	1.2540E8		91.7	80-120			
Chromium	223000		ng/l	240000		92.8	80-120			
Cobalt	48400		ng/l	50000		96.7	80-120			
Copper	1.85E6		ng/l	2.0000E6		92.6	80-120			
Iron	1.68E7		ng/l	1.7500E7		95.9	80-120			
Lead	199000		ng/l	200000		99.5	80-120			
Magnesium	1.61E7		ng/l	1.6000E7		101	80-120			
Manganese	510000		ng/l	500000		102	80-120			
Molybdenum	334000		ng/l	350000		95.6	80-120			
Nickel	114000		ng/l	120000		94.6	80-120			
Phosphorus	1.59E7		ng/l	1.5200E7		105	80-120			
Potassium	1.70E7		ng/l	1.7500E7		97.3	80-120			
Rubidium	9900		ng/l	10000		99.0	80-120			
Selenium	19000		ng/l	20000		94.8	80-120			
Sodium	1.81E7		ng/l	1.7500E7		103	80-120			
Strontium	48900		ng/l	50000		97.8	80-120			
Thallium	506		ng/l	500.00		101	80-120			
Thorium	520		ng/l	500.00		104	80-120			
Uranium	522		ng/l	500.00		104	80-120			
Vanadium	18600		ng/l	20000		93.1	80-120			
Zinc	460000		ng/l	500000		92.0	80-120			

Batch B3L2703 - ICP-MS Extraction

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (B3L2703-BLK1)				Prepared & Analyzed: 12/27/23						
Aluminum	ND	32.1	ng/m³ Air							U
Antimony	ND	0.0441	ng/m³ Air							SL, U
Arsenic	ND	0.00955	ng/m³ Air							U
Barium	ND	0.948	ng/m³ Air							U
Beryllium	ND	0.00332	ng/m³ Air							U
Cadmium	ND	0.109	ng/m³ Air							U
Calcium	ND	292	ng/m³ Air							LJ, QB-01, U
Chromium	ND	2.03	ng/m³ Air							U
Cobalt	ND	0.0156	ng/m³ Air							QB-01, U
Copper	ND	3.00	ng/m³ Air							U
Iron	ND	24.2	ng/m³ Air							U
Lead	ND	0.276	ng/m³ Air							U
Magnesium	ND	96.4	ng/m³ Air							U
Manganese	ND	1.19	ng/m³ Air							U
Molybdenum	ND	0.213	ng/m³ Air							QB-01, U

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Inorganics by Compendium Method IO-3.5 - Quality Control

Batch B3L2703 - ICP-MS Extraction

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (B3L2703-BLK1) Continued				Prepared & Analyzed: 12/27/23						
Nickel	ND	0.801	ng/m³ Air							U
Phosphorus	ND	1250	ng/m³ Air							GC-BS, U
Potassium	ND	38.0	ng/m³ Air							U
Rubidium	ND	0.0183	ng/m³ Air							U
Selenium	ND	0.0110	ng/m³ Air							U
Sodium	ND	2000	ng/m³ Air							U
Strontium	ND	0.652	ng/m³ Air							QB-01, U
Thallium	ND	5.03E-4	ng/m³ Air							U
Thorium	ND	0.00300	ng/m³ Air							U
Uranium	ND	0.0170	ng/m³ Air							U
Vanadium	ND	0.0492	ng/m³ Air							U
Zinc	ND	97.7	ng/m³ Air							U
LCS (B3L2703-BS1)				Prepared & Analyzed: 12/27/23						
Aluminum	93.7	32.1	ng/m³ Air	82.975		113	80-120			
Antimony	0.519	0.0441	ng/m³ Air	1.3829		37.5	80-120			SL
Arsenic	2.71	0.00955	ng/m³ Air	2.7658		98.0	80-120			
Barium	28.0	0.948	ng/m³ Air	27.658		101	80-120			
Beryllium	1.44	0.00332	ng/m³ Air	1.3829		104	80-120			
Cadmium	1.38	0.109	ng/m³ Air	1.3829		100	80-120			
Calcium	647	292	ng/m³ Air	69.146		935	80-120			LJ, QB-01
Chromium	15.9	2.03	ng/m³ Air	13.829		115	80-120			
Cobalt	1.41	0.0156	ng/m³ Air	1.3829		102	80-120			QB-01
Copper	31.2	3.00	ng/m³ Air	27.658		113	80-120			
Iron	40.7	24.2	ng/m³ Air	27.658		147	80-120			
Lead	13.5	0.276	ng/m³ Air	13.829		97.6	80-120			
Magnesium	ND	96.4	ng/m³ Air	27.658			80-120			U
Manganese	8.82	1.19	ng/m³ Air	8.2975		106	80-120			
Molybdenum	1.63	0.213	ng/m³ Air	1.3829		118	80-120			QB-01
Nickel	3.01	0.801	ng/m³ Air	2.7658		109	80-120			
Phosphorus	ND	1250	ng/m³ Air	13.829			80-120			GC-BS, U
Potassium	68.0	38.0	ng/m³ Air	55.317		123	80-120			
Rubidium	1.34	0.0183	ng/m³ Air	1.3829		96.7	80-120			
Selenium	2.71	0.0110	ng/m³ Air	2.7658		98.0	80-120			
Sodium	ND	2000	ng/m³ Air	55.317			80-120			U
Strontium	2.28	0.652	ng/m³ Air	1.3829		165	80-120			QB-01
Thallium	0.133	5.03E-4	ng/m³ Air	0.13829		96.1	80-120			
Thorium	0.130	0.00300	ng/m³ Air	0.13829		94.0	80-120			
Uranium	0.129	0.0170	ng/m³ Air	0.13829		93.3	80-120			

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Inorganics by Compendium Method IO-3.5 - Quality Control

Batch B3L2703 - ICP-MS Extraction

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
LCS (B3L2703-BS1) Continued				Prepared & Analyzed: 12/27/23						
Vanadium	2.75	0.0492	ng/m³ Air	2.7658		99.4	80-120			
Zinc	124	97.7	ng/m³ Air	82.975		150	80-120			
Duplicate (B3L2703-DUP1)	**Source: 3122607-05**			Prepared & Analyzed: 12/27/23						
Aluminum	466	26.8	ng/m³ Air		477			2.35	10	
Antimony	0.0556	0.0369	ng/m³ Air		0.0598			7.22	10	SL
Arsenic	0.179	0.00798	ng/m³ Air		0.208			15.2	10	
Barium	5.00	0.792	ng/m³ Air		5.22			4.39	10	
Beryllium	0.0160	0.00277	ng/m³ Air		0.0156			2.14	10	
Cadmium	ND	0.0911	ng/m³ Air		ND				10	U
Calcium	519	244	ng/m³ Air		551			5.86	10	LJ, QB-01
Chromium	1.89	1.70	ng/m³ Air		1.95			3.03	10	
Cobalt	0.233	0.0130	ng/m³ Air		0.249			6.68	10	QB-01
Copper	21.1	2.51	ng/m³ Air		20.0			5.31	10	
Iron	500	20.2	ng/m³ Air		516			2.98	10	
Lead	0.365	0.231	ng/m³ Air		0.312			15.7	10	
Magnesium	264	80.6	ng/m³ Air		267			1.14	10	
Manganese	13.1	0.994	ng/m³ Air		13.5			2.62	10	
Molybdenum	1.18	0.178	ng/m³ Air		1.11			6.07	10	QB-01
Nickel	ND	0.669	ng/m³ Air		ND				10	U
Phosphorus	ND	1040	ng/m³ Air		ND				10	GC-BS, U
Potassium	104	31.8	ng/m³ Air		118			11.9	10	
Rubidium	0.162	0.0153	ng/m³ Air		0.168			3.77	10	
Selenium	0.130	0.00919	ng/m³ Air		0.137			5.56	10	
Sodium	2190	1670	ng/m³ Air		2190			0.0622	10	E
Strontium	3.90	0.545	ng/m³ Air		3.96			1.49	10	QB-01
Thallium	0.00103	4.20E-4	ng/m³ Air		0.00111			7.62	10	
Thorium	0.0109	0.00251	ng/m³ Air		0.0117			6.63	10	
Uranium	ND	0.0142	ng/m³ Air		ND				10	U
Vanadium	1.23	0.0411	ng/m³ Air		1.26			2.42	10	
Zinc	ND	81.6	ng/m³ Air		ND				10	U
Duplicate (B3L2703-DUP2)	**Source: 3122607-10**			Prepared: 12/27/23 Analyzed: 12/28/23						
Aluminum	466	26.1	ng/m³ Air		473			1.53	10	
Antimony	0.0533	0.0359	ng/m³ Air		0.0535			0.378	10	SL
Arsenic	0.143	0.00778	ng/m³ Air		0.139			3.22	10	
Barium	5.39	0.772	ng/m³ Air		5.40			0.144	10	
Beryllium	0.0174	0.00270	ng/m³ Air		0.0184			5.55	10	
Cadmium	ND	0.0888	ng/m³ Air		ND				10	U
Calcium	703	238	ng/m³ Air		706			0.453	10	LJ, QB-01

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Inorganics by Compendium Method IO-3.5 - Quality Control

Batch B3L2703 - ICP-MS Extraction

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Duplicate (B3L2703-DUP2) Continued		**Source: 3122607-10**		Prepared: 12/27/23 Analyzed: 12/28/23						
Chromium	1.76	1.65	ng/m³ Air		1.77			0.594	10	
Cobalt	0.274	0.0127	ng/m³ Air		0.275			0.157	10	QB-01
Copper	15.4	2.44	ng/m³ Air		15.5			0.936	10	
Iron	524	19.7	ng/m³ Air		525			0.0519	10	
Lead	0.346	0.225	ng/m³ Air		0.347			0.286	10	
Magnesium	307	78.5	ng/m³ Air		307			0.0793	10	
Manganese	14.6	0.969	ng/m³ Air		14.6			0.0235	10	
Molybdenum	0.979	0.173	ng/m³ Air		0.974			0.482	10	QB-01
Nickel	0.666	0.652	ng/m³ Air		0.670			0.643	10	
Phosphorus	ND	1020	ng/m³ Air		ND				10	GC-BS, U
Potassium	110	31.0	ng/m³ Air		111			1.45	10	
Rubidium	0.192	0.0149	ng/m³ Air		0.189			1.93	10	
Selenium	0.169	0.00896	ng/m³ Air		0.183			7.76	10	
Sodium	2490	1630	ng/m³ Air		2480			0.288	10	E
Strontium	4.52	0.531	ng/m³ Air		4.57			1.07	10	QB-01
Thallium	9.71E-4	4.10E-4	ng/m³ Air		0.00104			7.17	10	
Thorium	0.0149	0.00244	ng/m³ Air		0.0150			0.753	10	
Uranium	ND	0.0138	ng/m³ Air		ND				10	U
Vanadium	1.38	0.0401	ng/m³ Air		1.40			1.16	10	
Zinc	ND	79.6	ng/m³ Air		ND				10	U
Matrix Spike (B3L2703-MS1)		**Source: 3122607-05**		Prepared & Analyzed: 12/27/23						
Aluminum	544	26.8	ng/m³ Air	69.339	477	97.0	80-120			
Antimony	0.569	0.0369	ng/m³ Air	1.1557	0.0598	44.1	80-120			SL
Arsenic	2.47	0.00798	ng/m³ Air	2.3113	0.208	98.0	80-120			
Barium	28.7	0.792	ng/m³ Air	23.113	5.22	102	80-120			
Beryllium	1.19	0.00277	ng/m³ Air	1.1557	0.0156	101	80-120			
Cadmium	1.17	0.0911	ng/m³ Air	1.1557	ND	102	80-120			
Calcium	603	244	ng/m³ Air	57.783	551	89.9	80-120			LJ, QB-01
Chromium	14.0	1.70	ng/m³ Air	11.557	1.95	104	80-120			
Cobalt	1.39	0.0130	ng/m³ Air	1.1557	0.249	98.3	80-120			QB-01
Copper	48.3	2.51	ng/m³ Air	23.113	20.0	122	80-120			QM-07
Iron	529	20.2	ng/m³ Air	23.113	516	56.3	80-120			QM-4X
Lead	12.0	0.231	ng/m³ Air	11.557	0.312	101	80-120			
Magnesium	297	80.6	ng/m³ Air	23.113	267	127	80-120			QM-4X
Manganese	20.8	0.994	ng/m³ Air	6.9339	13.5	105	80-120			
Molybdenum	2.23	0.178	ng/m³ Air	1.1557	1.11	97.3	80-120			QB-01
Nickel	2.85	0.669	ng/m³ Air	2.3113	ND	123	80-120			

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Inorganics by Compendium Method IO-3.5 - Quality Control

Batch B3L2703 - ICP-MS Extraction

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Matrix Spike (B3L2703-MS1) Continued	**Source: 3122607-05**		Prepared & Analyzed: 12/27/23							
Phosphorus	ND	1040	ng/m³ Air	11.557	ND		80-120			GC-BS, QM-4X, U
Potassium	152	31.8	ng/m³ Air	46.226	118	75.2	80-120			QM-07
Rubidium	1.25	0.0153	ng/m³ Air	1.1557	0.168	93.7	80-120			
Selenium	2.40	0.00919	ng/m³ Air	2.3113	0.137	98.0	80-120			
Sodium	2310	1670	ng/m³ Air	46.226	2190	261	80-120			E, QM-4X
Strontium	5.06	0.545	ng/m³ Air	1.1557	3.96	95.4	80-120			QB-01
Thallium	0.115	4.20E-4	ng/m³ Air	0.11557	0.00111	98.2	80-120			
Thorium	0.0479	0.00251	ng/m³ Air	0.11557	0.0117	31.4	80-120			QM-07
Uranium	0.121	0.0142	ng/m³ Air	0.11557	ND	104	80-120			
Vanadium	3.55	0.0411	ng/m³ Air	2.3113	1.26	98.9	80-120			
Zinc	98.9	81.6	ng/m³ Air	69.339	ND	143	80-120			
Matrix Spike Dup (B3L2703-MSD1)	**Source: 3122607-05**		Prepared & Analyzed: 12/27/23							
Aluminum	514	26.8	ng/m³ Air	69.339	477	53.8	80-120	5.66	20	QM-4X
Antimony	0.586	0.0369	ng/m³ Air	1.1557	0.0598	45.5	80-120	2.89	20	SL
Arsenic	2.44	0.00798	ng/m³ Air	2.3113	0.208	96.7	80-120	1.20	20	
Barium	28.1	0.792	ng/m³ Air	23.113	5.22	99.0	80-120	2.14	20	
Beryllium	1.28	0.00277	ng/m³ Air	1.1557	0.0156	109	80-120	7.43	20	
Cadmium	1.15	0.0911	ng/m³ Air	1.1557	ND	99.7	80-120	1.87	20	
Calcium	591	244	ng/m³ Air	57.783	551	69.3	80-120	2.00	20	LJ, QB-01, QM-4X
Chromium	13.9	1.70	ng/m³ Air	11.557	1.95	103	80-120	0.686	20	
Cobalt	1.37	0.0130	ng/m³ Air	1.1557	0.249	97.1	80-120	1.02	20	QB-01
Copper	49.8	2.51	ng/m³ Air	23.113	20.0	129	80-120	3.17	20	QM-07
Iron	504	20.2	ng/m³ Air	23.113	516	NR	80-120	4.76	20	QM-4X
Lead	11.8	0.231	ng/m³ Air	11.557	0.312	99.7	80-120	1.41	20	
Magnesium	281	80.6	ng/m³ Air	23.113	267	60.9	80-120	5.32	20	QM-4X
Manganese	19.8	0.994	ng/m³ Air	6.9339	13.5	91.6	80-120	4.59	20	
Molybdenum	2.24	0.178	ng/m³ Air	1.1557	1.11	97.6	80-120	0.186	20	QB-01
Nickel	2.99	0.669	ng/m³ Air	2.3113	ND	129	80-120	4.71	20	
Phosphorus	ND	1040	ng/m³ Air	11.557	ND		80-120		20	GC-BS, QM-4X, U
Potassium	148	31.8	ng/m³ Air	46.226	118	65.0	80-120	3.15	20	QM-07
Rubidium	1.24	0.0153	ng/m³ Air	1.1557	0.168	93.1	80-120	0.596	20	
Selenium	2.41	0.00919	ng/m³ Air	2.3113	0.137	98.4	80-120	0.437	20	
Sodium	2210	1670	ng/m³ Air	46.226	2190	30.5	80-120	4.70	20	QM-4X
Strontium	4.91	0.545	ng/m³ Air	1.1557	3.96	82.2	80-120	3.08	20	QB-01
Thallium	0.113	4.20E-4	ng/m³ Air	0.11557	0.00111	97.0	80-120	1.17	20	
Thorium	0.0537	0.00251	ng/m³ Air	0.11557	0.0117	36.3	80-120	11.3	20	QM-07

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Inorganics by Compendium Method IO-3.5 - Quality Control

Batch B3L2703 - ICP-MS Extraction

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Matrix Spike Dup (B3L2703-MSD1) ContirSource: 3122607-05			Prepared & Analyzed: 12/27/23							
Uranium	0.119	0.0142	ng/m³ Air	0.11557	ND	103	80-120	1.71	20	
Vanadium	3.45	0.0411	ng/m³ Air	2.3113	1.26	94.6	80-120	2.85	20	
Zinc	103	81.6	ng/m³ Air	69.339	ND	148	80-120	3.72	20	
Post Spike (B3L2703-PS1)	**Source: 3122607-05**		Prepared & Analyzed: 12/27/23							
Aluminum	504	26.8	ng/m³ Air	23.113	477	118	75-125			
Antimony	0.286	0.0369	ng/m³ Air	0.23113	0.0598	97.8	75-125			SL
Arsenic	1.31	0.00798	ng/m³ Air	1.1557	0.208	95.7	75-125			
Barium	7.53	0.792	ng/m³ Air	2.3113	5.22	99.8	75-125			
Beryllium	0.250	0.00277	ng/m³ Air	0.23113	0.0156	101	75-125			
Cadmium	0.122	0.0911	ng/m³ Air	0.11557	ND	105	75-125			
Calcium	587	244	ng/m³ Air		551		75-125			A-01, LJ, QB-01
Chromium	3.09	1.70	ng/m³ Air	1.1557	1.95	98.2	75-125			
Cobalt	0.481	0.0130	ng/m³ Air	0.23113	0.249	100	75-125			QB-01
Copper	32.3	2.51	ng/m³ Air	11.557	20.0	107	75-125			
Iron	544	20.2	ng/m³ Air	23.113	516	121	75-125			
Lead	23.2	0.231	ng/m³ Air	23.113	0.312	98.8	75-125			
Magnesium	292	80.6	ng/m³ Air	23.113	267	108	75-125			
Manganese	16.0	0.994	ng/m³ Air	2.3113	13.5	109	75-125			
Molybdenum	2.20	0.178	ng/m³ Air	1.1557	1.11	94.4	75-125			QB-01
Nickel	2.87	0.669	ng/m³ Air	2.3113	ND	124	75-125			
Phosphorus	ND	1040	ng/m³ Air	4.6226	ND		75-125			A-01, GC-BS, U
Potassium	141	31.8	ng/m³ Air	23.113	118	101	75-125			
Rubidium	0.278	0.0153	ng/m³ Air	0.11557	0.168	95.6	75-125			
Selenium	1.23	0.00919	ng/m³ Air	1.1557	0.137	94.7	75-125			
Sodium	2260	1670	ng/m³ Air	23.113	2190	263	75-125			A-01
Strontium	5.04	0.545	ng/m³ Air	1.1557	3.96	93.3	75-125			QB-01
Thallium	0.0561	4.20E-4	ng/m³ Air	5.7783E-2	0.00111	95.2	75-125			
Thorium	0.0637	0.00251	ng/m³ Air	5.7783E-2	0.0117	89.9	75-125			
Uranium	0.0647	0.0142	ng/m³ Air	5.7783E-2	ND	112	75-125			
Vanadium	2.39	0.0411	ng/m³ Air	1.1557	1.26	97.9	75-125			
Zinc	ND	81.6	ng/m³ Air	23.113	ND		75-125			U
Dilution Check (B3L2703-SRL1)	**Source: 3122607-05**		Prepared & Analyzed: 12/27/23							
Aluminum	467	134	ng/m³ Air		477			2.04	10	
Antimony	ND	0.184	ng/m³ Air		ND				10	SL, U
Arsenic	0.207	0.0399	ng/m³ Air		0.208			0.569	10	
Barium	5.37	3.96	ng/m³ Air		5.22			2.80	10	

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CERTIFICATE OF ANALYSIS

Tetra Tech, Inc.
1777 Sentry Pkwy, Bldg 12
Blue Bell, PA 19422
ATTN: Ms. Chelsea Saber
PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 01/03/24 09:12
SUBMITTED: 12/26/23
AQS SITE CODE:
SITE CODE: Maui fires

Inorganics by Compendium Method IO-3.5 - Quality Control

Batch B3L2703 - ICP-MS Extraction

Dilution Check (B3L2703-SRL1) Continued **Source: 3122607-05** Prepared & Analyzed: 12/27/23

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Beryllium	0.0152	0.0139	ng/m³ Air		0.0156			2.41	10	
Cadmium	ND	0.455	ng/m³ Air		ND				10	U
Calcium	ND	1220	ng/m³ Air		ND				10	LJ, QB-01, U
Chromium	ND	8.48	ng/m³ Air		ND				10	U
Cobalt	0.249	0.0652	ng/m³ Air		0.249			0.123	10	QB-01
Copper	20.1	12.5	ng/m³ Air		20.0			0.675	10	
Iron	514	101	ng/m³ Air		516			0.328	10	
Lead	ND	1.15	ng/m³ Air		ND				10	U
Magnesium	ND	403	ng/m³ Air		ND				10	U
Manganese	13.5	4.97	ng/m³ Air		13.5			0.127	10	
Molybdenum	1.11	0.890	ng/m³ Air		1.11			0.287	10	QB-01
Nickel	ND	3.35	ng/m³ Air		ND				10	U
Phosphorus	ND	5220	ng/m³ Air		ND				10	GC-BS, U
Potassium	ND	159	ng/m³ Air		ND				10	U
Rubidium	0.161	0.0765	ng/m³ Air		0.168			4.42	10	
Selenium	0.152	0.0460	ng/m³ Air		0.137			10.1	10	
Sodium	ND	8360	ng/m³ Air		ND				10	U
Strontium	4.02	2.72	ng/m³ Air		3.96			1.67	10	QB-01
Thallium	ND	0.00210	ng/m³ Air		ND				10	U
Thorium	ND	0.0125	ng/m³ Air		ND				10	U
Uranium	ND	0.0710	ng/m³ Air		ND				10	U
Vanadium	1.29	0.206	ng/m³ Air		1.26			2.12	10	
Zinc	ND	408	ng/m³ Air		ND				10	U

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REPORTED: 01/03/24 09:12
SUBMITTED: 12/26/23
AQS SITE CODE:
SITE CODE: Maui fires

Notes and Definitions

U	Under Detection Limit
SL	The spike recovery was outside acceptance limits. Reported value may be biased low.
QM-4X	The MS/MSD recovery exceeds criteria because the parent sample concentration is greater than 4x the spike concentration. Sample results for the QC batch were accepted based on acceptable BS/BSD recoveries.
QM-07	The spike recovery was outside acceptance limits for the MS and/or MSD. The batch was accepted based on acceptable LCS recovery.
QB-01	Analyte exceeds method blank criteria
LJ	Identification of analyte is acceptable; reported value is an estimate.
GC-BS	Compound exceeds Blank Spike Criteria
FB-01	Analyte exceeds Field Blank criteria.
E	The concentration indicated for this analyte is an estimated value above the calibration range of the instrument. This value is considered an estimate (CLP E-flag).
A-01	Parent sample >4x spike amount
ND	Analyte NOT DETECTED
NR	Not Reported
MDL	Method Detection Limit
RPD	Relative Percent Difference

Note: This test is accredited under the 2016 TNI Standard.

Eastern Research Group
601 Keystone Park Drive
Suite 700
Morrisville, NC 27560

January 05, 2024

Ms. Chelsea Saber
Tetra Tech, Inc.
1777 Sentry Pkwy, Bldg 12
Blue Bell, PA 19422
Project Name: Maui fires

Dear Ms. Chelsea Saber,

This report contains the analytical results for the sample(s) received under chain(s) of custody by Eastern Research Group on 12/28/23 13:04.

Values below the MDL for QC results in this report are recorded as ND, however the actual values are reported in the accompanying Excel report with a "U" flag (Under the detection limit). The actual values are reported in AQS.

This test is accredited under the 2016 TNI Standard for Environmental Laboratories (FL DOH Certification # E87673). All analyses were performed as described in the US EPA-approved QAPP, under the contract for National Hazardous Air Pollutant Support (US EPA Contract No. 68HERH22D0002). This cover page is an integral part of this report, and any exceptions or comments are noted on the last page.

Release of the data contained in this data package and in the data submitted in the electronic data deliverable, has been authorized by the Program Manager, or the Program Manager's designee as verified by the following signature.

The issuance of the final Certificate of Analysis takes precedence over any previous Report. If you have any questions, please contact me at 919-468-7924.

Sincerely,

Julie Swift
Program Manager
julie.swift@erg.com

The information contained in this report and its attachment(s) are intended only for the use of the individual to whom it is addressed and may contain information that is privileged, confidential, or exempt from disclosure. If the reader of this message is not the intended recipient, you are hereby notified that any dissemination, distribution, or copying of this report is strictly prohibited. If you have received this report in error, please notify julie.swift@erg.com and delete the report without retaining any copies.

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1777 Sentry Pkwy, Bldg 12
Blue Bell, PA 19422
ATTN: Ms. Chelsea Saber
PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 01/05/24 14:13
SUBMITTED: 12/28/23
AQS SITE CODE:
SITE CODE: Maui fires

ANALYTICAL REPORT FOR SAMPLES

SampleName	LabNumber	Matrix	Sampled	Received
TetraTech Q9551158	3122828-01	Air	12/21/23 23:59	12/28/23 13:04
TetraTech Q9524491	3122828-02	Air	12/21/23 23:59	12/28/23 13:04
TetraTech Q9524490	3122828-03	Air	12/21/23 23:59	12/28/23 13:04
TetraTech Q9524486 FB	3122828-04	Air	12/21/23 00:00	12/28/23 13:04
TetraTech Q9524487	3122828-05	Air	12/22/23 23:59	12/28/23 13:04
TetraTech Q9524477	3122828-06	Air	12/22/23 23:59	12/28/23 13:04
TetraTech Q9524489	3122828-07	Air	12/22/23 23:59	12/28/23 13:04
TetraTech Q9524485 FB	3122828-08	Air	12/22/23 00:00	12/28/23 13:04
TetraTech Q9524482	3122828-09	Air	12/24/23 23:59	12/28/23 13:04
TetraTech Q9524479	3122828-10	Air	12/24/23 23:59	12/28/23 13:04
TetraTech Q9524469	3122828-11	Air	12/24/23 23:59	12/28/23 13:04
TetraTech Q9524481 FB	3122828-12	Air	12/24/23 00:00	12/28/23 13:04
TetraTech Q9524478	3122828-13	Air	12/23/23 23:59	12/28/23 13:04
TetraTech Q9524484	3122828-14	Air	12/23/23 23:59	12/28/23 13:04
TetraTech Q9524483	3122828-15	Air	12/23/23 23:59	12/28/23 13:04
TetraTech Q9524480 FB	3122828-16	Air	12/23/23 00:00	12/28/23 13:04

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Blue Bell, PA 19422
ATTN: Ms. Chelsea Saber
PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 01/05/24 14:13
SUBMITTED: 12/28/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9551158 **Lab ID:** 3122828-01 **Sampled:** 12/21/23 23:59
Matrix: Air **Sample Volume:** 1917.117 m³ **Received:** 12/28/23 13:04
Filter ID: **Analysis Date:** 01/02/24 20:12
Comments: MFK-AM01-122123-HM

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	**7429-90-5**	**477**		**27.2**
Antimony	**7440-36-0**	**0.0962**	SL	**0.0374**
Arsenic	**7440-38-2**	**0.155**		**0.00810**
Barium	**7440-39-3**	**5.16**		**0.805**
Beryllium	**7440-41-7**	**0.0151**		**0.00282**
Cadmium	7440-43-9	0.00818	U	0.0925
Calcium	**7440-70-2**	**436**	LJ, QB-01	**248**
Chromium	**7440-47-3**	**1.84**		**1.72**
Cobalt	**7440-48-4**	**0.242**	QB-01	**0.0132**
Copper	**7440-50-8**	**18.8**		**2.55**
Iron	**7439-89-6**	**548**		**20.5**
Lead	**7439-92-1**	**0.287**		**0.234**
Magnesium	**7439-95-4**	**219**		**81.8**
Manganese	**7439-96-5**	**13.8**		**1.01**
Molybdenum	**7439-98-7**	**0.795**	QB-01	**0.181**
Nickel	**7440-02-0**	**0.721**		**0.680**
Phosphorus	7723-14-0	385	GC-BS, U	1060
Potassium	**7440-09-7**	**94.8**		**32.2**
Rubidium	**7440-17-7**	**0.175**		**0.0155**
Selenium	**7782-49-2**	**0.151**		**0.00934**
Sodium	**7440-23-5**	**1930**	E, GC-BS	**1700**
Strontium	**7440-24-6**	**3.50**	QB-01	**0.553**
Thallium	**7440-28-0**	**0.00170**		**4.27E-4**
Thorium	**7440-29-01**	**0.0110**		**0.00255**
Uranium	7440-61-1	0.0111	U	0.0144
Vanadium	**7440-62-2**	**1.53**		**0.0418**
Zinc	7440-66-6	31.2	U	82.9

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Tetra Tech, Inc.
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Blue Bell, PA 19422
ATTN: Ms. Chelsea Saber
PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 01/05/24 14:13
SUBMITTED: 12/28/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9524491 **Lab ID:** 3122828-02 **Sampled:** 12/21/23 23:59
Matrix: Air **Sample Volume:** 2016.319 m³ **Received:** 12/28/23 13:04
Filter ID: **Analysis Date:** 01/02/24 20:26
Comments: MFK-AM02-122123-HM

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	**7429-90-5**	**402**		**25.9**
Antimony	**7440-36-0**	**0.103**	SL	**0.0356**
Arsenic	**7440-38-2**	**0.158**		**0.00771**
Barium	**7440-39-3**	**5.45**		**0.765**
Beryllium	**7440-41-7**	**0.0139**		**0.00268**
Cadmium	7440-43-9	0.00641	U	0.0880
Calcium	**7440-70-2**	**377**	LJ, QB-01	**236**
Chromium	7440-47-3	1.03	U	1.64
Cobalt	**7440-48-4**	**0.219**	QB-01	**0.0126**
Copper	**7440-50-8**	**13.7**		**2.42**
Iron	**7439-89-6**	**472**		**19.5**
Lead	7439-92-1	0.221	U	0.223
Magnesium	**7439-95-4**	**220**		**77.8**
Manganese	**7439-96-5**	**12.8**		**0.960**
Molybdenum	**7439-98-7**	**0.927**	QB-01	**0.172**
Nickel	7440-02-0	0.503	U	0.646
Phosphorus	7723-14-0	193	GC-BS, U	1010
Potassium	**7440-09-7**	**103**		**30.7**
Rubidium	**7440-17-7**	**0.166**		**0.0148**
Selenium	**7782-49-2**	**0.159**		**0.00888**
Sodium	**7440-23-5**	**1820**	E, GC-BS	**1610**
Strontium	**7440-24-6**	**3.45**	QB-01	**0.526**
Thallium	**7440-28-0**	**0.00162**		**4.06E-4**
Thorium	**7440-29-01**	**0.0134**		**0.00242**
Uranium	7440-61-1	0.00967	U	0.0137
Vanadium	**7440-62-2**	**1.41**		**0.0397**
Zinc	7440-66-6	21.8	U	78.8

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ATTN: Ms. Chelsea Saber
PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 01/05/24 14:13
SUBMITTED: 12/28/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9524490 **Lab ID:** 3122828-03 **Sampled:** 12/21/23 23:59
Matrix: Air **Sample Volume:** 2287.28€ m³ **Received:** 12/28/23 13:04
Filter ID: **Analysis Date:** 01/02/24 20:40
Comments: MFK-AM03-122123-HM

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	**7429-90-5**	**318**		**22.8**
Antimony	**7440-36-0**	**0.149**	SL	**0.0314**
Arsenic	**7440-38-2**	**0.155**		**0.00679**
Barium	**7440-39-3**	**6.35**		**0.674**
Beryllium	**7440-41-7**	**0.0144**		**0.00236**
Cadmium	7440-43-9	0.0186	U	0.0775
Calcium	**7440-70-2**	**382**	LJ, QB-01	**208**
Chromium	7440-47-3	0.949	U	1.44
Cobalt	**7440-48-4**	**0.218**	QB-01	**0.0111**
Copper	**7440-50-8**	**16.9**		**2.13**
Iron	**7439-89-6**	**423**		**17.2**
Lead	**7439-92-1**	**0.243**		**0.196**
Magnesium	**7439-95-4**	**228**		**68.6**
Manganese	**7439-96-5**	**12.6**		**0.846**
Molybdenum	**7439-98-7**	**0.738**	QB-01	**0.152**
Nickel	7440-02-0	0.510	U	0.570
Phosphorus	7723-14-0	164	GC-BS, U	889
Potassium	**7440-09-7**	**105**		**27.0**
Rubidium	**7440-17-7**	**0.156**		**0.0130**
Selenium	**7782-49-2**	**0.159**		**0.00782**
Sodium	**7440-23-5**	**1850**	E, GC-BS	**1420**
Strontium	**7440-24-6**	**3.35**	QB-01	**0.464**
Thallium	**7440-28-0**	**0.00151**		**3.58E-4**
Thorium	**7440-29-01**	**0.0140**		**0.00213**
Uranium	7440-61-1	0.00836	U	0.0121
Vanadium	**7440-62-2**	**1.27**		**0.0350**
Zinc	7440-66-6	25.2	U	69.5

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Tetra Tech, Inc.
1777 Sentry Pkwy, Bldg 12
Blue Bell, PA 19422
ATTN: Ms. Chelsea Saber
PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 01/05/24 14:13
SUBMITTED: 12/28/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9524486 FB **Lab ID:** 3122828-04 **Sampled:** 12/21/23 00:00
Matrix: Air **Sample Volume:** 1917.117 m³ **Received:** 12/28/23 13:04
Filter ID: **Analysis Date:** 01/02/24 20:54
Comments: MFK-FB01-122123-HM Field Blank

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	7429-90-5	9.89	U	27.2
Antimony	7440-36-0	0.0170	SL, U	0.0374
Arsenic	7440-38-2	0.00343	U	0.00810
Barium	7440-39-3	0.681	U	0.805
Beryllium	7440-41-7	5.16E-4	U	0.00282
Cadmium	7440-43-9	0.00779	U	0.0925
Calcium	7440-70-2	144	LJ, QB-01, U	248
Chromium	7440-47-3	0.643	U	1.72
Cobalt	7440-48-4	0.00555	QB-01, U	0.0132
Copper	7440-50-8	0.253	U	2.55
Iron	7439-89-6	11.7	U	20.5
Lead	7439-92-1	0.0297	U	0.234
Magnesium	7439-95-4	22.6	U	81.8
Manganese	7439-96-5	0.147	U	1.01
Molybdenum	7439-98-7	0.0974	QB-01, U	0.181
Nickel	7440-02-0	0.188	U	0.680
Phosphorus	7723-14-0	172	GC-BS, U	1060
Potassium	7440-09-7	11.2	U	32.2
Rubidium	7440-17-7	0.00657	U	0.0155
Selenium	7782-49-2	0.00162	U	0.00934
Sodium	7440-23-5	547	GC-BS, U	1700
Strontium	7440-24-6	0.280	QB-01, U	0.553
Thallium	7440-28-0	1.94E-4	U	4.27E-4
Thorium	7440-29-01	0.00206	U	0.00255
Uranium	7440-61-1	7.49E-4	U	0.0144
Vanadium	7440-62-2	0.0164	U	0.0418
Zinc	7440-66-6	22.2	U	82.9

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Tetra Tech, Inc.
1777 Sentry Pkwy, Bldg 12
Blue Bell, PA 19422
ATTN: Ms. Chelsea Saber
PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 01/05/24 14:13
SUBMITTED: 12/28/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9524487
Matrix: Air
Lab ID: 3122828-05
Sample Volume: 1891.231 m^3
Filter ID:
Sampled: 12/22/23 23:59
Received: 12/28/23 13:04
Analysis Date: 01/02/24 21:08
Comments: MFK-AM01-122223-HM

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m^3 Air	Flag	MDL ng/m^3 Air
Aluminum	**7429-90-5**	**531**		**27.6**
Antimony	**7440-36-0**	**0.101**	SL	**0.0379**
Arsenic	**7440-38-2**	**0.168**		**0.00822**
Barium	**7440-39-3**	**6.71**		**0.816**
Beryllium	**7440-41-7**	**0.0172**		**0.00286**
Cadmium	7440-43-9	0.0120	U	0.0938
Calcium	**7440-70-2**	**442**	LJ, QB-01	**251**
Chromium	7440-47-3	1.23	U	1.75
Cobalt	**7440-48-4**	**0.277**	QB-01	**0.0134**
Copper	**7440-50-8**	**28.3**		**2.58**
Iron	**7439-89-6**	**604**		**20.8**
Lead	**7439-92-1**	**0.512**		**0.237**
Magnesium	**7439-95-4**	**282**		**82.9**
Manganese	**7439-96-5**	**15.8**		**1.02**
Molybdenum	**7439-98-7**	**0.803**	QB-01	**0.183**
Nickel	7440-02-0	0.564	U	0.689
Phosphorus	7723-14-0	202	GC-BS, U	1080
Potassium	**7440-09-7**	**115**		**32.7**
Rubidium	**7440-17-7**	**0.208**		**0.0157**
Selenium	**7782-49-2**	**0.186**		**0.00946**
Sodium	**7440-23-5**	**2280**	E, GC-BS	**1720**
Strontium	**7440-24-6**	**4.21**	QB-01	**0.561**
Thallium	**7440-28-0**	**0.00167**		**4.33E-4**
Thorium	**7440-29-01**	**0.0173**		**0.00258**
Uranium	7440-61-1	0.0123	U	0.0146
Vanadium	**7440-62-2**	**1.51**		**0.0423**
Zinc	7440-66-6	25.7	U	84.0

CERTIFICATE OF ANALYSIS

Tetra Tech, Inc.
1777 Sentry Pkwy, Bldg 12
Blue Bell, PA 19422
ATTN: Ms. Chelsea Saber
PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 01/05/24 14:13
SUBMITTED: 12/28/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9524477
Matrix: Air
Lab ID: 3122828-06
Sample Volume: 2157.187 m^3
Filter ID:
Sampled: 12/22/23 23:59
Received: 12/28/23 13:04
Analysis Date: 01/02/24 21:22
Comments: MFK-AM02-122223-HM

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	**7429-90-5**	**480**		**24.2**
Antimony	**7440-36-0**	**0.0718**	SL	**0.0333**
Arsenic	**7440-38-2**	**0.159**		**0.00720**
Barium	**7440-39-3**	**6.64**		**0.715**
Beryllium	**7440-41-7**	**0.0165**		**0.00250**
Cadmium	7440-43-9	0.0110	U	0.0822
Calcium	**7440-70-2**	**390**	LJ, QB-01	**220**
Chromium	7440-47-3	1.06	U	1.53
Cobalt	**7440-48-4**	**0.251**	QB-01	**0.0118**
Copper	**7440-50-8**	**11.5**		**2.26**
Iron	**7439-89-6**	**546**		**18.3**
Lead	**7439-92-1**	**0.282**		**0.208**
Magnesium	**7439-95-4**	**252**		**72.7**
Manganese	**7439-96-5**	**15.7**		**0.898**
Molybdenum	**7439-98-7**	**0.801**	QB-01	**0.161**
Nickel	7440-02-0	0.498	U	0.604
Phosphorus	7723-14-0	195	GC-BS, U	943
Potassium	**7440-09-7**	**131**		**28.7**
Rubidium	**7440-17-7**	**0.239**		**0.0138**
Selenium	**7782-49-2**	**0.168**		**0.00830**
Sodium	**7440-23-5**	**2040**	E, GC-BS	**1510**
Strontium	**7440-24-6**	**3.99**	QB-01	**0.492**
Thallium	**7440-28-0**	**0.00164**		**3.79E-4**
Thorium	**7440-29-01**	**0.0169**		**0.00226**
Uranium	7440-61-1	0.0112	U	0.0128
Vanadium	**7440-62-2**	**1.40**		**0.0371**
Zinc	7440-66-6	20.5	U	73.7

The results in this report apply only to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

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Tetra Tech, Inc.
1777 Sentry Pkwy, Bldg 12
Blue Bell, PA 19422
ATTN: Ms. Chelsea Saber
PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 01/05/24 14:13
SUBMITTED: 12/28/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9524489
Lab ID: 3122828-07
Sampled: 12/22/23 23:59
Matrix: Air
Sample Volume: 2305.563 m³
Received: 12/28/23 13:04
Filter ID:
Analysis Date: 01/02/24 21:36
Comments: MFK-AM03-122223-HM

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	**7429-90-5**	**399**		**22.7**
Antimony	**7440-36-0**	**0.122**	SL	**0.0311**
Arsenic	**7440-38-2**	**0.134**		**0.00674**
Barium	**7440-39-3**	**6.98**		**0.669**
Beryllium	**7440-41-7**	**0.0164**		**0.00234**
Cadmium	7440-43-9	0.00927	U	0.0769
Calcium	**7440-70-2**	**395**	LJ, QB-01	**206**
Chromium	7440-47-3	1.01	U	1.43
Cobalt	**7440-48-4**	**0.252**	QB-01	**0.0110**
Copper	**7440-50-8**	**15.3**		**2.12**
Iron	**7439-89-6**	**514**		**17.1**
Lead	**7439-92-1**	**0.276**		**0.195**
Magnesium	**7439-95-4**	**269**		**68.0**
Manganese	**7439-96-5**	**15.4**		**0.840**
Molybdenum	**7439-98-7**	**0.707**	QB-01	**0.150**
Nickel	7440-02-0	0.474	U	0.565
Phosphorus	7723-14-0	181	GC-BS, U	882
Potassium	**7440-09-7**	**121**		**26.8**
Rubidium	**7440-17-7**	**0.205**		**0.0129**
Selenium	**7782-49-2**	**0.166**		**0.00776**
Sodium	**7440-23-5**	**2140**	E, GC-BS	**1410**
Strontium	**7440-24-6**	**4.41**	QB-01	**0.460**
Thallium	**7440-28-0**	**0.00156**		**3.55E-4**
Thorium	**7440-29-01**	**0.0168**		**0.00212**
Uranium	7440-61-1	0.0103	U	0.0120
Vanadium	**7440-62-2**	**1.33**		**0.0347**
Zinc	7440-66-6	18.9	U	68.9

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1777 Sentry Pkwy, Bldg 12
Blue Bell, PA 19422
ATTN: Ms. Chelsea Saber
PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 01/05/24 14:13
SUBMITTED: 12/28/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9524485 FB **Lab ID:** 3122828-08 **Sampled:** 12/22/23 00:00
Matrix: Air **Sample Volume:** 1891.231 m³ **Received:** 12/28/23 13:04
Filter ID: **Analysis Date:** 01/02/24 21:50
Comments: MFK-FB01-122223-HM Field Blank

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	7429-90-5	9.60	U	27.6
Antimony	7440-36-0	0.0147	SL, U	0.0379
Arsenic	7440-38-2	0.00377	U	0.00822
Barium	7440-39-3	0.719	U	0.816
Beryllium	7440-41-7	5.38E-4	U	0.00286
Cadmium	7440-43-9	0.00264	U	0.0938
Calcium	7440-70-2	139	LJ, QB-01, U	251
Chromium	7440-47-3	0.639	U	1.75
Cobalt	7440-48-4	0.00641	QB-01, U	0.0134
Copper	7440-50-8	0.195	U	2.58
Iron	7439-89-6	9.72	U	20.8
Lead	7439-92-1	0.0278	U	0.237
Magnesium	7439-95-4	23.3	U	82.9
Manganese	7439-96-5	0.149	U	1.02
Molybdenum	7439-98-7	0.0864	QB-01, U	0.183
Nickel	7440-02-0	0.182	U	0.689
Phosphorus	7723-14-0	167	GC-BS, U	1080
Potassium	7440-09-7	17.3	U	32.7
Rubidium	7440-17-7	0.00651	U	0.0157
Selenium	7782-49-2	0.00274	U	0.00946
Sodium	7440-23-5	557	GC-BS, U	1720
Strontium	7440-24-6	0.249	QB-01, U	0.561
Thallium	7440-28-0	1.54E-4	U	4.33E-4
Thorium	7440-29-01	0.00215	U	0.00258
Uranium	7440-61-1	6.87E-4	U	0.0146
Vanadium	7440-62-2	0.0177	U	0.0423
Zinc	7440-66-6	18.7	U	84.0

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Tetra Tech, Inc.
1777 Sentry Pkwy, Bldg 12
Blue Bell, PA 19422
ATTN: Ms. Chelsea Saber
PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 01/05/24 14:13
SUBMITTED: 12/28/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9524482 **Lab ID:** 3122828-09 **Sampled:** 12/24/23 23:59
Matrix: Air **Sample Volume:** 1958.81 m^3 **Received:** 12/28/23 13:04
Filter ID: **Analysis Date:** 01/02/24 17:50
Comments: MFK-AM01-122423-HM

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	**7429-90-5**	**343**	QM-4X	**26.7**
Antimony	**7440-36-0**	**0.117**	SL	**0.0366**
Arsenic	**7440-38-2**	**0.144**		**0.00793**
Barium	**7440-39-3**	**5.54**		**0.787**
Beryllium	**7440-41-7**	**0.0136**		**0.00276**
Cadmium	7440-43-9	0.00716	U	0.0905
Calcium	**7440-70-2**	**516**	A-01, LJ, QB-01, QM-4X	**243**
Chromium	7440-47-3	1.10	U	1.69
Cobalt	**7440-48-4**	**0.268**	QB-01	**0.0130**
Copper	**7440-50-8**	**18.1**	QM-07	**2.49**
Iron	**7439-89-6**	**467**	A-01, QM-4X	**20.1**
Lead	**7439-92-1**	**0.258**		**0.229**
Magnesium	**7439-95-4**	**243**	QM-4X	**80.1**
Manganese	**7439-96-5**	**14.1**		**0.988**
Molybdenum	**7439-98-7**	**0.594**	QB-01	**0.177**
Nickel	7440-02-0	0.605	U	0.665
Phosphorus	7723-14-0	179	A-01, GC-BS, U	1040
Potassium	**7440-09-7**	**111**	QM-07	**31.6**
Rubidium	**7440-17-7**	**0.167**		**0.0152**
Selenium	**7782-49-2**	**0.153**		**0.00914**
Sodium	**7440-23-5**	**1880**	QM-4X, A-01, E, GC-BS	**1660**
Strontium	**7440-24-6**	**3.65**	QB-01	**0.542**
Thallium	**7440-28-0**	**0.00126**		**4.18E-4**
Thorium	**7440-29-01**	**0.0121**	QM-07	**0.00249**
Uranium	7440-61-1	0.00962	U	0.0141
Vanadium	**7440-62-2**	**1.41**		**0.0409**
Zinc	7440-66-6	39.1	U	81.2

Eastern Research Group

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Blue Bell, PA 19422
ATTN: Ms. Chelsea Saber
PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 01/05/24 14:13
SUBMITTED: 12/28/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9524479 **Lab ID:** 3122828-10 **Sampled:** 12/24/23 23:59
Matrix: Air **Sample Volume:** 2041.741 m³ **Received:** 12/28/23 13:04
Filter ID: **Analysis Date:** 01/02/24 22:04
Comments: MFK-AM02-122423-HM

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	**7429-90-5**	**529**		**25.6**
Antimony	**7440-36-0**	**0.112**	SL	**0.0351**
Arsenic	**7440-38-2**	**0.209**		**0.00761**
Barium	**7440-39-3**	**7.29**		**0.755**
Beryllium	**7440-41-7**	**0.0177**		**0.00265**
Cadmium	7440-43-9	0.0120	U	0.0869
Calcium	**7440-70-2**	**521**	LJ, QB-01	**233**
Chromium	7440-47-3	1.24	U	1.62
Cobalt	**7440-48-4**	**0.313**	QB-01	**0.0124**
Copper	**7440-50-8**	**9.25**		**2.39**
Iron	**7439-89-6**	**635**		**19.3**
Lead	**7439-92-1**	**0.299**		**0.220**
Magnesium	**7439-95-4**	**260**		**76.8**
Manganese	**7439-96-5**	**18.3**		**0.948**
Molybdenum	**7439-98-7**	**0.609**	QB-01	**0.170**
Nickel	**7440-02-0**	**0.687**		**0.638**
Phosphorus	7723-14-0	203	GC-BS, U	996
Potassium	**7440-09-7**	**132**		**30.3**
Rubidium	**7440-17-7**	**0.245**		**0.0146**
Selenium	**7782-49-2**	**0.176**		**0.00877**
Sodium	**7440-23-5**	**1960**	E, GC-BS	**1590**
Strontium	**7440-24-6**	**4.45**	QB-01	**0.520**
Thallium	**7440-28-0**	**0.00146**		**4.01E-4**
Thorium	**7440-29-01**	**0.0194**		**0.00239**
Uranium	**7440-61-1**	**0.0136**		**0.0135**
Vanadium	**7440-62-2**	**1.86**		**0.0392**
Zinc	7440-66-6	30.7	U	77.9

CERTIFICATE OF ANALYSIS

Tetra Tech, Inc.
1777 Sentry Pkwy, Bldg 12
Blue Bell, PA 19422
ATTN: Ms. Chelsea Saber
PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 01/05/24 14:13
SUBMITTED: 12/28/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9524469
Matrix: Air
Lab ID: 3122828-11
Sample Volume: 2131.191 m^3
Filter ID:
Sampled: 12/24/23 23:59
Received: 12/28/23 13:04
Analysis Date: 01/02/24 23:06
Comments: MFK-AM03-122423-HM

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	**7429-90-5**	**319**		**24.5**
Antimony	**7440-36-0**	**0.129**	SL	**0.0337**
Arsenic	**7440-38-2**	**0.135**		**0.00729**
Barium	**7440-39-3**	**5.77**		**0.724**
Beryllium	**7440-41-7**	**0.0136**		**0.00253**
Cadmium	7440-43-9	0.00775	U	0.0832
Calcium	**7440-70-2**	**466**	LJ, QB-01	**223**
Chromium	7440-47-3	1.05	U	1.55
Cobalt	**7440-48-4**	**0.241**	QB-01	**0.0119**
Copper	**7440-50-8**	**12.4**		**2.29**
Iron	**7439-89-6**	**449**		**18.5**
Lead	**7439-92-1**	**0.296**		**0.211**
Magnesium	**7439-95-4**	**276**		**73.6**
Manganese	**7439-96-5**	**13.7**		**0.908**
Molybdenum	**7439-98-7**	**0.652**	QB-01	**0.163**
Nickel	**7440-02-0**	**0.618**		**0.612**
Phosphorus	7723-14-0	174	GC-BS, U	954
Potassium	**7440-09-7**	**109**		**29.0**
Rubidium	**7440-17-7**	**0.173**		**0.0140**
Selenium	**7782-49-2**	**0.163**		**0.00840**
Sodium	**7440-23-5**	**2040**	E, GC-BS	**1530**
Strontium	**7440-24-6**	**3.84**	QB-01	**0.498**
Thallium	**7440-28-0**	**0.00128**		**3.84E-4**
Thorium	**7440-29-01**	**0.0139**		**0.00229**
Uranium	7440-61-1	0.0102	U	0.0130
Vanadium	**7440-62-2**	**1.46**		**0.0376**
Zinc	7440-66-6	19.7	U	74.6

CERTIFICATE OF ANALYSIS

Tetra Tech, Inc.
1777 Sentry Pkwy, Bldg 12
Blue Bell, PA 19422
ATTN: Ms. Chelsea Saber
PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 01/05/24 14:13
SUBMITTED: 12/28/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9524481 FB
Lab ID: 3122828-12
Sampled: 12/24/23 00:00
Matrix: Air
Sample Volume: 1958.81 m³
Received: 12/28/23 13:04
Filter ID:
Analysis Date: 01/02/24 23:21
Comments: MFK-FB01-122423-HM Field Blank

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	7429-90-5	9.47	U	26.7
Antimony	7440-36-0	0.0153	SL, U	0.0366
Arsenic	7440-38-2	0.00299	U	0.00793
Barium	**7440-39-3**	**0.890**	FB-01	**0.787**
Beryllium	7440-41-7	5.95E-4	U	0.00276
Cadmium	7440-43-9	0.00128	U	0.0905
Calcium	7440-70-2	126	LJ, QB-01, U	243
Chromium	7440-47-3	0.633	U	1.69
Cobalt	7440-48-4	0.00573	QB-01, U	0.0130
Copper	7440-50-8	0.285	U	2.49
Iron	7439-89-6	9.22	U	20.1
Lead	7439-92-1	0.0333	U	0.229
Magnesium	7439-95-4	22.6	U	80.1
Manganese	7439-96-5	0.147	U	0.988
Molybdenum	7439-98-7	0.0840	QB-01, U	0.177
Nickel	7440-02-0	0.190	U	0.665
Phosphorus	7723-14-0	158	GC-BS, U	1040
Potassium	7440-09-7	13.5	U	31.6
Rubidium	7440-17-7	0.00684	U	0.0152
Selenium	7782-49-2	9.35E-4	U	0.00914
Sodium	7440-23-5	519	GC-BS, U	1660
Strontium	7440-24-6	0.246	QB-01, U	0.542
Thallium	7440-28-0	1.77E-4	U	4.18E-4
Thorium	7440-29-01	0.00208	U	0.00249
Uranium	7440-61-1	6.67E-4	U	0.0141
Vanadium	7440-62-2	0.0144	U	0.0409
Zinc	7440-66-6	19.8	U	81.2

CERTIFICATE OF ANALYSIS

Tetra Tech, Inc.
1777 Sentry Pkwy, Bldg 12
Blue Bell, PA 19422
ATTN: Ms. Chelsea Saber
PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 01/05/24 14:13
SUBMITTED: 12/28/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9524478 **Lab ID:** 3122828-13 **Sampled:** 12/23/23 23:59
Matrix: Air **Sample Volume:** 2054.738 m³ **Received:** 12/28/23 13:04
Filter ID: **Analysis Date:** 01/02/24 23:35
Comments: MFK-AM01-122323-HM

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	**7429-90-5**	**380**		**25.4**
Antimony	**7440-36-0**	**0.0834**	SL	**0.0349**
Arsenic	**7440-38-2**	**0.149**		**0.00756**
Barium	**7440-39-3**	**4.99**		**0.751**
Beryllium	**7440-41-7**	**0.0128**		**0.00263**
Cadmium	7440-43-9	0.00761	U	0.0863
Calcium	**7440-70-2**	**397**	LJ, QB-01	**231**
Chromium	7440-47-3	1.13	U	1.61
Cobalt	**7440-48-4**	**0.254**	QB-01	**0.0124**
Copper	**7440-50-8**	**19.6**		**2.38**
Iron	**7439-89-6**	**481**		**19.2**
Lead	**7439-92-1**	**0.301**		**0.219**
Magnesium	**7439-95-4**	**197**		**76.3**
Manganese	**7439-96-5**	**13.6**		**0.942**
Molybdenum	**7439-98-7**	**0.602**	QB-01	**0.169**
Nickel	7440-02-0	0.571	U	0.634
Phosphorus	7723-14-0	200	GC-BS, U	990
Potassium	**7440-09-7**	**95.7**		**30.1**
Rubidium	**7440-17-7**	**0.171**		**0.0145**
Selenium	**7782-49-2**	**0.135**		**0.00871**
Sodium	**7440-23-5**	**1590**	E, GC-BS	**1580**
Strontium	**7440-24-6**	**3.27**	QB-01	**0.516**
Thallium	**7440-28-0**	**0.00102**		**3.98E-4**
Thorium	**7440-29-01**	**0.0135**		**0.00238**
Uranium	7440-61-1	0.00921	U	0.0135
Vanadium	**7440-62-2**	**1.38**		**0.0390**
Zinc	7440-66-6	19.0	U	77.4

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CERTIFICATE OF ANALYSIS

Tetra Tech, Inc.
1777 Sentry Pkwy, Bldg 12
Blue Bell, PA 19422
ATTN: Ms. Chelsea Saber
PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 01/05/24 14:13
SUBMITTED: 12/28/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9524484 **Lab ID:** 3122828-14 **Sampled:** 12/23/23 23:59
Matrix: Air **Sample Volume:** 2126.294 m^3 **Received:** 12/28/23 13:04
Filter ID: **Analysis Date:** 01/02/24 23:49
Comments: MFK-AM02-122323-HM

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	**7429-90-5**	**381**		**24.6**
Antimony	**7440-36-0**	**0.0970**	SL	**0.0337**
Arsenic	**7440-38-2**	**0.225**		**0.00731**
Barium	**7440-39-3**	**5.19**		**0.725**
Beryllium	**7440-41-7**	**0.0138**		**0.00254**
Cadmium	7440-43-9	0.00968	U	0.0834
Calcium	**7440-70-2**	**423**	LJ, QB-01	**223**
Chromium	7440-47-3	1.16	U	1.55
Cobalt	**7440-48-4**	**0.261**	QB-01	**0.0119**
Copper	**7440-50-8**	**12.0**		**2.30**
Iron	**7439-89-6**	**495**		**18.5**
Lead	7439-92-1	0.207	U	0.211
Magnesium	**7439-95-4**	**211**		**73.8**
Manganese	**7439-96-5**	**14.2**		**0.911**
Molybdenum	**7439-98-7**	**0.806**	QB-01	**0.163**
Nickel	7440-02-0	0.582	U	0.613
Phosphorus	7723-14-0	180	GC-BS, U	956
Potassium	**7440-09-7**	**102**		**29.1**
Rubidium	**7440-17-7**	**0.168**		**0.0140**
Selenium	**7782-49-2**	**0.135**		**0.00842**
Sodium	**7440-23-5**	**1640**	E, GC-BS	**1530**
Strontium	**7440-24-6**	**3.72**	QB-01	**0.499**
Thallium	**7440-28-0**	**0.00102**		**3.85E-4**
Thorium	**7440-29-01**	**0.0163**		**0.00230**
Uranium	7440-61-1	0.00963	U	0.0130
Vanadium	**7440-62-2**	**1.40**		**0.0376**
Zinc	7440-66-6	21.5	U	74.8

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FILE #: 0000.00
REPORTED: 01/05/24 14:13
SUBMITTED: 12/28/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9524483
Matrix: Air
Lab ID: 3122828-15
Sample Volume: 2333.452 m³
Filter ID:
Sampled: 12/23/23 23:59
Received: 12/28/23 13:04
Analysis Date: 01/03/24 00:03
Comments: MFK-AM03-122323-HM

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	**7429-90-5**	**326**		**22.4**
Antimony	**7440-36-0**	**0.112**	SL	**0.0307**
Arsenic	**7440-38-2**	**0.119**		**0.00666**
Barium	**7440-39-3**	**5.24**		**0.661**
Beryllium	**7440-41-7**	**0.0143**		**0.00231**
Cadmium	7440-43-9	0.00656	U	0.0760
Calcium	**7440-70-2**	**399**	LJ, QB-01	**204**
Chromium	7440-47-3	1.01	U	1.42
Cobalt	**7440-48-4**	**0.250**	QB-01	**0.0109**
Copper	**7440-50-8**	**15.7**		**2.09**
Iron	**7439-89-6**	**461**		**16.9**
Lead	**7439-92-1**	**0.215**		**0.192**
Magnesium	**7439-95-4**	**222**		**67.2**
Manganese	**7439-96-5**	**13.8**		**0.830**
Molybdenum	**7439-98-7**	**0.724**	QB-01	**0.149**
Nickel	7440-02-0	0.517	U	0.558
Phosphorus	7723-14-0	170	GC-BS, U	872
Potassium	**7440-09-7**	**100**		**26.5**
Rubidium	**7440-17-7**	**0.159**		**0.0128**
Selenium	**7782-49-2**	**0.126**		**0.00767**
Sodium	**7440-23-5**	**1720**	E, GC-BS	**1390**
Strontium	**7440-24-6**	**3.42**	QB-01	**0.455**
Thallium	**7440-28-0**	**9.26E-4**		**3.51E-4**
Thorium	**7440-29-01**	**0.0155**		**0.00209**
Uranium	7440-61-1	0.00884	U	0.0119
Vanadium	**7440-62-2**	**1.27**		**0.0343**
Zinc	7440-66-6	20.3	U	68.1

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FILE #: 0000.00
REPORTED: 01/05/24 14:13
SUBMITTED: 12/28/23
AQS SITE CODE:
SITE CODE: Maui fires

Description:	TetraTech Q9524480 FB	**Lab ID:**	3122828-16	**Sampled:**	12/23/23 00:00
Matrix:	Air	**Sample Volume:**	2054.738 m³	**Received:**	12/28/23 13:04
		Filter ID:		**Analysis Date:**	01/03/24 00:17
Comments:	MFK-FB01-122323-HM Field Blank				

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	7429-90-5	8.36	U	25.4
Antimony	7440-36-0	0.0146	SL, U	0.0349
Arsenic	7440-38-2	0.00359	U	0.00756
Barium	**7440-39-3**	**0.919**	FB-01	**0.751**
Beryllium	7440-41-7	5.38E-4	U	0.00263
Cadmium	7440-43-9	0.00103	U	0.0863
Calcium	7440-70-2	105	LJ, QB-01, U	231
Chromium	7440-47-3	0.623	U	1.61
Cobalt	7440-48-4	0.00816	QB-01, U	0.0124
Copper	7440-50-8	0.244	U	2.38
Iron	7439-89-6	8.35	U	19.2
Lead	7439-92-1	0.0342	U	0.219
Magnesium	7439-95-4	21.7	U	76.3
Manganese	7439-96-5	0.128	U	0.942
Molybdenum	**7439-98-7**	**0.216**	FB-01, QB-01	**0.169**
Nickel	7440-02-0	0.204	U	0.634
Phosphorus	7723-14-0	157	GC-BS, U	990
Potassium	7440-09-7	29.5	U	30.1
Rubidium	7440-17-7	0.00696	U	0.0145
Selenium	7782-49-2	8.42E-4	U	0.00871
Sodium	7440-23-5	536	GC-BS, U	1580
Strontium	7440-24-6	0.228	QB-01, U	0.516
Thallium	7440-28-0	9.95E-5	U	3.98E-4
Thorium	7440-29-01	0.00205	U	0.00238
Uranium	7440-61-1	6.65E-4	U	0.0135
Vanadium	7440-62-2	0.0137	U	0.0390
Zinc	7440-66-6	13.5	U	77.4

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FILE #: 0000.00
REPORTED: 01/05/24 14:13
SUBMITTED: 12/28/23
AQS SITE CODE:
SITE CODE: Maui fires

Inorganics by Compendium Method IO-3.5 - Quality Control

Batch 2401002 - B4A0205

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Calibration Blank (2401002-CCB1)				Prepared & Analyzed: 01/02/24						
Aluminum	29.2		ng/l							
Antimony	0.334		ng/l							
Arsenic	4.98		ng/l							
Barium	-0.516		ng/l							U
Beryllium	0.0560		ng/l							
Cadmium	0.173		ng/l							
Calcium	101		ng/l							
Chromium	5.99		ng/l							
Cobalt	3.62E-4		ng/l							
Copper	12.9		ng/l							
Iron	-181		ng/l							U
Lead	2.85		ng/l							
Magnesium	-27.7		ng/l							U
Manganese	2.73		ng/l							
Molybdenum	13.4		ng/l							
Nickel	0.270		ng/l							
Phosphorus	-28.0		ng/l							U
Potassium	413		ng/l							
Rubidium	-0.352		ng/l							U
Selenium	-4.83		ng/l							U
Sodium	-431		ng/l							U
Strontium	-0.257		ng/l							U
Thallium	0.698		ng/l							
Thorium	0.505		ng/l							
Uranium	0.00426		ng/l							
Vanadium	24.2		ng/l							
Zinc	-48.1		ng/l							U
Calibration Blank (2401002-CCB2)				Prepared & Analyzed: 01/02/24						
Aluminum	60.1		ng/l							
Antimony	1.03		ng/l							
Arsenic	-1.10		ng/l							U
Barium	3.25		ng/l							
Beryllium	0.412		ng/l							
Cadmium	0.576		ng/l							
Calcium	160		ng/l							
Chromium	8.48		ng/l							
Cobalt	0.947		ng/l							
Copper	53.8		ng/l							

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FILE #: 0000.00
REPORTED: 01/05/24 14:13
SUBMITTED: 12/28/23
AQS SITE CODE:
SITE CODE: Maui fires

Inorganics by Compendium Method IO-3.5 - Quality Control

Batch 2401002 - B4A0205

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Calibration Blank (2401002-CCB2) Contin				Prepared & Analyzed: 01/02/24						
Iron	9.74		ng/l							
Lead	10.1		ng/l							
Magnesium	-32.5		ng/l							U
Manganese	10.7		ng/l							
Molybdenum	10.5		ng/l							
Nickel	2.89		ng/l							
Phosphorus	22.9		ng/l							
Potassium	-284		ng/l							U
Rubidium	0.182		ng/l							
Selenium	-0.317		ng/l							U
Sodium	-270		ng/l							U
Strontium	0.380		ng/l							
Thallium	1.19		ng/l							
Thorium	0.765		ng/l							
Uranium	0.0172		ng/l							
Vanadium	-4.91		ng/l							U
Zinc	-49.3		ng/l							U
Calibration Blank (2401002-CCB3)				Prepared & Analyzed: 01/02/24						
Aluminum	29.1		ng/l							
Antimony	0.949		ng/l							
Arsenic	1.33		ng/l							
Barium	2.83		ng/l							
Beryllium	0.206		ng/l							
Cadmium	0.661		ng/l							
Calcium	-378		ng/l							U
Chromium	6.51		ng/l							
Cobalt	1.11		ng/l							
Copper	55.8		ng/l							
Iron	77.2		ng/l							
Lead	9.47		ng/l							
Magnesium	9.66		ng/l							
Manganese	11.7		ng/l							
Molybdenum	9.87		ng/l							
Nickel	2.65		ng/l							
Phosphorus	-652		ng/l							U
Potassium	392		ng/l							
Rubidium	0.482		ng/l							
Selenium	-1.76		ng/l							U

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REPORTED: 01/05/24 14:13
SUBMITTED: 12/28/23
AQS SITE CODE:
SITE CODE: Maui fires

Inorganics by Compendium Method IO-3.5 - Quality Control

Batch 2401002 - B4A0205

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Calibration Blank (2401002-CCB3) Contin				Prepared & Analyzed: 01/02/24						
Sodium	-5.82		ng/l						U	
Strontium	0.427		ng/l							
Thallium	1.06		ng/l							
Thorium	0.812		ng/l							
Uranium	0.00232		ng/l							
Vanadium	-4.80		ng/l						U	
Zinc	-50.0		ng/l						U	
Calibration Blank (2401002-CCB4)				Prepared: 01/02/24 Analyzed: 01/03/24						
Aluminum	17.1		ng/l							
Antimony	0.744		ng/l							
Arsenic	6.62		ng/l							
Barium	14.6		ng/l							
Beryllium	0.464		ng/l							
Cadmium	0.660		ng/l							
Calcium	158		ng/l							
Chromium	7.05		ng/l							
Cobalt	1.07		ng/l							
Copper	58.2		ng/l							
Iron	-31.3		ng/l						U	
Lead	9.09		ng/l							
Magnesium	2.39		ng/l							
Manganese	10.5		ng/l							
Molybdenum	11.5		ng/l							
Nickel	2.12		ng/l							
Phosphorus	-837		ng/l						U	
Potassium	149		ng/l							
Rubidium	0.216		ng/l							
Selenium	-10.1		ng/l						U	
Sodium	-217		ng/l						U	
Strontium	1.75		ng/l							
Thallium	1.07		ng/l							
Thorium	0.802		ng/l							
Uranium	0.0146		ng/l							
Vanadium	-15.5		ng/l						U	
Zinc	-44.8		ng/l						U	
Calibration Check (2401002-CCV1)				Prepared & Analyzed: 01/02/24						
Aluminum	1.53E6		ng/l	1.5000E6		102	90-110			
Antimony	20100		ng/l	20000		100	90-110			

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REPORTED: 01/05/24 14:13
SUBMITTED: 12/28/23
AQS SITE CODE:
SITE CODE: Maui fires

Inorganics by Compendium Method IO-3.5 - Quality Control

Batch 2401002 - B4A0205

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Calibration Check (2401002-CCV1) Contin				Prepared & Analyzed: 01/02/24						
Arsenic	20100		ng/l	20000		101	90-110			
Barium	204000		ng/l	200000		102	90-110			
Beryllium	5190		ng/l	5000.0		104	90-110			
Cadmium	20200		ng/l	20000		101	90-110			
Calcium	2.52E7		ng/l	2.5000E7		101	90-110			
Chromium	239000		ng/l	240000		99.5	90-110			
Cobalt	51300		ng/l	50000		103	90-110			
Copper	2.07E6		ng/l	2.0000E6		103	90-110			
Iron	2.54E6		ng/l	2.5000E6		102	90-110			
Lead	200000		ng/l	200000		100	90-110			
Magnesium	1.03E6		ng/l	1.0000E6		103	90-110			
Manganese	507000		ng/l	500000		101	90-110			
Molybdenum	50100		ng/l	50000		100	90-110			
Nickel	123000		ng/l	120000		103	90-110			
Phosphorus	202000		ng/l	200000		101	90-110			
Potassium	2.51E6		ng/l	2.5000E6		100	90-110			
Rubidium	10100		ng/l	10000		101	90-110			
Selenium	20400		ng/l	20000		102	90-110			
Sodium	2.61E6		ng/l	2.5000E6		105	90-110			
Strontium	50400		ng/l	50000		101	90-110			
Thallium	489		ng/l	500.00		97.7	90-110			
Thorium	493		ng/l	500.00		98.6	90-110			
Uranium	495		ng/l	500.00		99.0	90-110			
Vanadium	20000		ng/l	20000		99.9	90-110			
Zinc	532000		ng/l	500000		106	90-110			
Calibration Check (2401002-CCV2)				Prepared & Analyzed: 01/02/24						
Aluminum	1.49E6		ng/l	1.5000E6		99.0	90-110			
Antimony	20200		ng/l	20000		101	90-110			
Arsenic	20100		ng/l	20000		101	90-110			
Barium	203000		ng/l	200000		102	90-110			
Beryllium	4840		ng/l	5000.0		96.8	90-110			
Cadmium	20300		ng/l	20000		102	90-110			
Calcium	2.49E7		ng/l	2.5000E7		99.5	90-110			
Chromium	254000		ng/l	240000		106	90-110			
Cobalt	50300		ng/l	50000		101	90-110			
Copper	2.05E6		ng/l	2.0000E6		102	90-110			
Iron	2.49E6		ng/l	2.5000E6		99.7	90-110			
Lead	200000		ng/l	200000		100	90-110			

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REPORTED: 01/05/24 14:13
SUBMITTED: 12/28/23
AQS SITE CODE:
SITE CODE: Maui fires

Inorganics by Compendium Method IO-3.5 - Quality Control

Batch 2401002 - B4A0205

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Calibration Check (2401002-CCV2) Contin				Prepared & Analyzed: 01/02/24						
Magnesium	998000		ng/l	1.0000E6		99.8	90-110			
Manganese	496000		ng/l	500000		99.3	90-110			
Molybdenum	50600		ng/l	50000		101	90-110			
Nickel	122000		ng/l	120000		101	90-110			
Phosphorus	196000		ng/l	200000		98.0	90-110			
Potassium	2.45E6		ng/l	2.5000E6		97.9	90-110			
Rubidium	10000		ng/l	10000		100	90-110			
Selenium	20200		ng/l	20000		101	90-110			
Sodium	2.57E6		ng/l	2.5000E6		103	90-110			
Strontium	50400		ng/l	50000		101	90-110			
Thallium	490		ng/l	500.00		98.0	90-110			
Thorium	497		ng/l	500.00		99.4	90-110			
Uranium	497		ng/l	500.00		99.3	90-110			
Vanadium	20300		ng/l	20000		101	90-110			
Zinc	533000		ng/l	500000		107	90-110			
Calibration Check (2401002-CCV3)				Prepared & Analyzed: 01/02/24						
Aluminum	1.48E6		ng/l	1.5000E6		98.4	90-110			
Antimony	20000		ng/l	20000		100	90-110			
Arsenic	20000		ng/l	20000		99.8	90-110			
Barium	202000		ng/l	200000		101	90-110			
Beryllium	5000		ng/l	5000.0		100	90-110			
Cadmium	20200		ng/l	20000		101	90-110			
Calcium	2.48E7		ng/l	2.5000E7		99.3	90-110			
Chromium	247000		ng/l	240000		103	90-110			
Cobalt	50100		ng/l	50000		100	90-110			
Copper	2.05E6		ng/l	2.0000E6		103	90-110			
Iron	2.50E6		ng/l	2.5000E6		99.9	90-110			
Lead	201000		ng/l	200000		101	90-110			
Magnesium	998000		ng/l	1.0000E6		99.8	90-110			
Manganese	497000		ng/l	500000		99.4	90-110			
Molybdenum	50500		ng/l	50000		101	90-110			
Nickel	122000		ng/l	120000		101	90-110			
Phosphorus	192000		ng/l	200000		96.1	90-110			
Potassium	2.44E6		ng/l	2.5000E6		97.5	90-110			
Rubidium	10000		ng/l	10000		100	90-110			
Selenium	19900		ng/l	20000		99.4	90-110			
Sodium	2.56E6		ng/l	2.5000E6		103	90-110			
Strontium	50000		ng/l	50000		100	90-110			

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CERTIFICATE OF ANALYSIS

Tetra Tech, Inc.
1777 Sentry Pkwy, Bldg 12
Blue Bell, PA 19422
ATTN: Ms. Chelsea Saber
PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 01/05/24 14:13
SUBMITTED: 12/28/23
AQS SITE CODE:
SITE CODE: Maui fires

Inorganics by Compendium Method IO-3.5 - Quality Control

Batch 2401002 - B4A0205

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Calibration Check (2401002-CCV3) Contin				Prepared & Analyzed: 01/02/24						
Thallium	488		ng/l	500.00		97.7	90-110			
Thorium	494		ng/l	500.00		98.7	90-110			
Uranium	495		ng/l	500.00		99.0	90-110			
Vanadium	20200		ng/l	20000		101	90-110			
Zinc	530000		ng/l	500000		106	90-110			
Calibration Check (2401002-CCV4)				Prepared: 01/02/24 Analyzed: 01/03/24						
Aluminum	1.52E6		ng/l	1.5000E6		101	90-110			
Antimony	20400		ng/l	20000		102	90-110			
Arsenic	20300		ng/l	20000		102	90-110			
Barium	204000		ng/l	200000		102	90-110			
Beryllium	4780		ng/l	5000.0		95.6	90-110			
Cadmium	20600		ng/l	20000		103	90-110			
Calcium	2.53E7		ng/l	2.5000E7		101	90-110			
Chromium	260000		ng/l	240000		108	90-110			
Cobalt	51400		ng/l	50000		103	90-110			
Copper	2.10E6		ng/l	2.0000E6		105	90-110			
Iron	2.55E6		ng/l	2.5000E6		102	90-110			
Lead	203000		ng/l	200000		101	90-110			
Magnesium	1.03E6		ng/l	1.0000E6		103	90-110			
Manganese	509000		ng/l	500000		102	90-110			
Molybdenum	51300		ng/l	50000		103	90-110			
Nickel	124000		ng/l	120000		104	90-110			
Phosphorus	201000		ng/l	200000		101	90-110			
Potassium	2.47E6		ng/l	2.5000E6		98.9	90-110			
Rubidium	10100		ng/l	10000		101	90-110			
Selenium	20100		ng/l	20000		101	90-110			
Sodium	2.64E6		ng/l	2.5000E6		105	90-110			
Strontium	50900		ng/l	50000		102	90-110			
Thallium	487		ng/l	500.00		97.4	90-110			
Thorium	498		ng/l	500.00		99.6	90-110			
Uranium	502		ng/l	500.00		100	90-110			
Vanadium	20800		ng/l	20000		104	90-110			
Zinc	541000		ng/l	500000		108	90-110			
High Cal Check (2401002-HCV1)				Prepared & Analyzed: 01/02/24						
Aluminum	2.95E6		ng/l	3.0000E6		98.3	95-105			
Antimony	40000		ng/l	40000		99.9	95-105			
Arsenic	39900		ng/l	40000		99.8	95-105			
Barium	403000		ng/l	400000		101	95-105			

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Inorganics by Compendium Method IO-3.5 - Quality Control

Batch 2401002 - B4A0205

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
High Cal Check (2401002-HCV1) Continue				Prepared & Analyzed: 01/02/24						
Beryllium	10400		ng/l	10000		104	95-105			
Cadmium	39600		ng/l	40000		99.1	95-105			
Calcium	4.97E7		ng/l	5.0000E7		99.4	95-105			
Chromium	477000		ng/l	480000		99.3	95-105			
Cobalt	99000		ng/l	100000		99.0	95-105			
Copper	3.95E6		ng/l	4.0000E6		98.8	95-105			
Iron	4.93E6		ng/l	5.0000E6		98.5	95-105			
Lead	400000		ng/l	400000		100	95-105			
Magnesium	1.96E6		ng/l	2.0000E6		98.2	95-105			
Manganese	986000		ng/l	1.0000E6		98.6	95-105			
Molybdenum	99600		ng/l	100000		99.6	95-105			
Nickel	236000		ng/l	240000		98.4	95-105			
Phosphorus	393000		ng/l	400000		98.3	95-105			
Potassium	4.99E6		ng/l	5.0000E6		99.7	95-105			
Rubidium	19800		ng/l	20000		99.2	95-105			
Selenium	39600		ng/l	40000		99.0	95-105			
Sodium	4.90E6		ng/l	5.0000E6		98.0	95-105			
Strontium	99300		ng/l	100000		99.3	95-105			
Thallium	987		ng/l	1000.0		98.7	95-105			
Thorium	996		ng/l	1000.0		99.6	95-105			
Uranium	1000		ng/l	1000.0		100	95-105			
Vanadium	40000		ng/l	40000		100	95-105			
Zinc	1.04E6		ng/l	1.0000E6		104	95-105			
Initial Cal Blank (2401002-ICB1)				Prepared & Analyzed: 01/02/24						
Aluminum	46.2		ng/l							
Antimony	1.67		ng/l							
Arsenic	4.49		ng/l							
Barium	2.17		ng/l							
Beryllium	0.253		ng/l							
Cadmium	0.503		ng/l							
Calcium	524		ng/l							
Chromium	16.1		ng/l							
Cobalt	1.01		ng/l							
Copper	55.6		ng/l							
Iron	31.2		ng/l							
Lead	12.7		ng/l							
Magnesium	-4.87		ng/l							U
Manganese	15.5		ng/l							

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Inorganics by Compendium Method IO-3.5 - Quality Control

Batch 2401002 - B4A0205

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Initial Cal Blank (2401002-ICB1) Continu				Prepared & Analyzed: 01/02/24						
Molybdenum	17.2		ng/l							
Nickel	2.94		ng/l							
Phosphorus	-698		ng/l							U
Potassium	461		ng/l							
Rubidium	-0.262		ng/l							U
Selenium	-9.56		ng/l							U
Sodium	-311		ng/l							U
Strontium	-0.423		ng/l							U
Thallium	0.519		ng/l							
Thorium	0.436		ng/l							
Uranium	0.0182		ng/l							
Vanadium	16.8		ng/l							
Zinc	-29.2		ng/l							U
Initial Cal Check (2401002-ICV1)				Prepared & Analyzed: 01/02/24						
Aluminum	1.47E6		ng/l	1.5000E6		97.8	90-110			
Antimony	19900		ng/l	20000		99.3	90-110			
Arsenic	19900		ng/l	20000		99.5	90-110			
Barium	201000		ng/l	200000		101	90-110			
Beryllium	5460		ng/l	5000.0		109	90-110			
Cadmium	20600		ng/l	20000		103	90-110			
Calcium	2.46E7		ng/l	2.5000E7		98.5	90-110			
Chromium	237000		ng/l	240000		98.7	90-110			
Cobalt	50100		ng/l	50000		100	90-110			
Copper	2.02E6		ng/l	2.0000E6		101	90-110			
Iron	2.51E6		ng/l	2.5000E6		100	90-110			
Lead	199000		ng/l	200000		99.3	90-110			
Magnesium	991000		ng/l	1.0000E6		99.1	90-110			
Manganese	497000		ng/l	500000		99.5	90-110			
Molybdenum	49600		ng/l	50000		99.3	90-110			
Nickel	119000		ng/l	120000		99.4	90-110			
Phosphorus	199000		ng/l	200000		99.5	90-110			
Potassium	2.52E6		ng/l	2.5000E6		101	90-110			
Rubidium	9760		ng/l	10000		97.6	90-110			
Selenium	20700		ng/l	20000		104	90-110			
Sodium	2.54E6		ng/l	2.5000E6		102	90-110			
Strontium	50400		ng/l	50000		101	90-110			
Thallium	489		ng/l	500.00		97.9	90-110			
Thorium	484		ng/l	500.00		96.7	90-110			

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Inorganics by Compendium Method IO-3.5 - Quality Control

Batch 2401002 - B4A0205

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Initial Cal Check (2401002-ICV1) Continu				Prepared & Analyzed: 01/02/24						
Uranium	498		ng/l	500.00		99.6	90-110			
Vanadium	20200		ng/l	20000		101	90-110			
Zinc	532000		ng/l	500000		106	90-110			
Interference Check A (2401002-IFA1)				Prepared & Analyzed: 01/02/24						
Aluminum	1.45E7		ng/l	1.5000E7		96.6	80-120			
Antimony	0.00		ng/l				80-120			U
Arsenic	0.00		ng/l				80-120			U
Barium	0.00		ng/l				80-120			U
Beryllium	0.00		ng/l				80-120			U
Cadmium	0.00		ng/l				80-120			U
Calcium	9.49E7		ng/l	1.0040E8		94.5	80-120			
Chromium	0.00		ng/l				80-120			U
Cobalt	0.00		ng/l				80-120			U
Copper	0.00		ng/l				80-120			U
Iron	1.44E7		ng/l	1.5000E7		95.9	80-120			
Lead	0.00		ng/l				80-120			U
Magnesium	1.53E7		ng/l	1.5000E7		102	80-120			
Manganese	0.00		ng/l				80-120			U
Molybdenum	297000		ng/l	300000		98.9	80-120			
Nickel	0.00		ng/l				80-120			U
Phosphorus	1.60E7		ng/l	1.5000E7		106	80-120			
Potassium	1.44E7		ng/l	1.5000E7		95.7	80-120			
Rubidium	0.00		ng/l				80-120			U
Selenium	0.00		ng/l				80-120			U
Sodium	1.55E7		ng/l	1.5000E7		103	80-120			
Strontium	0.00		ng/l				80-120			U
Thallium	0.00		ng/l				80-120			U
Thorium	0.00		ng/l				80-120			U
Uranium	0.00		ng/l				80-120			U
Vanadium	0.00		ng/l				80-120			U
Zinc	0.00		ng/l				80-120			U
Interference Check B (2401002-IFB1)				Prepared & Analyzed: 01/02/24						
Aluminum	1.65E7		ng/l	1.6500E7		100	80-120			
Antimony	20700		ng/l	20000		103	80-120			
Arsenic	20600		ng/l	20000		103	80-120			
Barium	209000		ng/l	200000		104	80-120			
Beryllium	4590		ng/l	5000.0		91.8	80-120			
Cadmium	20100		ng/l	20000		100	80-120			

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Inorganics by Compendium Method IO-3.5 - Quality Control

Batch 2401002 - B4A0205

Interference Check B (2401002-IFB1) Co — Prepared & Analyzed: 01/02/24

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Calcium	1.19E8		ng/l	1.2540E8		95.2	80-120			
Chromium	237000		ng/l	240000		98.8	80-120			
Cobalt	50600		ng/l	50000		101	80-120			
Copper	1.94E6		ng/l	2.0000E6		96.9	80-120			
Iron	1.72E7		ng/l	1.7500E7		98.0	80-120			
Lead	209000		ng/l	200000		105	80-120			
Magnesium	1.67E7		ng/l	1.6000E7		104	80-120			
Manganese	527000		ng/l	500000		105	80-120			
Molybdenum	347000		ng/l	350000		99.0	80-120			
Nickel	118000		ng/l	120000		98.6	80-120			
Phosphorus	1.67E7		ng/l	1.5200E7		110	80-120			
Potassium	1.74E7		ng/l	1.7500E7		99.4	80-120			
Rubidium	10400		ng/l	10000		104	80-120			
Selenium	19600		ng/l	20000		97.8	80-120			
Sodium	1.90E7		ng/l	1.7500E7		108	80-120			
Strontium	51900		ng/l	50000		104	80-120			
Thallium	523		ng/l	500.00		105	80-120			
Thorium	551		ng/l	500.00		110	80-120			
Uranium	552		ng/l	500.00		110	80-120			
Vanadium	19600		ng/l	20000		98.2	80-120			
Zinc	494000		ng/l	500000		98.8	80-120			

Batch B4A0205 - ICP-MS Extraction

Blank (B4A0205-BLK1) — Prepared & Analyzed: 01/02/24

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Aluminum	ND	32.1	ng/m³ Air							U
Antimony	ND	0.0441	ng/m³ Air							SL, U
Arsenic	ND	0.00955	ng/m³ Air							U
Barium	ND	0.948	ng/m³ Air							U
Beryllium	ND	0.00332	ng/m³ Air							U
Cadmium	ND	0.109	ng/m³ Air							U
Calcium	ND	292	ng/m³ Air							LJ, QB-01, U
Chromium	ND	2.03	ng/m³ Air							U
Cobalt	ND	0.0156	ng/m³ Air							QB-01, U
Copper	ND	3.00	ng/m³ Air							U
Iron	ND	24.2	ng/m³ Air							U
Lead	ND	0.276	ng/m³ Air							U
Magnesium	ND	96.4	ng/m³ Air							U
Manganese	ND	1.19	ng/m³ Air							U
Molybdenum	ND	0.213	ng/m³ Air							QB-01, U

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Inorganics by Compendium Method IO-3.5 - Quality Control

Batch B4A0205 - ICP-MS Extraction

Blank (B4A0205-BLK1) Continued — Prepared & Analyzed: 01/02/24

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Nickel	ND	0.801	ng/m³ Air							U
Phosphorus	ND	1250	ng/m³ Air							GC-BS, U
Potassium	ND	38.0	ng/m³ Air							U
Rubidium	ND	0.0183	ng/m³ Air							U
Selenium	ND	0.0110	ng/m³ Air							U
Sodium	ND	2000	ng/m³ Air							GC-BS, U
Strontium	ND	0.652	ng/m³ Air							QB-01, U
Thallium	ND	5.03E-4	ng/m³ Air							U
Thorium	ND	0.00300	ng/m³ Air							U
Uranium	ND	0.0170	ng/m³ Air							U
Vanadium	ND	0.0492	ng/m³ Air							U
Zinc	ND	97.7	ng/m³ Air							U

LCS (B4A0205-BS1) — Prepared & Analyzed: 01/02/24

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Aluminum	93.4	32.1	ng/m³ Air	82.975		113	80-120			
Antimony	0.515	0.0441	ng/m³ Air	1.3829		37.3	80-120			SL
Arsenic	2.72	0.00955	ng/m³ Air	2.7658		98.5	80-120			
Barium	28.4	0.948	ng/m³ Air	27.658		103	80-120			
Beryllium	1.29	0.00332	ng/m³ Air	1.3829		93.2	80-120			
Cadmium	1.38	0.109	ng/m³ Air	1.3829		100	80-120			
Calcium	642	292	ng/m³ Air	69.146		929	80-120			LJ, QB-01
Chromium	16.5	2.03	ng/m³ Air	13.829		119	80-120			
Cobalt	1.38	0.0156	ng/m³ Air	1.3829		99.7	80-120			QB-01
Copper	32.0	3.00	ng/m³ Air	27.658		116	80-120			
Iron	42.6	24.2	ng/m³ Air	27.658		154	80-120			
Lead	13.7	0.276	ng/m³ Air	13.829		99.3	80-120			
Magnesium	ND	96.4	ng/m³ Air	27.658			80-120			U
Manganese	8.94	1.19	ng/m³ Air	8.2975		108	80-120			
Molybdenum	1.65	0.213	ng/m³ Air	1.3829		120	80-120			QB-01
Nickel	3.11	0.801	ng/m³ Air	2.7658		113	80-120			
Phosphorus	ND	1250	ng/m³ Air	13.829			80-120			GC-BS, U
Potassium	68.3	38.0	ng/m³ Air	55.317		124	80-120			
Rubidium	1.35	0.0183	ng/m³ Air	1.3829		97.3	80-120			
Selenium	2.76	0.0110	ng/m³ Air	2.7658		99.7	80-120			
Sodium	ND	2000	ng/m³ Air	55.317			80-120			GC-BS, U
Strontium	2.28	0.652	ng/m³ Air	1.3829		165	80-120			QB-01
Thallium	0.135	5.03E-4	ng/m³ Air	0.13829		97.3	80-120			
Thorium	0.132	0.00300	ng/m³ Air	0.13829		95.6	80-120			
Uranium	0.133	0.0170	ng/m³ Air	0.13829		96.0	80-120			

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Inorganics by Compendium Method IO-3.5 - Quality Control

Batch B4A0205 - ICP-MS Extraction

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
LCS (B4A0205-BS1) Continued				Prepared & Analyzed: 01/02/24						
Vanadium	2.81	0.0492	ng/m³ Air	2.7658		102	80-120			
Zinc	126	97.7	ng/m³ Air	82.975		152	80-120			
Duplicate (B4A0205-DUP1)		**Source: 3122828-09**		Prepared & Analyzed: 01/02/24						
Aluminum	357	26.7	ng/m³ Air		343			4.07	10	
Antimony	0.119	0.0366	ng/m³ Air		0.117			1.44	10	SL
Arsenic	0.159	0.00793	ng/m³ Air		0.144			9.53	10	
Barium	5.62	0.787	ng/m³ Air		5.54			1.34	10	
Beryllium	0.0144	0.00276	ng/m³ Air		0.0136			5.82	10	
Cadmium	ND	0.0905	ng/m³ Air		ND				10	U
Calcium	525	243	ng/m³ Air		516			1.74	10	LJ, QB-01
Chromium	ND	1.69	ng/m³ Air		ND				10	U
Cobalt	0.274	0.0130	ng/m³ Air		0.268			2.27	10	QB-01
Copper	20.2	2.49	ng/m³ Air		18.1			11.2	10	
Iron	492	20.1	ng/m³ Air		467			5.19	10	
Lead	0.285	0.229	ng/m³ Air		0.258			9.69	10	
Magnesium	250	80.1	ng/m³ Air		243			2.89	10	
Manganese	14.4	0.988	ng/m³ Air		14.1			2.32	10	
Molybdenum	0.612	0.177	ng/m³ Air		0.594			2.96	10	QB-01
Nickel	ND	0.665	ng/m³ Air		ND				10	U
Phosphorus	ND	1040	ng/m³ Air		ND				10	GC-BS, U
Potassium	106	31.6	ng/m³ Air		111			4.71	10	
Rubidium	0.172	0.0152	ng/m³ Air		0.167			2.88	10	
Selenium	0.164	0.00914	ng/m³ Air		0.153			6.93	10	
Sodium	1920	1660	ng/m³ Air		1880			2.20	10	E, GC-BS
Strontium	3.77	0.542	ng/m³ Air		3.65			3.17	10	QB-01
Thallium	0.00129	4.18E-4	ng/m³ Air		0.00126			2.31	10	
Thorium	0.0139	0.00249	ng/m³ Air		0.0121			13.3	10	
Uranium	ND	0.0141	ng/m³ Air		ND				10	U
Vanadium	1.47	0.0409	ng/m³ Air		1.41			4.18	10	
Zinc	ND	81.2	ng/m³ Air		ND				10	U
Duplicate (B4A0205-DUP2)		**Source: 3122828-10**		Prepared & Analyzed: 01/02/24						
Aluminum	529	25.6	ng/m³ Air		529			0.00114	10	
Antimony	0.113	0.0351	ng/m³ Air		0.112			0.395	10	SL
Arsenic	0.209	0.00761	ng/m³ Air		0.209			0.311	10	
Barium	7.28	0.755	ng/m³ Air		7.29			0.206	10	
Beryllium	0.0175	0.00265	ng/m³ Air		0.0177			1.21	10	
Cadmium	ND	0.0869	ng/m³ Air		ND				10	U
Calcium	525	233	ng/m³ Air		521			0.750	10	LJ, QB-01

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CERTIFICATE OF ANALYSIS

Tetra Tech, Inc.
1777 Sentry Pkwy, Bldg 12
Blue Bell, PA 19422
ATTN: Ms. Chelsea Saber
PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 01/05/24 14:13
SUBMITTED: 12/28/23
AQS SITE CODE:
SITE CODE: Maui fires

Inorganics by Compendium Method IO-3.5 - Quality Control

Batch B4A0205 - ICP-MS Extraction

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Duplicate (B4A0205-DUP2) Continued	**Source: 3122828-10**		Prepared & Analyzed: 01/02/24							
Chromium	ND	1.62	ng/m³ Air		ND				10	U
Cobalt	0.311	0.0124	ng/m³ Air		0.313			0.667	10	QB-01
Copper	9.31	2.39	ng/m³ Air		9.25			0.646	10	
Iron	632	19.3	ng/m³ Air		635			0.546	10	
Lead	0.296	0.220	ng/m³ Air		0.299			1.02	10	
Magnesium	261	76.8	ng/m³ Air		260			0.667	10	
Manganese	18.3	0.948	ng/m³ Air		18.3			0.0661	10	
Molybdenum	0.608	0.170	ng/m³ Air		0.609			0.0869	10	QB-01
Nickel	0.689	0.638	ng/m³ Air		0.687			0.249	10	
Phosphorus	ND	996	ng/m³ Air		ND				10	GC-BS, U
Potassium	133	30.3	ng/m³ Air		132			0.936	10	
Rubidium	0.248	0.0146	ng/m³ Air		0.245			1.11	10	
Selenium	0.181	0.00877	ng/m³ Air		0.176			2.41	10	
Sodium	1950	1590	ng/m³ Air		1960			0.630	10	E, GC-BS
Strontium	4.41	0.520	ng/m³ Air		4.45			0.722	10	QB-01
Thallium	0.00140	4.01E-4	ng/m³ Air		0.00146			4.19	10	
Thorium	0.0194	0.00239	ng/m³ Air		0.0194			0.266	10	
Uranium	ND	0.0135	ng/m³ Air		0.0136				10	U
Vanadium	1.86	0.0392	ng/m³ Air		1.86			0.114	10	
Zinc	ND	77.9	ng/m³ Air		ND				10	U
Matrix Spike (B4A0205-MS1)	**Source: 3122828-09**		Prepared & Analyzed: 01/02/24							
Aluminum	426	26.7	ng/m³ Air	68.919	343	121	80-120			QM-4X
Antimony	0.850	0.0366	ng/m³ Air	1.1487	0.117	63.8	80-120			SL
Arsenic	2.40	0.00793	ng/m³ Air	2.2973	0.144	98.2	80-120			
Barium	28.9	0.787	ng/m³ Air	22.973	5.54	102	80-120			
Beryllium	1.07	0.00276	ng/m³ Air	1.1487	0.0136	92.1	80-120			
Cadmium	1.17	0.0905	ng/m³ Air	1.1487	ND	102	80-120			
Calcium	592	243	ng/m³ Air	57.433	516	132	80-120			LJ, QB-01, QM-4X
Chromium	13.3	1.69	ng/m³ Air	11.487	ND	116	80-120			
Cobalt	1.40	0.0130	ng/m³ Air	1.1487	0.268	98.9	80-120			QB-01
Copper	46.4	2.49	ng/m³ Air	22.973	18.1	123	80-120			QM-07
Iron	517	20.1	ng/m³ Air	22.973	467	217	80-120			QM-4X
Lead	11.8	0.229	ng/m³ Air	11.487	0.258	101	80-120			
Magnesium	274	80.1	ng/m³ Air	22.973	243	135	80-120			QM-4X
Manganese	21.7	0.988	ng/m³ Air	6.8919	14.1	111	80-120			
Molybdenum	1.71	0.177	ng/m³ Air	1.1487	0.594	97.2	80-120			QB-01
Nickel	2.94	0.665	ng/m³ Air	2.2973	ND	128	80-120			

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Blue Bell, PA 19422
ATTN: Ms. Chelsea Saber
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FILE #: 0000.00
REPORTED: 01/05/24 14:13
SUBMITTED: 12/28/23
AQS SITE CODE:
SITE CODE: Maui fires

Inorganics by Compendium Method IO-3.5 - Quality Control

Batch B4A0205 - ICP-MS Extraction

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Matrix Spike (B4A0205-MS1) Continued	**Source: 3122828-09**		Prepared & Analyzed: 01/02/24							
Phosphorus	ND	1040	ng/m³ Air	11.487	ND		80-120			GC-BS, U
Potassium	151	31.6	ng/m³ Air	45.946	111	88.2	80-120			
Rubidium	1.25	0.0152	ng/m³ Air	1.1487	0.167	94.1	80-120			
Selenium	2.40	0.00914	ng/m³ Air	2.2973	0.153	97.8	80-120			
Sodium	1980	1660	ng/m³ Air	45.946	1880	215	80-120			E, GC-BS, QM-4X
Strontium	4.89	0.542	ng/m³ Air	1.1487	3.65	108	80-120			QB-01
Thallium	0.115	4.18E-4	ng/m³ Air	0.11487	0.00126	98.7	80-120			
Thorium	0.0649	0.00249	ng/m³ Air	0.11487	0.0121	45.9	80-120			QM-07
Uranium	0.121	0.0141	ng/m³ Air	0.11487	ND	106	80-120			
Vanadium	3.76	0.0409	ng/m³ Air	2.2973	1.41	102	80-120			
Zinc	107	81.2	ng/m³ Air	68.919	ND	156	80-120			
Matrix Spike Dup (B4A0205-MSD1)	**Source: 3122828-09**		Prepared & Analyzed: 01/02/24							
Aluminum	430	26.7	ng/m³ Air	68.919	343	127	80-120	0.963	20	QM-4X
Antimony	0.830	0.0366	ng/m³ Air	1.1487	0.117	62.0	80-120	2.46	20	SL
Arsenic	2.37	0.00793	ng/m³ Air	2.2973	0.144	97.0	80-120	1.18	20	
Barium	28.8	0.787	ng/m³ Air	22.973	5.54	101	80-120	0.412	20	
Beryllium	1.09	0.00276	ng/m³ Air	1.1487	0.0136	94.1	80-120	2.12	20	
Cadmium	1.15	0.0905	ng/m³ Air	1.1487	ND	99.8	80-120	2.31	20	
Calcium	593	243	ng/m³ Air	57.433	516	134	80-120	0.245	20	LJ, QB-01, QM-4X
Chromium	13.1	1.69	ng/m³ Air	11.487	ND	114	80-120	1.68	20	
Cobalt	1.40	0.0130	ng/m³ Air	1.1487	0.268	98.1	80-120	0.658	20	QB-01
Copper	45.9	2.49	ng/m³ Air	22.973	18.1	121	80-120	0.946	20	QM-07
Iron	511	20.1	ng/m³ Air	22.973	467	189	80-120	1.26	20	QM-4X
Lead	11.7	0.229	ng/m³ Air	11.487	0.258	99.9	80-120	0.852	20	
Magnesium	277	80.1	ng/m³ Air	22.973	243	146	80-120	0.962	20	QM-4X
Manganese	21.9	0.988	ng/m³ Air	6.8919	14.1	113	80-120	0.609	20	
Molybdenum	1.67	0.177	ng/m³ Air	1.1487	0.594	93.6	80-120	2.46	20	QB-01
Nickel	2.92	0.665	ng/m³ Air	2.2973	ND	127	80-120	0.884	20	
Phosphorus	ND	1040	ng/m³ Air	11.487	ND		80-120		20	GC-BS, U
Potassium	144	31.6	ng/m³ Air	45.946	111	73.2	80-120	4.64	20	QM-07
Rubidium	1.24	0.0152	ng/m³ Air	1.1487	0.167	93.0	80-120	0.996	20	
Selenium	2.43	0.00914	ng/m³ Air	2.2973	0.153	99.1	80-120	1.24	20	
Sodium	2000	1660	ng/m³ Air	45.946	1880	265	80-120	1.17	20	E, GC-BS, QM-4X
Strontium	4.93	0.542	ng/m³ Air	1.1487	3.65	111	80-120	0.728	20	QB-01
Thallium	0.113	4.18E-4	ng/m³ Air	0.11487	0.00126	97.4	80-120	1.33	20	
Thorium	0.0625	0.00249	ng/m³ Air	0.11487	0.0121	43.8	80-120	3.78	20	QM-07

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PHONE: (703) 885-5495 **FAX:**

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REPORTED: 01/05/24 14:13
SUBMITTED: 12/28/23
AQS SITE CODE:
SITE CODE: Maui fires

Inorganics by Compendium Method IO-3.5 - Quality Control

Batch B4A0205 - ICP-MS Extraction

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Matrix Spike Dup (B4A0205-MSD1) Conti	**Source: 3122828-09**		Prepared & Analyzed: 01/02/24							
Uranium	0.120	0.0141	ng/m³ Air	0.11487	ND	104	80-120	1.42	20	
Vanadium	3.75	0.0409	ng/m³ Air	2.2973	1.41	102	80-120	0.226	20	
Zinc	106	81.2	ng/m³ Air	68.919	ND	154	80-120	0.996	20	
Post Spike (B4A0205-PS1)	**Source: 3122828-09**		Prepared & Analyzed: 01/02/24							
Aluminum	371	26.7	ng/m³ Air	22.973	343	123	75-125			
Antimony	0.346	0.0366	ng/m³ Air	0.22973	0.117	99.3	75-125			SL
Arsenic	1.26	0.00793	ng/m³ Air	1.1487	0.144	96.7	75-125			
Barium	7.90	0.787	ng/m³ Air	2.2973	5.54	102	75-125			
Beryllium	0.229	0.00276	ng/m³ Air	0.22973	0.0136	93.9	75-125			
Cadmium	0.123	0.0905	ng/m³ Air	0.11487	ND	107	75-125			
Calcium	558	243	ng/m³ Air	22.973	516	182	75-125			A-01, LJ, QB-01
Chromium	2.28	1.69	ng/m³ Air	1.1487	ND	198	75-125			
Cobalt	0.501	0.0130	ng/m³ Air	0.22973	0.268	101	75-125			QB-01
Copper	30.7	2.49	ng/m³ Air	11.487	18.1	110	75-125			
Iron	496	20.1	ng/m³ Air	22.973	467	126	75-125			A-01
Lead	23.1	0.229	ng/m³ Air	22.973	0.258	99.3	75-125			
Magnesium	269	80.1	ng/m³ Air	22.973	243	112	75-125			
Manganese	16.6	0.988	ng/m³ Air	2.2973	14.1	109	75-125			
Molybdenum	1.68	0.177	ng/m³ Air	1.1487	0.594	94.7	75-125			QB-01
Nickel	2.88	0.665	ng/m³ Air	2.2973	ND	125	75-125			
Phosphorus	ND	1040	ng/m³ Air	4.5946	ND		75-125			A-01, GC-BS, U
Potassium	134	31.6	ng/m³ Air	22.973	111	100	75-125			
Rubidium	0.270	0.0152	ng/m³ Air	0.11487	0.167	90.0	75-125			
Selenium	1.27	0.00914	ng/m³ Air	1.1487	0.153	97.3	75-125			
Sodium	1920	1660	ng/m³ Air	22.973	1880	185	75-125			A-01, E, GC-BS
Strontium	4.78	0.542	ng/m³ Air	1.1487	3.65	98.5	75-125			QB-01
Thallium	0.0559	4.18E-4	ng/m³ Air	5.7433E-2	0.00126	95.1	75-125			
Thorium	0.0663	0.00249	ng/m³ Air	5.7433E-2	0.0121	94.3	75-125			
Uranium	0.0649	0.0141	ng/m³ Air	5.7433E-2	ND	113	75-125			
Vanadium	2.55	0.0409	ng/m³ Air	1.1487	1.41	99.9	75-125			
Zinc	ND	81.2	ng/m³ Air	22.973	ND		75-125			U
Dilution Check (B4A0205-SRL1)	**Source: 3122828-09**		Prepared & Analyzed: 01/02/24							
Aluminum	329	133	ng/m³ Air		343			4.01	10	
Antimony	ND	0.183	ng/m³ Air		ND				10	SL, U
Arsenic	0.145	0.0397	ng/m³ Air		0.144			0.426	10	
Barium	5.38	3.94	ng/m³ Air		5.54			2.98	10	

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FILE #: 0000.00
REPORTED: 01/05/24 14:13
SUBMITTED: 12/28/23
AQS SITE CODE:
SITE CODE: Maui fires

Inorganics by Compendium Method IO-3.5 - Quality Control

Batch B4A0205 - ICP-MS Extraction

Dilution Check (B4A0205-SRL1) Continue Source: 3122828-09 Prepared & Analyzed: 01/02/24

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Beryllium	0.0150	0.0138	ng/m³ Air		ND			9.86	10	
Cadmium	ND	0.453	ng/m³ Air		ND				10	U
Calcium	ND	1210	ng/m³ Air		ND				10	LJ, QB-01, U
Chromium	ND	8.43	ng/m³ Air		ND				10	U
Cobalt	0.263	0.0648	ng/m³ Air		0.268			2.05	10	QB-01
Copper	17.8	12.5	ng/m³ Air		18.1			1.62	10	
Iron	455	101	ng/m³ Air		467			2.65	10	
Lead	ND	1.15	ng/m³ Air		ND				10	U
Magnesium	ND	400	ng/m³ Air		ND				10	U
Manganese	13.7	4.94	ng/m³ Air		14.1			2.95	10	
Molybdenum	ND	0.885	ng/m³ Air		ND				10	QB-01, U
Nickel	ND	3.33	ng/m³ Air		ND				10	U
Phosphorus	ND	5190	ng/m³ Air		ND				10	GC-BS, U
Potassium	ND	158	ng/m³ Air		ND				10	U
Rubidium	0.163	0.0760	ng/m³ Air		0.167			2.21	10	
Selenium	0.167	0.0457	ng/m³ Air		0.153			8.95	10	
Sodium	ND	8310	ng/m³ Air		ND				10	GC-BS, U
Strontium	3.57	2.71	ng/m³ Air		3.65			2.08	10	QB-01
Thallium	ND	0.00209	ng/m³ Air		ND				10	U
Thorium	ND	0.0125	ng/m³ Air		ND				10	U
Uranium	ND	0.0706	ng/m³ Air		ND				10	U
Vanadium	1.38	0.204	ng/m³ Air		1.41			1.78	10	
Zinc	ND	406	ng/m³ Air		ND				10	U

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REPORTED: 01/05/24 14:13
SUBMITTED: 12/28/23
AQS SITE CODE:
SITE CODE: Maui fires

Notes and Definitions

U	Under Detection Limit
SL	The spike recovery was outside acceptance limits. Reported value may be biased low.
QM-4X	The MS/MSD recovery exceeds criteria because the parent sample concentration is greater than 4x the spike concentration. Sample results for the QC batch were accepted based on acceptable BS/BSD recoveries.
QM-07	The spike recovery was outside acceptance limits for the MS and/or MSD. The batch was accepted based on acceptable LCS recovery.
QB-01	Analyte exceeds method blank criteria
LJ	Identification of analyte is acceptable; reported value is an estimate.
GC-BS	Compound exceeds Blank Spike Criteria
FB-01	Analyte exceeds Field Blank criteria.
E	The concentration indicated for this analyte is an estimated value above the calibration range of the instrument. This value is considered an estimate (CLP E-flag).
A-01	Parent sample >4x spike
ND	Analyte NOT DETECTED
NR	Not Reported
MDL	Method Detection Limit
RPD	Relative Percent Difference

Note: This test is accredited under the 2016 TNI Standard.

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Eastern Research Group
601 Keystone Park Drive
Suite 700
Morrisville, NC 27560

January 09, 2024

Ms. Chelsea Saber
Tetra Tech, Inc.
1777 Sentry Pkwy, Bldg 12
Blue Bell, PA 19422
Project Name: Maui fires

Dear Ms. Chelsea Saber,

This report contains the analytical results for the sample(s) received under chain(s) of custody by Eastern Research Group on 01/02/24 11:20 through 01/03/24 12:50.

Values below the MDL for QC results in this report are recorded as ND, however the actual values are reported in the accompanying Excel report with a "U" flag (Under the detection limit). The actual values are reported in AQS.

This test is accredited under the 2016 TNI Standard for Environmental Laboratories (FL DOH Certification # E87673). All analyses were performed as described in the US EPA-approved QAPP, under the contract for National Hazardous Air Pollutant Support (US EPA Contract No. 68HERH22D0002). This cover page is an integral part of this report, and any exceptions or comments are noted on the last page.

Release of the data contained in this data package and in the data submitted in the electronic data deliverable, has been authorized by the Program Manager, or the Program Manager's designee as verified by the following signature.

The issuance of the final Certificate of Analysis takes precedence over any previous Report. If you have any questions, please contact me at 919-468-7924.

Sincerely,

Julie Swift
Program Manager
julie.swift@erg.com

The information contained in this report and its attachment(s) are intended only for the use of the individual to whom it is addressed and may contain information that is privileged, confidential, or exempt from disclosure. If the reader of this message is not the intended recipient, you are hereby notified that any dissemination, distribution, or copying of this report is strictly prohibited. If you have received this report in error, please notify julie.swift@erg.com and delete the report without retaining any copies.

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1777 Sentry Pkwy, Bldg 12
Blue Bell, PA 19422
ATTN: Ms. Chelsea Saber
PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 01/09/24 12:34
SUBMITTED: 01/02/24 to 01/03/24
AQS SITE CODE:
SITE CODE: Maui fires

ANALYTICAL REPORT FOR SAMPLES

SampleName	LabNumber	Matrix	Sampled	Received
TetraTech Q9524471	4010214-01	Air	12/27/23 23:59	01/02/24 11:20
TetraTech Q9524470	4010214-02	Air	12/27/23 23:59	01/02/24 11:20
TetraTech Q9524472	4010214-03	Air	12/27/23 23:59	01/02/24 11:20
TetraTech Q9524467 FB	4010214-04	Air	12/27/23 00:00	01/02/24 11:20
TetraTech Q9524473	4010353-01	Air	12/28/23 23:59	01/03/24 12:50
TetraTech Q9524468	4010353-02	Air	12/28/23 23:59	01/03/24 12:50
TetraTech Q9524465	4010353-03	Air	12/28/23 23:59	01/03/24 12:50
TetraTech Q9524466	4010353-04	Air	12/29/23 23:59	01/03/24 12:50
TetraTech Q9524474	4010353-05	Air	12/29/23 23:59	01/03/24 12:50
TetraTech Q9524464	4010353-06	Air	12/29/23 23:59	01/03/24 12:50

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ATTN: Ms. Chelsea Saber
PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 01/09/24 12:34
SUBMITTED: 01/02/24 to 01/03/24
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9524471 **Lab ID:** 4010214-01 **Sampled:** 12/27/23 23:59
Matrix: Air **Sample Volume:** 2034.182 m³ **Received:** 01/02/24 11:20
Filter ID: **Analysis Date:** 01/04/24 19:48
Comments: MFK-AM01-122723-HM

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	**7429-90-5**	**189**		**25.7**
Antimony	**7440-36-0**	**0.0662**	SL	**0.0353**
Arsenic	**7440-38-2**	**0.0606**		**0.00764**
Barium	**7440-39-3**	**3.12**		**0.758**
Beryllium	**7440-41-7**	**0.00616**		**0.00266**
Cadmium	7440-43-9	0.00521	U	0.0872
Calcium	7440-70-2	214	GC-BS, LJ, QB-01, U	234
Chromium	7440-47-3	0.798	U	1.62
Cobalt	**7440-48-4**	**0.0886**	QB-01	**0.0125**
Copper	**7440-50-8**	**18.4**		**2.40**
Iron	**7439-89-6**	**203**		**19.4**
Lead	7439-92-1	0.205	U	0.221
Magnesium	7439-95-4	44.9	U	77.1
Manganese	**7439-96-5**	**5.59**		**0.952**
Molybdenum	**7439-98-7**	**0.614**	QB-01	**0.170**
Nickel	7440-02-0	0.589	U	0.641
Phosphorus	7723-14-0	186	GC-BS, U	1000
Potassium	**7440-09-7**	**48.7**		**30.4**
Rubidium	**7440-17-7**	**0.0902**		**0.0146**
Selenium	**7782-49-2**	**0.0336**		**0.00880**
Sodium	7440-23-5	567	GC-BS, U	1600
Strontium	**7440-24-6**	**1.17**	QB-01	**0.521**
Thallium	**7440-28-0**	**5.98E-4**		**4.02E-4**
Thorium	**7440-29-01**	**0.00491**		**0.00240**
Uranium	7440-61-1	0.00441	U	0.0136
Vanadium	**7440-62-2**	**0.477**		**0.0394**
Zinc	7440-66-6	27.9	U	78.1

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Tetra Tech, Inc.
1777 Sentry Pkwy, Bldg 12
Blue Bell, PA 19422
ATTN: Ms. Chelsea Saber
PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 01/09/24 12:34
SUBMITTED: 01/02/24 to 01/03/24
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9524470 **Lab ID:** 4010214-02 **Sampled:** 12/27/23 23:59
Matrix: Air **Sample Volume:** 1005.15 m³ **Received:** 01/02/24 11:20
Filter ID: **Analysis Date:** 01/04/24 17:16
Comments: MFK-AM02-122723-HM-MS-MSD

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	**7429-90-5**	**380**		**52.0**
Antimony	**7440-36-0**	**0.126**	SL	**0.0714**
Arsenic	**7440-38-2**	**0.198**		**0.0155**
Barium	**7440-39-3**	**5.72**		**1.53**
Beryllium	**7440-41-7**	**0.0134**		**0.00537**
Cadmium	7440-43-9	0.0441	U	0.176
Calcium	7440-70-2	459	A-01, GC-BS, LJ, QB-01, QM-4X, U	473
Chromium	7440-47-3	1.54	U	3.29
Cobalt	**7440-48-4**	**0.177**	QB-01	**0.0253**
Copper	**7440-50-8**	**25.0**	QM-07	**4.86**
Iron	**7439-89-6**	**406**		**39.2**
Lead	7439-92-1	0.274	U	0.447
Magnesium	7439-95-4	96.2	U	156
Manganese	**7439-96-5**	**11.1**		**1.93**
Molybdenum	**7439-98-7**	**1.44**	QB-01	**0.345**
Nickel	7440-02-0	0.569	U	1.30
Phosphorus	7723-14-0	369	GC-BS, QM-4X, U	2020
Potassium	**7440-09-7**	**119**	QM-07	**61.5**
Rubidium	**7440-17-7**	**0.193**		**0.0296**
Selenium	**7782-49-2**	**0.0744**		**0.0178**
Sodium	7440-23-5	1140	GC-BS, QM-4X, U	3240
Strontium	**7440-24-6**	**2.74**	QB-01	**1.06**
Thallium	**7440-28-0**	**0.00115**		**8.14E-4**
Thorium	**7440-29-01**	**0.0123**	QM-07	**0.00486**
Uranium	7440-61-1	0.00913	U	0.0275
Vanadium	**7440-62-2**	**1.01**		**0.0796**
Zinc	7440-66-6	52.3	U	158

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PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 01/09/24 12:34
SUBMITTED: 01/02/24 to 01/03/24
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9524472
Matrix: Air
Lab ID: 4010214-03
Sample Volume: 1028.79 m³
Filter ID:
Sampled: 12/27/23 23:59
Received: 01/02/24 11:20
Analysis Date: 01/04/24 20:07
Comments: MFK-AM03-122723-HM

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	**7429-90-5**	**390**		**50.8**
Antimony	**7440-36-0**	**0.168**	SL	**0.0697**
Arsenic	**7440-38-2**	**0.139**		**0.0151**
Barium	**7440-39-3**	**7.64**		**1.50**
Beryllium	**7440-41-7**	**0.0182**		**0.00525**
Cadmium	7440-43-9	0.00857	U	0.172
Calcium	7440-70-2	457	GC-BS, LJ, QB-01, U	462
Chromium	7440-47-3	1.56	U	3.21
Cobalt	**7440-48-4**	**0.205**	QB-01	**0.0247**
Copper	**7440-50-8**	**41.0**		**4.74**
Iron	**7439-89-6**	**460**		**38.3**
Lead	7439-92-1	0.271	U	0.436
Magnesium	7439-95-4	132	U	152
Manganese	**7439-96-5**	**14.0**		**1.88**
Molybdenum	**7439-98-7**	**2.46**	QB-01	**0.337**
Nickel	7440-02-0	0.665	U	1.27
Phosphorus	7723-14-0	370	GC-BS, U	1980
Potassium	**7440-09-7**	**191**		**60.1**
Rubidium	**7440-17-7**	**0.254**		**0.0289**
Selenium	**7782-49-2**	**0.0963**		**0.0174**
Sodium	7440-23-5	1260	GC-BS, U	3160
Strontium	**7440-24-6**	**3.46**	QB-01	**1.03**
Thallium	**7440-28-0**	**0.00129**		**7.95E-4**
Thorium	**7440-29-01**	**0.0142**		**0.00474**
Uranium	7440-61-1	0.00993	U	0.0269
Vanadium	**7440-62-2**	**1.12**		**0.0778**
Zinc	7440-66-6	50.5	U	155

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Blue Bell, PA 19422
ATTN: Ms. Chelsea Saber
PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 01/09/24 12:34
SUBMITTED: 01/02/24 to 01/03/24
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9524467 FB
Matrix: Air
Lab ID: 4010214-04
Sample Volume: 2034.182 m³
Filter ID:
Sampled: 12/27/23 00:00
Received: 01/02/24 11:20
Analysis Date: 01/04/24 20:21
Comments: MFK-FB01-122723-HM Field Blank

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	7429-90-5	9.36	U	25.7
Antimony	7440-36-0	0.0145	SL, U	0.0353
Arsenic	7440-38-2	0.00300	U	0.00764
Barium	**7440-39-3**	**0.955**	FB-01	**0.758**
Beryllium	7440-41-7	5.60E-4	U	0.00266
Cadmium	7440-43-9	0.00214	U	0.0872
Calcium	7440-70-2	138	GC-BS, LJ, QB-01, U	234
Chromium	7440-47-3	0.638	U	1.62
Cobalt	7440-48-4	0.00787	QB-01, U	0.0125
Copper	7440-50-8	0.206	U	2.40
Iron	7439-89-6	11.3	U	19.4
Lead	7439-92-1	0.0345	U	0.221
Magnesium	7439-95-4	22.0	U	77.1
Manganese	7439-96-5	0.151	U	0.952
Molybdenum	7439-98-7	0.0872	QB-01, U	0.170
Nickel	7440-02-0	0.238	U	0.641
Phosphorus	7723-14-0	155	GC-BS, U	1000
Potassium	7440-09-7	10.9	U	30.4
Rubidium	7440-17-7	0.00669	U	0.0146
Selenium	7782-49-2	ND	U	0.00880
Sodium	7440-23-5	502	GC-BS, U	1600
Strontium	7440-24-6	0.337	QB-01, U	0.521
Thallium	7440-28-0	1.97E-4	U	4.02E-4
Thorium	7440-29-01	0.00199	U	0.00240
Uranium	7440-61-1	6.31E-4	U	0.0136
Vanadium	7440-62-2	0.0113	U	0.0394
Zinc	7440-66-6	18.9	U	78.1

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Blue Bell, PA 19422
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PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 01/09/24 12:34
SUBMITTED: 01/02/24 to 01/03/24
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9524473 **Lab ID:** 4010353-01 **Sampled:** 12/28/23 23:59
Matrix: Air **Sample Volume:** 2057.307 m³ **Received:** 01/03/24 12:50
Filter ID: **Analysis Date:** 01/04/24 20:36
Comments: MFK-AM01-122823-HM

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	**7429-90-5**	**182**		**25.4**
Antimony	**7440-36-0**	**0.0587**	SL	**0.0349**
Arsenic	**7440-38-2**	**0.0749**		**0.00755**
Barium	**7440-39-3**	**2.69**		**0.750**
Beryllium	**7440-41-7**	**0.00613**		**0.00263**
Cadmium	7440-43-9	0.00639	U	0.0862
Calcium	**7440-70-2**	**296**	GC-BS, LJ, QB-01	**231**
Chromium	7440-47-3	0.791	U	1.61
Cobalt	**7440-48-4**	**0.0860**	QB-01	**0.0123**
Copper	**7440-50-8**	**17.5**		**2.37**
Iron	**7439-89-6**	**203**		**19.1**
Lead	7439-92-1	0.207	U	0.218
Magnesium	**7439-95-4**	**169**		**76.2**
Manganese	**7439-96-5**	**5.25**		**0.941**
Molybdenum	**7439-98-7**	**0.584**	QB-01	**0.168**
Nickel	7440-02-0	0.352	U	0.633
Phosphorus	7723-14-0	181	GC-BS, U	989
Potassium	**7440-09-7**	**81.8**		**30.1**
Rubidium	**7440-17-7**	**0.102**		**0.0145**
Selenium	**7782-49-2**	**0.0917**		**0.00870**
Sodium	7440-23-5	1550	GC-BS, U	1580
Strontium	**7440-24-6**	**1.95**	QB-01	**0.516**
Thallium	**7440-28-0**	**6.94E-4**		**3.98E-4**
Thorium	**7440-29-01**	**0.00575**		**0.00237**
Uranium	7440-61-1	0.00511	U	0.0134
Vanadium	**7440-62-2**	**0.637**		**0.0389**
Zinc	7440-66-6	22.8	U	77.3

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Blue Bell, PA 19422
ATTN: Ms. Chelsea Saber
PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 01/09/24 12:34
SUBMITTED: 01/02/24 to 01/03/24
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9524468 **Lab ID:** 4010353-02 **Sampled:** 12/28/23 23:59
Matrix: Air **Sample Volume:** 2153.885 m³ **Received:** 01/03/24 12:50
Filter ID: **Analysis Date:** 01/04/24 20:51
Comments: MFK-AM02-122823-HM

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	**7429-90-5**	**258**		**24.2**
Antimony	**7440-36-0**	**0.0586**	SL	**0.0333**
Arsenic	**7440-38-2**	**0.0820**		**0.00721**
Barium	**7440-39-3**	**3.47**		**0.716**
Beryllium	**7440-41-7**	**0.00848**		**0.00251**
Cadmium	7440-43-9	0.00535	U	0.0823
Calcium	**7440-70-2**	**277**	GC-BS, LJ, QB-01	**221**
Chromium	7440-47-3	0.787	U	1.53
Cobalt	**7440-48-4**	**0.102**	QB-01	**0.0118**
Copper	**7440-50-8**	**10.0**		**2.27**
Iron	**7439-89-6**	**268**		**18.3**
Lead	7439-92-1	0.195	U	0.208
Magnesium	**7439-95-4**	**191**		**72.8**
Manganese	**7439-96-5**	**6.63**		**0.899**
Molybdenum	**7439-98-7**	**0.626**	QB-01	**0.161**
Nickel	7440-02-0	0.376	U	0.605
Phosphorus	7723-14-0	176	GC-BS, U	944
Potassium	**7440-09-7**	**91.2**		**28.7**
Rubidium	**7440-17-7**	**0.114**		**0.0138**
Selenium	**7782-49-2**	**0.113**		**0.00831**
Sodium	**7440-23-5**	**1710**	E, GC-BS	**1510**
Strontium	**7440-24-6**	**2.27**	QB-01	**0.493**
Thallium	**7440-28-0**	**8.09E-4**		**3.80E-4**
Thorium	**7440-29-01**	**0.00754**		**0.00227**
Uranium	7440-61-1	0.00661	U	0.0128
Vanadium	**7440-62-2**	**0.771**		**0.0372**
Zinc	7440-66-6	19.9	U	73.8

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1777 Sentry Pkwy, Bldg 12
Blue Bell, PA 19422
ATTN: Ms. Chelsea Saber
PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 01/09/24 12:34
SUBMITTED: 01/02/24 to 01/03/24
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9524465 **Lab ID:** 4010353-03 **Sampled:** 12/28/23 23:59
Matrix: Air **Sample Volume:** 2322.877 m³ **Received:** 01/03/24 12:50
Filter ID: **Analysis Date:** 01/04/24 21:05
Comments: MFK-AM03-122823-HM

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	**7429-90-5**	**385**		**22.5**
Antimony	**7440-36-0**	**0.0902**	SL	**0.0309**
Arsenic	**7440-38-2**	**0.109**		**0.00669**
Barium	**7440-39-3**	**6.11**		**0.664**
Beryllium	**7440-41-7**	**0.0177**		**0.00233**
Cadmium	7440-43-9	0.00942	U	0.0763
Calcium	**7440-70-2**	**308**	GC-BS, LJ, QB-01	**205**
Chromium	7440-47-3	0.907	U	1.42
Cobalt	**7440-48-4**	**0.187**	QB-01	**0.0109**
Copper	**7440-50-8**	**19.4**		**2.10**
Iron	**7439-89-6**	**463**		**17.0**
Lead	**7439-92-1**	**0.574**		**0.193**
Magnesium	**7439-95-4**	**223**		**67.5**
Manganese	**7439-96-5**	**14.7**		**0.834**
Molybdenum	**7439-98-7**	**0.705**	QB-01	**0.149**
Nickel	7440-02-0	0.436	U	0.561
Phosphorus	7723-14-0	193	GC-BS, U	876
Potassium	**7440-09-7**	**113**		**26.6**
Rubidium	**7440-17-7**	**0.171**		**0.0128**
Selenium	**7782-49-2**	**0.143**		**0.00770**
Sodium	**7440-23-5**	**1780**	E, GC-BS	**1400**
Strontium	**7440-24-6**	**3.59**	QB-01	**0.457**
Thallium	**7440-28-0**	**0.00140**		**3.52E-4**
Thorium	**7440-29-01**	**0.0120**		**0.00210**
Uranium	**7440-61-1**	**0.0124**		**0.0119**
Vanadium	**7440-62-2**	**1.08**		**0.0345**
Zinc	7440-66-6	23.7	U	68.4

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Tetra Tech, Inc.
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Blue Bell, PA 19422
ATTN: Ms. Chelsea Saber
PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 01/09/24 12:34
SUBMITTED: 01/02/24 to 01/03/24
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9524466 **Lab ID:** 4010353-04 **Sampled:** 12/29/23 23:59
Matrix: Air **Sample Volume:** 1666.744 m³ **Received:** 01/03/24 12:50
Filter ID: **Analysis Date:** 01/04/24 21:21
Comments: MFK-AM01-122923-HM

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	**7429-90-5**	**360**		**31.3**
Antimony	**7440-36-0**	**0.0919**	SL	**0.0430**
Arsenic	**7440-38-2**	**0.0788**		**0.00932**
Barium	**7440-39-3**	**5.22**		**0.925**
Beryllium	**7440-41-7**	**0.0128**		**0.00324**
Cadmium	7440-43-9	0.0242	U	0.106
Calcium	**7440-70-2**	**300**	GC-BS, LJ, QB-01	**285**
Chromium	7440-47-3	1.34	U	1.98
Cobalt	**7440-48-4**	**0.192**	QB-01	**0.0152**
Copper	**7440-50-8**	**21.1**		**2.93**
Iron	**7439-89-6**	**402**		**23.6**
Lead	**7439-92-1**	**0.343**		**0.269**
Magnesium	**7439-95-4**	**151**		**94.1**
Manganese	**7439-96-5**	**11.1**		**1.16**
Molybdenum	**7439-98-7**	**0.678**	QB-01	**0.208**
Nickel	7440-02-0	0.546	U	0.782
Phosphorus	7723-14-0	230	GC-BS, U	1220
Potassium	**7440-09-7**	**70.4**		**37.1**
Rubidium	**7440-17-7**	**0.147**		**0.0179**
Selenium	**7782-49-2**	**0.112**		**0.0107**
Sodium	7440-23-5	1390	GC-BS, U	1950
Strontium	**7440-24-6**	**2.59**	QB-01	**0.636**
Thallium	**7440-28-0**	**9.29E-4**		**4.91E-4**
Thorium	**7440-29-01**	**0.00998**		**0.00293**
Uranium	7440-61-1	0.00847	U	0.0166
Vanadium	**7440-62-2**	**0.939**		**0.0480**
Zinc	7440-66-6	26.3	U	95.4

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1777 Sentry Pkwy, Bldg 12
Blue Bell, PA 19422
ATTN: Ms. Chelsea Saber
PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 01/09/24 12:34
SUBMITTED: 01/02/24 to 01/03/24
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9524474 **Lab ID:** 4010353-05 **Sampled:** 12/29/23 23:59
Matrix: Air **Sample Volume:** 1804.992 m³ **Received:** 01/03/24 12:50
Filter ID: **Analysis Date:** 01/04/24 21:36
Comments: MFK-AM02-122923-HM

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	**7429-90-5**	**342**		**28.9**
Antimony	**7440-36-0**	**0.0744**	SL	**0.0398**
Arsenic	**7440-38-2**	**0.107**		**0.00861**
Barium	**7440-39-3**	**4.77**		**0.855**
Beryllium	**7440-41-7**	**0.0110**		**0.00299**
Cadmium	7440-43-9	0.00588	U	0.0983
Calcium	**7440-70-2**	**284**	GC-BS, LJ, QB-01	**263**
Chromium	7440-47-3	0.984	U	1.83
Cobalt	**7440-48-4**	**0.154**	QB-01	**0.0141**
Copper	**7440-50-8**	**14.1**		**2.70**
Iron	**7439-89-6**	**374**		**21.8**
Lead	**7439-92-1**	**0.286**		**0.249**
Magnesium	**7439-95-4**	**137**		**86.9**
Manganese	**7439-96-5**	**10.2**		**1.07**
Molybdenum	**7439-98-7**	**0.696**	QB-01	**0.192**
Nickel	7440-02-0	0.371	U	0.722
Phosphorus	7723-14-0	212	GC-BS, U	1130
Potassium	**7440-09-7**	**71.4**		**34.3**
Rubidium	**7440-17-7**	**0.148**		**0.0165**
Selenium	**7782-49-2**	**0.105**		**0.00992**
Sodium	7440-23-5	1290	GC-BS, U	1800
Strontium	**7440-24-6**	**2.51**	QB-01	**0.588**
Thallium	**7440-28-0**	**7.90E-4**		**4.53E-4**
Thorium	**7440-29-01**	**0.0107**		**0.00270**
Uranium	7440-61-1	0.00786	U	0.0153
Vanadium	**7440-62-2**	**0.863**		**0.0443**
Zinc	7440-66-6	22.1	U	88.1

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CERTIFICATE OF ANALYSIS

Tetra Tech, Inc.
1777 Sentry Pkwy, Bldg 12
Blue Bell, PA 19422
ATTN: Ms. Chelsea Saber
PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 01/09/24 12:34
SUBMITTED: 01/02/24 to 01/03/24
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9524464
Matrix: Air
Lab ID: 4010353-06
Sample Volume: 1934.288 m³
Filter ID:
Sampled: 12/29/23 23:59
Received: 01/03/24 12:50
Analysis Date: 01/04/24 21:51
Comments: MFK-AM03-122923-HM

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	**7429-90-5**	**298**		**27.0**
Antimony	**7440-36-0**	**0.0939**	SL	**0.0371**
Arsenic	**7440-38-2**	**0.0616**		**0.00803**
Barium	**7440-39-3**	**4.96**		**0.797**
Beryllium	**7440-41-7**	**0.0129**		**0.00279**
Cadmium	7440-43-9	0.00639	U	0.0917
Calcium	**7440-70-2**	**255**	GC-BS, LJ, QB-01	**246**
Chromium	7440-47-3	0.952	U	1.71
Cobalt	**7440-48-4**	**0.147**	QB-01	**0.0131**
Copper	**7440-50-8**	**12.4**		**2.52**
Iron	**7439-89-6**	**339**		**20.4**
Lead	7439-92-1	0.219	U	0.232
Magnesium	**7439-95-4**	**123**		**81.1**
Manganese	**7439-96-5**	**10.5**		**1.00**
Molybdenum	**7439-98-7**	**0.728**	QB-01	**0.179**
Nickel	7440-02-0	0.333	U	0.674
Phosphorus	7723-14-0	206	GC-BS, U	1050
Potassium	**7440-09-7**	**66.1**		**32.0**
Rubidium	**7440-17-7**	**0.131**		**0.0154**
Selenium	**7782-49-2**	**0.0899**		**0.00925**
Sodium	7440-23-5	1140	GC-BS, U	1680
Strontium	**7440-24-6**	**2.45**	QB-01	**0.548**
Thallium	**7440-28-0**	**8.04E-4**		**4.23E-4**
Thorium	**7440-29-01**	**0.0103**		**0.00252**
Uranium	7440-61-1	0.00748	U	0.0143
Vanadium	**7440-62-2**	**0.748**		**0.0414**
Zinc	7440-66-6	22.4	U	82.2

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Inorganics by Compendium Method IO-3.5 - Quality Control

Batch 2401011 - B4A0401

Calibration Blank (2401011-CCB1) Prepared & Analyzed: 01/04/24

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Aluminum	-79.4		ng/l							U
Antimony	0.720		ng/l							
Arsenic	1.07		ng/l							
Barium	0.862		ng/l							
Beryllium	0.151		ng/l							
Cadmium	0.116		ng/l							
Calcium	519		ng/l							
Chromium	3.39		ng/l							
Cobalt	0.164		ng/l							
Copper	10.6		ng/l							
Iron	24.2		ng/l							
Lead	3.74		ng/l							
Magnesium	19.9		ng/l							
Manganese	4.26		ng/l							
Molybdenum	11.6		ng/l							
Nickel	0.362		ng/l							
Phosphorus	-266		ng/l							U
Potassium	-727		ng/l							U
Rubidium	-0.296		ng/l							U
Selenium	-14.3		ng/l							U
Sodium	-187		ng/l							U
Strontium	-0.112		ng/l							U
Thallium	0.609		ng/l							
Thorium	0.298		ng/l							
Uranium	-0.00246		ng/l							U
Vanadium	-28.1		ng/l							U
Zinc	-42.8		ng/l							U

Calibration Blank (2401011-CCB2) Prepared & Analyzed: 01/04/24

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Aluminum	-91.1		ng/l							U
Antimony	1.09		ng/l							
Arsenic	7.75		ng/l							
Barium	4.87		ng/l							
Beryllium	0.507		ng/l							
Cadmium	0.566		ng/l							
Calcium	643		ng/l							
Chromium	6.13		ng/l							
Cobalt	1.24		ng/l							
Copper	59.3		ng/l							

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Inorganics by Compendium Method IO-3.5 - Quality Control

Batch 2401011 - B4A0401

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Calibration Blank (2401011-CCB2) Contin				Prepared & Analyzed: 01/04/24						
Iron	-42.4		ng/l							U
Lead	12.4		ng/l							
Magnesium	17.5		ng/l							
Manganese	14.0		ng/l							
Molybdenum	11.1		ng/l							
Nickel	2.85		ng/l							
Phosphorus	118		ng/l							
Potassium	-662		ng/l							U
Rubidium	0.235		ng/l							
Selenium	-7.96		ng/l							U
Sodium	-161		ng/l							U
Strontium	2.34		ng/l							
Thallium	1.20		ng/l							
Thorium	0.569		ng/l							
Uranium	0.00481		ng/l							
Vanadium	-36.0		ng/l							U
Zinc	-45.0		ng/l							U
Calibration Blank (2401011-CCB3)				Prepared & Analyzed: 01/04/24						
Aluminum	-64.4		ng/l							U
Antimony	0.991		ng/l							
Arsenic	6.08		ng/l							
Barium	0.616		ng/l							
Beryllium	0.686		ng/l							
Cadmium	0.192		ng/l							
Calcium	154		ng/l							
Chromium	2.05		ng/l							
Cobalt	0.384		ng/l							
Copper	20.0		ng/l							
Iron	143		ng/l							
Lead	6.33		ng/l							
Magnesium	-14.9		ng/l							U
Manganese	2.92		ng/l							
Molybdenum	9.85		ng/l							
Nickel	1.02		ng/l							
Phosphorus	-187		ng/l							U
Potassium	-114		ng/l							U
Rubidium	-0.0106		ng/l							U
Selenium	9.65		ng/l							

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Batch 2401011 - B4A0401

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Calibration Blank (2401011-CCB3) Contin				Prepared & Analyzed: 01/04/24						
Sodium	-53.6		ng/l							U
Strontium	0.510		ng/l							
Thallium	1.19		ng/l							
Thorium	0.578		ng/l							
Uranium	0.0107		ng/l							
Vanadium	-38.9		ng/l							U
Zinc	102		ng/l							
Calibration Check (2401011-CCV1)				Prepared & Analyzed: 01/04/24						
Aluminum	1.49E6		ng/l	1.5000E6		99.2	90-110			
Antimony	19200		ng/l	20000		96.0	90-110			
Arsenic	19500		ng/l	20000		97.6	90-110			
Barium	195000		ng/l	200000		97.3	90-110			
Beryllium	4960		ng/l	5000.0		99.2	90-110			
Cadmium	19400		ng/l	20000		97.1	90-110			
Calcium	2.44E7		ng/l	2.5000E7		97.5	90-110			
Chromium	230000		ng/l	240000		95.8	90-110			
Cobalt	49600		ng/l	50000		99.2	90-110			
Copper	1.99E6		ng/l	2.0000E6		99.7	90-110			
Iron	2.46E6		ng/l	2.5000E6		98.5	90-110			
Lead	193000		ng/l	200000		96.5	90-110			
Magnesium	990000		ng/l	1.0000E6		99.0	90-110			
Manganese	493000		ng/l	500000		98.7	90-110			
Molybdenum	48500		ng/l	50000		97.0	90-110			
Nickel	119000		ng/l	120000		99.0	90-110			
Phosphorus	196000		ng/l	200000		98.0	90-110			
Potassium	2.45E6		ng/l	2.5000E6		97.9	90-110			
Rubidium	9780		ng/l	10000		97.8	90-110			
Selenium	19800		ng/l	20000		98.9	90-110			
Sodium	2.51E6		ng/l	2.5000E6		101	90-110			
Strontium	48500		ng/l	50000		97.0	90-110			
Thallium	474		ng/l	500.00		94.8	90-110			
Thorium	471		ng/l	500.00		94.2	90-110			
Uranium	472		ng/l	500.00		94.5	90-110			
Vanadium	19200		ng/l	20000		96.2	90-110			
Zinc	511000		ng/l	500000		102	90-110			
Calibration Check (2401011-CCV2)				Prepared & Analyzed: 01/04/24						
Aluminum	1.49E6		ng/l	1.5000E6		99.0	90-110			
Antimony	20000		ng/l	20000		100	90-110			

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Inorganics by Compendium Method IO-3.5 - Quality Control

Batch 2401011 - B4A0401

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Calibration Check (2401011-CCV2) Contin				Prepared & Analyzed: 01/04/24						
Arsenic	20000		ng/l	20000		100	90-110			
Barium	201000		ng/l	200000		100	90-110			
Beryllium	5230		ng/l	5000.0		105	90-110			
Cadmium	20100		ng/l	20000		100	90-110			
Calcium	2.50E7		ng/l	2.5000E7		100	90-110			
Chromium	249000		ng/l	240000		104	90-110			
Cobalt	49800		ng/l	50000		99.6	90-110			
Copper	2.05E6		ng/l	2.0000E6		102	90-110			
Iron	2.48E6		ng/l	2.5000E6		99.4	90-110			
Lead	200000		ng/l	200000		100	90-110			
Magnesium	998000		ng/l	1.0000E6		99.8	90-110			
Manganese	496000		ng/l	500000		99.3	90-110			
Molybdenum	49900		ng/l	50000		99.9	90-110			
Nickel	120000		ng/l	120000		100	90-110			
Phosphorus	193000		ng/l	200000		96.6	90-110			
Potassium	2.45E6		ng/l	2.5000E6		97.9	90-110			
Rubidium	9980		ng/l	10000		99.8	90-110			
Selenium	20100		ng/l	20000		100	90-110			
Sodium	2.55E6		ng/l	2.5000E6		102	90-110			
Strontium	49900		ng/l	50000		99.7	90-110			
Thallium	484		ng/l	500.00		96.8	90-110			
Thorium	490		ng/l	500.00		97.9	90-110			
Uranium	488		ng/l	500.00		97.6	90-110			
Vanadium	19900		ng/l	20000		99.5	90-110			
Zinc	523000		ng/l	500000		105	90-110			
Calibration Check (2401011-CCV3)				Prepared & Analyzed: 01/04/24						
Aluminum	1.50E6		ng/l	1.5000E6		100	90-110			
Antimony	20000		ng/l	20000		100	90-110			
Arsenic	20000		ng/l	20000		99.9	90-110			
Barium	200000		ng/l	200000		99.9	90-110			
Beryllium	5240		ng/l	5000.0		105	90-110			
Cadmium	20100		ng/l	20000		101	90-110			
Calcium	2.50E7		ng/l	2.5000E7		99.9	90-110			
Chromium	255000		ng/l	240000		106	90-110			
Cobalt	49900		ng/l	50000		99.8	90-110			
Copper	2.05E6		ng/l	2.0000E6		103	90-110			
Iron	2.49E6		ng/l	2.5000E6		99.7	90-110			
Lead	198000		ng/l	200000		99.2	90-110			

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Inorganics by Compendium Method IO-3.5 - Quality Control

Batch 2401011 - B4A0401

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Calibration Check (2401011-CCV3) Contin				Prepared & Analyzed: 01/04/24						
Magnesium	1.01E6		ng/l	1.0000E6		101	90-110			
Manganese	501000		ng/l	500000		100	90-110			
Molybdenum	50000		ng/l	50000		99.9	90-110			
Nickel	121000		ng/l	120000		101	90-110			
Phosphorus	201000		ng/l	200000		100	90-110			
Potassium	2.46E6		ng/l	2.5000E6		98.5	90-110			
Rubidium	9980		ng/l	10000		99.8	90-110			
Selenium	20100		ng/l	20000		100	90-110			
Sodium	2.56E6		ng/l	2.5000E6		102	90-110			
Strontium	49900		ng/l	50000		99.8	90-110			
Thallium	475		ng/l	500.00		94.9	90-110			
Thorium	483		ng/l	500.00		96.7	90-110			
Uranium	486		ng/l	500.00		97.2	90-110			
Vanadium	20100		ng/l	20000		100	90-110			
Zinc	525000		ng/l	500000		105	90-110			
High Cal Check (2401011-HCV1)				Prepared & Analyzed: 01/04/24						
Aluminum	2.96E6		ng/l	3.0000E6		98.6	95-105			
Antimony	39700		ng/l	40000		99.3	95-105			
Arsenic	39700		ng/l	40000		99.2	95-105			
Barium	399000		ng/l	400000		99.8	95-105			
Beryllium	10200		ng/l	10000		102	95-105			
Cadmium	39200		ng/l	40000		98.1	95-105			
Calcium	4.97E7		ng/l	5.0000E7		99.4	95-105			
Chromium	476000		ng/l	480000		99.1	95-105			
Cobalt	98600		ng/l	100000		98.6	95-105			
Copper	3.95E6		ng/l	4.0000E6		98.7	95-105			
Iron	4.96E6		ng/l	5.0000E6		99.2	95-105			
Lead	396000		ng/l	400000		99.1	95-105			
Magnesium	1.96E6		ng/l	2.0000E6		98.0	95-105			
Manganese	996000		ng/l	1.0000E6		99.6	95-105			
Molybdenum	99500		ng/l	100000		99.5	95-105			
Nickel	236000		ng/l	240000		98.3	95-105			
Phosphorus	405000		ng/l	400000		101	95-105			
Potassium	4.94E6		ng/l	5.0000E6		98.8	95-105			
Rubidium	20000		ng/l	20000		100	95-105			
Selenium	40100		ng/l	40000		100	95-105			
Sodium	4.92E6		ng/l	5.0000E6		98.3	95-105			
Strontium	99800		ng/l	100000		99.8	95-105			

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Inorganics by Compendium Method IO-3.5 - Quality Control

Batch 2401011 - B4A0401

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
High Cal Check (2401011-HCV1) Continue				Prepared & Analyzed: 01/04/24						
Thallium	986		ng/l	1000.0		98.6	95-105			
Thorium	990		ng/l	1000.0		99.0	95-105			
Uranium	989		ng/l	1000.0		98.9	95-105			
Vanadium	39800		ng/l	40000		99.5	95-105			
Zinc	1.03E6		ng/l	1.0000E6		103	95-105			
Initial Cal Blank (2401011-ICB1)				Prepared & Analyzed: 01/04/24						
Aluminum	-108		ng/l							U
Antimony	1.04		ng/l							
Arsenic	2.89		ng/l							
Barium	0.485		ng/l							
Beryllium	0.249		ng/l							
Cadmium	0.325		ng/l							
Calcium	-524		ng/l							U
Chromium	5.47		ng/l							
Cobalt	0.189		ng/l							
Copper	18.4		ng/l							
Iron	29.6		ng/l							
Lead	12.7		ng/l							
Magnesium	-13.2		ng/l							U
Manganese	6.41		ng/l							
Molybdenum	15.5		ng/l							
Nickel	1.13		ng/l							
Phosphorus	122		ng/l							
Potassium	-1030		ng/l							U
Rubidium	0.297		ng/l							
Selenium	-12.0		ng/l							U
Sodium	-350		ng/l							U
Strontium	0.414		ng/l							
Thallium	0.690		ng/l							
Thorium	0.601		ng/l							
Uranium	0.00365		ng/l							
Vanadium	-32.9		ng/l							U
Zinc	-7.45		ng/l							U
Initial Cal Check (2401011-ICV1)				Prepared & Analyzed: 01/04/24						
Aluminum	1.47E6		ng/l	1.5000E6		98.0	90-110			
Antimony	19700		ng/l	20000		98.3	90-110			
Arsenic	19900		ng/l	20000		99.4	90-110			
Barium	200000		ng/l	200000		99.8	90-110			

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Inorganics by Compendium Method IO-3.5 - Quality Control

Batch 2401011 - B4A0401

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Initial Cal Check (2401011-ICV1) Continu				Prepared & Analyzed: 01/04/24						
Beryllium	5130		ng/l	5000.0		103	90-110			
Cadmium	20400		ng/l	20000		102	90-110			
Calcium	2.46E7		ng/l	2.5000E7		98.3	90-110			
Chromium	242000		ng/l	240000		101	90-110			
Cobalt	49800		ng/l	50000		99.5	90-110			
Copper	2.03E6		ng/l	2.0000E6		101	90-110			
Iron	2.51E6		ng/l	2.5000E6		100	90-110			
Lead	197000		ng/l	200000		98.5	90-110			
Magnesium	992000		ng/l	1.0000E6		99.2	90-110			
Manganese	495000		ng/l	500000		99.1	90-110			
Molybdenum	49500		ng/l	50000		98.9	90-110			
Nickel	119000		ng/l	120000		98.9	90-110			
Phosphorus	192000		ng/l	200000		96.2	90-110			
Potassium	2.50E6		ng/l	2.5000E6		99.9	90-110			
Rubidium	9750		ng/l	10000		97.5	90-110			
Selenium	20500		ng/l	20000		102	90-110			
Sodium	2.56E6		ng/l	2.5000E6		102	90-110			
Strontium	50400		ng/l	50000		101	90-110			
Thallium	488		ng/l	500.00		97.5	90-110			
Thorium	482		ng/l	500.00		96.3	90-110			
Uranium	490		ng/l	500.00		98.0	90-110			
Vanadium	20200		ng/l	20000		101	90-110			
Zinc	527000		ng/l	500000		105	90-110			
Interference Check A (2401011-IFA1)				Prepared & Analyzed: 01/04/24						
Aluminum	1.42E7		ng/l	1.5000E7		94.4	80-120			
Antimony	0.00		ng/l				80-120			U
Arsenic	0.00		ng/l				80-120			U
Barium	0.00		ng/l				80-120			U
Beryllium	0.00		ng/l				80-120			U
Cadmium	0.00		ng/l				80-120			U
Calcium	9.78E7		ng/l	1.0040E8		97.4	80-120			
Chromium	0.00		ng/l				80-120			U
Cobalt	0.00		ng/l				80-120			U
Copper	0.00		ng/l				80-120			U
Iron	1.41E7		ng/l	1.5000E7		94.3	80-120			
Lead	0.00		ng/l				80-120			U
Magnesium	1.49E7		ng/l	1.5000E7		99.6	80-120			
Manganese	0.00		ng/l				80-120			U

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ERG

Tetra Tech, Inc.
1777 Sentry Pkwy, Bldg 12
Blue Bell, PA 19422
ATTN: Ms. Chelsea Saber
PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 01/09/24 12:34
SUBMITTED: 01/02/24 to 01/03/24
AQS SITE CODE:
SITE CODE: Maui fires

Inorganics by Compendium Method IO-3.5 - Quality Control

Batch 2401011 - B4A0401

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Interference Check A (2401011-IFA1) Co				Prepared & Analyzed: 01/04/24						
Molybdenum	291000		ng/l	300000		96.8	80-120			
Nickel	0.00		ng/l				80-120			U
Phosphorus	1.55E7		ng/l	1.5000E7		103	80-120			
Potassium	1.41E7		ng/l	1.5000E7		94.0	80-120			
Rubidium	0.00		ng/l				80-120			U
Selenium	0.00		ng/l				80-120			U
Sodium	1.51E7		ng/l	1.5000E7		101	80-120			
Strontium	0.00		ng/l				80-120			U
Thallium	0.00		ng/l				80-120			U
Thorium	0.00		ng/l				80-120			U
Uranium	0.00		ng/l				80-120			U
Vanadium	0.00		ng/l				80-120			U
Zinc	0.00		ng/l				80-120			U
Interference Check B (2401011-IFB1)				Prepared & Analyzed: 01/04/24						
Aluminum	1.60E7		ng/l	1.6500E7		97.0	80-120			
Antimony	19900		ng/l	20000		99.4	80-120			
Arsenic	20000		ng/l	20000		99.8	80-120			
Barium	201000		ng/l	200000		100	80-120			
Beryllium	5040		ng/l	5000.0		101	80-120			
Cadmium	19200		ng/l	20000		95.9	80-120			
Calcium	1.16E8		ng/l	1.2540E8		92.2	80-120			
Chromium	228000		ng/l	240000		95.2	80-120			
Cobalt	48600		ng/l	50000		97.2	80-120			
Copper	1.87E6		ng/l	2.0000E6		93.3	80-120			
Iron	1.68E7		ng/l	1.7500E7		95.8	80-120			
Lead	201000		ng/l	200000		101	80-120			
Magnesium	1.61E7		ng/l	1.6000E7		100	80-120			
Manganese	509000		ng/l	500000		102	80-120			
Molybdenum	337000		ng/l	350000		96.2	80-120			
Nickel	113000		ng/l	120000		94.2	80-120			
Phosphorus	1.62E7		ng/l	1.5200E7		107	80-120			
Potassium	1.70E7		ng/l	1.7500E7		97.0	80-120			
Rubidium	9990		ng/l	10000		99.9	80-120			
Selenium	19000		ng/l	20000		95.1	80-120			
Sodium	1.81E7		ng/l	1.7500E7		103	80-120			
Strontium	49900		ng/l	50000		99.8	80-120			
Thallium	503		ng/l	500.00		101	80-120			
Thorium	522		ng/l	500.00		104	80-120			

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Inorganics by Compendium Method IO-3.5 - Quality Control

Batch 2401011 - B4A0401

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Interference Check B (2401011-IFB1) Co				Prepared & Analyzed: 01/04/24						
Uranium	531		ng/l	500.00		106	80-120			
Vanadium	18900		ng/l	20000		94.6	80-120			
Zinc	472000		ng/l	500000		94.5	80-120			

Batch B4A0401 - ICP-MS Extraction

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (B4A0401-BLK1)				Prepared & Analyzed: 01/04/24						
Aluminum	ND	32.1	ng/m³ Air							U
Antimony	ND	0.0441	ng/m³ Air							SL, U
Arsenic	ND	0.00955	ng/m³ Air							U
Barium	ND	0.948	ng/m³ Air							U
Beryllium	ND	0.00332	ng/m³ Air							U
Cadmium	ND	0.109	ng/m³ Air							U
Calcium	ND	292	ng/m³ Air							GC-BS, LJ, QB-01, U
Chromium	ND	2.03	ng/m³ Air							U
Cobalt	ND	0.0156	ng/m³ Air							QB-01, U
Copper	ND	3.00	ng/m³ Air							U
Iron	ND	24.2	ng/m³ Air							U
Lead	ND	0.276	ng/m³ Air							U
Magnesium	ND	96.4	ng/m³ Air							U
Manganese	ND	1.19	ng/m³ Air							U
Molybdenum	ND	0.213	ng/m³ Air							QB-01, U
Nickel	ND	0.801	ng/m³ Air							U
Phosphorus	ND	1250	ng/m³ Air							GC-BS, U
Potassium	ND	38.0	ng/m³ Air							U
Rubidium	ND	0.0183	ng/m³ Air							U
Selenium	ND	0.0110	ng/m³ Air							U
Sodium	ND	2000	ng/m³ Air							GC-BS, U
Strontium	ND	0.652	ng/m³ Air							QB-01, U
Thallium	ND	5.03E-4	ng/m³ Air							U
Thorium	ND	0.00300	ng/m³ Air							U
Uranium	ND	0.0170	ng/m³ Air							U
Vanadium	ND	0.0492	ng/m³ Air							U
Zinc	ND	97.7	ng/m³ Air							U
LCS (B4A0401-BS1)				Prepared & Analyzed: 01/04/24						
Aluminum	89.9	32.1	ng/m³ Air	82.975		108	80-120			
Antimony	0.493	0.0441	ng/m³ Air	1.3829		35.6	80-120			SL
Arsenic	2.68	0.00955	ng/m³ Air	2.7658		96.8	80-120			
Barium	27.5	0.948	ng/m³ Air	27.658		99.4	80-120			

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Inorganics by Compendium Method IO-3.5 - Quality Control

Batch B4A0401 - ICP-MS Extraction

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
LCS (B4A0401-BS1) Continued				Prepared & Analyzed: 01/04/24						
Beryllium	1.39	0.00332	ng/m³ Air	1.3829		100	80-120			
Cadmium	1.35	0.109	ng/m³ Air	1.3829		97.4	80-120			
Calcium	629	292	ng/m³ Air	69.146		909	80-120			GC-BS, LJ, QB-01
Chromium	15.9	2.03	ng/m³ Air	13.829		115	80-120			
Cobalt	1.34	0.0156	ng/m³ Air	1.3829		97.3	80-120			QB-01
Copper	31.1	3.00	ng/m³ Air	27.658		112	80-120			
Iron	41.1	24.2	ng/m³ Air	27.658		149	80-120			
Lead	13.3	0.276	ng/m³ Air	13.829		96.3	80-120			
Magnesium	ND	96.4	ng/m³ Air	27.658			80-120			U
Manganese	8.71	1.19	ng/m³ Air	8.2975		105	80-120			
Molybdenum	1.58	0.213	ng/m³ Air	1.3829		115	80-120			QB-01
Nickel	3.02	0.801	ng/m³ Air	2.7658		109	80-120			
Phosphorus	ND	1250	ng/m³ Air	13.829			80-120			GC-BS, U
Potassium	67.9	38.0	ng/m³ Air	55.317		123	80-120			
Rubidium	1.33	0.0183	ng/m³ Air	1.3829		96.1	80-120			
Selenium	2.71	0.0110	ng/m³ Air	2.7658		98.0	80-120			
Sodium	ND	2000	ng/m³ Air	55.317			80-120			GC-BS, U
Strontium	2.20	0.652	ng/m³ Air	1.3829		159	80-120			QB-01
Thallium	0.132	5.03E-4	ng/m³ Air	0.13829		95.2	80-120			
Thorium	0.127	0.00300	ng/m³ Air	0.13829		91.7	80-120			
Uranium	0.128	0.0170	ng/m³ Air	0.13829		92.4	80-120			
Vanadium	2.73	0.0492	ng/m³ Air	2.7658		98.8	80-120			
Zinc	126	97.7	ng/m³ Air	82.975		152	80-120			
Duplicate (B4A0401-DUP1)		**Source: 4010214-02**		Prepared & Analyzed: 01/04/24						
Aluminum	391	52.0	ng/m³ Air		380			2.89	10	
Antimony	0.120	0.0714	ng/m³ Air		0.126			4.58	10	SL
Arsenic	0.175	0.0155	ng/m³ Air		0.198			11.9	10	
Barium	5.88	1.53	ng/m³ Air		5.72			2.79	10	
Beryllium	0.0131	0.00537	ng/m³ Air		0.0134			2.39	10	
Cadmium	ND	0.176	ng/m³ Air		ND				10	U
Calcium	ND	473	ng/m³ Air		ND				10	GC-BS, LJ, QB-01, U
Chromium	ND	3.29	ng/m³ Air		ND				10	U
Cobalt	0.181	0.0253	ng/m³ Air		0.177			2.51	10	QB-01
Copper	25.7	4.86	ng/m³ Air		25.0			2.69	10	
Iron	423	39.2	ng/m³ Air		406			4.07	10	
Lead	ND	0.447	ng/m³ Air		ND				10	U
Magnesium	ND	156	ng/m³ Air		ND				10	U

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AQS SITE CODE:
SITE CODE: Maui fires

Inorganics by Compendium Method IO-3.5 - Quality Control

Batch B4A0401 - ICP-MS Extraction

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Duplicate (B4A0401-DUP1) Continued	**Source: 4010214-02**		Prepared & Analyzed: 01/04/24							
Manganese	11.4	1.93	ng/m³ Air		11.1			2.43	10	
Molybdenum	1.46	0.345	ng/m³ Air		1.44			1.55	10	QB-01
Nickel	ND	1.30	ng/m³ Air		ND				10	U
Phosphorus	ND	2020	ng/m³ Air		ND				10	GC-BS, U
Potassium	108	61.5	ng/m³ Air		119			9.76	10	
Rubidium	0.193	0.0296	ng/m³ Air		0.193			0.00967	10	
Selenium	0.0891	0.0178	ng/m³ Air		0.0744			18.0	10	
Sodium	ND	3240	ng/m³ Air		ND				10	GC-BS, U
Strontium	2.75	1.06	ng/m³ Air		2.74			0.452	10	QB-01
Thallium	0.00111	8.14E-4	ng/m³ Air		0.00115			3.88	10	
Thorium	0.0123	0.00486	ng/m³ Air		0.0123			0.351	10	
Uranium	ND	0.0275	ng/m³ Air		ND				10	U
Vanadium	1.03	0.0796	ng/m³ Air		1.01			2.58	10	
Zinc	ND	158	ng/m³ Air		ND				10	U
Matrix Spike (B4A0401-MS1)	**Source: 4010214-02**		Prepared & Analyzed: 01/04/24							
Aluminum	506	52.0	ng/m³ Air	134.31	380	94.0	80-120			
Antimony	1.54	0.0714	ng/m³ Air	2.2385	0.126	63.2	80-120			SL
Arsenic	4.46	0.0155	ng/m³ Air	4.4769	0.198	95.1	80-120			
Barium	49.5	1.53	ng/m³ Air	44.769	5.72	97.8	80-120			
Beryllium	2.27	0.00537	ng/m³ Air	2.2385	0.0134	101	80-120			
Cadmium	2.19	0.176	ng/m³ Air	2.2385	ND	97.8	80-120			
Calcium	607	473	ng/m³ Air	111.92	ND	543	80-120			GC-BS, LJ, QB-01, QM-4X
Chromium	24.4	3.29	ng/m³ Air	22.385	ND	109	80-120			
Cobalt	2.30	0.0253	ng/m³ Air	2.2385	0.177	94.9	80-120			QB-01
Copper	76.4	4.86	ng/m³ Air	44.769	25.0	115	80-120			
Iron	450	39.2	ng/m³ Air	44.769	406	97.2	80-120			
Lead	21.9	0.447	ng/m³ Air	22.385	ND	97.7	80-120			
Magnesium	ND	156	ng/m³ Air	44.769	ND		80-120			U
Manganese	25.0	1.93	ng/m³ Air	13.431	11.1	104	80-120			
Molybdenum	3.70	0.345	ng/m³ Air	2.2385	1.44	101	80-120			QB-01
Nickel	4.88	1.30	ng/m³ Air	4.4769	ND	109	80-120			
Phosphorus	ND	2020	ng/m³ Air	22.385	ND		80-120			GC-BS, U
Potassium	190	61.5	ng/m³ Air	89.539	119	80.0	80-120			
Rubidium	2.29	0.0296	ng/m³ Air	2.2385	0.193	93.7	80-120			
Selenium	4.47	0.0178	ng/m³ Air	4.4769	0.0744	98.2	80-120			
Sodium	ND	3240	ng/m³ Air	89.539	ND		80-120			GC-BS, QM-4X, U
Strontium	4.86	1.06	ng/m³ Air	2.2385	2.74	94.9	80-120			QB-01

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Inorganics by Compendium Method IO-3.5 - Quality Control

Batch B4A0401 - ICP-MS Extraction

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Matrix Spike (B4A0401-MS1) Continued	**Source: 4010214-02**		Prepared & Analyzed: 01/04/24							
Thallium	0.212	8.14E-4	ng/m³ Air	0.22385	0.00115	94.1	80-120			
Thorium	0.112	0.00486	ng/m³ Air	0.22385	0.0123	44.5	80-120			QM-07
Uranium	0.212	0.0275	ng/m³ Air	0.22385	ND	94.9	80-120			
Vanadium	5.35	0.0796	ng/m³ Air	4.4769	1.01	96.9	80-120			
Zinc	204	158	ng/m³ Air	134.31	ND	152	80-120			
Matrix Spike Dup (B4A0401-MSD1)	**Source: 4010214-02**		Prepared & Analyzed: 01/04/24							
Aluminum	503	52.0	ng/m³ Air	134.31	380	91.9	80-120	0.544	20	
Antimony	1.54	0.0714	ng/m³ Air	2.2385	0.126	63.4	80-120	0.252	20	SL
Arsenic	4.49	0.0155	ng/m³ Air	4.4769	0.198	95.8	80-120	0.683	20	
Barium	50.0	1.53	ng/m³ Air	44.769	5.72	98.9	80-120	0.992	20	
Beryllium	2.34	0.00537	ng/m³ Air	2.2385	0.0134	104	80-120	2.83	20	
Cadmium	2.22	0.176	ng/m³ Air	2.2385	ND	99.3	80-120	1.51	20	
Calcium	618	473	ng/m³ Air	111.92	ND	552	80-120	1.68	20	GC-BS, LJ, QB-01, QM-4X
Chromium	24.7	3.29	ng/m³ Air	22.385	ND	110	80-120	1.25	20	
Cobalt	2.33	0.0253	ng/m³ Air	2.2385	0.177	96.3	80-120	1.35	20	QB-01
Copper	81.2	4.86	ng/m³ Air	44.769	25.0	126	80-120	6.18	20	QM-07
Iron	444	39.2	ng/m³ Air	44.769	406	84.9	80-120	1.23	20	
Lead	22.1	0.447	ng/m³ Air	22.385	ND	98.9	80-120	1.22	20	
Magnesium	ND	156	ng/m³ Air	44.769	ND		80-120		20	U
Manganese	25.2	1.93	ng/m³ Air	13.431	11.1	105	80-120	0.521	20	
Molybdenum	3.81	0.345	ng/m³ Air	2.2385	1.44	106	80-120	3.06	20	QB-01
Nickel	4.99	1.30	ng/m³ Air	4.4769	ND	111	80-120	2.28	20	
Phosphorus	ND	2020	ng/m³ Air	22.385	ND		80-120		20	GC-BS, QM-4X, U
Potassium	190	61.5	ng/m³ Air	89.539	119	79.6	80-120	0.185	20	QM-07
Rubidium	2.29	0.0296	ng/m³ Air	2.2385	0.193	93.8	80-120	0.0627	20	
Selenium	4.42	0.0178	ng/m³ Air	4.4769	0.0744	97.0	80-120	1.12	20	
Sodium	ND	3240	ng/m³ Air	89.539	ND		80-120		20	GC-BS, QM-4X, U
Strontium	4.91	1.06	ng/m³ Air	2.2385	2.74	96.9	80-120	0.897	20	QB-01
Thallium	0.215	8.14E-4	ng/m³ Air	0.22385	0.00115	95.5	80-120	1.46	20	
Thorium	0.0947	0.00486	ng/m³ Air	0.22385	0.0123	36.8	80-120	16.7	20	QM-07
Uranium	0.212	0.0275	ng/m³ Air	0.22385	ND	94.6	80-120	0.293	20	
Vanadium	5.39	0.0796	ng/m³ Air	4.4769	1.01	97.8	80-120	0.785	20	
Zinc	207	158	ng/m³ Air	134.31	ND	154	80-120	1.70	20	
Post Spike (B4A0401-PS1)	**Source: 4010214-02**		Prepared & Analyzed: 01/04/24							
Aluminum	423	52.0	ng/m³ Air	44.769	380	95.7	75-125			
Antimony	0.554	0.0714	ng/m³ Air	0.44769	0.126	95.5	75-125			SL

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Inorganics by Compendium Method IO-3.5 - Quality Control

Batch B4A0401 - ICP-MS Extraction

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Post Spike (B4A0401-PS1) Continued	**Source: 4010214-02**		Prepared & Analyzed: 01/04/24							
Arsenic	2.31	0.0155	ng/m³ Air	2.2385	0.198	94.5	75-125			
Barium	10.1	1.53	ng/m³ Air	4.4769	5.72	97.2	75-125			
Beryllium	0.460	0.00537	ng/m³ Air	0.44769	0.0134	99.9	75-125			
Cadmium	0.258	0.176	ng/m³ Air	0.22385	ND	115	75-125			
Calcium	525	473	ng/m³ Air	44.769	ND	NR	75-125			A-01, GC-BS, LJ, QB-01
Chromium	3.75	3.29	ng/m³ Air	2.2385	ND	168	75-125			
Cobalt	0.605	0.0253	ng/m³ Air	0.44769	0.177	95.6	75-125			QB-01
Copper	48.8	4.86	ng/m³ Air	22.385	25.0	106	75-125			
Iron	455	39.2	ng/m³ Air	44.769	406	109	75-125			
Lead	43.0	0.447	ng/m³ Air	44.769	ND	96.0	75-125			
Magnesium	ND	156	ng/m³ Air	44.769	ND		75-125			U
Manganese	15.7	1.93	ng/m³ Air	4.4769	11.1	102	75-125			
Molybdenum	3.49	0.345	ng/m³ Air	2.2385	1.44	91.7	75-125			QB-01
Nickel	4.86	1.30	ng/m³ Air	4.4769	ND	109	75-125			
Phosphorus	ND	2020	ng/m³ Air	8.9539	ND		75-125			GC-BS, U
Potassium	161	61.5	ng/m³ Air	44.769	119	95.3	75-125			
Rubidium	0.398	0.0296	ng/m³ Air	0.22385	0.193	91.7	75-125			
Selenium	2.22	0.0178	ng/m³ Air	2.2385	0.0744	96.0	75-125			
Sodium	ND	3240	ng/m³ Air	44.769	ND		75-125			GC-BS, U
Strontium	4.82	1.06	ng/m³ Air	2.2385	2.74	93.1	75-125			QB-01
Thallium	0.105	8.14E-4	ng/m³ Air	0.11192	0.00115	92.4	75-125			
Thorium	0.108	0.00486	ng/m³ Air	0.11192	0.0123	85.5	75-125			
Uranium	0.108	0.0275	ng/m³ Air	0.11192	ND	96.7	75-125			
Vanadium	3.13	0.0796	ng/m³ Air	2.2385	1.01	95.0	75-125			
Zinc	ND	158	ng/m³ Air	44.769	ND		75-125			U
Dilution Check (B4A0401-SRL1)	**Source: 4010214-02**		Prepared & Analyzed: 01/04/24							
Aluminum	376	260	ng/m³ Air		380			0.933	10	
Antimony	ND	0.357	ng/m³ Air		ND				10	SL, U
Arsenic	0.195	0.0773	ng/m³ Air		0.198			1.47	10	
Barium	ND	7.67	ng/m³ Air		ND				10	U
Beryllium	ND	0.0269	ng/m³ Air		ND				10	U
Cadmium	ND	0.882	ng/m³ Air		ND				10	U
Calcium	ND	2360	ng/m³ Air		ND				10	GC-BS, LJ, QB-01, U
Chromium	ND	16.4	ng/m³ Air		ND				10	U
Cobalt	0.174	0.126	ng/m³ Air		0.177			1.80	10	QB-01
Copper	25.0	24.3	ng/m³ Air		25.0			0.0484	10	
Iron	406	196	ng/m³ Air		406			0.0535	10	

Tetra Tech, Inc.
1777 Sentry Pkwy, Bldg 12
Blue Bell, PA 19422
ATTN: Ms. Chelsea Saber
PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 01/09/24 12:34
SUBMITTED: 01/02/24 to 01/03/24
AQS SITE CODE:
SITE CODE: Maui fires

Inorganics by Compendium Method IO-3.5 - Quality Control

Batch B4A0401 - ICP-MS Extraction

Dilution Check (B4A0401-SRL1) ContinueSource: 4010214-02 Prepared & Analyzed: 01/04/24

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Lead	ND	2.23	ng/m³ Air		ND				10	U
Magnesium	ND	780	ng/m³ Air		ND				10	U
Manganese	11.0	9.63	ng/m³ Air		11.1			0.761	10	
Molybdenum	ND	1.72	ng/m³ Air		ND				10	QB-01, U
Nickel	ND	6.48	ng/m³ Air		ND				10	U
Phosphorus	ND	10100	ng/m³ Air		ND				10	GC-BS, U
Potassium	ND	308	ng/m³ Air		ND				10	U
Rubidium	0.187	0.148	ng/m³ Air		0.193			3.43	10	
Selenium	ND	0.0890	ng/m³ Air		ND				10	U
Sodium	ND	16200	ng/m³ Air		ND				10	GC-BS, U
Strontium	ND	5.28	ng/m³ Air		ND				10	QB-01, U
Thallium	ND	0.00407	ng/m³ Air		ND				10	U
Thorium	ND	0.0243	ng/m³ Air		ND				10	U
Uranium	ND	0.138	ng/m³ Air		ND				10	U
Vanadium	1.02	0.398	ng/m³ Air		1.01			1.06	10	
Zinc	ND	791	ng/m³ Air		ND				10	U

The results in this report apply only to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

CERTIFICATE OF ANALYSIS

Tetra Tech, Inc.
1777 Sentry Pkwy, Bldg 12
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ATTN: Ms. Chelsea Saber
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FILE #: 0000.00
REPORTED: 01/09/24 12:34
SUBMITTED: 01/02/24 to 01/03/24
AQS SITE CODE:
SITE CODE: Maui fires

Notes and Definitions

U	Under Detection Limit
SL	The spike recovery was outside acceptance limits. Reported value may be biased low.
QM-4X	The MS/MSD recovery exceeds criteria because the parent sample concentration is greater than 4x the spike concentration. Sample results for the QC batch were accepted based on acceptable BS/BSD recoveries.
QM-07	The spike recovery was outside acceptance limits for the MS and/or MSD. The batch was accepted based on acceptable LCS recovery.
QB-01	Analyte exceeds method blank criteria
LJ	Identification of analyte is acceptable; reported value is an estimate.
GC-BS	Compound exceeds Blank Spike Criteria
FB-01	Analyte exceeds Field Blank criteria.
E	The concentration indicated for this analyte is an estimated value above the calibration range of the instrument. This value is considered an estimate (CLP E-flag).
A-01	Parent sample >4x spike amount
ND	Analyte NOT DETECTED
NR	Not Reported
MDL	Method Detection Limit
RPD	Relative Percent Difference

Note: This test is accredited under the 2016 TNI Standard.

TETRA TECH

Ambient Community Air Monitoring Weekly Report
For the Hawaii Department of Health – Clean Air Branch

Kula, Maui

11/08/2023-11/15/2023
[Report Updated: 4/12/2024]

As a result of ongoing debris removal operations in response to the Maui Wildfires, a community air monitoring and sampling plan (CAMSP, 2023) has been developed and sampling is being performed at three community locations across the area of Kula.

This approach includes ambient community air monitoring and sampling to monitor conditions and ensure debris removal activities, taking place under the U.S. Army Corps of Engineers (USACE), does not significantly impact air quality in the area of Kula. Data collected is made available to HDOH via online shared site and this weekly report. This approach to air monitoring and sampling will continue until debris removal activities are complete or until HDOH CAB advises otherwise.

Air quality monitoring for particulate matter was collected at all three community locations over a 24-hour period each day in accordance with the CAMSP. Additionally, daily air samples were collected at all community locations for asbestos and heavy metals. Summary analytical data is presented in **Tables 1 and 2**. **Figure 1** depicts the community air monitoring and sampling locations. **Appendix 1** provides detailed analytical results for all community locations where air sampling was performed. Analytical results were compared to site-specific screening levels for particulate matter, asbestos, and heavy metals as published in the CAMSP (Tetra Tech 2023; see Table 2).

Project Summary:
The results and data summary provided in this report are representative of the first week and air monitoring and sampling in response to wildfire cleanup operations.

Mobilization of field staff and equipment took place the week of November 6. Set up of the EBAMs for particulate monitoring took place from November 7th to November 8th.

Following the arrival of metals and asbestos sampling equipment and media, high flow asbestos samples began on November 9th, with low volume samples at all three locations resulted in voided samples. The first valid samples began on November 10th. Sampling for metals began at one location on November 11th, with sampling at all three commenced the following workday.

A database is currently being created for storage and display of particulate and analytical data. Lab reports in the form of pdfs, are being uploaded to a shared Teams folder following validation. Current air monitoring data from the $PM_{2.5}$ monitors has also been shared and can be found displayed on the EPA Fire and Smoke Map. PM_{10} data has also been shared, and efforts are underway to also incorporate onto the map.

A draft sampling plan was sent to HDOH for review on November 9th, including an outline of project deliverables, sampling methods and procedures, and calculated site-specific screening levels. Comments have been received and corresponding edits were made. A final version will be submitted following confirmation of no additional comments.

Results for Community Locations:

Ambient particulate air monitoring was performed to assess for the presence and concentrations of airborne particulates with a particle size aerodynamic diameter of 2.5 micrometers (µm) and less ($PM_{2.5}$), as well as 10 micrometers (µm) and less (PM_{10}). This particle size diameter is recognized for health evaluations and is identified as "$PM_{2.5}$" and "PM_{10}". The particle size diameters of 2.5 micrometers (µm) and 10 micrometers (µm) are small enough to be inhaled into a person's lungs. Monitoring for $PM_{2.5}$ and PM_{10} was conducted 7 days a week at each of the following locations: Top Property (AM-01) (November 8 – 15), Middle Property (AM-02) 2 (November 8 – 15), Lower Property (AM-03) (November 8 – 15).

The results of PM_{10} monitoring found that screening levels were exceeded at the Top Property air monitoring station on November 14. High winds were reported in conjunction with the homeowners of the property spreading woodchips.

The results of $PM_{2.5}$ monitoring found that screening levels were exceeded at the Top Property air monitoring station on November 15. It was recorded that the homeowners were spreading woodchips around the property as well as operating a woodchipper at the adjacent property.

Neither exceedance of particulate screening levels is likely to be attributable to USACE debris removal operations.

Upon further investigation into the date and time issue on the PM2.5 EBAM located at the lower property (AM-03) detailed in report [11/16/2023-11/22/2023], the issues extended back to the initial set up on 11/8 due to the EBAM set 12 hours back. When it was discovered by the field technician on 11/17/2023 the time was set back another 12 hours creating a 24 hr date error which was corrected on 11/29/2023. No data was lost because of the date error. This report shows a revised 24 hr TWA calculation for the Lower property (AM-03) when the data was corrected to the correct date and time for the readings.

There were eighteen samples collected for asbestos fibers at community monitoring locations throughout this time frame. No asbestos sample returned a value above the laboratory's detection limit, indicating fibers were not present in air sampled. All asbestos results were below the public health screening level of 0.0034 fibers/cc (as well as the laboratory's detection limits), and therefore not a concern.

Some extremely low levels of heavy metals were detected in ambient air samples at community locations. Although detected, all detections were below the public health screening levels for heavy metals. Details for particulates, heavy metal and asbestos sampling data for community locations are found in Attachment 1.

Attachments:

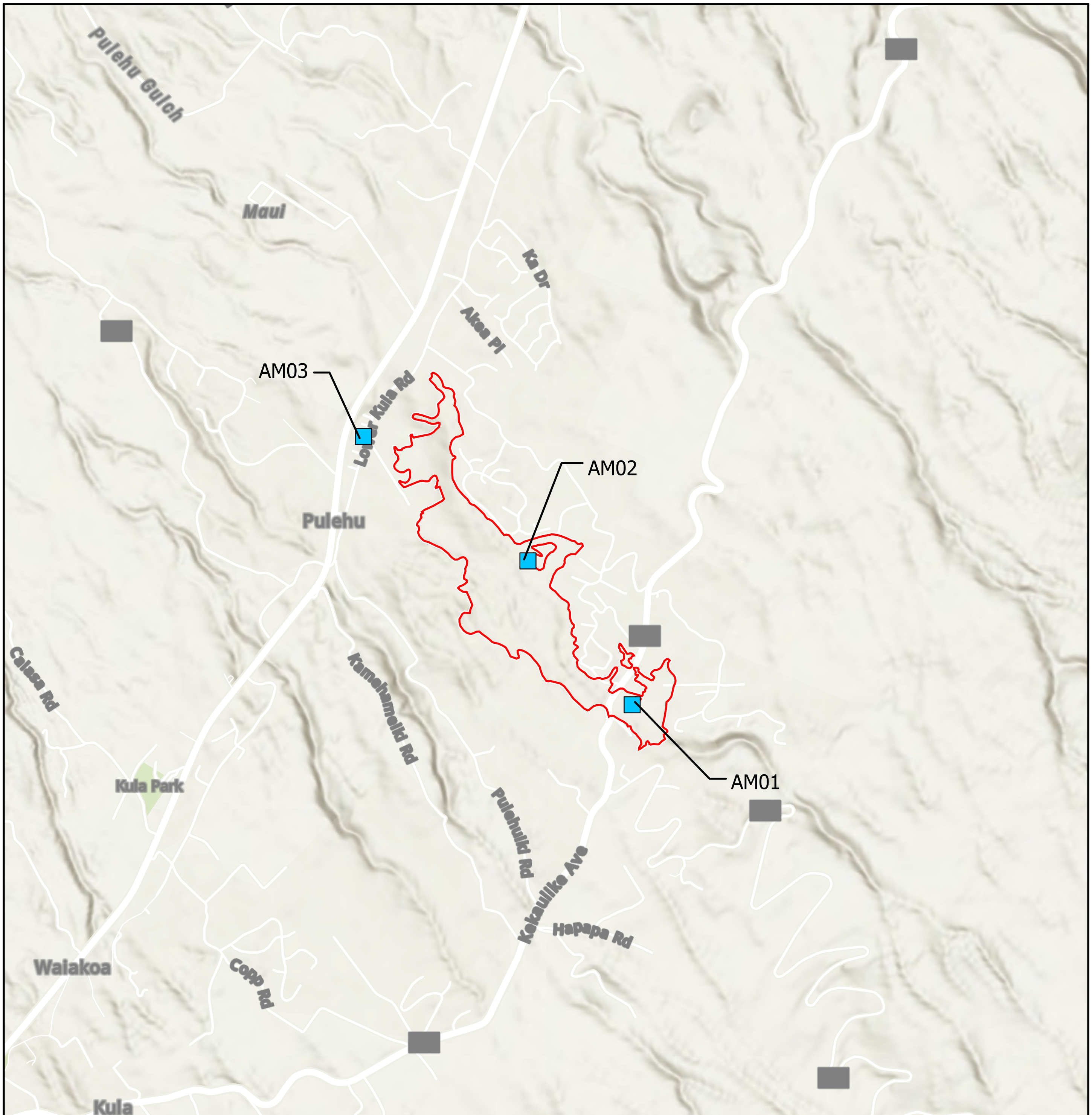
Analytical Sampling Results and Particulate Monitoring Results

Air Monitoring and Sampling Locations

Appendix:

Analytical Reports

Attachments



Air Monitoring Locations

Kula Fire Perimeter

N

0 0.25 0.5
Miles

TETRA TECH

Figure 1
Ambient Community
Air Monitoring Locations

Hawaii DOH
2023 Kula Wildfire

Basemap: ESRI ArcGIS World Street Map

Table 1: HDOH CAB Ambient Community Monitoring and Sampling
Analytical Sampling Results
Maui Wildfire, Kula
11/10/2023-11/15/2023
[Report Updated: 4/12/2024]

Analyte		Asbestos		Antimony	Arsenic	Barium	Beryllium	Cadmium	Chromium	Cobalt	Copper	Lead	Manganese	Molybdenum	Nickel	Selenium	Thallium	Vanadium	Zinc
Units		f/cc	Y/N	µg/m³	µg/m³	µg/m³	µg/m³	µg/m³	µg/m³	µg/m³	µg/m³	µg/m³	µg/m³	µg/m³	µg/m³	µg/m³	µg/m³	µg/m³	µg/m³
Screening Level	Location / ID	0.0034 [1]	Confirmed Asbestos [2]	1.4	0.18	2.4	0.1	0.048	24	0.029	480	1.5	0.24	9.6	0.048	96	48	0.48	2400
11/10/2023	Top Property (AM-01)	<0.00129	N																
	Middle Property (AM-02)	<0.00101	N																
	Lower Property (AM-03)	<0.00088	N																
11/11/2023	Top Property (AM-01)	<0.00052	N																
	Middle Property (AM-02)	<0.00057	N																
	Lower Property (AM-03)	<0.00044	N	0.000123	0.00017	0.00756	0.0000224	ND	0.00227	0.000447	0.027	0.00039	0.0242	0.000867	0.00109	0.000237	0.00000156	0.00243	ND
11/12/2003	Top Property (AM-01)	<0.00057	N	0.00012	0.000211	0.00802	0.0000259	ND	0.00263	0.000517	0.0199	0.00048	0.0275	0.000848	0.00126	0.000264	0.00000228	0.00287	ND
	Middle Property (AM-02)	<0.00062	N	0.0000881	0.000262	0.00923	0.0000277	ND	0.00268	0.000543	0.0109	0.000379	0.0293	0.000571	0.00204	0.000256	0.00000246	0.00294	ND
	Lower Property (AM-03)	<0.00057	N	0.0000881	0.00022	0.00873	0.0000259	ND	0.0024	0.000565	0.0171	0.000345	0.0301	0.000648	0.0011	0.000243	0.00000244	0.00292	ND
11/13/2023	Top Property (AM-01)	<0.00039	N	0.0000832	0.000457	0.018	0.0000656	ND	0.00355	0.00124	0.0201	0.000804	0.0675	0.00102	0.00178	0.000642	0.00000408	0.00545	ND
	Middle Property (AM-02)	<0.00038	N	0.0000794	0.000478	0.0143	0.0000474	ND	0.00309	0.00102	0.0151	0.000512	0.0539	0.00072	0.00179	0.00056	0.00000354	0.0046	ND
	Lower Property (AM-03)	<0.00064	N	0.000104	0.000332	0.0151	0.0000465	ND	0.00336	0.000896	0.0311	0.000563	0.0464	0.001	0.00148	0.000527	0.00000341	0.00395	ND
11/14/2023	Top Property (AM-01)	<0.00040	N	0.000111	0.000361	0.0174	0.0000497	ND	0.00326	0.000899	0.0514	0.00234	0.0528	0.000965	0.00173	0.000514	0.00000344	0.00447	ND
	Middle Property (AM-02)	<0.00035	N	0.0000876	0.000349	0.0137	0.0000433	ND	0.00259	0.000644	0.0188	0.000635	0.0362	0.000695	0.00119	0.00039	0.00000244	0.00339	ND
	Lower Property (AM-03)	<0.00057	N	0.000107	0.000238	0.0135	0.0000393	ND	0.00222	0.00056	0.0363	0.000443	0.0354	0.0012	0.00106	0.000333	0.00000312	0.00252	ND
11/15/2023	Top Property (AM-01)	<0.00040	N																
	Middle Property (AM-02)	<0.00040	N																
	Lower Property (AM-03)	<0.00045	N																
95% Upper Confidence Limit[3]		0.00068		0.00011	0.00039	0.0157	0.00005	NA	0.00311	0.00092	0.0345	0.00102	0.051	0.00099	0.0017	0.00052	0.0000033	0.00425	NA

Notes:
Metals sampling began at one location only on 11/11
No metals sampling tookplace on 11/15 due to high winds knocking over the Tisch samplers the day prior. Equipment was repositioned and secured on 11/15
NA = Not Available
f/cc = fibers per cubic centimeter
µg/m3= micrograms per cubic meter
ND = Not detected at or above the laboratory reporting or method detection limit
1 Fiber count sample result via Phase Contrast Microscopy
2 Confirmed asbestos sample result via Transmission Electron Microscopy
3 95% UCL determined through 'best fit' lognormal or normal parametric statistics via W test

Table 2: HDOH CAB Ambient Community Monitoring and Sampling
Particulate Monitoring Results
Maui Wildfire, Kula
11/08/2023-11/15/2023
[Report Updated: 4/12/2024]

Particulate Size		PM 2.5	PM 10
Screening Level	**Location / ID**	**35 µg/m³**	**150 µg/m³**
11/8/2023	Top Property (AM-01)	7.3	13
	Middle Property (AM-02)	8.5	12
	Lower Property (AM-03)	4.9	15
11/9/2023	Top Property (AM-01)	7.9	13
	Middle Property (AM-02)	6.3	10
	Lower Property (AM-03)	5.8	13
11/10/2023	Top Property (AM-01)	8.0	11
	Middle Property (AM-02)	7.2	11
	Lower Property (AM-03)	6.1	11
11/11/2023	Top Property (AM-01)	6.8	7.9
	Middle Property (AM-02)	5.2	7.1
	Lower Property (AM-03)	5.7	8.5
11/12/2023	Top Property (AM-01)	5.7	21
	Middle Property (AM-02)	6.1	7.7
	Lower Property (AM-03)	5.1	9.7
11/13/2023	Top Property (AM-01)	6.9	17
	Middle Property (AM-02)	4.9	11
	Lower Property (AM-03)	5.3	13
11/14/2023	Top Property (AM-01)	6.7	170
	Middle Property (AM-02)	14	12
	Lower Property (AM-03)	5.8	13
11/15/2023	Top Property (AM-01)	36	24
	Middle Property (AM-02)	19	6.7
	Lower Property (AM-03)	4.8	8.3

Notes:
The exceedances on 11/14 and 11/15 are a result of woodchips spread and private operations on the property
Lower Property (AM-03) PM2.5 EBAM 24 hr TWA was corrected on this report after review and correction of previously mentioned EBAM error
The 24hr TWA for 11/8/2023 was adjusted to reflect the official start times of valid data reporting for each property location.
Results are based on 24 hour TWA calculation
24 hour TWA calculation has been adjusted to be presented in the rule of two significant figures.
µg/m3 = micrograms per cubic meter
ND = Not detected at or above the laboratory reporting limit
NA = Not Available
Data for the Top Property (AM-01) on 11/9 and 11/10 have been revised from the prerviously submitted report

Appendix 1

Eastern Research Group
601 Keystone Park Drive
Suite 700
Morrisville, NC 27560

November 21, 2023

Ms. Chelsea Saber
Tetra Tech, Inc.
1777 Sentry Pkwy, Bldg 12
Blue Bell, PA 19422
Project Name: Maui fires

Dear Ms. Chelsea Saber,

This report contains the analytical results for the sample(s) received under chain(s) of custody by Eastern Research Group on 11/15/23 13:08.

Values below the MDL for QC results in this report are recorded as ND, however the actual values are reported in the accompanying Excel report with a "U" flag (Under the detection limit). The actual values are reported in AQS.

This test is accredited under the 2016 TNI Standard for Environmental Laboratories (FL DOH Certification # E87673). All analyses were performed as described in the US EPA-approved QAPP, under the contract for National Hazardous Air Pollutant Support (US EPA Contract No. 68HERH22D0002). This cover page is an integral part of this report, and any exceptions or comments are noted on the last page.

Release of the data contained in this data package and in the data submitted in the electronic data deliverable, has been authorized by the Program Manager, or the Program Manager's designee as verified by the following signature.

The issuance of the final Certificate of Analysis takes precedence over any previous Report. If you have any questions, please contact me at 919-468-7924.

Sincerely,

Julie Swift
Program Manager
julie.swift@erg.com

The information contained in this report and its attachment(s) are intended only for the use of the individual to whom it is addressed and may contain information that is privileged, confidential, or exempt from disclosure. If the reader of this message is not the intended recipient, you are hereby notified that any dissemination, distribution, or copying of this report is strictly prohibited. If you have received this report in error, please notify julie.swift@erg.com and delete the report without retaining any copies.

CERTIFICATE OF ANALYSIS

Tetra Tech, Inc.
1777 Sentry Pkwy, Bldg 12
Blue Bell, PA 19422
ATTN: Ms. Chelsea Saber
PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 11/21/23 13:30
SUBMITTED: 11/15/23
AQS SITE CODE:
SITE CODE: Maui fires

ANALYTICAL REPORT FOR SAMPLES

SampleName	LabNumber	Matrix	Sampled	Received
Q9541253	3111547-01	Air	11/11/23 23:59	11/15/23 13:08
Q9541250	3111547-02	Air	11/12/23 23:59	11/15/23 13:08
Q9541247	3111547-03	Air	11/12/23 23:59	11/15/23 13:08
Q9541246	3111547-04	Air	11/12/23 23:59	11/15/23 13:08

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ATTN: Ms. Chelsea Saber
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FILE #: 0000.00
REPORTED: 11/21/23 13:30
SUBMITTED: 11/15/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: Q9541253 **Lab ID:** 3111547-01 **Sampled:** 11/11/23 23:59
Matrix: Air **Sample Volume:** 1639.8 m³ **Received:** 11/15/23 13:08
Filter ID: **Analysis Date:** 11/18/23 02:37
Comments: MFK-AM-03-111123-HM - Sample received unfolded in envelope

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	**7429-90-5**	**530**		**31.8**
Antimony	**7440-36-0**	**0.123**	SL	**0.0438**
Arsenic	**7440-38-2**	**0.170**		**0.00948**
Barium	**7440-39-3**	**7.56**		**0.941**
Beryllium	**7440-41-7**	**0.0224**		**0.00329**
Cadmium	7440-43-9	0.0124	U	0.108
Calcium	**7440-70-2**	**537**		**290**
Chromium	**7440-47-3**	**2.27**		**2.01**
Cobalt	**7440-48-4**	**0.447**		**0.0155**
Copper	**7440-50-8**	**27.0**		**2.98**
Iron	**7439-89-6**	**778**		**24.0**
Lead	**7439-92-1**	**0.390**		**0.274**
Magnesium	**7439-95-4**	**311**		**95.6**
Manganese	**7439-96-5**	**24.2**		**1.18**
Molybdenum	**7439-98-7**	**0.867**		**0.211**
Nickel	**7440-02-0**	**1.09**		**0.795**
Phosphorus	7723-14-0	406	U, E, ICS-01, LK, QX	1240
Potassium	**7440-09-7**	**138**		**37.7**
Rubidium		**0.253**		**0.0182**
Selenium	**7782-49-2**	**0.237**		**0.0109**
Sodium	**7440-23-5**	**2570**	E, ICS-01, LK	**1980**
Strontium	**7440-24-6**	**4.88**		**0.647**
Thallium	**7440-28-0**	**0.00156**		**4.99E-4**
Thorium	**7440-29-01**	**0.0229**		**0.00298**
Uranium	NA	0.0160	U	0.0169
Vanadium	**7440-62-2**	**2.43**		**0.0488**
Zinc	7440-66-6	15.1	U	96.9

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Blue Bell, PA 19422
ATTN: Ms. Chelsea Saber
PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 11/21/23 13:30
SUBMITTED: 11/15/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: Q9541250
Matrix: Air
Lab ID: 3111547-02
Sample Volume: 1641.6 m³
Filter ID:
Sampled: 11/12/23 23:59
Received: 11/15/23 13:08
Analysis Date: 11/17/23 17:44

Comments: MFK-AM-01-111223-HM - Sample received unfolded in envelope

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	**7429-90-5**	**703**		**31.8**
Antimony	**7440-36-0**	**0.120**	SL	**0.0437**
Arsenic	**7440-38-2**	**0.211**		**0.00947**
Barium	**7440-39-3**	**8.02**		**0.940**
Beryllium	**7440-41-7**	**0.0259**		**0.00329**
Cadmium	7440-43-9	0.0172	U	0.108
Calcium	**7440-70-2**	**638**		**289**
Chromium	**7440-47-3**	**2.63**		**2.01**
Cobalt	**7440-48-4**	**0.517**		**0.0155**
Copper	**7440-50-8**	**19.9**		**2.97**
Iron	**7439-89-6**	**949**		**24.0**
Lead	**7439-92-1**	**0.480**		**0.274**
Magnesium	**7439-95-4**	**345**		**95.5**
Manganese	**7439-96-5**	**27.5**		**1.18**
Molybdenum	**7439-98-7**	**0.848**		**0.211**
Nickel	**7440-02-0**	**1.26**		**0.794**
Phosphorus	7723-14-0	404	U, E, ICS-01, LK, QX	1240
Potassium	**7440-09-7**	**145**		**37.7**
Rubidium		**0.293**		**0.0181**
Selenium	**7782-49-2**	**0.264**		**0.0109**
Sodium	**7440-23-5**	**2640**	E, ICS-01, LK	**1980**
Strontium	**7440-24-6**	**6.21**		**0.646**
Thallium	**7440-28-0**	**0.00228**		**4.99E-4**
Thorium	**7440-29-01**	**0.0273**		**0.00297**
Uranium	**NA**	**0.0195**		**0.0168**
Vanadium	**7440-62-2**	**2.87**		**0.0488**
Zinc	7440-66-6	18.1	U	96.8

CERTIFICATE OF ANALYSIS

ERG

Tetra Tech, Inc.
1777 Sentry Pkwy, Bldg 12
Blue Bell, PA 19422
ATTN: Ms. Chelsea Saber
PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 11/21/23 13:30
SUBMITTED: 11/15/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: Q9541247 **Lab ID:** 3111547-03 **Sampled:** 11/12/23 23:59
Matrix: Air **Sample Volume:** 1627.2 m³ **Received:** 11/15/23 13:08
Filter ID: **Analysis Date:** 11/18/23 02:53
Comments: MFK-AM-02-111223-HM - Sample received unfolded in envelope

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	**7429-90-5**	**851**	E	**32.1**
Antimony	**7440-36-0**	**0.0881**	SL	**0.0441**
Arsenic	**7440-38-2**	**0.262**		**0.00955**
Barium	**7440-39-3**	**9.23**		**0.948**
Beryllium	**7440-41-7**	**0.0277**		**0.00332**
Cadmium	7440-43-9	0.0154	U	0.109
Calcium	**7440-70-2**	**664**		**292**
Chromium	**7440-47-3**	**2.68**		**2.03**
Cobalt	**7440-48-4**	**0.543**		**0.0156**
Copper	**7440-50-8**	**10.9**		**3.00**
Iron	**7439-89-6**	**1030**		**24.2**
Lead	**7439-92-1**	**0.379**		**0.276**
Magnesium	**7439-95-4**	**342**		**96.4**
Manganese	**7439-96-5**	**29.3**		**1.19**
Molybdenum	**7439-98-7**	**0.571**		**0.213**
Nickel	**7440-02-0**	**2.04**		**0.801**
Phosphorus	7723-14-0	468	U, E, ICS-01, LK, QX	1250
Potassium	**7440-09-7**	**169**		**38.0**
Rubidium		**0.344**		**0.0183**
Selenium	**7782-49-2**	**0.256**		**0.0110**
Sodium	**7440-23-5**	**2700**	E, ICS-01, LK	**2000**
Strontium	**7440-24-6**	**6.79**		**0.652**
Thallium	**7440-28-0**	**0.00246**		**5.03E-4**
Thorium	**7440-29-01**	**0.0292**		**0.00300**
Uranium	**NA**	**0.0210**		**0.0170**
Vanadium	**7440-62-2**	**2.94**		**0.0492**
Zinc	7440-66-6	10.3	U	97.7

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FILE #: 0000.00
REPORTED: 11/21/23 13:30
SUBMITTED: 11/15/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: Q9541246 **Lab ID:** 3111547-04 **Sampled:** 11/12/23 23:59
Matrix: Air **Sample Volume:** 1834.56 m³ **Received:** 11/15/23 13:08
Filter ID: **Analysis Date:** 11/18/23 03:48
Comments: MFK-AM-03-111223-HM - Sample received unfolded in envelope

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	**7429-90-5**	**675**		**28.5**
Antimony	**7440-36-0**	**0.0881**	SL	**0.0391**
Arsenic	**7440-38-2**	**0.220**		**0.00847**
Barium	**7440-39-3**	**8.73**		**0.841**
Beryllium	**7440-41-7**	**0.0259**		**0.00294**
Cadmium	7440-43-9	0.0141	U	0.0967
Calcium	**7440-70-2**	**583**		**259**
Chromium	**7440-47-3**	**2.40**		**1.80**
Cobalt	**7440-48-4**	**0.565**		**0.0138**
Copper	**7440-50-8**	**17.1**		**2.66**
Iron	**7439-89-6**	**1020**		**21.5**
Lead	**7439-92-1**	**0.345**		**0.245**
Magnesium	**7439-95-4**	**317**		**85.5**
Manganese	**7439-96-5**	**30.1**		**1.06**
Molybdenum	**7439-98-7**	**0.648**		**0.189**
Nickel	**7440-02-0**	**1.10**		**0.710**
Phosphorus	7723-14-0	385	U, E, ICS-01, LK, QX	1110
Potassium	**7440-09-7**	**146**		**33.7**
Rubidium		**0.305**		**0.0162**
Selenium	**7782-49-2**	**0.243**		**0.00976**
Sodium	**7440-23-5**	**2400**	E, ICS-01, LK	**1770**
Strontium	**7440-24-6**	**5.77**		**0.578**
Thallium	**7440-28-0**	**0.00244**		**4.46E-4**
Thorium	**7440-29-01**	**0.0336**		**0.00266**
Uranium	**NA**	**0.0212**		**0.0151**
Vanadium	**7440-62-2**	**2.92**		**0.0436**
Zinc	7440-66-6	8.69	U	86.6

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FILE #: 0000.00
REPORTED: 11/21/23 13:30
SUBMITTED: 11/15/23
AQS SITE CODE:
SITE CODE: Maui fires

Inorganics by Compendium Method IO-3.5 - Quality Control

Batch 2311043 - B3K1601

Calibration Blank (2311043-CCB1) Prepared: 11/16/23 Analyzed: 11/17/23

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Aluminum	41.6		ng/l							
Antimony	1.87		ng/l							
Arsenic	-1.80		ng/l							U
Barium	5.10		ng/l							
Beryllium	-0.108		ng/l							U
Cadmium	0.862		ng/l							
Calcium	801		ng/l							
Chromium	8.29		ng/l							
Cobalt	1.16		ng/l							
Copper	61.2		ng/l							
Iron	145		ng/l							
Lead	11.9		ng/l							
Magnesium	46.5		ng/l							
Manganese	15.1		ng/l							
Molybdenum	39.8		ng/l							
Nickel	2.50		ng/l							
Phosphorus	106		ng/l							ICS-01, LK, QX
Potassium	2360		ng/l							
Rubidium	-0.371		ng/l							U
Selenium	-2.22		ng/l							U
Sodium	-3210		ng/l							ICS-01, LK, U
Strontium	0.927		ng/l							
Thallium	0.499		ng/l							
Thorium	0.391		ng/l							
Uranium	0.0504		ng/l							
Vanadium	-57.9		ng/l							U
Zinc	-15.4		ng/l							U

Calibration Blank (2311043-CCB2) Prepared: 11/16/23 Analyzed: 11/17/23

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Aluminum	33.7		ng/l							
Antimony	1.30		ng/l							
Arsenic	1.95		ng/l							
Barium	4.42		ng/l							
Beryllium	-0.359		ng/l							U
Cadmium	0.569		ng/l							
Calcium	286		ng/l							
Chromium	7.03		ng/l							
Cobalt	0.989		ng/l							

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REPORTED: 11/21/23 13:30
SUBMITTED: 11/15/23
AQS SITE CODE:
SITE CODE: Maui fires

Inorganics by Compendium Method IO-3.5 - Quality Control

Batch 2311043 - B3K1601

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Calibration Blank (2311043-CCB2) Contin				Prepared: 11/16/23 Analyzed: 11/17/23						
Copper	49.3		ng/l							
Iron	143		ng/l							
Lead	11.9		ng/l							
Magnesium	39.1		ng/l							
Manganese	9.63		ng/l							
Molybdenum	12.2		ng/l							
Nickel	2.73		ng/l							
Phosphorus	-20.4		ng/l							ICS-01, LK, QX, U
Potassium	1010		ng/l							
Rubidium	0.765		ng/l							
Selenium	2.26		ng/l							
Sodium	-3920		ng/l							ICS-01, LK, U
Strontium	0.601		ng/l							
Thallium	0.498		ng/l							
Thorium	0.814		ng/l							
Uranium	0.00911		ng/l							
Vanadium	-64.0		ng/l							U
Zinc	-42.7		ng/l							U
Calibration Blank (2311043-CCB3)				Prepared: 11/16/23 Analyzed: 11/17/23						
Aluminum	47.4		ng/l							
Antimony	1.51		ng/l							
Arsenic	-3.21		ng/l							U
Barium	3.95		ng/l							
Beryllium	-0.706		ng/l							U
Cadmium	0.456		ng/l							
Calcium	251		ng/l							
Chromium	5.93		ng/l							
Cobalt	0.737		ng/l							
Copper	43.9		ng/l							
Iron	91.0		ng/l							
Lead	13.0		ng/l							
Magnesium	34.5		ng/l							
Manganese	8.71		ng/l							
Molybdenum	15.6		ng/l							
Nickel	4.22		ng/l							
Phosphorus	-160		ng/l							ICS-01, LK, QX, U
Potassium	633		ng/l							

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Inorganics by Compendium Method IO-3.5 - Quality Control

Batch 2311043 - B3K1601

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Calibration Blank (2311043-CCB3) Contin				Prepared: 11/16/23 Analyzed: 11/17/23						
Rubidium	-0.0142		ng/l							U
Selenium	-0.348		ng/l							U
Sodium	-5730		ng/l							ICS-01, LK, U
Strontium	-0.111		ng/l							U
Thallium	0.428		ng/l							
Thorium	0.916		ng/l							
Uranium	0.00701		ng/l							
Vanadium	-67.3		ng/l							U
Zinc	-61.7		ng/l							U
Calibration Blank (2311043-CCB4)				Prepared: 11/16/23 Analyzed: 11/18/23						
Aluminum	-6.92		ng/l							U
Antimony	1.48		ng/l							
Arsenic	0.304		ng/l							
Barium	4.99		ng/l							
Beryllium	-0.852		ng/l							U
Cadmium	0.542		ng/l							
Calcium	347		ng/l							
Chromium	6.09		ng/l							
Cobalt	0.998		ng/l							
Copper	57.8		ng/l							
Iron	118		ng/l							
Lead	10.8		ng/l							
Magnesium	58.2		ng/l							
Manganese	11.2		ng/l							
Molybdenum	13.4		ng/l							
Nickel	5.80		ng/l							
Phosphorus	38.3		ng/l							ICS-01, LK, QX
Potassium	127		ng/l							
Rubidium	0.556		ng/l							
Selenium	11.3		ng/l							
Sodium	-4480		ng/l							ICS-01, LK, U
Strontium	1.92		ng/l							
Thallium	0.360		ng/l							
Thorium	0.489		ng/l							
Uranium	0.0121		ng/l							
Vanadium	-65.2		ng/l							U
Zinc	-45.4		ng/l							U

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FILE #: 0000.00
REPORTED: 11/21/23 13:30
SUBMITTED: 11/15/23
AQS SITE CODE:
SITE CODE: Maui fires

Inorganics by Compendium Method IO-3.5 - Quality Control

Batch 2311043 - B3K1601

Calibration Blank (2311043-CCB5) Prepared: 11/16/23 Analyzed: 11/18/23

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Aluminum	101		ng/l							
Antimony	1.89		ng/l							
Arsenic	-0.504		ng/l							U
Barium	5.84		ng/l							
Beryllium	-0.952		ng/l							U
Cadmium	0.677		ng/l							
Calcium	717		ng/l							
Chromium	7.19		ng/l							
Cobalt	0.920		ng/l							
Copper	56.9		ng/l							
Iron	183		ng/l							
Lead	11.1		ng/l							
Magnesium	69.2		ng/l							
Manganese	12.6		ng/l							
Molybdenum	33.7		ng/l							
Nickel	5.69		ng/l							
Phosphorus	35.2		ng/l							ICS-01, LK, QX
Potassium	1010		ng/l							
Rubidium	-0.160		ng/l							U
Selenium	6.04		ng/l							
Sodium	-5750		ng/l							ICS-01, LK, U
Strontium	1.84		ng/l							
Thallium	0.408		ng/l							
Thorium	0.677		ng/l							
Uranium	0.0332		ng/l							
Vanadium	-67.6		ng/l							U
Zinc	-57.8		ng/l							U

Calibration Check (2311043-CCV1) Prepared: 11/16/23 Analyzed: 11/17/23

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Aluminum	1.56E6		ng/l	1.5000E6		104	90-110			
Antimony	20300		ng/l	20000		101	90-110			
Arsenic	20000		ng/l	20000		100	90-110			
Barium	200000		ng/l	200000		100	90-110			
Beryllium	4880		ng/l	5000.0		97.6	90-110			
Cadmium	20500		ng/l	20000		102	90-110			
Calcium	2.61E7		ng/l	2.5000E7		104	90-110			
Chromium	244000		ng/l	240000		102	90-110			
Cobalt	53400		ng/l	50000		107	90-110			
Copper	2.10E6		ng/l	2.0000E6		105	90-110			

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Blue Bell, PA 19422
ATTN: Ms. Chelsea Saber
PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 11/21/23 13:30
SUBMITTED: 11/15/23
AQS SITE CODE:
SITE CODE: Maui fires

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes

Inorganics by Compendium Method IO-3.5 - Quality Control

Batch 2311043 - B3K1601

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Calibration Check (2311043-CCV1) Contin				Prepared: 11/16/23	Analyzed: 11/17/23					
Iron	2.63E6		ng/l	2.5000E6		105	90-110			
Lead	201000		ng/l	200000		100	90-110			
Magnesium	1.07E6		ng/l	1.0000E6		107	90-110			
Manganese	515000		ng/l	500000		103	90-110			
Molybdenum	50600		ng/l	50000		101	90-110			
Nickel	129000		ng/l	120000		108	90-110			
Phosphorus	208000		ng/l	200000		104	90-110			ICS-01, LK, QX
Potassium	2.66E6		ng/l	2.5000E6		107	90-110			
Rubidium	10000		ng/l	10000		100	90-110			
Selenium	19900		ng/l	20000		99.6	90-110			
Sodium	2.67E6		ng/l	2.5000E6		107	90-110			ICS-01, LK
Strontium	50300		ng/l	50000		101	90-110			
Thallium	510		ng/l	500.00		102	90-110			
Thorium	495		ng/l	500.00		99.1	90-110			
Uranium	496		ng/l	500.00		99.1	90-110			
Vanadium	20400		ng/l	20000		102	90-110			
Zinc	538000		ng/l	500000		108	90-110			
Calibration Check (2311043-CCV2)				Prepared: 11/16/23	Analyzed: 11/17/23					
Aluminum	1.47E6		ng/l	1.5000E6		97.8	90-110			
Antimony	20300		ng/l	20000		102	90-110			
Arsenic	20000		ng/l	20000		100	90-110			
Barium	201000		ng/l	200000		100	90-110			
Beryllium	4710		ng/l	5000.0		94.2	90-110			
Cadmium	20600		ng/l	20000		103	90-110			
Calcium	2.52E7		ng/l	2.5000E7		101	90-110			
Chromium	244000		ng/l	240000		102	90-110			
Cobalt	51700		ng/l	50000		103	90-110			
Copper	2.07E6		ng/l	2.0000E6		103	90-110			
Iron	2.54E6		ng/l	2.5000E6		102	90-110			
Lead	201000		ng/l	200000		101	90-110			
Magnesium	999000		ng/l	1.0000E6		99.9	90-110			
Manganese	497000		ng/l	500000		99.4	90-110			
Molybdenum	51700		ng/l	50000		103	90-110			
Nickel	126000		ng/l	120000		105	90-110			
Phosphorus	193000		ng/l	200000		96.3	90-110			ICS-01, LK, QX
Potassium	2.53E6		ng/l	2.5000E6		101	90-110			
Rubidium	10000		ng/l	10000		100	90-110			

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PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 11/21/23 13:30
SUBMITTED: 11/15/23
AQS SITE CODE:
SITE CODE: Maui fires

Inorganics by Compendium Method IO-3.5 - Quality Control

Batch 2311043 - B3K1601

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Calibration Check (2311043-CCV2) Contin				Prepared: 11/16/23	Analyzed: 11/17/23					
Selenium	19900		ng/l	20000		99.7	90-110			
Sodium	2.50E6		ng/l	2.5000E6		100	90-110			ICS-01, LK
Strontium	50200		ng/l	50000		100	90-110			
Thallium	505		ng/l	500.00		101	90-110			
Thorium	502		ng/l	500.00		100	90-110			
Uranium	501		ng/l	500.00		100	90-110			
Vanadium	20300		ng/l	20000		101	90-110			
Zinc	529000		ng/l	500000		106	90-110			
Calibration Check (2311043-CCV3)				Prepared: 11/16/23	Analyzed: 11/17/23					
Aluminum	1.45E6		ng/l	1.5000E6		96.7	90-110			
Antimony	20400		ng/l	20000		102	90-110			
Arsenic	20000		ng/l	20000		100	90-110			
Barium	200000		ng/l	200000		99.9	90-110			
Beryllium	4640		ng/l	5000.0		92.7	90-110			
Cadmium	20700		ng/l	20000		104	90-110			
Calcium	2.53E7		ng/l	2.5000E7		101	90-110			
Chromium	244000		ng/l	240000		102	90-110			
Cobalt	51500		ng/l	50000		103	90-110			
Copper	2.05E6		ng/l	2.0000E6		103	90-110			
Iron	2.54E6		ng/l	2.5000E6		102	90-110			
Lead	203000		ng/l	200000		101	90-110			
Magnesium	1.00E6		ng/l	1.0000E6		100	90-110			
Manganese	500000		ng/l	500000		100	90-110			
Molybdenum	51500		ng/l	50000		103	90-110			
Nickel	125000		ng/l	120000		104	90-110			
Phosphorus	193000		ng/l	200000		96.4	90-110			ICS-01, LK, QX
Potassium	2.54E6		ng/l	2.5000E6		101	90-110			
Rubidium	9960		ng/l	10000		99.6	90-110			
Selenium	19900		ng/l	20000		99.6	90-110			
Sodium	2.51E6		ng/l	2.5000E6		101	90-110			ICS-01, LK
Strontium	50200		ng/l	50000		100	90-110			
Thallium	498		ng/l	500.00		99.6	90-110			
Thorium	498		ng/l	500.00		99.6	90-110			
Uranium	506		ng/l	500.00		101	90-110			
Vanadium	20400		ng/l	20000		102	90-110			
Zinc	531000		ng/l	500000		106	90-110			
Calibration Check (2311043-CCV4)				Prepared: 11/16/23	Analyzed: 11/18/23					

CERTIFICATE OF ANALYSIS

Tetra Tech, Inc.
1777 Sentry Pkwy, Bldg 12
Blue Bell, PA 19422
ATTN: Ms. Chelsea Saber
PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 11/21/23 13:30
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AQS SITE CODE:
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Inorganics by Compendium Method IO-3.5 - Quality Control

Batch 2311043 - B3K1601

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Calibration Check (2311043-CCV4) Contin				Prepared: 11/16/23		Analyzed: 11/18/23				
Aluminum	1.48E6		ng/l	1.5000E6		98.5	90-110			
Antimony	20500		ng/l	20000		103	90-110			
Arsenic	20300		ng/l	20000		101	90-110			
Barium	202000		ng/l	200000		101	90-110			
Beryllium	4640		ng/l	5000.0		92.7	90-110			
Cadmium	20900		ng/l	20000		104	90-110			
Calcium	2.56E7		ng/l	2.5000E7		102	90-110			
Chromium	249000		ng/l	240000		104	90-110			
Cobalt	52700		ng/l	50000		105	90-110			
Copper	2.11E6		ng/l	2.0000E6		105	90-110			
Iron	2.56E6		ng/l	2.5000E6		103	90-110			
Lead	203000		ng/l	200000		101	90-110			
Magnesium	1.01E6		ng/l	1.0000E6		101	90-110			
Manganese	510000		ng/l	500000		102	90-110			
Molybdenum	52400		ng/l	50000		105	90-110			
Nickel	128000		ng/l	120000		107	90-110			
Phosphorus	191000		ng/l	200000		95.3	90-110			ICS-01, LK, QX
Potassium	2.58E6		ng/l	2.5000E6		103	90-110			
Rubidium	10100		ng/l	10000		101	90-110			
Selenium	20400		ng/l	20000		102	90-110			
Sodium	2.56E6		ng/l	2.5000E6		102	90-110			ICS-01, LK
Strontium	50800		ng/l	50000		102	90-110			
Thallium	496		ng/l	500.00		99.2	90-110			
Thorium	497		ng/l	500.00		99.5	90-110			
Uranium	499		ng/l	500.00		99.8	90-110			
Vanadium	20500		ng/l	20000		103	90-110			
Zinc	534000		ng/l	500000		107	90-110			
Calibration Check (2311043-CCV5)				Prepared: 11/16/23		Analyzed: 11/18/23				
Aluminum	1.50E6		ng/l	1.5000E6		99.8	90-110			
Antimony	20500		ng/l	20000		102	90-110			
Arsenic	20300		ng/l	20000		102	90-110			
Barium	203000		ng/l	200000		101	90-110			
Beryllium	4650		ng/l	5000.0		93.0	90-110			
Cadmium	20700		ng/l	20000		104	90-110			
Calcium	2.56E7		ng/l	2.5000E7		102	90-110			
Chromium	246000		ng/l	240000		102	90-110			
Cobalt	52700		ng/l	50000		105	90-110			

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Inorganics by Compendium Method IO-3.5 - Quality Control

Batch 2311043 - B3K1601

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Calibration Check (2311043-CCV5) Contin				Prepared: 11/16/23	Analyzed: 11/18/23					
Copper	2.10E6		ng/l	2.0000E6		105	90-110			
Iron	2.59E6		ng/l	2.5000E6		104	90-110			
Lead	204000		ng/l	200000		102	90-110			
Magnesium	1.02E6		ng/l	1.0000E6		102	90-110			
Manganese	511000		ng/l	500000		102	90-110			
Molybdenum	51500		ng/l	50000		103	90-110			
Nickel	128000		ng/l	120000		107	90-110			
Phosphorus	197000		ng/l	200000		98.3	90-110			ICS-01, LK, QX
Potassium	2.59E6		ng/l	2.5000E6		104	90-110			
Rubidium	10100		ng/l	10000		101	90-110			
Selenium	20000		ng/l	20000		100	90-110			
Sodium	2.57E6		ng/l	2.5000E6		103	90-110			ICS-01, LK
Strontium	50600		ng/l	50000		101	90-110			
Thallium	506		ng/l	500.00		101	90-110			
Thorium	502		ng/l	500.00		100	90-110			
Uranium	501		ng/l	500.00		100	90-110			
Vanadium	20400		ng/l	20000		102	90-110			
Zinc	538000		ng/l	500000		108	90-110			
High Cal Check (2311043-HCV1)				Prepared: 11/16/23	Analyzed: 11/17/23					
Aluminum	3.01E6		ng/l	3.0000E6		100	95-105			
Antimony	41400		ng/l	40000		103	95-105			
Arsenic	40700		ng/l	40000		102	95-105			
Barium	409000		ng/l	400000		102	95-105			
Beryllium	9810		ng/l	10000		98.1	95-105			
Cadmium	41200		ng/l	40000		103	95-105			
Calcium	5.20E7		ng/l	5.0000E7		104	95-105			
Chromium	493000		ng/l	480000		103	95-105			
Cobalt	101000		ng/l	100000		101	95-105			
Copper	4.03E6		ng/l	4.0000E6		101	95-105			
Iron	5.07E6		ng/l	5.0000E6		101	95-105			
Lead	409000		ng/l	400000		102	95-105			
Magnesium	2.01E6		ng/l	2.0000E6		100	95-105			
Manganese	1.01E6		ng/l	1.0000E6		101	95-105			
Molybdenum	104000		ng/l	100000		104	95-105			
Nickel	240000		ng/l	240000		99.8	95-105			
Phosphorus	399000		ng/l	400000		99.7	95-105			ICS-01, LK, QX
Potassium	4.93E6		ng/l	5.0000E6		98.6	95-105			

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Inorganics by Compendium Method IO-3.5 - Quality Control

Batch 2311043 - B3K1601

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
High Cal Check (2311043-HCV1) Continue				Prepared: 11/16/23		Analyzed: 11/17/23				
Rubidium	20400		ng/l	20000		102	95-105			
Selenium	40500		ng/l	40000		101	95-105			
Sodium	4.98E6		ng/l	5.0000E6		99.6	95-105			ICS-01, LK
Strontium	104000		ng/l	100000		104	95-105			
Thallium	1020		ng/l	1000.0		102	95-105			
Thorium	1040		ng/l	1000.0		104	95-105			
Uranium	1050		ng/l	1000.0		105	95-105			
Vanadium	41500		ng/l	40000		104	95-105			
Zinc	1.00E6		ng/l	1.0000E6		100	95-105			
Initial Cal Blank (2311043-ICB1)				Prepared: 11/16/23		Analyzed: 11/17/23				
Aluminum	14.5		ng/l							
Antimony	1.81		ng/l							
Arsenic	-7.99		ng/l							U
Barium	3.22		ng/l							
Beryllium	0.748		ng/l							
Cadmium	0.540		ng/l							
Calcium	-117		ng/l							U
Chromium	7.03		ng/l							
Cobalt	0.818		ng/l							
Copper	51.2		ng/l							
Iron	50.9		ng/l							
Lead	14.8		ng/l							
Magnesium	6.01		ng/l							
Manganese	12.4		ng/l							
Molybdenum	20.1		ng/l							
Nickel	0.702		ng/l							
Phosphorus	-13.2		ng/l							ICS-01, LK, QX, U
Potassium	-152		ng/l							U
Rubidium	-0.579		ng/l							U
Selenium	5.30		ng/l							
Sodium	-5650		ng/l							ICS-01, LK, U
Strontium	-0.536		ng/l							U
Thallium	0.412		ng/l							
Thorium	0.807		ng/l							
Uranium	0.0330		ng/l							
Vanadium	-57.3		ng/l							U
Zinc	-14.6		ng/l							U

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Inorganics by Compendium Method IO-3.5 - Quality Control

Batch 2311043 - B3K1601

Initial Cal Check (2311043-ICV1) Prepared: 11/16/23 Analyzed: 11/17/23

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Aluminum	1.48E6		ng/l	1.5000E6		98.7	90-110			
Antimony	20200		ng/l	20000		101	90-110			
Arsenic	20200		ng/l	20000		101	90-110			
Barium	202000		ng/l	200000		101	90-110			
Beryllium	4740		ng/l	5000.0		94.8	90-110			
Cadmium	20600		ng/l	20000		103	90-110			
Calcium	2.51E7		ng/l	2.5000E7		100	90-110			
Chromium	238000		ng/l	240000		99.3	90-110			
Cobalt	51200		ng/l	50000		102	90-110			
Copper	2.00E6		ng/l	2.0000E6		100	90-110			
Iron	2.52E6		ng/l	2.5000E6		101	90-110			
Lead	199000		ng/l	200000		99.6	90-110			
Magnesium	997000		ng/l	1.0000E6		99.7	90-110			
Manganese	490000		ng/l	500000		98.1	90-110			
Molybdenum	50200		ng/l	50000		100	90-110			
Nickel	127000		ng/l	120000		106	90-110			
Phosphorus	190000		ng/l	200000		95.2	90-110			ICS-01, LK, QX
Potassium	2.53E6		ng/l	2.5000E6		101	90-110			
Rubidium	9030		ng/l	10000		90.3	90-110			
Selenium	20200		ng/l	20000		101	90-110			
Sodium	2.43E6		ng/l	2.5000E6		97.0	90-110			ICS-01, LK
Strontium	50500		ng/l	50000		101	90-110			
Thallium	482		ng/l	500.00		96.4	90-110			
Thorium	493		ng/l	500.00		98.7	90-110			
Uranium	493		ng/l	500.00		98.5	90-110			
Vanadium	20500		ng/l	20000		102	90-110			
Zinc	536000		ng/l	500000		107	90-110			

Interference Check A (2311043-IFA1) Prepared: 11/16/23 Analyzed: 11/17/23

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Aluminum	1.60E7		ng/l	1.5000E7		107	80-120			
Antimony	0.00		ng/l				80-120			U
Arsenic	0.00		ng/l				80-120			U
Barium	0.00		ng/l				80-120			U
Beryllium	0.00		ng/l				80-120			U
Cadmium	0.00		ng/l				80-120			U
Calcium	9.91E7		ng/l	1.0040E8		98.7	80-120			
Chromium	0.00		ng/l				80-120			U
Cobalt	0.00		ng/l				80-120			U
Copper	0.00		ng/l				80-120			U

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Inorganics by Compendium Method IO-3.5 - Quality Control

Batch 2311043 - B3K1601

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Interference Check A (2311043-IFA1) Co				Prepared: 11/16/23	Analyzed: 11/17/23					
Iron	1.57E7		ng/l	1.5000E7		104	80-120			
Lead	0.00		ng/l				80-120			U
Magnesium	1.58E7		ng/l	1.5000E7		105	80-120			
Manganese	0.00		ng/l				80-120			U
Molybdenum	305000		ng/l	300000		102	80-120			
Nickel	0.00		ng/l				80-120			U
Phosphorus	1.72E7		ng/l	1.5000E7		115	80-120			ICS-01, LK, QX
Potassium	1.60E7		ng/l	1.5000E7		107	80-120			
Rubidium	0.00		ng/l				80-120			U
Selenium	0.00		ng/l				80-120			U
Sodium	1.66E7		ng/l	1.5000E7		111	80-120			ICS-01, LK
Strontium	0.00		ng/l				80-120			U
Thallium	0.00		ng/l				80-120			U
Thorium	0.00		ng/l				80-120			U
Uranium	0.00		ng/l				80-120			U
Vanadium	0.00		ng/l				80-120			U
Zinc	0.00		ng/l				80-120			U
Interference Check B (2311043-IFB1)				Prepared: 11/16/23	Analyzed: 11/17/23					
Aluminum	1.90E7		ng/l	1.6500E7		115	80-120			
Antimony	21000		ng/l	20000		105	80-120			
Arsenic	20800		ng/l	20000		104	80-120			
Barium	207000		ng/l	200000		104	80-120			
Beryllium	4590		ng/l	5000.0		91.8	80-120			
Cadmium	20400		ng/l	20000		102	80-120			
Calcium	1.30E8		ng/l	1.2540E8		104	80-120			
Chromium	240000		ng/l	240000		100	80-120			
Cobalt	54000		ng/l	50000		108	80-120			
Copper	2.02E6		ng/l	2.0000E6		101	80-120			
Iron	1.91E7		ng/l	1.7500E7		109	80-120			
Lead	209000		ng/l	200000		105	80-120			
Magnesium	1.82E7		ng/l	1.6000E7		114	80-120			
Manganese	556000		ng/l	500000		111	80-120			
Molybdenum	367000		ng/l	350000		105	80-120			
Nickel	128000		ng/l	120000		106	80-120			
Phosphorus	1.87E7		ng/l	1.5200E7		123	80-120			ICS-01, LK, QX
Potassium	1.99E7		ng/l	1.7500E7		114	80-120			
Rubidium	10200		ng/l	10000		102	80-120			

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Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes

Inorganics by Compendium Method IO-3.5 - Quality Control

Batch 2311043 - B3K1601

Interference Check B (2311043-IFB1) Co Prepared: 11/16/23 Analyzed: 11/17/23

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Selenium	19400		ng/l	20000		96.9	80-120			
Sodium	2.11E7		ng/l	1.7500E7		121	80-120			ICS-01, LK
Strontium	51000		ng/l	50000		102	80-120			
Thallium	531		ng/l	500.00		106	80-120			
Thorium	552		ng/l	500.00		110	80-120			
Uranium	561		ng/l	500.00		112	80-120			
Vanadium	19600		ng/l	20000		98.1	80-120			
Zinc	508000		ng/l	500000		102	80-120			

Serial Dilution (2311043-SRD1) **Source: 3111547-02** Prepared: 11/16/23 Analyzed: 11/17/23

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Aluminum	693	159	ng/m³ Air		703			1.37	10	
Antimony	ND	0.219	ng/m³ Air		ND				10	SL, U
Arsenic	0.212	0.0473	ng/m³ Air		0.211			0.247	10	
Barium	7.82	4.70	ng/m³ Air		8.02			2.47	10	
Beryllium	0.0261	0.0165	ng/m³ Air		0.0259			0.942	10	
Cadmium	ND	0.540	ng/m³ Air		ND				10	U
Calcium	ND	1450	ng/m³ Air		ND				10	U
Chromium	ND	10.1	ng/m³ Air		ND				10	U
Cobalt	0.520	0.0773	ng/m³ Air		0.517			0.420	10	
Copper	20.0	14.9	ng/m³ Air		19.9			0.226	10	
Iron	936	120	ng/m³ Air		949			1.37	10	
Lead	ND	1.37	ng/m³ Air		ND				10	U
Magnesium	ND	478	ng/m³ Air		ND				10	U
Manganese	27.4	5.90	ng/m³ Air		27.5			0.519	10	
Molybdenum	ND	1.06	ng/m³ Air		ND				10	U
Nickel	ND	3.97	ng/m³ Air		ND				10	U
Phosphorus	ND	6190	ng/m³ Air		ND				10	ICS-01, LK, QX, U
Potassium	ND	188	ng/m³ Air		ND				10	U
Rubidium	0.293	0.0907	ng/m³ Air		0.293			0.0326	10	
Selenium	0.292	0.0545	ng/m³ Air		0.264			9.95	10	
Sodium	ND	9910	ng/m³ Air		ND				10	ICS-01, LK, U
Strontium	6.23	3.23	ng/m³ Air		6.21			0.416	10	
Thallium	0.00297	0.00249	ng/m³ Air		ND			26.4	10	
Thorium	0.0254	0.0149	ng/m³ Air		0.0273			7.33	10	
Uranium	ND	0.0842	ng/m³ Air		ND				10	U
Vanadium	2.76	0.244	ng/m³ Air		2.87			3.77	10	
Zinc	ND	484	ng/m³ Air		ND				10	U

Batch B3K1601 - ICP-MS Extraction

The results in this report apply only to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

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Inorganics by Compendium Method IO-3.5 - Quality Control

Batch B3K1601 - ICP-MS Extraction

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (B3K1601-BLK1)				Prepared: 11/16/23 Analyzed: 11/17/23						
Aluminum	ND	32.1	ng/m³ Air							U
Antimony	ND	0.0441	ng/m³ Air							U, SL
Arsenic	ND	0.00955	ng/m³ Air							U
Barium	ND	0.948	ng/m³ Air							U
Beryllium	ND	0.00332	ng/m³ Air							U
Cadmium	ND	0.109	ng/m³ Air							U
Calcium	ND	292	ng/m³ Air							U
Chromium	ND	2.03	ng/m³ Air							U
Cobalt	ND	0.0156	ng/m³ Air							U
Copper	ND	3.00	ng/m³ Air							U
Iron	ND	24.2	ng/m³ Air							U
Lead	ND	0.276	ng/m³ Air							U
Magnesium	ND	96.4	ng/m³ Air							U
Manganese	ND	1.19	ng/m³ Air							U
Molybdenum	ND	0.213	ng/m³ Air							U
Nickel	ND	0.801	ng/m³ Air							U
Phosphorus	ND	1250	ng/m³ Air							ICS-01, LK, QX, U
Potassium	ND	38.0	ng/m³ Air							U
Rubidium	ND	0.0183	ng/m³ Air							U
Selenium	ND	0.0110	ng/m³ Air							U
Sodium	ND	2000	ng/m³ Air							ICS-01, LK, U
Strontium	ND	0.652	ng/m³ Air							U
Thallium	ND	5.03E-4	ng/m³ Air							U
Thorium	ND	0.00300	ng/m³ Air							U
Uranium	ND	0.0170	ng/m³ Air							U
Vanadium	ND	0.0492	ng/m³ Air							U
Zinc	ND	97.7	ng/m³ Air							U
LCS (B3K1601-BS1)				Prepared: 11/16/23 Analyzed: 11/17/23						
Aluminum	86.3	32.1	ng/m³ Air	82.975		104	80-120			
Antimony	0.944	0.0441	ng/m³ Air	1.3829		68.3	80-120			SL
Arsenic	2.77	0.00955	ng/m³ Air	2.7658		100	80-120			
Barium	28.0	0.948	ng/m³ Air	27.658		101	80-120			
Beryllium	1.25	0.00332	ng/m³ Air	1.3829		90.3	80-120			
Cadmium	1.43	0.109	ng/m³ Air	1.3829		104	80-120			
Calcium	ND	292	ng/m³ Air	69.146			80-120			U
Chromium	15.2	2.03	ng/m³ Air	13.829		110	80-120			
Cobalt	1.43	0.0156	ng/m³ Air	1.3829		103	80-120			
Copper	30.7	3.00	ng/m³ Air	27.658		111	80-120			

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1777 Sentry Pkwy, Bldg 12
Blue Bell, PA 19422
ATTN: Ms. Chelsea Saber
PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 11/21/23 13:30
SUBMITTED: 11/15/23
AQS SITE CODE:
SITE CODE: Maui fires

Inorganics by Compendium Method IO-3.5 - Quality Control

Batch B3K1601 - ICP-MS Extraction

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
LCS (B3K1601-BS1) Continued				Prepared: 11/16/23	Analyzed: 11/17/23					
Iron	35.2	24.2	ng/m³ Air	27.658		127	80-120			
Lead	13.9	0.276	ng/m³ Air	13.829		100	80-120			
Magnesium	ND	96.4	ng/m³ Air	27.658			80-120			U
Manganese	8.56	1.19	ng/m³ Air	8.2975		103	80-120			
Molybdenum	1.50	0.213	ng/m³ Air	1.3829		108	80-120			
Nickel	3.12	0.801	ng/m³ Air	2.7658		113	80-120			
Phosphorus	ND	1250	ng/m³ Air	13.829			80-120			GC-BS, ICS-01, LK,
Potassium	61.6	38.0	ng/m³ Air	55.317		111	80-120			
Rubidium	1.36	0.0183	ng/m³ Air	1.3829		98.4	80-120			
Selenium	2.72	0.0110	ng/m³ Air	2.7658		98.4	80-120			
Sodium	ND	2000	ng/m³ Air	55.317			80-120			GC-BS, ICS-01, LK, U
Strontium	1.64	0.652	ng/m³ Air	1.3829		119	80-120			
Thallium	0.132	5.03E-4	ng/m³ Air	0.13829		95.2	80-120			
Thorium	0.134	0.00300	ng/m³ Air	0.13829		96.7	80-120			
Uranium	0.132	0.0170	ng/m³ Air	0.13829		95.8	80-120			
Vanadium	2.88	0.0492	ng/m³ Air	2.7658		104	80-120			
Zinc	109	97.7	ng/m³ Air	82.975		131	80-120			
Duplicate (B3K1601-DUP1)		**Source: 3111547-02**		Prepared: 11/16/23	Analyzed: 11/17/23					
Aluminum	715	31.8	ng/m³ Air		703			1.71	10	
Antimony	0.0989	0.0437	ng/m³ Air		0.120			19.0	10	SL
Arsenic	0.210	0.00947	ng/m³ Air		0.211			0.348	10	
Barium	8.03	0.940	ng/m³ Air		8.02			0.142	10	
Beryllium	0.0296	0.00329	ng/m³ Air		0.0259			13.7	10	
Cadmium	ND	0.108	ng/m³ Air		ND				10	U
Calcium	633	289	ng/m³ Air		638			0.738	10	
Chromium	2.70	2.01	ng/m³ Air		2.63			2.56	10	
Cobalt	0.525	0.0155	ng/m³ Air		0.517			1.46	10	
Copper	20.7	2.97	ng/m³ Air		19.9			3.67	10	
Iron	967	24.0	ng/m³ Air		949			1.93	10	
Lead	0.568	0.274	ng/m³ Air		0.480			16.8	10	
Magnesium	349	95.5	ng/m³ Air		345			1.17	10	
Manganese	27.8	1.18	ng/m³ Air		27.5			1.04	10	
Molybdenum	0.825	0.211	ng/m³ Air		0.848			2.70	10	
Nickel	1.21	0.794	ng/m³ Air		1.26			3.98	10	
Phosphorus	ND	1240	ng/m³ Air		ND				10	U, E, ICS-01, LK, QX
Potassium	146	37.7	ng/m³ Air		145			0.337	10	

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REPORTED: 11/21/23 13:30
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AQS SITE CODE:
SITE CODE: Maui fires

Inorganics by Compendium Method IO-3.5 - Quality Control

Batch B3K1601 - ICP-MS Extraction

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Duplicate (B3K1601-DUP1) Continued		**Source: 3111547-02**		Prepared: 11/16/23		Analyzed: 11/17/23				
Rubidium	0.289	0.0181	ng/m³ Air		0.293			1.22	10	
Selenium	0.251	0.0109	ng/m³ Air		0.264			5.10	10	
Sodium	2730	1980	ng/m³ Air		2640			3.30	10	ICS-01, LK, SI
Strontium	6.09	0.646	ng/m³ Air		6.21			1.94	10	
Thallium	0.00244	4.99E-4	ng/m³ Air		0.00228			6.88	10	
Thorium	0.0290	0.00297	ng/m³ Air		0.0273			5.89	10	
Uranium	0.0188	0.0168	ng/m³ Air		0.0195			3.83	10	
Vanadium	2.84	0.0488	ng/m³ Air		2.87			0.947	10	
Zinc	ND	96.8	ng/m³ Air		ND				10	U
Matrix Spike (B3K1601-MS1)		**Source: 3111547-02**		Prepared: 11/16/23		Analyzed: 11/17/23				
Aluminum	827	31.8	ng/m³ Air	82.237	703	151	80-120			E, QM-4X
Antimony	0.766	0.0437	ng/m³ Air	1.3706	0.120	47.2	80-120			SL
Arsenic	2.84	0.00947	ng/m³ Air	2.7412	0.211	95.7	80-120			
Barium	35.5	0.940	ng/m³ Air	27.412	8.02	100	80-120			
Beryllium	1.53	0.00329	ng/m³ Air	1.3706	0.0259	110	80-120			
Cadmium	1.43	0.108	ng/m³ Air	1.3706	ND	104	80-120			
Calcium	740	289	ng/m³ Air	68.531	638	148	80-120			QM-4X
Chromium	16.5	2.01	ng/m³ Air	13.706	2.63	101	80-120			
Cobalt	1.96	0.0155	ng/m³ Air	1.3706	0.517	105	80-120			
Copper	48.8	2.97	ng/m³ Air	27.412	19.9	105	80-120			
Iron	1010	24.0	ng/m³ Air	27.412	949	214	80-120			QM-4X
Lead	14.0	0.274	ng/m³ Air	13.706	0.480	98.7	80-120			
Magnesium	393	95.5	ng/m³ Air	27.412	345	175	80-120			QM-4X
Manganese	37.9	1.18	ng/m³ Air	8.2237	27.5	126	80-120			QM-07
Molybdenum	2.19	0.211	ng/m³ Air	1.3706	0.848	98.2	80-120			
Nickel	4.03	0.794	ng/m³ Air	2.7412	1.26	101	80-120			
Phosphorus	ND	1240	ng/m³ Air	13.706	ND		80-120			U, E, ICS-01, LK, QM-4X,
Potassium	205	37.7	ng/m³ Air	54.825	145	108	80-120			
Rubidium	1.55	0.0181	ng/m³ Air	1.3706	0.293	91.7	80-120			
Selenium	2.86	0.0109	ng/m³ Air	2.7412	0.264	94.6	80-120			
Sodium	2900	1980	ng/m³ Air	54.825	2640	478	80-120			E, ICS-01, LK, QM-4X
Strontium	7.47	0.646	ng/m³ Air	1.3706	6.21	92.4	80-120			
Thallium	0.131	4.99E-4	ng/m³ Air	0.13706	0.00228	93.6	80-120			
Thorium	0.0815	0.00297	ng/m³ Air	0.13706	0.0273	39.5	80-120			QM-07
Uranium	0.149	0.0168	ng/m³ Air	0.13706	0.0195	94.1	80-120			
Vanadium	5.65	0.0488	ng/m³ Air	2.7412	2.87	101	80-120			
Zinc	111	96.8	ng/m³ Air	82.237	ND	135	80-120			

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AQS SITE CODE:
SITE CODE: Maui fires

Inorganics by Compendium Method IO-3.5 - Quality Control

Batch B3K1601 - ICP-MS Extraction

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Matrix Spike Dup (B3K1601-MSD1)		**Source: 3111547-02**		Prepared: 11/16/23		Analyzed: 11/17/23				
Aluminum	850	31.8	ng/m³ Air	82.237	703	178	80-120	2.65	20	E, QM-4X
Antimony	0.784	0.0437	ng/m³ Air	1.3706	0.120	48.5	80-120	2.30	20	SL
Arsenic	2.90	0.00947	ng/m³ Air	2.7412	0.211	98.1	80-120	2.22	20	
Barium	36.0	0.940	ng/m³ Air	27.412	8.02	102	80-120	1.34	20	
Beryllium	1.30	0.00329	ng/m³ Air	1.3706	0.0259	93.3	80-120	16.0	20	
Cadmium	1.44	0.108	ng/m³ Air	1.3706	ND	105	80-120	0.658	20	
Calcium	764	289	ng/m³ Air	68.531	638	183	80-120	3.20	20	QM-4X
Chromium	17.2	2.01	ng/m³ Air	13.706	2.63	106	80-120	3.82	20	
Cobalt	2.01	0.0155	ng/m³ Air	1.3706	0.517	109	80-120	2.85	20	
Copper	52.0	2.97	ng/m³ Air	27.412	19.9	117	80-120	6.39	20	
Iron	1040	24.0	ng/m³ Air	27.412	949	321	80-120	2.85	20	QM-4X
Lead	14.4	0.274	ng/m³ Air	13.706	0.480	102	80-120	3.06	20	
Magnesium	407	95.5	ng/m³ Air	27.412	345	228	80-120	3.62	20	QM-4X
Manganese	38.7	1.18	ng/m³ Air	8.2237	27.5	136	80-120	2.16	20	QM-07
Molybdenum	2.37	0.211	ng/m³ Air	1.3706	0.848	111	80-120	7.75	20	
Nickel	4.18	0.794	ng/m³ Air	2.7412	1.26	106	80-120	3.50	20	
Phosphorus	ND	1240	ng/m³ Air	13.706	ND		80-120		20	U, E, ICS-01, LK, QM-4X,
Potassium	209	37.7	ng/m³ Air	54.825	145	117	80-120	2.28	20	
Rubidium	1.57	0.0181	ng/m³ Air	1.3706	0.293	93.3	80-120	1.48	20	
Selenium	2.88	0.0109	ng/m³ Air	2.7412	0.264	95.3	80-120	0.695	20	
Sodium	3010	1980	ng/m³ Air	54.825	2640	682	80-120	3.79	20	E, ICS-01, LK, QM-4X
Strontium	7.71	0.646	ng/m³ Air	1.3706	6.21	110	80-120	3.16	20	
Thallium	0.134	4.99E-4	ng/m³ Air	0.13706	0.00228	95.8	80-120	2.22	20	
Thorium	0.0866	0.00297	ng/m³ Air	0.13706	0.0273	43.2	80-120	6.07	20	QM-07
Uranium	0.153	0.0168	ng/m³ Air	0.13706	0.0195	97.1	80-120	2.71	20	
Vanadium	5.75	0.0488	ng/m³ Air	2.7412	2.87	105	80-120	1.71	20	
Zinc	106	96.8	ng/m³ Air	82.237	ND	129	80-120	4.57	20	
Post Spike (B3K1601-PS1)		**Source: 3111547-02**		Prepared: 11/16/23		Analyzed: 11/17/23				
Aluminum	748	31.8	ng/m³ Air	27.412	703	165	75-125			PS-01
Antimony	0.390	0.0437	ng/m³ Air	0.27412	0.120	98.6	75-125			SL
Arsenic	1.53	0.00947	ng/m³ Air	1.3706	0.211	95.9	75-125			
Barium	10.6	0.940	ng/m³ Air	2.7412	8.02	94.9	75-125			
Beryllium	0.293	0.00329	ng/m³ Air	0.27412	0.0259	97.5	75-125			
Cadmium	0.152	0.108	ng/m³ Air	0.13706	ND	111	75-125			
Calcium	653	289	ng/m³ Air		638		75-125			
Chromium	3.95	2.01	ng/m³ Air	1.3706	2.63	96.2	75-125			
Cobalt	0.806	0.0155	ng/m³ Air	0.27412	0.517	105	75-125			

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AQS SITE CODE:
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Inorganics by Compendium Method IO-3.5 - Quality Control

Batch B3K1601 - ICP-MS Extraction

Post Spike (B3K1601-PS1) Continued **Source: 3111547-02** Prepared: 11/16/23 Analyzed: 11/17/23

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Copper	33.9	2.97	ng/m³ Air	13.706	19.9	102	75-125			
Iron	984	24.0	ng/m³ Air	27.412	949	126	75-125			PS-01
Lead	27.5	0.274	ng/m³ Air	27.412	0.480	98.7	75-125			
Magnesium	385	95.5	ng/m³ Air	27.412	345	145	75-125			PS-01
Manganese	30.8	1.18	ng/m³ Air	2.7412	27.5	119	75-125			
Molybdenum	2.13	0.211	ng/m³ Air	1.3706	0.848	93.5	75-125			
Nickel	4.05	0.794	ng/m³ Air	2.7412	1.26	102	75-125			
Phosphorus	ND	1240	ng/m³ Air	5.4825	ND		75-125			E, ICS-01, LK, PS-01, QX, U
Potassium	177	37.7	ng/m³ Air	27.412	145	114	75-125			
Rubidium	0.402	0.0181	ng/m³ Air	0.13706	0.293	79.5	75-125			
Selenium	1.51	0.0109	ng/m³ Air	1.3706	0.264	90.9	75-125			
Sodium	2790	1980	ng/m³ Air	27.412	2640	567	75-125			E, ICS-01, LK, PS-01
Strontium	7.25	0.646	ng/m³ Air	1.3706	6.21	76.3	75-125			
Thallium	0.0669	4.99E-4	ng/m³ Air	6.8531E-2	0.00228	94.3	75-125			
Thorium	0.0895	0.00297	ng/m³ Air	6.8531E-2	0.0273	90.7	75-125			
Uranium	0.0838	0.0168	ng/m³ Air	6.8531E-2	0.0195	93.8	75-125			
Vanadium	4.16	0.0488	ng/m³ Air	1.3706	2.87	93.9	75-125			
Zinc	ND	96.8	ng/m³ Air	27.412	ND		75-125			U

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Notes and Definitions

U	Under Detection Limit
SL	The spike recovery was outside acceptance limits. Reported value may be biased low.
QX	Compound does not meet QC criteria. Results should be considered an estimate.
QM-4X	The MS/MSD recovery exceeds criteria because the parent sample concentration is greater than 4x the spike concentration. Sample results for the QC batch were accepted based on acceptable BS/BSD recoveries.
QM-07	The spike recovery was outside acceptance limits for the MS and/or MSD. The batch was accepted based on acceptable LCS recovery.
PS-01	Post Spike exceeds DQO criteria.
LK	Analyte identified; Reported value may be biased high.
ICS-01	Interference check exceeds criteria.
GC-BS	Compound exceeds Blank Spike Criteria
E	The concentration indicated for this analyte is an estimated value above the calibration range of the instrument. This value is considered an estimate (CLP E-flag).
ND	Analyte NOT DETECTED
NR	Not Reported
MDL	Method Detection Limit
RPD	Relative Percent Difference

Note: This test is accredited under the 2016 TNI Standard.

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Eastern Research Group
601 Keystone Park Drive
Suite 700
Morrisville, NC 27560

November 29, 2023

Ms. Chelsea Saber
Tetra Tech, Inc.
1777 Sentry Pkwy, Bldg 12
Blue Bell, PA 19422
Project Name: Maui fires

Dear Ms. Chelsea Saber,

This report contains the analytical results for the sample(s) received under chain(s) of custody by Eastern Research Group on 11/20/23 10:27.

Values below the MDL for QC results in this report are recorded as ND, however the actual values are reported in the accompanying Excel report with a "U" flag (Under the detection limit). The actual values are reported in AQS.

This test is accredited under the 2016 TNI Standard for Environmental Laboratories (FL DOH Certification # E87673). All analyses were performed as described in the US EPA-approved QAPP, under the contract for National Hazardous Air Pollutant Support (US EPA Contract No. 68HERH22D0002). This cover page is an integral part of this report, and any exceptions or comments are noted on the last page.

Release of the data contained in this data package and in the data submitted in the electronic data deliverable, has been authorized by the Program Manager, or the Program Manager's designee as verified by the following signature.

The issuance of the final Certificate of Analysis takes precedence over any previous Report. If you have any questions, please contact me at 919-468-7924.

Sincerely,

Julie Swift
Program Manager
julie.swift@erg.com

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FILE #: 0000.00
REPORTED: 11/29/23 10:49
SUBMITTED: 11/20/23
AQS SITE CODE:
SITE CODE: Maui fires

ANALYTICAL REPORT FOR SAMPLES

SampleName	LabNumber	Matrix	Sampled	Received
Q9541243	3112027-01	Air	11/13/23 23:59	11/20/23 10:27
Q9541244	3112027-02	Air	11/13/23 23:59	11/20/23 10:27
Q9541245	3112027-03	Air	11/13/23 23:59	11/20/23 10:27
Q9541239	3112027-04	Air	11/14/23 23:59	11/20/23 10:27
Q9541241	3112027-05	Air	11/14/23 23:59	11/20/23 10:27
Q9541242	3112027-06	Air	11/14/23 23:59	11/20/23 10:27

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FILE #: 0000.00
REPORTED: 11/29/23 10:49
SUBMITTED: 11/20/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: Q9541243
Matrix: Air
Lab ID: 3112027-01
Sample Volume: 1713.6 m³
Filter ID:
Sampled: 11/13/23 23:59
Received: 11/20/23 10:27
Analysis Date: 11/23/23 00:32
Comments: MFK-AM-03-111323-HM

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	**7429-90-5**	**1080**		**30.5**
Antimony	**7440-36-0**	**0.104**	SL	**0.0419**
Arsenic	**7440-38-2**	**0.332**		**0.00907**
Barium	**7440-39-3**	**15.1**		**0.900**
Cadmium	7440-43-9	0.0246	U	0.103
Calcium	**7440-70-2**	**940**	LJ	**277**
Chromium	**7440-47-3**	**3.36**		**1.93**
Cobalt	**7440-48-4**	**0.896**		**0.0148**
Copper	**7440-50-8**	**31.1**		**2.85**
Lead	**7439-92-1**	**0.563**		**0.262**
Magnesium	**7439-95-4**	**538**		**91.5**
Manganese	**7439-96-5**	**46.4**		**1.13**
Molybdenum	**7439-98-7**	**1.00**		**0.202**
Nickel	**7440-02-0**	**1.48**		**0.761**
Phosphorus	7723-14-0	447	U, GC-BS	1190
Potassium	**7440-09-7**	**240**		**36.1**
Rubidium		**0.446**		**0.0174**
Selenium	**7782-49-2**	**0.527**		**0.0104**
Sodium	**7440-23-5**	**3770**	GC-BS	**1900**
Strontium	**7440-24-6**	**9.01**		**0.619**
Thallium	**7440-28-0**	**0.00341**		**4.78E-4**
Thorium	**7440-29-01**	**0.0593**		**0.00285**
Uranium	**NA**	**0.0313**		**0.0161**
Vanadium	**7440-62-2**	**3.95**		**0.0467**
Zinc	7440-66-6	27.6	U	92.8

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PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 11/29/23 10:49
SUBMITTED: 11/20/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: Q9541243 **Lab ID:** 3112027-01RE1 **Sampled:** 11/13/23 23:59
Matrix: Air **Sample Volume:** 1713.6 m^3 **Received:** 11/20/23 10:27
Filter ID: **Analysis Date:** 11/23/23 03:28
Comments: MFK-AM-03-111323-HM

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m^3 Air	Flag	MDL ng/m^3 Air
Iron	7439-89-6	1580	D	230

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FILE #: 0000.00
REPORTED: 11/29/23 10:49
SUBMITTED: 11/20/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: Q9541243
Matrix: Air
Lab ID: 3112027-01RE2
Sample Volume: 1713.6 m³
Filter ID:
Sampled: 11/13/23 23:59
Received: 11/20/23 10:27
Analysis Date: 11/24/23 13:17
Comments: MFK-AM-03-111323-HM

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Beryllium	7440-41-7	0.0465		0.00315

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FILE #: 0000.00
REPORTED: 11/29/23 10:49
SUBMITTED: 11/20/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: Q9541244
Matrix: Air
Lab ID: 3112027-02
Sample Volume: 1617.28 m³
Filter ID:
Sampled: 11/13/23 23:59
Received: 11/20/23 10:27
Analysis Date: 11/23/23 00:49
Comments: MFK-AM-02-111323-HM

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	**7429-90-5**	**1320**		**32.3**
Antimony	**7440-36-0**	**0.0794**	SL	**0.0444**
Arsenic	**7440-38-2**	**0.478**		**0.00961**
Barium	**7440-39-3**	**14.3**		**0.954**
Cadmium	7440-43-9	0.0236	U	0.110
Calcium	**7440-70-2**	**990**	LJ	**294**
Chromium	**7440-47-3**	**3.09**		**2.04**
Cobalt	**7440-48-4**	**1.02**		**0.0157**
Copper	**7440-50-8**	**15.1**		**3.02**
Lead	**7439-92-1**	**0.512**		**0.278**
Magnesium	**7439-95-4**	**502**		**97.0**
Manganese	**7439-96-5**	**53.9**		**1.20**
Molybdenum	**7439-98-7**	**0.720**		**0.214**
Nickel	**7440-02-0**	**1.79**		**0.806**
Phosphorus	7723-14-0	474	U, GC-BS	1260
Potassium	**7440-09-7**	**206**		**38.2**
Rubidium		**0.445**		**0.0184**
Selenium	**7782-49-2**	**0.560**		**0.0111**
Sodium	**7440-23-5**	**3440**	GC-BS	**2010**
Strontium	**7440-24-6**	**9.52**		**0.656**
Thallium	**7440-28-0**	**0.00354**		**5.06E-4**
Thorium	**7440-29-01**	**0.0754**		**0.00302**
Uranium	**NA**	**0.0359**		**0.0171**
Vanadium	**7440-62-2**	**4.60**		**0.0495**
Zinc	7440-66-6	17.3	U	98.3

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FILE #: 0000.00
REPORTED: 11/29/23 10:49
SUBMITTED: 11/20/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: Q9541244 **Lab ID:** 3112027-02RE1 **Sampled:** 11/13/23 23:59
Matrix: Air **Sample Volume:** 1617.28 m³ **Received:** 11/20/23 10:27
Filter ID: **Analysis Date:** 11/23/23 03:43
Comments: MFK-AM-02-111323-HM

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Iron	7439-89-6	1770	D	243

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FILE #: 0000.00
REPORTED: 11/29/23 10:49
SUBMITTED: 11/20/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: Q9541244 **Lab ID:** 3112027-02RE2 **Sampled:** 11/13/23 23:59
Matrix: Air **Sample Volume:** 1617.28 m^3 **Received:** 11/20/23 10:27
Filter ID: **Analysis Date:** 11/24/23 13:25
Comments: MFK-AM-02-111323-HM

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Beryllium	7440-41-7	0.0474		0.00334

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FILE #: 0000.00
REPORTED: 11/29/23 10:49
SUBMITTED: 11/20/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: Q9541245
Matrix: Air
Lab ID: 3112027-03
Sample Volume: 1699.2 m³
Filter ID:
Sampled: 11/13/23 23:59
Received: 11/20/23 10:27
Analysis Date: 11/23/23 01:06
Comments: MFK-AM-01-111323-HM

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	**7429-90-5**	**1660**		**30.7**
Antimony	**7440-36-0**	**0.0832**	SL	**0.0422**
Arsenic	**7440-38-2**	**0.457**		**0.00914**
Barium	**7440-39-3**	**18.0**		**0.908**
Cadmium	7440-43-9	0.0220	U	0.104
Calcium	**7440-70-2**	**1130**	LJ	**280**
Chromium	**7440-47-3**	**3.55**		**1.94**
Cobalt	**7440-48-4**	**1.24**		**0.0149**
Copper	**7440-50-8**	**20.1**		**2.87**
Lead	**7439-92-1**	**0.804**		**0.264**
Magnesium	**7439-95-4**	**548**		**92.3**
Manganese	**7439-96-5**	**67.5**		**1.14**
Molybdenum	**7439-98-7**	**1.02**		**0.204**
Nickel	**7440-02-0**	**1.78**		**0.767**
Phosphorus	7723-14-0	484	U, GC-BS	1200
Potassium	**7440-09-7**	**241**		**36.4**
Rubidium		**0.530**		**0.0175**
Selenium	**7782-49-2**	**0.642**		**0.0105**
Sodium	**7440-23-5**	**3530**	GC-BS	**1920**
Strontium	**7440-24-6**	**11.0**		**0.624**
Thallium	**7440-28-0**	**0.00408**		**4.82E-4**
Thorium	**7440-29-01**	**0.0884**		**0.00287**
Uranium	**NA**	**0.0421**		**0.0163**
Vanadium	**7440-62-2**	**5.45**		**0.0471**
Zinc	7440-66-6	17.7	U	93.5

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FILE #: 0000.00
REPORTED: 11/29/23 10:49
SUBMITTED: 11/20/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: Q9541245 **Lab ID:** 3112027-03RE1 **Sampled:** 11/13/23 23:59
Matrix: Air **Sample Volume:** 1699.2 m³ **Received:** 11/20/23 10:27
Filter ID: **Analysis Date:** 11/23/23 04:03
Comments: MFK-AM-01-111323-HM

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Iron	7439-89-6	2120	D	232

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FILE #: 0000.00
REPORTED: 11/29/23 10:49
SUBMITTED: 11/20/23
AQS SITE CODE:
SITE CODE: Maui fires

Description:	Q9541245	**Lab ID:**	3112027-03RE2	**Sampled:**	11/13/23 23:59
Matrix:	Air	**Sample Volume:**	1699.2 m³	**Received:**	11/20/23 10:27
		Filter ID:		**Analysis Date:**	11/24/23 13:48
Comments:	MFK-AM-01-111323-HM				

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Beryllium	7440-41-7	0.0656		0.00318

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FILE #: 0000.00
REPORTED: 11/29/23 10:49
SUBMITTED: 11/20/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: Q9541239
Matrix: Air
Lab ID: 3112027-04
Sample Volume: 1785.6 m³
Filter ID:
Sampled: 11/14/23 23:59
Received: 11/20/23 10:27
Analysis Date: 11/23/23 02:33
Comments: MFK-AM-03-111423-HM

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	**7429-90-5**	**907**		**29.2**
Antimony	**7440-36-0**	**0.107**	SL	**0.0402**
Arsenic	**7440-38-2**	**0.238**		**0.00870**
Barium	**7440-39-3**	**13.5**		**0.864**
Cadmium	7440-43-9	0.0356	U	0.0993
Calcium	**7440-70-2**	**758**	LJ	**266**
Chromium	**7440-47-3**	**2.22**		**1.85**
Cobalt	**7440-48-4**	**0.560**		**0.0142**
Copper	**7440-50-8**	**36.3**		**2.73**
Iron	**7439-89-6**	**1100**		**22.1**
Lead	**7439-92-1**	**0.443**		**0.251**
Magnesium	**7439-95-4**	**349**		**87.8**
Manganese	**7439-96-5**	**35.4**		**1.08**
Molybdenum	**7439-98-7**	**1.20**		**0.194**
Nickel	**7440-02-0**	**1.06**		**0.730**
Phosphorus	7723-14-0	438	U, GC-BS	1140
Potassium	**7440-09-7**	**231**		**34.6**
Rubidium		**0.408**		**0.0167**
Selenium	**7782-49-2**	**0.333**		**0.0100**
Sodium	**7440-23-5**	**2270**	GC-BS	**1820**
Strontium	**7440-24-6**	**10.0**		**0.594**
Thallium	**7440-28-0**	**0.00312**		**4.58E-4**
Thorium	**7440-29-01**	**0.0322**		**0.00273**
Uranium	**NA**	**0.0242**		**0.0155**
Vanadium	**7440-62-2**	**2.52**		**0.0448**
Zinc	7440-66-6	17.3	U	89.0

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FILE #: 0000.00
REPORTED: 11/29/23 10:49
SUBMITTED: 11/20/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: Q9541239 **Lab ID:** 3112027-04RE2 **Sampled:** 11/14/23 23:59
Matrix: Air **Sample Volume:** 1785.6 m^3 **Received:** 11/20/23 10:27
Filter ID: **Analysis Date:** 11/24/23 13:56
Comments: MFK-AM-03-111423-HM

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Beryllium	7440-41-7	0.0393		0.00303

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FILE #: 0000.00
REPORTED: 11/29/23 10:49
SUBMITTED: 11/20/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: Q9541241 **Lab ID:** 3112027-05 **Sampled:** 11/14/23 23:59
Matrix: Air **Sample Volume:** 1857.6 m^3 **Received:** 11/20/23 10:27
Filter ID: **Analysis Date:** 11/23/23 02:52
Comments: MFK-AM-02-111423-HM

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	**7429-90-5**	**1340**		**28.1**
Antimony	**7440-36-0**	**0.0876**	SL	**0.0386**
Arsenic	**7440-38-2**	**0.349**		**0.00836**
Barium	**7440-39-3**	**13.7**		**0.830**
Cadmium	7440-43-9	0.0195	U	0.0955
Calcium	**7440-70-2**	**789**	LJ	**256**
Chromium	**7440-47-3**	**2.59**		**1.78**
Cobalt	**7440-48-4**	**0.644**		**0.0137**
Copper	**7440-50-8**	**18.8**		**2.63**
Lead	**7439-92-1**	**0.635**		**0.242**
Magnesium	**7439-95-4**	**342**		**84.4**
Manganese	**7439-96-5**	**36.2**		**1.04**
Molybdenum	**7439-98-7**	**0.695**		**0.187**
Nickel	**7440-02-0**	**1.19**		**0.702**
Phosphorus	7723-14-0	412	U, GC-BS	1090
Potassium	**7440-09-7**	**197**		**33.3**
Rubidium		**0.381**		**0.0160**
Selenium	**7782-49-2**	**0.390**		**0.00963**
Sodium	**7440-23-5**	**2160**	GC-BS	**1750**
Strontium	**7440-24-6**	**9.71**		**0.571**
Thallium	**7440-28-0**	**0.00244**		**4.41E-4**
Thorium	**7440-29-01**	**0.0458**		**0.00263**
Uranium	**NA**	**0.0288**		**0.0149**
Vanadium	**7440-62-2**	**3.39**		**0.0431**
Zinc	7440-66-6	16.9	U	85.6

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FILE #: 0000.00
REPORTED: 11/29/23 10:49
SUBMITTED: 11/20/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: Q9541241
Matrix: Air
Lab ID: 3112027-05RE1
Sample Volume: 1857.6 m³
Filter ID:
Sampled: 11/14/23 23:59
Received: 11/20/23 10:27
Analysis Date: 11/23/23 04:32
Comments: MFK-AM-02-111423-HM

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Iron	7439-89-6	1360	D	212

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FILE #: 0000.00
REPORTED: 11/29/23 10:49
SUBMITTED: 11/20/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: Q9541241 **Lab ID:** 3112027-05RE2 **Sampled:** 11/14/23 23:59
Matrix: Air **Sample Volume:** 1857.6 m³ **Received:** 11/20/23 10:27
Filter ID: **Analysis Date:** 11/24/23 14:04
Comments: MFK-AM-02-111423-HM

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Beryllium	7440-41-7	0.0433		0.00291

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FILE #: 0000.00
REPORTED: 11/29/23 10:49
SUBMITTED: 11/20/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: Q9541242
Matrix: Air
Lab ID: 3112027-06
Sample Volume: 1826.8 m³
Filter ID:
Sampled: 11/14/23 23:59
Received: 11/20/23 10:27
Analysis Date: 11/23/23 03:09
Comments: MFK-AM-01-111423-HM

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	**7429-90-5**	**1900**		**28.6**
Antimony	**7440-36-0**	**0.111**	SL	**0.0393**
Arsenic	**7440-38-2**	**0.361**		**0.00851**
Barium	**7440-39-3**	**17.4**		**0.844**
Cadmium	7440-43-9	0.0281	U	0.0971
Calcium	**7440-70-2**	**1680**	LJ	**260**
Chromium	**7440-47-3**	**3.26**		**1.81**
Cobalt	**7440-48-4**	**0.899**		**0.0139**
Copper	**7440-50-8**	**51.4**		**2.67**
Lead	**7439-92-1**	**2.34**		**0.246**
Magnesium	**7439-95-4**	**437**		**85.9**
Manganese	**7439-96-5**	**52.8**		**1.06**
Molybdenum	**7439-98-7**	**0.965**		**0.190**
Nickel	**7440-02-0**	**1.73**		**0.713**
Phosphorus	7723-14-0	506	U, GC-BS	1110
Potassium	**7440-09-7**	**222**		**33.8**
Rubidium		**0.537**		**0.0163**
Selenium	**7782-49-2**	**0.514**		**0.00980**
Sodium	**7440-23-5**	**2480**	GC-BS	**1780**
Strontium	**7440-24-6**	**24.7**		**0.581**
Thallium	**7440-28-0**	**0.00344**		**4.48E-4**
Thorium	**7440-29-01**	**0.0667**		**0.00267**
Uranium	**NA**	**0.0405**		**0.0151**
Vanadium	**7440-62-2**	**4.47**		**0.0438**
Zinc	7440-66-6	36.2	U	87.0

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FILE #: 0000.00
REPORTED: 11/29/23 10:49
SUBMITTED: 11/20/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: Q9541242 **Lab ID:** 3112027-06RE1 **Sampled:** 11/14/23 23:59
Matrix: Air **Sample Volume:** 1826.8 m³ **Received:** 11/20/23 10:27
Filter ID: **Analysis Date:** 11/23/23 04:46
Comments: MFK-AM-01-111423-HM

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Iron	7439-89-6	1850	D	216

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PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 11/29/23 10:49
SUBMITTED: 11/20/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: Q9541242
Matrix: Air
Lab ID: 3112027-06RE2
Sample Volume: 1826.8 m³
Filter ID:
Sampled: 11/14/23 23:59
Received: 11/20/23 10:27
Analysis Date: 11/24/23 14:11
Comments: MFK-AM-01-111423-HM

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Beryllium	7440-41-7	0.0497		0.00296

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Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes

Inorganics by Compendium Method IO-3.5 - Quality Control

Batch 2311061 - B3K2104

Calibration Blank (2311061-CCB1) Prepared & Analyzed: 11/22/23

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Aluminum	293		ng/l							
Antimony	2.24		ng/l							
Arsenic	10.7		ng/l							
Barium	4.84		ng/l							
Beryllium	-0.442		ng/l							U
Cadmium	0.661		ng/l							
Calcium	2100		ng/l							
Chromium	6.17		ng/l							
Cobalt	0.752		ng/l							
Copper	48.2		ng/l							
Iron	237		ng/l							
Lead	9.93		ng/l							
Magnesium	216		ng/l							
Manganese	12.6		ng/l							
Molybdenum	38.1		ng/l							
Nickel	0.461		ng/l							
Phosphorus	105		ng/l							
Potassium	2770		ng/l							
Rubidium	0.325		ng/l							
Selenium	0.980		ng/l							
Sodium	2810		ng/l							
Strontium	1.04		ng/l							
Thallium	0.524		ng/l							
Thorium	0.265		ng/l							
Uranium	-0.00683		ng/l							U
Vanadium	-22.6		ng/l							U
Zinc	-4.13		ng/l							U

Calibration Blank (2311061-CCB2) Prepared & Analyzed: 11/22/23

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Aluminum	36.6		ng/l							
Antimony	2.09		ng/l							
Arsenic	5.50		ng/l							
Barium	7.46		ng/l							
Beryllium	-0.964		ng/l							U
Cadmium	0.423		ng/l							
Calcium	868		ng/l							
Chromium	6.14		ng/l							
Cobalt	1.18		ng/l							
Copper	50.8		ng/l							

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Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes

Inorganics by Compendium Method IO-3.5 - Quality Control

Batch 2311061 - B3K2104

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Calibration Blank (2311061-CCB2) Contin				Prepared & Analyzed: 11/22/23						
Iron	112		ng/l							
Lead	7.59		ng/l							
Magnesium	31.6		ng/l							
Manganese	12.9		ng/l							
Molybdenum	9.27		ng/l							
Nickel	2.47		ng/l							
Phosphorus	-740		ng/l							U
Potassium	1320		ng/l							
Rubidium	0.00678		ng/l							
Selenium	2.82		ng/l							
Sodium	964		ng/l							
Strontium	3.17		ng/l							
Thallium	0.715		ng/l							
Thorium	0.348		ng/l							
Uranium	0.0131		ng/l							
Vanadium	-16.5		ng/l							U
Zinc	77.2		ng/l							
Calibration Blank (2311061-CCB3)				Prepared: 11/22/23 Analyzed: 11/23/23						
Aluminum	151		ng/l							
Antimony	2.35		ng/l							
Arsenic	11.7		ng/l							
Barium	6.87		ng/l							
Beryllium	-1.25		ng/l							U
Cadmium	1.21		ng/l							
Calcium	1390		ng/l							
Chromium	11.4		ng/l							
Cobalt	1.67		ng/l							
Copper	76.2		ng/l							
Iron	175		ng/l							
Lead	9.11		ng/l							
Magnesium	77.3		ng/l							
Manganese	19.0		ng/l							
Molybdenum	12.3		ng/l							
Nickel	7.19		ng/l							
Phosphorus	-707		ng/l							U
Potassium	973		ng/l							
Rubidium	0.924		ng/l							
Selenium	4.38		ng/l							

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Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes

Inorganics by Compendium Method IO-3.5 - Quality Control

Batch 2311061 - B3K2104

Calibration Blank (2311061-CCB3) Contin — Prepared: 11/22/23 Analyzed: 11/23/23

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Sodium	3240		ng/l							
Strontium	4.72		ng/l							
Thallium	0.549		ng/l							
Thorium	0.500		ng/l							
Uranium	0.0167		ng/l							
Vanadium	-21.0		ng/l							U
Zinc	63.2		ng/l							

Calibration Blank (2311061-CCB4) — Prepared: 11/22/23 Analyzed: 11/23/23

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Aluminum	374		ng/l							
Antimony	2.91		ng/l							
Arsenic	7.52		ng/l							
Barium	20.9		ng/l							
Beryllium	-0.259		ng/l							U
Cadmium	1.75		ng/l							
Calcium	4480		ng/l							
Chromium	17.3		ng/l							
Cobalt	3.46		ng/l							
Copper	158		ng/l							
Iron	592		ng/l							
Lead	17.3		ng/l							
Magnesium	224		ng/l							
Manganese	45.9		ng/l							
Molybdenum	13.4		ng/l							
Nickel	11.4		ng/l							
Phosphorus	-393		ng/l							U
Potassium	494		ng/l							
Rubidium	0.483		ng/l							
Selenium	10.7		ng/l							
Sodium	2910		ng/l							
Strontium	16.9		ng/l							
Thallium	0.520		ng/l							
Thorium	0.524		ng/l							
Uranium	0.0405		ng/l							
Vanadium	-19.9		ng/l							U
Zinc	167		ng/l							

Calibration Check (2311061-CCV1) — Prepared & Analyzed: 11/22/23

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Aluminum	1.55E6		ng/l	1.5000E6		103	90-110			
Antimony	19800		ng/l	20000		98.8	90-110			

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Inorganics by Compendium Method IO-3.5 - Quality Control

Batch 2311061 - B3K2104

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Calibration Check (2311061-CCV1) Contin				Prepared & Analyzed: 11/22/23						
Arsenic	19700		ng/l	20000		98.6	90-110			
Barium	200000		ng/l	200000		100	90-110			
Beryllium	4850		ng/l	5000.0		96.9	90-110			
Cadmium	19800		ng/l	20000		99.2	90-110			
Calcium	2.50E7		ng/l	2.5000E7		99.8	90-110			
Chromium	224000		ng/l	240000		93.3	90-110			
Cobalt	52300		ng/l	50000		105	90-110			
Copper	2.02E6		ng/l	2.0000E6		101	90-110			
Iron	2.51E6		ng/l	2.5000E6		100	90-110			
Lead	196000		ng/l	200000		98.1	90-110			
Magnesium	1.05E6		ng/l	1.0000E6		105	90-110			
Manganese	503000		ng/l	500000		101	90-110			
Molybdenum	49100		ng/l	50000		98.3	90-110			
Nickel	124000		ng/l	120000		104	90-110			
Phosphorus	206000		ng/l	200000		103	90-110			
Potassium	2.61E6		ng/l	2.5000E6		104	90-110			
Rubidium	9840		ng/l	10000		98.4	90-110			
Selenium	19700		ng/l	20000		98.6	90-110			
Sodium	2.62E6		ng/l	2.5000E6		105	90-110			
Strontium	49100		ng/l	50000		98.2	90-110			
Thallium	488		ng/l	500.00		97.6	90-110			
Thorium	489		ng/l	500.00		97.8	90-110			
Uranium	488		ng/l	500.00		97.6	90-110			
Vanadium	18800		ng/l	20000		94.2	90-110			
Zinc	526000		ng/l	500000		105	90-110			
Calibration Check (2311061-CCV2)				Prepared & Analyzed: 11/22/23						
Aluminum	1.47E6		ng/l	1.5000E6		97.9	90-110			
Antimony	20000		ng/l	20000		99.9	90-110			
Arsenic	19600		ng/l	20000		98.2	90-110			
Barium	212000		ng/l	200000		106	90-110			
Beryllium	4690		ng/l	5000.0		93.9	90-110			
Cadmium	20100		ng/l	20000		101	90-110			
Calcium	2.47E7		ng/l	2.5000E7		99.0	90-110			
Chromium	224000		ng/l	240000		93.4	90-110			
Cobalt	51500		ng/l	50000		103	90-110			
Copper	2.00E6		ng/l	2.0000E6		100	90-110			
Iron	2.46E6		ng/l	2.5000E6		98.2	90-110			
Lead	199000		ng/l	200000		99.4	90-110			

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Inorganics by Compendium Method IO-3.5 - Quality Control

Batch 2311061 - B3K2104

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Calibration Check (2311061-CCV2) Contin				Prepared & Analyzed: 11/22/23						
Magnesium	1.01E6		ng/l	1.0000E6		101	90-110			
Manganese	488000		ng/l	500000		97.6	90-110			
Molybdenum	51500		ng/l	50000		103	90-110			
Nickel	122000		ng/l	120000		102	90-110			
Phosphorus	188000		ng/l	200000		94.0	90-110			
Potassium	2.51E6		ng/l	2.5000E6		100	90-110			
Rubidium	9960		ng/l	10000		99.6	90-110			
Selenium	19800		ng/l	20000		98.8	90-110			
Sodium	2.56E6		ng/l	2.5000E6		102	90-110			
Strontium	49400		ng/l	50000		98.7	90-110			
Thallium	500		ng/l	500.00		100	90-110			
Thorium	497		ng/l	500.00		99.3	90-110			
Uranium	498		ng/l	500.00		99.6	90-110			
Vanadium	19500		ng/l	20000		97.3	90-110			
Zinc	530000		ng/l	500000		106	90-110			
Calibration Check (2311061-CCV3)				Prepared: 11/22/23 Analyzed: 11/23/23						
Aluminum	1.47E6		ng/l	1.5000E6		98.1	90-110			
Antimony	20200		ng/l	20000		101	90-110			
Arsenic	19800		ng/l	20000		98.8	90-110			
Barium	212000		ng/l	200000		106	90-110			
Beryllium	4430		ng/l	5000.0		88.5	90-110			
Cadmium	20400		ng/l	20000		102	90-110			
Calcium	2.49E7		ng/l	2.5000E7		99.7	90-110			
Chromium	231000		ng/l	240000		96.1	90-110			
Cobalt	51800		ng/l	50000		104	90-110			
Copper	2.02E6		ng/l	2.0000E6		101	90-110			
Iron	2.47E6		ng/l	2.5000E6		98.8	90-110			
Lead	200000		ng/l	200000		100	90-110			
Magnesium	1.01E6		ng/l	1.0000E6		101	90-110			
Manganese	496000		ng/l	500000		99.1	90-110			
Molybdenum	52100		ng/l	50000		104	90-110			
Nickel	123000		ng/l	120000		102	90-110			
Phosphorus	193000		ng/l	200000		96.6	90-110			
Potassium	2.55E6		ng/l	2.5000E6		102	90-110			
Rubidium	10000		ng/l	10000		100	90-110			
Selenium	19700		ng/l	20000		98.3	90-110			
Sodium	2.55E6		ng/l	2.5000E6		102	90-110			
Strontium	49900		ng/l	50000		99.9	90-110			

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Inorganics by Compendium Method IO-3.5 - Quality Control

Batch 2311061 - B3K2104

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Calibration Check (2311061-CCV3) Contin				Prepared: 11/22/23	Analyzed: 11/23/23					
Thallium	493		ng/l	500.00		98.5	90-110			
Thorium	497		ng/l	500.00		99.3	90-110			
Uranium	495		ng/l	500.00		99.0	90-110			
Vanadium	19700		ng/l	20000		98.3	90-110			
Zinc	528000		ng/l	500000		106	90-110			
Calibration Check (2311061-CCV4)				Prepared: 11/22/23	Analyzed: 11/23/23					
Aluminum	1.41E6		ng/l	1.5000E6		94.3	90-110			
Antimony	20400		ng/l	20000		102	90-110			
Arsenic	19900		ng/l	20000		99.6	90-110			
Barium	216000		ng/l	200000		108	90-110			
Beryllium	4530		ng/l	5000.0		90.5	90-110			
Cadmium	20500		ng/l	20000		103	90-110			
Calcium	2.48E7		ng/l	2.5000E7		99.0	90-110			
Chromium	233000		ng/l	240000		97.1	90-110			
Cobalt	51000		ng/l	50000		102	90-110			
Copper	2.00E6		ng/l	2.0000E6		100	90-110			
Iron	2.44E6		ng/l	2.5000E6		97.8	90-110			
Lead	199000		ng/l	200000		99.7	90-110			
Magnesium	968000		ng/l	1.0000E6		96.8	90-110			
Manganese	488000		ng/l	500000		97.6	90-110			
Molybdenum	52200		ng/l	50000		104	90-110			
Nickel	121000		ng/l	120000		101	90-110			
Phosphorus	186000		ng/l	200000		93.0	90-110			
Potassium	2.49E6		ng/l	2.5000E6		99.7	90-110			
Rubidium	10200		ng/l	10000		102	90-110			
Selenium	20200		ng/l	20000		101	90-110			
Sodium	2.48E6		ng/l	2.5000E6		99.2	90-110			
Strontium	50700		ng/l	50000		101	90-110			
Thallium	497		ng/l	500.00		99.5	90-110			
Thorium	504		ng/l	500.00		101	90-110			
Uranium	503		ng/l	500.00		101	90-110			
Vanadium	20200		ng/l	20000		101	90-110			
Zinc	531000		ng/l	500000		106	90-110			
High Cal Check (2311061-HCV1)				Prepared & Analyzed: 11/22/23						
Aluminum	2.95E6		ng/l	3.0000E6		98.4	95-105			
Antimony	40500		ng/l	40000		101	95-105			
Arsenic	40000		ng/l	40000		99.9	95-105			
Barium	406000		ng/l	400000		101	95-105			

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Inorganics by Compendium Method IO-3.5 - Quality Control

Batch 2311061 - B3K2104

High Cal Check (2311061-HCV1) Continue — Prepared & Analyzed: 11/22/23

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Beryllium	9610		ng/l	10000		96.1	95-105			
Cadmium	40200		ng/l	40000		101	95-105			
Calcium	4.99E7		ng/l	5.0000E7		99.8	95-105			
Chromium	470000		ng/l	480000		97.9	95-105			
Cobalt	98000		ng/l	100000		98.0	95-105			
Copper	3.92E6		ng/l	4.0000E6		98.0	95-105			
Iron	4.95E6		ng/l	5.0000E6		98.9	95-105			
Lead	402000		ng/l	400000		101	95-105			
Magnesium	1.98E6		ng/l	2.0000E6		98.9	95-105			
Manganese	986000		ng/l	1.0000E6		98.6	95-105			
Molybdenum	101000		ng/l	100000		101	95-105			
Nickel	239000		ng/l	240000		99.4	95-105			
Phosphorus	394000		ng/l	400000		98.5	95-105			
Potassium	4.99E6		ng/l	5.0000E6		99.7	95-105			
Rubidium	20000		ng/l	20000		100	95-105			
Selenium	40200		ng/l	40000		101	95-105			
Sodium	4.93E6		ng/l	5.0000E6		98.6	95-105			
Strontium	101000		ng/l	100000		101	95-105			
Thallium	999		ng/l	1000.0		99.9	95-105			
Thorium	1000		ng/l	1000.0		100	95-105			
Uranium	1020		ng/l	1000.0		102	95-105			
Vanadium	39600		ng/l	40000		98.9	95-105			
Zinc	980000		ng/l	1.0000E6		98.0	95-105			

Initial Cal Blank (2311061-ICB1) — Prepared & Analyzed: 11/22/23

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Aluminum	-62.2		ng/l							U
Antimony	9.15		ng/l							
Arsenic	-0.710		ng/l							U
Barium	1.23		ng/l							
Beryllium	-0.0373		ng/l							U
Cadmium	0.0937		ng/l							
Calcium	301		ng/l							
Chromium	2.95		ng/l							
Cobalt	0.166		ng/l							
Copper	16.8		ng/l							
Iron	-25.5		ng/l							U
Lead	6.73		ng/l							
Magnesium	55.7		ng/l							
Manganese	5.62		ng/l							

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Inorganics by Compendium Method IO-3.5 - Quality Control

Batch 2311061 - B3K2104

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Initial Cal Blank (2311061-ICB1) Continu				Prepared & Analyzed: 11/22/23						
Molybdenum	13.4		ng/l							
Nickel	-1.45		ng/l							U
Phosphorus	-143		ng/l							U
Potassium	663		ng/l							
Rubidium	0.487		ng/l							
Selenium	10.7		ng/l							
Sodium	-1010		ng/l							U
Strontium	1.09		ng/l							
Thallium	0.173		ng/l							
Thorium	0.293		ng/l							
Uranium	0.00257		ng/l							
Vanadium	-21.9		ng/l							U
Zinc	10.4		ng/l							
Initial Cal Check (2311061-ICV1)				Prepared & Analyzed: 11/22/23						
Aluminum	1.44E6		ng/l	1.5000E6		96.1	90-110			
Antimony	19600		ng/l	20000		97.8	90-110			
Arsenic	19700		ng/l	20000		98.3	90-110			
Barium	197000		ng/l	200000		98.6	90-110			
Beryllium	4700		ng/l	5000.0		94.0	90-110			
Cadmium	20700		ng/l	20000		103	90-110			
Calcium	2.43E7		ng/l	2.5000E7		97.0	90-110			
Chromium	231000		ng/l	240000		96.2	90-110			
Cobalt	50400		ng/l	50000		101	90-110			
Copper	1.99E6		ng/l	2.0000E6		99.3	90-110			
Iron	2.45E6		ng/l	2.5000E6		98.1	90-110			
Lead	197000		ng/l	200000		98.3	90-110			
Magnesium	970000		ng/l	1.0000E6		97.0	90-110			
Manganese	483000		ng/l	500000		96.6	90-110			
Molybdenum	49600		ng/l	50000		99.1	90-110			
Nickel	121000		ng/l	120000		101	90-110			
Phosphorus	186000		ng/l	200000		93.2	90-110			
Potassium	2.49E6		ng/l	2.5000E6		99.8	90-110			
Rubidium	9610		ng/l	10000		96.1	90-110			
Selenium	20200		ng/l	20000		101	90-110			
Sodium	2.40E6		ng/l	2.5000E6		96.1	90-110			
Strontium	50200		ng/l	50000		100	90-110			
Thallium	468		ng/l	500.00		93.7	90-110			
Thorium	489		ng/l	500.00		97.8	90-110			

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CERTIFICATE OF ANALYSIS

Tetra Tech, Inc.
1777 Sentry Pkwy, Bldg 12
Blue Bell, PA 19422
ATTN: Ms. Chelsea Saber
PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 11/29/23 10:49
SUBMITTED: 11/20/23
AQS SITE CODE:
SITE CODE: Maui fires

Inorganics by Compendium Method IO-3.5 - Quality Control

Batch 2311061 - B3K2104

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Initial Cal Check (2311061-ICV1) Continu				Prepared & Analyzed: 11/22/23						
Uranium	487		ng/l	500.00		97.3	90-110			
Vanadium	20100		ng/l	20000		100	90-110			
Zinc	532000		ng/l	500000		106	90-110			
Interference Check A (2311061-IFA1)				Prepared & Analyzed: 11/22/23						
Aluminum	1.53E7		ng/l	1.5000E7		102	80-120			
Antimony	0.00		ng/l				80-120			U
Arsenic	0.00		ng/l				80-120			U
Barium	0.00		ng/l				80-120			U
Beryllium	0.00		ng/l				80-120			U
Cadmium	0.00		ng/l				80-120			U
Calcium	9.02E7		ng/l	1.0040E8		89.9	80-120			
Chromium	0.00		ng/l				80-120			U
Cobalt	0.00		ng/l				80-120			U
Copper	0.00		ng/l				80-120			U
Iron	1.47E7		ng/l	1.5000E7		98.1	80-120			
Lead	0.00		ng/l				80-120			U
Magnesium	1.59E7		ng/l	1.5000E7		106	80-120			
Manganese	0.00		ng/l				80-120			U
Molybdenum	294000		ng/l	300000		97.9	80-120			
Nickel	0.00		ng/l				80-120			U
Phosphorus	1.69E7		ng/l	1.5000E7		112	80-120			
Potassium	1.53E7		ng/l	1.5000E7		102	80-120			
Rubidium	0.00		ng/l				80-120			U
Selenium	0.00		ng/l				80-120			U
Sodium	1.59E7		ng/l	1.5000E7		106	80-120			
Strontium	0.00		ng/l				80-120			U
Thallium	0.00		ng/l				80-120			U
Thorium	0.00		ng/l				80-120			U
Uranium	0.00		ng/l				80-120			U
Vanadium	0.00		ng/l				80-120			U
Zinc	0.00		ng/l				80-120			U
Interference Check B (2311061-IFB1)				Prepared & Analyzed: 11/22/23						
Aluminum	1.79E7		ng/l	1.6500E7		109	80-120			
Antimony	20100		ng/l	20000		101	80-120			
Arsenic	20500		ng/l	20000		103	80-120			
Barium	206000		ng/l	200000		103	80-120			
Beryllium	4690		ng/l	5000.0		93.9	80-120			
Cadmium	19300		ng/l	20000		96.4	80-120			

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AQS SITE CODE:
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Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes

Inorganics by Compendium Method IO-3.5 - Quality Control

Batch 2311061 - B3K2104

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Interference Check B (2311061-IFB1) Co				Prepared & Analyzed: 11/22/23						
Calcium	1.16E8		ng/l	1.2540E8		92.9	80-120			
Chromium	219000		ng/l	240000		91.0	80-120			
Cobalt	51900		ng/l	50000		104	80-120			
Copper	1.89E6		ng/l	2.0000E6		94.7	80-120			
Iron	1.77E7		ng/l	1.7500E7		101	80-120			
Lead	204000		ng/l	200000		102	80-120			
Magnesium	1.80E7		ng/l	1.6000E7		112	80-120			
Manganese	535000		ng/l	500000		107	80-120			
Molybdenum	343000		ng/l	350000		98.0	80-120			
Nickel	120000		ng/l	120000		99.8	80-120			
Phosphorus	1.81E7		ng/l	1.5200E7		119	80-120			
Potassium	1.88E7		ng/l	1.7500E7		107	80-120			
Rubidium	10200		ng/l	10000		102	80-120			
Selenium	19300		ng/l	20000		96.7	80-120			
Sodium	1.99E7		ng/l	1.7500E7		114	80-120			
Strontium	50000		ng/l	50000		100	80-120			
Thallium	511		ng/l	500.00		102	80-120			
Thorium	528		ng/l	500.00		106	80-120			
Uranium	531		ng/l	500.00		106	80-120			
Vanadium	17400		ng/l	20000		87.2	80-120			
Zinc	486000		ng/l	500000		97.2	80-120			

Batch 2311063 - B3K2104

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Calibration Blank (2311063-CCB1)				Prepared & Analyzed: 11/24/23						
Beryllium	-0.134		ng/l							U
Calibration Blank (2311063-CCB2)				Prepared & Analyzed: 11/24/23						
Beryllium	-0.893		ng/l							U
Calibration Blank (2311063-CCB3)				Prepared & Analyzed: 11/24/23						
Beryllium	-1.67		ng/l							U
Calibration Check (2311063-CCV1)				Prepared & Analyzed: 11/24/23						
Beryllium	4570		ng/l	5000.0		91.4	90-110			
Calibration Check (2311063-CCV2)				Prepared & Analyzed: 11/24/23						
Beryllium	4680		ng/l	5000.0		93.6	90-110			
Calibration Check (2311063-CCV3)				Prepared & Analyzed: 11/24/23						
Beryllium	4560		ng/l	5000.0		91.2	90-110			
High Cal Check (2311063-HCV1)				Prepared & Analyzed: 11/24/23						
Beryllium	9800		ng/l	10000		98.0	95-105			

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Inorganics by Compendium Method IO-3.5 - Quality Control

Batch 2311063 - B3K2104

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Initial Cal Blank (2311063-ICB1)				Prepared & Analyzed: 11/24/23						
Beryllium	-0.0416		ng/l							U
Initial Cal Check (2311063-ICV1)				Prepared & Analyzed: 11/24/23						
Beryllium	4580		ng/l	5000.0		91.6	90-110			
Interference Check A (2311063-IFA1)				Prepared & Analyzed: 11/24/23						
Beryllium	0.00		ng/l				80-120			U
Interference Check B (2311063-IFB1)				Prepared & Analyzed: 11/24/23						
Beryllium	4610		ng/l	5000.0		92.2	80-120			
Batch B3K2104 - ICP-MS Extraction										
Blank (B3K2104-BLK1)				Prepared: 11/21/23 Analyzed: 11/22/23						
Aluminum	ND	32.1	ng/m³ Air							U
Antimony	ND	0.0441	ng/m³ Air							U, SL
Arsenic	ND	0.00955	ng/m³ Air							U
Barium	ND	0.948	ng/m³ Air							U
Beryllium	ND	0.00332	ng/m³ Air							U
Cadmium	ND	0.109	ng/m³ Air							U
Calcium	ND	292	ng/m³ Air							U
Chromium	ND	2.03	ng/m³ Air							U
Cobalt	ND	0.0156	ng/m³ Air							U
Copper	ND	3.00	ng/m³ Air							U
Iron	ND	24.2	ng/m³ Air							U
Lead	ND	0.276	ng/m³ Air							U
Magnesium	ND	96.4	ng/m³ Air							U
Manganese	ND	1.19	ng/m³ Air							U
Molybdenum	ND	0.213	ng/m³ Air							U
Nickel	ND	0.801	ng/m³ Air							U
Phosphorus	ND	1250	ng/m³ Air							U, GC-BS
Potassium	ND	38.0	ng/m³ Air							U
Rubidium	ND	0.0183	ng/m³ Air							U
Selenium	ND	0.0110	ng/m³ Air							U
Sodium	ND	2000	ng/m³ Air							U
Strontium	ND	0.652	ng/m³ Air							U
Thallium	ND	5.03E-4	ng/m³ Air							U
Thorium	ND	0.00300	ng/m³ Air							U
Uranium	ND	0.0170	ng/m³ Air							U
Vanadium	ND	0.0492	ng/m³ Air							U
Zinc	ND	97.7	ng/m³ Air							U
LCS (B3K2104-BS1)				Prepared: 11/21/23 Analyzed: 11/22/23						

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Inorganics by Compendium Method IO-3.5 - Quality Control

Batch B3K2104 - ICP-MS Extraction

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
LCS (B3K2104-BS1) Continued				Prepared: 11/21/23	Analyzed: 11/22/23					
Aluminum	87.7	32.1	ng/m³ Air	82.975		106	80-120			
Antimony	0.896	0.0441	ng/m³ Air	1.3829		64.8	80-120			SL
Arsenic	2.67	0.00955	ng/m³ Air	2.7658		96.5	80-120			
Barium	27.8	0.948	ng/m³ Air	27.658		101	80-120			
Beryllium	1.33	0.00332	ng/m³ Air	1.3829		96.3	80-120			
Cadmium	1.38	0.109	ng/m³ Air	1.3829		99.5	80-120			
Calcium	ND	292	ng/m³ Air	69.146			80-120			U
Chromium	14.0	2.03	ng/m³ Air	13.829		101	80-120			
Cobalt	1.39	0.0156	ng/m³ Air	1.3829		101	80-120			
Copper	29.8	3.00	ng/m³ Air	27.658		108	80-120			
Iron	36.2	24.2	ng/m³ Air	27.658		131	80-120			
Lead	13.5	0.276	ng/m³ Air	13.829		97.4	80-120			
Magnesium	ND	96.4	ng/m³ Air	27.658			80-120			U
Manganese	8.26	1.19	ng/m³ Air	8.2975		99.5	80-120			
Molybdenum	1.43	0.213	ng/m³ Air	1.3829		103	80-120			
Nickel	2.96	0.801	ng/m³ Air	2.7658		107	80-120			
Phosphorus	ND	1250	ng/m³ Air	13.829			80-120			U, GC-BS
Potassium	61.3	38.0	ng/m³ Air	55.317		111	80-120			
Rubidium	1.33	0.0183	ng/m³ Air	1.3829		96.4	80-120			
Selenium	2.63	0.0110	ng/m³ Air	2.7658		95.1	80-120			
Sodium	ND	2000	ng/m³ Air	55.317			80-120			U, GC-BS
Strontium	1.63	0.652	ng/m³ Air	1.3829		118	80-120			
Thallium	0.128	5.03E-4	ng/m³ Air	0.13829		92.8	80-120			
Thorium	0.129	0.00300	ng/m³ Air	0.13829		93.4	80-120			
Uranium	0.127	0.0170	ng/m³ Air	0.13829		91.8	80-120			
Vanadium	2.70	0.0492	ng/m³ Air	2.7658		97.7	80-120			
Zinc	111	97.7	ng/m³ Air	82.975		133	80-120			
LCS (B3K2104-BS2)				Prepared: 11/21/23	Analyzed: 11/22/23					
Aluminum	77.1	32.1	ng/m³ Air	82.975		92.9	80-120			
Antimony	1.34	0.0441	ng/m³ Air	1.3829		97.0	80-120			SL
Arsenic	2.62	0.00955	ng/m³ Air	2.7658		94.8	80-120			
Barium	26.8	0.948	ng/m³ Air	27.658		96.9	80-120			
Beryllium	1.41	0.00332	ng/m³ Air	1.3829		102	80-120			
Cadmium	1.37	0.109	ng/m³ Air	1.3829		98.9	80-120			
Calcium	ND	292	ng/m³ Air	69.146			80-120			U, LJ
Chromium	13.2	2.03	ng/m³ Air	13.829		95.6	80-120			
Cobalt	1.36	0.0156	ng/m³ Air	1.3829		98.2	80-120			
Copper	29.0	3.00	ng/m³ Air	27.658		105	80-120			

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AQS SITE CODE:
SITE CODE: Maui fires

Inorganics by Compendium Method IO-3.5 - Quality Control

Batch B3K2104 - ICP-MS Extraction

LCS (B3K2104-BS2) Continued Prepared: 11/21/23 Analyzed: 11/22/23

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Iron	25.8	24.2	ng/m³ Air	27.658		93.4	80-120			
Lead	13.3	0.276	ng/m³ Air	13.829		96.3	80-120			
Magnesium	ND	96.4	ng/m³ Air	27.658			80-120			U
Manganese	7.88	1.19	ng/m³ Air	8.2975		95.0	80-120			
Molybdenum	1.33	0.213	ng/m³ Air	1.3829		96.5	80-120			
Nickel	2.69	0.801	ng/m³ Air	2.7658		97.3	80-120			
Phosphorus	ND	1250	ng/m³ Air	13.829			80-120			U, GC-BS
Potassium	54.3	38.0	ng/m³ Air	55.317		98.1	80-120			
Rubidium	1.32	0.0183	ng/m³ Air	1.3829		95.4	80-120			
Selenium	2.62	0.0110	ng/m³ Air	2.7658		94.8	80-120			
Sodium	ND	2000	ng/m³ Air	55.317			80-120			U
Strontium	1.34	0.652	ng/m³ Air	1.3829		97.1	80-120			
Thallium	0.129	5.03E-4	ng/m³ Air	0.13829		93.0	80-120			
Thorium	0.126	0.00300	ng/m³ Air	0.13829		90.9	80-120			
Uranium	0.124	0.0170	ng/m³ Air	0.13829		90.0	80-120			
Vanadium	2.69	0.0492	ng/m³ Air	2.7658		97.2	80-120			
Zinc	ND	97.7	ng/m³ Air	82.975			80-120			U

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Notes and Definitions

U	Under Detection Limit
SL	The spike recovery was outside acceptance limits. Reported value may be biased low.
LJ	Identification of analyte is acceptable; reported value is an estimate.
GC-BS	Compound exceeds Blank Spike Criteria
D	This result obtained by dilution.
ND	Analyte NOT DETECTED
NR	Not Reported
MDL	Method Detection Limit
RPD	Relative Percent Difference

Note: This test is accredited under the 2016 TNI Standard.

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Eurofins Built Environment Testing
6110 W. 34th Street, Houston, Texas 77092
Phone: (713) 290-0221 Fax: (713) 290-0248
www.EurofinsUS.com/BuiltEnv

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Airborne Asbestos Fiber Analysis by Transmission Electron Microscopy (TEM) ISO 10312 - Ambient Air - Determination of Asbestos Fibers Direct-Transfer Transmission Electron Microscopy Method

Maura McAleese
TetraTech
1999 Harrison St, Suite 500
Oakland, CA 94612

EBET Order #: 3454309
Project #: 1032864023141
Receipt Date: 15-Nov-2023
Analysis Date: 20-Nov-2023
Report Date: 20-Nov-2023

HDOH Kula Community Air

Sample Number **MFK-AMO1-111023-AB**

Air Volume:	2261.714
Effective Filter Area:	385.0 mm^2
Level of Analysis (Chrysotile):	CDQ
Level of Analysis (Amphibole):	ADQ
Magnification Used for Fiber Counting:	20,000
Aspect Ratio for Fiber Definition:	5:1
Mean Dimension of Grid Openings (GOs):	0.0132 mm^2
Initials of Analyst:	WC
Number of GO's Examined:	10
Analytical Sensitivity: f/Liter:	1.28958
Analytical Sensitivity: f/cm3:	0.00129
Number of primary asbestos structures:	0
Number of asbestos structures counted:	0
Number of asbestos structures > 5 um :	0
Number of asbestos fibers and bundles > 5 um:	0
Number of PCM equivalent asbestos structures:	0
Number of PCM equivalent asbestos fibers:	0
Concentration of Asbestos (Chrysotile) f/cm3:	<0.00129
Concentration of Asbestos (Amphibole) f/cm3:	<0.00129
Concentration of PCME Asbestos (Chrysotile) f/cm3:	<0.00129
Concentration of Asbestos (Chrysotile), Str/L:	0
Concentration of Asbestos (Amphibole), Str/L:	0
Lower 95% Confidence Limit (Chrysotile), Str/L:	0
Upper 95% Confidence Limit (Chrysotile), Str/L:	4.8
Lower 95% Confidence Limit (Amphibole), Str/L:	0
Upper 95% Confidence Limit (Amphibole), Str/L:	4.8

Analyst: William Colbert

Scott M. Ward, Ph.D. **Lab Director**

This report relates only to the samples tested. Eurofins Built Environment Testing (EBET) is not responsible for results reported in fibers or asbestos structures per cubic centimeter, which is dependent on volumes provided by non-laboratory personnel. This report is for the exclusive use of the addressed client and shall not be reproduced except in full, without written approval by EBET. All samples received in good condition unless otherwise noted. This report shall not be used to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the federal government.

NVLAP Lab Code: 200525-0; TDSHS License: 30-0273

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Airborne Asbestos Fiber Analysis by Transmission Electron Microscopy (TEM) ISO 10312 - Ambient Air - Determination of Asbestos Fibers Direct-Transfer Transmission Electron Microscopy Method

Maura McAleese
TetraTech
1999 Harrison St, Suite 500
Oakland, CA 94612

EBET Order #: 3454309
Project #: 1032864023141
Receipt Date: 15-Nov-2023
Analysis Date: 20-Nov-2023
Report Date: 20-Nov-2023

HDOH Kula Community Air

Sample Number **MFK-AMO2-111023-AB**

Air Volume:	2885.531
Effective Filter Area:	385.0 mm^2
Level of Analysis (Chrysotile):	CDQ
Level of Analysis (Amphibole):	ADQ
Magnification Used for Fiber Counting:	20,000
Aspect Ratio for Fiber Definition:	5:1
Mean Dimension of Grid Openings (GOs):	0.0132 mm^2
Initials of Analyst:	WC
Number of GO's Examined:	10
Analytical Sensitivity: f/Liter:	1.01079
Analytical Sensitivity: f/cm3:	0.00101
Number of primary asbestos structures:	0
Number of asbestos structures counted:	0
Number of asbestos structures > 5 um :	0
Number of asbestos fibers and bundles > 5 um:	0
Number of PCM equivalent asbestos structures:	0
Number of PCM equivalent asbestos fibers:	0
Concentration of Asbestos (Chrysotile) f/cm3:	<0.00101
Concentration of Asbestos (Amphibole) f/cm3:	<0.00101
Concentration of PCME Asbestos (Chrysotile) f/cm3:	<0.00101
Concentration of Asbestos (Chrysotile), Str/L:	0
Concentration of Asbestos (Amphibole), Str/L:	0
Lower 95% Confidence Limit (Chrysotile), Str/L:	0
Upper 95% Confidence Limit (Chrysotile), Str/L:	3.7
Lower 95% Confidence Limit (Amphibole), Str/L:	0
Upper 95% Confidence Limit (Amphibole), Str/L:	3.7

Analyst: William Colbert

Scott M. Ward, Ph.D. **Lab Director**

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Airborne Asbestos Fiber Analysis
by Transmission Electron Microscopy (TEM)
ISO 10312 - Ambient Air - Determination of Asbestos Fibers
Direct-Transfer Transmission Electron Microscopy Method

Maura McAleese
TetraTech
1999 Harrison St, Suite 500
Oakland, CA 94612

EBET Order #: 3454309
Project #: 1032864023141
Receipt Date: 15-Nov-2023
Analysis Date: 20-Nov-2023
Report Date: 20-Nov-2023

HDOH Kula Community Air

Sample Number **MFK-AMO3-111023-AB**

Air Volume:	3312.221
Effective Filter Area:	385.0 mm^2
Level of Analysis (Chrysotile):	CDQ
Level of Analysis (Amphibole):	ADQ
Magnification Used for Fiber Counting:	20,000
Aspect Ratio for Fiber Definition:	5:1
Mean Dimension of Grid Openings (GOs):	0.0132 mm^2
Initials of Analyst:	WC
Number of GO's Examined:	10
Analytical Sensitivity: f/Liter:	0.88058
Analytical Sensitivity: f/cm3:	0.00088
Number of primary asbestos structures:	0
Number of asbestos structures counted:	0
Number of asbestos structures > 5 um :	0
Number of asbestos fibers and bundles > 5 um:	0
Number of PCM equivalent asbestos structures:	0
Number of PCM equivalent asbestos fibers:	0
Concentration of Asbestos (Chrysotile) f/cm3:	<0.00088
Concentration of Asbestos (Amphibole) f/cm3:	<0.00088
Concentration of PCME Asbestos (Chrysotile) f/cm3:	<0.00088
Concentration of Asbestos (Chrysotile), Str/L:	0
Concentration of Asbestos (Amphibole), Str/L:	0
Lower 95% Confidence Limit (Chrysotile), Str/L:	0
Upper 95% Confidence Limit (Chrysotile), Str/L:	3.2
Lower 95% Confidence Limit (Amphibole), Str/L:	0
Upper 95% Confidence Limit (Amphibole), Str/L:	3.2

Analyst: William Colbert

Scott M. Ward, Ph.D. **Lab Director**

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HDOH Kula Community Air

Sample Number **MFK-AMO1-111123-AB**

Air Volume:	5658.48
Effective Filter Area:	385.0 mm^2
Level of Analysis (Chrysotile):	CDQ
Level of Analysis (Amphibole):	ADQ
Magnification Used for Fiber Counting:	20,000
Aspect Ratio for Fiber Definition:	5:1
Mean Dimension of Grid Openings (GOs):	0.0132 mm^2
Initials of Analyst:	WC
Number of GO's Examined:	10
Analytical Sensitivity: f/Liter:	0.51545
Analytical Sensitivity: f/cm3:	0.00052
Number of primary asbestos structures:	0
Number of asbestos structures counted:	0
Number of asbestos structures > 5 um :	0
Number of asbestos fibers and bundles > 5 um:	0
Number of PCM equivalent asbestos structures:	0
Number of PCM equivalent asbestos fibers:	0
Concentration of Asbestos (Chrysotile) f/cm3:	<0.00052
Concentration of Asbestos (Amphibole) f/cm3:	<0.00052
Concentration of PCME Asbestos (Chrysotile) f/cm3:	<0.00052
Concentration of Asbestos (Chrysotile), Str/L:	0
Concentration of Asbestos (Amphibole), Str/L:	0
Lower 95% Confidence Limit (Chrysotile), Str/L:	0
Upper 95% Confidence Limit (Chrysotile), Str/L:	1.9
Lower 95% Confidence Limit (Amphibole), Str/L:	0
Upper 95% Confidence Limit (Amphibole), Str/L:	1.9

Analyst: William Colbert

Scott M. Ward, Ph.D. **Lab Director**

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HDOH Kula Community Air

Sample Number **MFK-AMO2-111123-AB**

Air Volume:	5148.37
Effective Filter Area:	385.0 mm^2
Level of Analysis (Chrysotile):	CDQ
Level of Analysis (Amphibole):	ADQ
Magnification Used for Fiber Counting:	20,000
Aspect Ratio for Fiber Definition:	5:1
Mean Dimension of Grid Openings (GOs):	0.0132 mm^2
Initials of Analyst:	WC
Number of GO's Examined:	10
Analytical Sensitivity: f/Liter:	0.56652
Analytical Sensitivity: f/cm3:	0.00057
Number of primary asbestos structures:	0
Number of asbestos structures counted:	0
Number of asbestos structures > 5 um :	0
Number of asbestos fibers and bundles > 5 um:	0
Number of PCM equivalent asbestos structures:	0
Number of PCM equivalent asbestos fibers:	0
Concentration of Asbestos (Chrysotile) f/cm3:	<0.00057
Concentration of Asbestos (Amphibole) f/cm3:	<0.00057
Concentration of PCME Asbestos (Chrysotile) f/cm3:	<0.00057
Concentration of Asbestos (Chrysotile), Str/L:	0
Concentration of Asbestos (Amphibole), Str/L:	0
Lower 95% Confidence Limit (Chrysotile), Str/L:	0
Upper 95% Confidence Limit (Chrysotile), Str/L:	2.1
Lower 95% Confidence Limit (Amphibole), Str/L:	0
Upper 95% Confidence Limit (Amphibole), Str/L:	2.1

Analyst: William Colbert

Scott M. Ward, Ph.D. **Lab Director**

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HDOH Kula Community Air

Sample Number **MFK-AMO3-111123-AB**

Air Volume:	6677.049
Effective Filter Area:	385.0 mm^2
Level of Analysis (Chrysotile):	CDQ
Level of Analysis (Amphibole):	ADQ
Magnification Used for Fiber Counting:	20,000
Aspect Ratio for Fiber Definition:	5:1
Mean Dimension of Grid Openings (GOs):	0.0132 mm^2
Initials of Analyst:	WC
Number of GO's Examined:	10
Analytical Sensitivity: f/Liter:	0.43682
Analytical Sensitivity: f/cm3:	0.00044
Number of primary asbestos structures:	0
Number of asbestos structures counted:	0
Number of asbestos structures > 5 um :	0
Number of asbestos fibers and bundles > 5 um:	0
Number of PCM equivalent asbestos structures:	0
Number of PCM equivalent asbestos fibers:	0
Concentration of Asbestos (Chrysotile) f/cm3:	<0.00044
Concentration of Asbestos (Amphibole) f/cm3:	<0.00044
Concentration of PCME Asbestos (Chrysotile) f/cm3:	<0.00044
Concentration of Asbestos (Chrysotile), Str/L:	0
Concentration of Asbestos (Amphibole), Str/L:	0
Lower 95% Confidence Limit (Chrysotile), Str/L:	0
Upper 95% Confidence Limit (Chrysotile), Str/L:	1.6
Lower 95% Confidence Limit (Amphibole), Str/L:	0
Upper 95% Confidence Limit (Amphibole), Str/L:	1.6

Analyst: William Colbert

Scott M. Ward, Ph.D. **Lab Director**

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HDOH Kula Community Air

Sample Number **MFK-AMO1-111223-AB**

Air Volume:	5121.496
Effective Filter Area:	385.0 mm^2
Level of Analysis (Chrysotile):	CDQ
Level of Analysis (Amphibole):	ADQ
Magnification Used for Fiber Counting:	20,000
Aspect Ratio for Fiber Definition:	5:1
Mean Dimension of Grid Openings (GOs):	0.0132 mm^2
Initials of Analyst:	WC
Number of GO's Examined:	10
Analytical Sensitivity: f/Liter:	0.56950
Analytical Sensitivity: f/cm3:	0.00057
Number of primary asbestos structures:	0
Number of asbestos structures counted:	0
Number of asbestos structures > 5 um :	0
Number of asbestos fibers and bundles > 5 um:	0
Number of PCM equivalent asbestos structures:	0
Number of PCM equivalent asbestos fibers:	0
Concentration of Asbestos (Chrysotile) f/cm3:	<0.00057
Concentration of Asbestos (Amphibole) f/cm3:	<0.00057
Concentration of PCME Asbestos (Chrysotile) f/cm3:	<0.00057
Concentration of Asbestos (Chrysotile), Str/L:	0
Concentration of Asbestos (Amphibole), Str/L:	0
Lower 95% Confidence Limit (Chrysotile), Str/L:	0
Upper 95% Confidence Limit (Chrysotile), Str/L:	2.1
Lower 95% Confidence Limit (Amphibole), Str/L:	0
Upper 95% Confidence Limit (Amphibole), Str/L:	2.1

Analyst: William Colbert

Scott M. Ward, Ph.D. **Lab Director**

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HDOH Kula Community Air

Sample Number **MFK-AMO2-111223-AB**

Air Volume:	4696.992
Effective Filter Area:	385.0 mm^2
Level of Analysis (Chrysotile):	CDQ
Level of Analysis (Amphibole):	ADQ
Magnification Used for Fiber Counting:	20,000
Aspect Ratio for Fiber Definition:	5:1
Mean Dimension of Grid Openings (GOs):	0.0132 mm^2
Initials of Analyst:	WC
Number of GO's Examined:	10
Analytical Sensitivity: f/Liter:	0.62096
Analytical Sensitivity: f/cm3:	0.00062
Number of primary asbestos structures:	0
Number of asbestos structures counted:	0
Number of asbestos structures > 5 um :	0
Number of asbestos fibers and bundles > 5 um:	0
Number of PCM equivalent asbestos structures:	0
Number of PCM equivalent asbestos fibers:	0
Concentration of Asbestos (Chrysotile) f/cm3:	<0.00062
Concentration of Asbestos (Amphibole) f/cm3:	<0.00062
Concentration of PCME Asbestos (Chrysotile) f/cm3:	<0.00062
Concentration of Asbestos (Chrysotile), Str/L:	0
Concentration of Asbestos (Amphibole), Str/L:	0
Lower 95% Confidence Limit (Chrysotile), Str/L:	0
Upper 95% Confidence Limit (Chrysotile), Str/L:	2.3
Lower 95% Confidence Limit (Amphibole), Str/L:	0
Upper 95% Confidence Limit (Amphibole), Str/L:	2.3

Analyst: William Colbert

Scott M. Ward, Ph.D. **Lab Director**

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HDOH Kula Community Air

Sample Number **MFK-AMO3-111223-AB**

Air Volume:	5134.032
Effective Filter Area:	385.0 mm^2
Level of Analysis (Chrysotile):	CDQ
Level of Analysis (Amphibole):	ADQ
Magnification Used for Fiber Counting:	20,000
Aspect Ratio for Fiber Definition:	5:1
Mean Dimension of Grid Openings (GOs):	0.0132 mm^2
Initials of Analyst:	WC
Number of GO's Examined:	10
Analytical Sensitivity: f/Liter:	0.56810
Analytical Sensitivity: f/cm3:	0.00057
Number of primary asbestos structures:	0
Number of asbestos structures counted:	0
Number of asbestos structures > 5 um :	0
Number of asbestos fibers and bundles > 5 um:	0
Number of PCM equivalent asbestos structures:	0
Number of PCM equivalent asbestos fibers:	0
Concentration of Asbestos (Chrysotile) f/cm3:	<0.00057
Concentration of Asbestos (Amphibole) f/cm3:	<0.00057
Concentration of PCME Asbestos (Chrysotile) f/cm3:	<0.00057
Concentration of Asbestos (Chrysotile), Str/L:	0
Concentration of Asbestos (Amphibole), Str/L:	0
Lower 95% Confidence Limit (Chrysotile), Str/L:	0
Upper 95% Confidence Limit (Chrysotile), Str/L:	2.1
Lower 95% Confidence Limit (Amphibole), Str/L:	0
Upper 95% Confidence Limit (Amphibole), Str/L:	2.1

Analyst: William Colbert

Scott M. Ward, Ph.D. **Lab Director**

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Report for:

Maura McAleese
Tetra Tech- Maui Fire
1999 Harrison St. Ste. 500
Oakland, CA 94612

Regarding: Eurofins J3 Resources, Inc.
Project: 103286402341; HDOH Kula Community Air
EML ID: 3458356

Approved by:

Lab Director
Scott Ward

Dates of Analysis:
Asbestos TEM ISO 10312 / ASTM6281-06: 11-27-2023

All samples were received in acceptable condition unless noted in the Report Comments portion in the body of the report. Due to the nature of the analyses performed, field blank correction of results is not applied. The results relate only to the samples as received and tested.

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Airborne Asbestos Fiber Analysis by Transmission Electron Microscopy (TEM) ISO 10312 - Ambient Air - Determination of Asbestos Fibers Direct-Transfer Transmission Electron Microscopy Method

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EJ3 Order #: 3458356
Project #: 103286402341.00
Receipt Date: 20-Nov-2023
Analysis Date: 27-Nov-2023
Report Date: 27-Nov-2023

HDOH Kula Community Air

Sample Number **MFK-AM01-111323-AB**

Air Volume:	7394.855
Effective Filter Area:	385.0 mm^2
Level of Analysis (Chrysotile):	CDQ
Level of Analysis (Amphibole):	ADQ
Magnification Used for Fiber Counting:	20,000
Aspect Ratio for Fiber Definition:	5:1
Mean Dimension of Grid Openings (GOs):	0.0132 mm^2
Initials of Analyst:	TS
Number of GO's Examined:	10
Analytical Sensitivity: f/Liter:	0.39442
Analytical Sensitivity: f/cm3:	0.00039
Number of primary asbestos structures:	0
Number of asbestos structures counted:	0
Number of asbestos structures > 5 um :	0
Number of asbestos fibers and bundles > 5 um:	0
Number of PCM equivalent asbestos structures:	0
Number of PCM equivalent asbestos fibers:	0
Concentration of Asbestos (Chrysotile) f/cm3:	<0.00039
Concentration of Asbestos (Amphibole) f/cm3:	<0.00039
Concentration of PCME Asbestos (Chrysotile) f/cm3:	<0.00039
Concentration of Asbestos (Chrysotile), Str/L:	0
Concentration of Asbestos (Amphibole), Str/L:	0
Lower 95% Confidence Limit (Chrysotile), Str/L:	0
Upper 95% Confidence Limit (Chrysotile), Str/L:	1.5
Lower 95% Confidence Limit (Amphibole), Str/L:	0
Upper 95% Confidence Limit (Amphibole), Str/L:	1.5

Analyst: Taylor Smylie

Scott M. Ward, Ph.D. **Lab Director**

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EJ3 Order #: 3458356
Project #: 103286402341.00
Receipt Date: 20-Nov-2023
Analysis Date: 27-Nov-2023
Report Date: 27-Nov-2023

HDOH Kula Community Air

Sample Number **MFK-AM02-111323-AB**

Air Volume:	7670.678
Effective Filter Area:	385.0 mm^2
Level of Analysis (Chrysotile):	CDQ
Level of Analysis (Amphibole):	ADQ
Magnification Used for Fiber Counting:	20,000
Aspect Ratio for Fiber Definition:	5:1
Mean Dimension of Grid Openings (GOs):	0.0132 mm^2
Initials of Analyst:	TS
Number of GO's Examined:	10
Analytical Sensitivity: f/Liter:	0.38024
Analytical Sensitivity: f/cm3:	0.00038
Number of primary asbestos structures:	0
Number of asbestos structures counted:	0
Number of asbestos structures > 5 um :	0
Number of asbestos fibers and bundles > 5 um:	0
Number of PCM equivalent asbestos structures:	0
Number of PCM equivalent asbestos fibers:	0
Concentration of Asbestos (Chrysotile) f/cm3:	<0.00038
Concentration of Asbestos (Amphibole) f/cm3:	<0.00038
Concentration of PCME Asbestos (Chrysotile) f/cm3:	<0.00038
Concentration of Asbestos (Chrysotile), Str/L:	0
Concentration of Asbestos (Amphibole), Str/L:	0
Lower 95% Confidence Limit (Chrysotile), Str/L:	0
Upper 95% Confidence Limit (Chrysotile), Str/L:	1.4
Lower 95% Confidence Limit (Amphibole), Str/L:	0
Upper 95% Confidence Limit (Amphibole), Str/L:	1.4

Analyst: Taylor Smylie

Scott M. Ward, Ph.D. **Lab Director**

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Oakland, CA 94612

EJ3 Order #: 3458356
Project #: 103286402341.00
Receipt Date: 20-Nov-2023
Analysis Date: 27-Nov-2023
Report Date: 27-Nov-2023

HDOH Kula Community Air

Sample Number **MFK-AM03-111323-AB**

Air Volume:	4540.176
Effective Filter Area:	385.0 mm^2
Level of Analysis (Chrysotile):	CDQ
Level of Analysis (Amphibole):	ADQ
Magnification Used for Fiber Counting:	20,000
Aspect Ratio for Fiber Definition:	5:1
Mean Dimension of Grid Openings (GOs):	0.0132 mm^2
Initials of Analyst:	TS
Number of GO's Examined:	10
Analytical Sensitivity: f/Liter:	0.64241
Analytical Sensitivity: f/cm3:	0.00064
Number of primary asbestos structures:	0
Number of asbestos structures counted:	0
Number of asbestos structures > 5 um :	0
Number of asbestos fibers and bundles > 5 um:	0
Number of PCM equivalent asbestos structures:	0
Number of PCM equivalent asbestos fibers:	0
Concentration of Asbestos (Chrysotile) f/cm3:	<0.00064
Concentration of Asbestos (Amphibole) f/cm3:	<0.00064
Concentration of PCME Asbestos (Chrysotile) f/cm3:	<0.00064
Concentration of Asbestos (Chrysotile), Str/L:	0
Concentration of Asbestos (Amphibole), Str/L:	0
Lower 95% Confidence Limit (Chrysotile), Str/L:	0
Upper 95% Confidence Limit (Chrysotile), Str/L:	2.4
Lower 95% Confidence Limit (Amphibole), Str/L:	0
Upper 95% Confidence Limit (Amphibole), Str/L:	2.4

Analyst: Taylor Smylie

Scott M. Ward, Ph.D. **Lab Director**

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Airborne Asbestos Fiber Analysis by Transmission Electron Microscopy (TEM) ISO 10312 - Ambient Air - Determination of Asbestos Fibers Direct-Transfer Transmission Electron Microscopy Method

Maura McAleese
Tetra Tech - Maui Fire
1999 Harrison St. Ste. 500
Oakland, CA 94612

EJ3 Order #: 3458356
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Receipt Date: 20-Nov-2023
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HDOH Kula Community Air

Sample Number **MFK-AM01-111423-AB**

Air Volume:	7307.402
Effective Filter Area:	385.0 mm^2
Level of Analysis (Chrysotile):	CDQ
Level of Analysis (Amphibole):	ADQ
Magnification Used for Fiber Counting:	20,000
Aspect Ratio for Fiber Definition:	5:1
Mean Dimension of Grid Openings (GOs):	0.0132 mm^2
Initials of Analyst:	TS
Number of GO's Examined:	10
Analytical Sensitivity: f/Liter:	0.39914
Analytical Sensitivity: f/cm3:	0.00040
Number of primary asbestos structures:	0
Number of asbestos structures counted:	0
Number of asbestos structures > 5 um :	0
Number of asbestos fibers and bundles > 5 um:	0
Number of PCM equivalent asbestos structures:	0
Number of PCM equivalent asbestos fibers:	0
Concentration of Asbestos (Chrysotile) f/cm3:	<0.00040
Concentration of Asbestos (Amphibole) f/cm3:	<0.00040
Concentration of PCME Asbestos (Chrysotile) f/cm3:	<0.00040
Concentration of Asbestos (Chrysotile), Str/L:	0
Concentration of Asbestos (Amphibole), Str/L:	0
Lower 95% Confidence Limit (Chrysotile), Str/L:	0
Upper 95% Confidence Limit (Chrysotile), Str/L:	1.5
Lower 95% Confidence Limit (Amphibole), Str/L:	0
Upper 95% Confidence Limit (Amphibole), Str/L:	1.5

Analyst: Taylor Smylie

Scott M. Ward, Ph.D. **Lab Director**

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HDOH Kula Community Air

Sample Number **MFK-AM02-111423-AB**

Air Volume:	8400.285
Effective Filter Area:	385.0 mm^2
Level of Analysis (Chrysotile):	CDQ
Level of Analysis (Amphibole):	ADQ
Magnification Used for Fiber Counting:	20,000
Aspect Ratio for Fiber Definition:	5:1
Mean Dimension of Grid Openings (GOs):	0.0132 mm^2
Initials of Analyst:	TS
Number of GO's Examined:	10
Analytical Sensitivity: f/Liter:	0.34721
Analytical Sensitivity: f/cm3:	0.00035
Number of primary asbestos structures:	0
Number of asbestos structures counted:	0
Number of asbestos structures > 5 um :	0
Number of asbestos fibers and bundles > 5 um:	0
Number of PCM equivalent asbestos structures:	0
Number of PCM equivalent asbestos fibers:	0
Concentration of Asbestos (Chrysotile) f/cm3:	<0.00035
Concentration of Asbestos (Amphibole) f/cm3:	<0.00035
Concentration of PCME Asbestos (Chrysotile) f/cm3:	<0.00035
Concentration of Asbestos (Chrysotile), Str/L:	0
Concentration of Asbestos (Amphibole), Str/L:	0
Lower 95% Confidence Limit (Chrysotile), Str/L:	0
Upper 95% Confidence Limit (Chrysotile), Str/L:	1.3
Lower 95% Confidence Limit (Amphibole), Str/L:	0
Upper 95% Confidence Limit (Amphibole), Str/L:	1.3

Analyst: Taylor Smylie

Scott M. Ward, Ph.D. **Lab Director**

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Report Date: 27-Nov-2023

HDOH Kula Community Air

Sample Number **MFK-AM03-111423-AB**

Air Volume:	5086.31
Effective Filter Area:	385.0 mm^2
Level of Analysis (Chrysotile):	CDQ
Level of Analysis (Amphibole):	ADQ
Magnification Used for Fiber Counting:	20,000
Aspect Ratio for Fiber Definition:	5:1
Mean Dimension of Grid Openings (GOs):	0.0132 mm^2
Initials of Analyst:	TS
Number of GO's Examined:	10
Analytical Sensitivity: f/Liter:	0.57343
Analytical Sensitivity: f/cm3:	0.00057
Number of primary asbestos structures:	0
Number of asbestos structures counted:	0
Number of asbestos structures > 5 um :	0
Number of asbestos fibers and bundles > 5 um:	0
Number of PCM equivalent asbestos structures:	0
Number of PCM equivalent asbestos fibers:	0
Concentration of Asbestos (Chrysotile) f/cm3:	<0.00057
Concentration of Asbestos (Amphibole) f/cm3:	<0.00057
Concentration of PCME Asbestos (Chrysotile) f/cm3:	<0.00057
Concentration of Asbestos (Chrysotile), Str/L:	0
Concentration of Asbestos (Amphibole), Str/L:	0
Lower 95% Confidence Limit (Chrysotile), Str/L:	0
Upper 95% Confidence Limit (Chrysotile), Str/L:	2.1
Lower 95% Confidence Limit (Amphibole), Str/L:	0
Upper 95% Confidence Limit (Amphibole), Str/L:	2.1

Analyst: Taylor Smylie

Scott M. Ward, Ph.D. **Lab Director**

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HDOH Kula Community Air

Sample Number **MFK-AM01-111523-AB**

Air Volume:	7228.224
Effective Filter Area:	385.0 mm^2
Level of Analysis (Chrysotile):	CDQ
Level of Analysis (Amphibole):	ADQ
Magnification Used for Fiber Counting:	20,000
Aspect Ratio for Fiber Definition:	5:1
Mean Dimension of Grid Openings (GOs):	0.0132 mm^2
Initials of Analyst:	TS
Number of GO's Examined:	10
Analytical Sensitivity: f/Liter:	0.40351
Analytical Sensitivity: f/cm3:	0.00040
Number of primary asbestos structures:	0
Number of asbestos structures counted:	0
Number of asbestos structures > 5 um :	0
Number of asbestos fibers and bundles > 5 um:	0
Number of PCM equivalent asbestos structures:	0
Number of PCM equivalent asbestos fibers:	0
Concentration of Asbestos (Chrysotile) f/cm3:	<0.00040
Concentration of Asbestos (Amphibole) f/cm3:	<0.00040
Concentration of PCME Asbestos (Chrysotile) f/cm3:	<0.00040
Concentration of Asbestos (Chrysotile), Str/L:	0
Concentration of Asbestos (Amphibole), Str/L:	0
Lower 95% Confidence Limit (Chrysotile), Str/L:	0
Upper 95% Confidence Limit (Chrysotile), Str/L:	1.5
Lower 95% Confidence Limit (Amphibole), Str/L:	0
Upper 95% Confidence Limit (Amphibole), Str/L:	1.5

Analyst: Taylor Smylie

Scott M. Ward, Ph.D. **Lab Director**

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HDOH Kula Community Air

Sample Number **MFK-AM02-111523-AB**

Air Volume:	7311.168
Effective Filter Area:	385.0 mm^2
Level of Analysis (Chrysotile):	CDQ
Level of Analysis (Amphibole):	ADQ
Magnification Used for Fiber Counting:	20,000
Aspect Ratio for Fiber Definition:	5:1
Mean Dimension of Grid Openings (GOs):	0.0132 mm^2
Initials of Analyst:	TS
Number of GO's Examined:	10
Analytical Sensitivity: f/Liter:	0.39893
Analytical Sensitivity: f/cm3:	0.00040
Number of primary asbestos structures:	0
Number of asbestos structures counted:	0
Number of asbestos structures > 5 um :	0
Number of asbestos fibers and bundles > 5 um:	0
Number of PCM equivalent asbestos structures:	0
Number of PCM equivalent asbestos fibers:	0
Concentration of Asbestos (Chrysotile) f/cm3:	<0.00040
Concentration of Asbestos (Amphibole) f/cm3:	<0.00040
Concentration of PCME Asbestos (Chrysotile) f/cm3:	<0.00040
Concentration of Asbestos (Chrysotile), Str/L:	0
Concentration of Asbestos (Amphibole), Str/L:	0
Lower 95% Confidence Limit (Chrysotile), Str/L:	0
Upper 95% Confidence Limit (Chrysotile), Str/L:	1.5
Lower 95% Confidence Limit (Amphibole), Str/L:	0
Upper 95% Confidence Limit (Amphibole), Str/L:	1.5

Analyst: Taylor Smylie

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HDOH Kula Community Air

Sample Number **MFK-AM03-111523-AB**

Air Volume:	6445.728
Effective Filter Area:	385.0 mm^2
Level of Analysis (Chrysotile):	CDQ
Level of Analysis (Amphibole):	ADQ
Magnification Used for Fiber Counting:	20,000
Aspect Ratio for Fiber Definition:	5:1
Mean Dimension of Grid Openings (GOs):	0.0132 mm^2
Initials of Analyst:	TS
Number of GO's Examined:	10
Analytical Sensitivity: f/Liter:	0.45250
Analytical Sensitivity: f/cm3:	0.00045
Number of primary asbestos structures:	0
Number of asbestos structures counted:	0
Number of asbestos structures > 5 um :	0
Number of asbestos fibers and bundles > 5 um:	0
Number of PCM equivalent asbestos structures:	0
Number of PCM equivalent asbestos fibers:	0
Concentration of Asbestos (Chrysotile) f/cm3:	<0.00045
Concentration of Asbestos (Amphibole) f/cm3:	<0.00045
Concentration of PCME Asbestos (Chrysotile) f/cm3:	<0.00045
Concentration of Asbestos (Chrysotile), Str/L:	0
Concentration of Asbestos (Amphibole), Str/L:	0
Lower 95% Confidence Limit (Chrysotile), Str/L:	0
Upper 95% Confidence Limit (Chrysotile), Str/L:	1.7
Lower 95% Confidence Limit (Amphibole), Str/L:	0
Upper 95% Confidence Limit (Amphibole), Str/L:	1.7

Analyst: Taylor Smylie

Scott M. Ward, Ph.D. **Lab Director**

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TETRA TECH

Ambient Community Air Monitoring Weekly Report
For the Hawaii Department of Health – Clean Air Branch

Kula, Maui

11/16/2023-11/22/2023
[Report Updated: 4/12/2024]

As a result of ongoing debris removal operations in response to the Maui Wildfires, a community air monitoring and sampling plan (CAMSP, 2023) has been developed and sampling is being performed at three community locations across the area of Kula.

This approach includes ambient community air monitoring and sampling to monitor conditions and ensure debris removal activities, taking place under the U.S. Army Corps of Engineers (USACE), does not significantly impact air quality in the area of Kula. Data collected is made available to HDOH via online shared site and this weekly report. This approach to air monitoring and sampling will continue until debris removal activities are complete or until HDOH CAB advises otherwise.

Air quality monitoring for particulate matter was collected at all three community locations over a 24-hour period each day in accordance with the CAMSP. Additionally, daily air samples were collected at all community locations for asbestos and heavy metals. Summary analytical data is presented in **Tables 1 and 2**. **Figure 1** depicts the community air monitoring and sampling locations. **Appendix 1** provides detailed analytical results for all community locations where air sampling was performed. Analytical results were compared to site-specific screening levels for particulate matter, asbestos, and heavy metals as published in the CAMSP (Tetra Tech 2023; see Table 2).

Results for Community Locations:
Ambient particulate air monitoring was performed to assess for the presence and concentrations of airborne particulates with a particle size aerodynamic diameter of 2.5 micrometers (µm) and less ($PM_{2.5}$), as well as 10 micrometers (µm) and less (PM_{10}). This particle size diameter is recognized for health evaluations and is identified as "$PM_{2.5}$" and "PM_{10}". The particle size diameters of 2.5 micrometers (µm) and 10 micrometers (µm) are small enough to be inhaled into a person's lungs. Monitoring for $PM_{2.5}$ and PM_{10} was conducted 7 days a week at each of the following locations: Top Property (AM-01) (November 16 – 22), Middle Property (AM-02) 2 (November 16 – 22), Lower Property (AM-03) (November 16 – 22).

The results of $PM_{2.5}$ monitoring found that screening levels were exceeded at the Top Property air monitoring station on November 17-21. High winds were recorded on these days. It was also recorded that the property owners were spreading woodchips around the property as well as operating a woodchipper at the adjacent property on all these days.

None of these exceedances of particulate screening levels are likely to be attributable to USACE debris removal operations.

Upon further investigation into the date and time issue on the PM2.5 EBAM located at the lower property (AM-03) detailed in report [11/16/2023-11/22/2023], the issues extended back to the initial set up on 11/8 due to the EBAM set 12 hours back. When it was discovered by the field technician on 11/17/2023 the time was set back another 12 hours creating a 24 hr date error which was corrected on 11/29/2023. No data was lost because of the date error. This report shows a revised 24 hr TWA calculation for the lower property (AM-03) when the data was corrected to the correct date and time for the readings.

There were twenty-one samples collected for asbestos fibers at community monitoring locations throughout this time frame. This report has been revised with the lab results received for the asbestos sample collected on November 22, 2023, that was previously voided from the Top Property (AM-01) because of incorrect low sample volume limits. No asbestos samples returned a value above the laboratory's detection limit, indicating fibers were not present in air sampled. All asbestos results were below the public health screening level of 0.0034 fibers/cc (and the laboratory's detection limits).

Some extremely low levels of heavy metals were detected in ambient air samples at community locations. Although detected, all detections were below the public health screening levels for heavy metals. Details for particulates, heavy metal and asbestos sampling data for community locations are found in Attachment 1.

Attachments:

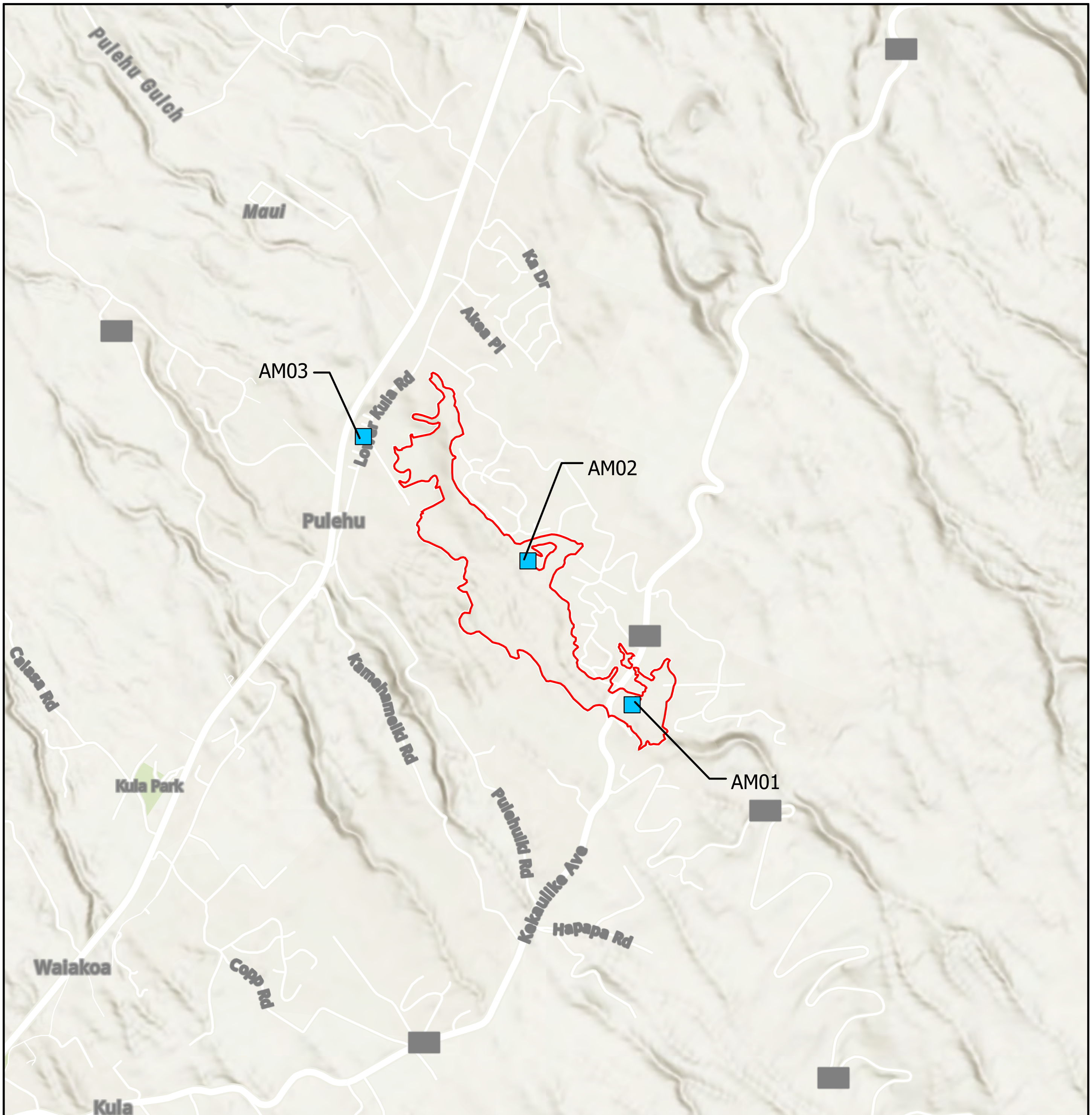
Analytical Sampling Results and Particulate Monitoring Results

Air Monitoring and Sampling Locations

Appendix:

Analytical Reports

Attachments



Air Monitoring Locations

Kula Fire Perimeter

N

0 0.25 0.5
Miles

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Figure 1
Ambient Community
Air Monitoring Locations

Hawaii DOH
2023 Kula Wildfire

Basemap: ESRI ArcGIS World Street Map

Table 1: HDOH CAB Ambient Community Monitoring and Sampling
Analytical Sampling Results
Maui Wildfire, Kula
11/16/2023-11/22/2023
[Report Updated: 4/12/2024]

Analyte		Asbestos		Antimony	Arsenic	Barium	Beryllium	Cadmium	Chromium	Cobalt	Copper	Lead	Manganese	Molybdenum	Nickel	Selenium	Thallium	Vanadium	Zinc
Units		f/cc	Y/N	µg/m³	µg/m³	µg/m³	µg/m³	µg/m³	µg/m³	µg/m³	µg/m³	µg/m³	µg/m³	µg/m³	µg/m³	µg/m³	µg/m³	µg/m³	µg/m³
Screening Level	Location / ID	0.0034 [1]	Confirmed Asbestos [2]	1.4	0.18	2.4	0.1	0.048	24	0.029	480	1.5	0.24	9.6	0.048	96	48	0.48	2400
11/16/2023	Top Property (AM-01)	<0.00038	N	0.0000768	0.000176	0.00789	0.0000289	ND	0.00171	0.000453	0.0128	0.000353	0.0243	0.00071	0.000661	0.000302	0.0000017	0.00205	ND
	Middle Property (AM-02)	<0.00059	N	0.0000617	0.000249	0.00797	0.0000318	ND	0.00169	0.000442	0.0121	0.000312	0.0238	0.00066	0.000668	0.000277	0.00000173	0.00208	ND
	Lower Property (AM-03)	<0.00046	N	0.000109	0.000129	0.00756	0.0000253	ND	0.00172	0.000451	0.0159	0.000302	0.0201	0.000787	0.000674	0.000235	0.00000148	0.00165	ND
11/17/2023	Top Property (AM-01)	<0.00037	N	0.0000747	0.000165	0.0059	0.0000193	ND	ND	0.000312	0.017	0.000518	0.0169	0.000722	ND	0.000214	0.00000147	0.00144	ND
	Middle Property (AM-02)	<0.00058	N	0.0000673	0.000842	0.0113	0.0000332	ND	0.00199	0.000466	0.0138	0.000565	0.0286	0.000685	0.000762	0.000318	0.00000224	0.00253	ND
	Lower Property (AM-03)	<0.00041	N	0.0000994	0.00014	0.00694	0.0000212	ND	ND	0.000319	0.0159	0.000358	0.0171	0.000918	0.000647	0.000223	0.00000172	0.00139	ND
11/18/2003	Top Property (AM-01)	<0.00037	N	0.000099	0.000352	0.00625	0.0000195	ND	0.00181	0.00032	0.0177	0.000883	0.0171	0.000603	0.000691	0.000253	0.00000336	0.00154	ND
	Middle Property (AM-02)	<0.00040	N	0.0000846	0.000354	0.00844	0.000027	ND	0.00166	0.000388	0.00995	0.000434	0.0219	0.000547	0.000696	0.000299	0.00000393	0.00205	ND
	Lower Property (AM-03)	<0.00041	N	0.000129	0.000171	0.00659	0.0000194	ND	ND	0.000303	0.0145	0.000468	0.0159	0.000972	ND	0.000224	0.00000393	0.00137	ND
11/19/2023	Top Property (AM-01)	<0.00038	N	0.0000678	0.000177	0.00459	0.0000138	ND	0.00152	0.000217	0.0131	0.000374	0.0131	0.000649	ND	0.000191	0.00000321	0.00122	ND
	Middle Property (AM-02)	<0.00038	N	0.0000678	0.000874	0.0214	0.0000845	ND	0.00309	0.000927	0.0137	0.000932	0.0598	0.000798	0.00169	0.000637	0.00000613	0.00628	ND
	Lower Property (AM-03)	<0.00038	N	0.000113	0.00062	0.00872	0.0000141	ND	ND	0.000228	0.0194	0.000376	0.0113	0.0013	ND	0.000199	0.00000371	0.00105	ND
11/20/2023	Top Property (AM-01)	<0.00038	N	0.000101	0.000156	0.00478	0.0000126	ND	ND	0.00022	0.0223	0.000469	0.0106	0.000893	ND	0.000175	0.0000014	0.000993	ND
	Middle Property (AM-02)	<0.00040	N	0.000138	0.000319	0.0076	0.0000263	0.000103	0.00198	0.000314	0.0161	0.000532	0.0187	0.000954	0.000716	0.000257	0.00000192	0.00191	ND
	Lower Property (AM-03)	<0.00039	N	0.000132	0.0000874	0.00518	0.000013	ND	ND	0.000236	0.0276	ND	0.0094	0.000945	ND	0.000152	0.00000141	0.000761	ND
11/21/2023	Top Property (AM-01)	<0.00042	N	0.0000665	0.00013	0.00243	0.00000442	ND	ND	0.0000827	0.0189	ND	0.00337	0.00109	ND	0.0000788	0.000000422	0.000336	ND
	Middle Property (AM-02)	<0.00043	N	0.0000734	0.000156	0.00339	0.00000687	ND	ND	0.000107	0.0179	ND	0.00455	0.00106	ND	0.0001	0.000000533	0.000473	ND
	Lower Property (AM-03)	<0.00040	N	0.0000652	0.0000869	0.00296	0.00000579	ND	ND	0.0000968	0.0388	ND	0.00365	0.0013	ND	0.000103	ND	0.000334	ND
11/22/2023	Top Property (AM-01)	<0.00136	N	0.0000846	0.000308	0.00623	0.0000179	ND	0.00192	0.000314	0.0238	0.000443	0.0138	0.00139	0.000985	0.000217	0.000000925	0.002	ND
	Middle Property (AM-02)	<0.00044	N	0.0000637	0.000239	0.00487	0.0000149	ND	0.00189	0.00028	0.0171	0.000335	0.0121	0.00109	0.00102	0.000197	0.000000838	0.00216	ND
	Lower Property (AM-03)	<0.00055	N	0.0000998	0.000148	0.00465	0.0000131	ND	0.00161	0.000275	0.028	0.000257	0.011	0.000934	0.00117	0.000171	0.0000008	0.00223	ND
95% Upper Confidence Limit[3]		0.00052		0.0001	0.00038	0.00849	0.00003	NA	0.00193	0.00042	0.0209	0.00051	0.024	0.00101	0.00085	0.00028	0.0000031	0.00245	NA

Notes:
Asbestos sampling at Top Property (AM-01) on 11/22 results were recieved back from the lab.
NA = Not Available
f/cc = fibers per cubic centimeter
µg/m3= micrograms per cubic meter
ND = Not detected at or above the laboratory reporting or method detection limit
1 Fiber count sample result via Phase Contrast Microscopy
2 Confirmed asbestos sample result via Transmission Electron Microscopy
3 95% UCL determined through 'best fit' lognormal or normal parametric statistics via W test

Table 2: HDOH CAB Ambient Community Monitoring and Sampling
Particulate Monitoring Results
Maui Wildfire, Kula
11/16/2023-11/22/2023
[Report Updated: 4/12/024]

Particulate Size		PM 2.5	PM 10
Screening Level	Location / ID	35 µg/m^3	150 µg/m^3
11/16/2023	Top Property (AM-01)	33	32
	Middle Property (AM-02)	11	8.3
	Lower Property (AM-03)	5.3	7.9
11/17/2023	Top Property (AM-01)	38	32
	Middle Property (AM-02)	15	12
	Lower Property (AM-03)	5.8	11
11/18/2023	Top Property (AM-01)	42	33
	Middle Property (AM-02)	14	7.8
	Lower Property (AM-03)	6.2	11
11/19/2023	Top Property (AM-01)	72	107
	Middle Property (AM-02)	18	15
	Lower Property (AM-03)	6.5	9.2
11/20/2023	Top Property (AM-01)	46	28
	Middle Property (AM-02)	16	6.7
	Lower Property (AM-03)	9.2	6.0
11/21/2023	Top Property (AM-01)	58	130
	Middle Property (AM-02)	18	5.6
	Lower Property (AM-03)	6.3	7.0
11/22/2023	Top Property (AM-01)	30	73
	Middle Property (AM-02)	9.2	6.0
	Lower Property (AM-03)	6.7	7.0

Notes:
The exceedances on 11/17, 11/18, 11/19, 11/20, and 11/21 are a result of woodchips spread and private operations on the property and high winds
Lower Property (AM-03) PM2.5 EBAM 24 hr TWA was corrected on 11/16, 11/17, 11/18 after review and correction of previously mentioned EBAM error
Results are based on 24 hour TWA calculation
24 hour TWA calculation has been adjusted to be presented in the rule of two significant figures.
µg/m3 = micrograms per cubic meter
ND = Not detected at or above the laboratory reporting limit
NA = Not Available
Data for the Middle Property (AM-02) on 11/21 has been revised from the prerviously submitted report

Appendix 1

[redacted]

Eastern Research Group
601 Keystone Park Drive
Suite 700
Morrisville, NC 27560

December 01, 2023

Ms. Chelsea Saber
Tetra Tech, Inc.
1777 Sentry Pkwy, Bldg 12
Blue Bell, PA 19422
Project Name: Maui fires

Dear Ms. Chelsea Saber,

This report contains the analytical results for the sample(s) received under chain(s) of custody by Eastern Research Group on 11/24/23 10:33.

Values below the MDL for QC results in this report are recorded as ND, however the actual values are reported in the accompanying Excel report with a "U" flag (Under the detection limit). The actual values are reported in AQS.

This test is accredited under the 2016 TNI Standard for Environmental Laboratories (FL DOH Certification # E87673). All analyses were performed as described in the US EPA-approved QAPP, under the contract for National Hazardous Air Pollutant Support (US EPA Contract No. 68HERH22D0002). This cover page is an integral part of this report, and any exceptions or comments are noted on the last page.

Release of the data contained in this data package and in the data submitted in the electronic data deliverable, has been authorized by the Program Manager, or the Program Manager's designee as verified by the following signature.

The issuance of the final Certificate of Analysis takes precedence over any previous Report. If you have any questions, please contact me at 919-468-7924.

Sincerely,

Julie Swift
Program Manager
julie.swift@erg.com

The information contained in this report and its attachment(s) are intended only for the use of the individual to whom it is addressed and may contain information that is privileged, confidential, or exempt from disclosure. If the reader of this message is not the intended recipient, you are hereby notified that any dissemination, distribution, or copying of this report is strictly prohibited. If you have received this report in error, please notify julie.swift@erg.com and delete the report without retaining any copies.

[redacted]

CERTIFICATE OF ANALYSIS

Tetra Tech, Inc.
1777 Sentry Pkwy, Bldg 12
Blue Bell, PA 19422
ATTN: Ms. Chelsea Saber
PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 12/01/23 13:09
SUBMITTED: 11/24/23
AQS SITE CODE:
SITE CODE: Maui fires

ANALYTICAL REPORT FOR SAMPLES

SampleName	LabNumber	Matrix	Sampled	Received
TetraTech Q9541238	3112732-01	Air	11/16/23 23:59	11/24/23 10:33
TetraTech Q9541237	3112732-02	Air	11/16/23 23:59	11/24/23 10:33
TetraTech Q9541233	3112732-03	Air	11/16/23 23:59	11/24/23 10:33
TetraTech Q9541264 FB	3112732-04	Air	11/16/23 00:00	11/24/23 10:33
TetraTech Q9541263 LB	3112732-05	Air	11/16/23 00:00	11/24/23 10:33
TetraTech Q9541232	3112732-06	Air	11/17/23 23:59	11/24/23 10:33
TetraTech Q9541231	3112732-07	Air	11/17/23 23:59	11/24/23 10:33
TetraTech Q9541265	3112732-08	Air	11/17/23 23:59	11/24/23 10:33
TetraTech Q9541257 FB	3112732-09	Air	11/17/23 00:00	11/24/23 10:33
TetraTech Q9541260	3112732-10	Air	11/18/23 23:59	11/24/23 10:33
TetraTech Q9541259	3112732-11	Air	11/18/23 23:59	11/24/23 10:33
TetraTech Q9541258	3112732-12	Air	11/18/23 23:59	11/24/23 10:33
TetraTech Q9541272 FB	3112732-13	Air	11/18/23 00:00	11/24/23 10:33
TetraTech Q9541254	3112732-14	Air	11/19/23 23:59	11/24/23 10:33
TetraTech Q9541283	3112732-15	Air	11/19/23 23:59	11/24/23 10:33
TetraTech Q9541282	3112732-16	Air	11/19/23 23:59	11/24/23 10:33
TetraTech Q9541269 - FB	3112732-17	Air	11/19/23 00:00	11/24/23 10:33

The results in this report apply only to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

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CERTIFICATE OF ANALYSIS

Tetra Tech, Inc.
1777 Sentry Pkwy, Bldg 12
Blue Bell, PA 19422
ATTN: Ms. Chelsea Saber
PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 12/01/23 13:09
SUBMITTED: 11/24/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9541238 **Lab ID:** 3112732-01 **Sampled:** 11/16/23 23:59
Matrix: Air **Sample Volume:** 2038.818 m³ **Received:** 11/24/23 10:33
Filter ID: **Analysis Date:** 11/29/23 21:14
Comments: MFK-AM01-111623-HM

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	**7429-90-5**	**847**	ICS-01, LK	**25.6**
Antimony	**7440-36-0**	**0.0768**	GC-BS, SL	**0.0352**
Arsenic	**7440-38-2**	**0.176**		**0.00762**
Barium	**7440-39-3**	**7.89**		**0.757**
Beryllium	**7440-41-7**	**0.0289**		**0.00265**
Cadmium	7440-43-9	0.0107	U	0.0870
Calcium	**7440-70-2**	**623**	GC-BS, LJ, QB-01	**233**
Chromium	**7440-47-3**	**1.71**		**1.62**
Cobalt	**7440-48-4**	**0.453**	QB-01	**0.0124**
Copper	**7440-50-8**	**12.8**		**2.39**
Iron	**7439-89-6**	**935**	GC-BS	**19.3**
Lead	**7439-92-1**	**0.353**		**0.220**
Magnesium	**7439-95-4**	**417**	ICS-01, LK	**76.9**
Manganese	**7439-96-5**	**24.3**		**0.950**
Molybdenum	**7439-98-7**	**0.710**	QB-01	**0.170**
Nickel	**7440-02-0**	**0.661**		**0.639**
Phosphorus	7723-14-0	380	GC-BS, ICS-01, LK, U	998
Potassium	**7440-09-7**	**164**		**30.3**
Rubidium		**0.280**	QB-01	**0.0146**
Selenium	**7782-49-2**	**0.302**		**0.00878**
Sodium	**7440-23-5**	**3130**	ICS-01, LK	**1600**
Strontium	**7440-24-6**	**6.57**	QB-01	**0.520**
Thallium	**7440-28-0**	**0.00170**		**4.01E-4**
Thorium	**7440-29-01**	**0.0303**		**0.00239**
Uranium	**NA**	**0.0175**		**0.0136**
Vanadium	**7440-62-2**	**2.05**		**0.0393**
Zinc	7440-66-6	16.9	U	78.0

[redacted]

CERTIFICATE OF ANALYSIS

Tetra Tech, Inc.
1777 Sentry Pkwy, Bldg 12
Blue Bell, PA 19422
ATTN: Ms. Chelsea Saber
PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 12/01/23 13:09
SUBMITTED: 11/24/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9541237 **Lab ID:** 3112732-02 **Sampled:** 11/16/23 23:59
Matrix: Air **Sample Volume:** 2026.064 m³ **Received:** 11/24/23 10:33
Filter ID: **Analysis Date:** 11/29/23 21:29
Comments: MFK-AM02-111623-HM

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	**7429-90-5**	**891**	ICS-01, LK	**25.8**
Antimony	**7440-36-0**	**0.0617**	GC-BS, SL	**0.0354**
Arsenic	**7440-38-2**	**0.249**		**0.00767**
Barium	**7440-39-3**	**7.97**		**0.761**
Beryllium	**7440-41-7**	**0.0318**		**0.00267**
Cadmium	7440-43-9	0.0127	U	0.0875
Calcium	**7440-70-2**	**604**	GC-BS, LJ, QB-01	**234**
Chromium	**7440-47-3**	**1.69**		**1.63**
Cobalt	**7440-48-4**	**0.442**	QB-01	**0.0125**
Copper	**7440-50-8**	**12.1**		**2.41**
Iron	**7439-89-6**	**957**	GC-BS	**19.4**
Lead	**7439-92-1**	**0.312**		**0.222**
Magnesium	**7439-95-4**	**376**	ICS-01, LK	**77.4**
Manganese	**7439-96-5**	**23.8**		**0.956**
Molybdenum	**7439-98-7**	**0.660**	QB-01	**0.171**
Nickel	**7440-02-0**	**0.668**		**0.643**
Phosphorus	7723-14-0	375	GC-BS, ICS-01, LK, U	1000
Potassium	**7440-09-7**	**145**		**30.5**
Rubidium		**0.290**	QB-01	**0.0147**
Selenium	**7782-49-2**	**0.277**		**0.00883**
Sodium	**7440-23-5**	**2870**	ICS-01, LK	**1610**
Strontium	**7440-24-6**	**6.58**	QB-01	**0.524**
Thallium	**7440-28-0**	**0.00173**		**4.04E-4**
Thorium	**7440-29-01**	**0.0358**		**0.00241**
Uranium	**NA**	**0.0180**		**0.0137**
Vanadium	**7440-62-2**	**2.08**		**0.0395**
Zinc	7440-66-6	17.8	U	78.5

The results in this report apply only to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

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CERTIFICATE OF ANALYSIS

Tetra Tech, Inc.
1777 Sentry Pkwy, Bldg 12
Blue Bell, PA 19422
ATTN: Ms. Chelsea Saber
PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 12/01/23 13:09
SUBMITTED: 11/24/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9541233 **Lab ID:** 3112732-03 **Sampled:** 11/16/23 23:59
Matrix: Air **Sample Volume:** 2012.196 m³ **Received:** 11/24/23 10:33
Filter ID: **Analysis Date:** 11/29/23 18:57
Comments: MFK-AM03-111623-HM

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	**7429-90-5**	**613**	ICS-01, LK, QM-4X	**26.0**
Antimony	**7440-36-0**	**0.109**	GC-BS, QM-07, SL	**0.0357**
Arsenic	**7440-38-2**	**0.129**		**0.00772**
Barium	**7440-39-3**	**7.56**		**0.767**
Beryllium	**7440-41-7**	**0.0253**		**0.00268**
Cadmium	7440-43-9	0.0103	U	0.0881
Calcium	**7440-70-2**	**544**	GC-BS, LJ, QB-01, QM-4X	**236**
Chromium	**7440-47-3**	**1.72**		**1.64**
Cobalt	**7440-48-4**	**0.451**	QB-01	**0.0126**
Copper	**7440-50-8**	**15.9**	QM-07	**2.43**
Iron	**7439-89-6**	**750**	GC-BS, QM-4X	**19.6**
Lead	**7439-92-1**	**0.302**		**0.223**
Magnesium	**7439-95-4**	**401**	ICS-01, LK, QM-4X, QX	**77.9**
Manganese	**7439-96-5**	**20.1**	QM-07	**0.962**
Molybdenum	**7439-98-7**	**0.787**	QB-01	**0.172**
Nickel	**7440-02-0**	**0.674**		**0.648**
Phosphorus	7723-14-0	366	U, GC-BS, ICS-01, LK, QM-4X	1010
Potassium	**7440-09-7**	**147**	QM-4X	**30.7**
Rubidium		**0.258**	QB-01, QM-07	**0.0148**
Selenium	**7782-49-2**	**0.235**		**0.00889**
Sodium	**7440-23-5**	**3150**	ICS-01, LK, QM-4X, QX	**1620**
Strontium	**7440-24-6**	**5.62**	QB-01, QM-4X	**0.527**
Thallium	**7440-28-0**	**0.00148**	QM-4X	**4.07E-4**
Thorium	**7440-29-01**	**0.0274**	QM-07	**0.00243**
Uranium	**NA**	**0.0147**		**0.0137**
Vanadium	**7440-62-2**	**1.65**		**0.0398**
Zinc	7440-66-6	20.7	U	79.0

[redacted]

CERTIFICATE OF ANALYSIS

Tetra Tech, Inc.
1777 Sentry Pkwy, Bldg 12
Blue Bell, PA 19422
ATTN: Ms. Chelsea Saber
PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 12/01/23 13:09
SUBMITTED: 11/24/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9541264 FB
Matrix: Air
Lab ID: 3112732-04
Sample Volume: 2038.818 m³
Filter ID:
Sampled: 11/16/23 00:00
Received: 11/24/23 10:33
Analysis Date: 11/29/23 21:44

Comments: Field Blank - MFK-FB01-111623-HM

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	7429-90-5	16.2	U, ICS-01, LK	25.6
Antimony	7440-36-0	0.0115	U, GC-BS, SL	0.0352
Arsenic	7440-38-2	0.00567	U	0.00762
Barium	7440-39-3	0.472	U	0.757
Beryllium	7440-41-7	0.00109	U	0.00265
Cadmium	7440-43-9	0.00132	U	0.0870
Calcium	7440-70-2	159	U, GC-BS, LJ, QB-01	233
Chromium	7440-47-3	1.12	U	1.62
Cobalt	**7440-48-4**	**0.0257**	FB-01, QB-01	**0.0124**
Copper	7440-50-8	0.286	U	2.39
Iron	7439-89-6	12.7	U, GC-BS	19.3
Lead	7439-92-1	0.0336	U	0.220
Magnesium	7439-95-4	43.7	U, ICS-01, LK	76.9
Manganese	7439-96-5	0.183	U	0.950
Molybdenum	**7439-98-7**	**0.178**	FB-01, QB-01	**0.170**
Nickel	7440-02-0	0.269	U	0.639
Phosphorus	7723-14-0	329	GC-BS, ICS-01, LK, U	998
Potassium	7440-09-7	8.25	U	30.3
Rubidium		0.0104	QB-01, U	0.0146
Selenium	7782-49-2	0.00242	U	0.00878
Sodium	7440-23-5	820	ICS-01, LK, U	1600
Strontium	7440-24-6	0.372	QB-01, U	0.520
Thallium	7440-28-0	9.35E-5	U	4.01E-4
Thorium	7440-29-01	0.00238	U	0.00239
Uranium	NA	0.00127	U	0.0136
Vanadium	7440-62-2	0.0144	U	0.0393
Zinc	7440-66-6	10.4	U	78.0

[redacted]

CERTIFICATE OF ANALYSIS

Tetra Tech, Inc.
1777 Sentry Pkwy, Bldg 12
Blue Bell, PA 19422
ATTN: Ms. Chelsea Saber
PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 12/01/23 13:09
SUBMITTED: 11/24/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9541263 LB
Matrix: Air
Lab ID: 3112732-05
Sample Volume: 2038.818 m³
Filter ID:
Sampled: 11/16/23 00:00
Received: 11/24/23 10:33
Analysis Date: 11/29/23 21:58
Comments: Lot Blank - MFK-LB01-111623-HM

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	7429-90-5	17.5	ICS-01, LK, U	25.6
Antimony	7440-36-0	0.0122	GC-BS, SL, U	0.0352
Arsenic	7440-38-2	0.00488	U	0.00762
Barium	7440-39-3	0.481	U	0.757
Beryllium	7440-41-7	0.00121	U	0.00265
Cadmium	7440-43-9	0.00141	U	0.0870
Calcium	7440-70-2	157	GC-BS, LJ, QB-01, U	233
Chromium	7440-47-3	1.10	U	1.62
Cobalt	**7440-48-4**	**0.0223**	FB-01, QB-01	**0.0124**
Copper	7440-50-8	0.356	U	2.39
Iron	7439-89-6	13.6	GC-BS, U	19.3
Lead	7439-92-1	0.0342	U	0.220
Magnesium	7439-95-4	41.7	ICS-01, LK, U	76.9
Manganese	7439-96-5	0.194	U	0.950
Molybdenum	**7439-98-7**	**0.177**	FB-01, QB-01	**0.170**
Nickel	7440-02-0	0.265	U	0.639
Phosphorus	7723-14-0	317	GC-BS, ICS-01, LK, U	998
Potassium	7440-09-7	8.39	U	30.3
Rubidium		0.0111	QB-01, U	0.0146
Selenium	7782-49-2	0.00227	U	0.00878
Sodium	7440-23-5	782	ICS-01, LK, U	1600
Strontium	7440-24-6	0.379	QB-01, U	0.520
Thallium	7440-28-0	1.21E-4	U	4.01E-4
Thorium	7440-29-01	0.00235	U	0.00239
Uranium	NA	0.00127	U	0.0136
Vanadium	7440-62-2	0.0161	U	0.0393
Zinc	7440-66-6	10.9	U	78.0

[redacted]

CERTIFICATE OF ANALYSIS

Tetra Tech, Inc.
1777 Sentry Pkwy, Bldg 12
Blue Bell, PA 19422
ATTN: Ms. Chelsea Saber
PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 12/01/23 13:09
SUBMITTED: 11/24/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9541232 **Lab ID:** 3112732-06 **Sampled:** 11/17/23 23:59
Matrix: Air **Sample Volume:** 2038.818 m³ **Received:** 11/24/23 10:33
Filter ID: **Analysis Date:** 11/29/23 22:12
Comments: MFK-AM01-111723-HM

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	**7429-90-5**	**542**	ICS-01, LK	**25.6**
Antimony	**7440-36-0**	**0.0747**	GC-BS, SL	**0.0352**
Arsenic	**7440-38-2**	**0.165**		**0.00762**
Barium	**7440-39-3**	**5.90**		**0.757**
Beryllium	**7440-41-7**	**0.0193**		**0.00265**
Cadmium	7440-43-9	0.0106	U	0.0870
Calcium	**7440-70-2**	**443**	GC-BS, LJ, QB-01	**233**
Chromium	7440-47-3	1.52	U	1.62
Cobalt	**7440-48-4**	**0.312**	QB-01	**0.0124**
Copper	**7440-50-8**	**17.0**		**2.39**
Iron	**7439-89-6**	**628**	GC-BS	**19.3**
Lead	**7439-92-1**	**0.518**		**0.220**
Magnesium	**7439-95-4**	**281**	ICS-01, LK	**76.9**
Manganese	**7439-96-5**	**16.9**		**0.950**
Molybdenum	**7439-98-7**	**0.722**	QB-01	**0.170**
Nickel	7440-02-0	0.562	U	0.639
Phosphorus	7723-14-0	357	GC-BS, ICS-01, LK, U	998
Potassium	**7440-09-7**	**117**		**30.3**
Rubidium		**0.210**	QB-01	**0.0146**
Selenium	**7782-49-2**	**0.214**		**0.00878**
Sodium	**7440-23-5**	**2350**	ICS-01, LK	**1600**
Strontium	**7440-24-6**	**4.42**	QB-01	**0.520**
Thallium	**7440-28-0**	**0.00147**		**4.01E-4**
Thorium	**7440-29-01**	**0.0178**		**0.00239**
Uranium	NA	0.0127	U	0.0136
Vanadium	**7440-62-2**	**1.44**		**0.0393**
Zinc	7440-66-6	18.9	U	78.0

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CERTIFICATE OF ANALYSIS

Tetra Tech, Inc.
1777 Sentry Pkwy, Bldg 12
Blue Bell, PA 19422
ATTN: Ms. Chelsea Saber
PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 12/01/23 13:09
SUBMITTED: 11/24/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9541231 **Lab ID:** 3112732-07 **Sampled:** 11/17/23 23:59
Matrix: Air **Sample Volume:** 2110.483 m³ **Received:** 11/24/23 10:33
Filter ID: **Analysis Date:** 11/29/23 22:26
Comments: MFK-AM02-111723-HM

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	**7429-90-5**	**1110**	ICS-01, LK	**24.7**
Antimony	**7440-36-0**	**0.0673**	GC-BS, SL	**0.0340**
Arsenic	**7440-38-2**	**0.842**		**0.00736**
Barium	**7440-39-3**	**11.3**		**0.731**
Beryllium	**7440-41-7**	**0.0332**		**0.00256**
Cadmium	7440-43-9	0.0199	U	0.0840
Calcium	**7440-70-2**	**766**	QB-01, GC-BS, LJ	**225**
Chromium	**7440-47-3**	**1.99**		**1.56**
Cobalt	**7440-48-4**	**0.466**	QB-01	**0.0120**
Copper	**7440-50-8**	**13.8**		**2.31**
Lead	**7439-92-1**	**0.565**		**0.213**
Magnesium	**7439-95-4**	**332**	ICS-01, LK	**74.3**
Manganese	**7439-96-5**	**28.6**		**0.917**
Molybdenum	**7439-98-7**	**0.685**	QB-01	**0.164**
Nickel	**7440-02-0**	**0.762**		**0.618**
Phosphorus	7723-14-0	390	GC-BS, ICS-01, LK, U	964
Potassium	**7440-09-7**	**177**		**29.3**
Rubidium		**0.378**	QB-01	**0.0141**
Selenium	**7782-49-2**	**0.318**		**0.00848**
Sodium	**7440-23-5**	**2340**	ICS-01, LK	**1540**
Strontium	**7440-24-6**	**9.66**	QB-01	**0.503**
Thallium	**7440-28-0**	**0.00224**		**3.88E-4**
Thorium	**7440-29-01**	**0.0404**		**0.00231**
Uranium	**NA**	**0.0246**		**0.0131**
Vanadium	**7440-62-2**	**2.53**		**0.0379**
Zinc	7440-66-6	15.7	U	75.3

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Tetra Tech, Inc.
1777 Sentry Pkwy, Bldg 12
Blue Bell, PA 19422
ATTN: Ms. Chelsea Saber
PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 12/01/23 13:09
SUBMITTED: 11/24/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9541231 **Lab ID:** 3112732-07RE1 **Sampled:** 11/17/23 23:59
Matrix: Air **Sample Volume:** 2110.483 m³ **Received:** 11/24/23 10:33
Filter ID: **Analysis Date:** 11/30/23 03:50
Comments: MFK-AM02-111723-HM

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Iron	7439-89-6	1060	D, GC-BS	187

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Blue Bell, PA 19422
ATTN: Ms. Chelsea Saber
PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 12/01/23 13:09
SUBMITTED: 11/24/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9541265 **Lab ID:** 3112732-08 **Sampled:** 11/17/23 23:59
Matrix: Air **Sample Volume:** 2059.148 m^3 **Received:** 11/24/23 10:33
Filter ID: **Analysis Date:** 11/29/23 22:41
Comments: MFK-AM03-111723-HM

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	**7429-90-5**	**504**	ICS-01, LK	**25.4**
Antimony	**7440-36-0**	**0.0994**	SL, GC-BS	**0.0348**
Arsenic	**7440-38-2**	**0.140**		**0.00755**
Barium	**7440-39-3**	**6.94**		**0.749**
Beryllium	**7440-41-7**	**0.0212**		**0.00262**
Cadmium	7440-43-9	0.0104	U	0.0861
Calcium	**7440-70-2**	**471**	GC-BS, LJ, QB-01	**231**
Chromium	7440-47-3	1.58	U	1.60
Cobalt	**7440-48-4**	**0.319**	QB-01	**0.0123**
Copper	**7440-50-8**	**15.9**		**2.37**
Iron	**7439-89-6**	**638**	GC-BS	**19.1**
Lead	**7439-92-1**	**0.358**		**0.218**
Magnesium	**7439-95-4**	**345**	ICS-01, LK	**76.2**
Manganese	**7439-96-5**	**17.1**		**0.940**
Molybdenum	**7439-98-7**	**0.918**	QB-01	**0.168**
Nickel	**7440-02-0**	**0.647**		**0.633**
Phosphorus	7723-14-0	369	GC-BS, ICS-01, LK, U	988
Potassium	**7440-09-7**	**129**		**30.0**
Rubidium		**0.238**	QB-01	**0.0145**
Selenium	**7782-49-2**	**0.223**		**0.00869**
Sodium	**7440-23-5**	**2850**	ICS-01, LK	**1580**
Strontium	**7440-24-6**	**4.58**	QB-01	**0.515**
Thallium	**7440-28-0**	**0.00172**		**3.97E-4**
Thorium	**7440-29-01**	**0.0219**		**0.00237**
Uranium	NA	0.0126	U	0.0134
Vanadium	**7440-62-2**	**1.39**		**0.0389**
Zinc	7440-66-6	15.2	U	77.2

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1777 Sentry Pkwy, Bldg 12
Blue Bell, PA 19422
ATTN: Ms. Chelsea Saber
PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 12/01/23 13:09
SUBMITTED: 11/24/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9541257 FB **Lab ID:** 3112732-09 **Sampled:** 11/17/23 00:00
Matrix: Air **Sample Volume:** 2038.818 m³ **Received:** 11/24/23 10:33
Filter ID: **Analysis Date:** 11/29/23 22:55
Comments: Field Blank - MFK-FB01-111723-HM

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	7429-90-5	17.2	ICS-01, LK, U	25.6
Antimony	7440-36-0	0.0113	GC-BS, SL, U	0.0352
Arsenic	7440-38-2	0.00458	U	0.00762
Barium	7440-39-3	0.490	U	0.757
Beryllium	7440-41-7	0.00108	U	0.00265
Cadmium	7440-43-9	0.00131	U	0.0870
Calcium	7440-70-2	155	GC-BS, LJ, QB-01, U	233
Chromium	7440-47-3	1.10	U	1.62
Cobalt	**7440-48-4**	**0.0219**	FB-01, QB-01	**0.0124**
Copper	7440-50-8	0.337	U	2.39
Iron	7439-89-6	13.8	GC-BS, U	19.3
Lead	7439-92-1	0.0336	U	0.220
Magnesium	7439-95-4	41.1	ICS-01, LK, U	76.9
Manganese	7439-96-5	0.192	U	0.950
Molybdenum	**7439-98-7**	**0.179**	FB-01, QB-01	**0.170**
Nickel	7440-02-0	0.272	U	0.639
Phosphorus	7723-14-0	309	GC-BS, ICS-01, LK, U	998
Potassium	7440-09-7	9.23	U	30.3
Rubidium		0.0107	QB-01, U	0.0146
Selenium	7782-49-2	0.00322	U	0.00878
Sodium	7440-23-5	781	ICS-01, LK, U	1600
Strontium	7440-24-6	0.371	QB-01, U	0.520
Thallium	7440-28-0	7.57E-5	U	4.01E-4
Thorium	7440-29-01	0.00234	U	0.00239
Uranium	NA	0.00127	U	0.0136
Vanadium	7440-62-2	0.0167	U	0.0393
Zinc	7440-66-6	8.98	U	78.0

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CERTIFICATE OF ANALYSIS

Tetra Tech, Inc.
1777 Sentry Pkwy, Bldg 12
Blue Bell, PA 19422
ATTN: Ms. Chelsea Saber
PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 12/01/23 13:09
SUBMITTED: 11/24/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9541260 **Lab ID:** 3112732-10 **Sampled:** 11/18/23 23:59
Matrix: Air **Sample Volume:** 2128.508 m³ **Received:** 11/24/23 10:33
Filter ID: **Analysis Date:** 11/29/23 23:09
Comments: MFK-AM01-111823-HM

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	**7429-90-5**	**578**	ICS-01, LK	**24.5**
Antimony	**7440-36-0**	**0.0990**	GC-BS, SL	**0.0337**
Arsenic	**7440-38-2**	**0.352**		**0.00730**
Barium	**7440-39-3**	**6.25**		**0.725**
Beryllium	**7440-41-7**	**0.0195**		**0.00254**
Cadmium	7440-43-9	0.0164	U	0.0833
Calcium	**7440-70-2**	**473**	GC-BS, LJ, QB-01	**223**
Chromium	**7440-47-3**	**1.81**		**1.55**
Cobalt	**7440-48-4**	**0.320**	QB-01	**0.0119**
Copper	**7440-50-8**	**17.7**		**2.29**
Iron	**7439-89-6**	**652**	GC-BS	**18.5**
Lead	**7439-92-1**	**0.883**		**0.211**
Magnesium	**7439-95-4**	**345**	ICS-01, LK	**73.7**
Manganese	**7439-96-5**	**17.1**		**0.910**
Molybdenum	**7439-98-7**	**0.603**	QB-01	**0.163**
Nickel	**7440-02-0**	**0.691**		**0.612**
Phosphorus	7723-14-0	337	LK, GC-BS, ICS-01, U	955
Potassium	**7440-09-7**	**120**		**29.0**
Rubidium		**0.214**	QB-01	**0.0140**
Selenium	**7782-49-2**	**0.253**		**0.00841**
Sodium	**7440-23-5**	**2840**	ICS-01, LK	**1530**
Strontium	**7440-24-6**	**4.75**	QB-01	**0.498**
Thallium	**7440-28-0**	**0.00336**		**3.84E-4**
Thorium	**7440-29-01**	**0.0198**		**0.00229**
Uranium	**NA**	**0.0140**		**0.0130**
Vanadium	**7440-62-2**	**1.54**		**0.0376**
Zinc	7440-66-6	15.4	U	74.7

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CERTIFICATE OF ANALYSIS

Tetra Tech, Inc.
1777 Sentry Pkwy, Bldg 12
Blue Bell, PA 19422
ATTN: Ms. Chelsea Saber
PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 12/01/23 13:09
SUBMITTED: 11/24/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9541259 **Lab ID:** 3112732-11 **Sampled:** 11/18/23 23:59
Matrix: Air **Sample Volume:** 2044.401 m³ **Received:** 11/24/23 10:33
Filter ID: **Analysis Date:** 11/30/23 00:13
Comments: MFK-AM02-111823-HM

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	**7429-90-5**	**788**	ICS-01, LK	**25.5**
Antimony	**7440-36-0**	**0.0846**	GC-BS, SL	**0.0351**
Arsenic	**7440-38-2**	**0.354**		**0.00760**
Barium	**7440-39-3**	**8.44**		**0.754**
Beryllium	**7440-41-7**	**0.0270**		**0.00264**
Cadmium	7440-43-9	0.0189	U	0.0867
Calcium	**7440-70-2**	**544**	GC-BS, LJ, QB-01	**232**
Chromium	**7440-47-3**	**1.66**		**1.62**
Cobalt	**7440-48-4**	**0.388**	QB-01	**0.0124**
Copper	**7440-50-8**	**9.95**		**2.39**
Iron	**7439-89-6**	**846**	GC-BS	**19.3**
Lead	**7439-92-1**	**0.434**		**0.220**
Magnesium	**7439-95-4**	**364**	LK, ICS-01	**76.7**
Manganese	**7439-96-5**	**21.9**		**0.947**
Molybdenum	**7439-98-7**	**0.547**	QB-01	**0.170**
Nickel	**7440-02-0**	**0.696**		**0.637**
Phosphorus	7723-14-0	362	GC-BS, ICS-01, LK, U	995
Potassium	**7440-09-7**	**173**		**30.2**
Rubidium		**0.340**	QB-01	**0.0146**
Selenium	**7782-49-2**	**0.299**		**0.00875**
Sodium	**7440-23-5**	**2890**	ICS-01, LK	**1590**
Strontium	**7440-24-6**	**6.14**	QB-01	**0.519**
Thallium	**7440-28-0**	**0.00393**		**4.00E-4**
Thorium	**7440-29-01**	**0.0277**		**0.00239**
Uranium	**NA**	**0.0197**		**0.0135**
Vanadium	**7440-62-2**	**2.05**		**0.0392**
Zinc	7440-66-6	17.2	U	77.8

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CERTIFICATE OF ANALYSIS

Tetra Tech, Inc.	**FILE #:** 0000.00
1777 Sentry Pkwy, Bldg 12	**REPORTED:** 12/01/23 13:09
Blue Bell, PA 19422	**SUBMITTED:** 11/24/23
ATTN: Ms. Chelsea Saber	**AQS SITE CODE:**
PHONE: (703) 885-5495 **FAX:**	**SITE CODE:** Maui fires

Description:	TetraTech Q9541258	**Lab ID:**	3112732-12	**Sampled:**	11/18/23 23:59
Matrix:	Air	**Sample Volume:**	1231.803 m³	**Received:**	11/24/23 10:33
		Filter ID:		**Analysis Date:**	11/30/23 00:28
Comments:	MFK-AM03-111823-HM				

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	**7429-90-5**	**428**	ICS-01, LK	**42.4**
Antimony	**7440-36-0**	**0.129**	GC-BS, SL	**0.0582**
Arsenic	**7440-38-2**	**0.171**		**0.0126**
Barium	**7440-39-3**	**6.59**		**1.25**
Beryllium	**7440-41-7**	**0.0194**		**0.00439**
Cadmium	7440-43-9	0.0157	U	0.144
Calcium	**7440-70-2**	**544**	QB-01, GC-BS, LJ	**386**
Chromium	7440-47-3	2.38	U	2.68
Cobalt	**7440-48-4**	**0.303**	QB-01	**0.0206**
Copper	**7440-50-8**	**14.5**		**3.96**
Iron	**7439-89-6**	**569**	GC-BS	**32.0**
Lead	**7439-92-1**	**0.468**		**0.365**
Magnesium	**7439-95-4**	**392**	ICS-01, LK	**127**
Manganese	**7439-96-5**	**15.9**		**1.57**
Molybdenum	**7439-98-7**	**0.972**	QB-01	**0.281**
Nickel	7440-02-0	1.00	U	1.06
Phosphorus	7723-14-0	562	GC-BS, ICS-01, LK, U	1650
Potassium	**7440-09-7**	**139**		**50.2**
Rubidium		**0.245**	QB-01	**0.0242**
Selenium	**7782-49-2**	**0.224**		**0.0145**
Sodium	**7440-23-5**	**3540**	ICS-01, LK	**2640**
Strontium	**7440-24-6**	**4.77**	QB-01	**0.861**
Thallium	**7440-28-0**	**0.00393**		**6.64E-4**
Thorium	**7440-29-01**	**0.0181**		**0.00396**
Uranium	NA	0.0132	U	0.0225
Vanadium	**7440-62-2**	**1.37**		**0.0650**
Zinc	7440-66-6	21.8	U	129

[redacted]

CERTIFICATE OF ANALYSIS

Tetra Tech, Inc.
1777 Sentry Pkwy, Bldg 12
Blue Bell, PA 19422
ATTN: Ms. Chelsea Saber
PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 12/01/23 13:09
SUBMITTED: 11/24/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9541272 FB
Matrix: Air
Lab ID: 3112732-13
Sample Volume: 2128.508 m³
Filter ID:
Sampled: 11/18/23 00:00
Received: 11/24/23 10:33
Analysis Date: 11/30/23 00:43
Comments: Field Blank - MFK-FB01-111823-HM

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	7429-90-5	15.0	ICS-01, LK, U	24.5
Antimony	7440-36-0	0.0106	GC-BS, SL, U	0.0337
Arsenic	7440-38-2	0.00362	U	0.00730
Barium	7440-39-3	0.465	U	0.725
Beryllium	7440-41-7	8.20E-4	U	0.00254
Cadmium	7440-43-9	0.00117	U	0.0833
Calcium	7440-70-2	146	GC-BS, LJ, QB-01, U	223
Chromium	7440-47-3	1.25	U	1.55
Cobalt	**7440-48-4**	**0.0251**	FB-01, QB-01	**0.0119**
Copper	7440-50-8	0.296	U	2.29
Iron	7439-89-6	13.5	GC-BS, U	18.5
Lead	7439-92-1	0.0348	U	0.211
Magnesium	7439-95-4	39.2	ICS-01, LK, U	73.7
Manganese	7439-96-5	0.200	U	0.910
Molybdenum	**7439-98-7**	**0.201**	FB-01, QB-01	**0.163**
Nickel	7440-02-0	0.385	U	0.612
Phosphorus	7723-14-0	303	ICS-01, LK, GC-BS, U	955
Potassium	7440-09-7	6.87	U	29.0
Rubidium		0.0103	QB-01, U	0.0140
Selenium	7782-49-2	0.00252	U	0.00841
Sodium	7440-23-5	729	ICS-01, LK, U	1530
Strontium	7440-24-6	0.354	QB-01, U	0.498
Thallium	7440-28-0	7.25E-5	U	3.84E-4
Thorium	7440-29-01	0.00222	U	0.00229
Uranium	NA	0.00126	U	0.0130
Vanadium	7440-62-2	0.0153	U	0.0376
Zinc	7440-66-6	8.88	U	74.7

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CERTIFICATE OF ANALYSIS

Tetra Tech, Inc.
1777 Sentry Pkwy, Bldg 12
Blue Bell, PA 19422
ATTN: Ms. Chelsea Saber
PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 12/01/23 13:09
SUBMITTED: 11/24/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9541254 **Lab ID:** 3112732-14 **Sampled:** 11/19/23 23:59
Matrix: Air **Sample Volume:** 2173.355 m³ **Received:** 11/24/23 10:33
Filter ID: **Analysis Date:** 11/30/23 00:56
Comments: MFK-AM01-111923-HM

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	**7429-90-5**	**490**	ICS-01, LK	**24.0**
Antimony	**7440-36-0**	**0.0678**	GC-BS, SL	**0.0330**
Arsenic	**7440-38-2**	**0.177**		**0.00715**
Barium	**7440-39-3**	**4.59**		**0.710**
Beryllium	**7440-41-7**	**0.0138**		**0.00249**
Cadmium	7440-43-9	0.0124	U	0.0816
Calcium	**7440-70-2**	**361**	GC-BS, LJ, QB-01	**219**
Chromium	**7440-47-3**	**1.52**		**1.52**
Cobalt	**7440-48-4**	**0.217**	QB-01	**0.0117**
Copper	**7440-50-8**	**13.1**		**2.25**
Iron	**7439-89-6**	**507**	GC-BS	**18.1**
Lead	**7439-92-1**	**0.374**		**0.207**
Magnesium	**7439-95-4**	**222**	ICS-01, LK	**72.2**
Manganese	**7439-96-5**	**13.1**		**0.891**
Molybdenum	**7439-98-7**	**0.649**	QB-01	**0.159**
Nickel	7440-02-0	0.552	U	0.600
Phosphorus	7723-14-0	320	GC-BS, ICS-01, LK, U	936
Potassium	**7440-09-7**	**88.3**		**28.4**
Rubidium		**0.172**	QB-01	**0.0137**
Selenium	**7782-49-2**	**0.191**		**0.00823**
Sodium	**7440-23-5**	**1940**	ICS-01, LK	**1500**
Strontium	**7440-24-6**	**3.63**	QB-01	**0.488**
Thallium	**7440-28-0**	**0.00321**		**3.77E-4**
Thorium	**7440-29-01**	**0.0142**		**0.00225**
Uranium	NA	0.0109	U	0.0127
Vanadium	**7440-62-2**	**1.22**		**0.0368**
Zinc	7440-66-6	10.5	U	73.1

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PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 12/01/23 13:09
SUBMITTED: 11/24/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9541283 **Lab ID:** 3112732-15 **Sampled:** 11/19/23 23:59
Matrix: Air **Sample Volume:** 2059.832 m³ **Received:** 11/24/23 10:33
Filter ID: **Analysis Date:** 11/30/23 01:11
Comments: MFK-AM02-111923-HM

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	**7429-90-5**	**3040**	ICS-01, LK	**25.4**
Antimony	**7440-36-0**	**0.0678**	SL, GC-BS	**0.0348**
Arsenic	**7440-38-2**	**0.874**		**0.00754**
Barium	**7440-39-3**	**21.4**		**0.749**
Beryllium	**7440-41-7**	**0.0845**		**0.00262**
Cadmium	7440-43-9	0.0666	U	0.0861
Calcium	**7440-70-2**	**1070**	GC-BS, LJ, QB-01	**231**
Chromium	**7440-47-3**	**3.09**		**1.60**
Cobalt	**7440-48-4**	**0.927**	QB-01	**0.0123**
Copper	**7440-50-8**	**13.7**		**2.37**
Lead	**7439-92-1**	**0.932**		**0.218**
Magnesium	**7439-95-4**	**385**	ICS-01, LK	**76.1**
Manganese	**7439-96-5**	**59.8**		**0.940**
Molybdenum	**7439-98-7**	**0.798**	QB-01	**0.168**
Nickel	**7440-02-0**	**1.69**		**0.633**
Phosphorus	7723-14-0	505	GC-BS, ICS-01, LK, U	987
Potassium	**7440-09-7**	**183**		**30.0**
Rubidium		**0.562**	QB-01	**0.0145**
Selenium	**7782-49-2**	**0.637**		**0.00869**
Sodium	**7440-23-5**	**2120**	ICS-01, LK	**1580**
Strontium	**7440-24-6**	**15.2**	QB-01	**0.515**
Thallium	**7440-28-0**	**0.00613**		**3.97E-4**
Thorium	**7440-29-01**	**0.117**		**0.00237**
Uranium	**NA**	**0.0624**		**0.0134**
Vanadium	**7440-62-2**	**6.28**		**0.0389**
Zinc	7440-66-6	15.5	U	77.2

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Blue Bell, PA 19422
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PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 12/01/23 13:09
SUBMITTED: 11/24/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9541283
Matrix: Air
Lab ID: 3112732-15RE1
Sample Volume: 2059.832 m^3
Filter ID:
Sampled: 11/19/23 23:59
Received: 11/24/23 10:33
Analysis Date: 11/30/23 06:00
Comments: MFK-AM02-111923-HM

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Iron	**7439-89-6**	**2610**	D, GC-BS	**191**

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FILE #: 0000.00
REPORTED: 12/01/23 13:09
SUBMITTED: 11/24/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9541282 **Lab ID:** 3112732-16 **Sampled:** 11/19/23 23:59
Matrix: Air **Sample Volume:** 1405.224 m³ **Received:** 11/24/23 10:33
Filter ID: **Analysis Date:** 11/30/23 01:26
Comments: MFK-AM03-111923-HM - Requested to use for MS/MSD

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	**7429-90-5**	**362**	ICS-01, LK	**37.2**
Antimony	**7440-36-0**	**0.113**	GC-BS, SL	**0.0511**
Arsenic	**7440-38-2**	**0.620**		**0.0111**
Barium	**7440-39-3**	**8.72**		**1.10**
Beryllium	**7440-41-7**	**0.0141**		**0.00384**
Cadmium	7440-43-9	0.0159	U	0.126
Calcium	**7440-70-2**	**418**	GC-BS, LJ, QB-01	**338**
Chromium	7440-47-3	1.97	U	2.35
Cobalt	**7440-48-4**	**0.228**	QB-01	**0.0181**
Copper	**7440-50-8**	**19.4**		**3.47**
Iron	**7439-89-6**	**452**	GC-BS	**28.0**
Lead	**7439-92-1**	**0.376**		**0.320**
Magnesium	**7439-95-4**	**296**	ICS-01, LK	**112**
Manganese	**7439-96-5**	**11.3**		**1.38**
Molybdenum	**7439-98-7**	**1.30**	QB-01	**0.247**
Nickel	7440-02-0	0.633	U	0.927
Phosphorus	7723-14-0	476	GC-BS, ICS-01, LK, U	1450
Potassium	**7440-09-7**	**108**		**44.0**
Rubidium		**0.201**	QB-01	**0.0212**
Selenium	**7782-49-2**	**0.199**		**0.0127**
Sodium	**7440-23-5**	**2800**	ICS-01, LK	**2320**
Strontium	**7440-24-6**	**3.61**	QB-01	**0.755**
Thallium	**7440-28-0**	**0.00371**		**5.82E-4**
Thorium	**7440-29-01**	**0.0143**		**0.00347**
Uranium	NA	0.0107	U	0.0197
Vanadium	**7440-62-2**	**1.05**		**0.0570**
Zinc	7440-66-6	15.3	U	113

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FILE #: 0000.00
REPORTED: 12/01/23 13:09
SUBMITTED: 11/24/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9541269 - FB **Lab ID:** 3112732-17 **Sampled:** 11/19/23 00:00
Matrix: Air **Sample Volume:** 2173.355 m³ **Received:** 11/24/23 10:33
Filter ID: **Analysis Date:** 11/30/23 01:39
Comments: Field Blank - MFK-FB01-111923-HM

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	7429-90-5	22.2	ICS-01, LK, U	24.0
Antimony	7440-36-0	0.0108	GC-BS, SL, U	0.0330
Arsenic	7440-38-2	0.00575	U	0.00715
Barium	7440-39-3	0.599	U	0.710
Beryllium	7440-41-7	0.00100	U	0.00249
Cadmium	7440-43-9	0.00118	U	0.0816
Calcium	7440-70-2	139	GC-BS, LJ, QB-01, U	219
Chromium	7440-47-3	1.03	U	1.52
Cobalt	**7440-48-4**	**0.0228**	FB-01, QB-01	**0.0117**
Copper	7440-50-8	0.255	U	2.25
Iron	**7439-89-6**	**18.4**	FB-01, GC-BS	**18.1**
Lead	7439-92-1	0.0362	U	0.207
Magnesium	7439-95-4	38.8	ICS-01, LK, U	72.2
Manganese	7439-96-5	0.315	U	0.891
Molybdenum	**7439-98-7**	**0.165**	FB-01, QB-01	**0.159**
Nickel	7440-02-0	0.306	U	0.600
Phosphorus	7723-14-0	292	GC-BS, ICS-01, LK, U	936
Potassium	7440-09-7	7.46	U	28.4
Rubidium		0.0125	QB-01, U	0.0137
Selenium	7782-49-2	0.00457	U	0.00823
Sodium	7440-23-5	717	ICS-01, LK, U	1500
Strontium	7440-24-6	0.381	QB-01, U	0.488
Thallium	7440-28-0	6.48E-5	U	3.77E-4
Thorium	**7440-29-01**	**0.00249**	FB-01	**0.00225**
Uranium	NA	0.00135	U	0.0127
Vanadium	7440-62-2	0.0287	U	0.0368
Zinc	7440-66-6	6.44	U	73.1

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1777 Sentry Pkwy, Bldg 12
Blue Bell, PA 19422
ATTN: Ms. Chelsea Saber
PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 12/01/23 13:09
SUBMITTED: 11/24/23
AQS SITE CODE:
SITE CODE: Maui fires

Inorganics by Compendium Method IO-3.5 - Quality Control

Batch 2311066 - B3K2802

Calibration Blank (2311066-CCB1) Prepared: 11/28/23 Analyzed: 11/29/23

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Aluminum	114		ng/l							
Antimony	1.04		ng/l							
Arsenic	8.21		ng/l							
Barium	3.04		ng/l							
Beryllium	1.29		ng/l							
Cadmium	0.620		ng/l							
Calcium	1270		ng/l							
Chromium	8.37		ng/l							
Cobalt	0.722		ng/l							
Copper	54.4		ng/l							
Iron	59.1		ng/l							
Lead	11.6		ng/l							
Magnesium	48.3		ng/l							
Manganese	1.93		ng/l							
Molybdenum	23.7		ng/l							
Nickel	-0.741		ng/l							U
Phosphorus	-11.5		ng/l							U
Potassium	2650		ng/l							
Rubidium	1.04		ng/l							
Selenium	-0.114		ng/l							U
Sodium	3500		ng/l							
Strontium	1.66		ng/l							
Thallium	0.499		ng/l							
Thorium	0.555		ng/l							
Uranium	0.00786		ng/l							
Vanadium	0.872		ng/l							
Zinc	11.6		ng/l							

Calibration Blank (2311066-CCB2) Prepared: 11/28/23 Analyzed: 11/29/23

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Aluminum	24.2		ng/l							
Antimony	0.684		ng/l							
Arsenic	3.51		ng/l							
Barium	0.472		ng/l							
Beryllium	0.513		ng/l							
Cadmium	0.151		ng/l							
Calcium	400		ng/l							
Chromium	1.86		ng/l							
Cobalt	-0.136		ng/l							U
Copper	21.1		ng/l							

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FILE #: 0000.00
REPORTED: 12/01/23 13:09
SUBMITTED: 11/24/23
AQS SITE CODE:
SITE CODE: Maui fires

Inorganics by Compendium Method IO-3.5 - Quality Control

Batch 2311066 - B3K2802

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Calibration Blank (2311066-CCB2) Contin				Prepared: 11/28/23 Analyzed: 11/29/23						
Iron	-31.2		ng/l							U
Lead	7.94		ng/l							
Magnesium	18.5		ng/l							
Manganese	-7.27		ng/l							U
Molybdenum	9.11		ng/l							
Nickel	-5.15		ng/l							U
Phosphorus	-593		ng/l							U
Potassium	1480		ng/l							
Rubidium	0.807		ng/l							
Selenium	1.62		ng/l							
Sodium	4600		ng/l							
Strontium	-1.17		ng/l							U
Thallium	0.325		ng/l							
Thorium	0.645		ng/l							
Uranium	0.00972		ng/l							
Vanadium	-11.1		ng/l							U
Zinc	-15.3		ng/l							U
Calibration Blank (2311066-CCB3)				Prepared: 11/28/23 Analyzed: 11/29/23						
Aluminum	53.4		ng/l							
Antimony	0.585		ng/l							
Arsenic	3.21		ng/l							
Barium	0.346		ng/l							
Beryllium	-0.362		ng/l							U
Cadmium	0.185		ng/l							
Calcium	-1180		ng/l							U
Chromium	1.26		ng/l							
Cobalt	-0.269		ng/l							U
Copper	15.7		ng/l							
Iron	-43.9		ng/l							U
Lead	6.34		ng/l							
Magnesium	1.74		ng/l							
Manganese	-8.49		ng/l							U
Molybdenum	8.54		ng/l							
Nickel	-5.45		ng/l							U
Phosphorus	-317		ng/l							U
Potassium	383		ng/l							
Rubidium	1.36		ng/l							
Selenium	5.79		ng/l							

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REPORTED: 12/01/23 13:09
SUBMITTED: 11/24/23
AQS SITE CODE:
SITE CODE: Maui fires

Inorganics by Compendium Method IO-3.5 - Quality Control

Batch 2311066 - B3K2802

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Calibration Blank (2311066-CCB3) Contin				Prepared: 11/28/23 Analyzed: 11/29/23						
Sodium	6050		ng/l							
Strontium	-2.56		ng/l							U
Thallium	0.342		ng/l							
Thorium	0.518		ng/l							
Uranium	-8.69E-4		ng/l							U
Vanadium	-17.9		ng/l							U
Zinc	-8.57		ng/l							U
Calibration Blank (2311066-CCB4)				Prepared: 11/28/23 Analyzed: 11/30/23						
Aluminum	21.9		ng/l							
Antimony	0.791		ng/l							
Arsenic	1.89		ng/l							
Barium	-0.281		ng/l							U
Beryllium	-0.121		ng/l							U
Cadmium	0.327		ng/l							
Calcium	-212		ng/l							U
Chromium	0.942		ng/l							
Cobalt	-0.197		ng/l							U
Copper	22.4		ng/l							
Iron	-68.7		ng/l							U
Lead	7.10		ng/l							
Magnesium	27.7		ng/l							
Manganese	-7.80		ng/l							U
Molybdenum	11.0		ng/l							
Nickel	-3.84		ng/l							U
Phosphorus	-468		ng/l							U
Potassium	430		ng/l							
Rubidium	0.118		ng/l							
Selenium	-0.676		ng/l							U
Sodium	5630		ng/l							
Strontium	-1.61		ng/l							U
Thallium	0.344		ng/l							
Thorium	0.730		ng/l							
Uranium	-0.00892		ng/l							U
Vanadium	-20.4		ng/l							U
Zinc	-3.40		ng/l							U
Calibration Blank (2311066-CCB5)				Prepared: 11/28/23 Analyzed: 11/30/23						
Aluminum	-13.1		ng/l							U
Antimony	0.431		ng/l							

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ATTN: Ms. Chelsea Saber
PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 12/01/23 13:09
SUBMITTED: 11/24/23
AQS SITE CODE:
SITE CODE: Maui fires

Inorganics by Compendium Method IO-3.5 - Quality Control

Batch 2311066 - B3K2802

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Calibration Blank (2311066-CCB5) Contin				Prepared: 11/28/23 Analyzed: 11/30/23						
Arsenic	-0.418		ng/l							U
Barium	1.08		ng/l							
Beryllium	0.100		ng/l							
Cadmium	0.230		ng/l							
Calcium	-1130		ng/l							U
Chromium	-0.343		ng/l							U
Cobalt	-0.400		ng/l							U
Copper	18.9		ng/l							
Iron	-123		ng/l							U
Lead	7.10		ng/l							
Magnesium	-12.7		ng/l							U
Manganese	-10.2		ng/l							U
Molybdenum	8.84		ng/l							
Nickel	-6.23		ng/l							U
Phosphorus	-1300		ng/l							U
Potassium	-567		ng/l							U
Rubidium	0.682		ng/l							
Selenium	-0.105		ng/l							U
Sodium	3700		ng/l							
Strontium	-1.30		ng/l							U
Thallium	0.376		ng/l							
Thorium	0.670		ng/l							
Uranium	0.0108		ng/l							
Vanadium	-23.0		ng/l							U
Zinc	-12.5		ng/l							U
Calibration Blank (2311066-CCB6)				Prepared: 11/28/23 Analyzed: 11/30/23						
Aluminum	-33.0		ng/l							U
Antimony	0.593		ng/l							
Arsenic	0.549		ng/l							
Barium	0.534		ng/l							
Beryllium	-0.310		ng/l							U
Cadmium	0.225		ng/l							
Calcium	-1410		ng/l							U
Chromium	1.31		ng/l							
Cobalt	-0.407		ng/l							U
Copper	19.3		ng/l							
Iron	-92.4		ng/l							U
Lead	7.53		ng/l							

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Blue Bell, PA 19422
ATTN: Ms. Chelsea Saber
PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 12/01/23 13:09
SUBMITTED: 11/24/23
AQS SITE CODE:
SITE CODE: Maui fires

Inorganics by Compendium Method IO-3.5 - Quality Control

Batch 2311066 - B3K2802

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Calibration Blank (2311066-CCB6) Contin				Prepared: 11/28/23 Analyzed: 11/30/23						
Magnesium	25.7		ng/l							
Manganese	-9.27		ng/l							U
Molybdenum	9.37		ng/l							
Nickel	-6.94		ng/l							U
Phosphorus	-1470		ng/l							U
Potassium	-533		ng/l							U
Rubidium	0.299		ng/l							
Selenium	4.71		ng/l							
Sodium	3540		ng/l							
Strontium	-2.24		ng/l							U
Thallium	0.306		ng/l							
Thorium	0.576		ng/l							
Uranium	0.00541		ng/l							
Vanadium	-24.8		ng/l							U
Zinc	-1.17		ng/l							U
Calibration Check (2311066-CCV1)				Prepared: 11/28/23 Analyzed: 11/29/23						
Aluminum	1.63E6		ng/l	1.5000E6		109	90-110			
Antimony	20300		ng/l	20000		102	90-110			
Arsenic	20100		ng/l	20000		101	90-110			
Barium	204000		ng/l	200000		102	90-110			
Beryllium	4960		ng/l	5000.0		99.3	90-110			
Cadmium	20600		ng/l	20000		103	90-110			
Calcium	2.58E7		ng/l	2.5000E7		103	90-110			
Chromium	231000		ng/l	240000		96.1	90-110			
Cobalt	52800		ng/l	50000		106	90-110			
Copper	2.08E6		ng/l	2.0000E6		104	90-110			
Iron	2.62E6		ng/l	2.5000E6		105	90-110			
Lead	201000		ng/l	200000		101	90-110			
Magnesium	1.11E6		ng/l	1.0000E6		111	90-110			QX
Manganese	525000		ng/l	500000		105	90-110			
Molybdenum	50300		ng/l	50000		101	90-110			
Nickel	125000		ng/l	120000		104	90-110			
Phosphorus	211000		ng/l	200000		105	90-110			
Potassium	2.59E6		ng/l	2.5000E6		103	90-110			
Rubidium	9930		ng/l	10000		99.3	90-110			
Selenium	19700		ng/l	20000		98.6	90-110			
Sodium	2.79E6		ng/l	2.5000E6		111	90-110			QX
Strontium	49900		ng/l	50000		99.8	90-110			

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[redacted]

CERTIFICATE OF ANALYSIS

Tetra Tech, Inc.
1777 Sentry Pkwy, Bldg 12
Blue Bell, PA 19422
ATTN: Ms. Chelsea Saber
PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 12/01/23 13:09
SUBMITTED: 11/24/23
AQS SITE CODE:
SITE CODE: Maui fires

Inorganics by Compendium Method IO-3.5 - Quality Control

Batch 2311066 - B3K2802

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Calibration Check (2311066-CCV1) Contin				Prepared: 11/28/23		Analyzed: 11/29/23				
Thallium	507		ng/l	500.00		101	90-110			
Thorium	509		ng/l	500.00		102	90-110			
Uranium	509		ng/l	500.00		102	90-110			
Vanadium	20100		ng/l	20000		100	90-110			
Zinc	525000		ng/l	500000		105	90-110			
Calibration Check (2311066-CCV2)				Prepared: 11/28/23		Analyzed: 11/29/23				
Aluminum	1.52E6		ng/l	1.5000E6		102	90-110			
Antimony	20300		ng/l	20000		101	90-110			
Arsenic	20000		ng/l	20000		100	90-110			
Barium	203000		ng/l	200000		102	90-110			
Beryllium	4730		ng/l	5000.0		94.5	90-110			
Cadmium	20500		ng/l	20000		102	90-110			
Calcium	2.52E7		ng/l	2.5000E7		101	90-110			
Chromium	232000		ng/l	240000		96.9	90-110			
Cobalt	51200		ng/l	50000		102	90-110			
Copper	2.04E6		ng/l	2.0000E6		102	90-110			
Iron	2.54E6		ng/l	2.5000E6		101	90-110			
Lead	200000		ng/l	200000		100	90-110			
Magnesium	1.05E6		ng/l	1.0000E6		105	90-110			
Manganese	508000		ng/l	500000		102	90-110			
Molybdenum	50000		ng/l	50000		100	90-110			
Nickel	122000		ng/l	120000		102	90-110			
Phosphorus	205000		ng/l	200000		103	90-110			
Potassium	2.51E6		ng/l	2.5000E6		101	90-110			
Rubidium	9940		ng/l	10000		99.4	90-110			
Selenium	19900		ng/l	20000		99.7	90-110			
Sodium	2.65E6		ng/l	2.5000E6		106	90-110			
Strontium	49700		ng/l	50000		99.3	90-110			
Thallium	500		ng/l	500.00		100	90-110			
Thorium	506		ng/l	500.00		101	90-110			
Uranium	503		ng/l	500.00		101	90-110			
Vanadium	19800		ng/l	20000		99.1	90-110			
Zinc	518000		ng/l	500000		104	90-110			
Calibration Check (2311066-CCV3)				Prepared: 11/28/23		Analyzed: 11/29/23				
Aluminum	1.49E6		ng/l	1.5000E6		99.0	90-110			
Antimony	20300		ng/l	20000		102	90-110			
Arsenic	20100		ng/l	20000		101	90-110			
Barium	202000		ng/l	200000		101	90-110			

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Inorganics by Compendium Method IO-3.5 - Quality Control

Batch 2311066 - B3K2802

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Calibration Check (2311066-CCV3) Contin				Prepared: 11/28/23		Analyzed: 11/29/23				
Beryllium	4980		ng/l	5000.0		99.6	90-110			
Cadmium	20600		ng/l	20000		103	90-110			
Calcium	2.50E7		ng/l	2.5000E7		99.8	90-110			
Chromium	231000		ng/l	240000		96.4	90-110			
Cobalt	50800		ng/l	50000		102	90-110			
Copper	2.04E6		ng/l	2.0000E6		102	90-110			
Iron	2.51E6		ng/l	2.5000E6		100	90-110			
Lead	201000		ng/l	200000		101	90-110			
Magnesium	1.03E6		ng/l	1.0000E6		103	90-110			
Manganese	505000		ng/l	500000		101	90-110			
Molybdenum	50100		ng/l	50000		100	90-110			
Nickel	121000		ng/l	120000		101	90-110			
Phosphorus	203000		ng/l	200000		101	90-110			
Potassium	2.48E6		ng/l	2.5000E6		99.1	90-110			
Rubidium	10100		ng/l	10000		101	90-110			
Selenium	19700		ng/l	20000		98.6	90-110			
Sodium	2.65E6		ng/l	2.5000E6		106	90-110			
Strontium	50200		ng/l	50000		100	90-110			
Thallium	499		ng/l	500.00		99.8	90-110			
Thorium	506		ng/l	500.00		101	90-110			
Uranium	507		ng/l	500.00		101	90-110			
Vanadium	19700		ng/l	20000		98.6	90-110			
Zinc	516000		ng/l	500000		103	90-110			
Calibration Check (2311066-CCV4)				Prepared: 11/28/23		Analyzed: 11/30/23				
Aluminum	1.43E6		ng/l	1.5000E6		95.0	90-110			
Antimony	20400		ng/l	20000		102	90-110			
Arsenic	19800		ng/l	20000		99.1	90-110			
Barium	200000		ng/l	200000		100	90-110			
Beryllium	4870		ng/l	5000.0		97.4	90-110			
Cadmium	20500		ng/l	20000		103	90-110			
Calcium	2.47E7		ng/l	2.5000E7		98.6	90-110			
Chromium	233000		ng/l	240000		96.9	90-110			
Cobalt	49700		ng/l	50000		99.3	90-110			
Copper	1.99E6		ng/l	2.0000E6		99.7	90-110			
Iron	2.46E6		ng/l	2.5000E6		98.4	90-110			
Lead	201000		ng/l	200000		100	90-110			
Magnesium	984000		ng/l	1.0000E6		98.4	90-110			
Manganese	497000		ng/l	500000		99.3	90-110			

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Inorganics by Compendium Method IO-3.5 - Quality Control

Batch 2311066 - B3K2802

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Calibration Check (2311066-CCV4) Contin				Prepared: 11/28/23 Analyzed: 11/30/23						
Molybdenum	49900		ng/l	50000		99.8	90-110			
Nickel	118000		ng/l	120000		98.3	90-110			
Phosphorus	186000		ng/l	200000		93.0	90-110			
Potassium	2.41E6		ng/l	2.5000E6		96.5	90-110			
Rubidium	9880		ng/l	10000		98.8	90-110			
Selenium	19800		ng/l	20000		98.8	90-110			
Sodium	2.46E6		ng/l	2.5000E6		98.4	90-110			
Strontium	49900		ng/l	50000		99.8	90-110			
Thallium	496		ng/l	500.00		99.2	90-110			
Thorium	508		ng/l	500.00		102	90-110			
Uranium	509		ng/l	500.00		102	90-110			
Vanadium	19900		ng/l	20000		99.6	90-110			
Zinc	512000		ng/l	500000		102	90-110			
Calibration Check (2311066-CCV5)				Prepared: 11/28/23 Analyzed: 11/30/23						
Aluminum	1.38E6		ng/l	1.5000E6		92.1	90-110			
Antimony	20500		ng/l	20000		102	90-110			
Arsenic	20000		ng/l	20000		100	90-110			
Barium	203000		ng/l	200000		101	90-110			
Beryllium	4980		ng/l	5000.0		99.6	90-110			
Cadmium	20600		ng/l	20000		103	90-110			
Calcium	2.46E7		ng/l	2.5000E7		98.2	90-110			
Chromium	236000		ng/l	240000		98.4	90-110			
Cobalt	49500		ng/l	50000		99.0	90-110			
Copper	2.00E6		ng/l	2.0000E6		100	90-110			
Iron	2.45E6		ng/l	2.5000E6		98.0	90-110			
Lead	202000		ng/l	200000		101	90-110			
Magnesium	957000		ng/l	1.0000E6		95.7	90-110			
Manganese	491000		ng/l	500000		98.1	90-110			
Molybdenum	50200		ng/l	50000		100	90-110			
Nickel	118000		ng/l	120000		98.1	90-110			
Phosphorus	183000		ng/l	200000		91.3	90-110			
Potassium	2.35E6		ng/l	2.5000E6		94.2	90-110			
Rubidium	10100		ng/l	10000		101	90-110			
Selenium	19600		ng/l	20000		98.1	90-110			
Sodium	2.43E6		ng/l	2.5000E6		97.3	90-110			
Strontium	50400		ng/l	50000		101	90-110			
Thallium	500		ng/l	500.00		100	90-110			
Thorium	516		ng/l	500.00		103	90-110			

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Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes

Inorganics by Compendium Method IO-3.5 - Quality Control

Batch 2311066 - B3K2802

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Calibration Check (2311066-CCV5) Contin				Prepared: 11/28/23		Analyzed: 11/30/23				
Uranium	515		ng/l	500.00		103	90-110			
Vanadium	20200		ng/l	20000		101	90-110			
Zinc	516000		ng/l	500000		103	90-110			
Calibration Check (2311066-CCV6)				Prepared: 11/28/23		Analyzed: 11/30/23				
Aluminum	1.39E6		ng/l	1.5000E6		92.6	90-110			
Antimony	20600		ng/l	20000		103	90-110			
Arsenic	20200		ng/l	20000		101	90-110			
Barium	204000		ng/l	200000		102	90-110			
Beryllium	4780		ng/l	5000.0		95.5	90-110			
Cadmium	20700		ng/l	20000		103	90-110			
Calcium	2.48E7		ng/l	2.5000E7		99.0	90-110			
Chromium	237000		ng/l	240000		98.7	90-110			
Cobalt	49600		ng/l	50000		99.3	90-110			
Copper	2.00E6		ng/l	2.0000E6		100	90-110			
Iron	2.46E6		ng/l	2.5000E6		98.3	90-110			
Lead	202000		ng/l	200000		101	90-110			
Magnesium	958000		ng/l	1.0000E6		95.8	90-110			
Manganese	490000		ng/l	500000		98.1	90-110			
Molybdenum	50200		ng/l	50000		100	90-110			
Nickel	119000		ng/l	120000		98.8	90-110			
Phosphorus	188000		ng/l	200000		94.1	90-110			
Potassium	2.36E6		ng/l	2.5000E6		94.2	90-110			
Rubidium	10100		ng/l	10000		101	90-110			
Selenium	20300		ng/l	20000		102	90-110			
Sodium	2.42E6		ng/l	2.5000E6		96.9	90-110			
Strontium	50300		ng/l	50000		101	90-110			
Thallium	504		ng/l	500.00		101	90-110			
Thorium	520		ng/l	500.00		104	90-110			
Uranium	517		ng/l	500.00		103	90-110			
Vanadium	20200		ng/l	20000		101	90-110			
Zinc	516000		ng/l	500000		103	90-110			
High Cal Check (2311066-HCV1)				Prepared: 11/28/23		Analyzed: 11/29/23				
Aluminum	3.04E6		ng/l	3.0000E6		101	95-105			
Antimony	40300		ng/l	40000		101	95-105			
Arsenic	40300		ng/l	40000		101	95-105			
Barium	405000		ng/l	400000		101	95-105			
Beryllium	10200		ng/l	10000		102	95-105			
Cadmium	40000		ng/l	40000		100	95-105			

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Inorganics by Compendium Method IO-3.5 - Quality Control

Batch 2311066 - B3K2802

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
High Cal Check (2311066-HCV1) Continue				Prepared: 11/28/23	Analyzed: 11/29/23					
Calcium	5.04E7		ng/l	5.0000E7		101	95-105			
Chromium	477000		ng/l	480000		99.4	95-105			
Cobalt	100000		ng/l	100000		100	95-105			
Copper	3.99E6		ng/l	4.0000E6		99.9	95-105			
Iron	5.07E6		ng/l	5.0000E6		101	95-105			
Lead	400000		ng/l	400000		100	95-105			
Magnesium	2.04E6		ng/l	2.0000E6		102	95-105			
Manganese	1.01E6		ng/l	1.0000E6		101	95-105			
Molybdenum	100000		ng/l	100000		100	95-105			
Nickel	240000		ng/l	240000		99.8	95-105			
Phosphorus	409000		ng/l	400000		102	95-105			
Potassium	5.05E6		ng/l	5.0000E6		101	95-105			
Rubidium	20000		ng/l	20000		100	95-105			
Selenium	40500		ng/l	40000		101	95-105			
Sodium	5.11E6		ng/l	5.0000E6		102	95-105			
Strontium	101000		ng/l	100000		101	95-105			
Thallium	1000		ng/l	1000.0		100	95-105			
Thorium	1020		ng/l	1000.0		102	95-105			
Uranium	1020		ng/l	1000.0		102	95-105			
Vanadium	40300		ng/l	40000		101	95-105			
Zinc	998000		ng/l	1.0000E6		99.8	95-105			
Initial Cal Blank (2311066-ICB1)				Prepared: 11/28/23	Analyzed: 11/29/23					
Aluminum	-12.8		ng/l							U
Antimony	1.66		ng/l							
Arsenic	2.01		ng/l							
Barium	2.28		ng/l							
Beryllium	0.610		ng/l							
Cadmium	0.629		ng/l							
Calcium	916		ng/l							
Chromium	4.95		ng/l							
Cobalt	0.403		ng/l							
Copper	50.0		ng/l							
Iron	79.0		ng/l							
Lead	12.3		ng/l							
Magnesium	57.3		ng/l							
Manganese	5.65		ng/l							
Molybdenum	16.7		ng/l							
Nickel	-4.92		ng/l							U

[redacted]

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Inorganics by Compendium Method IO-3.5 - Quality Control

Batch 2311066 - B3K2802

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Initial Cal Blank (2311066-ICB1) Continu				Prepared: 11/28/23 Analyzed: 11/29/23						
Phosphorus	740		ng/l							
Potassium	975		ng/l							
Rubidium	1.12		ng/l							
Selenium	7.68		ng/l							
Sodium	690		ng/l							
Strontium	0.925		ng/l							
Thallium	0.447		ng/l							
Thorium	0.475		ng/l							
Uranium	0.0187		ng/l							
Vanadium	12.2		ng/l							
Zinc	-1.42		ng/l							U
Initial Cal Check (2311066-ICV1)				Prepared: 11/28/23 Analyzed: 11/29/23						
Aluminum	1.51E6		ng/l	1.5000E6		101	90-110			
Antimony	20000		ng/l	20000		99.8	90-110			
Arsenic	20100		ng/l	20000		100	90-110			
Barium	200000		ng/l	200000		100	90-110			
Beryllium	5130		ng/l	5000.0		103	90-110			
Cadmium	21000		ng/l	20000		105	90-110			
Calcium	2.52E7		ng/l	2.5000E7		101	90-110			
Chromium	236000		ng/l	240000		98.3	90-110			
Cobalt	51400		ng/l	50000		103	90-110			
Copper	2.03E6		ng/l	2.0000E6		102	90-110			
Iron	2.56E6		ng/l	2.5000E6		102	90-110			
Lead	198000		ng/l	200000		99.0	90-110			
Magnesium	1.03E6		ng/l	1.0000E6		103	90-110			
Manganese	503000		ng/l	500000		101	90-110			
Molybdenum	50100		ng/l	50000		100	90-110			
Nickel	122000		ng/l	120000		101	90-110			
Phosphorus	203000		ng/l	200000		101	90-110			
Potassium	2.54E6		ng/l	2.5000E6		101	90-110			
Rubidium	9740		ng/l	10000		97.4	90-110			
Selenium	20400		ng/l	20000		102	90-110			
Sodium	2.54E6		ng/l	2.5000E6		101	90-110			
Strontium	50400		ng/l	50000		101	90-110			
Thallium	483		ng/l	500.00		96.6	90-110			
Thorium	495		ng/l	500.00		99.0	90-110			
Uranium	496		ng/l	500.00		99.1	90-110			
Vanadium	20500		ng/l	20000		103	90-110			

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CERTIFICATE OF ANALYSIS

Tetra Tech, Inc.
1777 Sentry Pkwy, Bldg 12
Blue Bell, PA 19422
ATTN: Ms. Chelsea Saber
PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 12/01/23 13:09
SUBMITTED: 11/24/23
AQS SITE CODE:
SITE CODE: Maui fires

Inorganics by Compendium Method IO-3.5 - Quality Control

Batch 2311066 - B3K2802

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Initial Cal Check (2311066-ICV1) Continu				Prepared: 11/28/23 Analyzed: 11/29/23						
Zinc	523000		ng/l	500000		105	90-110			
Interference Check A (2311066-IFA1)				Prepared: 11/28/23 Analyzed: 11/29/23						
Aluminum	1.72E7		ng/l	1.5000E7		114	80-120			ICS-01, LK
Antimony	0.00		ng/l				80-120			U
Arsenic	0.00		ng/l				80-120			U
Barium	0.00		ng/l				80-120			U
Beryllium	0.00		ng/l				80-120			U
Cadmium	0.00		ng/l				80-120			U
Calcium	9.98E7		ng/l	1.0040E8		99.4	80-120			
Chromium	0.00		ng/l				80-120			U
Cobalt	0.00		ng/l				80-120			U
Copper	0.00		ng/l				80-120			U
Iron	1.57E7		ng/l	1.5000E7		105	80-120			
Lead	0.00		ng/l				80-120			U
Magnesium	1.72E7		ng/l	1.5000E7		115	80-120			ICS-01, LK
Manganese	0.00		ng/l				80-120			U
Molybdenum	303000		ng/l	300000		101	80-120			
Nickel	0.00		ng/l				80-120			U
Phosphorus	1.81E7		ng/l	1.5000E7		121	80-120			ICS-01, LK
Potassium	1.63E7		ng/l	1.5000E7		108	80-120			
Rubidium	0.00		ng/l				80-120			U
Selenium	0.00		ng/l				80-120			U
Sodium	1.73E7		ng/l	1.5000E7		115	80-120			ICS-01, LK
Strontium	0.00		ng/l				80-120			U
Thallium	0.00		ng/l				80-120			U
Thorium	0.00		ng/l				80-120			U
Uranium	0.00		ng/l				80-120			U
Vanadium	0.00		ng/l				80-120			U
Zinc	0.00		ng/l				80-120			U
Interference Check B (2311066-IFB1)				Prepared: 11/28/23 Analyzed: 11/29/23						
Aluminum	2.06E7		ng/l	1.6500E7		125	80-120			ICS-01, LK
Antimony	20600		ng/l	20000		103	80-120			
Arsenic	20400		ng/l	20000		102	80-120			
Barium	206000		ng/l	200000		103	80-120			
Beryllium	5400		ng/l	5000.0		108	80-120			
Cadmium	19800		ng/l	20000		98.8	80-120			
Calcium	1.29E8		ng/l	1.2540E8		103	80-120			
Chromium	231000		ng/l	240000		96.2	80-120			

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Inorganics by Compendium Method IO-3.5 - Quality Control

Batch 2311066 - B3K2802

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Interference Check B (2311066-IFB1) Co				Prepared: 11/28/23	Analyzed: 11/29/23					
Cobalt	52100		ng/l	50000		104	80-120			
Copper	1.92E6		ng/l	2.0000E6		96.0	80-120			
Iron	1.90E7		ng/l	1.7500E7		109	80-120			
Lead	206000		ng/l	200000		103	80-120			
Magnesium	1.98E7		ng/l	1.6000E7		124	80-120			ICS-01, LK
Manganese	564000		ng/l	500000		113	80-120			
Molybdenum	352000		ng/l	350000		101	80-120			
Nickel	119000		ng/l	120000		99.2	80-120			
Phosphorus	1.96E7		ng/l	1.5200E7		129	80-120			ICS-01, LK
Potassium	2.02E7		ng/l	1.7500E7		115	80-120			
Rubidium	10300		ng/l	10000		103	80-120			
Selenium	19400		ng/l	20000		97.1	80-120			
Sodium	2.21E7		ng/l	1.7500E7		126	80-120			ICS-01, LK
Strontium	51000		ng/l	50000		102	80-120			
Thallium	522		ng/l	500.00		104	80-120			
Thorium	550		ng/l	500.00		110	80-120			
Uranium	551		ng/l	500.00		110	80-120			
Vanadium	19300		ng/l	20000		96.7	80-120			
Zinc	478000		ng/l	500000		95.6	80-120			

Batch B3K2802 - ICP-MS Extraction

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (B3K2802-BLK1)				Prepared: 11/28/23	Analyzed: 11/29/23					
Aluminum	ND	32.1	ng/m³ Air							ICS-01, LK, U
Antimony	ND	0.0441	ng/m³ Air							GC-BS, SL, U
Arsenic	ND	0.00955	ng/m³ Air							U
Barium	ND	0.948	ng/m³ Air							U
Beryllium	ND	0.00332	ng/m³ Air							U
Cadmium	ND	0.109	ng/m³ Air							U
Calcium	ND	292	ng/m³ Air							GC-BS, LJ, QB-01, U
Chromium	ND	2.03	ng/m³ Air							U
Cobalt	ND	0.0156	ng/m³ Air							QB-01, U
Copper	ND	3.00	ng/m³ Air							U
Iron	ND	24.2	ng/m³ Air							GC-BS, U
Lead	ND	0.276	ng/m³ Air							U
Magnesium	ND	96.4	ng/m³ Air							ICS-01, LK, QX, U
Manganese	ND	1.19	ng/m³ Air							U
Molybdenum	ND	0.213	ng/m³ Air							QB-01, U
Nickel	ND	0.801	ng/m³ Air							U

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Inorganics by Compendium Method IO-3.5 - Quality Control

Batch B3K2802 - ICP-MS Extraction

Blank (B3K2802-BLK1) Continued Prepared: 11/28/23 Analyzed: 11/29/23

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Phosphorus	ND	1250	ng/m³ Air							GC-BS, ICS-01, LK, U
Potassium	ND	38.0	ng/m³ Air							U
Rubidium	ND	0.0183	ng/m³ Air							QB-01, U
Selenium	ND	0.0110	ng/m³ Air							U
Sodium	ND	2000	ng/m³ Air							ICS-01, LK, QX, U
Strontium	ND	0.652	ng/m³ Air							QB-01, U
Thallium	ND	5.03E-4	ng/m³ Air							U
Thorium	ND	0.00300	ng/m³ Air							U
Uranium	ND	0.0170	ng/m³ Air							U
Vanadium	ND	0.0492	ng/m³ Air							U
Zinc	ND	97.7	ng/m³ Air							U

LCS (B3K2802-BS1) Prepared: 11/28/23 Analyzed: 11/29/23

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Aluminum	95.5	32.1	ng/m³ Air	82.975		115	80-120			ICS-01, LK
Antimony	0.540	0.0441	ng/m³ Air	1.3829		39.1	80-120			GC-BS, SL
Arsenic	2.79	0.00955	ng/m³ Air	2.7658		101	80-120			
Barium	29.0	0.948	ng/m³ Air	27.658		105	80-120			
Beryllium	1.31	0.00332	ng/m³ Air	1.3829		95.0	80-120			
Cadmium	1.45	0.109	ng/m³ Air	1.3829		105	80-120			
Calcium	585	292	ng/m³ Air	69.146		846	80-120			GC-BS, LJ, QB-01
Chromium	15.5	2.03	ng/m³ Air	13.829		112	80-120			
Cobalt	1.49	0.0156	ng/m³ Air	1.3829		107	80-120			QB-01
Copper	30.8	3.00	ng/m³ Air	27.658		111	80-120			
Iron	49.4	24.2	ng/m³ Air	27.658		178	80-120			GC-BS
Lead	14.1	0.276	ng/m³ Air	13.829		102	80-120			
Magnesium	ND	96.4	ng/m³ Air	27.658			80-120			ICS-01, LK, QX, U
Manganese	8.86	1.19	ng/m³ Air	8.2975		107	80-120			
Molybdenum	1.70	0.213	ng/m³ Air	1.3829		123	80-120			QB-01
Nickel	3.16	0.801	ng/m³ Air	2.7658		114	80-120			
Phosphorus	ND	1250	ng/m³ Air	13.829			80-120			GC-BS, ICS-01, LK, U
Potassium	73.4	38.0	ng/m³ Air	55.317		133	80-120			
Rubidium	1.37	0.0183	ng/m³ Air	1.3829		99.1	80-120			QB-01
Selenium	2.71	0.0110	ng/m³ Air	2.7658		98.0	80-120			
Sodium	ND	2000	ng/m³ Air	55.317			80-120			ICS-01, LK, QX, U
Strontium	2.30	0.652	ng/m³ Air	1.3829		166	80-120			QB-01

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Inorganics by Compendium Method IO-3.5 - Quality Control

Batch B3K2802 - ICP-MS Extraction

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
LCS (B3K2802-BS1) Continued				Prepared: 11/28/23	Analyzed: 11/29/23					
Thallium	0.136	5.03E-4	ng/m³ Air	0.13829		98.1	80-120			
Thorium	0.139	0.00300	ng/m³ Air	0.13829		101	80-120			
Uranium	0.136	0.0170	ng/m³ Air	0.13829		98.2	80-120			
Vanadium	2.84	0.0492	ng/m³ Air	2.7658		103	80-120			
Zinc	111	97.7	ng/m³ Air	82.975		134	80-120			
Duplicate (B3K2802-DUP2)		**Source: 3112732-10**		Prepared: 11/28/23	Analyzed: 11/29/23					
Aluminum	594	24.5	ng/m³ Air		578			2.80	10	ICS-01, LK
Antimony	0.101	0.0337	ng/m³ Air		0.0990			1.91	10	GC-BS, SL
Arsenic	0.356	0.00730	ng/m³ Air		0.352			1.17	10	
Barium	6.33	0.725	ng/m³ Air		6.25			1.21	10	
Beryllium	0.0195	0.00254	ng/m³ Air		0.0195			0.0449	10	
Cadmium	ND	0.0833	ng/m³ Air		ND				10	U
Calcium	475	223	ng/m³ Air		473			0.549	10	GC-BS, LJ, QB-01
Chromium	1.85	1.55	ng/m³ Air		1.81			2.04	10	
Cobalt	0.327	0.0119	ng/m³ Air		0.320			2.14	10	QB-01
Copper	17.9	2.29	ng/m³ Air		17.7			1.53	10	
Iron	666	18.5	ng/m³ Air		652			2.16	10	GC-BS
Lead	0.890	0.211	ng/m³ Air		0.883			0.834	10	
Magnesium	353	73.7	ng/m³ Air		345			2.31	10	ICS-01, LK
Manganese	17.3	0.910	ng/m³ Air		17.1			1.42	10	
Molybdenum	0.611	0.163	ng/m³ Air		0.603			1.27	10	QB-01
Nickel	0.700	0.612	ng/m³ Air		0.691			1.32	10	
Phosphorus	ND	955	ng/m³ Air		ND				10	GC-BS, ICS-01, LK, U
Potassium	121	29.0	ng/m³ Air		120			1.01	10	
Rubidium	0.220	0.0140	ng/m³ Air		0.214			2.80	10	QB-01
Selenium	0.239	0.00841	ng/m³ Air		0.253			5.41	10	
Sodium	2920	1530	ng/m³ Air		2840			3.02	10	ICS-01, LK
Strontium	4.82	0.498	ng/m³ Air		4.75			1.39	10	QB-01
Thallium	0.00329	3.84E-4	ng/m³ Air		0.00336			2.35	10	
Thorium	0.0201	0.00229	ng/m³ Air		0.0198			1.19	10	
Uranium	0.0143	0.0130	ng/m³ Air		0.0140			1.45	10	
Vanadium	1.56	0.0376	ng/m³ Air		1.54			1.43	10	
Zinc	ND	74.7	ng/m³ Air		ND				10	U
Duplicate (B3K2802-DUP3)		**Source: 3112732-03R**		Prepared: 11/28/23	Analyzed: 11/30/23					
Aluminum	560	260	ng/m³ Air		613			9.01	10	D, ICS-01, LK
Antimony	ND	0.357	ng/m³ Air		ND				10	D, GC-BS, SL, U

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Inorganics by Compendium Method IO-3.5 - Quality Control

Batch B3K2802 - ICP-MS Extraction

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Duplicate (B3K2802-DUP3) Continued		**Source: 3112732-03R**		Prepared: 11/28/23 Analyzed: 11/30/23						
Arsenic	0.131	0.0772	ng/m³ Air		0.129			1.27	10	D
Barium	7.69	7.67	ng/m³ Air		ND			1.65	10	D
Beryllium	ND	0.0268	ng/m³ Air		ND				10	D, U
Cadmium	ND	0.881	ng/m³ Air		ND				10	D, U
Calcium	ND	2360	ng/m³ Air		ND				10	D, GC-BS, LJ, QB-01, U
Chromium	ND	16.4	ng/m³ Air		ND				10	D, U
Cobalt	0.379	0.126	ng/m³ Air		0.451			17.5	10	QB-01, D
Copper	ND	24.3	ng/m³ Air		ND				10	D, U
Iron	738	196	ng/m³ Air		750			1.67	10	D, GC-BS
Lead	ND	2.23	ng/m³ Air		ND				10	D, U
Magnesium	ND	779	ng/m³ Air		ND				10	D, ICS-01, LK U
Manganese	19.3	9.62	ng/m³ Air		20.1			3.69	10	D
Molybdenum	ND	1.72	ng/m³ Air		ND				10	D, QB-01, U
Nickel	ND	6.48	ng/m³ Air		ND				10	D, U
Phosphorus	ND	10100	ng/m³ Air		ND				10	D, GC-BS, ICS-01, LK, U
Potassium	ND	307	ng/m³ Air		ND				10	D, U
Rubidium	0.280	0.148	ng/m³ Air		0.258			8.14	10	D, QB-01
Selenium	0.228	0.0889	ng/m³ Air		0.235			3.15	10	D
Sodium	ND	16200	ng/m³ Air		ND				10	D, ICS-01, LK U
Strontium	5.91	5.27	ng/m³ Air		5.62			5.10	10	D, QB-01
Thallium	ND	0.00407	ng/m³ Air		ND				10	D, U
Thorium	0.0266	0.0243	ng/m³ Air		0.0274			2.93	10	D
Uranium	ND	0.137	ng/m³ Air		ND				10	D, U
Vanadium	1.71	0.398	ng/m³ Air		1.65			3.50	10	D
Zinc	ND	790	ng/m³ Air		ND				10	D, U
Duplicate (B3K2802-DUP4)		**Source: 3112732-10R**		Prepared: 11/28/23 Analyzed: 11/30/23						
Aluminum	521	245	ng/m³ Air		578			10.4	10	D, ICS-01, LK
Antimony	ND	0.337	ng/m³ Air		ND				10	D, GC-BS, SL, U
Arsenic	0.336	0.0730	ng/m³ Air		0.352			4.60	10	D
Barium	ND	7.25	ng/m³ Air		ND				10	D, U
Beryllium	ND	0.0254	ng/m³ Air		ND				10	D, U
Cadmium	ND	0.833	ng/m³ Air		ND				10	D, U
Calcium	ND	2230	ng/m³ Air		ND				10	D, GC-BS, LJ, QB-01, U
Chromium	ND	15.5	ng/m³ Air		ND				10	D, U

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Batch B3K2802 - ICP-MS Extraction

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Duplicate (B3K2802-DUP4) Continued		**Source: 3112732-10R**		Prepared: 11/28/23		Analyzed: 11/30/23				
Cobalt	0.308	0.119	ng/m³ Air		0.320			3.82	10	D, QB-01
Copper	ND	22.9	ng/m³ Air		ND				10	D, U
Iron	626	185	ng/m³ Air		652			4.18	10	D, GC-BS
Lead	ND	2.11	ng/m³ Air		ND				10	D, U
Magnesium	ND	737	ng/m³ Air		ND				10	D, ICS-01, LK U
Manganese	16.2	9.10	ng/m³ Air		17.1			5.43	10	D
Molybdenum	ND	1.63	ng/m³ Air		ND				10	D, QB-01, U
Nickel	ND	6.12	ng/m³ Air		ND				10	D, U
Phosphorus	ND	9550	ng/m³ Air		ND				10	D, GC-BS, ICS-01, LK, U
Potassium	ND	290	ng/m³ Air		ND				10	D, U
Rubidium	0.209	0.140	ng/m³ Air		0.214			2.23	10	D, QB-01
Selenium	0.247	0.0841	ng/m³ Air		0.253			2.21	10	D
Sodium	ND	15300	ng/m³ Air		ND				10	D, ICS-01, LK U
Strontium	ND	4.98	ng/m³ Air		ND				10	D, QB-01, U
Thallium	ND	0.00384	ng/m³ Air		ND				10	D, U
Thorium	ND	0.0229	ng/m³ Air		ND				10	D, U
Uranium	ND	0.130	ng/m³ Air		ND				10	D, U
Vanadium	1.57	0.376	ng/m³ Air		1.54			2.34	10	D
Zinc	ND	747	ng/m³ Air		ND				10	D, U
Matrix Spike (B3K2802-MS1)		**Source: 3112732-03**		Prepared: 11/28/23		Analyzed: 11/29/23				
Aluminum	727	26.0	ng/m³ Air	67.091	613	169	80-120			ICS-01, LK, QM-4X
Antimony	0.637	0.0357	ng/m³ Air	1.1182	0.109	47.2	80-120			GC-BS, QM-07, SL
Arsenic	2.36	0.00772	ng/m³ Air	2.2364	0.129	99.8	80-120			
Barium	31.6	0.767	ng/m³ Air	22.364	7.56	107	80-120			
Beryllium	1.12	0.00268	ng/m³ Air	1.1182	0.0253	98.0	80-120			
Cadmium	1.21	0.0881	ng/m³ Air	1.1182	ND	108	80-120			
Calcium	657	236	ng/m³ Air	55.909	544	203	80-120			GC-BS, LJ, QB-01, QM-4X
Chromium	12.8	1.64	ng/m³ Air	11.182	1.72	99.1	80-120			
Cobalt	1.60	0.0126	ng/m³ Air	1.1182	0.451	103	80-120			QB-01
Copper	41.8	2.43	ng/m³ Air	22.364	15.9	116	80-120			
Iron	826	19.6	ng/m³ Air	22.364	750	338	80-120			GC-BS, QM-4X
Lead	11.8	0.223	ng/m³ Air	11.182	0.302	103	80-120			
Magnesium	455	77.9	ng/m³ Air	22.364	401	244	80-120			ICS-01, LK, QM-4X, QX

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AQS SITE CODE:
SITE CODE: Maui fires

Inorganics by Compendium Method IO-3.5 - Quality Control

Batch B3K2802 - ICP-MS Extraction

Matrix Spike (B3K2802-MS1) Continued **Source: 3112732-03** Prepared: 11/28/23 Analyzed: 11/29/23

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Manganese	28.8	0.962	ng/m³ Air	6.7091	20.1	131	80-120			QM-07
Molybdenum	1.94	0.172	ng/m³ Air	1.1182	0.787	103	80-120			QB-01
Nickel	2.96	0.648	ng/m³ Air	2.2364	0.674	102	80-120			
Phosphorus	ND	1010	ng/m³ Air	11.182	ND		80-120			GC-BS, ICS-01, LK,
Potassium	208	30.7	ng/m³ Air	44.727	147	136	80-120			QM-07
Rubidium	1.33	0.0148	ng/m³ Air	1.1182	0.258	96.2	80-120			QB-01
Selenium	2.47	0.00889	ng/m³ Air	2.2364	0.235	99.8	80-120			
Sodium	3400	1620	ng/m³ Air	44.727	3150	551	80-120			ICS-01, LK, QM-4X, QX
Strontium	6.92	0.527	ng/m³ Air	1.1182	5.62	116	80-120			QB-01, QM-4X
Thallium	0.111	4.07E-4	ng/m³ Air	0.11182	0.00148	98.0	80-120			
Thorium	0.0900	0.00243	ng/m³ Air	0.11182	0.0274	56.0	80-120			QM-07
Uranium	0.127	0.0137	ng/m³ Air	0.11182	0.0147	101	80-120			
Vanadium	4.03	0.0398	ng/m³ Air	2.2364	1.65	106	80-120			
Zinc	91.0	79.0	ng/m³ Air	67.091	ND	136	80-120			

Matrix Spike Dup (B3K2802-MSD1) **Source: 3112732-03** Prepared: 11/28/23 Analyzed: 11/29/23

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Aluminum	681	26.0	ng/m³ Air	67.091	613	101	80-120	6.50	20	ICS-01, LK, QM-4X
Antimony	0.656	0.0357	ng/m³ Air	1.1182	0.109	48.9	80-120	2.92	20	SL, GC-BS, QM-07
Arsenic	2.29	0.00772	ng/m³ Air	2.2364	0.129	96.8	80-120	2.85	20	
Barium	30.1	0.767	ng/m³ Air	22.364	7.56	101	80-120	4.65	20	
Beryllium	1.07	0.00268	ng/m³ Air	1.1182	0.0253	93.3	80-120	4.82	20	
Cadmium	1.16	0.0881	ng/m³ Air	1.1182	ND	103	80-120	4.28	20	
Calcium	599	236	ng/m³ Air	55.909	544	98.3	80-120	9.30	20	GC-BS, LJ, QB-01
Chromium	12.3	1.64	ng/m³ Air	11.182	1.72	95.1	80-120	3.56	20	
Cobalt	1.55	0.0126	ng/m³ Air	1.1182	0.451	98.4	80-120	3.33	20	QB-01
Copper	43.7	2.43	ng/m³ Air	22.364	15.9	124	80-120	4.37	20	QM-07
Iron	760	19.6	ng/m³ Air	22.364	750	45.3	80-120	8.24	20	GC-BS, QM-4X
Lead	11.6	0.223	ng/m³ Air	11.182	0.302	101	80-120	1.42	20	
Magnesium	427	77.9	ng/m³ Air	22.364	401	117	80-120	6.41	20	ICS-01, LK, QX
Manganese	27.2	0.962	ng/m³ Air	6.7091	20.1	107	80-120	5.77	20	
Molybdenum	1.88	0.172	ng/m³ Air	1.1182	0.787	97.7	80-120	3.32	20	QB-01
Nickel	2.85	0.648	ng/m³ Air	2.2364	0.674	97.2	80-120	3.73	20	
Phosphorus	ND	1010	ng/m³ Air	11.182	ND		80-120		20	GC-BS, ICS-01, LK,
Potassium	192	30.7	ng/m³ Air	44.727	147	99.3	80-120	8.20	20	

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[redacted]

CERTIFICATE OF ANALYSIS

Tetra Tech, Inc.
1777 Sentry Pkwy, Bldg 12
Blue Bell, PA 19422
ATTN: Ms. Chelsea Saber
PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 12/01/23 13:09
SUBMITTED: 11/24/23
AQS SITE CODE:
SITE CODE: Maui fires

Inorganics by Compendium Method IO-3.5 - Quality Control

Batch B3K2802 - ICP-MS Extraction

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Matrix Spike Dup (B3K2802-MSD1) Conti Source: 3112732-03				Prepared: 11/28/23	Analyzed: 11/29/23					
Rubidium	1.30	0.0148	ng/m³ Air	1.1182	0.258	92.8	80-120	2.87	20	QB-01
Selenium	2.39	0.00889	ng/m³ Air	2.2364	0.235	96.4	80-120	3.13	20	
Sodium	3230	1620	ng/m³ Air	44.727	3150	167	80-120	5.20	20	ICS-01, LK, QX
Strontium	6.58	0.527	ng/m³ Air	1.1182	5.62	86.2	80-120	5.00	20	QB-01
Thallium	0.107	4.07E-4	ng/m³ Air	0.11182	0.00148	94.6	80-120	3.53	20	QM-4X
Thorium	0.0818	0.00243	ng/m³ Air	0.11182	0.0274	48.7	80-120	9.54	20	QM-07
Uranium	0.122	0.0137	ng/m³ Air	0.11182	0.0147	95.9	80-120	4.30	20	
Vanadium	3.79	0.0398	ng/m³ Air	2.2364	1.65	96.0	80-120	5.93	20	
Zinc	89.0	79.0	ng/m³ Air	67.091	ND	133	80-120	2.19	20	
Post Spike (B3K2802-PS1) Source: 3112732-03				Prepared: 11/28/23	Analyzed: 11/29/23					
Aluminum	646	26.0	ng/m³ Air	22.364	613	149	75-125			A-01, ICS-01, LK
Antimony	0.326	0.0357	ng/m³ Air	0.22364	0.109	96.8	75-125			GC-BS, SL
Arsenic	1.19	0.00772	ng/m³ Air	1.1182	0.129	94.4	75-125			
Barium	9.61	0.767	ng/m³ Air	2.2364	7.56	91.8	75-125			
Beryllium	0.237	0.00268	ng/m³ Air	0.22364	0.0253	94.8	75-125			
Cadmium	0.121	0.0881	ng/m³ Air	0.11182	ND	108	75-125			
Calcium	578	236	ng/m³ Air	22.364	544	154	75-125			GC-BS, LJ, QB-01
Chromium	2.71	1.64	ng/m³ Air	1.1182	1.72	89.0	75-125			
Cobalt	0.678	0.0126	ng/m³ Air	0.22364	0.451	101	75-125			QB-01
Copper	27.5	2.43	ng/m³ Air	11.182	15.9	103	75-125			
Iron	775	19.6	ng/m³ Air	22.364	750	111	75-125			GC-BS
Lead	22.2	0.223	ng/m³ Air	22.364	0.302	98.1	75-125			
Magnesium	430	77.9	ng/m³ Air	22.364	401	132	75-125			A-01, ICS-01, LK, QX
Manganese	22.4	0.962	ng/m³ Air	2.2364	20.1	106	75-125			
Molybdenum	1.81	0.172	ng/m³ Air	1.1182	0.787	91.8	75-125			QB-01
Nickel	2.88	0.648	ng/m³ Air	2.2364	0.674	98.5	75-125			
Phosphorus	ND	1010	ng/m³ Air	4.4727	ND		75-125			A-01, GC-BS, ICS-01, LK, U
Potassium	171	30.7	ng/m³ Air	22.364	147	106	75-125			
Rubidium	0.358	0.0148	ng/m³ Air	0.11182	0.258	88.9	75-125			QB-01
Selenium	1.30	0.00889	ng/m³ Air	1.1182	0.235	95.1	75-125			
Sodium	3220	1620	ng/m³ Air	22.364	3150	298	75-125			A-01, ICS-01, LK, QX
Strontium	6.54	0.527	ng/m³ Air	1.1182	5.62	82.4	75-125			QB-01
Thallium	0.0536	4.07E-4	ng/m³ Air	5.5909E-2	0.00148	93.2	75-125			
Thorium	0.0801	0.00243	ng/m³ Air	5.5909E-2	0.0274	94.2	75-125			

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CERTIFICATE OF ANALYSIS

Tetra Tech, Inc.
1777 Sentry Pkwy, Bldg 12
Blue Bell, PA 19422
ATTN: Ms. Chelsea Saber
PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 12/01/23 13:09
SUBMITTED: 11/24/23
AQS SITE CODE:
SITE CODE: Maui fires

Inorganics by Compendium Method IO-3.5 - Quality Control

Batch B3K2802 - ICP-MS Extraction

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Post Spike (B3K2802-PS1) Continued	**Source: 3112732-03**		Prepared: 11/28/23	Analyzed: 11/29/23						
Uranium	0.0676	0.0137	ng/m³ Air	5.5909E-2	0.0147	94.6	75-125			
Vanadium	2.71	0.0398	ng/m³ Air	1.1182	1.65	95.3	75-125			
Zinc	ND	79.0	ng/m³ Air	22.364	ND		75-125			U
Dilution Check (B3K2802-SRL1)	**Source: 3112732-03**		Prepared: 11/28/23	Analyzed: 11/29/23						
Aluminum	622	130	ng/m³ Air		613			1.37	10	ICS-01, LK
Antimony	ND	0.178	ng/m³ Air		ND				10	GC-BS, SL, U
Arsenic	0.139	0.0386	ng/m³ Air		0.129			7.59	10	
Barium	7.59	3.83	ng/m³ Air		7.56			0.399	10	
Beryllium	0.0245	0.0134	ng/m³ Air		0.0253			3.27	10	
Cadmium	ND	0.441	ng/m³ Air		ND				10	U
Calcium	ND	1180	ng/m³ Air		ND				10	GC-BS, LJ, QB-01, U
Chromium	ND	8.21	ng/m³ Air		ND				10	U
Cobalt	0.467	0.0631	ng/m³ Air		0.451			3.55	10	QB-01
Copper	16.5	12.1	ng/m³ Air		15.9			3.77	10	
Iron	772	97.8	ng/m³ Air		750			2.90	10	GC-BS
Lead	ND	1.12	ng/m³ Air		ND				10	U
Magnesium	408	390	ng/m³ Air		401			1.82	10	ICS-01, LK, QX
Manganese	20.7	4.81	ng/m³ Air		20.1			3.19	10	
Molybdenum	ND	0.861	ng/m³ Air		ND				10	QB-01, U
Nickel	ND	3.24	ng/m³ Air		ND				10	U
Phosphorus	ND	5050	ng/m³ Air		ND				10	GC-BS, ICS-01, LK, U
Potassium	155	154	ng/m³ Air		ND			4.86	10	
Rubidium	0.269	0.0740	ng/m³ Air		0.258			4.20	10	QB-01
Selenium	0.249	0.0445	ng/m³ Air		0.235			5.88	10	
Sodium	ND	8090	ng/m³ Air		ND				10	QX, ICS-01, LK, U
Strontium	5.81	2.64	ng/m³ Air		5.62			3.33	10	QB-01
Thallium	ND	0.00203	ng/m³ Air		ND				10	U
Thorium	0.0264	0.0121	ng/m³ Air		0.0274			3.70	10	
Uranium	ND	0.0687	ng/m³ Air		ND				10	U
Vanadium	1.68	0.199	ng/m³ Air		1.65			1.74	10	
Zinc	ND	395	ng/m³ Air		ND				10	U
Dilution Check (B3K2802-SRL2)	**Source: 3112732-03R**		Prepared: 11/28/23	Analyzed: 11/30/23						
Aluminum	534	260	ng/m³ Air		613			13.8	10	D, ICS-01, LK
Antimony	ND	0.357	ng/m³ Air		ND				10	D, GC-BS, SL, U

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Blue Bell, PA 19422
ATTN: Ms. Chelsea Saber
PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 12/01/23 13:09
SUBMITTED: 11/24/23
AQS SITE CODE:
SITE CODE: Maui fires

Inorganics by Compendium Method IO-3.5 - Quality Control

Batch B3K2802 - ICP-MS Extraction

Dilution Check (B3K2802-SRL2) ContinueSource: 3112732-03R Prepared: 11/28/23 Analyzed: 11/30/23

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Arsenic	0.114	0.0772	ng/m³ Air		0.129			12.3	10	D
Barium	ND	7.67	ng/m³ Air		ND				10	D, U
Beryllium	ND	0.0268	ng/m³ Air		ND				10	D, U
Cadmium	ND	0.881	ng/m³ Air		ND				10	D, U
Calcium	ND	2360	ng/m³ Air		ND				10	D, GC-BS, LJ, QB-01, U
Chromium	ND	16.4	ng/m³ Air		ND				10	D, U
Cobalt	0.424	0.126	ng/m³ Air		0.451			6.29	10	D, QB-01
Copper	ND	24.3	ng/m³ Air		ND				10	D, U
Iron	694	196	ng/m³ Air		750			7.79	10	D, GC-BS
Lead	ND	2.23	ng/m³ Air		ND				10	D, U
Magnesium	ND	779	ng/m³ Air		ND				10	LK, D, ICS-01 U
Manganese	18.5	9.62	ng/m³ Air		20.1			8.26	10	D
Molybdenum	ND	1.72	ng/m³ Air		ND				10	D, QB-01, U
Nickel	ND	6.48	ng/m³ Air		ND				10	D, U
Phosphorus	ND	10100	ng/m³ Air		ND				10	D, GC-BS, ICS-01, LK, U
Potassium	ND	307	ng/m³ Air		ND				10	D, U
Rubidium	0.258	0.148	ng/m³ Air		0.258			0.107	10	D, QB-01
Selenium	0.197	0.0889	ng/m³ Air		0.235			17.5	10	D
Sodium	ND	16200	ng/m³ Air		ND				10	D, ICS-01, LK U
Strontium	5.70	5.27	ng/m³ Air		5.62			1.44	10	D, QB-01
Thallium	ND	0.00407	ng/m³ Air		ND				10	D, U
Thorium	0.0258	0.0243	ng/m³ Air		0.0274			6.24	10	D
Uranium	ND	0.137	ng/m³ Air		ND				10	D, U
Vanadium	1.63	0.398	ng/m³ Air		1.65			0.856	10	D
Zinc	ND	790	ng/m³ Air		ND				10	D, U

[redacted]

CERTIFICATE OF ANALYSIS

Tetra Tech, Inc.
1777 Sentry Pkwy, Bldg 12
Blue Bell, PA 19422
ATTN: Ms. Chelsea Saber
PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 12/01/23 13:09
SUBMITTED: 11/24/23
AQS SITE CODE:
SITE CODE: Maui fires

Notes and Definitions

U	Under Detection Limit
SL	The spike recovery was outside acceptance limits. Reported value may be biased low.
QX	Compound does not meet QC criteria. Results should be considered an estimate.
QM-4X	The MS/MSD recovery exceeds criteria because the parent sample concentration is greater than 4x the spike concentration. Sample results for the QC batch were accepted based on acceptable BS/BSD recoveries.
QM-07	The spike recovery was outside acceptance limits for the MS and/or MSD. The batch was accepted based on acceptable LCS recovery.
QB-01	Analyte exceeds method blank criteria
LK	Analyte identified; Reported value may be biased high.
LJ	Identification of analyte is acceptable; reported value is an estimate.
ICS-01	Interference check exceeds criteria.
GC-BS	Compound exceeds Blank Spike Criteria
FB-01	Analyte exceeds Field Blank criteria.
D	This result obtained by dilution.
A-01	parent sample >4x spike amount
ND	Analyte NOT DETECTED
NR	Not Reported
MDL	Method Detection Limit
RPD	Relative Percent Difference

Note: This test is accredited under the 2016 TNI Standard.

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[redacted]

Eastern Research Group
601 Keystone Park Drive
Suite 700
Morrisville, NC 27560

December 04, 2023

Ms. Chelsea Saber
Tetra Tech, Inc.
1777 Sentry Pkwy, Bldg 12
Blue Bell, PA 19422
Project Name: Maui fires

Dear Ms. Chelsea Saber,

This report contains the analytical results for the sample(s) received under chain(s) of custody by Eastern Research Group on 11/27/23 11:25.

Values below the MDL for QC results in this report are recorded as ND, however the actual values are reported in the accompanying Excel report with a "U" flag (Under the detection limit). The actual values are reported in AQS.

This test is accredited under the 2016 TNI Standard for Environmental Laboratories (FL DOH Certification # E87673). All analyses were performed as described in the US EPA-approved QAPP, under the contract for National Hazardous Air Pollutant Support (US EPA Contract No. 68HERH22D0002). This cover page is an integral part of this report, and any exceptions or comments are noted on the last page.

Release of the data contained in this data package and in the data submitted in the electronic data deliverable, has been authorized by the Program Manager, or the Program Manager's designee as verified by the following signature.

The issuance of the final Certificate of Analysis takes precedence over any previous Report. If you have any questions, please contact me at 919-468-7924.

Sincerely,

Julie Swift
Program Manager
julie.swift@erg.com

The information contained in this report and its attachment(s) are intended only for the use of the individual to whom it is addressed and may contain information that is privileged, confidential, or exempt from disclosure. If the reader of this message is not the intended recipient, you are hereby notified that any dissemination, distribution, or copying of this report is strictly prohibited. If you have received this report in error, please notify julie.swift@erg.com and delete the report without retaining any copies.

[redacted]

CERTIFICATE OF ANALYSIS

Tetra Tech, Inc.
1777 Sentry Pkwy, Bldg 12
Blue Bell, PA 19422
ATTN: Ms. Chelsea Saber
PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 12/04/23 11:41
SUBMITTED: 11/27/23
AQS SITE CODE:
SITE CODE: Maui fires

ANALYTICAL REPORT FOR SAMPLES

SampleName	LabNumber	Matrix	Sampled	Received
TetraTech Q9541277	3112737-01	Air	11/20/23 23:59	11/27/23 11:25
TetraTech Q9541276	3112737-02	Air	11/20/23 23:59	11/27/23 11:25
TetraTech Q9541275	3112737-03	Air	11/20/23 23:59	11/27/23 11:25
TetraTech Q9541930 FB	3112737-04	Air	11/20/23 00:00	11/27/23 11:25
TetraTech Q9541268	3112737-05	Air	11/21/23 23:59	11/27/23 11:25
TetraTech Q9541266	3112737-06	Air	11/21/23 23:59	11/27/23 11:25
TetraTech Q9541932	3112737-07	Air	11/21/23 23:59	11/27/23 11:25
TetraTech Q9541926 - FB	3112737-08	Air	11/21/23 00:00	11/27/23 11:25
TetraTech Q9541929	3112737-09	Air	11/22/23 23:59	11/27/23 11:25
TetraTech Q9541928	3112737-10	Air	11/22/23 23:59	11/27/23 11:25
TetraTech Q9541290	3112737-11	Air	11/22/23 23:59	11/27/23 11:25
TetraTech Q9541285 - FB	3112737-12	Air	11/22/23 00:00	11/27/23 11:25
TetraTech Q9541288	3112737-13	Air	11/23/23 23:59	11/27/23 11:25
TetraTech Q9541287	3112737-14	Air	11/23/23 23:59	11/27/23 11:25
TetraTech Q9541284	3112737-15	Air	11/23/23 23:59	11/27/23 11:25
TetraTech Q9541913 FB	3112737-16	Air	11/23/23 00:00	11/27/23 11:25

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Tetra Tech, Inc.
1777 Sentry Pkwy, Bldg 12
Blue Bell, PA 19422
ATTN: Ms. Chelsea Saber
PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 12/04/23 11:41
SUBMITTED: 11/27/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9541277 **Lab ID:** 3112737-01 **Sampled:** 11/20/23 23:59
Matrix: Air **Sample Volume:** 2038.818 m³ **Received:** 11/27/23 11:25
Filter ID: **Analysis Date:** 11/30/23 21:47
Comments: MFK-AM01-112023-HM

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	**7429-90-5**	**404**	ICS-01, LK	**25.6**
Antimony	**7440-36-0**	**0.101**	SL	**0.0352**
Arsenic	**7440-38-2**	**0.156**		**0.00762**
Barium	**7440-39-3**	**4.78**		**0.757**
Beryllium	**7440-41-7**	**0.0126**		**0.00265**
Cadmium	7440-43-9	0.00937	U	0.0870
Calcium	**7440-70-2**	**328**	LJ, QB-01	**233**
Chromium	7440-47-3	1.61	U	1.62
Cobalt	**7440-48-4**	**0.220**	QB-01	**0.0124**
Copper	**7440-50-8**	**22.3**		**2.39**
Iron	**7439-89-6**	**410**	GC-BS	**19.3**
Lead	**7439-92-1**	**0.469**		**0.220**
Magnesium	**7439-95-4**	**150**	ICS-01, LK	**76.9**
Manganese	**7439-96-5**	**10.6**		**0.950**
Molybdenum	**7439-98-7**	**0.893**	QB-01	**0.170**
Nickel	7440-02-0	0.575	U	0.639
Phosphorus	7723-14-0	309	U, GC-BS, ICS-01, LK, QX	998
Potassium	**7440-09-7**	**63.1**	ICS-01, LK	**30.3**
Rubidium		**0.138**		**0.0146**
Selenium	**7782-49-2**	**0.175**	LJ, QX	**0.00878**
Sodium	7440-23-5	1350	U, ICS-01, LK	1600
Strontium	**7440-24-6**	**3.07**	QB-01	**0.520**
Thallium	**7440-28-0**	**0.00140**		**4.01E-4**
Thorium	**7440-29-01**	**0.0100**		**0.00239**
Uranium	NA	0.00929	U	0.0136
Vanadium	**7440-62-2**	**0.993**		**0.0393**
Zinc	7440-66-6	15.2	U	78.0

The results in this report apply only to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

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CERTIFICATE OF ANALYSIS

Tetra Tech, Inc.
1777 Sentry Pkwy, Bldg 12
Blue Bell, PA 19422
ATTN: Ms. Chelsea Saber
PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 12/04/23 11:41
SUBMITTED: 11/27/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9541276 **Lab ID:** 3112737-02 **Sampled:** 11/20/23 23:59
Matrix: Air **Sample Volume:** 2026.064 m³ **Received:** 11/27/23 11:25
Filter ID: **Analysis Date:** 11/30/23 22:02
Comments: MFK-AM02-112023-HM

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	**7429-90-5**	**862**	E, ICS-01, LK	**25.8**
Antimony	**7440-36-0**	**0.138**	SL	**0.0354**
Arsenic	**7440-38-2**	**0.319**		**0.00767**
Barium	**7440-39-3**	**7.60**		**0.761**
Beryllium	**7440-41-7**	**0.0263**		**0.00267**
Cadmium	**7440-43-9**	**0.103**		**0.0875**
Calcium	**7440-70-2**	**429**	LJ, QB-01	**234**
Chromium	**7440-47-3**	**1.98**		**1.63**
Cobalt	**7440-48-4**	**0.314**	QB-01	**0.0125**
Copper	**7440-50-8**	**16.1**		**2.41**
Iron	**7439-89-6**	**786**	GC-BS	**19.4**
Lead	**7439-92-1**	**0.532**		**0.222**
Magnesium	**7439-95-4**	**174**	ICS-01, LK	**77.4**
Manganese	**7439-96-5**	**18.7**		**0.956**
Molybdenum	**7439-98-7**	**0.954**	QB-01	**0.171**
Nickel	**7440-02-0**	**0.716**		**0.643**
Phosphorus	7723-14-0	352	U, GC-BS, ICS-01, LK, QX	1000
Potassium	**7440-09-7**	**79.0**	ICS-01, LK	**30.5**
Rubidium		**0.211**		**0.0147**
Selenium	**7782-49-2**	**0.257**	LJ, QX	**0.00883**
Sodium	7440-23-5	1370	U, ICS-01, LK	1610
Strontium	**7440-24-6**	**4.83**	QB-01	**0.524**
Thallium	**7440-28-0**	**0.00192**		**4.04E-4**
Thorium	**7440-29-01**	**0.0243**		**0.00241**
Uranium	**NA**	**0.0195**		**0.0137**
Vanadium	**7440-62-2**	**1.91**		**0.0395**
Zinc	7440-66-6	12.1	U	78.5

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CERTIFICATE OF ANALYSIS

Tetra Tech, Inc.
1777 Sentry Pkwy, Bldg 12
Blue Bell, PA 19422
ATTN: Ms. Chelsea Saber
PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 12/04/23 11:41
SUBMITTED: 11/27/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9541275
Matrix: Air
Lab ID: 3112737-03
Sample Volume: 1752.065 m³
Filter ID:
Sampled: 11/20/23 23:59
Received: 11/27/23 11:25
Analysis Date: 11/30/23 18:50

Comments: MFK-AM03-112023-HM

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	**7429-90-5**	**289**	D-F, ICS-01, LK	**29.8**
Antimony	**7440-36-0**	**0.132**	SL	**0.0410**
Arsenic	**7440-38-2**	**0.0874**		**0.00887**
Barium	**7440-39-3**	**5.18**		**0.880**
Beryllium	**7440-41-7**	**0.0130**		**0.00308**
Cadmium	7440-43-9	0.0130	U	0.101
Calcium	**7440-70-2**	**306**	LJ, QB-01, QM-4X	**271**
Chromium	7440-47-3	1.66	U	1.89
Cobalt	**7440-48-4**	**0.236**	D-F, QB-01	**0.0145**
Copper	**7440-50-8**	**27.6**		**2.79**
Iron	**7439-89-6**	**331**	GC-BS, QM-4X	**22.5**
Lead	7439-92-1	0.241	U	0.256
Magnesium	**7439-95-4**	**164**	ICS-01, LK, QM-4X	**89.5**
Manganese	**7439-96-5**	**9.40**		**1.11**
Molybdenum	**7439-98-7**	**0.945**	QB-01	**0.198**
Nickel	7440-02-0	0.534	U	0.744
Phosphorus	7723-14-0	354	U, GC-BS, ICS-01, LK, QM-4X, QX	1160
Potassium	**7440-09-7**	**76.1**	ICS-01, LK	**35.3**
Rubidium		**0.139**		**0.0170**
Selenium	**7782-49-2**	**0.152**	LJ, QX	**0.0102**
Sodium	7440-23-5	1550	ICS-01, LK, QM-4X, U	1860
Strontium	**7440-24-6**	**2.80**	QB-01	**0.605**
Thallium	**7440-28-0**	**0.00141**		**4.67E-4**
Thorium	**7440-29-01**	**0.00854**	QM-07	**0.00279**
Uranium	NA	0.00893	U	0.0158
Vanadium	**7440-62-2**	**0.761**		**0.0457**
Zinc	7440-66-6	14.1	U	90.7

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CERTIFICATE OF ANALYSIS

Tetra Tech, Inc.
1777 Sentry Pkwy, Bldg 12
Blue Bell, PA 19422
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PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 12/04/23 11:41
SUBMITTED: 11/27/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9541930 FB
Lab ID: 3112737-04
Sampled: 11/20/23 00:00
Matrix: Air
Sample Volume: 2038.818 m³
Received: 11/27/23 11:25
Filter ID:
Analysis Date: 11/30/23 22:17
Comments: Field Blank - MFK-FB01-112023-HM

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	7429-90-5	10.1	ICS-01, LK, U	25.6
Antimony	7440-36-0	0.00792	SL, U	0.0352
Arsenic	7440-38-2	0.00403	U	0.00762
Barium	7440-39-3	0.542	U	0.757
Beryllium	7440-41-7	0.00110	U	0.00265
Cadmium	7440-43-9	0.00234	U	0.0870
Calcium	**7440-70-2**	**380**	FB-01, LJ, QB-01	**233**
Chromium	7440-47-3	1.48	U	1.62
Cobalt	**7440-48-4**	**0.0221**	FB-01, QB-01	**0.0124**
Copper	7440-50-8	0.331	U	2.39
Iron	7439-89-6	12.5	GC-BS, U	19.3
Lead	7439-92-1	0.0582	U	0.220
Magnesium	7439-95-4	42.2	ICS-01, LK, U	76.9
Manganese	7439-96-5	0.175	U	0.950
Molybdenum	**7439-98-7**	**0.251**	FB-01, QB-01	**0.170**
Nickel	7440-02-0	0.304	U	0.639
Phosphorus	7723-14-0	337	GC-BS, ICS-01, LK, QX, U	998
Potassium	7440-09-7	12.1	ICS-01, LK, U	30.3
Rubidium		0.0136	U	0.0146
Selenium	7782-49-2	0.00208	LJ, QX, U	0.00878
Sodium	7440-23-5	693	ICS-01, LK, U	1600
Strontium	**7440-24-6**	**0.720**	FB-01, QB-01	**0.520**
Thallium	7440-28-0	6.72E-5	U	4.01E-4
Thorium	7440-29-01	0.00220	U	0.00239
Uranium	NA	0.00175	U	0.0136
Vanadium	7440-62-2	0.0170	U	0.0393
Zinc	7440-66-6	5.18	U	78.0

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Tetra Tech, Inc.
1777 Sentry Pkwy, Bldg 12
Blue Bell, PA 19422
ATTN: Ms. Chelsea Saber
PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 12/04/23 11:41
SUBMITTED: 11/27/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9541268
Matrix: Air
Lab ID: 3112737-05
Sample Volume: 2038.818 m³
Filter ID:
Sampled: 11/21/23 23:59
Received: 11/27/23 11:25
Analysis Date: 11/30/23 22:31

Comments: MFK-AM01-112123-HM

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	**7429-90-5**	**122**	ICS-01, LK	**25.6**
Antimony	**7440-36-0**	**0.0665**	SL	**0.0352**
Arsenic	**7440-38-2**	**0.130**		**0.00762**
Barium	**7440-39-3**	**2.43**		**0.757**
Beryllium	**7440-41-7**	**0.00442**		**0.00265**
Cadmium	7440-43-9	0.00545	U	0.0870
Calcium	7440-70-2	207	LJ, QB-01, U	233
Chromium	7440-47-3	1.39	U	1.62
Cobalt	**7440-48-4**	**0.0827**	QB-01	**0.0124**
Copper	**7440-50-8**	**18.9**		**2.39**
Iron	**7439-89-6**	**128**	GC-BS	**19.3**
Lead	7439-92-1	0.171	U	0.220
Magnesium	7439-95-4	72.1	ICS-01, LK, U	76.9
Manganese	**7439-96-5**	**3.37**		**0.950**
Molybdenum	**7439-98-7**	**1.09**	QB-01	**0.170**
Nickel	7440-02-0	0.482	U	0.639
Phosphorus	7723-14-0	310	GC-BS, ICS-01, LK, QX, U	998
Potassium	**7440-09-7**	**60.3**	ICS-01, LK	**30.3**
Rubidium		**0.0845**		**0.0146**
Selenium	**7782-49-2**	**0.0788**	LJ, QX	**0.00878**
Sodium	7440-23-5	871	ICS-01, LK, U	1600
Strontium	**7440-24-6**	**1.19**	QB-01	**0.520**
Thallium	**7440-28-0**	**4.22E-4**		**4.01E-4**
Thorium	**7440-29-01**	**0.00404**		**0.00239**
Uranium	NA	0.00351	U	0.0136
Vanadium	**7440-62-2**	**0.336**		**0.0393**
Zinc	7440-66-6	10.0	U	78.0

The results in this report apply only to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

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Tetra Tech, Inc.
1777 Sentry Pkwy, Bldg 12
Blue Bell, PA 19422
ATTN: Ms. Chelsea Saber
PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 12/04/23 11:41
SUBMITTED: 11/27/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9541266 **Lab ID:** 3112737-06 **Sampled:** 11/21/23 23:59
Matrix: Air **Sample Volume:** 2008.06 m^3 **Received:** 11/27/23 11:25
Filter ID: **Analysis Date:** 11/30/23 22:45
Comments: MFK-AM02-112123-HM

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	**7429-90-5**	**180**	ICS-01, LK	**26.0**
Antimony	**7440-36-0**	**0.0734**	SL	**0.0357**
Arsenic	**7440-38-2**	**0.156**		**0.00774**
Barium	**7440-39-3**	**3.39**		**0.768**
Beryllium	**7440-41-7**	**0.00687**		**0.00269**
Cadmium	7440-43-9	0.00686	U	0.0883
Calcium	7440-70-2	228	LJ, QB-01, U	237
Chromium	7440-47-3	1.35	U	1.64
Cobalt	**7440-48-4**	**0.107**	QB-01	**0.0126**
Copper	**7440-50-8**	**17.9**		**2.43**
Iron	**7439-89-6**	**188**	GC-BS	**19.6**
Lead	7439-92-1	0.151	U	0.224
Magnesium	**7439-95-4**	**82.4**	ICS-01, LK	**78.1**
Manganese	**7439-96-5**	**4.55**		**0.964**
Molybdenum	**7439-98-7**	**1.06**	QB-01	**0.173**
Nickel	7440-02-0	0.484	U	0.649
Phosphorus	7723-14-0	327	GC-BS, ICS-01, LK, QX, U	1010
Potassium	**7440-09-7**	**70.2**	ICS-01, LK	**30.8**
Rubidium		**0.109**		**0.0148**
Selenium	**7782-49-2**	**0.100**	LJ, QX	**0.00891**
Sodium	7440-23-5	918	ICS-01, LK, U	1620
Strontium	**7440-24-6**	**1.53**	QB-01	**0.528**
Thallium	**7440-28-0**	**5.33E-4**		**4.08E-4**
Thorium	**7440-29-01**	**0.00593**		**0.00243**
Uranium	NA	0.00473	U	0.0138
Vanadium	**7440-62-2**	**0.473**		**0.0399**
Zinc	7440-66-6	11.4	U	79.2

[redacted]

CERTIFICATE OF ANALYSIS

Tetra Tech, Inc.
1777 Sentry Pkwy, Bldg 12
Blue Bell, PA 19422
ATTN: Ms. Chelsea Saber
PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 12/04/23 11:41
SUBMITTED: 11/27/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9541932
Matrix: Air
Lab ID: 3112737-07
Sample Volume: 1687.032 m^3
Filter ID:
Sampled: 11/21/23 23:59
Received: 11/27/23 11:25
Analysis Date: 11/30/23 23:14

Comments: MFK-AM03-112123-HM

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	**7429-90-5**	**106**	ICS-01, LK	**31.0**
Antimony	**7440-36-0**	**0.0652**	SL	**0.0425**
Arsenic	**7440-38-2**	**0.0869**		**0.00921**
Barium	**7440-39-3**	**2.96**		**0.914**
Beryllium	**7440-41-7**	**0.00579**		**0.00320**
Cadmium	7440-43-9	0.00886	U	0.105
Calcium	**7440-70-2**	**531**	LJ, QB-01	**282**
Chromium	7440-47-3	1.77	U	1.96
Cobalt	**7440-48-4**	**0.0968**	QB-01	**0.0150**
Copper	**7440-50-8**	**38.8**		**2.89**
Iron	**7439-89-6**	**132**	GC-BS	**23.3**
Lead	7439-92-1	0.236	U	0.266
Magnesium	**7439-95-4**	**101**	ICS-01, LK	**93.0**
Manganese	**7439-96-5**	**3.65**		**1.15**
Molybdenum	**7439-98-7**	**1.30**	QB-01	**0.205**
Nickel	7440-02-0	0.494	U	0.772
Phosphorus	7723-14-0	436	GC-BS, ICS-01, LK, QX, U	1210
Potassium	**7440-09-7**	**77.2**	ICS-01, LK	**36.6**
Rubidium		**0.0888**		**0.0176**
Selenium	**7782-49-2**	**0.103**	LJ, QX	**0.0106**
Sodium	7440-23-5	1100	ICS-01, LK, U	1930
Strontium	**7440-24-6**	**1.84**	QB-01	**0.629**
Thallium	7440-28-0	4.15E-4	U	4.85E-4
Thorium	**7440-29-01**	**0.00569**		**0.00289**
Uranium	NA	0.00435	U	0.0164
Vanadium	**7440-62-2**	**0.334**		**0.0474**
Zinc	7440-66-6	9.77	U	94.2

[redacted]

CERTIFICATE OF ANALYSIS

Tetra Tech, Inc.
1777 Sentry Pkwy, Bldg 12
Blue Bell, PA 19422
ATTN: Ms. Chelsea Saber
PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 12/04/23 11:41
SUBMITTED: 11/27/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9541926 - FB
Lab ID: 3112737-08
Sampled: 11/21/23 00:00
Matrix: Air
Sample Volume: 2038.818 m³
Received: 11/27/23 11:25
Filter ID:
Analysis Date: 11/30/23 23:28
Comments: Field Blank - MFK-FB01-112123-HM

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	7429-90-5	9.14	ICS-01, LK, U	25.6
Antimony	7440-36-0	0.00661	SL, U	0.0352
Arsenic	7440-38-2	0.00502	U	0.00762
Barium	7440-39-3	0.540	U	0.757
Beryllium	7440-41-7	0.00106	U	0.00265
Cadmium	7440-43-9	0.00202	U	0.0870
Calcium	**7440-70-2**	**393**	FB-01, LJ, QB-01	**233**
Chromium	7440-47-3	1.56	U	1.62
Cobalt	**7440-48-4**	**0.0373**	FB-01, QB-01	**0.0124**
Copper	7440-50-8	0.226	U	2.39
Iron	7439-89-6	11.7	GC-BS, U	19.3
Lead	7439-92-1	0.0573	U	0.220
Magnesium	7439-95-4	43.7	ICS-01, LK, U	76.9
Manganese	7439-96-5	0.147	U	0.950
Molybdenum	**7439-98-7**	**0.279**	FB-01, QB-01	**0.170**
Nickel	7440-02-0	0.289	U	0.639
Phosphorus	7723-14-0	343	GC-BS, ICS-01, LK, QX, U	998
Potassium	7440-09-7	24.1	ICS-01, LK, U	30.3
Rubidium		**0.0157**	FB-01	**0.0146**
Selenium	7782-49-2	9.16E-4	LJ, QX, U	0.00878
Sodium	7440-23-5	701	ICS-01, LK, U	1600
Strontium	**7440-24-6**	**0.750**	FB-01, QB-01	**0.520**
Thallium	7440-28-0	6.64E-5	U	4.01E-4
Thorium	7440-29-01	0.00217	U	0.00239
Uranium	NA	0.00182	U	0.0136
Vanadium	7440-62-2	0.0163	U	0.0393
Zinc	7440-66-6	4.75	U	78.0

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Tetra Tech, Inc.
1777 Sentry Pkwy, Bldg 12
Blue Bell, PA 19422
ATTN: Ms. Chelsea Saber
PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 12/04/23 11:41
SUBMITTED: 11/27/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9541929 **Lab ID:** 3112737-09 **Sampled:** 11/22/23 23:59
Matrix: Air **Sample Volume:** 2038.818 m^3 **Received:** 11/27/23 11:25
Filter ID: **Analysis Date:** 12/01/23 00:16
Comments: MFK-AM01-112223-HM

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m^3 Air	Flag	MDL ng/m^3 Air
Aluminum	**7429-90-5**	**441**	ICS-01, LK	**25.6**
Antimony	**7440-36-0**	**0.0846**	SL	**0.0352**
Arsenic	**7440-38-2**	**0.308**		**0.00762**
Barium	**7440-39-3**	**6.23**		**0.757**
Beryllium	**7440-41-7**	**0.0179**		**0.00265**
Cadmium	7440-43-9	0.00877	U	0.0870
Calcium	**7440-70-2**	**735**	LJ, QB-01	**233**
Chromium	**7440-47-3**	**1.92**		**1.62**
Cobalt	**7440-48-4**	**0.314**	QB-01	**0.0124**
Copper	**7440-50-8**	**23.8**		**2.39**
Iron	**7439-89-6**	**514**	GC-BS	**19.3**
Lead	**7439-92-1**	**0.443**		**0.220**
Magnesium	**7439-95-4**	**197**	ICS-01, LK	**76.9**
Manganese	**7439-96-5**	**13.8**		**0.950**
Molybdenum	**7439-98-7**	**1.39**	QB-01	**0.170**
Nickel	**7440-02-0**	**0.985**		**0.639**
Phosphorus	7723-14-0	369	GC-BS, ICS-01, LK, QX, U	998
Potassium	**7440-09-7**	**92.3**	ICS-01, LK	**30.3**
Rubidium		**0.179**		**0.0146**
Selenium	**7782-49-2**	**0.217**	LJ, QX	**0.00878**
Sodium	7440-23-5	1430	ICS-01, LK, U	1600
Strontium	**7440-24-6**	**4.40**	QB-01	**0.520**
Thallium	**7440-28-0**	**9.25E-4**		**4.01E-4**
Thorium	**7440-29-01**	**0.0131**		**0.00239**
Uranium	NA	0.0109	U	0.0136
Vanadium	**7440-62-2**	**2.00**		**0.0393**
Zinc	7440-66-6	12.2	U	78.0

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[redacted]

CERTIFICATE OF ANALYSIS

Tetra Tech, Inc.
1777 Sentry Pkwy, Bldg 12
Blue Bell, PA 19422
ATTN: Ms. Chelsea Saber
PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 12/04/23 11:41
SUBMITTED: 11/27/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9541928
Matrix: Air
Comments: MFK-AM02-112223-HM

Lab ID: 3112737-10
Sample Volume: 2026.064 m³
Filter ID:

Sampled: 11/22/23 23:59
Received: 11/27/23 11:25
Analysis Date: 12/01/23 00:33

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	**7429-90-5**	**373**	ICS-01, LK	**25.8**
Antimony	**7440-36-0**	**0.0637**	SL	**0.0354**
Arsenic	**7440-38-2**	**0.239**		**0.00767**
Barium	**7440-39-3**	**4.87**		**0.761**
Beryllium	**7440-41-7**	**0.0149**		**0.00267**
Cadmium	7440-43-9	0.00779	U	0.0875
Calcium	**7440-70-2**	**700**	LJ, QB-01	**234**
Chromium	**7440-47-3**	**1.89**		**1.63**
Cobalt	**7440-48-4**	**0.280**	QB-01	**0.0125**
Copper	**7440-50-8**	**17.1**		**2.41**
Iron	**7439-89-6**	**446**	GC-BS	**19.4**
Lead	**7439-92-1**	**0.335**		**0.222**
Magnesium	**7439-95-4**	**206**	ICS-01, LK	**77.4**
Manganese	**7439-96-5**	**12.1**		**0.956**
Molybdenum	**7439-98-7**	**1.09**	QB-01	**0.171**
Nickel	**7440-02-0**	**1.02**		**0.643**
Phosphorus	7723-14-0	379	GC-BS, ICS-01, LK, QX, U	1000
Potassium	**7440-09-7**	**105**	ICS-01, LK	**30.5**
Rubidium		**0.168**		**0.0147**
Selenium	**7782-49-2**	**0.197**	LJ, QX	**0.00883**
Sodium	7440-23-5	1580	ICS-01, LK, U	1610
Strontium	**7440-24-6**	**3.95**	QB-01	**0.524**
Thallium	**7440-28-0**	**8.38E-4**		**4.04E-4**
Thorium	**7440-29-01**	**0.0118**		**0.00241**
Uranium	NA	0.00935	U	0.0137
Vanadium	**7440-62-2**	**2.16**		**0.0395**
Zinc	7440-66-6	9.01	U	78.5

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1777 Sentry Pkwy, Bldg 12
Blue Bell, PA 19422
ATTN: Ms. Chelsea Saber
PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 12/04/23 11:41
SUBMITTED: 11/27/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9541290
Matrix: Air
Lab ID: 3112737-11
Sample Volume: 2242.105 m³
Filter ID:
Sampled: 11/22/23 23:59
Received: 11/27/23 11:25
Analysis Date: 12/01/23 00:48
Comments: MFK-AM03-112223-HM

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	**7429-90-5**	**291**	ICS-01, LK	**23.3**
Antimony	**7440-36-0**	**0.0998**	SL	**0.0320**
Arsenic	**7440-38-2**	**0.148**		**0.00693**
Barium	**7440-39-3**	**4.65**		**0.688**
Beryllium	**7440-41-7**	**0.0131**		**0.00241**
Cadmium	7440-43-9	0.00705	U	0.0791
Calcium	**7440-70-2**	**416**	LJ, QB-01	**212**
Chromium	**7440-47-3**	**1.61**		**1.47**
Cobalt	**7440-48-4**	**0.275**	QB-01	**0.0113**
Copper	**7440-50-8**	**28.0**		**2.18**
Iron	**7439-89-6**	**391**	GC-BS	**17.6**
Lead	**7439-92-1**	**0.257**		**0.200**
Magnesium	**7439-95-4**	**220**	ICS-01, LK	**70.0**
Manganese	**7439-96-5**	**11.0**		**0.864**
Molybdenum	**7439-98-7**	**0.934**	QB-01	**0.155**
Nickel	**7440-02-0**	**1.17**		**0.581**
Phosphorus	7723-14-0	310	GC-BS, ICS-01, LK, QX, U	907
Potassium	**7440-09-7**	**116**	ICS-01, LK	**27.6**
Rubidium		**0.140**		**0.0133**
Selenium	**7782-49-2**	**0.171**	LJ, QX	**0.00798**
Sodium	**7440-23-5**	**1760**	E, ICS-01, LK	**1450**
Strontium	**7440-24-6**	**3.24**	QB-01	**0.473**
Thallium	**7440-28-0**	**8.00E-4**		**3.65E-4**
Thorium	**7440-29-01**	**0.0107**		**0.00218**
Uranium	NA	0.00748	U	0.0123
Vanadium	**7440-62-2**	**2.23**		**0.0357**
Zinc	7440-66-6	8.98	U	70.9

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1777 Sentry Pkwy, Bldg 12
Blue Bell, PA 19422
ATTN: Ms. Chelsea Saber
PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 12/04/23 11:41
SUBMITTED: 11/27/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9541285 - FB
Matrix: Air
Lab ID: 3112737-12
Sample Volume: 2038.818 m³
Filter ID:
Sampled: 11/22/23 00:00
Received: 11/27/23 11:25
Analysis Date: 12/01/23 01:03

Comments: Field Blank - MFK-FB01-112223-HM

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	7429-90-5	13.9	ICS-01, LK, U	25.6
Antimony	7440-36-0	0.0183	SL, U	0.0352
Arsenic	7440-38-2	0.00299	U	0.00762
Barium	**7440-39-3**	**1.10**	FB-01	**0.757**
Beryllium	7440-41-7	0.00102	U	0.00265
Cadmium	7440-43-9	0.00143	U	0.0870
Calcium	7440-70-2	136	LJ, QB-01, U	233
Chromium	7440-47-3	1.21	U	1.62
Cobalt	**7440-48-4**	**0.0367**	FB-01, QB-01	**0.0124**
Copper	7440-50-8	0.290	U	2.39
Iron	7439-89-6	13.8	GC-BS, U	19.3
Lead	7439-92-1	0.0406	U	0.220
Magnesium	7439-95-4	37.5	ICS-01, LK, U	76.9
Manganese	7439-96-5	0.172	U	0.950
Molybdenum	**7439-98-7**	**0.203**	FB-01, QB-01	**0.170**
Nickel	7440-02-0	0.340	U	0.639
Phosphorus	7723-14-0	301	GC-BS, ICS-01, LK, QX, U	998
Potassium	**7440-09-7**	**32.7**	FB-01, ICS-01, LK	**30.3**
Rubidium		0.0112	U	0.0146
Selenium	7782-49-2	0.00357	LJ, QX, U	0.00878
Sodium	7440-23-5	734	ICS-01, LK, U	1600
Strontium	7440-24-6	0.350	QB-01, U	0.520
Thallium	7440-28-0	6.21E-5	U	4.01E-4
Thorium	7440-29-01	0.00207	U	0.00239
Uranium	NA	0.00121	U	0.0136
Vanadium	7440-62-2	0.0151	U	0.0393
Zinc	7440-66-6	4.72	U	78.0

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Tetra Tech, Inc.
1777 Sentry Pkwy, Bldg 12
Blue Bell, PA 19422
ATTN: Ms. Chelsea Saber
PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 12/04/23 11:41
SUBMITTED: 11/27/23
AQS SITE CODE:
SITE CODE: Maui fires

Inorganics by Compendium Method IO-3.5 - Quality Control

Batch 2311075 - B3K2906

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Calibration Blank (2311075-CCB1)				Prepared & Analyzed: 11/30/23						
Aluminum	129		ng/l							
Antimony	0.882		ng/l							
Arsenic	5.57		ng/l							
Barium	1.18		ng/l							
Beryllium	0.635		ng/l							
Cadmium	0.196		ng/l							
Calcium	613		ng/l							
Chromium	6.32		ng/l							
Cobalt	0.487		ng/l							
Copper	23.7		ng/l							
Iron	113		ng/l							
Lead	6.51		ng/l							
Magnesium	22.5		ng/l							
Manganese	5.79		ng/l							
Molybdenum	20.1		ng/l							
Nickel	-3.14		ng/l							U
Phosphorus	213		ng/l							QX
Potassium	2710		ng/l							
Rubidium	1.06		ng/l							
Selenium	-6.78		ng/l							LJ, QX, U
Sodium	2830		ng/l							
Strontium	0.319		ng/l							
Thallium	0.445		ng/l							
Thorium	0.770		ng/l							
Uranium	-0.0127		ng/l							U
Vanadium	-24.6		ng/l							U
Zinc	-42.8		ng/l							U
Calibration Blank (2311075-CCB2)				Prepared & Analyzed: 11/30/23						
Aluminum	86.6		ng/l							
Antimony	0.856		ng/l							
Arsenic	0.629		ng/l							
Barium	2.60		ng/l							
Beryllium	0.486		ng/l							
Cadmium	0.598		ng/l							
Calcium	-77.0		ng/l							U
Chromium	6.84		ng/l							
Cobalt	1.06		ng/l							
Copper	49.7		ng/l							

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FILE #: 0000.00
REPORTED: 12/04/23 11:41
SUBMITTED: 11/27/23
AQS SITE CODE:
SITE CODE: Maui fires

Inorganics by Compendium Method IO-3.5 - Quality Control

Batch 2311075 - B3K2906

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Calibration Blank (2311075-CCB2) Contin				Prepared & Analyzed: 11/30/23						
Iron	93.0		ng/l							
Lead	12.0		ng/l							
Magnesium	5.21		ng/l							
Manganese	10.7		ng/l							
Molybdenum	9.79		ng/l							
Nickel	2.02		ng/l							
Phosphorus	-60.5		ng/l							QX, U
Potassium	1270		ng/l							
Rubidium	1.04		ng/l							
Selenium	-4.69		ng/l							LJ, QX, U
Sodium	1520		ng/l							
Strontium	0.576		ng/l							
Thallium	0.442		ng/l							
Thorium	0.981		ng/l							
Uranium	0.00347		ng/l							
Vanadium	-26.4		ng/l							U
Zinc	-39.0		ng/l							U
Calibration Blank (2311075-CCB3)				Prepared: 11/30/23 Analyzed: 12/01/23						
Aluminum	64.2		ng/l							
Antimony	0.875		ng/l							
Arsenic	2.26		ng/l							
Barium	1.44		ng/l							
Beryllium	-0.363		ng/l							U
Cadmium	0.455		ng/l							
Calcium	-28.7		ng/l							U
Chromium	3.82		ng/l							
Cobalt	0.621		ng/l							
Copper	31.5		ng/l							
Iron	47.1		ng/l							
Lead	8.50		ng/l							
Magnesium	21.4		ng/l							
Manganese	4.79		ng/l							
Molybdenum	10.4		ng/l							
Nickel	-0.196		ng/l							U
Phosphorus	264		ng/l							QX
Potassium	1060		ng/l							
Rubidium	1.07		ng/l							
Selenium	-6.78		ng/l							LJ, QX, U

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FILE #: 0000.00
REPORTED: 12/04/23 11:41
SUBMITTED: 11/27/23
AQS SITE CODE:
SITE CODE: Maui fires

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes

Inorganics by Compendium Method IO-3.5 - Quality Control

Batch 2311075 - B3K2906

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Calibration Blank (2311075-CCB3) Contin				Prepared: 11/30/23 Analyzed: 12/01/23						
Sodium	1980		ng/l							
Strontium	-0.192		ng/l							U
Thallium	0.350		ng/l							
Thorium	0.469		ng/l							
Uranium	0.0232		ng/l							
Vanadium	-25.5		ng/l							U
Zinc	-38.7		ng/l							U
Calibration Blank (2311075-CCB4)				Prepared: 11/30/23 Analyzed: 12/01/23						
Aluminum	96.0		ng/l							
Antimony	1.22		ng/l							
Arsenic	7.55		ng/l							
Barium	2.61		ng/l							
Beryllium	-0.0913		ng/l							U
Cadmium	0.384		ng/l							
Calcium	-143		ng/l							U
Chromium	3.91		ng/l							
Cobalt	0.723		ng/l							
Copper	34.2		ng/l							
Iron	80.9		ng/l							
Lead	7.77		ng/l							
Magnesium	6.59		ng/l							
Manganese	6.16		ng/l							
Molybdenum	9.21		ng/l							
Nickel	1.66		ng/l							
Phosphorus	-185		ng/l							QX, U
Potassium	973		ng/l							
Rubidium	0.0776		ng/l							
Selenium	-3.34		ng/l							LJ, QX, U
Sodium	3490		ng/l							
Strontium	-1.23		ng/l							U
Thallium	0.366		ng/l							
Thorium	0.767		ng/l							
Uranium	-0.00956		ng/l							U
Vanadium	-25.2		ng/l							U
Zinc	-29.0		ng/l							U
Calibration Check (2311075-CCV1)				Prepared & Analyzed: 11/30/23						
Aluminum	1.61E6		ng/l	1.5000E6		107	90-110			
Antimony	20000		ng/l	20000		100	90-110			

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Blue Bell, PA 19422
ATTN: Ms. Chelsea Saber
PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 12/04/23 11:41
SUBMITTED: 11/27/23
AQS SITE CODE:
SITE CODE: Maui fires

Inorganics by Compendium Method IO-3.5 - Quality Control

Batch 2311075 - B3K2906

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Calibration Check (2311075-CCV1) Contin				Prepared & Analyzed: 11/30/23						
Arsenic	20100		ng/l	20000		100	90-110			
Barium	200000		ng/l	200000		99.9	90-110			
Beryllium	5090		ng/l	5000.0		102	90-110			
Cadmium	20400		ng/l	20000		102	90-110			
Calcium	2.54E7		ng/l	2.5000E7		102	90-110			
Chromium	235000		ng/l	240000		98.1	90-110			
Cobalt	53000		ng/l	50000		106	90-110			
Copper	2.09E6		ng/l	2.0000E6		104	90-110			
Iron	2.62E6		ng/l	2.5000E6		105	90-110			
Lead	200000		ng/l	200000		100	90-110			
Magnesium	1.09E6		ng/l	1.0000E6		109	90-110			
Manganese	520000		ng/l	500000		104	90-110			
Molybdenum	50800		ng/l	50000		102	90-110			
Nickel	126000		ng/l	120000		105	90-110			
Phosphorus	205000		ng/l	200000		102	90-110			QX
Potassium	2.61E6		ng/l	2.5000E6		105	90-110			
Rubidium	10000		ng/l	10000		100	90-110			
Selenium	20000		ng/l	20000		100	90-110			LJ, QX
Sodium	2.74E6		ng/l	2.5000E6		110	90-110			
Strontium	49900		ng/l	50000		99.8	90-110			
Thallium	505		ng/l	500.00		101	90-110			
Thorium	504		ng/l	500.00		101	90-110			
Uranium	502		ng/l	500.00		100	90-110			
Vanadium	20100		ng/l	20000		100	90-110			
Zinc	534000		ng/l	500000		107	90-110			
Calibration Check (2311075-CCV2)				Prepared & Analyzed: 11/30/23						
Aluminum	1.46E6		ng/l	1.5000E6		97.0	90-110			
Antimony	20000		ng/l	20000		100	90-110			
Arsenic	19900		ng/l	20000		99.6	90-110			
Barium	202000		ng/l	200000		101	90-110			
Beryllium	5480		ng/l	5000.0		110	90-110			
Cadmium	20400		ng/l	20000		102	90-110			
Calcium	2.47E7		ng/l	2.5000E7		98.8	90-110			
Chromium	241000		ng/l	240000		100	90-110			
Cobalt	51200		ng/l	50000		102	90-110			
Copper	2.05E6		ng/l	2.0000E6		103	90-110			
Iron	2.48E6		ng/l	2.5000E6		99.3	90-110			
Lead	200000		ng/l	200000		99.8	90-110			

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1777 Sentry Pkwy, Bldg 12
Blue Bell, PA 19422
ATTN: Ms. Chelsea Saber
PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 12/04/23 11:41
SUBMITTED: 11/27/23
AQS SITE CODE:
SITE CODE: Maui fires

Inorganics by Compendium Method IO-3.5 - Quality Control

Batch 2311075 - B3K2906

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Calibration Check (2311075-CCV2) Contin				Prepared & Analyzed: 11/30/23						
Magnesium	1.01E6		ng/l	1.0000E6		101	90-110			
Manganese	491000		ng/l	500000		98.2	90-110			
Molybdenum	51400		ng/l	50000		103	90-110			
Nickel	122000		ng/l	120000		102	90-110			
Phosphorus	191000		ng/l	200000		95.6	90-110			QX
Potassium	2.47E6		ng/l	2.5000E6		98.8	90-110			
Rubidium	9860		ng/l	10000		98.6	90-110			
Selenium	19700		ng/l	20000		98.4	90-110			LJ, QX
Sodium	2.51E6		ng/l	2.5000E6		101	90-110			
Strontium	49300		ng/l	50000		98.6	90-110			
Thallium	505		ng/l	500.00		101	90-110			
Thorium	503		ng/l	500.00		101	90-110			
Uranium	504		ng/l	500.00		101	90-110			
Vanadium	20300		ng/l	20000		101	90-110			
Zinc	528000		ng/l	500000		106	90-110			
Calibration Check (2311075-CCV3)				Prepared & Analyzed: 11/30/23						
Aluminum	1.50E6		ng/l	1.5000E6		99.7	90-110			
Antimony	20900		ng/l	20000		104	90-110			
Arsenic	20500		ng/l	20000		103	90-110			
Barium	209000		ng/l	200000		104	90-110			
Beryllium	4950		ng/l	5000.0		99.0	90-110			
Cadmium	21400		ng/l	20000		107	90-110			
Calcium	2.56E7		ng/l	2.5000E7		102	90-110			
Chromium	254000		ng/l	240000		106	90-110			
Cobalt	52600		ng/l	50000		105	90-110			
Copper	2.12E6		ng/l	2.0000E6		106	90-110			
Iron	2.57E6		ng/l	2.5000E6		103	90-110			
Lead	208000		ng/l	200000		104	90-110			
Magnesium	1.03E6		ng/l	1.0000E6		103	90-110			
Manganese	508000		ng/l	500000		102	90-110			
Molybdenum	54300		ng/l	50000		109	90-110			
Nickel	126000		ng/l	120000		105	90-110			
Phosphorus	192000		ng/l	200000		96.0	90-110			QX
Potassium	2.49E6		ng/l	2.5000E6		99.6	90-110			
Rubidium	10200		ng/l	10000		102	90-110			
Selenium	20500		ng/l	20000		102	90-110			LJ, QX
Sodium	2.55E6		ng/l	2.5000E6		102	90-110			
Strontium	51700		ng/l	50000		103	90-110			

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CERTIFICATE OF ANALYSIS

Tetra Tech, Inc.
1777 Sentry Pkwy, Bldg 12
Blue Bell, PA 19422
ATTN: Ms. Chelsea Saber
PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 12/04/23 11:41
SUBMITTED: 11/27/23
AQS SITE CODE:
SITE CODE: Maui fires

Inorganics by Compendium Method IO-3.5 - Quality Control

Batch 2311075 - B3K2906

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Calibration Check (2311075-CCV3) Contin				Prepared & Analyzed: 11/30/23						
Thallium	517		ng/l	500.00		103	90-110			
Thorium	522		ng/l	500.00		104	90-110			
Uranium	525		ng/l	500.00		105	90-110			
Vanadium	21300		ng/l	20000		106	90-110			
Zinc	543000		ng/l	500000		109	90-110			
Calibration Check (2311075-CCV4)				Prepared: 11/30/23 Analyzed: 12/01/23						
Aluminum	1.49E6		ng/l	1.5000E6		99.0	90-110			
Antimony	20600		ng/l	20000		103	90-110			
Arsenic	20300		ng/l	20000		101	90-110			
Barium	206000		ng/l	200000		103	90-110			
Beryllium	4880		ng/l	5000.0		97.5	90-110			
Cadmium	21100		ng/l	20000		105	90-110			
Calcium	2.51E7		ng/l	2.5000E7		100	90-110			
Chromium	249000		ng/l	240000		104	90-110			
Cobalt	52100		ng/l	50000		104	90-110			
Copper	2.09E6		ng/l	2.0000E6		105	90-110			
Iron	2.55E6		ng/l	2.5000E6		102	90-110			
Lead	206000		ng/l	200000		103	90-110			
Magnesium	1.03E6		ng/l	1.0000E6		103	90-110			
Manganese	507000		ng/l	500000		101	90-110			
Molybdenum	53600		ng/l	50000		107	90-110			
Nickel	124000		ng/l	120000		103	90-110			
Phosphorus	190000		ng/l	200000		95.1	90-110			QX
Potassium	2.49E6		ng/l	2.5000E6		99.7	90-110			
Rubidium	10100		ng/l	10000		101	90-110			
Selenium	20200		ng/l	20000		101	90-110			LJ, QX
Sodium	2.57E6		ng/l	2.5000E6		103	90-110			
Strontium	50800		ng/l	50000		102	90-110			
Thallium	520		ng/l	500.00		104	90-110			
Thorium	519		ng/l	500.00		104	90-110			
Uranium	520		ng/l	500.00		104	90-110			
Vanadium	20800		ng/l	20000		104	90-110			
Zinc	538000		ng/l	500000		108	90-110			
High Cal Check (2311075-HCV1)				Prepared & Analyzed: 11/30/23						
Aluminum	2.99E6		ng/l	3.0000E6		99.8	95-105			
Antimony	40500		ng/l	40000		101	95-105			
Arsenic	40300		ng/l	40000		101	95-105			
Barium	405000		ng/l	400000		101	95-105			

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Inorganics by Compendium Method IO-3.5 - Quality Control

Batch 2311075 - B3K2906

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
High Cal Check (2311075-HCV1) Continue				Prepared & Analyzed: 11/30/23						
Beryllium	10000		ng/l	10000		100	95-105			
Cadmium	40300		ng/l	40000		101	95-105			
Calcium	5.02E7		ng/l	5.0000E7		100	95-105			
Chromium	482000		ng/l	480000		100	95-105			
Cobalt	99600		ng/l	100000		99.6	95-105			
Copper	3.99E6		ng/l	4.0000E6		99.6	95-105			
Iron	5.01E6		ng/l	5.0000E6		100	95-105			
Lead	404000		ng/l	400000		101	95-105			
Magnesium	2.00E6		ng/l	2.0000E6		100	95-105			
Manganese	998000		ng/l	1.0000E6		99.8	95-105			
Molybdenum	102000		ng/l	100000		102	95-105			
Nickel	238000		ng/l	240000		99.3	95-105			
Phosphorus	407000		ng/l	400000		102	95-105			QX
Potassium	5.12E6		ng/l	5.0000E6		102	95-105			
Rubidium	20400		ng/l	20000		102	95-105			
Selenium	39900		ng/l	40000		99.7	95-105			LJ, QX
Sodium	5.00E6		ng/l	5.0000E6		100	95-105			
Strontium	102000		ng/l	100000		102	95-105			
Thallium	1020		ng/l	1000.0		102	95-105			
Thorium	1020		ng/l	1000.0		102	95-105			
Uranium	1020		ng/l	1000.0		102	95-105			
Vanadium	40300		ng/l	40000		101	95-105			
Zinc	993000		ng/l	1.0000E6		99.3	95-105			
Initial Cal Blank (2311075-ICB1)				Prepared & Analyzed: 11/30/23						
Aluminum	72.1		ng/l							
Antimony	0.969		ng/l							
Arsenic	2.05		ng/l							
Barium	1.73		ng/l							
Beryllium	0.663		ng/l							
Cadmium	0.447		ng/l							
Calcium	51.5		ng/l							
Chromium	4.86		ng/l							
Cobalt	0.381		ng/l							
Copper	27.8		ng/l							
Iron	61.9		ng/l							
Lead	6.23		ng/l							
Magnesium	7.16		ng/l							
Manganese	6.76		ng/l							

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Inorganics by Compendium Method IO-3.5 - Quality Control

Batch 2311075 - B3K2906

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Initial Cal Blank (2311075-ICB1) Continu				Prepared & Analyzed: 11/30/23						
Molybdenum	13.4		ng/l							
Nickel	-3.35		ng/l							U
Phosphorus	417		ng/l							QX
Potassium	1730		ng/l							
Rubidium	-0.114		ng/l							U
Selenium	0.518		ng/l							LJ, QX
Sodium	408		ng/l							
Strontium	-0.0745		ng/l							U
Thallium	0.478		ng/l							
Thorium	0.549		ng/l							
Uranium	-0.00599		ng/l							U
Vanadium	-21.3		ng/l							U
Zinc	-12.8		ng/l							U
Initial Cal Check (2311075-ICV1)				Prepared & Analyzed: 11/30/23						
Aluminum	1.46E6		ng/l	1.5000E6		97.7	90-110			
Antimony	20000		ng/l	20000		100	90-110			
Arsenic	20200		ng/l	20000		101	90-110			
Barium	200000		ng/l	200000		100	90-110			
Beryllium	4680		ng/l	5000.0		93.6	90-110			
Cadmium	21000		ng/l	20000		105	90-110			
Calcium	2.46E7		ng/l	2.5000E7		98.5	90-110			
Chromium	240000		ng/l	240000		100	90-110			
Cobalt	51700		ng/l	50000		103	90-110			
Copper	2.05E6		ng/l	2.0000E6		103	90-110			
Iron	2.52E6		ng/l	2.5000E6		101	90-110			
Lead	200000		ng/l	200000		100	90-110			
Magnesium	994000		ng/l	1.0000E6		99.4	90-110			
Manganese	495000		ng/l	500000		98.9	90-110			
Molybdenum	50800		ng/l	50000		102	90-110			
Nickel	123000		ng/l	120000		102	90-110			
Phosphorus	189000		ng/l	200000		94.3	90-110			QX
Potassium	2.50E6		ng/l	2.5000E6		99.9	90-110			
Rubidium	9660		ng/l	10000		96.6	90-110			
Selenium	20500		ng/l	20000		103	90-110			LJ, QX
Sodium	2.47E6		ng/l	2.5000E6		98.6	90-110			
Strontium	50900		ng/l	50000		102	90-110			
Thallium	485		ng/l	500.00		97.0	90-110			
Thorium	499		ng/l	500.00		99.9	90-110			

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Inorganics by Compendium Method IO-3.5 - Quality Control

Batch 2311075 - B3K2906

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Initial Cal Check (2311075-ICV1) Continu				Prepared & Analyzed: 11/30/23						
Uranium	503		ng/l	500.00		101	90-110			
Vanadium	20600		ng/l	20000		103	90-110			
Zinc	535000		ng/l	500000		107	90-110			
Interference Check A (2311075-IFA1)				Prepared & Analyzed: 11/30/23						
Aluminum	1.69E7		ng/l	1.5000E7		112	80-120			ICS-01
Antimony	0.00		ng/l				80-120			U
Arsenic	0.00		ng/l				80-120			U
Barium	0.00		ng/l				80-120			U
Beryllium	0.00		ng/l				80-120			U
Cadmium	0.00		ng/l				80-120			U
Calcium	9.84E7		ng/l	1.0040E8		98.0	80-120			
Chromium	0.00		ng/l				80-120			U
Cobalt	0.00		ng/l				80-120			U
Copper	0.00		ng/l				80-120			U
Iron	1.57E7		ng/l	1.5000E7		104	80-120			
Lead	0.00		ng/l				80-120			U
Magnesium	1.74E7		ng/l	1.5000E7		116	80-120			ICS-01
Manganese	0.00		ng/l				80-120			U
Molybdenum	305000		ng/l	300000		102	80-120			
Nickel	0.00		ng/l				80-120			U
Phosphorus	1.84E7		ng/l	1.5000E7		123	80-120			ICS-01, QX
Potassium	1.65E7		ng/l	1.5000E7		110	80-120			ICS-01
Rubidium	0.00		ng/l				80-120			U
Selenium	0.00		ng/l				80-120			LJ, QX, U
Sodium	1.74E7		ng/l	1.5000E7		116	80-120			ICS-01
Strontium	0.00		ng/l				80-120			U
Thallium	0.00		ng/l				80-120			U
Thorium	0.00		ng/l				80-120			U
Uranium	0.00		ng/l				80-120			U
Vanadium	0.00		ng/l				80-120			U
Zinc	0.00		ng/l				80-120			U
Interference Check B (2311075-IFB1)				Prepared & Analyzed: 11/30/23						
Aluminum	2.12E7		ng/l	1.6500E7		128	80-120			ICS-01, LK
Antimony	20500		ng/l	20000		103	80-120			
Arsenic	20900		ng/l	20000		105	80-120			
Barium	206000		ng/l	200000		103	80-120			
Beryllium	4970		ng/l	5000.0		99.3	80-120			
Cadmium	19900		ng/l	20000		99.4	80-120			

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Inorganics by Compendium Method IO-3.5 - Quality Control

Batch 2311075 - B3K2906

Interference Check B (2311075-IFB1) Co — Prepared & Analyzed: 11/30/23

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Calcium	1.32E8		ng/l	1.2540E8		105	80-120			
Chromium	237000		ng/l	240000		98.6	80-120			
Cobalt	54500		ng/l	50000		109	80-120			
Copper	2.00E6		ng/l	2.0000E6		100	80-120			
Iron	1.95E7		ng/l	1.7500E7		112	80-120			
Lead	208000		ng/l	200000		104	80-120			
Magnesium	2.10E7		ng/l	1.6000E7		131	80-120			ICS-01, LK
Manganese	586000		ng/l	500000		117	80-120			
Molybdenum	356000		ng/l	350000		102	80-120			
Nickel	125000		ng/l	120000		105	80-120			
Phosphorus	2.07E7		ng/l	1.5200E7		136	80-120			ICS-01, LK, QX
Potassium	2.11E7		ng/l	1.7500E7		121	80-120			ICS-01, LK
Rubidium	10400		ng/l	10000		104	80-120			
Selenium	19700		ng/l	20000		98.3	80-120			LJ, QX
Sodium	2.32E7		ng/l	1.7500E7		132	80-120			ICS-01, LK
Strontium	51100		ng/l	50000		102	80-120			
Thallium	536		ng/l	500.00		107	80-120			
Thorium	554		ng/l	500.00		111	80-120			
Uranium	563		ng/l	500.00		113	80-120			
Vanadium	19500		ng/l	20000		97.7	80-120			
Zinc	505000		ng/l	500000		101	80-120			

Batch B3K2906 - ICP-MS Extraction

Blank (B3K2906-BLK1) — Prepared: 11/29/23 Analyzed: 11/30/23

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Aluminum	ND	32.1	ng/m³ Air							ICS-01, LK, U
Antimony	ND	0.0441	ng/m³ Air							SL, U
Arsenic	ND	0.00955	ng/m³ Air							U
Barium	ND	0.948	ng/m³ Air							U
Beryllium	ND	0.00332	ng/m³ Air							U
Cadmium	ND	0.109	ng/m³ Air							U
Calcium	ND	292	ng/m³ Air							LJ, QB-01, U
Chromium	ND	2.03	ng/m³ Air							U
Cobalt	ND	0.0156	ng/m³ Air							QB-01, U
Copper	ND	3.00	ng/m³ Air							U
Iron	ND	24.2	ng/m³ Air							GC-BS, U
Lead	ND	0.276	ng/m³ Air							U
Magnesium	ND	96.4	ng/m³ Air							ICS-01, LK, U
Manganese	ND	1.19	ng/m³ Air							U

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Inorganics by Compendium Method IO-3.5 - Quality Control

Batch B3K2906 - ICP-MS Extraction

Blank (B3K2906-BLK1) Continued Prepared: 11/29/23 Analyzed: 11/30/23

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Molybdenum	ND	0.213	ng/m³ Air							QB-01, U
Nickel	ND	0.801	ng/m³ Air							U
Phosphorus	ND	1250	ng/m³ Air							GC-BS, ICS-01, LK,
Potassium	ND	38.0	ng/m³ Air							ICS-01, LK, U
Rubidium	ND	0.0183	ng/m³ Air							U
Selenium	ND	0.0110	ng/m³ Air							LJ, QX, U
Sodium	ND	2000	ng/m³ Air							ICS-01, LK, U
Strontium	ND	0.652	ng/m³ Air							QB-01, U
Thallium	ND	5.03E-4	ng/m³ Air							U
Thorium	ND	0.00300	ng/m³ Air							U
Uranium	ND	0.0170	ng/m³ Air							U
Vanadium	ND	0.0492	ng/m³ Air							U
Zinc	ND	97.7	ng/m³ Air							U

LCS (B3K2906-BS1) Prepared: 11/29/23 Analyzed: 11/30/23

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Aluminum	92.0	32.1	ng/m³ Air	82.975		111	80-120			ICS-01, LK
Antimony	0.526	0.0441	ng/m³ Air	1.3829		38.1	80-120			SL
Arsenic	2.73	0.00955	ng/m³ Air	2.7658		98.6	80-120			
Barium	28.2	0.948	ng/m³ Air	27.658		102	80-120			
Beryllium	1.48	0.00332	ng/m³ Air	1.3829		107	80-120			
Cadmium	1.43	0.109	ng/m³ Air	1.3829		104	80-120			
Calcium	527	292	ng/m³ Air	69.146		762	80-120			LJ, QB-01
Chromium	15.8	2.03	ng/m³ Air	13.829		114	80-120			
Cobalt	1.45	0.0156	ng/m³ Air	1.3829		105	80-120			QB-01
Copper	30.9	3.00	ng/m³ Air	27.658		112	80-120			
Iron	43.4	24.2	ng/m³ Air	27.658		157	80-120			GC-BS
Lead	13.8	0.276	ng/m³ Air	13.829		100	80-120			
Magnesium	ND	96.4	ng/m³ Air	27.658			80-120			ICS-01, LK, U
Manganese	8.66	1.19	ng/m³ Air	8.2975		104	80-120			
Molybdenum	1.71	0.213	ng/m³ Air	1.3829		124	80-120			QB-01
Nickel	3.14	0.801	ng/m³ Air	2.7658		114	80-120			
Phosphorus	ND	1250	ng/m³ Air	13.829			80-120			GC-BS, ICS-01, LK,
Potassium	64.7	38.0	ng/m³ Air	55.317		117	80-120			LK, ICS-01
Rubidium	1.36	0.0183	ng/m³ Air	1.3829		98.5	80-120			
Selenium	2.64	0.0110	ng/m³ Air	2.7658		95.4	80-120			LJ, QX
Sodium	ND	2000	ng/m³ Air	55.317			80-120			ICS-01, LK, U
Strontium	2.27	0.652	ng/m³ Air	1.3829		164	80-120			QB-01
Thallium	0.133	5.03E-4	ng/m³ Air	0.13829		95.9	80-120			

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Inorganics by Compendium Method IO-3.5 - Quality Control

Batch B3K2906 - ICP-MS Extraction

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
LCS (B3K2906-BS1) Continued				Prepared: 11/29/23	Analyzed: 11/30/23					
Thorium	0.137	0.00300	ng/m³ Air	0.13829		99.0	80-120			
Uranium	0.134	0.0170	ng/m³ Air	0.13829		96.6	80-120			
Vanadium	2.84	0.0492	ng/m³ Air	2.7658		103	80-120			
Zinc	104	97.7	ng/m³ Air	82.975		125	80-120			
Duplicate (B3K2906-DUP1)		**Source: 3112737-03**		Prepared: 11/29/23	Analyzed: 11/30/23					
Aluminum	296	29.8	ng/m³ Air		289			2.20	10	D-F, ICS-01, LK
Antimony	0.134	0.0410	ng/m³ Air		0.132			1.98	10	SL
Arsenic	0.0804	0.00887	ng/m³ Air		0.0874			8.33	10	
Barium	5.40	0.880	ng/m³ Air		5.18			4.11	10	
Beryllium	0.0128	0.00308	ng/m³ Air		0.0130			1.81	10	
Cadmium	ND	0.101	ng/m³ Air		ND				10	U
Calcium	318	271	ng/m³ Air		306			4.08	10	LJ, QB-01
Chromium	ND	1.89	ng/m³ Air		ND				10	U
Cobalt	0.172	0.0145	ng/m³ Air		0.236			31.6	10	D-F, QB-01
Copper	29.9	2.79	ng/m³ Air		27.6			7.70	10	
Iron	333	22.5	ng/m³ Air		331			0.438	10	GC-BS
Lead	0.314	0.256	ng/m³ Air		ND				10	
Magnesium	168	89.5	ng/m³ Air		164			1.88	10	ICS-01, LK
Manganese	9.42	1.11	ng/m³ Air		9.40			0.220	10	
Molybdenum	0.953	0.198	ng/m³ Air		0.945			0.804	10	QB-01
Nickel	ND	0.744	ng/m³ Air		ND				10	U
Phosphorus	ND	1160	ng/m³ Air		ND				10	GC-BS, ICS-01, LK,
Potassium	75.7	35.3	ng/m³ Air		76.1			0.558	10	ICS-01, LK
Rubidium	0.144	0.0170	ng/m³ Air		0.139			3.20	10	
Selenium	0.161	0.0102	ng/m³ Air		0.152			5.36	10	LJ, QX
Sodium	ND	1860	ng/m³ Air		ND				10	ICS-01, LK, U
Strontium	2.88	0.605	ng/m³ Air		2.80			2.57	10	QB-01
Thallium	0.00141	4.67E-4	ng/m³ Air		0.00141			0.0618	10	
Thorium	0.00880	0.00279	ng/m³ Air		0.00854			3.02	10	
Uranium	ND	0.0158	ng/m³ Air		ND				10	U
Vanadium	0.763	0.0457	ng/m³ Air		0.761			0.215	10	
Zinc	ND	90.7	ng/m³ Air		ND				10	U
Duplicate (B3K2906-DUP2)		**Source: 3112737-06**		Prepared: 11/29/23	Analyzed: 11/30/23					
Aluminum	179	26.0	ng/m³ Air		180			0.125	10	ICS-01, LK
Antimony	0.0722	0.0357	ng/m³ Air		0.0734			1.69	10	SL
Arsenic	0.157	0.00774	ng/m³ Air		0.156			1.15	10	

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[redacted]

CERTIFICATE OF ANALYSIS

Tetra Tech, Inc.
1777 Sentry Pkwy, Bldg 12
Blue Bell, PA 19422
ATTN: Ms. Chelsea Saber
PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 12/04/23 11:41
SUBMITTED: 11/27/23
AQS SITE CODE:
SITE CODE: Maui fires

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes

Inorganics by Compendium Method IO-3.5 - Quality Control

Batch B3K2906 - ICP-MS Extraction

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Duplicate (B3K2906-DUP2) Continued		**Source: 3112737-06**		Prepared: 11/29/23	Analyzed: 11/30/23					
Barium	3.34	0.768	ng/m³ Air		3.39			1.34	10	
Beryllium	0.00650	0.00269	ng/m³ Air		0.00687			5.58	10	
Cadmium	ND	0.0883	ng/m³ Air		ND				10	U
Calcium	ND	237	ng/m³ Air		ND				10	LJ, QB-01, U
Chromium	ND	1.64	ng/m³ Air		ND				10	U
Cobalt	0.106	0.0126	ng/m³ Air		0.107			0.0428	10	QB-01
Copper	17.8	2.43	ng/m³ Air		17.9			0.549	10	
Iron	186	19.6	ng/m³ Air		188			0.749	10	GC-BS
Lead	ND	0.224	ng/m³ Air		ND				10	U
Magnesium	82.7	78.1	ng/m³ Air		82.4			0.355	10	ICS-01, LK
Manganese	4.54	0.964	ng/m³ Air		4.55			0.137	10	
Molybdenum	1.06	0.173	ng/m³ Air		1.06			0.505	10	QB-01
Nickel	ND	0.649	ng/m³ Air		ND				10	U
Phosphorus	ND	1010	ng/m³ Air		ND				10	GC-BS, ICS-01, LK,
Potassium	70.8	30.8	ng/m³ Air		70.2			0.909	10	ICS-01, LK
Rubidium	0.109	0.0148	ng/m³ Air		0.109			0.0834	10	
Selenium	0.104	0.00891	ng/m³ Air		0.100			3.52	10	LJ, QX
Sodium	ND	1620	ng/m³ Air		ND				10	ICS-01, LK, U
Strontium	1.52	0.528	ng/m³ Air		1.53			0.802	10	QB-01
Thallium	5.39E-4	4.08E-4	ng/m³ Air		5.33E-4			1.05	10	
Thorium	0.00589	0.00243	ng/m³ Air		0.00593			0.703	10	
Uranium	ND	0.0138	ng/m³ Air		ND				10	U
Vanadium	0.471	0.0399	ng/m³ Air		0.473			0.339	10	
Zinc	ND	79.2	ng/m³ Air		ND				10	U
Matrix Spike (B3K2906-MS1)		**Source: 3112737-03**		Prepared: 11/29/23	Analyzed: 11/30/23					
Aluminum	379	29.8	ng/m³ Air	77.052	289	116	80-120			ICS-01, LK
Antimony	0.874	0.0410	ng/m³ Air	1.2842	0.132	57.8	80-120			SL
Arsenic	2.63	0.00887	ng/m³ Air	2.5684	0.0874	99.1	80-120			
Barium	31.4	0.880	ng/m³ Air	25.684	5.18	102	80-120			
Beryllium	1.33	0.00308	ng/m³ Air	1.2842	0.0130	103	80-120			
Cadmium	1.35	0.101	ng/m³ Air	1.2842	ND	105	80-120			
Calcium	412	271	ng/m³ Air	64.210	306	165	80-120			LJ, QB-01, QM-4X
Chromium	14.6	1.89	ng/m³ Air	12.842	ND	113	80-120			
Cobalt	1.51	0.0145	ng/m³ Air	1.2842	0.236	98.8	80-120			QB-01
Copper	57.5	2.79	ng/m³ Air	25.684	27.6	116	80-120			
Iron	369	22.5	ng/m³ Air	25.684	331	146	80-120			GC-BS, QM-4
Lead	13.2	0.256	ng/m³ Air	12.842	ND	103	80-120			

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FILE #: 0000.00
REPORTED: 12/04/23 11:41
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AQS SITE CODE:
SITE CODE: Maui fires

Inorganics by Compendium Method IO-3.5 - Quality Control

Batch B3K2906 - ICP-MS Extraction

Matrix Spike (B3K2906-MS1) Continued Source: 3112737-03 Prepared: 11/29/23 Analyzed: 11/30/23

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Magnesium	199	89.5	ng/m³ Air	25.684	164	134	80-120			ICS-01, LK, QM-4X
Manganese	17.7	1.11	ng/m³ Air	7.7052	9.40	108	80-120			
Molybdenum	2.28	0.198	ng/m³ Air	1.2842	0.945	104	80-120			QB-01
Nickel	3.08	0.744	ng/m³ Air	2.5684	ND	120	80-120			
Phosphorus	ND	1160	ng/m³ Air	12.842	ND		80-120			GC-BS, ICS-01, LK,
Potassium	130	35.3	ng/m³ Air	51.368	76.1	106	80-120			ICS-01, LK
Rubidium	1.39	0.0170	ng/m³ Air	1.2842	0.139	97.2	80-120			
Selenium	2.62	0.0102	ng/m³ Air	2.5684	0.152	96.0	80-120			LJ, QX
Sodium	ND	1860	ng/m³ Air	51.368	ND		80-120			ICS-01, LK, QM-4X, U
Strontium	4.18	0.605	ng/m³ Air	1.2842	2.80	107	80-120			QB-01
Thallium	0.126	4.67E-4	ng/m³ Air	0.12842	0.00141	96.6	80-120			
Thorium	0.0566	0.00279	ng/m³ Air	0.12842	0.00854	37.4	80-120			QM-07
Uranium	0.133	0.0158	ng/m³ Air	0.12842	ND	104	80-120			
Vanadium	3.38	0.0457	ng/m³ Air	2.5684	0.761	102	80-120			
Zinc	102	90.7	ng/m³ Air	77.052	ND	133	80-120			

Matrix Spike Dup (B3K2906-MSD1) Source: 3112737-03 Prepared: 11/29/23 Analyzed: 11/30/23

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Aluminum	381	29.8	ng/m³ Air	77.052	289	120	80-120	0.753	20	ICS-01, LK
Antimony	0.915	0.0410	ng/m³ Air	1.2842	0.132	61.0	80-120	4.56	20	SL
Arsenic	2.64	0.00887	ng/m³ Air	2.5684	0.0874	99.2	80-120	0.0995	20	
Barium	32.3	0.880	ng/m³ Air	25.684	5.18	105	80-120	2.77	20	
Beryllium	1.34	0.00308	ng/m³ Air	1.2842	0.0130	103	80-120	0.210	20	
Cadmium	1.36	0.101	ng/m³ Air	1.2842	ND	106	80-120	0.808	20	
Calcium	397	271	ng/m³ Air	64.210	306	142	80-120	3.75	20	LJ, QB-01, QM-4X
Chromium	14.7	1.89	ng/m³ Air	12.842	ND	115	80-120	1.04	20	
Cobalt	1.52	0.0145	ng/m³ Air	1.2842	0.236	99.8	80-120	0.804	20	QB-01
Copper	56.2	2.79	ng/m³ Air	25.684	27.6	111	80-120	2.22	20	
Iron	370	22.5	ng/m³ Air	25.684	331	153	80-120	0.504	20	GC-BS, QM-4
Lead	13.3	0.256	ng/m³ Air	12.842	ND	103	80-120	0.667	20	
Magnesium	200	89.5	ng/m³ Air	25.684	164	136	80-120	0.340	20	ICS-01, LK, QM-4X
Manganese	17.7	1.11	ng/m³ Air	7.7052	9.40	108	80-120	0.372	20	
Molybdenum	2.30	0.198	ng/m³ Air	1.2842	0.945	106	80-120	1.06	20	QB-01
Nickel	3.22	0.744	ng/m³ Air	2.5684	ND	126	80-120	4.64	20	
Phosphorus	ND	1160	ng/m³ Air	12.842	ND		80-120		20	GC-BS, ICS-01, LK,
Potassium	124	35.3	ng/m³ Air	51.368	76.1	94.0	80-120	4.70	20	ICS-01, LK

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REPORTED: 12/04/23 11:41
SUBMITTED: 11/27/23
AQS SITE CODE:
SITE CODE: Maui fires

Inorganics by Compendium Method IO-3.5 - Quality Control

Batch B3K2906 - ICP-MS Extraction

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Matrix Spike Dup (B3K2906-MSD1) Conti Source: 3112737-03				Prepared: 11/29/23		Analyzed: 11/30/23				
Rubidium	1.37	0.0170	ng/m³ Air	1.2842	0.139	95.9	80-120	1.28	20	
Selenium	2.64	0.0102	ng/m³ Air	2.5684	0.152	97.0	80-120	0.982	20	QX, LJ
Sodium	ND	1860	ng/m³ Air	51.368	ND		80-120		20	ICS-01, LK, QM-4X, U
Strontium	4.11	0.605	ng/m³ Air	1.2842	2.80	101	80-120	1.72	20	QB-01
Thallium	0.127	4.67E-4	ng/m³ Air	0.12842	0.00141	97.6	80-120	0.946	20	
Thorium	0.0599	0.00279	ng/m³ Air	0.12842	0.00854	40.0	80-120	5.63	20	QM-07
Uranium	0.134	0.0158	ng/m³ Air	0.12842	ND	104	80-120	0.0599	20	
Vanadium	3.39	0.0457	ng/m³ Air	2.5684	0.761	102	80-120	0.318	20	
Zinc	98.3	90.7	ng/m³ Air	77.052	ND	128	80-120	4.03	20	
Post Spike (B3K2906-PS1) Source: 3112737-03				Prepared: 11/29/23		Analyzed: 11/30/23				
Aluminum	324	29.8	ng/m³ Air	25.684	289	134	75-125			A-01, ICS-01, LK
Antimony	0.385	0.0410	ng/m³ Air	0.25684	0.132	98.5	75-125			SL
Arsenic	1.31	0.00887	ng/m³ Air	1.2842	0.0874	95.4	75-125			
Barium	7.78	0.880	ng/m³ Air	2.5684	5.18	101	75-125			
Beryllium	0.274	0.00308	ng/m³ Air	0.25684	0.0130	102	75-125			
Cadmium	0.141	0.101	ng/m³ Air	0.12842	ND	110	75-125			
Calcium	351	271	ng/m³ Air	25.684	306	176	75-125			LJ, QB-01
Chromium	2.92	1.89	ng/m³ Air	1.2842	ND	227	75-125			
Cobalt	0.497	0.0145	ng/m³ Air	0.25684	0.236	101	75-125			QB-01
Copper	40.7	2.79	ng/m³ Air	12.842	27.6	102	75-125			
Iron	362	22.5	ng/m³ Air	25.684	331	119	75-125			GC-BS
Lead	25.2	0.256	ng/m³ Air	25.684	ND	98.3	75-125			
Magnesium	193	89.5	ng/m³ Air	25.684	164	112	75-125			ICS-01, LK
Manganese	12.1	1.11	ng/m³ Air	2.5684	9.40	106	75-125			
Molybdenum	2.22	0.198	ng/m³ Air	1.2842	0.945	99.3	75-125			QB-01
Nickel	3.07	0.744	ng/m³ Air	2.5684	ND	120	75-125			
Phosphorus	ND	1160	ng/m³ Air	5.1368	ND		75-125			A-01, GC-BS, ICS-01, LK,
Potassium	97.1	35.3	ng/m³ Air	25.684	76.1	81.7	75-125			ICS-01, LK
Rubidium	0.251	0.0170	ng/m³ Air	0.12842	0.139	87.1	75-125			
Selenium	1.39	0.0102	ng/m³ Air	1.2842	0.152	96.1	75-125			LJ, QX
Sodium	ND	1860	ng/m³ Air	25.684	ND		75-125			A-01, ICS-01, LK, U
Strontium	3.99	0.605	ng/m³ Air	1.2842	2.80	92.5	75-125			QB-01
Thallium	0.0611	4.67E-4	ng/m³ Air	6.4210E-2	0.00141	93.0	75-125			
Thorium	0.0681	0.00279	ng/m³ Air	6.4210E-2	0.00854	92.8	75-125			
Uranium	0.0691	0.0158	ng/m³ Air	6.4210E-2	ND	108	75-125			

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Inorganics by Compendium Method IO-3.5 - Quality Control

Batch B3K2906 - ICP-MS Extraction

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Post Spike (B3K2906-PS1) Continued		**Source: 3112737-03**		Prepared: 11/29/23		Analyzed: 11/30/23				
Vanadium	2.04	0.0457	ng/m³ Air	1.2842	0.761	99.2	75-125			
Zinc	ND	90.7	ng/m³ Air	25.684	ND		75-125			U
Dilution Check (B3K2906-SRL1)		**Source: 3112737-03**		Prepared: 11/29/23		Analyzed: 11/30/23				
Aluminum	293	149	ng/m³ Air		289			1.41	10	ICS-01, LK
Antimony	ND	0.205	ng/m³ Air		ND				10	SL, U
Arsenic	0.0934	0.0443	ng/m³ Air		0.0874			6.57	10	
Barium	5.26	4.40	ng/m³ Air		5.18			1.55	10	
Beryllium	ND	0.0154	ng/m³ Air		ND				10	U
Cadmium	ND	0.506	ng/m³ Air		ND				10	U
Calcium	ND	1360	ng/m³ Air		ND				10	LJ, QB-01, U
Chromium	ND	9.43	ng/m³ Air		ND				10	U
Cobalt	0.239	0.0724	ng/m³ Air		0.236			0.933	10	QB-01
Copper	28.1	13.9	ng/m³ Air		27.6			1.68	10	
Iron	336	112	ng/m³ Air		331			1.49	10	GC-BS
Lead	ND	1.28	ng/m³ Air		ND				10	U
Magnesium	ND	448	ng/m³ Air		ND				10	ICS-01, LK, U
Manganese	9.50	5.53	ng/m³ Air		9.40			1.03	10	
Molybdenum	ND	0.989	ng/m³ Air		ND				10	QB-01, U
Nickel	ND	3.72	ng/m³ Air		ND				10	U
Phosphorus	ND	5800	ng/m³ Air		ND				10	GC-BS, ICS-01, LK,
Potassium	ND	176	ng/m³ Air		ND				10	LK, ICS-01, U
Rubidium	0.141	0.0850	ng/m³ Air		0.139			1.05	10	
Selenium	0.150	0.0511	ng/m³ Air		0.152			1.26	10	LJ, QX
Sodium	ND	9290	ng/m³ Air		ND				10	ICS-01, LK, U
Strontium	ND	3.03	ng/m³ Air		ND				10	QB-01, U
Thallium	ND	0.00234	ng/m³ Air		ND				10	U
Thorium	ND	0.0139	ng/m³ Air		ND				10	U
Uranium	ND	0.0789	ng/m³ Air		ND				10	U
Vanadium	0.771	0.228	ng/m³ Air		0.761			1.26	10	
Zinc	ND	454	ng/m³ Air		ND				10	U

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Notes and Definitions

U	Under Detection Limit
SL	The spike recovery was outside acceptance limits. Reported value may be biased low.
QX	Compound does not meet QC criteria. Results should be considered an estimate.
QM-4X	The MS/MSD recovery exceeds criteria because the parent sample concentration is greater than 4x the spike concentration. Sample results for the QC batch were accepted based on acceptable BS/BSD recoveries.
QM-07	The spike recovery was outside acceptance limits for the MS and/or MSD. The batch was accepted based on acceptable LCS recovery.
QB-01	Analyte exceeds method blank criteria
LK	Analyte identified; Reported value may be biased high.
LJ	Identification of analyte is acceptable; reported value is an estimate.
ICS-01	Interference check exceeds criteria.
GC-BS	Compound exceeds Blank Spike Criteria
FB-01	Analyte exceeds Field Blank criteria.
E	The concentration indicated for this analyte is an estimated value above the calibration range of the instrument. This value is considered an estimate (CLP E-flag).
D-F	Duplicate exceeds DQO criteria.
A-01	Parent Sample >4x Spike amount
ND	Analyte NOT DETECTED
NR	Not Reported
MDL	Method Detection Limit
RPD	Relative Percent Difference

Note: This test is accredited under the 2016 TNI Standard.

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Report for:

Maura McAleese
Tetra Tech- Maui Fire
1999 Harrison St. Ste. 500
Oakland, CA 94612

Regarding: Eurofins J3 Resources, Inc.
Project: 1032864023141; HDOH Kula Community Air
EML ID: 3461524

Approved by:

Lab Director
Scott Ward

Dates of Analysis:
Asbestos TEM ISO 10312 / ASTM6281-06: 11-29-2023

All samples were received in acceptable condition unless noted in the Report Comments portion in the body of the report. Due to the nature of the analyses performed, field blank correction of results is not applied. The results relate only to the samples as received and tested.

Eurofins J3 Resources, Inc. ("the Company"), a member of the Eurofins Built Environment Testing group of companies, shall have no liability to the client or the client's customer with respect to decisions or recommendations made, actions taken or courses of conduct implemented by either the client or the client's customer as a result of or based upon the Test Results. In no event shall the Company be liable to the client with respect to the Test Results except for the Company's own willful misconduct or gross negligence nor shall the Company be liable for incidental or consequential damages or lost profits or revenues to the fullest extent such liability may be disclaimed by law, even if the Company has been advised of the possibility of such damages, lost profits or lost revenues. In no event shall the Company's liability with respect to the Test Results exceed the amount paid to the Company by the client therefor.

J3 Resources, Inc.
6110 W. 34th Street, Houston, Texas 77092
Phone: (713) 290-0221 Fax: (713) 290-0248
j3resources.com

Airborn Asbestos Fiber Analysis by Transmission Electron Microscopy (TEM) ISO 10312 - Ambient Air - Determination of Asbestos Fibers Direct-Transfer Transmission Electron Microscopy Method

Maura McAleese
Tetra Tech- Maui Fire
1999 Harrison St. Ste. 500
Oakland, CA 94612

J3 Order #: 3461524
Project #: 1032864023141
Receipt Date: 22-Nov-2023
Analysis Date: 29-Nov-2023
Report Date: 29-Nov-2023

HDOH Kula Community Air

Sample Number **MFK-AM01-111623-AB**

Air Volume:	7674.048
Effective Filter Area:	385.0 mm^2
Level of Analysis (Chrysotile):	CDQ
Level of Analysis (Amphibole):	ADQ
Magnification Used for Fiber Counting:	20,000
Aspect Ratio for Fiber Definition:	5:1
Mean Dimension of Grid Openings (GOs):	0.0132 mm^2
Initials of Analyst:	TS
Number of GO's Examined:	10
Analytical Sensitivity: f/Liter:	0.38007
Analytical Sensitivity: f/cm3:	0.00038
Number of primary asbestos structures:	0
Number of asbestos structures counted:	0
Number of asbestos structures > 5 um :	0
Number of asbestos fibers and bundles > 5 um:	0
Number of PCM equivalent asbestos structures:	0
Number of PCM equivalent asbestos fibers:	0
Concentration of Asbestos (Chrysotile) f/cm3:	<0.00038
Concentration of Asbestos (Amphibole) f/cm3:	<0.00038
Concentration of PCME Asbestos (Chrysotile) f/cm3:	<0.00038
Concentration of Asbestos (Chrysotile), Str/L:	0
Concentration of Asbestos (Amphibole), Str/L:	0
Lower 95% Confidence Limit (Chrysotile), Str/L:	0
Upper 95% Confidence Limit (Chrysotile), Str/L:	1.4
Lower 95% Confidence Limit (Amphibole), Str/L:	0
Upper 95% Confidence Limit (Amphibole), Str/L:	1.4

Analyst: Taylor Smylie

SMWard
Scott M. Ward, Ph.D. **Lab Director**

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Airborn Asbestos Fiber Analysis
by Transmission Electron Microscopy (TEM)
ISO 10312 - Ambient Air - Determination of Asbestos Fibers
Direct-Transfer Transmission Electron Microscopy Method

Maura McAleese
Tetra Tech- Maui Fire
1999 Harrison St. Ste. 500
Oakland, CA 94612

J3 Order #: 3461524
Project #: 1032864023141
Receipt Date: 22-Nov-2023
Analysis Date: 29-Nov-2023
Report Date: 29-Nov-2023

HDOH Kula Community Air

Sample Number **MFK-AM02-111623-AB**

Air Volume:	4944.096
Effective Filter Area:	385.0 mm^2
Level of Analysis (Chrysotile):	CDQ
Level of Analysis (Amphibole):	ADQ
Magnification Used for Fiber Counting:	20,000
Aspect Ratio for Fiber Definition:	5:1
Mean Dimension of Grid Openings (GOs):	0.0132 mm^2
Initials of Analyst:	TS
Number of GO's Examined:	10
Analytical Sensitivity: f/Liter:	0.58993
Analytical Sensitivity: f/cm3:	0.00059
Number of primary asbestos structures:	0
Number of asbestos structures counted:	0
Number of asbestos structures > 5 um :	0
Number of asbestos fibers and bundles > 5 um:	0
Number of PCM equivalent asbestos structures:	0
Number of PCM equivalent asbestos fibers:	0
Concentration of Asbestos (Chrysotile) f/cm3:	<0.00059
Concentration of Asbestos (Amphibole) f/cm3:	<0.00059
Concentration of PCME Asbestos (Chrysotile) f/cm3:	<0.00059
Concentration of Asbestos (Chrysotile), Str/L:	0
Concentration of Asbestos (Amphibole), Str/L:	0
Lower 95% Confidence Limit (Chrysotile), Str/L:	0
Upper 95% Confidence Limit (Chrysotile), Str/L:	2.2
Lower 95% Confidence Limit (Amphibole), Str/L:	0
Upper 95% Confidence Limit (Amphibole), Str/L:	2.2

S Ward

Analyst: Taylor Smylie

Scott M. Ward, Ph.D. **Lab Director**

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J3 Order #: 3461524
Project #: 1.03286E+12
Receipt Date: 22-Nov-2023
Analysis Date: 29-Nov-2023
Report Date: 29-Nov-2023

HDOH Kula Community Air

Sample Number **MFK-AM03-111623-AB**

Air Volume:	6285.168
Effective Filter Area:	385.0 mm^2
Level of Analysis (Chrysotile):	CDQ
Level of Analysis (Amphibole):	ADQ
Magnification Used for Fiber Counting:	20,000
Aspect Ratio for Fiber Definition:	5:1
Mean Dimension of Grid Openings (GOs):	0.0132 mm^2
Initials of Analyst:	TS
Number of GO's Examined:	10
Analytical Sensitivity: f/Liter:	0.46406
Analytical Sensitivity: f/cm3:	0.00046
Number of primary asbestos structures:	0
Number of asbestos structures counted:	0
Number of asbestos structures > 5 um :	0
Number of asbestos fibers and bundles > 5 um:	0
Number of PCM equivalent asbestos structures:	0
Number of PCM equivalent asbestos fibers:	0
Concentration of Asbestos (Chrysotile) f/cm3:	<0.00046
Concentration of Asbestos (Amphibole) f/cm3:	<0.00046
Concentration of PCME Asbestos (Chrysotile) f/cm3:	<0.00046
Concentration of Asbestos (Chrysotile), Str/L:	0
Concentration of Asbestos (Amphibole), Str/L:	0
Lower 95% Confidence Limit (Chrysotile), Str/L:	0
Upper 95% Confidence Limit (Chrysotile), Str/L:	1.7
Lower 95% Confidence Limit (Amphibole), Str/L:	0
Upper 95% Confidence Limit (Amphibole), Str/L:	1.7

Analyst: Taylor Smylie

Scott M. Ward, Ph.D. **Lab Director**

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J3 Order #: 3461524
Project #: 1.03286E+12
Receipt Date: 22-Nov-2023
Analysis Date: 29-Nov-2023
Report Date: 29-Nov-2023

HDOH Kula Community Air

Sample Number **MFK-FB01-111623-AB**

Air Volume:	0
Effective Filter Area:	385.0 mm^2
Level of Analysis (Chrysotile):	CDQ
Level of Analysis (Amphibole):	ADQ
Magnification Used for Fiber Counting:	20,000
Aspect Ratio for Fiber Definition:	5:1
Mean Dimension of Grid Openings (GOs):	0.0132 mm^2
Initials of Analyst:	TS
Number of GO's Examined:	10
Analytical Sensitivity: f/Liter:	N/A
Analytical Sensitivity: f/cm3:	N/A
Number of primary asbestos structures:	0
Number of asbestos structures counted:	0
Number of asbestos structures > 5 um :	0
Number of asbestos fibers and bundles > 5 um:	0
Number of PCM equivalent asbestos structures:	0
Number of PCM equivalent asbestos fibers:	0
Concentration of Asbestos (Chrysotile) f/cm3:	N/A
Concentration of Asbestos (Amphibole) f/cm3:	N/A
Concentration of PCME Asbestos (Chrysotile) f/cm3:	NA
Concentration of Asbestos (Chrysotile), Str/L:	N/A
Concentration of Asbestos (Amphibole), Str/L:	N/A
Lower 95% Confidence Limit (Chrysotile), Str/L:	N/A
Upper 95% Confidence Limit (Chrysotile), Str/L:	N/A
Lower 95% Confidence Limit (Amphibole), Str/L:	N/A
Upper 95% Confidence Limit (Amphibole), Str/L:	N/A

Analyst: Taylor Smylie

Scott M. Ward, Ph.D. **Lab Director**

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J3 Order #: 3461524
Project #: 1032864023141
Receipt Date: 22-Nov-2023
Analysis Date: 29-Nov-2023
Report Date: 29-Nov-2023

HDOH Kula Community Air

Sample Number **MFK-LB01-111623-AB**

Air Volume:	0
Effective Filter Area:	385.0 mm^2
Level of Analysis (Chrysotile):	CDQ
Level of Analysis (Amphibole):	ADQ
Magnification Used for Fiber Counting:	20,000
Aspect Ratio for Fiber Definition:	5:1
Mean Dimension of Grid Openings (GOs):	0.0132 mm^2
Initials of Analyst:	TS
Number of GO's Examined:	10
Analytical Sensitivity: f/Liter:	N/A
Analytical Sensitivity: f/cm3:	N/A
Number of primary asbestos structures:	0
Number of asbestos structures counted:	0
Number of asbestos structures > 5 um :	0
Number of asbestos fibers and bundles > 5 um:	0
Number of PCM equivalent asbestos structures:	0
Number of PCM equivalent asbestos fibers:	0
Concentration of Asbestos (Chrysotile) f/cm3:	N/A
Concentration of Asbestos (Amphibole) f/cm3:	N/A
Concentration of PCME Asbestos (Chrysotile) f/cm3:	N/A
Concentration of Asbestos (Chrysotile), Str/L:	N/A
Concentration of Asbestos (Amphibole), Str/L:	N/A
Lower 95% Confidence Limit (Chrysotile), Str/L:	N/A
Upper 95% Confidence Limit (Chrysotile), Str/L:	N/A
Lower 95% Confidence Limit (Amphibole), Str/L:	N/A
Upper 95% Confidence Limit (Amphibole), Str/L:	N/A

Analyst: Taylor Smylie

SMWard

Scott M. Ward, Ph.D. **Lab Director**

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Report Date: 29-Nov-2023

HDOH Kula Community Air

Sample Number **MFK-AM02-111723-AB**

Air Volume:	5061.466
Effective Filter Area:	385.0 mm^2
Level of Analysis (Chrysotile):	CDQ
Level of Analysis (Amphibole):	ADQ
Magnification Used for Fiber Counting:	20,000
Aspect Ratio for Fiber Definition:	5:1
Mean Dimension of Grid Openings (GOs):	0.0132 mm^2
Initials of Analyst:	TS
Number of GO's Examined:	10
Analytical Sensitivity: f/Liter:	0.57625
Analytical Sensitivity: f/cm3:	0.00058
Number of primary asbestos structures:	0
Number of asbestos structures counted:	0
Number of asbestos structures > 5 um :	0
Number of asbestos fibers and bundles > 5 um:	0
Number of PCM equivalent asbestos structures:	0
Number of PCM equivalent asbestos fibers:	0
Concentration of Asbestos (Chrysotile) f/cm3:	<0.00058
Concentration of Asbestos (Amphibole) f/cm3:	<0.00058
Concentration of PCME Asbestos (Chrysotile) f/cm3:	<0.00058
Concentration of Asbestos (Chrysotile), Str/L:	0
Concentration of Asbestos (Amphibole), Str/L:	0
Lower 95% Confidence Limit (Chrysotile), Str/L:	0
Upper 95% Confidence Limit (Chrysotile), Str/L:	2.1
Lower 95% Confidence Limit (Amphibole), Str/L:	0
Upper 95% Confidence Limit (Amphibole), Str/L:	2.1

Analyst: Taylor Smylie

Scott M. Ward, Ph.D. **Lab Director**

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HDOH Kula Community Air

Sample Number **MFK-AM01-111723-AB**

Air Volume:	7855.781
Effective Filter Area:	385.0 mm^2
Level of Analysis (Chrysotile):	CDQ
Level of Analysis (Amphibole):	ADQ
Magnification Used for Fiber Counting:	20,000
Aspect Ratio for Fiber Definition:	5:1
Mean Dimension of Grid Openings (GOs):	0.0132 mm^2
Initials of Analyst:	TS
Number of GO's Examined:	10
Analytical Sensitivity: f/Liter:	0.37128
Analytical Sensitivity: f/cm3:	0.00037
Number of primary asbestos structures:	0
Number of asbestos structures counted:	0
Number of asbestos structures > 5 um :	0
Number of asbestos fibers and bundles > 5 um:	0
Number of PCM equivalent asbestos structures:	0
Number of PCM equivalent asbestos fibers:	0
Concentration of Asbestos (Chrysotile) f/cm3:	<0.00037
Concentration of Asbestos (Amphibole) f/cm3:	<0.00037
Concentration of PCME Asbestos (Chrysotile) f/cm3:	<0.00037
Concentration of Asbestos (Chrysotile), Str/L:	0
Concentration of Asbestos (Amphibole), Str/L:	0
Lower 95% Confidence Limit (Chrysotile), Str/L:	0
Upper 95% Confidence Limit (Chrysotile), Str/L:	1.4
Lower 95% Confidence Limit (Amphibole), Str/L:	0
Upper 95% Confidence Limit (Amphibole), Str/L:	1.4

Analyst: Taylor Smylie

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HDOH Kula Community Air

Sample Number **MFK-AM03-111723-AB**

Air Volume:	7055.702
Effective Filter Area:	385.0 mm^2
Level of Analysis (Chrysotile):	CDQ
Level of Analysis (Amphibole):	ADQ
Magnification Used for Fiber Counting:	20,000
Aspect Ratio for Fiber Definition:	5:1
Mean Dimension of Grid Openings (GOs):	0.0132 mm^2
Initials of Analyst:	TS
Number of GO's Examined:	10
Analytical Sensitivity: f/Liter:	0.41338
Analytical Sensitivity: f/cm3:	0.00041
Number of primary asbestos structures:	0
Number of asbestos structures counted:	0
Number of asbestos structures > 5 um :	0
Number of asbestos fibers and bundles > 5 um:	0
Number of PCM equivalent asbestos structures:	0
Number of PCM equivalent asbestos fibers:	0
Concentration of Asbestos (Chrysotile) f/cm3:	<0.00041
Concentration of Asbestos (Amphibole) f/cm3:	<0.00041
Concentration of PCME Asbestos (Chrysotile) f/cm3:	<0.00041
Concentration of Asbestos (Chrysotile), Str/L:	0
Concentration of Asbestos (Amphibole), Str/L:	0
Lower 95% Confidence Limit (Chrysotile), Str/L:	0
Upper 95% Confidence Limit (Chrysotile), Str/L:	1.5
Lower 95% Confidence Limit (Amphibole), Str/L:	0
Upper 95% Confidence Limit (Amphibole), Str/L:	1.5

Analyst: Taylor Smylie

Scott M. Ward, Ph.D. **Lab Director**

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HDOH Kula Community Air

Sample Number **MFK-FB01-111723-AB**

Air Volume:	0
Effective Filter Area:	385.0 mm^2
Level of Analysis (Chrysotile):	CDQ
Level of Analysis (Amphibole):	ADQ
Magnification Used for Fiber Counting:	20,000
Aspect Ratio for Fiber Definition:	5:1
Mean Dimension of Grid Openings (GOs):	0.0132 mm^2
Initials of Analyst:	TS
Number of GO's Examined:	10
Analytical Sensitivity: f/Liter:	N/A
Analytical Sensitivity: f/cm3:	N/A
Number of primary asbestos structures:	0
Number of asbestos structures counted:	0
Number of asbestos structures > 5 um :	0
Number of asbestos fibers and bundles > 5 um:	0
Number of PCM equivalent asbestos structures:	0
Number of PCM equivalent asbestos fibers:	0
Concentration of Asbestos (Chrysotile) f/cm3:	N/A
Concentration of Asbestos (Amphibole) f/cm3:	N/A
Concentration of PCME Asbestos (Chrysotile) f/cm3:	N/A
Concentration of Asbestos (Chrysotile), Str/L:	N/A
Concentration of Asbestos (Amphibole), Str/L:	N/A
Lower 95% Confidence Limit (Chrysotile), Str/L:	N/A
Upper 95% Confidence Limit (Chrysotile), Str/L:	N/A
Lower 95% Confidence Limit (Amphibole), Str/L:	N/A
Upper 95% Confidence Limit (Amphibole), Str/L:	N/A

Analyst: Taylor Smylie

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J3 Order #: 3461524
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Receipt Date: 22-Nov-2023
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Report Date: 29-Nov-2023

HDOH Kula Community Air

Sample Number **MFK-AM01-111823-AB**

Air Volume:	7808.4
Effective Filter Area:	385.0 mm^2
Level of Analysis (Chrysotile):	CDQ
Level of Analysis (Amphibole):	ADQ
Magnification Used for Fiber Counting:	20,000
Aspect Ratio for Fiber Definition:	5:1
Mean Dimension of Grid Openings (GOs):	0.0132 mm^2
Initials of Analyst:	TS
Number of GO's Examined:	10
Analytical Sensitivity: f/Liter:	0.37353
Analytical Sensitivity: f/cm3:	0.00037
Number of primary asbestos structures:	0
Number of asbestos structures counted:	0
Number of asbestos structures > 5 um :	0
Number of asbestos fibers and bundles > 5 um:	0
Number of PCM equivalent asbestos structures:	0
Number of PCM equivalent asbestos fibers:	0
Concentration of Asbestos (Chrysotile) f/cm3:	<0.00037
Concentration of Asbestos (Amphibole) f/cm3:	<0.00037
Concentration of PCME Asbestos (Chrysotile) f/cm3:	<0.00037
Concentration of Asbestos (Chrysotile), Str/L:	0
Concentration of Asbestos (Amphibole), Str/L:	0
Lower 95% Confidence Limit (Chrysotile), Str/L:	0
Upper 95% Confidence Limit (Chrysotile), Str/L:	1.4
Lower 95% Confidence Limit (Amphibole), Str/L:	0
Upper 95% Confidence Limit (Amphibole), Str/L:	1.4

Analyst: Taylor Smylie

Scott M. Ward, Ph.D. **Lab Director**

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J3 Order #: 3461524
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Receipt Date: 22-Nov-2023
Analysis Date: 29-Nov-2023
Report Date: 29-Nov-2023

HDOH Kula Community Air

Sample Number **MFK-AM02-111823-AB**

Air Volume:	7230.672
Effective Filter Area:	385.0 mm^2
Level of Analysis (Chrysotile):	CDQ
Level of Analysis (Amphibole):	ADQ
Magnification Used for Fiber Counting:	20,000
Aspect Ratio for Fiber Definition:	5:1
Mean Dimension of Grid Openings (GOs):	0.0132 mm^2
Initials of Analyst:	TS
Number of GO's Examined:	10
Analytical Sensitivity: f/Liter:	0.40337
Analytical Sensitivity: f/cm3:	0.00040
Number of primary asbestos structures:	0
Number of asbestos structures counted:	0
Number of asbestos structures > 5 um :	0
Number of asbestos fibers and bundles > 5 um:	0
Number of PCM equivalent asbestos structures:	0
Number of PCM equivalent asbestos fibers:	0
Concentration of Asbestos (Chrysotile) f/cm3:	<0.00040
Concentration of Asbestos (Amphibole) f/cm3:	<0.00040
Concentration of PCME Asbestos (Chrysotile) f/cm3:	<0.00040
Concentration of Asbestos (Chrysotile), Str/L:	0
Concentration of Asbestos (Amphibole), Str/L:	0
Lower 95% Confidence Limit (Chrysotile), Str/L:	0
Upper 95% Confidence Limit (Chrysotile), Str/L:	1.5
Lower 95% Confidence Limit (Amphibole), Str/L:	0
Upper 95% Confidence Limit (Amphibole), Str/L:	1.5

Analyst: Taylor Smylie

Scott M. Ward, Ph.D. **Lab Director**

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NVLAP Lab Code: 200525-0; TDSHS License: 30-0273

J3 Resources, Inc.
6110 W. 34th Street, Houston, Texas 77092
Phone: (713) 290-0221 Fax: (713) 290-0248
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Airborn Asbestos Fiber Analysis by Transmission Electron Microscopy (TEM) ISO 10312 - Ambient Air - Determination of Asbestos Fibers Direct-Transfer Transmission Electron Microscopy Method

Maura McAleese
Tetra Tech- Maui Fire
1999 Harrison St. Ste. 500
Oakland, CA 94612

J3 Order #: 3461524
Project #: 1032864023141
Receipt Date: 22-Nov-2023
Analysis Date: 29-Nov-2023
Report Date: 29-Nov-2023

HDOH Kula Community Air

Sample Number **MFK-AM03-111823-AB**

Air Volume:	7132.752
Effective Filter Area:	385.0 mm^2
Level of Analysis (Chrysotile):	CDQ
Level of Analysis (Amphibole):	ADQ
Magnification Used for Fiber Counting:	20,000
Aspect Ratio for Fiber Definition:	5:1
Mean Dimension of Grid Openings (GOs):	0.0132 mm^2
Initials of Analyst:	TS
Number of GO's Examined:	10
Analytical Sensitivity: f/Liter:	0.40891
Analytical Sensitivity: f/cm3:	0.00041
Number of primary asbestos structures:	0
Number of asbestos structures counted:	0
Number of asbestos structures > 5 um :	0
Number of asbestos fibers and bundles > 5 um:	0
Number of PCM equivalent asbestos structures:	0
Number of PCM equivalent asbestos fibers:	0
Concentration of Asbestos (Chrysotile) f/cm3:	<0.00041
Concentration of Asbestos (Amphibole) f/cm3:	<0.00041
Concentration of PCME Asbestos (Chrysotile) f/cm3:	<0.00041
Concentration of Asbestos (Chrysotile), Str/L:	0
Concentration of Asbestos (Amphibole), Str/L:	0
Lower 95% Confidence Limit (Chrysotile), Str/L:	0
Upper 95% Confidence Limit (Chrysotile), Str/L:	1.5
Lower 95% Confidence Limit (Amphibole), Str/L:	0
Upper 95% Confidence Limit (Amphibole), Str/L:	1.5

Analyst: Taylor Smylie

Scott M. Ward, Ph.D. **Lab Director**

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J3 Order #: 3461524
Project #: 1032864023141
Receipt Date: 22-Nov-2023
Analysis Date: 29-Nov-2023
Report Date: 29-Nov-2023

HDOH Kula Community Air

Sample Number **MFK-AM01-111923-AB**

Air Volume:	7660.644
Effective Filter Area:	385.0 mm^2
Level of Analysis (Chrysotile):	CDQ
Level of Analysis (Amphibole):	ADQ
Magnification Used for Fiber Counting:	20,000
Aspect Ratio for Fiber Definition:	5:1
Mean Dimension of Grid Openings (GOs):	0.0132 mm^2
Initials of Analyst:	TS
Number of GO's Examined:	10
Analytical Sensitivity: f/Liter:	0.38073
Analytical Sensitivity: f/cm3:	0.00038
Number of primary asbestos structures:	0
Number of asbestos structures counted:	0
Number of asbestos structures > 5 um :	0
Number of asbestos fibers and bundles > 5 um:	0
Number of PCM equivalent asbestos structures:	0
Number of PCM equivalent asbestos fibers:	0
Concentration of Asbestos (Chrysotile) f/cm3:	<0.00038
Concentration of Asbestos (Amphibole) f/cm3:	<0.00038
Concentration of PCME Asbestos (Chrysotile) f/cm3:	<0.00038
Concentration of Asbestos (Chrysotile), Str/L:	0
Concentration of Asbestos (Amphibole), Str/L:	0
Lower 95% Confidence Limit (Chrysotile), Str/L:	0
Upper 95% Confidence Limit (Chrysotile), Str/L:	1.4
Lower 95% Confidence Limit (Amphibole), Str/L:	0
Upper 95% Confidence Limit (Amphibole), Str/L:	1.4

Analyst: Taylor Smylie

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J3 Order #: 3461524
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Receipt Date: 22-Nov-2023
Analysis Date: 29-Nov-2023
Report Date: 29-Nov-2023

HDOH Kula Community Air

Sample Number **MFK-AM02-111923-AB**

Air Volume:	7576.003
Effective Filter Area:	385.0 mm^2
Level of Analysis (Chrysotile):	CDQ
Level of Analysis (Amphibole):	ADQ
Magnification Used for Fiber Counting:	20,000
Aspect Ratio for Fiber Definition:	5:1
Mean Dimension of Grid Openings (GOs):	0.0132 mm^2
Initials of Analyst:	TS
Number of GO's Examined:	10
Analytical Sensitivity: f/Liter:	0.38499
Analytical Sensitivity: f/cm3:	0.00038
Number of primary asbestos structures:	0
Number of asbestos structures counted:	0
Number of asbestos structures > 5 um :	0
Number of asbestos fibers and bundles > 5 um:	0
Number of PCM equivalent asbestos structures:	0
Number of PCM equivalent asbestos fibers:	0
Concentration of Asbestos (Chrysotile) f/cm3:	<0.00038
Concentration of Asbestos (Amphibole) f/cm3:	<0.00038
Concentration of PCME Asbestos (Chrysotile) f/cm3:	<0.00038
Concentration of Asbestos (Chrysotile), Str/L:	0
Concentration of Asbestos (Amphibole), Str/L:	0
Lower 95% Confidence Limit (Chrysotile), Str/L:	0
Upper 95% Confidence Limit (Chrysotile), Str/L:	1.4
Lower 95% Confidence Limit (Amphibole), Str/L:	0
Upper 95% Confidence Limit (Amphibole), Str/L:	1.4

Analyst: Taylor Smylie

Scott M. Ward, Ph.D. **Lab Director**

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Receipt Date: 22-Nov-2023
Analysis Date: 29-Nov-2023
Report Date: 29-Nov-2023

HDOH Kula Community Air

Sample Number **MFK-AM03-111923-AB**

Air Volume:	7655.727
Effective Filter Area:	385.0 mm^2
Level of Analysis (Chrysotile):	CDQ
Level of Analysis (Amphibole):	ADQ
Magnification Used for Fiber Counting:	20,000
Aspect Ratio for Fiber Definition:	5:1
Mean Dimension of Grid Openings (GOs):	0.0132 mm^2
Initials of Analyst:	TS
Number of GO's Examined:	10
Analytical Sensitivity: f/Liter:	0.38098
Analytical Sensitivity: f/cm3:	0.00038
Number of primary asbestos structures:	0
Number of asbestos structures counted:	0
Number of asbestos structures > 5 um :	0
Number of asbestos fibers and bundles > 5 um:	0
Number of PCM equivalent asbestos structures:	0
Number of PCM equivalent asbestos fibers:	0
Concentration of Asbestos (Chrysotile) f/cm3:	<0.00038
Concentration of Asbestos (Amphibole) f/cm3:	<0.00038
Concentration of PCME Asbestos (Chrysotile) f/cm3:	<0.00038
Concentration of Asbestos (Chrysotile), Str/L:	0
Concentration of Asbestos (Amphibole), Str/L:	0
Lower 95% Confidence Limit (Chrysotile), Str/L:	0
Upper 95% Confidence Limit (Chrysotile), Str/L:	1.4
Lower 95% Confidence Limit (Amphibole), Str/L:	0
Upper 95% Confidence Limit (Amphibole), Str/L:	1.4

Analyst: Taylor Smylie

Scott M. Ward, Ph.D. **Lab Director**

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ISO 10312 - Ambient Air - Determination of Asbestos Fibers Direct-Transfer Transmission Electron Microscopy Method

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J3 Order #: 3461524
Project #: 1032864023141
Receipt Date: 22-Nov-2023
Analysis Date: 29-Nov-2023
Report Date: 29-Nov-2023

HDOH Kula Community Air

Sample Number **MFK-FB01-111823-AB**

Air Volume:	0
Effective Filter Area:	385.0 mm^2
Level of Analysis (Chrysotile):	CDQ
Level of Analysis (Amphibole):	ADQ
Magnification Used for Fiber Counting:	20,000
Aspect Ratio for Fiber Definition:	5:1
Mean Dimension of Grid Openings (GOs):	0.0132 mm^2
Initials of Analyst:	TS
Number of GO's Examined:	10
Analytical Sensitivity: f/Liter:	N/A
Analytical Sensitivity: f/cm3:	N/A
Number of primary asbestos structures:	0
Number of asbestos structures counted:	0
Number of asbestos structures > 5 um :	0
Number of asbestos fibers and bundles > 5 um:	0
Number of PCM equivalent asbestos structures:	0
Number of PCM equivalent asbestos fibers:	0
Concentration of Asbestos (Chrysotile) f/cm3:	N/A
Concentration of Asbestos (Amphibole) f/cm3:	N/A
Concentration of PCME Asbestos (Chrysotile) f/cm3:	N/A
Concentration of Asbestos (Chrysotile), Str/L:	N/A
Concentration of Asbestos (Amphibole), Str/L:	N/A
Lower 95% Confidence Limit (Chrysotile), Str/L:	N/A
Upper 95% Confidence Limit (Chrysotile), Str/L:	N/A
Lower 95% Confidence Limit (Amphibole), Str/L:	N/A
Upper 95% Confidence Limit (Amphibole), Str/L:	N/A

Analyst: Taylor Smylie

SMWard

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J3 Order #: 3461524
Project #: 1032864023141
Receipt Date: 22-Nov-2023
Analysis Date: 29-Nov-2023
Report Date: 29-Nov-2023

HDOH Kula Community Air

Sample Number **MFK-FB01-111923-AB**

Air Volume:	0
Effective Filter Area:	385.0 mm^2
Level of Analysis (Chrysotile):	CDQ
Level of Analysis (Amphibole):	ADQ
Magnification Used for Fiber Counting:	20,000
Aspect Ratio for Fiber Definition:	5:1
Mean Dimension of Grid Openings (GOs):	0.0132 mm^2
Initials of Analyst:	TS
Number of GO's Examined:	10
Analytical Sensitivity: f/Liter:	N/A
Analytical Sensitivity: f/cm3:	N/A
Number of primary asbestos structures:	0
Number of asbestos structures counted:	0
Number of asbestos structures > 5 um :	0
Number of asbestos fibers and bundles > 5 um:	0
Number of PCM equivalent asbestos structures:	0
Number of PCM equivalent asbestos fibers:	0
Concentration of Asbestos (Chrysotile) f/cm3:	N/A
Concentration of Asbestos (Amphibole) f/cm3:	N/A
Concentration of PCME Asbestos (Chrysotile) f/cm3:	N/A
Concentration of Asbestos (Chrysotile), Str/L:	N/A
Concentration of Asbestos (Amphibole), Str/L:	N/A
Lower 95% Confidence Limit (Chrysotile), Str/L:	N/A
Upper 95% Confidence Limit (Chrysotile), Str/L:	N/A
Lower 95% Confidence Limit (Amphibole), Str/L:	N/A
Upper 95% Confidence Limit (Amphibole), Str/L:	N/A

Analyst: Taylor Smylie

Scott M. Ward, Ph.D. **Lab Director**

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Built Environment Testing

Report for:

Maura McAleese
Tetra Tech- Maui Fire
1999 Harrison St. Ste. 500
Oakland, CA 94612

Regarding: Eurofins J3 Resources, Inc.
Project: 1032864023141; HDOH Kula Community Air
EML ID: 3463023

Approved by:

Dates of Analysis:
Asbestos TEM ISO 10312 / ASTM6281-06: 11-30-2023

Lab Director
Scott Ward

All samples were received in acceptable condition unless noted in the Report Comments portion in the body of the report. Due to the nature of the analyses performed, field blank correction of results is not applied. The results relate only to the samples as received and tested.

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by Transmission Electron Microscopy (TEM)
ISO 10312 - Ambient Air - Determination of Asbestos Fibers
Direct-Transfer Transmission Electron Microscopy Method

Maura McAleese
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EJ3 Order #: 3463023
Project #: 1032864023141
Receipt Date: 27-Nov-2023
Analysis Date: 30-Nov-2023
Report Date: 30-Nov-2023

HDOH Kula Community Air (11/20 to 11/23)

Sample Number **MFK-AM01-112023-AB**

Air Volume:	7645.248
Effective Filter Area:	385.0 mm^2
Level of Analysis (Chrysotile):	CDQ
Level of Analysis (Amphibole):	ADQ
Magnification Used for Fiber Counting:	20,000
Aspect Ratio for Fiber Definition:	5:1
Mean Dimension of Grid Openings (GOs):	0.0132 mm^2
Initials of Analyst:	TS
Number of GO's Examined:	10
Analytical Sensitivity: f/Liter:	0.38150
Analytical Sensitivity: f/cm3:	0.00038
Number of primary asbestos structures:	0
Number of asbestos structures counted:	0
Number of asbestos structures > 5 um :	0
Number of asbestos fibers and bundles > 5 um:	0
Number of PCM equivalent asbestos structures:	0
Number of PCM equivalent asbestos fibers:	0
Concentration of Asbestos (Chrysotile) f/cm3:	<0.00038
Concentration of Asbestos (Amphibole) f/cm3:	<0.00038
Concentration of PCME Asbestos (Chrysotile) f/cm3:	<0.00038
Concentration of Asbestos (Chrysotile), Str/L:	0
Concentration of Asbestos (Amphibole), Str/L:	0
Lower 95% Confidence Limit (Chrysotile), Str/L:	0
Upper 95% Confidence Limit (Chrysotile), Str/L:	1.4
Lower 95% Confidence Limit (Amphibole), Str/L:	0
Upper 95% Confidence Limit (Amphibole), Str/L:	1.4

Analyst: Taylor Smylie

Scott M. Ward, Ph.D. **Lab Director**

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EJ3 Order #: 3463023
Project #: 1032864023141
Receipt Date: 27-Nov-2023
Analysis Date: 30-Nov-2023
Report Date: 30-Nov-2023

HDOH Kula Community Air (11/20 to 11/23)

Sample Number **MFK-AM02-112023-AB**

Air Volume:	7373.436
Effective Filter Area:	385.0 mm^2
Level of Analysis (Chrysotile):	CDQ
Level of Analysis (Amphibole):	ADQ
Magnification Used for Fiber Counting:	20,000
Aspect Ratio for Fiber Definition:	5:1
Mean Dimension of Grid Openings (GOs):	0.0132 mm^2
Initials of Analyst:	TS
Number of GO's Examined:	10
Analytical Sensitivity: f/Liter:	0.39556
Analytical Sensitivity: f/cm3:	0.00040
Number of primary asbestos structures:	0
Number of asbestos structures counted:	0
Number of asbestos structures > 5 um :	0
Number of asbestos fibers and bundles > 5 um:	0
Number of PCM equivalent asbestos structures:	0
Number of PCM equivalent asbestos fibers:	0
Concentration of Asbestos (Chrysotile) f/cm3:	<0.00040
Concentration of Asbestos (Amphibole) f/cm3:	<0.00040
Concentration of PCME Asbestos (Chrysotile) f/cm3:	<0.00040
Concentration of Asbestos (Chrysotile), Str/L:	0
Concentration of Asbestos (Amphibole), Str/L:	0
Lower 95% Confidence Limit (Chrysotile), Str/L:	0
Upper 95% Confidence Limit (Chrysotile), Str/L:	1.5
Lower 95% Confidence Limit (Amphibole), Str/L:	0
Upper 95% Confidence Limit (Amphibole), Str/L:	1.5

Analyst: Taylor Smylie

Scott M. Ward, Ph.D. **Lab Director**

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Project #: 1032864023141
Receipt Date: 27-Nov-2023
Analysis Date: 30-Nov-2023
Report Date: 30-Nov-2023

HDOH Kula Community Air (11/20 to 11/23)

Sample Number **MFK-AM03-112023-AB□**

Air Volume:	7528.505
Effective Filter Area:	385.0 mm^2
Level of Analysis (Chrysotile):	CDQ
Level of Analysis (Amphibole):	ADQ
Magnification Used for Fiber Counting:	20,000
Aspect Ratio for Fiber Definition:	5:1
Mean Dimension of Grid Openings (GOs):	0.0132 mm^2
Initials of Analyst:	TS
Number of GO's Examined:	10
Analytical Sensitivity: f/Liter:	0.38742
Analytical Sensitivity: f/cm3:	0.00039
Number of primary asbestos structures:	0
Number of asbestos structures counted:	0
Number of asbestos structures > 5 um :	0
Number of asbestos fibers and bundles > 5 um:	0
Number of PCM equivalent asbestos structures:	0
Number of PCM equivalent asbestos fibers:	0
Concentration of Asbestos (Chrysotile) f/cm3:	<0.00039
Concentration of Asbestos (Amphibole) f/cm3:	<0.00039
Concentration of PCME Asbestos (Chrysotile) f/cm3:	<0.00039
Concentration of Asbestos (Chrysotile), Str/L:	0
Concentration of Asbestos (Amphibole), Str/L:	0
Lower 95% Confidence Limit (Chrysotile), Str/L:	0
Upper 95% Confidence Limit (Chrysotile), Str/L:	1.4
Lower 95% Confidence Limit (Amphibole), Str/L:	0
Upper 95% Confidence Limit (Amphibole), Str/L:	1.4

Analyst: Taylor Smylie

Scott M. Ward, Ph.D. **Lab Director**

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EJ3 Order #: 3463023
Project #: 1032864023141
Receipt Date: 27-Nov-2023
Analysis Date: 30-Nov-2023
Report Date: 30-Nov-2023

HDOH Kula Community Air (11/20 to 11/23)

Sample Number **MFK-AM01-112123-AB**

Air Volume:	6935.184
Effective Filter Area:	385.0 mm^2
Level of Analysis (Chrysotile):	CDQ
Level of Analysis (Amphibole):	ADQ
Magnification Used for Fiber Counting:	20,000
Aspect Ratio for Fiber Definition:	5:1
Mean Dimension of Grid Openings (GOs):	0.0132 mm^2
Initials of Analyst:	TS
Number of GO's Examined:	10
Analytical Sensitivity: f/Liter:	0.42056
Analytical Sensitivity: f/cm3:	0.00042
Number of primary asbestos structures:	0
Number of asbestos structures counted:	0
Number of asbestos structures > 5 um :	0
Number of asbestos fibers and bundles > 5 um:	0
Number of PCM equivalent asbestos structures:	0
Number of PCM equivalent asbestos fibers:	0
Concentration of Asbestos (Chrysotile) f/cm3:	<0.00042
Concentration of Asbestos (Amphibole) f/cm3:	<0.00042
Concentration of PCME Asbestos (Chrysotile) f/cm3:	<0.00042
Concentration of Asbestos (Chrysotile), Str/L:	0
Concentration of Asbestos (Amphibole), Str/L:	0
Lower 95% Confidence Limit (Chrysotile), Str/L:	0
Upper 95% Confidence Limit (Chrysotile), Str/L:	1.6
Lower 95% Confidence Limit (Amphibole), Str/L:	0
Upper 95% Confidence Limit (Amphibole), Str/L:	1.6

Analyst: Taylor Smylie

Scott M. Ward, Ph.D. **Lab Director**

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Airborne Asbestos Fiber Analysis by Transmission Electron Microscopy (TEM) ISO 10312 - Ambient Air - Determination of Asbestos Fibers Direct-Transfer Transmission Electron Microscopy Method

Maura McAleese
Tetra Tech- Maui Fire
1999 Harrison St. Ste. 500
Oakland, CA 94612

EJ3 Order #: 3463023
Project #: 1032864023141
Receipt Date: 27-Nov-2023
Analysis Date: 30-Nov-2023
Report Date: 30-Nov-2023

HDOH Kula Community Air (11/20 to 11/23)

Sample Number **MFK-AM02-112123-AB□**

Air Volume:	6804.508
Effective Filter Area:	385.0 mm^2
Level of Analysis (Chrysotile):	CDQ
Level of Analysis (Amphibole):	ADQ
Magnification Used for Fiber Counting:	20,000
Aspect Ratio for Fiber Definition:	5:1
Mean Dimension of Grid Openings (GOs):	0.0132 mm^2
Initials of Analyst:	TS
Number of GO's Examined:	10
Analytical Sensitivity: f/Liter:	0.42864
Analytical Sensitivity: f/cm3:	0.00043
Number of primary asbestos structures:	0
Number of asbestos structures counted:	0
Number of asbestos structures > 5 um :	0
Number of asbestos fibers and bundles > 5 um:	0
Number of PCM equivalent asbestos structures:	0
Number of PCM equivalent asbestos fibers:	0
Concentration of Asbestos (Chrysotile) f/cm3:	<0.00043
Concentration of Asbestos (Amphibole) f/cm3:	<0.00043
Concentration of PCME Asbestos (Chrysotile) f/cm3:	<0.00043
Concentration of Asbestos (Chrysotile), Str/L:	0
Concentration of Asbestos (Amphibole), Str/L:	0
Lower 95% Confidence Limit (Chrysotile), Str/L:	0
Upper 95% Confidence Limit (Chrysotile), Str/L:	1.6
Lower 95% Confidence Limit (Amphibole), Str/L:	0
Upper 95% Confidence Limit (Amphibole), Str/L:	1.6

Analyst: Taylor Smylie

Scott M. Ward, Ph.D. **Lab Director**

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EJ3 Order #: 3463023
Project #: 1032864023141
Receipt Date: 27-Nov-2023
Analysis Date: 30-Nov-2023
Report Date: 30-Nov-2023

HDOH Kula Community Air (11/20 to 11/23)

Sample Number **MFK-AM03-112123-AB**

Air Volume:	7344
Effective Filter Area:	385.0 mm^2
Level of Analysis (Chrysotile):	CDQ
Level of Analysis (Amphibole):	ADQ
Magnification Used for Fiber Counting:	20,000
Aspect Ratio for Fiber Definition:	5:1
Mean Dimension of Grid Openings (GOs):	0.0132 mm^2
Initials of Analyst:	TS
Number of GO's Examined:	10
Analytical Sensitivity: f/Liter:	0.39715
Analytical Sensitivity: f/cm3:	0.00040
Number of primary asbestos structures:	0
Number of asbestos structures counted:	0
Number of asbestos structures > 5 um :	0
Number of asbestos fibers and bundles > 5 um:	0
Number of PCM equivalent asbestos structures:	0
Number of PCM equivalent asbestos fibers:	0
Concentration of Asbestos (Chrysotile) f/cm3:	<0.00040
Concentration of Asbestos (Amphibole) f/cm3:	<0.00040
Concentration of PCME Asbestos (Chrysotile) f/cm3:	<0.00040
Concentration of Asbestos (Chrysotile), Str/L:	0
Concentration of Asbestos (Amphibole), Str/L:	0
Lower 95% Confidence Limit (Chrysotile), Str/L:	0
Upper 95% Confidence Limit (Chrysotile), Str/L:	1.5
Lower 95% Confidence Limit (Amphibole), Str/L:	0
Upper 95% Confidence Limit (Amphibole), Str/L:	1.5

Analyst: Taylor Smylie

Scott M. Ward, Ph.D. **Lab Director**

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EJ3 Order #: 3463023
Project #: 1032864023141
Receipt Date: 27-Nov-2023
Analysis Date: 30-Nov-2023
Report Date: 30-Nov-2023

HDOH Kula Community Air (11/20 to 11/23)

Sample Number **MFK-FB01-112123-AB□**

Air Volume:	0
Effective Filter Area:	385.0 mm^2
Level of Analysis (Chrysotile):	CDQ
Level of Analysis (Amphibole):	ADQ
Magnification Used for Fiber Counting:	20,000
Aspect Ratio for Fiber Definition:	5:1
Mean Dimension of Grid Openings (GOs):	0.0132 mm^2
Initials of Analyst:	
Number of GO's Examined:	10
Analytical Sensitivity: f/Liter:	N/A
Analytical Sensitivity: f/cm3:	N/A
Number of primary asbestos structures:	0
Number of asbestos structures counted:	0
Number of asbestos structures > 5 um :	0
Number of asbestos fibers and bundles > 5 um:	0
Number of PCM equivalent asbestos structures:	0
Number of PCM equivalent asbestos fibers:	0
Concentration of Asbestos (Chrysotile) f/cm3:	N/A
Concentration of Asbestos (Amphibole) f/cm3:	N/A
Concentration of PCME Asbestos (Chrysotile) f/cm3:	N/A
Concentration of Asbestos (Chrysotile), Str/L:	N/A
Concentration of Asbestos (Amphibole), Str/L:	N/A
Lower 95% Confidence Limit (Chrysotile), Str/L:	N/A
Upper 95% Confidence Limit (Chrysotile), Str/L:	N/A
Lower 95% Confidence Limit (Amphibole), Str/L:	N/A
Upper 95% Confidence Limit (Amphibole), Str/L:	N/A

Analyst:

Scott M. Ward, Ph.D. **Lab Director**

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EJ3 Order #: 3463023
Project #: 1032864023141
Receipt Date: 27-Nov-2023
Analysis Date: 30-Nov-2023
Report Date: 30-Nov-2023

HDOH Kula Community Air (11/20 to 11/23)

Sample Number **MFK-LB01-112123-AB□**

Air Volume:	0
Effective Filter Area:	385.0 mm^2
Level of Analysis (Chrysotile):	CDQ
Level of Analysis (Amphibole):	ADQ
Magnification Used for Fiber Counting:	20,000
Aspect Ratio for Fiber Definition:	5:1
Mean Dimension of Grid Openings (GOs):	0.0132 mm^2
Initials of Analyst:	TS
Number of GO's Examined:	10
Analytical Sensitivity: f/Liter:	N/A
Analytical Sensitivity: f/cm3:	N/A
Number of primary asbestos structures:	0
Number of asbestos structures counted:	0
Number of asbestos structures > 5 um :	0
Number of asbestos fibers and bundles > 5 um:	0
Number of PCM equivalent asbestos structures:	0
Number of PCM equivalent asbestos fibers:	0
Concentration of Asbestos (Chrysotile) f/cm3:	N/A
Concentration of Asbestos (Amphibole) f/cm3:	N/A
Concentration of PCME Asbestos (Chrysotile) f/cm3:	N/A
Concentration of Asbestos (Chrysotile), Str/L:	N/A
Concentration of Asbestos (Amphibole), Str/L:	N/A
Lower 95% Confidence Limit (Chrysotile), Str/L:	N/A
Upper 95% Confidence Limit (Chrysotile), Str/L:	N/A
Lower 95% Confidence Limit (Amphibole), Str/L:	N/A
Upper 95% Confidence Limit (Amphibole), Str/L:	N/A

SMWard

Analyst: Taylor Smylie

Scott M. Ward, Ph.D. **Lab Director**

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Airborne Asbestos Fiber Analysis by Transmission Electron Microscopy (TEM) ISO 10312 - Ambient Air - Determination of Asbestos Fibers Direct-Transfer Transmission Electron Microscopy Method

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EJ3 Order #: 3463023
Project #: 1032864023141
Receipt Date: 27-Nov-2023
Analysis Date: 30-Nov-2023
Report Date: 30-Nov-2023

HDOH Kula Community Air (11/20 to 11/23)

Sample Number **MFK-AM02-112223-AB□**

Air Volume:	6692.074
Effective Filter Area:	385.0 mm^2
Level of Analysis (Chrysotile):	CDQ
Level of Analysis (Amphibole):	ADQ
Magnification Used for Fiber Counting:	20,000
Aspect Ratio for Fiber Definition:	5:1
Mean Dimension of Grid Openings (GOs):	0.0132 mm^2
Initials of Analyst:	Taylor Smylie
Number of GO's Examined:	10
Analytical Sensitivity: f/Liter:	0.43584
Analytical Sensitivity: f/cm3:	0.00044
Number of primary asbestos structures:	0
Number of asbestos structures counted:	0
Number of asbestos structures > 5 um :	0
Number of asbestos fibers and bundles > 5 um:	0
Number of PCM equivalent asbestos structures:	0
Number of PCM equivalent asbestos fibers:	0
Concentration of Asbestos (Chrysotile) f/cm3:	<0.00044
Concentration of Asbestos (Amphibole) f/cm3:	<0.00044
Concentration of PCME Asbestos (Chrysotile) f/cm3:	<0.00044
Concentration of Asbestos (Chrysotile), Str/L:	0
Concentration of Asbestos (Amphibole), Str/L:	0
Lower 95% Confidence Limit (Chrysotile), Str/L:	0
Upper 95% Confidence Limit (Chrysotile), Str/L:	1.6
Lower 95% Confidence Limit (Amphibole), Str/L:	0
Upper 95% Confidence Limit (Amphibole), Str/L:	1.6

Analyst: Taylor Smylie 45260 **Scott M. Ward, Ph.D.** **Lab Director**

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Airborne Asbestos Fiber Analysis by Transmission Electron Microscopy (TEM) ISO 10312 - Ambient Air - Determination of Asbestos Fibers Direct-Transfer Transmission Electron Microscopy Method

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EJ3 Order #: 3463023
Project #: 1032864023141
Receipt Date: 27-Nov-2023
Analysis Date: 30-Nov-2023
Report Date: 30-Nov-2023

HDOH Kula Community Air (11/20 to 11/23)

Sample Number **MFK-AM03-112223-AB□**

Air Volume:	5331.024
Effective Filter Area:	385.0 mm^2
Level of Analysis (Chrysotile):	CDQ
Level of Analysis (Amphibole):	ADQ
Magnification Used for Fiber Counting:	20,000
Aspect Ratio for Fiber Definition:	5:1
Mean Dimension of Grid Openings (GOs):	0.0132 mm^2
Initials of Analyst:	TS
Number of GO's Examined:	10
Analytical Sensitivity: f/Liter:	0.54711
Analytical Sensitivity: f/cm3:	0.00055
Number of primary asbestos structures:	0
Number of asbestos structures counted:	0
Number of asbestos structures > 5 um :	0
Number of asbestos fibers and bundles > 5 um:	0
Number of PCM equivalent asbestos structures:	0
Number of PCM equivalent asbestos fibers:	0
Concentration of Asbestos (Chrysotile) f/cm3:	<0.00055
Concentration of Asbestos (Amphibole) f/cm3:	<0.00055
Concentration of PCME Asbestos (Chrysotile) f/cm3:	<0.00055
Concentration of Asbestos (Chrysotile), Str/L:	0
Concentration of Asbestos (Amphibole), Str/L:	0
Lower 95% Confidence Limit (Chrysotile), Str/L:	0
Upper 95% Confidence Limit (Chrysotile), Str/L:	2
Lower 95% Confidence Limit (Amphibole), Str/L:	0
Upper 95% Confidence Limit (Amphibole), Str/L:	2

Analyst: Taylor Smylie

Scott M. Ward, Ph.D. **Lab Director**

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Oakland, CA 94612

EJ3 Order #: 3463023
Project #: 1032864023141
Receipt Date: 27-Nov-2023
Analysis Date: 30-Nov-2023
Report Date: 30-Nov-2023

HDOH Kula Community Air (11/20 to 11/23)

Sample Number **MFK-FB01-112223-AB□**

Air Volume:	0
Effective Filter Area:	385.0 mm^2
Level of Analysis (Chrysotile):	CDQ
Level of Analysis (Amphibole):	ADQ
Magnification Used for Fiber Counting:	20,000
Aspect Ratio for Fiber Definition:	5:1
Mean Dimension of Grid Openings (GOs):	0.0132 mm^2
Initials of Analyst:	Taylor Smylie
Number of GO's Examined:	10
Analytical Sensitivity: f/Liter:	N/A
Analytical Sensitivity: f/cm3:	N/A
Number of primary asbestos structures:	0
Number of asbestos structures counted:	0
Number of asbestos structures > 5 um :	0
Number of asbestos fibers and bundles > 5 um:	0
Number of PCM equivalent asbestos structures:	0
Number of PCM equivalent asbestos fibers:	0
Concentration of Asbestos (Chrysotile) f/cm3:	N/A
Concentration of Asbestos (Amphibole) f/cm3:	N/A
Concentration of PCME Asbestos (Chrysotile) f/cm3:	N/A
Concentration of Asbestos (Chrysotile), Str/L:	N/A
Concentration of Asbestos (Amphibole), Str/L:	N/A
Lower 95% Confidence Limit (Chrysotile), Str/L:	N/A
Upper 95% Confidence Limit (Chrysotile), Str/L:	N/A
Lower 95% Confidence Limit (Amphibole), Str/L:	N/A
Upper 95% Confidence Limit (Amphibole), Str/L:	N/A

Analyst: Taylor Smylie 45260 **Scott M. Ward, Ph.D.** **Lab Director**

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Airborne Asbestos Fiber Analysis by Transmission Electron Microscopy (TEM) ISO 10312 - Ambient Air - Determination of Asbestos Fibers Direct-Transfer Transmission Electron Microscopy Method

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EJ3 Order #: 3484617
Project #: 103S864023141
Receipt Date: 18-Dec-2023
Analysis Date: 21-Dec-2023
Report Date: 21-Dec-2023

HDOH Kula Community Air

Sample Number **MFK-AM01-112223-AB**

Air Volume:	2146.56
Effective Filter Area:	385.0 mm^2
Level of Analysis (Chrysotile):	CDQ
Level of Analysis (Amphibole):	ADQ
Magnification Used for Fiber Counting:	20,000
Aspect Ratio for Fiber Definition:	5:1
Mean Dimension of Grid Openings (GOs):	0.0132 mm^2
Initials of Analyst:	TS
Number of GO's Examined:	10
Analytical Sensitivity: f/Liter:	1.35876
Analytical Sensitivity: f/cm3:	0.00136
Number of primary asbestos structures:	0
Number of asbestos structures counted:	0
Number of asbestos structures > 5 um :	0
Number of asbestos fibers and bundles > 5 um:	0
Number of PCM equivalent asbestos structures:	0
Number of PCM equivalent asbestos fibers:	0
Concentration of Asbestos (Chrysotile) f/cm3:	<0.00136
Concentration of Asbestos (Amphibole) f/cm3:	<0.00136
Concentration of PCME Asbestos (Chrysotile) f/cm3:	<0.00136
Concentration of Asbestos (Chrysotile), Str/L:	0
Concentration of Asbestos (Amphibole), Str/L:	0
Lower 95% Confidence Limit (Chrysotile), Str/L:	0
Upper 95% Confidence Limit (Chrysotile), Str/L:	5
Lower 95% Confidence Limit (Amphibole), Str/L:	0
Upper 95% Confidence Limit (Amphibole), Str/L:	5

Analyst: Taylor Smylie

Scott M. Ward, Ph.D. **Lab Director**

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TETRA TECH

Ambient Community Air Monitoring Weekly Report
For the Hawaii Department of Health – Clean Air Branch

Kula, Maui

11/23/2023-11/29/2023
[Report Updated: 4/12/2024]

As a result of ongoing debris removal operations in response to the Maui Wildfires, a community air monitoring and sampling plan (CAMSP, 2023) has been developed and sampling is being performed at three community locations across the area of Kula.

This approach includes ambient community air monitoring and sampling to assess conditions and ensure debris removal activities, taking place under the direction of the U.S. Army Corps of Engineers (USACE), does not significantly impact air quality in the area of Kula. Data collected is made available to HDOH via online shared site and this weekly report. Air monitoring and sampling will continue until debris removal activities are complete or until HDOH CAB advises otherwise.

Air quality monitoring for particulate matter was conducted at all three community locations over a 24-hour period each day in accordance with the CAMSP. Additionally, daily air samples were collected at all community locations to be analyzed for asbestos and heavy metals. Summary analytical data is presented in **Tables 1 and 2**. **Figure 1** depicts the community air monitoring and sampling locations. **Appendix 1** provides detailed analytical results for all community locations where air sampling was performed. Analytical results were compared to site-specific screening levels for particulate matter, asbestos, and heavy metals as published in the CAMSP (Tetra Tech 2023; see Table 2).

Results for Community Locations:
Ambient particulate air monitoring was performed to assess for the presence and concentrations of airborne particulates with a particle size aerodynamic diameter of 2.5 micrometers (µm) and less ($PM_{2.5}$), as well as 10 micrometers (µm) and less (PM_{10}). This particle size diameter is recognized for health evaluations and is identified as "$PM_{2.5}$" and "PM_{10}". The particle size diameters of 2.5 micrometers (µm) and 10 micrometers (µm) are small enough to be inhaled into a person's lungs. Monitoring for $PM_{2.5}$ and PM_{10} was conducted 7 days a week at each of the following locations: Top Property (AM-01) (November 23 – 29), Middle Property (AM-02) 2 (November 23 – 29), Lower Property (AM-03) (November 23 – 29).

The results of PM_{10} monitoring found that screening levels were exceeded at the Top Property air monitoring station on November 29th. During this monitoring period, the property owner was observed removing burned wood on the property with use of a Skid Steer and mini excavator. This work disturbed dry undersoil and resulted in observable dust. The property owner was also spreading woodchips. All other days monitored during this period were below screening levels.

The results of $PM_{2.5}$ monitoring found that screening levels were exceeded at the Top Property air monitoring station on November 23rd, 28th and 29th. During these monitoring periods, the property owner was observed removing burned wood on the property with use of a Skid Steer and mini excavator. This work disturbed dry undersoil and resulted in observable dust. The property owner was also spreading woodchips. All other days monitored during this period were below screening levels.

None of these exceedances of particulate screening levels are likely to be attributable to USACE debris removal operations.

There were twenty samples collected for asbestos fibers at community monitoring locations throughout this time frame. No asbestos sample was collected on 11/27/2023 at the lower property (AM-03) because the instrument was found powered down due to a dead battery, flow rate was out of range for calibration and the instrument was unable to post calibrate. No asbestos sample returned a value above the laboratory's detection limit, indicating fibers were not present in air sampled. All asbestos results were below the public health screening level of 0.0034 fibers/cc, as well as the laboratory's detection limits, and therefore not a concern.

Extremely low levels of heavy metals were detected in ambient air samples at community locations. Although detected, all detections were below the public health screening levels for heavy metals. Details for particulates, heavy metal and asbestos sampling data for community locations are found in Attachment 1.

Attachments:

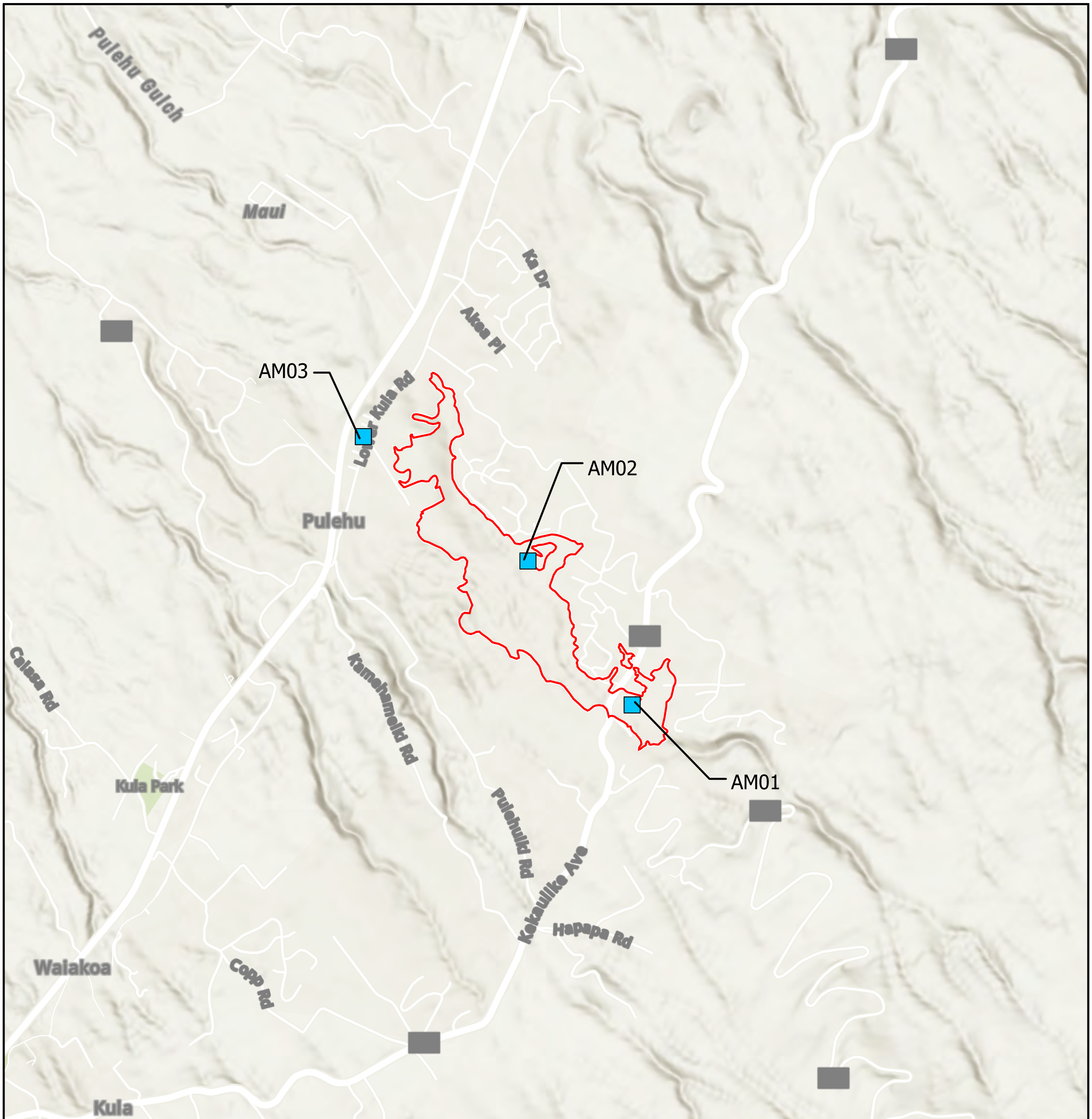
Analytical Sampling Results and Particulate Monitoring Results

Air Monitoring and Sampling Locations

Appendix:

Analytical Reports

Attachments



Air Monitoring Locations

Kula Fire Perimeter

N

0 0.25 0.5
Miles

TETRA TECH

Figure 1
Ambient Community
Air Monitoring Locations

Hawaii DOH
2023 Kula Wildfire

Basemap: ESRI ArcGIS World Street Map

Table 1: HDOH CAB Ambient Community Monitoring and Sampling
Analytical Sampling Results
Maui Wildfire, Kula
11/23/2023-11/29/2023
[Report Updated: 4/12/2024]

Analyte		Asbestos		Antimony	Arsenic	Barium	Beryllium	Cadmium	Chromium	Cobalt	Copper	Lead	Manganese	Molybdenum	Nickel	Selenium	Thallium	Vanadium	Zinc
Units		f/cc	Y/N	$\mu g/m^3$	$\mu g/m^3$	$\mu g/m^3$	$\mu g/m^3$	$\mu g/m^3$	$\mu g/m^3$	$\mu g/m^3$	$\mu g/m^3$	$\mu g/m^3$	$\mu g/m^3$	$\mu g/m^3$	$\mu g/m^3$	$\mu g/m^3$	$\mu g/m^3$	$\mu g/m^3$	$\mu g/m^3$
Screening Level	Location / ID	0.0034 [1]	Confirmed Asbestos [2]	1.4	0.18	2.4	0.1	0.048	24	0.029	480	1.5	0.24	9.6	0.048	96	48	0.48	2400
11/23/2023	Top Property (AM-01)	<0.00038	N	0.0000869	0.000155	0.00374	0.00000838	0.00000665	0.00156	0.000163	0.0174	0.000232	0.00706	0.00125	0.00104	0.000144	0.00000067	0.00189	0.0091
	Middle Property (AM-02)	<0.00040	N	0.0000803	0.000174	0.004	0.0000105	0.0000111	0.00144	0.000182	0.0129	0.000219	0.00814	0.00101	0.00094	0.000192	0.00000146	0.00188	0.0084
	Lower Property (AM-03)	<0.00038	N	0.0000883	0.000123	0.00459	0.00000908	0.00000781	0.00157	0.000205	0.0418	0.000179	0.00782	0.00138	0.00095	0.000153	0.000000776	0.0018	0.00919
11/24/2023	Top Property (AM-01)	<0.00039	N	0.000053	0.000122	0.00433	0.0000102	0.00000687	0.00171	0.000185	0.0226	0.000423	0.00861	0.00128	0.00339	0.000133	0.000000804	0.00144	0.0195
	Middle Property (AM-02)	<0.00041	N	0.0000525	0.00013	0.00472	0.0000109	0.00000775	0.00169	0.00029	0.0117	0.000182	0.00958	0.000865	0.000717	0.000144	0.000000916	0.00152	0.0133
	Lower Property (AM-03)	<0.00045	N	0.0000584	0.000105	0.00419	0.00000925	0.00000637	0.00186	0.000178	0.0297	0.000182	0.00804	0.00111	0.000843	0.000147	0.000000745	0.00148	0.0178
11/25/2003	Top Property (AM-01)	<0.00038	N	0.0000515	0.000114	0.0044	0.0000103	0.00000693	0.00181	0.000194	0.021	0.000369	0.00957	0.00114	0.00107	0.000152	0.000000896	0.00168	0.0187
	Middle Property (AM-02)	<0.00047	N	0.0000669	0.000153	0.00567	0.0000136	0.0000081	0.00157	0.000225	0.0129	0.000228	0.0119	0.000813	0.000951	0.000175	0.000000933	0.00204	0.0151
	Lower Property (AM-03)	<0.00047	N	0.0000643	0.000125	0.00553	0.0000128	0.00000703	0.00186	0.000208	0.0255	0.000249	0.0108	0.000981	0.000963	0.000181	0.000000872	0.002	0.013
11/26/2023	Top Property (AM-01)	<0.00040	N	0.0000636	0.000115	0.00474	0.0000101	0.00000605	0.0017	0.000197	0.02	0.000288	0.00973	0.00115	0.000655	0.000157	0.000000829	0.00111	0.0103
	Middle Property (AM-02)	<0.00051	N	0.0000706	0.000219	0.00777	0.0000165	0.0000124	0.00203	0.000276	0.0152	0.000266	0.0158	0.000967	0.000786	0.000192	0.00000139	0.00172	0.0114
	Lower Property (AM-03)	<0.00057	N	0.0000738	0.0001	0.00454	0.0000122	0.00000706	0.00183	0.000202	0.0332	0.000232	0.00987	0.000975	0.000704	0.000164	0.000000915	0.00123	0.0121
11/27/2023	Top Property (AM-01)	<0.00054	N	0.000077	0.000772	0.0359	0.000187	0.0000422	0.00566	0.0022	0.0224	0.00118	0.151	0.00119	0.00292	0.00112	0.00000891	0.0149	0.0405
	Middle Property (AM-02)	<0.00050	N	0.0000571	0.000457	0.00709	0.0000213	0.0000147	0.00186	0.000347	0.0221	0.000294	0.0201	0.00137	0.000939	0.0002	0.00000154	0.00274	0.0316
	Lower Property (AM-03)	NA	NA	0.0000715	0.000103	0.00519	0.0000133	0.00000668	0.00196	0.000232	0.0395	0.000227	0.0118	0.00139	0.001	0.000152	0.000000945	0.00221	0.0306
11/28/2023	Top Property (AM-01)	<0.00061	N	0.0000518	0.000377	0.0203	0.0000795	0.0000212	0.00358	0.00112	0.0176	0.00062	0.0807	0.000896	0.00161	0.000469	0.00000452	0.00712	0.0381
	Middle Property (AM-02)	<0.00050	N	0.0000483	0.000169	0.00413	0.0000113	0.00000755	0.0017	0.000176	0.0132	0.000173	0.00944	0.00096	0.000556	0.000115	0.000000868	0.0012	0.0208
	Lower Property (AM-03)	<0.00043	N	0.0000727	0.000095	0.00624	0.0000148	0.00000721	0.00187	0.00022	0.0275	0.000457	0.0129	0.00105	0.000556	0.000132	0.00000103	0.00127	0.0252
11/29/2023	Top Property (AM-01)	<0.00043	N	0.0000435	0.000143	0.00582	0.0000195	0.00000847	0.00193	0.000296	0.0195	0.000313	0.0198	0.00113	0.000593	0.000176	0.00000141	0.00177	0.0164
	Middle Property (AM-02)	<0.00046	N	0.0000488	0.000107	0.0032	0.00000394	0.00000481	0.00124	0.0000699	0.0162	0.0000826	0.00302	0.00115	0.000344	0.0000881	0.000000522	0.000319	0.0148
	Lower Property (AM-03)	<0.00056	N	0.0000878	0.0000858	0.00418	0.00000633	0.00000512	0.00149	0.0000929	0.0382	0.000157	0.00478	0.0012	0.000448	0.000123	0.000000673	0.000496	0.0223
95% Upper Confidence Limit[3]		0.00049		0.00007	0.00023	0.00863	0.00003	0.000012	0.00225	0.00044	0.0269	0.00039	0.027	0.00118	0.00131	0.00026	0.0000019	0.00343	0.023

Notes:
No Asbestos sampling tookplace at Lower Property (AM-03) on 11/27 due to Pump was found powered down. Flow rate was out of range for dry Cal and instrument was unable to post cal.
NA = Not Available
f/cc = fibers per cubic centimeter
µg/m3= micrograms per cubic meter
ND = Not detected at or above the laboratory reporting limit
1 Fiber count sample result via Phase Contrast Microscopy
2 Confirmed asbestos sample result via Transmission Electron Microscopy
3 95% UCL determined through 'best fit' lognormal or normal parametric statistics via W test

Table 2: HDOH CAB Ambient Community Monitoring and Sampling
Particulate Monitoring Results
Maui Wildfire, Kula
11/23/2023-11/29/2023
[Report Updated: 4/12/2024]

Particulate Size		PM 2.5	PM 10
Screening Level	**Location / ID**	**35 µg/m^3**	**150 µg/m^3**
11/23/2023	Top Property (AM-01)	35	22
	Middle Property (AM-02)	17	6.7
	Lower Property (AM-03)	6.3	9.0
11/24/2023	Top Property (AM-01)	28	25
	Middle Property (AM-02)	13	6.8
	Lower Property (AM-03)	7.7	8.7
11/25/2023	Top Property (AM-01)	31	23
	Middle Property (AM-02)	22	7.6
	Lower Property (AM-03)	8.6	9.8
11/26/2023	Top Property (AM-01)	32	24
	Middle Property (AM-02)	20	9.1
	Lower Property (AM-03)	6.7	7.4
11/27/2023	Top Property (AM-01)	34	29
	Middle Property (AM-02)	22	5.3
	Lower Property (AM-03)	5.5	8.1
11/28/2023	Top Property (AM-01)	43	34
	Middle Property (AM-02)	11	5.4
	Lower Property (AM-03)	6.8	6.8
11/29/2023	Top Property (AM-01)	88	190
	Middle Property (AM-02)	24	4.3
	Lower Property (AM-03)	6.1	6.5

Notes:
The exceedances on 11/23, 11/28 and 11/29 are a result of woodchips spread and private operations on the property
Results are based on 24 hour TWA calculation
24hr TWA average caluation is show with 2 significat figures.
µg/m3 = micrograms per cubic meter
ND = Not detected at or above the laboratory reporting limit
NA = Not Available
Data for the Lower Property (AM-03) on 11/27 has been revised from the prerviously submitted report

Appendix 1

Built Environment Testing

Report for:

Maura McAleese
Tetra Tech- Maui Fire
1999 Harrison St. Ste. 500
Oakland, CA 94612

Regarding: Eurofins J3 Resources, Inc.
Project: 1032864023141; HDOH Kula Community Air
EML ID: 3463023

Approved by:

Dates of Analysis:
Asbestos TEM ISO 10312 / ASTM6281-06: 11-30-2023

Lab Director
Scott Ward

All samples were received in acceptable condition unless noted in the Report Comments portion in the body of the report. Due to the nature of the analyses performed, field blank correction of results is not applied. The results relate only to the samples as received and tested.

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Airborne Asbestos Fiber Analysis by Transmission Electron Microscopy (TEM) ISO 10312 - Ambient Air - Determination of Asbestos Fibers Direct-Transfer Transmission Electron Microscopy Method

Maura McAleese
Tetra Tech- Maui Fire
1999 Harrison St. Ste. 500
Oakland, CA 94612

EJ3 Order #: 3463023
Project #: 1032864023141
Receipt Date: 27-Nov-2023
Analysis Date: 30-Nov-2023
Report Date: 30-Nov-2023

HDOH Kula Community Air (11/20 to 11/23)

Sample Number **MFK-AM01-112323-AB**

Air Volume:	7639.827
Effective Filter Area:	385.0 mm^2
Level of Analysis (Chrysotile):	CDQ
Level of Analysis (Amphibole):	ADQ
Magnification Used for Fiber Counting:	20,000
Aspect Ratio for Fiber Definition:	5:1
Mean Dimension of Grid Openings (GOs):	0.0132 mm^2
Initials of Analyst:	
Number of GO's Examined:	10
Analytical Sensitivity: f/Liter:	0.38177
Analytical Sensitivity: f/cm3:	0.00038
Number of primary asbestos structures:	0
Number of asbestos structures counted:	0
Number of asbestos structures > 5 um :	0
Number of asbestos fibers and bundles > 5 um:	0
Number of PCM equivalent asbestos structures:	0
Number of PCM equivalent asbestos fibers:	0
Concentration of Asbestos (Chrysotile) f/cm3:	<0.00038
Concentration of Asbestos (Amphibole) f/cm3:	<0.00038
Concentration of PCME Asbestos (Chrysotile) f/cm3:	<0.00038
Concentration of Asbestos (Chrysotile), Str/L:	0
Concentration of Asbestos (Amphibole), Str/L:	0
Lower 95% Confidence Limit (Chrysotile), Str/L:	0
Upper 95% Confidence Limit (Chrysotile), Str/L:	1.4
Lower 95% Confidence Limit (Amphibole), Str/L:	0
Upper 95% Confidence Limit (Amphibole), Str/L:	1.4

Analyst: Taylor Smylie

Scott M. Ward, Ph.D. **Lab Director**

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EJ3 Order #: 3463023
Project #: 1032864023141
Receipt Date: 27-Nov-2023
Analysis Date: 30-Nov-2023
Report Date: 30-Nov-2023

HDOH Kula Community Air (11/20 to 11/23)

Sample Number **MFK-AM02-112323-AB**

Air Volume:	7247.664
Effective Filter Area:	385.0 mm^2
Level of Analysis (Chrysotile):	CDQ
Level of Analysis (Amphibole):	ADQ
Magnification Used for Fiber Counting:	20,000
Aspect Ratio for Fiber Definition:	5:1
Mean Dimension of Grid Openings (GOs):	0.0132 mm^2
Initials of Analyst:	TS
Number of GO's Examined:	10
Analytical Sensitivity: f/Liter:	0.40243
Analytical Sensitivity: f/cm3:	0.00040
Number of primary asbestos structures:	0
Number of asbestos structures counted:	0
Number of asbestos structures > 5 um :	0
Number of asbestos fibers and bundles > 5 um:	0
Number of PCM equivalent asbestos structures:	0
Number of PCM equivalent asbestos fibers:	0
Concentration of Asbestos (Chrysotile) f/cm3:	<0.00040
Concentration of Asbestos (Amphibole) f/cm3:	<0.00040
Concentration of PCME Asbestos (Chrysotile) f/cm3:	<0.00040
Concentration of Asbestos (Chrysotile), Str/L:	0
Concentration of Asbestos (Amphibole), Str/L:	0
Lower 95% Confidence Limit (Chrysotile), Str/L:	0
Upper 95% Confidence Limit (Chrysotile), Str/L:	1.5
Lower 95% Confidence Limit (Amphibole), Str/L:	0
Upper 95% Confidence Limit (Amphibole), Str/L:	1.5

Analyst: Taylor Smylie

Scott M. Ward, Ph.D. **Lab Director**

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Airborne Asbestos Fiber Analysis
by Transmission Electron Microscopy (TEM)
ISO 10312 - Ambient Air - Determination of Asbestos Fibers
Direct-Transfer Transmission Electron Microscopy Method

Maura McAleese
Tetra Tech- Maui Fire
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Oakland, CA 94612

EJ3 Order #: 3463023
Project #: 1032864023141
Receipt Date: 27-Nov-2023
Analysis Date: 30-Nov-2023
Report Date: 30-Nov-2023

HDOH Kula Community Air (11/20 to 11/23)

Sample Number **MFK-AM03-112323-AB**

Air Volume:	7587.504
Effective Filter Area:	385.0 mm^2
Level of Analysis (Chrysotile):	CDQ
Level of Analysis (Amphibole):	ADQ
Magnification Used for Fiber Counting:	20,000
Aspect Ratio for Fiber Definition:	5:1
Mean Dimension of Grid Openings (GOs):	0.0132 mm^2
Initials of Analyst:	TS
Number of GO’s Examined:	10
Analytical Sensitivity: f/Liter:	0.38440
Analytical Sensitivity: f/cm3:	0.00038
Number of primary asbestos structures:	0
Number of asbestos structures counted:	0
Number of asbestos structures > 5 um :	0
Number of asbestos fibers and bundles > 5 um:	0
Number of PCM equivalent asbestos structures:	0
Number of PCM equivalent asbestos fibers:	0
Concentration of Asbestos (Chrysotile) f/cm3:	<0.00038
Concentration of Asbestos (Amphibole) f/cm3:	<0.00038
Concentration of PCME Asbestos (Chrysotile) f/cm3:	<0.00038
Concentration of Asbestos (Chrysotile), Str/L:	0
Concentration of Asbestos (Amphibole), Str/L:	0
Lower 95% Confidence Limit (Chrysotile), Str/L:	0
Upper 95% Confidence Limit (Chrysotile), Str/L:	1.4
Lower 95% Confidence Limit (Amphibole), Str/L:	0
Upper 95% Confidence Limit (Amphibole), Str/L:	1.4

Analyst: Taylor Smylie

Scott M. Ward, Ph.D.   **Lab Director**

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Airborne Asbestos Fiber Analysis by Transmission Electron Microscopy (TEM) ISO 10312 - Ambient Air - Determination of Asbestos Fibers Direct-Transfer Transmission Electron Microscopy Method

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EJ3 Order #: 3463023
Project #: 1032864023141
Receipt Date: 27-Nov-2023
Analysis Date: 30-Nov-2023
Report Date: 30-Nov-2023

HDOH Kula Community Air (11/20 to 11/23)

Sample Number **MFK-FB01-112323-AB**

Air Volume:	0
Effective Filter Area:	385.0 mm^2
Level of Analysis (Chrysotile):	CDQ
Level of Analysis (Amphibole):	ADQ
Magnification Used for Fiber Counting:	20,000
Aspect Ratio for Fiber Definition:	5:1
Mean Dimension of Grid Openings (GOs):	0.0132 mm^2
Initials of Analyst:	TS
Number of GO's Examined:	10
Analytical Sensitivity: f/Liter:	N/A
Analytical Sensitivity: f/cm3:	N/A
Number of primary asbestos structures:	0
Number of asbestos structures counted:	0
Number of asbestos structures > 5 um :	0
Number of asbestos fibers and bundles > 5 um:	0
Number of PCM equivalent asbestos structures:	0
Number of PCM equivalent asbestos fibers:	0
Concentration of Asbestos (Chrysotile) f/cm3:	N/A
Concentration of Asbestos (Amphibole) f/cm3:	N/A
Concentration of PCME Asbestos (Chrysotile) f/cm3:	N/A
Concentration of Asbestos (Chrysotile), Str/L:	N/A
Concentration of Asbestos (Amphibole), Str/L:	N/A
Lower 95% Confidence Limit (Chrysotile), Str/L:	N/A
Upper 95% Confidence Limit (Chrysotile), Str/L:	N/A
Lower 95% Confidence Limit (Amphibole), Str/L:	N/A
Upper 95% Confidence Limit (Amphibole), Str/L:	N/A

Analyst: Taylor Smylie

Scott M. Ward, Ph.D. **Lab Director**

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EJ3 Order #: 3465949REV1
Project #: 1.03286E+12
Receipt Date: 29-Nov-2023
Analysis Date: 4-Dec-2023
Report Date: 4-Dec-2023

HDOH Kula Community Air

Sample Number **MFK-AM01-112423-AB**

Air Volume:	7574.791
Effective Filter Area:	385.0 mm^2
Level of Analysis (Chrysotile):	CDQ
Level of Analysis (Amphibole):	ADQ
Magnification Used for Fiber Counting:	20,000
Aspect Ratio for Fiber Definition:	5:1
Mean Dimension of Grid Openings (GOs):	0.0132 mm^2
Initials of Analyst:	TS
Number of GO's Examined:	10
Analytical Sensitivity: f/Liter:	0.38505
Analytical Sensitivity: f/cm3:	0.00039
Number of primary asbestos structures:	0
Number of asbestos structures counted:	0
Number of asbestos structures > 5 um :	0
Number of asbestos fibers and bundles > 5 um:	0
Number of PCM equivalent asbestos structures:	0
Number of PCM equivalent asbestos fibers:	0
Concentration of Asbestos (Chrysotile) f/cm3:	<0.00039
Concentration of Asbestos (Amphibole) f/cm3:	<0.00039
Concentration of PCME Asbestos (Chrysotile) f/cm3:	<0.00039
Concentration of Asbestos (Chrysotile), Str/L:	0
Concentration of Asbestos (Amphibole), Str/L:	0
Lower 95% Confidence Limit (Chrysotile), Str/L:	0
Upper 95% Confidence Limit (Chrysotile), Str/L:	1.4
Lower 95% Confidence Limit (Amphibole), Str/L:	0
Upper 95% Confidence Limit (Amphibole), Str/L:	1.4

Analyst: Taylor Smylie

Scott M. Ward, Ph.D. **Lab Director**

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Airborne Asbestos Fiber Analysis by Transmission Electron Microscopy (TEM) ISO 10312 - Ambient Air - Determination of Asbestos Fibers Direct-Transfer Transmission Electron Microscopy Method

Maura McAleese
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EJ3 Order #: 3465949REV1
Project #: 1.03286E+12
Receipt Date: 29-Nov-2023
Analysis Date: 4-Dec-2023
Report Date: 4-Dec-2023

HDOH Kula Community Air

Sample Number **MFK-AM02-112423-AB**

Air Volume:	7041.571
Effective Filter Area:	385.0 mm^2
Level of Analysis (Chrysotile):	CDQ
Level of Analysis (Amphibole):	ADQ
Magnification Used for Fiber Counting:	20,000
Aspect Ratio for Fiber Definition:	5:1
Mean Dimension of Grid Openings (GOs):	0.0132 mm^2
Initials of Analyst:	TS
Number of GO's Examined:	10
Analytical Sensitivity: f/Liter:	0.41421
Analytical Sensitivity: f/cm3:	0.00041
Number of primary asbestos structures:	0
Number of asbestos structures counted:	0
Number of asbestos structures > 5 um :	0
Number of asbestos fibers and bundles > 5 um:	0
Number of PCM equivalent asbestos structures:	0
Number of PCM equivalent asbestos fibers:	0
Concentration of Asbestos (Chrysotile) f/cm3:	<0.00041
Concentration of Asbestos (Amphibole) f/cm3:	<0.00041
Concentration of PCME Asbestos (Chrysotile) f/cm3:	<0.00041
Concentration of Asbestos (Chrysotile), Str/L:	0
Concentration of Asbestos (Amphibole), Str/L:	0
Lower 95% Confidence Limit (Chrysotile), Str/L:	0
Upper 95% Confidence Limit (Chrysotile), Str/L:	1.5
Lower 95% Confidence Limit (Amphibole), Str/L:	0
Upper 95% Confidence Limit (Amphibole), Str/L:	1.5

Revision 1:
Correct Concentration of Asbestos to reflect correct value.

Analyst: Taylor Smylie

Scott M. Ward, Ph.D. **Lab Director**

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Airborne Asbestos Fiber Analysis by Transmission Electron Microscopy (TEM) ISO 10312 - Ambient Air - Determination of Asbestos Fibers Direct-Transfer Transmission Electron Microscopy Method

Maura McAleese
Tetra Tech
1999 Harrison St, Ste. 500
Oakland, CA 94612

EJ3 Order #: 3465949REV1
Project #: 1.03286E+12
Receipt Date: 29-Nov-2023
Analysis Date: 4-Dec-2023
Report Date: 4-Dec-2023

HDOH Kula Community Air

Sample Number **MFK-AM03-112423-AB**

Air Volume:	6431.553
Effective Filter Area:	385.0 mm^2
Level of Analysis (Chrysotile):	CDQ
Level of Analysis (Amphibole):	ADQ
Magnification Used for Fiber Counting:	20,000
Aspect Ratio for Fiber Definition:	5:1
Mean Dimension of Grid Openings (GOs):	0.0132 mm^2
Initials of Analyst:	TS
Number of GO's Examined:	10
Analytical Sensitivity: f/Liter:	0.45349
Analytical Sensitivity: f/cm3:	0.00045
Number of primary asbestos structures:	0
Number of asbestos structures counted:	0
Number of asbestos structures > 5 um :	0
Number of asbestos fibers and bundles > 5 um:	0
Number of PCM equivalent asbestos structures:	0
Number of PCM equivalent asbestos fibers:	0
Concentration of Asbestos (Chrysotile) f/cm3:	<0.00045
Concentration of Asbestos (Amphibole) f/cm3:	<0.00045
Concentration of PCME Asbestos (Chrysotile) f/cm3:	<0.00045
Concentration of Asbestos (Chrysotile), Str/L:	0
Concentration of Asbestos (Amphibole), Str/L:	0
Lower 95% Confidence Limit (Chrysotile), Str/L:	0
Upper 95% Confidence Limit (Chrysotile), Str/L:	1.7
Lower 95% Confidence Limit (Amphibole), Str/L:	0
Upper 95% Confidence Limit (Amphibole), Str/L:	1.7

Analyst: Taylor Smylie

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EJ3 Order #: 3465949REV1
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Receipt Date: 29-Nov-2023
Analysis Date: 4-Dec-2023
Report Date: 4-Dec-2023

HDOH Kula Community Air

Sample Number **MFK-FB01-112423-AB**

Air Volume:	0
Effective Filter Area:	385.0 mm^2
Level of Analysis (Chrysotile):	CDQ
Level of Analysis (Amphibole):	ADQ
Magnification Used for Fiber Counting:	20,000
Aspect Ratio for Fiber Definition:	5:1
Mean Dimension of Grid Openings (GOs):	0.0132 mm^2
Initials of Analyst:	TS
Number of GO's Examined:	10
Analytical Sensitivity: f/Liter:	N/A
Analytical Sensitivity: f/cm3:	N/A
Number of primary asbestos structures:	0
Number of asbestos structures counted:	0
Number of asbestos structures > 5 um :	0
Number of asbestos fibers and bundles > 5 um:	0
Number of PCM equivalent asbestos structures:	0
Number of PCM equivalent asbestos fibers:	0
Concentration of Asbestos (Chrysotile) f/cm3:	N/A
Concentration of Asbestos (Amphibole) f/cm3:	N/A
Concentration of PCME Asbestos (Chrysotile) f/cm3:	N/A
Concentration of Asbestos (Chrysotile), Str/L:	N/A
Concentration of Asbestos (Amphibole), Str/L:	N/A
Lower 95% Confidence Limit (Chrysotile), Str/L:	N/A
Upper 95% Confidence Limit (Chrysotile), Str/L:	N/A
Lower 95% Confidence Limit (Amphibole), Str/L:	N/A
Upper 95% Confidence Limit (Amphibole), Str/L:	N/A

Analyst: Taylor Smylie

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HDOH Kula Community Air

Sample Number **MFK-AM01-112523-AB**

Air Volume:	7754.256
Effective Filter Area:	385.0 mm^2
Level of Analysis (Chrysotile):	CDQ
Level of Analysis (Amphibole):	ADQ
Magnification Used for Fiber Counting:	20,000
Aspect Ratio for Fiber Definition:	5:1
Mean Dimension of Grid Openings (GOs):	0.0132 mm^2
Initials of Analyst:	TS
Number of GO's Examined:	10
Analytical Sensitivity: f/Liter:	0.37614
Analytical Sensitivity: f/cm3:	0.00038
Number of primary asbestos structures:	0
Number of asbestos structures counted:	0
Number of asbestos structures > 5 um :	0
Number of asbestos fibers and bundles > 5 um:	0
Number of PCM equivalent asbestos structures:	0
Number of PCM equivalent asbestos fibers:	0
Concentration of Asbestos (Chrysotile) f/cm3:	<0.00038
Concentration of Asbestos (Amphibole) f/cm3:	<0.00038
Concentration of PCME Asbestos (Chrysotile) f/cm3:	<0.00038
Concentration of Asbestos (Chrysotile), Str/L:	0
Concentration of Asbestos (Amphibole), Str/L:	0
Lower 95% Confidence Limit (Chrysotile), Str/L:	0
Upper 95% Confidence Limit (Chrysotile), Str/L:	1.4
Lower 95% Confidence Limit (Amphibole), Str/L:	0
Upper 95% Confidence Limit (Amphibole), Str/L:	1.4

Analyst: Taylor Smylie

Scott M. Ward, Ph.D. **Lab Director**

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Report Date: 4-Dec-2023

HDOH Kula Community Air

Sample Number **MFK-AM02-112523-AB**

Air Volume:	6246.288
Effective Filter Area:	385.0 mm^2
Level of Analysis (Chrysotile):	CDQ
Level of Analysis (Amphibole):	ADQ
Magnification Used for Fiber Counting:	20,000
Aspect Ratio for Fiber Definition:	5:1
Mean Dimension of Grid Openings (GOs):	0.0132 mm^2
Initials of Analyst:	TS
Number of GO’s Examined:	10
Analytical Sensitivity: f/Liter:	0.46694
Analytical Sensitivity: f/cm3:	0.00047
Number of primary asbestos structures:	0
Number of asbestos structures counted:	0
Number of asbestos structures > 5 um :	0
Number of asbestos fibers and bundles > 5 um:	0
Number of PCM equivalent asbestos structures:	0
Number of PCM equivalent asbestos fibers:	0
Concentration of Asbestos (Chrysotile) f/cm3:	<0.00047
Concentration of Asbestos (Amphibole) f/cm3:	<0.00047
Concentration of PCME Asbestos (Chrysotile) f/cm3:	<0.00047
Concentration of Asbestos (Chrysotile), Str/L:	0
Concentration of Asbestos (Amphibole), Str/L:	0
Lower 95% Confidence Limit (Chrysotile), Str/L:	0
Upper 95% Confidence Limit (Chrysotile), Str/L:	1.7
Lower 95% Confidence Limit (Amphibole), Str/L:	0
Upper 95% Confidence Limit (Amphibole), Str/L:	1.7

Analyst: Taylor Smylie

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HDOH Kula Community Air

Sample Number **MFK-AM03-112523-AB**

Air Volume:	6210.72
Effective Filter Area:	385.0 mm^2
Level of Analysis (Chrysotile):	CDQ
Level of Analysis (Amphibole):	ADQ
Magnification Used for Fiber Counting:	20,000
Aspect Ratio for Fiber Definition:	5:1
Mean Dimension of Grid Openings (GOs):	0.0132 mm^2
Initials of Analyst:	TS
Number of GO’s Examined:	10
Analytical Sensitivity: f/Liter:	0.46962
Analytical Sensitivity: f/cm3:	0.00047
Number of primary asbestos structures:	0
Number of asbestos structures counted:	0
Number of asbestos structures > 5 um :	0
Number of asbestos fibers and bundles > 5 um:	0
Number of PCM equivalent asbestos structures:	0
Number of PCM equivalent asbestos fibers:	0
Concentration of Asbestos (Chrysotile) f/cm3:	<0.00047
Concentration of Asbestos (Amphibole) f/cm3:	<0.00047
Concentration of PCME Asbestos (Chrysotile) f/cm3:	<0.00047
Concentration of Asbestos (Chrysotile), Str/L:	0
Concentration of Asbestos (Amphibole), Str/L:	0
Lower 95% Confidence Limit (Chrysotile), Str/L:	0
Upper 95% Confidence Limit (Chrysotile), Str/L:	1.7
Lower 95% Confidence Limit (Amphibole), Str/L:	0
Upper 95% Confidence Limit (Amphibole), Str/L:	1.7

Analyst: Taylor Smylie

Scott M. Ward, Ph.D. **Lab Director**

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HDOH Kula Community Air

Sample Number **MFK-FB01-112523-AB**

Air Volume:	0
Effective Filter Area:	385.0 mm^2
Level of Analysis (Chrysotile):	CDQ
Level of Analysis (Amphibole):	ADQ
Magnification Used for Fiber Counting:	20,000
Aspect Ratio for Fiber Definition:	5:1
Mean Dimension of Grid Openings (GOs):	0.0132 mm^2
Initials of Analyst:	TS
Number of GO's Examined:	10
Analytical Sensitivity: f/Liter:	N/A
Analytical Sensitivity: f/cm3:	N/A
Number of primary asbestos structures:	0
Number of asbestos structures counted:	0
Number of asbestos structures > 5 um :	0
Number of asbestos fibers and bundles > 5 um:	0
Number of PCM equivalent asbestos structures:	0
Number of PCM equivalent asbestos fibers:	0
Concentration of Asbestos (Chrysotile) f/cm3:	N/A
Concentration of Asbestos (Amphibole) f/cm3:	N/A
Concentration of PCME Asbestos (Chrysotile) f/cm3:	N/A
Concentration of Asbestos (Chrysotile), Str/L:	N/A
Concentration of Asbestos (Amphibole), Str/L:	N/A
Lower 95% Confidence Limit (Chrysotile), Str/L:	N/A
Upper 95% Confidence Limit (Chrysotile), Str/L:	N/A
Lower 95% Confidence Limit (Amphibole), Str/L:	N/A
Upper 95% Confidence Limit (Amphibole), Str/L:	N/A

Analyst: Taylor Smylie

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HDOH Kula Community Air

Sample Number **MFK-AM01-112623-AB**

Air Volume:	7351.344
Effective Filter Area:	385.0 mm^2
Level of Analysis (Chrysotile):	CDQ
Level of Analysis (Amphibole):	ADQ
Magnification Used for Fiber Counting:	20,000
Aspect Ratio for Fiber Definition:	5:1
Mean Dimension of Grid Openings (GOs):	0.0132 mm^2
Initials of Analyst:	TS
Number of GO’s Examined:	10
Analytical Sensitivity: f/Liter:	0.39675
Analytical Sensitivity: f/cm3:	0.00040
Number of primary asbestos structures:	0
Number of asbestos structures counted:	0
Number of asbestos structures > 5 um :	0
Number of asbestos fibers and bundles > 5 um:	0
Number of PCM equivalent asbestos structures:	0
Number of PCM equivalent asbestos fibers:	0
Concentration of Asbestos (Chrysotile) f/cm3:	<0.00040
Concentration of Asbestos (Amphibole) f/cm3:	<0.00040
Concentration of PCME Asbestos (Chrysotile) f/cm3:	<0.00040
Concentration of Asbestos (Chrysotile), Str/L:	0
Concentration of Asbestos (Amphibole), Str/L:	0
Lower 95% Confidence Limit (Chrysotile), Str/L:	0
Upper 95% Confidence Limit (Chrysotile), Str/L:	1.5
Lower 95% Confidence Limit (Amphibole), Str/L:	0
Upper 95% Confidence Limit (Amphibole), Str/L:	1.5

Analyst: Taylor Smylie

Scott M. Ward, Ph.D. **Lab Director**

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HDOH Kula Community Air

Sample Number **MFK-AM02-112623-AB**

Air Volume:	5769.072
Effective Filter Area:	385.0 mm^2
Level of Analysis (Chrysotile):	CDQ
Level of Analysis (Amphibole):	ADQ
Magnification Used for Fiber Counting:	20,000
Aspect Ratio for Fiber Definition:	5:1
Mean Dimension of Grid Openings (GOs):	0.0132 mm^2
Initials of Analyst:	TS
Number of GO's Examined:	10
Analytical Sensitivity: f/Liter:	0.50557
Analytical Sensitivity: f/cm3:	0.00051
Number of primary asbestos structures:	0
Number of asbestos structures counted:	0
Number of asbestos structures > 5 um :	0
Number of asbestos fibers and bundles > 5 um:	0
Number of PCM equivalent asbestos structures:	0
Number of PCM equivalent asbestos fibers:	0
Concentration of Asbestos (Chrysotile) f/cm3:	<0.00051
Concentration of Asbestos (Amphibole) f/cm3:	<0.00051
Concentration of PCME Asbestos (Chrysotile) f/cm3:	<0.00051
Concentration of Asbestos (Chrysotile), Str/L:	0
Concentration of Asbestos (Amphibole), Str/L:	0
Lower 95% Confidence Limit (Chrysotile), Str/L:	0
Upper 95% Confidence Limit (Chrysotile), Str/L:	1.9
Lower 95% Confidence Limit (Amphibole), Str/L:	0
Upper 95% Confidence Limit (Amphibole), Str/L:	1.9

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HDOH Kula Community Air

Sample Number **MFK-AM03-112623-AB**

Air Volume:	5143.177
Effective Filter Area:	385.0 mm^2
Level of Analysis (Chrysotile):	CDQ
Level of Analysis (Amphibole):	ADQ
Magnification Used for Fiber Counting:	20,000
Aspect Ratio for Fiber Definition:	5:1
Mean Dimension of Grid Openings (GOs):	0.0132 mm^2
Initials of Analyst:	TS
Number of GO’s Examined:	10
Analytical Sensitivity: f/Liter:	0.56709
Analytical Sensitivity: f/cm3:	0.00057
Number of primary asbestos structures:	0
Number of asbestos structures counted:	0
Number of asbestos structures > 5 um :	0
Number of asbestos fibers and bundles > 5 um:	0
Number of PCM equivalent asbestos structures:	0
Number of PCM equivalent asbestos fibers:	0
Concentration of Asbestos (Chrysotile) f/cm3:	<0.00057
Concentration of Asbestos (Amphibole) f/cm3:	<0.00057
Concentration of PCME Asbestos (Chrysotile) f/cm3:	<0.00057
Concentration of Asbestos (Chrysotile), Str/L:	0
Concentration of Asbestos (Amphibole), Str/L:	0
Lower 95% Confidence Limit (Chrysotile), Str/L:	0
Upper 95% Confidence Limit (Chrysotile), Str/L:	2.1
Lower 95% Confidence Limit (Amphibole), Str/L:	0
Upper 95% Confidence Limit (Amphibole), Str/L:	2.1

Analyst: Taylor Smylie

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HDOH Kula Community Air

Sample Number **MFK-FB01-112623-AB**

Air Volume:	0
Effective Filter Area:	385.0 mm^2
Level of Analysis (Chrysotile):	CDQ
Level of Analysis (Amphibole):	ADQ
Magnification Used for Fiber Counting:	20,000
Aspect Ratio for Fiber Definition:	5:1
Mean Dimension of Grid Openings (GOs):	0.0132 mm^2
Initials of Analyst:	TS
Number of GO's Examined:	10
Analytical Sensitivity: f/Liter:	N/A
Analytical Sensitivity: f/cm3:	N/A
Number of primary asbestos structures:	0
Number of asbestos structures counted:	0
Number of asbestos structures > 5 um :	0
Number of asbestos fibers and bundles > 5 um:	0
Number of PCM equivalent asbestos structures:	0
Number of PCM equivalent asbestos fibers:	0
Concentration of Asbestos (Chrysotile) f/cm3:	N/A
Concentration of Asbestos (Amphibole) f/cm3:	N/A
Concentration of PCME Asbestos (Chrysotile) f/cm3:	N/A
Concentration of Asbestos (Chrysotile), Str/L:	N/A
Concentration of Asbestos (Amphibole), Str/L:	N/A
Lower 95% Confidence Limit (Chrysotile), Str/L:	N/A
Upper 95% Confidence Limit (Chrysotile), Str/L:	N/A
Lower 95% Confidence Limit (Amphibole), Str/L:	N/A
Upper 95% Confidence Limit (Amphibole), Str/L:	N/A

Analyst: Taylor Smylie

Scott M. Ward, Ph.D. **Lab Director**

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6110 W. 34th Street, Houston, Texas 77092
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Airborne Asbestos Fiber Analysis by Transmission Electron Microscopy (TEM) ISO 10312 - Ambient Air - Determination of Asbestos Fibers Direct-Transfer Transmission Electron Microscopy Method

Maura McAleese
Tetra Tech- Maui Fire
1999 Harrison St. Ste. 500
Oakland, CA 94612

EJ3 Order #: 3470571
Project #: 1.03286E+12
Receipt Date: 4-Dec-2023
Analysis Date: 7-Dec-2023
Report Date: 7-Dec-2023

HDOH Kula Community Air

Sample Number **MFK-AM01-112723-AB**

Air Volume:	5400.941
Effective Filter Area:	385.0 mm^2
Level of Analysis (Chrysotile):	CDQ
Level of Analysis (Amphibole):	ADQ
Magnification Used for Fiber Counting:	20,000
Aspect Ratio for Fiber Definition:	5:1
Mean Dimension of Grid Openings (GOs):	0.0132 mm^2
Initials of Analyst:	TS
Number of GO's Examined:	10
Analytical Sensitivity: f/Liter:	0.54003
Analytical Sensitivity: f/cm3:	0.00054
Number of primary asbestos structures:	0
Number of asbestos structures counted:	0
Number of asbestos structures > 5 um :	0
Number of asbestos fibers and bundles > 5 um:	0
Number of PCM equivalent asbestos structures:	0
Number of PCM equivalent asbestos fibers:	0
Concentration of Asbestos (Chrysotile) f/cm3:	<0.00054
Concentration of Asbestos (Amphibole) f/cm3:	<0.00054
Concentration of PCME Asbestos (Chrysotile) f/cm3:	<0.00054
Concentration of Asbestos (Chrysotile), Str/L:	0
Concentration of Asbestos (Amphibole), Str/L:	0
Lower 95% Confidence Limit (Chrysotile), Str/L:	0
Upper 95% Confidence Limit (Chrysotile), Str/L:	2
Lower 95% Confidence Limit (Amphibole), Str/L:	0
Upper 95% Confidence Limit (Amphibole), Str/L:	2

Analyst: Taylor Smylie

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Report Date: 7-Dec-2023

HDOH Kula Community Air

Sample Number **MFK-AM02-112723-AB**

Air Volume:	5889.811
Effective Filter Area:	385.0 mm^2
Level of Analysis (Chrysotile):	CDQ
Level of Analysis (Amphibole):	ADQ
Magnification Used for Fiber Counting:	20,000
Aspect Ratio for Fiber Definition:	5:1
Mean Dimension of Grid Openings (GOs):	0.0132 mm^2
Initials of Analyst:	TS
Number of GO's Examined:	10
Analytical Sensitivity: f/Liter:	0.49521
Analytical Sensitivity: f/cm3:	0.00050
Number of primary asbestos structures:	0
Number of asbestos structures counted:	0
Number of asbestos structures > 5 um :	0
Number of asbestos fibers and bundles > 5 um:	0
Number of PCM equivalent asbestos structures:	0
Number of PCM equivalent asbestos fibers:	0
Concentration of Asbestos (Chrysotile) f/cm3:	<0.00050
Concentration of Asbestos (Amphibole) f/cm3:	<0.00050
Concentration of PCME Asbestos (Chrysotile) f/cm3:	<0.00050
Concentration of Asbestos (Chrysotile), Str/L:	0
Concentration of Asbestos (Amphibole), Str/L:	0
Lower 95% Confidence Limit (Chrysotile), Str/L:	0
Upper 95% Confidence Limit (Chrysotile), Str/L:	1.8
Lower 95% Confidence Limit (Amphibole), Str/L:	0
Upper 95% Confidence Limit (Amphibole), Str/L:	1.8

Analyst: Taylor Smylie

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Report Date: 7-Dec-2023

HDOH Kula Community Air

Sample Number **MFK-FB01-112723-AB**

Air Volume:	0
Effective Filter Area:	385.0 mm^2
Level of Analysis (Chrysotile):	CDQ
Level of Analysis (Amphibole):	ADQ
Magnification Used for Fiber Counting:	20,000
Aspect Ratio for Fiber Definition:	5:1
Mean Dimension of Grid Openings (GOs):	0.0132 mm^2
Initials of Analyst:	TS
Number of GO's Examined:	10
Analytical Sensitivity: f/Liter:	N/A
Analytical Sensitivity: f/cm3:	N/A
Number of primary asbestos structures:	0
Number of asbestos structures counted:	0
Number of asbestos structures > 5 um :	0
Number of asbestos fibers and bundles > 5 um:	0
Number of PCM equivalent asbestos structures:	0
Number of PCM equivalent asbestos fibers:	0
Concentration of Asbestos (Chrysotile) f/cm3:	N/A
Concentration of Asbestos (Amphibole) f/cm3:	N/A
Concentration of PCME Asbestos (Chrysotile) f/cm3:	N/A
Concentration of Asbestos (Chrysotile), Str/L:	N/A
Concentration of Asbestos (Amphibole), Str/L:	N/A
Lower 95% Confidence Limit (Chrysotile), Str/L:	N/A
Upper 95% Confidence Limit (Chrysotile), Str/L:	N/A
Lower 95% Confidence Limit (Amphibole), Str/L:	N/A
Upper 95% Confidence Limit (Amphibole), Str/L:	N/A

Analyst: Taylor Smylie

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Report Date: 7-Dec-2023

HDOH Kula Community Air

Sample Number **MFK-AM01-112823-AB**

Air Volume:	4811.299
Effective Filter Area:	385.0 mm^2
Level of Analysis (Chrysotile):	CDQ
Level of Analysis (Amphibole):	ADQ
Magnification Used for Fiber Counting:	20,000
Aspect Ratio for Fiber Definition:	5:1
Mean Dimension of Grid Openings (GOs):	0.0132 mm^2
Initials of Analyst:	TS
Number of GO's Examined:	10
Analytical Sensitivity: f/Liter:	0.60621
Analytical Sensitivity: f/cm3:	0.00061
Number of primary asbestos structures:	0
Number of asbestos structures counted:	0
Number of asbestos structures > 5 um :	0
Number of asbestos fibers and bundles > 5 um:	0
Number of PCM equivalent asbestos structures:	0
Number of PCM equivalent asbestos fibers:	0
Concentration of Asbestos (Chrysotile) f/cm3:	<0.00061
Concentration of Asbestos (Amphibole) f/cm3:	<0.00061
Concentration of PCME Asbestos (Chrysotile) f/cm3:	<0.00061
Concentration of Asbestos (Chrysotile), Str/L:	0
Concentration of Asbestos (Amphibole), Str/L:	0
Lower 95% Confidence Limit (Chrysotile), Str/L:	0
Upper 95% Confidence Limit (Chrysotile), Str/L:	2.2
Lower 95% Confidence Limit (Amphibole), Str/L:	0
Upper 95% Confidence Limit (Amphibole), Str/L:	2.2

Analyst: Taylor Smylie

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HDOH Kula Community Air

Sample Number **MFK-AM02-112823-AB**

Air Volume:	5823.046
Effective Filter Area:	385.0 mm^2
Level of Analysis (Chrysotile):	CDQ
Level of Analysis (Amphibole):	ADQ
Magnification Used for Fiber Counting:	20,000
Aspect Ratio for Fiber Definition:	5:1
Mean Dimension of Grid Openings (GOs):	0.0132 mm^2
Initials of Analyst:	TS
Number of GO's Examined:	10
Analytical Sensitivity: f/Liter:	0.50088
Analytical Sensitivity: f/cm3:	0.00050
Number of primary asbestos structures:	0
Number of asbestos structures counted:	0
Number of asbestos structures > 5 um :	0
Number of asbestos fibers and bundles > 5 um:	0
Number of PCM equivalent asbestos structures:	0
Number of PCM equivalent asbestos fibers:	0
Concentration of Asbestos (Chrysotile) f/cm3:	<0.00050
Concentration of Asbestos (Amphibole) f/cm3:	<0.00050
Concentration of PCME Asbestos (Chrysotile) f/cm3:	<0.00050
Concentration of Asbestos (Chrysotile), Str/L:	0
Concentration of Asbestos (Amphibole), Str/L:	0
Lower 95% Confidence Limit (Chrysotile), Str/L:	0
Upper 95% Confidence Limit (Chrysotile), Str/L:	1.8
Lower 95% Confidence Limit (Amphibole), Str/L:	0
Upper 95% Confidence Limit (Amphibole), Str/L:	1.8

Analyst: Taylor Smylie

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HDOH Kula Community Air

Sample Number **MFK-AM03-112823-AB**

Air Volume:	6850.368
Effective Filter Area:	385.0 mm^2
Level of Analysis (Chrysotile):	CDQ
Level of Analysis (Amphibole):	ADQ
Magnification Used for Fiber Counting:	20,000
Aspect Ratio for Fiber Definition:	5:1
Mean Dimension of Grid Openings (GOs):	0.0132 mm^2
Initials of Analyst:	TS
Number of GO's Examined:	10
Analytical Sensitivity: f/Liter:	0.42577
Analytical Sensitivity: f/cm3:	0.00043
Number of primary asbestos structures:	0
Number of asbestos structures counted:	0
Number of asbestos structures > 5 um :	0
Number of asbestos fibers and bundles > 5 um:	0
Number of PCM equivalent asbestos structures:	0
Number of PCM equivalent asbestos fibers:	0
Concentration of Asbestos (Chrysotile) f/cm3:	<0.00043
Concentration of Asbestos (Amphibole) f/cm3:	<0.00043
Concentration of PCME Asbestos (Chrysotile) f/cm3:	<0.00043
Concentration of Asbestos (Chrysotile), Str/L:	0
Concentration of Asbestos (Amphibole), Str/L:	0
Lower 95% Confidence Limit (Chrysotile), Str/L:	0
Upper 95% Confidence Limit (Chrysotile), Str/L:	1.6
Lower 95% Confidence Limit (Amphibole), Str/L:	0
Upper 95% Confidence Limit (Amphibole), Str/L:	1.6

Analyst: Taylor Smylie

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HDOH Kula Community Air

Sample Number **MFK-FB01-112823-AB**

Air Volume:	0
Effective Filter Area:	385.0 mm^2
Level of Analysis (Chrysotile):	CDQ
Level of Analysis (Amphibole):	ADQ
Magnification Used for Fiber Counting:	20,000
Aspect Ratio for Fiber Definition:	5:1
Mean Dimension of Grid Openings (GOs):	0.0132 mm^2
Initials of Analyst:	TS
Number of GO’s Examined:	10
Analytical Sensitivity: f/Liter:	N/A
Analytical Sensitivity: f/cm3:	N/A
Number of primary asbestos structures:	0
Number of asbestos structures counted:	0
Number of asbestos structures > 5 um :	0
Number of asbestos fibers and bundles > 5 um:	0
Number of PCM equivalent asbestos structures:	0
Number of PCM equivalent asbestos fibers:	0
Concentration of Asbestos (Chrysotile) f/cm3:	N/A
Concentration of Asbestos (Amphibole) f/cm3:	N/A
Concentration of PCME Asbestos (Chrysotile) f/cm3:	N/A
Concentration of Asbestos (Chrysotile), Str/L:	N/A
Concentration of Asbestos (Amphibole), Str/L:	N/A
Lower 95% Confidence Limit (Chrysotile), Str/L:	N/A
Upper 95% Confidence Limit (Chrysotile), Str/L:	N/A
Lower 95% Confidence Limit (Amphibole), Str/L:	N/A
Upper 95% Confidence Limit (Amphibole), Str/L:	N/A

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HDOH Kula Community Air

Sample Number **MFK-AM01-112923-AB**

Air Volume:	6711.485
Effective Filter Area:	385.0 mm^2
Level of Analysis (Chrysotile):	CDQ
Level of Analysis (Amphibole):	ADQ
Magnification Used for Fiber Counting:	20,000
Aspect Ratio for Fiber Definition:	5:1
Mean Dimension of Grid Openings (GOs):	0.0132 mm^2
Initials of Analyst:	TS
Number of GO's Examined:	10
Analytical Sensitivity: f/Liter:	0.43458
Analytical Sensitivity: f/cm3:	0.00043
Number of primary asbestos structures:	0
Number of asbestos structures counted:	0
Number of asbestos structures > 5 um :	0
Number of asbestos fibers and bundles > 5 um:	0
Number of PCM equivalent asbestos structures:	0
Number of PCM equivalent asbestos fibers:	0
Concentration of Asbestos (Chrysotile) f/cm3:	<0.00043
Concentration of Asbestos (Amphibole) f/cm3:	<0.00043
Concentration of PCME Asbestos (Chrysotile) f/cm3:	<0.00043
Concentration of Asbestos (Chrysotile), Str/L:	0
Concentration of Asbestos (Amphibole), Str/L:	0
Lower 95% Confidence Limit (Chrysotile), Str/L:	0
Upper 95% Confidence Limit (Chrysotile), Str/L:	1.6
Lower 95% Confidence Limit (Amphibole), Str/L:	0
Upper 95% Confidence Limit (Amphibole), Str/L:	1.6

Analyst: Taylor Smylie

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HDOH Kula Community Air

Sample Number **MFK-AM02-112923-AB**

Air Volume:	6355.2
Effective Filter Area:	385.0 mm^2
Level of Analysis (Chrysotile):	CDQ
Level of Analysis (Amphibole):	ADQ
Magnification Used for Fiber Counting:	20,000
Aspect Ratio for Fiber Definition:	5:1
Mean Dimension of Grid Openings (GOs):	0.0132 mm^2
Initials of Analyst:	AP
Number of GO's Examined:	10
Analytical Sensitivity: f/Liter:	0.45894
Analytical Sensitivity: f/cm3:	0.00046
Number of primary asbestos structures:	0
Number of asbestos structures counted:	0
Number of asbestos structures > 5 um :	0
Number of asbestos fibers and bundles > 5 um:	0
Number of PCM equivalent asbestos structures:	0
Number of PCM equivalent asbestos fibers:	0
Concentration of Asbestos (Chrysotile) f/cm3:	<0.00046
Concentration of Asbestos (Amphibole) f/cm3:	<0.00046
Concentration of PCME Asbestos (Chrysotile) f/cm3:	<0.00046
Concentration of Asbestos (Chrysotile), Str/L:	0
Concentration of Asbestos (Amphibole), Str/L:	0
Lower 95% Confidence Limit (Chrysotile), Str/L:	0
Upper 95% Confidence Limit (Chrysotile), Str/L:	1.7
Lower 95% Confidence Limit (Amphibole), Str/L:	0
Upper 95% Confidence Limit (Amphibole), Str/L:	1.7

Analyst: Anh Phung

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HDOH Kula Community Air

Sample Number **MFK-AM03-112923-AB**

Air Volume:	5176.51
Effective Filter Area:	385.0 mm^2
Level of Analysis (Chrysotile):	CDQ
Level of Analysis (Amphibole):	ADQ
Magnification Used for Fiber Counting:	20,000
Aspect Ratio for Fiber Definition:	5:1
Mean Dimension of Grid Openings (GOs):	0.0132 mm^2
Initials of Analyst:	AP
Number of GO's Examined:	10
Analytical Sensitivity: f/Liter:	0.56344
Analytical Sensitivity: f/cm3:	0.00056
Number of primary asbestos structures:	0
Number of asbestos structures counted:	0
Number of asbestos structures > 5 um :	0
Number of asbestos fibers and bundles > 5 um:	0
Number of PCM equivalent asbestos structures:	0
Number of PCM equivalent asbestos fibers:	0
Concentration of Asbestos (Chrysotile) f/cm3:	<0.00056
Concentration of Asbestos (Amphibole) f/cm3:	<0.00056
Concentration of PCME Asbestos (Chrysotile) f/cm3:	<0.00056
Concentration of Asbestos (Chrysotile), Str/L:	0
Concentration of Asbestos (Amphibole), Str/L:	0
Lower 95% Confidence Limit (Chrysotile), Str/L:	0
Upper 95% Confidence Limit (Chrysotile), Str/L:	2.1
Lower 95% Confidence Limit (Amphibole), Str/L:	0
Upper 95% Confidence Limit (Amphibole), Str/L:	2.1

Analyst: Anh Phung

Scott M. Ward, Ph.D. **Lab Director**

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NVLAP Lab Code: 200525-0; TDSHS License: 30-0273

Eurofins J3 Resources, Inc.
6110 W. 34th Street, Houston, Texas 77092
Phone: (713) 290-0221 Fax: (713) 290-0248
j3resources.com

Airborne Asbestos Fiber Analysis by Transmission Electron Microscopy (TEM) ISO 10312 - Ambient Air - Determination of Asbestos Fibers Direct-Transfer Transmission Electron Microscopy Method

Maura McAleese
Tetra Tech- Maui Fire
1999 Harrison St. Ste. 500
Oakland, CA 94612

EJ3 Order #: 3470571
Project #: 1.03286E+12
Receipt Date: 4-Dec-2023
Analysis Date: 7-Dec-2023
Report Date: 7-Dec-2023

HDOH Kula Community Air

Sample Number **MFK-FB01-112923-AB**

Air Volume:	0
Effective Filter Area:	385.0 mm^2
Level of Analysis (Chrysotile):	CDQ
Level of Analysis (Amphibole):	ADQ
Magnification Used for Fiber Counting:	20,000
Aspect Ratio for Fiber Definition:	5:1
Mean Dimension of Grid Openings (GOs):	0.0132 mm^2
Initials of Analyst:	AP
Number of GO's Examined:	10
Analytical Sensitivity: f/Liter:	N/A
Analytical Sensitivity: f/cm3:	N/A
Number of primary asbestos structures:	0
Number of asbestos structures counted:	0
Number of asbestos structures > 5 um :	0
Number of asbestos fibers and bundles > 5 um:	0
Number of PCM equivalent asbestos structures:	0
Number of PCM equivalent asbestos fibers:	0
Concentration of Asbestos (Chrysotile) f/cm3:	N/A
Concentration of Asbestos (Amphibole) f/cm3:	N/A
Concentration of PCME Asbestos (Chrysotile) f/cm3:	N/A
Concentration of Asbestos (Chrysotile), Str/L:	N/A
Concentration of Asbestos (Amphibole), Str/L:	N/A
Lower 95% Confidence Limit (Chrysotile), Str/L:	N/A
Upper 95% Confidence Limit (Chrysotile), Str/L:	N/A
Lower 95% Confidence Limit (Amphibole), Str/L:	N/A
Upper 95% Confidence Limit (Amphibole), Str/L:	N/A

Analyst: Anh Phung

Scott M. Ward, Ph.D. **Lab Director**

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NVLAP Lab Code: 200525-0; TDSHS License: 30-0273

Eastern Research Group
601 Keystone Park Drive
Suite 700
Morrisville, NC 27560

December 04, 2023

Ms. Chelsea Saber
Tetra Tech, Inc.
1777 Sentry Pkwy, Bldg 12
Blue Bell, PA 19422
Project Name: Maui fires

Dear Ms. Chelsea Saber,

This report contains the analytical results for the sample(s) received under chain(s) of custody by Eastern Research Group on 11/27/23 11:25.

Values below the MDL for QC results in this report are recorded as ND, however the actual values are reported in the accompanying Excel report with a "U" flag (Under the detection limit). The actual values are reported in AQS.

This test is accredited under the 2016 TNI Standard for Environmental Laboratories (FL DOH Certification # E87673). All analyses were performed as described in the US EPA-approved QAPP, under the contract for National Hazardous Air Pollutant Support (US EPA Contract No. 68HERH22D0002). This cover page is an integral part of this report, and any exceptions or comments are noted on the last page.

Release of the data contained in this data package and in the data submitted in the electronic data deliverable, has been authorized by the Program Manager, or the Program Manager's designee as verified by the following signature.

The issuance of the final Certificate of Analysis takes precedence over any previous Report. If you have any questions, please contact me at 919-468-7924.

Sincerely,

Julie Swift
Program Manager
julie.swift@erg.com

The information contained in this report and its attachment(s) are intended only for the use of the individual to whom it is addressed and may contain information that is privileged, confidential, or exempt from disclosure. If the reader of this message is not the intended recipient, you are hereby notified that any dissemination, distribution, or copying of this report is strictly prohibited. If you have received this report in error, please notify julie.swift@erg.com and delete the report without retaining any copies.

CERTIFICATE OF ANALYSIS

Tetra Tech, Inc.
1777 Sentry Pkwy, Bldg 12
Blue Bell, PA 19422
ATTN: Ms. Chelsea Saber
PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 12/04/23 11:41
SUBMITTED: 11/27/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9541288 **Lab ID:** 3112737-13 **Sampled:** 11/23/23 23:59
Matrix: Air **Sample Volume:** 2038.818 m³ **Received:** 11/27/23 11:25
Filter ID: **Analysis Date:** 12/01/23 01:17
Comments: MFK-AM01-112323-HM

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	**7429-90-5**	**226**	ICS-01, LK	**25.6**
Antimony	**7440-36-0**	**0.0869**	SL	**0.0352**
Arsenic	**7440-38-2**	**0.155**		**0.00762**
Barium	**7440-39-3**	**3.74**		**0.757**
Beryllium	**7440-41-7**	**0.00838**		**0.00265**
Cadmium	7440-43-9	0.00665	U	0.0870
Calcium	**7440-70-2**	**318**	LJ, QB-01	**233**
Chromium	7440-47-3	1.56	U	1.62
Cobalt	**7440-48-4**	**0.163**	QB-01	**0.0124**
Copper	**7440-50-8**	**17.4**		**2.39**
Iron	**7439-89-6**	**268**	GC-BS	**19.3**
Lead	**7439-92-1**	**0.232**		**0.220**
Magnesium	**7439-95-4**	**216**	ICS-01, LK	**76.9**
Manganese	**7439-96-5**	**7.06**		**0.950**
Molybdenum	**7439-98-7**	**1.25**	QB-01	**0.170**
Nickel	**7440-02-0**	**1.04**		**0.639**
Phosphorus	7723-14-0	332	GC-BS, ICS-01, LK, QX, U	998
Potassium	**7440-09-7**	**115**	ICS-01, LK	**30.3**
Rubidium		**0.125**		**0.0146**
Selenium	**7782-49-2**	**0.144**	LJ, QX	**0.00878**
Sodium	**7440-23-5**	**1980**	E, ICS-01, LK	**1600**
Strontium	**7440-24-6**	**2.65**	QB-01	**0.520**
Thallium	**7440-28-0**	**6.70E-4**		**4.01E-4**
Thorium	**7440-29-01**	**0.00679**		**0.00239**
Uranium	NA	0.00622	U	0.0136
Vanadium	**7440-62-2**	**1.89**		**0.0393**
Zinc	7440-66-6	9.10	U	78.0

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Blue Bell, PA 19422
ATTN: Ms. Chelsea Saber
PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 12/04/23 11:41
SUBMITTED: 11/27/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9541287 **Lab ID:** 3112737-14 **Sampled:** 11/23/23 23:59
Matrix: Air **Sample Volume:** 2026.064 m³ **Received:** 11/27/23 11:25
Filter ID: **Analysis Date:** 12/01/23 01:31
Comments: MFK-AM02-112323-HM

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	**7429-90-5**	**267**	ICS-01, LK	**25.8**
Antimony	**7440-36-0**	**0.0803**	SL	**0.0354**
Arsenic	**7440-38-2**	**0.174**		**0.00767**
Barium	**7440-39-3**	**4.00**		**0.761**
Beryllium	**7440-41-7**	**0.0105**		**0.00267**
Cadmium	7440-43-9	0.0111	U	0.0875
Calcium	**7440-70-2**	**332**	LJ, QB-01	**234**
Chromium	7440-47-3	1.44	U	1.63
Cobalt	**7440-48-4**	**0.182**	QB-01	**0.0125**
Copper	**7440-50-8**	**12.9**		**2.41**
Iron	**7439-89-6**	**317**	GC-BS	**19.4**
Lead	7439-92-1	0.219	U	0.222
Magnesium	**7439-95-4**	**217**	ICS-01, LK	**77.4**
Manganese	**7439-96-5**	**8.14**		**0.956**
Molybdenum	**7439-98-7**	**1.01**	QB-01	**0.171**
Nickel	**7440-02-0**	**0.940**		**0.643**
Phosphorus	7723-14-0	326	GC-BS, ICS-01, LK, QX, U	1000
Potassium	**7440-09-7**	**124**	ICS-01, LK	**30.5**
Rubidium		**0.154**		**0.0147**
Selenium	**7782-49-2**	**0.192**	LJ, QX	**0.00883**
Sodium	**7440-23-5**	**2000**	E, ICS-01, LK	**1610**
Strontium	**7440-24-6**	**3.22**	QB-01	**0.524**
Thallium	**7440-28-0**	**0.00146**		**4.04E-4**
Thorium	**7440-29-01**	**0.00917**		**0.00241**
Uranium	NA	0.00727	U	0.0137
Vanadium	**7440-62-2**	**1.88**		**0.0395**
Zinc	7440-66-6	8.40	U	78.5

Eastern Research Group

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Blue Bell, PA 19422
ATTN: Ms. Chelsea Saber
PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 12/04/23 11:41
SUBMITTED: 11/27/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9541284 **Lab ID:** 3112737-15 **Sampled:** 11/23/23 23:59
Matrix: Air **Sample Volume:** 1882.131 m³ **Received:** 11/27/23 11:25
Filter ID: **Analysis Date:** 12/01/23 01:45
Comments: MFK-AM03-112323-HM

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	**7429-90-5**	**192**	ICS-01, LK	**27.7**
Antimony	**7440-36-0**	**0.0883**	SL	**0.0381**
Arsenic	**7440-38-2**	**0.123**		**0.00826**
Barium	**7440-39-3**	**4.59**		**0.819**
Beryllium	**7440-41-7**	**0.00908**		**0.00287**
Cadmium	7440-43-9	0.00781	U	0.0942
Calcium	**7440-70-2**	**333**	LJ, QB-01	**252**
Chromium	7440-47-3	1.57	U	1.75
Cobalt	**7440-48-4**	**0.205**	QB-01	**0.0135**
Copper	**7440-50-8**	**41.8**		**2.59**
Iron	**7439-89-6**	**274**	GC-BS	**20.9**
Lead	7439-92-1	0.179	U	0.239
Magnesium	**7439-95-4**	**257**	ICS-01, LK	**83.3**
Manganese	**7439-96-5**	**7.82**		**1.03**
Molybdenum	**7439-98-7**	**1.38**	QB-01	**0.184**
Nickel	**7440-02-0**	**0.950**		**0.692**
Phosphorus	7723-14-0	346	LK, QX, GC-BS, ICS-01, U	1080
Potassium	**7440-09-7**	**119**	ICS-01, LK	**32.8**
Rubidium		**0.136**		**0.0158**
Selenium	**7782-49-2**	**0.153**	LJ, QX	**0.00951**
Sodium	**7440-23-5**	**2230**	E, ICS-01, LK	**1730**
Strontium	**7440-24-6**	**2.66**	QB-01	**0.564**
Thallium	**7440-28-0**	**7.76E-4**		**4.35E-4**
Thorium	**7440-29-01**	**0.00753**		**0.00259**
Uranium	NA	0.00665	U	0.0147
Vanadium	**7440-62-2**	**1.80**		**0.0425**
Zinc	7440-66-6	9.19	U	84.5

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Blue Bell, PA 19422
ATTN: Ms. Chelsea Saber
PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 12/04/23 11:41
SUBMITTED: 11/27/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9541913 FB
Lab ID: 3112737-16
Sampled: 11/23/23 00:00
Matrix: Air
Sample Volume: 2038.818 m³
Received: 11/27/23 11:25
Filter ID:
Analysis Date: 12/01/23 02:00
Comments: Field Blank - MFK-FB01-112323-HM

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	7429-90-5	10.4	ICS-01, LK, U	25.6
Antimony	7440-36-0	0.00731	SL, U	0.0352
Arsenic	7440-38-2	0.00386	U	0.00762
Barium	7440-39-3	0.583	U	0.757
Beryllium	7440-41-7	9.66E-4	U	0.00265
Cadmium	7440-43-9	0.00184	U	0.0870
Calcium	**7440-70-2**	**337**	FB-01, LJ, QB-01	**233**
Chromium	7440-47-3	1.50	U	1.62
Cobalt	**7440-48-4**	**0.0331**	FB-01, QB-01	**0.0124**
Copper	7440-50-8	0.388	U	2.39
Iron	7439-89-6	13.5	GC-BS, U	19.3
Lead	7439-92-1	0.0516	U	0.220
Magnesium	7439-95-4	43.6	ICS-01, LK, U	76.9
Manganese	7439-96-5	0.166	U	0.950
Molybdenum	**7439-98-7**	**0.247**	FB-01, QB-01	**0.170**
Nickel	7440-02-0	0.270	U	0.639
Phosphorus	7723-14-0	336	GC-BS, ICS-01, LK, QX, U	998
Potassium	**7440-09-7**	**37.6**	FB-01, ICS-01, LK	**30.3**
Rubidium		**0.0156**	FB-01	**0.0146**
Selenium	7782-49-2	0.00169	LJ, QX, U	0.00878
Sodium	7440-23-5	726	ICS-01, LK, U	1600
Strontium	**7440-24-6**	**0.693**	FB-01, QB-01	**0.520**
Thallium	7440-28-0	5.36E-5	U	4.01E-4
Thorium	7440-29-01	0.00235	U	0.00239
Uranium	NA	0.00169	U	0.0136
Vanadium	7440-62-2	0.0175	U	0.0393
Zinc	7440-66-6	3.80	U	78.0

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Tetra Tech, Inc.
1777 Sentry Pkwy, Bldg 12
Blue Bell, PA 19422
ATTN: Ms. Chelsea Saber
PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 12/04/23 11:41
SUBMITTED: 11/27/23
AQS SITE CODE:
SITE CODE: Maui fires

Inorganics by Compendium Method IO-3.5 - Quality Control

Batch 2311075 - B3K2906

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Calibration Blank (2311075-CCB1)				Prepared & Analyzed: 11/30/23						
Aluminum	129		ng/l							
Antimony	0.882		ng/l							
Arsenic	5.57		ng/l							
Barium	1.18		ng/l							
Beryllium	0.635		ng/l							
Cadmium	0.196		ng/l							
Calcium	613		ng/l							
Chromium	6.32		ng/l							
Cobalt	0.487		ng/l							
Copper	23.7		ng/l							
Iron	113		ng/l							
Lead	6.51		ng/l							
Magnesium	22.5		ng/l							
Manganese	5.79		ng/l							
Molybdenum	20.1		ng/l							
Nickel	-3.14		ng/l							U
Phosphorus	213		ng/l							QX
Potassium	2710		ng/l							
Rubidium	1.06		ng/l							
Selenium	-6.78		ng/l							LJ, QX, U
Sodium	2830		ng/l							
Strontium	0.319		ng/l							
Thallium	0.445		ng/l							
Thorium	0.770		ng/l							
Uranium	-0.0127		ng/l							U
Vanadium	-24.6		ng/l							U
Zinc	-42.8		ng/l							U
Calibration Blank (2311075-CCB2)				Prepared & Analyzed: 11/30/23						
Aluminum	86.6		ng/l							
Antimony	0.856		ng/l							
Arsenic	0.629		ng/l							
Barium	2.60		ng/l							
Beryllium	0.486		ng/l							
Cadmium	0.598		ng/l							
Calcium	-77.0		ng/l							U
Chromium	6.84		ng/l							
Cobalt	1.06		ng/l							
Copper	49.7		ng/l							

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AQS SITE CODE:
SITE CODE: Maui fires

Inorganics by Compendium Method IO-3.5 - Quality Control

Batch 2311075 - B3K2906

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Calibration Blank (2311075-CCB2) Contin				Prepared & Analyzed: 11/30/23						
Iron	93.0		ng/l							
Lead	12.0		ng/l							
Magnesium	5.21		ng/l							
Manganese	10.7		ng/l							
Molybdenum	9.79		ng/l							
Nickel	2.02		ng/l							
Phosphorus	-60.5		ng/l							QX, U
Potassium	1270		ng/l							
Rubidium	1.04		ng/l							
Selenium	-4.69		ng/l							LJ, QX, U
Sodium	1520		ng/l							
Strontium	0.576		ng/l							
Thallium	0.442		ng/l							
Thorium	0.981		ng/l							
Uranium	0.00347		ng/l							
Vanadium	-26.4		ng/l							U
Zinc	-39.0		ng/l							U
Calibration Blank (2311075-CCB3)				Prepared: 11/30/23 Analyzed: 12/01/23						
Aluminum	64.2		ng/l							
Antimony	0.875		ng/l							
Arsenic	2.26		ng/l							
Barium	1.44		ng/l							
Beryllium	-0.363		ng/l							U
Cadmium	0.455		ng/l							
Calcium	-28.7		ng/l							U
Chromium	3.82		ng/l							
Cobalt	0.621		ng/l							
Copper	31.5		ng/l							
Iron	47.1		ng/l							
Lead	8.50		ng/l							
Magnesium	21.4		ng/l							
Manganese	4.79		ng/l							
Molybdenum	10.4		ng/l							
Nickel	-0.196		ng/l							U
Phosphorus	264		ng/l							QX
Potassium	1060		ng/l							
Rubidium	1.07		ng/l							
Selenium	-6.78		ng/l							LJ, QX, U

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FILE #: 0000.00
REPORTED: 12/04/23 11:41
SUBMITTED: 11/27/23
AQS SITE CODE:
SITE CODE: Maui fires

Inorganics by Compendium Method IO-3.5 - Quality Control

Batch 2311075 - B3K2906

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Calibration Blank (2311075-CCB3) Contin				Prepared: 11/30/23 Analyzed: 12/01/23						
Sodium	1980		ng/l							
Strontium	-0.192		ng/l							U
Thallium	0.350		ng/l							
Thorium	0.469		ng/l							
Uranium	0.0232		ng/l							
Vanadium	-25.5		ng/l							U
Zinc	-38.7		ng/l							U
Calibration Blank (2311075-CCB4)				Prepared: 11/30/23 Analyzed: 12/01/23						
Aluminum	96.0		ng/l							
Antimony	1.22		ng/l							
Arsenic	7.55		ng/l							
Barium	2.61		ng/l							
Beryllium	-0.0913		ng/l							U
Cadmium	0.384		ng/l							
Calcium	-143		ng/l							U
Chromium	3.91		ng/l							
Cobalt	0.723		ng/l							
Copper	34.2		ng/l							
Iron	80.9		ng/l							
Lead	7.77		ng/l							
Magnesium	6.59		ng/l							
Manganese	6.16		ng/l							
Molybdenum	9.21		ng/l							
Nickel	1.66		ng/l							
Phosphorus	-185		ng/l							QX, U
Potassium	973		ng/l							
Rubidium	0.0776		ng/l							
Selenium	-3.34		ng/l							LJ, QX, U
Sodium	3490		ng/l							
Strontium	-1.23		ng/l							U
Thallium	0.366		ng/l							
Thorium	0.767		ng/l							
Uranium	-0.00956		ng/l							U
Vanadium	-25.2		ng/l							U
Zinc	-29.0		ng/l							U
Calibration Check (2311075-CCV1)				Prepared & Analyzed: 11/30/23						
Aluminum	1.61E6		ng/l	1.5000E6		107	90-110			
Antimony	20000		ng/l	20000		100	90-110			

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AQS SITE CODE:
SITE CODE: Maui fires

Inorganics by Compendium Method IO-3.5 - Quality Control

Batch 2311075 - B3K2906

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Calibration Check (2311075-CCV1) Contin				Prepared & Analyzed: 11/30/23						
Arsenic	20100		ng/l	20000		100	90-110			
Barium	200000		ng/l	200000		99.9	90-110			
Beryllium	5090		ng/l	5000.0		102	90-110			
Cadmium	20400		ng/l	20000		102	90-110			
Calcium	2.54E7		ng/l	2.5000E7		102	90-110			
Chromium	235000		ng/l	240000		98.1	90-110			
Cobalt	53000		ng/l	50000		106	90-110			
Copper	2.09E6		ng/l	2.0000E6		104	90-110			
Iron	2.62E6		ng/l	2.5000E6		105	90-110			
Lead	200000		ng/l	200000		100	90-110			
Magnesium	1.09E6		ng/l	1.0000E6		109	90-110			
Manganese	520000		ng/l	500000		104	90-110			
Molybdenum	50800		ng/l	50000		102	90-110			
Nickel	126000		ng/l	120000		105	90-110			
Phosphorus	205000		ng/l	200000		102	90-110			QX
Potassium	2.61E6		ng/l	2.5000E6		105	90-110			
Rubidium	10000		ng/l	10000		100	90-110			
Selenium	20000		ng/l	20000		100	90-110			LJ, QX
Sodium	2.74E6		ng/l	2.5000E6		110	90-110			
Strontium	49900		ng/l	50000		99.8	90-110			
Thallium	505		ng/l	500.00		101	90-110			
Thorium	504		ng/l	500.00		101	90-110			
Uranium	502		ng/l	500.00		100	90-110			
Vanadium	20100		ng/l	20000		100	90-110			
Zinc	534000		ng/l	500000		107	90-110			
Calibration Check (2311075-CCV2)				Prepared & Analyzed: 11/30/23						
Aluminum	1.46E6		ng/l	1.5000E6		97.0	90-110			
Antimony	20000		ng/l	20000		100	90-110			
Arsenic	19900		ng/l	20000		99.6	90-110			
Barium	202000		ng/l	200000		101	90-110			
Beryllium	5480		ng/l	5000.0		110	90-110			
Cadmium	20400		ng/l	20000		102	90-110			
Calcium	2.47E7		ng/l	2.5000E7		98.8	90-110			
Chromium	241000		ng/l	240000		100	90-110			
Cobalt	51200		ng/l	50000		102	90-110			
Copper	2.05E6		ng/l	2.0000E6		103	90-110			
Iron	2.48E6		ng/l	2.5000E6		99.3	90-110			
Lead	200000		ng/l	200000		99.8	90-110			

CERTIFICATE OF ANALYSIS

Tetra Tech, Inc.
1777 Sentry Pkwy, Bldg 12
Blue Bell, PA 19422
ATTN: Ms. Chelsea Saber
PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 12/04/23 11:41
SUBMITTED: 11/27/23
AQS SITE CODE:
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Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes

Inorganics by Compendium Method IO-3.5 - Quality Control

Batch 2311075 - B3K2906

Calibration Check (2311075-CCV2) Contin — Prepared & Analyzed: 11/30/23

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Magnesium	1.01E6		ng/l	1.0000E6		101	90-110			
Manganese	491000		ng/l	500000		98.2	90-110			
Molybdenum	51400		ng/l	50000		103	90-110			
Nickel	122000		ng/l	120000		102	90-110			
Phosphorus	191000		ng/l	200000		95.6	90-110			QX
Potassium	2.47E6		ng/l	2.5000E6		98.8	90-110			
Rubidium	9860		ng/l	10000		98.6	90-110			
Selenium	19700		ng/l	20000		98.4	90-110			LJ, QX
Sodium	2.51E6		ng/l	2.5000E6		101	90-110			
Strontium	49300		ng/l	50000		98.6	90-110			
Thallium	505		ng/l	500.00		101	90-110			
Thorium	503		ng/l	500.00		101	90-110			
Uranium	504		ng/l	500.00		101	90-110			
Vanadium	20300		ng/l	20000		101	90-110			
Zinc	528000		ng/l	500000		106	90-110			

Calibration Check (2311075-CCV3) — Prepared & Analyzed: 11/30/23

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Aluminum	1.50E6		ng/l	1.5000E6		99.7	90-110			
Antimony	20900		ng/l	20000		104	90-110			
Arsenic	20500		ng/l	20000		103	90-110			
Barium	209000		ng/l	200000		104	90-110			
Beryllium	4950		ng/l	5000.0		99.0	90-110			
Cadmium	21400		ng/l	20000		107	90-110			
Calcium	2.56E7		ng/l	2.5000E7		102	90-110			
Chromium	254000		ng/l	240000		106	90-110			
Cobalt	52600		ng/l	50000		105	90-110			
Copper	2.12E6		ng/l	2.0000E6		106	90-110			
Iron	2.57E6		ng/l	2.5000E6		103	90-110			
Lead	208000		ng/l	200000		104	90-110			
Magnesium	1.03E6		ng/l	1.0000E6		103	90-110			
Manganese	508000		ng/l	500000		102	90-110			
Molybdenum	54300		ng/l	50000		109	90-110			
Nickel	126000		ng/l	120000		105	90-110			
Phosphorus	192000		ng/l	200000		96.0	90-110			QX
Potassium	2.49E6		ng/l	2.5000E6		99.6	90-110			
Rubidium	10200		ng/l	10000		102	90-110			
Selenium	20500		ng/l	20000		102	90-110			LJ, QX
Sodium	2.55E6		ng/l	2.5000E6		102	90-110			
Strontium	51700		ng/l	50000		103	90-110			

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Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes

Inorganics by Compendium Method IO-3.5 - Quality Control

Batch 2311075 - B3K2906

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Calibration Check (2311075-CCV3) Contin				Prepared & Analyzed: 11/30/23						
Thallium	517		ng/l	500.00		103	90-110			
Thorium	522		ng/l	500.00		104	90-110			
Uranium	525		ng/l	500.00		105	90-110			
Vanadium	21300		ng/l	20000		106	90-110			
Zinc	543000		ng/l	500000		109	90-110			
Calibration Check (2311075-CCV4)				Prepared: 11/30/23 Analyzed: 12/01/23						
Aluminum	1.49E6		ng/l	1.5000E6		99.0	90-110			
Antimony	20600		ng/l	20000		103	90-110			
Arsenic	20300		ng/l	20000		101	90-110			
Barium	206000		ng/l	200000		103	90-110			
Beryllium	4880		ng/l	5000.0		97.5	90-110			
Cadmium	21100		ng/l	20000		105	90-110			
Calcium	2.51E7		ng/l	2.5000E7		100	90-110			
Chromium	249000		ng/l	240000		104	90-110			
Cobalt	52100		ng/l	50000		104	90-110			
Copper	2.09E6		ng/l	2.0000E6		105	90-110			
Iron	2.55E6		ng/l	2.5000E6		102	90-110			
Lead	206000		ng/l	200000		103	90-110			
Magnesium	1.03E6		ng/l	1.0000E6		103	90-110			
Manganese	507000		ng/l	500000		101	90-110			
Molybdenum	53600		ng/l	50000		107	90-110			
Nickel	124000		ng/l	120000		103	90-110			
Phosphorus	190000		ng/l	200000		95.1	90-110			QX
Potassium	2.49E6		ng/l	2.5000E6		99.7	90-110			
Rubidium	10100		ng/l	10000		101	90-110			
Selenium	20200		ng/l	20000		101	90-110			LJ, QX
Sodium	2.57E6		ng/l	2.5000E6		103	90-110			
Strontium	50800		ng/l	50000		102	90-110			
Thallium	520		ng/l	500.00		104	90-110			
Thorium	519		ng/l	500.00		104	90-110			
Uranium	520		ng/l	500.00		104	90-110			
Vanadium	20800		ng/l	20000		104	90-110			
Zinc	538000		ng/l	500000		108	90-110			
High Cal Check (2311075-HCV1)				Prepared & Analyzed: 11/30/23						
Aluminum	2.99E6		ng/l	3.0000E6		99.8	95-105			
Antimony	40500		ng/l	40000		101	95-105			
Arsenic	40300		ng/l	40000		101	95-105			
Barium	405000		ng/l	400000		101	95-105			

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Inorganics by Compendium Method IO-3.5 - Quality Control

Batch 2311075 - B3K2906

High Cal Check (2311075-HCV1) Continue — Prepared & Analyzed: 11/30/23

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Beryllium	10000		ng/l	10000		100	95-105			
Cadmium	40300		ng/l	40000		101	95-105			
Calcium	5.02E7		ng/l	5.0000E7		100	95-105			
Chromium	482000		ng/l	480000		100	95-105			
Cobalt	99600		ng/l	100000		99.6	95-105			
Copper	3.99E6		ng/l	4.0000E6		99.6	95-105			
Iron	5.01E6		ng/l	5.0000E6		100	95-105			
Lead	404000		ng/l	400000		101	95-105			
Magnesium	2.00E6		ng/l	2.0000E6		100	95-105			
Manganese	998000		ng/l	1.0000E6		99.8	95-105			
Molybdenum	102000		ng/l	100000		102	95-105			
Nickel	238000		ng/l	240000		99.3	95-105			
Phosphorus	407000		ng/l	400000		102	95-105			QX
Potassium	5.12E6		ng/l	5.0000E6		102	95-105			
Rubidium	20400		ng/l	20000		102	95-105			
Selenium	39900		ng/l	40000		99.7	95-105			LJ, QX
Sodium	5.00E6		ng/l	5.0000E6		100	95-105			
Strontium	102000		ng/l	100000		102	95-105			
Thallium	1020		ng/l	1000.0		102	95-105			
Thorium	1020		ng/l	1000.0		102	95-105			
Uranium	1020		ng/l	1000.0		102	95-105			
Vanadium	40300		ng/l	40000		101	95-105			
Zinc	993000		ng/l	1.0000E6		99.3	95-105			

Initial Cal Blank (2311075-ICB1) — Prepared & Analyzed: 11/30/23

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Aluminum	72.1		ng/l							
Antimony	0.969		ng/l							
Arsenic	2.05		ng/l							
Barium	1.73		ng/l							
Beryllium	0.663		ng/l							
Cadmium	0.447		ng/l							
Calcium	51.5		ng/l							
Chromium	4.86		ng/l							
Cobalt	0.381		ng/l							
Copper	27.8		ng/l							
Iron	61.9		ng/l							
Lead	6.23		ng/l							
Magnesium	7.16		ng/l							
Manganese	6.76		ng/l							

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Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes

Inorganics by Compendium Method IO-3.5 - Quality Control

Batch 2311075 - B3K2906

Initial Cal Blank (2311075-ICB1) Continu Prepared & Analyzed: 11/30/23

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Molybdenum	13.4		ng/l							
Nickel	-3.35		ng/l							U
Phosphorus	417		ng/l							QX
Potassium	1730		ng/l							
Rubidium	-0.114		ng/l							U
Selenium	0.518		ng/l							LJ, QX
Sodium	408		ng/l							
Strontium	-0.0745		ng/l							U
Thallium	0.478		ng/l							
Thorium	0.549		ng/l							
Uranium	-0.00599		ng/l							U
Vanadium	-21.3		ng/l							U
Zinc	-12.8		ng/l							U

Initial Cal Check (2311075-ICV1) Prepared & Analyzed: 11/30/23

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Aluminum	1.46E6		ng/l	1.5000E6		97.7	90-110			
Antimony	20000		ng/l	20000		100	90-110			
Arsenic	20200		ng/l	20000		101	90-110			
Barium	200000		ng/l	200000		100	90-110			
Beryllium	4680		ng/l	5000.0		93.6	90-110			
Cadmium	21000		ng/l	20000		105	90-110			
Calcium	2.46E7		ng/l	2.5000E7		98.5	90-110			
Chromium	240000		ng/l	240000		100	90-110			
Cobalt	51700		ng/l	50000		103	90-110			
Copper	2.05E6		ng/l	2.0000E6		103	90-110			
Iron	2.52E6		ng/l	2.5000E6		101	90-110			
Lead	200000		ng/l	200000		100	90-110			
Magnesium	994000		ng/l	1.0000E6		99.4	90-110			
Manganese	495000		ng/l	500000		98.9	90-110			
Molybdenum	50800		ng/l	50000		102	90-110			
Nickel	123000		ng/l	120000		102	90-110			
Phosphorus	189000		ng/l	200000		94.3	90-110			QX
Potassium	2.50E6		ng/l	2.5000E6		99.9	90-110			
Rubidium	9660		ng/l	10000		96.6	90-110			
Selenium	20500		ng/l	20000		103	90-110			LJ, QX
Sodium	2.47E6		ng/l	2.5000E6		98.6	90-110			
Strontium	50900		ng/l	50000		102	90-110			
Thallium	485		ng/l	500.00		97.0	90-110			
Thorium	499		ng/l	500.00		99.9	90-110			

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Inorganics by Compendium Method IO-3.5 - Quality Control

Batch 2311075 - B3K2906

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Initial Cal Check (2311075-ICV1) Continu				Prepared & Analyzed: 11/30/23						
Uranium	503		ng/l	500.00		101	90-110			
Vanadium	20600		ng/l	20000		103	90-110			
Zinc	535000		ng/l	500000		107	90-110			
Interference Check A (2311075-IFA1)				Prepared & Analyzed: 11/30/23						
Aluminum	1.69E7		ng/l	1.5000E7		112	80-120			ICS-01
Antimony	0.00		ng/l				80-120			U
Arsenic	0.00		ng/l				80-120			U
Barium	0.00		ng/l				80-120			U
Beryllium	0.00		ng/l				80-120			U
Cadmium	0.00		ng/l				80-120			U
Calcium	9.84E7		ng/l	1.0040E8		98.0	80-120			
Chromium	0.00		ng/l				80-120			U
Cobalt	0.00		ng/l				80-120			U
Copper	0.00		ng/l				80-120			U
Iron	1.57E7		ng/l	1.5000E7		104	80-120			
Lead	0.00		ng/l				80-120			U
Magnesium	1.74E7		ng/l	1.5000E7		116	80-120			ICS-01
Manganese	0.00		ng/l				80-120			U
Molybdenum	305000		ng/l	300000		102	80-120			
Nickel	0.00		ng/l				80-120			U
Phosphorus	1.84E7		ng/l	1.5000E7		123	80-120			ICS-01, QX
Potassium	1.65E7		ng/l	1.5000E7		110	80-120			ICS-01
Rubidium	0.00		ng/l				80-120			U
Selenium	0.00		ng/l				80-120			LJ, QX, U
Sodium	1.74E7		ng/l	1.5000E7		116	80-120			ICS-01
Strontium	0.00		ng/l				80-120			U
Thallium	0.00		ng/l				80-120			U
Thorium	0.00		ng/l				80-120			U
Uranium	0.00		ng/l				80-120			U
Vanadium	0.00		ng/l				80-120			U
Zinc	0.00		ng/l				80-120			U
Interference Check B (2311075-IFB1)				Prepared & Analyzed: 11/30/23						
Aluminum	2.12E7		ng/l	1.6500E7		128	80-120			ICS-01, LK
Antimony	20500		ng/l	20000		103	80-120			
Arsenic	20900		ng/l	20000		105	80-120			
Barium	206000		ng/l	200000		103	80-120			
Beryllium	4970		ng/l	5000.0		99.3	80-120			
Cadmium	19900		ng/l	20000		99.4	80-120			

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Inorganics by Compendium Method IO-3.5 - Quality Control

Batch 2311075 - B3K2906

Interference Check B (2311075-IFB1) Co — Prepared & Analyzed: 11/30/23

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Calcium	1.32E8		ng/l	1.2540E8		105	80-120			
Chromium	237000		ng/l	240000		98.6	80-120			
Cobalt	54500		ng/l	50000		109	80-120			
Copper	2.00E6		ng/l	2.0000E6		100	80-120			
Iron	1.95E7		ng/l	1.7500E7		112	80-120			
Lead	208000		ng/l	200000		104	80-120			
Magnesium	2.10E7		ng/l	1.6000E7		131	80-120			ICS-01, LK
Manganese	586000		ng/l	500000		117	80-120			
Molybdenum	356000		ng/l	350000		102	80-120			
Nickel	125000		ng/l	120000		105	80-120			
Phosphorus	2.07E7		ng/l	1.5200E7		136	80-120			ICS-01, LK, QX
Potassium	2.11E7		ng/l	1.7500E7		121	80-120			ICS-01, LK
Rubidium	10400		ng/l	10000		104	80-120			
Selenium	19700		ng/l	20000		98.3	80-120			LJ, QX
Sodium	2.32E7		ng/l	1.7500E7		132	80-120			ICS-01, LK
Strontium	51100		ng/l	50000		102	80-120			
Thallium	536		ng/l	500.00		107	80-120			
Thorium	554		ng/l	500.00		111	80-120			
Uranium	563		ng/l	500.00		113	80-120			
Vanadium	19500		ng/l	20000		97.7	80-120			
Zinc	505000		ng/l	500000		101	80-120			

Batch B3K2906 - ICP-MS Extraction

Blank (B3K2906-BLK1) — Prepared: 11/29/23 Analyzed: 11/30/23

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Aluminum	ND	32.1	ng/m³ Air							ICS-01, LK, U
Antimony	ND	0.0441	ng/m³ Air							SL, U
Arsenic	ND	0.00955	ng/m³ Air							U
Barium	ND	0.948	ng/m³ Air							U
Beryllium	ND	0.00332	ng/m³ Air							U
Cadmium	ND	0.109	ng/m³ Air							U
Calcium	ND	292	ng/m³ Air							LJ, QB-01, U
Chromium	ND	2.03	ng/m³ Air							U
Cobalt	ND	0.0156	ng/m³ Air							QB-01, U
Copper	ND	3.00	ng/m³ Air							U
Iron	ND	24.2	ng/m³ Air							GC-BS, U
Lead	ND	0.276	ng/m³ Air							U
Magnesium	ND	96.4	ng/m³ Air							ICS-01, LK, U
Manganese	ND	1.19	ng/m³ Air							U

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Inorganics by Compendium Method IO-3.5 - Quality Control

Batch B3K2906 - ICP-MS Extraction

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (B3K2906-BLK1) Continued				Prepared: 11/29/23 Analyzed: 11/30/23						
Molybdenum	ND	0.213	ng/m³ Air							QB-01, U
Nickel	ND	0.801	ng/m³ Air							U
Phosphorus	ND	1250	ng/m³ Air							GC-BS, ICS-01, LK,
Potassium	ND	38.0	ng/m³ Air							ICS-01, LK, U
Rubidium	ND	0.0183	ng/m³ Air							U
Selenium	ND	0.0110	ng/m³ Air							LJ, QX, U
Sodium	ND	2000	ng/m³ Air							ICS-01, LK, U
Strontium	ND	0.652	ng/m³ Air							QB-01, U
Thallium	ND	5.03E-4	ng/m³ Air							U
Thorium	ND	0.00300	ng/m³ Air							U
Uranium	ND	0.0170	ng/m³ Air							U
Vanadium	ND	0.0492	ng/m³ Air							U
Zinc	ND	97.7	ng/m³ Air							U
LCS (B3K2906-BS1)				Prepared: 11/29/23 Analyzed: 11/30/23						
Aluminum	92.0	32.1	ng/m³ Air	82.975		111	80-120			ICS-01, LK
Antimony	0.526	0.0441	ng/m³ Air	1.3829		38.1	80-120			SL
Arsenic	2.73	0.00955	ng/m³ Air	2.7658		98.6	80-120			
Barium	28.2	0.948	ng/m³ Air	27.658		102	80-120			
Beryllium	1.48	0.00332	ng/m³ Air	1.3829		107	80-120			
Cadmium	1.43	0.109	ng/m³ Air	1.3829		104	80-120			
Calcium	527	292	ng/m³ Air	69.146		762	80-120			LJ, QB-01
Chromium	15.8	2.03	ng/m³ Air	13.829		114	80-120			
Cobalt	1.45	0.0156	ng/m³ Air	1.3829		105	80-120			QB-01
Copper	30.9	3.00	ng/m³ Air	27.658		112	80-120			
Iron	43.4	24.2	ng/m³ Air	27.658		157	80-120			GC-BS
Lead	13.8	0.276	ng/m³ Air	13.829		100	80-120			
Magnesium	ND	96.4	ng/m³ Air	27.658			80-120			ICS-01, LK, U
Manganese	8.66	1.19	ng/m³ Air	8.2975		104	80-120			
Molybdenum	1.71	0.213	ng/m³ Air	1.3829		124	80-120			QB-01
Nickel	3.14	0.801	ng/m³ Air	2.7658		114	80-120			
Phosphorus	ND	1250	ng/m³ Air	13.829			80-120			GC-BS, ICS-01, LK,
Potassium	64.7	38.0	ng/m³ Air	55.317		117	80-120			LK, ICS-01
Rubidium	1.36	0.0183	ng/m³ Air	1.3829		98.5	80-120			
Selenium	2.64	0.0110	ng/m³ Air	2.7658		95.4	80-120			LJ, QX
Sodium	ND	2000	ng/m³ Air	55.317			80-120			ICS-01, LK, U
Strontium	2.27	0.652	ng/m³ Air	1.3829		164	80-120			QB-01
Thallium	0.133	5.03E-4	ng/m³ Air	0.13829		95.9	80-120			

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REPORTED: 12/04/23 11:41
SUBMITTED: 11/27/23
AQS SITE CODE:
SITE CODE: Maui fires

Inorganics by Compendium Method IO-3.5 - Quality Control

Batch B3K2906 - ICP-MS Extraction

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
LCS (B3K2906-BS1) Continued				Prepared: 11/29/23	Analyzed: 11/30/23					
Thorium	0.137	0.00300	ng/m³ Air	0.13829		99.0	80-120			
Uranium	0.134	0.0170	ng/m³ Air	0.13829		96.6	80-120			
Vanadium	2.84	0.0492	ng/m³ Air	2.7658		103	80-120			
Zinc	104	97.7	ng/m³ Air	82.975		125	80-120			
Duplicate (B3K2906-DUP1)		**Source: 3112737-03**		Prepared: 11/29/23	Analyzed: 11/30/23					
Aluminum	296	29.8	ng/m³ Air		289			2.20	10	D-F, ICS-01, LK
Antimony	0.134	0.0410	ng/m³ Air		0.132			1.98	10	SL
Arsenic	0.0804	0.00887	ng/m³ Air		0.0874			8.33	10	
Barium	5.40	0.880	ng/m³ Air		5.18			4.11	10	
Beryllium	0.0128	0.00308	ng/m³ Air		0.0130			1.81	10	
Cadmium	ND	0.101	ng/m³ Air		ND				10	U
Calcium	318	271	ng/m³ Air		306			4.08	10	LJ, QB-01
Chromium	ND	1.89	ng/m³ Air		ND				10	U
Cobalt	0.172	0.0145	ng/m³ Air		0.236			31.6	10	D-F, QB-01
Copper	29.9	2.79	ng/m³ Air		27.6			7.70	10	
Iron	333	22.5	ng/m³ Air		331			0.438	10	GC-BS
Lead	0.314	0.256	ng/m³ Air		ND				10	
Magnesium	168	89.5	ng/m³ Air		164			1.88	10	ICS-01, LK
Manganese	9.42	1.11	ng/m³ Air		9.40			0.220	10	
Molybdenum	0.953	0.198	ng/m³ Air		0.945			0.804	10	QB-01
Nickel	ND	0.744	ng/m³ Air		ND				10	U
Phosphorus	ND	1160	ng/m³ Air		ND				10	GC-BS, ICS-01, LK,
Potassium	75.7	35.3	ng/m³ Air		76.1			0.558	10	ICS-01, LK
Rubidium	0.144	0.0170	ng/m³ Air		0.139			3.20	10	
Selenium	0.161	0.0102	ng/m³ Air		0.152			5.36	10	LJ, QX
Sodium	ND	1860	ng/m³ Air		ND				10	ICS-01, LK, U
Strontium	2.88	0.605	ng/m³ Air		2.80			2.57	10	QB-01
Thallium	0.00141	4.67E-4	ng/m³ Air		0.00141			0.0618	10	
Thorium	0.00880	0.00279	ng/m³ Air		0.00854			3.02	10	
Uranium	ND	0.0158	ng/m³ Air		ND				10	U
Vanadium	0.763	0.0457	ng/m³ Air		0.761			0.215	10	
Zinc	ND	90.7	ng/m³ Air		ND				10	U
Duplicate (B3K2906-DUP2)		**Source: 3112737-06**		Prepared: 11/29/23	Analyzed: 11/30/23					
Aluminum	179	26.0	ng/m³ Air		180			0.125	10	ICS-01, LK
Antimony	0.0722	0.0357	ng/m³ Air		0.0734			1.69	10	SL
Arsenic	0.157	0.00774	ng/m³ Air		0.156			1.15	10	

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Inorganics by Compendium Method IO-3.5 - Quality Control

Batch B3K2906 - ICP-MS Extraction

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Duplicate (B3K2906-DUP2) Continued	**Source: 3112737-06**		Prepared: 11/29/23 Analyzed: 11/30/23							
Barium	3.34	0.768	ng/m³ Air		3.39			1.34	10	
Beryllium	0.00650	0.00269	ng/m³ Air		0.00687			5.58	10	
Cadmium	ND	0.0883	ng/m³ Air		ND				10	U
Calcium	ND	237	ng/m³ Air		ND				10	LJ, QB-01, U
Chromium	ND	1.64	ng/m³ Air		ND				10	U
Cobalt	0.106	0.0126	ng/m³ Air		0.107			0.0428	10	QB-01
Copper	17.8	2.43	ng/m³ Air		17.9			0.549	10	
Iron	186	19.6	ng/m³ Air		188			0.749	10	GC-BS
Lead	ND	0.224	ng/m³ Air		ND				10	U
Magnesium	82.7	78.1	ng/m³ Air		82.4			0.355	10	ICS-01, LK
Manganese	4.54	0.964	ng/m³ Air		4.55			0.137	10	
Molybdenum	1.06	0.173	ng/m³ Air		1.06			0.505	10	QB-01
Nickel	ND	0.649	ng/m³ Air		ND				10	U
Phosphorus	ND	1010	ng/m³ Air		ND				10	GC-BS, ICS-01, LK,
Potassium	70.8	30.8	ng/m³ Air		70.2			0.909	10	ICS-01, LK
Rubidium	0.109	0.0148	ng/m³ Air		0.109			0.0834	10	
Selenium	0.104	0.00891	ng/m³ Air		0.100			3.52	10	LJ, QX
Sodium	ND	1620	ng/m³ Air		ND				10	ICS-01, LK, U
Strontium	1.52	0.528	ng/m³ Air		1.53			0.802	10	QB-01
Thallium	5.39E-4	4.08E-4	ng/m³ Air		5.33E-4			1.05	10	
Thorium	0.00589	0.00243	ng/m³ Air		0.00593			0.703	10	
Uranium	ND	0.0138	ng/m³ Air		ND				10	U
Vanadium	0.471	0.0399	ng/m³ Air		0.473			0.339	10	
Zinc	ND	79.2	ng/m³ Air		ND				10	U
Matrix Spike (B3K2906-MS1)	**Source: 3112737-03**		Prepared: 11/29/23 Analyzed: 11/30/23							
Aluminum	379	29.8	ng/m³ Air	77.052	289	116	80-120			ICS-01, LK
Antimony	0.874	0.0410	ng/m³ Air	1.2842	0.132	57.8	80-120			SL
Arsenic	2.63	0.00887	ng/m³ Air	2.5684	0.0874	99.1	80-120			
Barium	31.4	0.880	ng/m³ Air	25.684	5.18	102	80-120			
Beryllium	1.33	0.00308	ng/m³ Air	1.2842	0.0130	103	80-120			
Cadmium	1.35	0.101	ng/m³ Air	1.2842	ND	105	80-120			
Calcium	412	271	ng/m³ Air	64.210	306	165	80-120			LJ, QB-01, QM-4X
Chromium	14.6	1.89	ng/m³ Air	12.842	ND	113	80-120			
Cobalt	1.51	0.0145	ng/m³ Air	1.2842	0.236	98.8	80-120			QB-01
Copper	57.5	2.79	ng/m³ Air	25.684	27.6	116	80-120			
Iron	369	22.5	ng/m³ Air	25.684	331	146	80-120			GC-BS, QM-4X
Lead	13.2	0.256	ng/m³ Air	12.842	ND	103	80-120			

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Inorganics by Compendium Method IO-3.5 - Quality Control

Batch B3K2906 - ICP-MS Extraction

Matrix Spike (B3K2906-MS1) Continued **Source: 3112737-03** Prepared: 11/29/23 Analyzed: 11/30/23

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Magnesium	199	89.5	ng/m³ Air	25.684	164	134	80-120			ICS-01, LK, QM-4X
Manganese	17.7	1.11	ng/m³ Air	7.7052	9.40	108	80-120			
Molybdenum	2.28	0.198	ng/m³ Air	1.2842	0.945	104	80-120			QB-01
Nickel	3.08	0.744	ng/m³ Air	2.5684	ND	120	80-120			
Phosphorus	ND	1160	ng/m³ Air	12.842	ND		80-120			GC-BS, ICS-01, LK,
Potassium	130	35.3	ng/m³ Air	51.368	76.1	106	80-120			ICS-01, LK
Rubidium	1.39	0.0170	ng/m³ Air	1.2842	0.139	97.2	80-120			
Selenium	2.62	0.0102	ng/m³ Air	2.5684	0.152	96.0	80-120			LJ, QX
Sodium	ND	1860	ng/m³ Air	51.368	ND		80-120			ICS-01, LK, QM-4X, U
Strontium	4.18	0.605	ng/m³ Air	1.2842	2.80	107	80-120			QB-01
Thallium	0.126	4.67E-4	ng/m³ Air	0.12842	0.00141	96.6	80-120			
Thorium	0.0566	0.00279	ng/m³ Air	0.12842	0.00854	37.4	80-120			QM-07
Uranium	0.133	0.0158	ng/m³ Air	0.12842	ND	104	80-120			
Vanadium	3.38	0.0457	ng/m³ Air	2.5684	0.761	102	80-120			
Zinc	102	90.7	ng/m³ Air	77.052	ND	133	80-120			

Matrix Spike Dup (B3K2906-MSD1) **Source: 3112737-03** Prepared: 11/29/23 Analyzed: 11/30/23

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Aluminum	381	29.8	ng/m³ Air	77.052	289	120	80-120	0.753	20	ICS-01, LK
Antimony	0.915	0.0410	ng/m³ Air	1.2842	0.132	61.0	80-120	4.56	20	SL
Arsenic	2.64	0.00887	ng/m³ Air	2.5684	0.0874	99.2	80-120	0.0995	20	
Barium	32.3	0.880	ng/m³ Air	25.684	5.18	105	80-120	2.77	20	
Beryllium	1.34	0.00308	ng/m³ Air	1.2842	0.0130	103	80-120	0.210	20	
Cadmium	1.36	0.101	ng/m³ Air	1.2842	ND	106	80-120	0.808	20	
Calcium	397	271	ng/m³ Air	64.210	306	142	80-120	3.75	20	LJ, QB-01, QM-4X
Chromium	14.7	1.89	ng/m³ Air	12.842	ND	115	80-120	1.04	20	
Cobalt	1.52	0.0145	ng/m³ Air	1.2842	0.236	99.8	80-120	0.804	20	QB-01
Copper	56.2	2.79	ng/m³ Air	25.684	27.6	111	80-120	2.22	20	
Iron	370	22.5	ng/m³ Air	25.684	331	153	80-120	0.504	20	GC-BS, QM-4)
Lead	13.3	0.256	ng/m³ Air	12.842	ND	103	80-120	0.667	20	
Magnesium	200	89.5	ng/m³ Air	25.684	164	136	80-120	0.340	20	ICS-01, LK, QM-4X
Manganese	17.7	1.11	ng/m³ Air	7.7052	9.40	108	80-120	0.372	20	
Molybdenum	2.30	0.198	ng/m³ Air	1.2842	0.945	106	80-120	1.06	20	QB-01
Nickel	3.22	0.744	ng/m³ Air	2.5684	ND	126	80-120	4.64	20	
Phosphorus	ND	1160	ng/m³ Air	12.842	ND		80-120		20	GC-BS, ICS-01, LK,
Potassium	124	35.3	ng/m³ Air	51.368	76.1	94.0	80-120	4.70	20	ICS-01, LK

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Inorganics by Compendium Method IO-3.5 - Quality Control

Batch B3K2906 - ICP-MS Extraction

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Matrix Spike Dup (B3K2906-MSD1) Conti	**Source: 3112737-03**			Prepared: 11/29/23	Analyzed: 11/30/23					
Rubidium	1.37	0.0170	ng/m³ Air	1.2842	0.139	95.9	80-120	1.28	20	
Selenium	2.64	0.0102	ng/m³ Air	2.5684	0.152	97.0	80-120	0.982	20	QX, LJ
Sodium	ND	1860	ng/m³ Air	51.368	ND		80-120		20	ICS-01, LK, QM-4X, U
Strontium	4.11	0.605	ng/m³ Air	1.2842	2.80	101	80-120	1.72	20	QB-01
Thallium	0.127	4.67E-4	ng/m³ Air	0.12842	0.00141	97.6	80-120	0.946	20	
Thorium	0.0599	0.00279	ng/m³ Air	0.12842	0.00854	40.0	80-120	5.63	20	QM-07
Uranium	0.134	0.0158	ng/m³ Air	0.12842	ND	104	80-120	0.0599	20	
Vanadium	3.39	0.0457	ng/m³ Air	2.5684	0.761	102	80-120	0.318	20	
Zinc	98.3	90.7	ng/m³ Air	77.052	ND	128	80-120	4.03	20	
Post Spike (B3K2906-PS1)	**Source: 3112737-03**			Prepared: 11/29/23	Analyzed: 11/30/23					
Aluminum	324	29.8	ng/m³ Air	25.684	289	134	75-125			A-01, ICS-01, LK
Antimony	0.385	0.0410	ng/m³ Air	0.25684	0.132	98.5	75-125			SL
Arsenic	1.31	0.00887	ng/m³ Air	1.2842	0.0874	95.4	75-125			
Barium	7.78	0.880	ng/m³ Air	2.5684	5.18	101	75-125			
Beryllium	0.274	0.00308	ng/m³ Air	0.25684	0.0130	102	75-125			
Cadmium	0.141	0.101	ng/m³ Air	0.12842	ND	110	75-125			
Calcium	351	271	ng/m³ Air	25.684	306	176	75-125			LJ, QB-01
Chromium	2.92	1.89	ng/m³ Air	1.2842	ND	227	75-125			
Cobalt	0.497	0.0145	ng/m³ Air	0.25684	0.236	101	75-125			QB-01
Copper	40.7	2.79	ng/m³ Air	12.842	27.6	102	75-125			
Iron	362	22.5	ng/m³ Air	25.684	331	119	75-125			GC-BS
Lead	25.2	0.256	ng/m³ Air	25.684	ND	98.3	75-125			
Magnesium	193	89.5	ng/m³ Air	25.684	164	112	75-125			ICS-01, LK
Manganese	12.1	1.11	ng/m³ Air	2.5684	9.40	106	75-125			
Molybdenum	2.22	0.198	ng/m³ Air	1.2842	0.945	99.3	75-125			QB-01
Nickel	3.07	0.744	ng/m³ Air	2.5684	ND	120	75-125			
Phosphorus	ND	1160	ng/m³ Air	5.1368	ND		75-125			A-01, GC-BS, ICS-01, LK,
Potassium	97.1	35.3	ng/m³ Air	25.684	76.1	81.7	75-125			ICS-01, LK
Rubidium	0.251	0.0170	ng/m³ Air	0.12842	0.139	87.1	75-125			
Selenium	1.39	0.0102	ng/m³ Air	1.2842	0.152	96.1	75-125			LJ, QX
Sodium	ND	1860	ng/m³ Air	25.684	ND		75-125			A-01, ICS-01, LK, U
Strontium	3.99	0.605	ng/m³ Air	1.2842	2.80	92.5	75-125			QB-01
Thallium	0.0611	4.67E-4	ng/m³ Air	6.4210E-2	0.00141	93.0	75-125			
Thorium	0.0681	0.00279	ng/m³ Air	6.4210E-2	0.00854	92.8	75-125			
Uranium	0.0691	0.0158	ng/m³ Air	6.4210E-2	ND	108	75-125			

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Inorganics by Compendium Method IO-3.5 - Quality Control

Batch B3K2906 - ICP-MS Extraction

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Post Spike (B3K2906-PS1) Continued		**Source: 3112737-03**		Prepared: 11/29/23		Analyzed: 11/30/23				
Vanadium	2.04	0.0457	ng/m³ Air	1.2842	0.761	99.2	75-125			
Zinc	ND	90.7	ng/m³ Air	25.684	ND		75-125			U
Dilution Check (B3K2906-SRL1)		**Source: 3112737-03**		Prepared: 11/29/23		Analyzed: 11/30/23				
Aluminum	293	149	ng/m³ Air		289			1.41	10	ICS-01, LK
Antimony	ND	0.205	ng/m³ Air		ND				10	SL, U
Arsenic	0.0934	0.0443	ng/m³ Air		0.0874			6.57	10	
Barium	5.26	4.40	ng/m³ Air		5.18			1.55	10	
Beryllium	ND	0.0154	ng/m³ Air		ND				10	U
Cadmium	ND	0.506	ng/m³ Air		ND				10	U
Calcium	ND	1360	ng/m³ Air		ND				10	LJ, QB-01, U
Chromium	ND	9.43	ng/m³ Air		ND				10	U
Cobalt	0.239	0.0724	ng/m³ Air		0.236			0.933	10	QB-01
Copper	28.1	13.9	ng/m³ Air		27.6			1.68	10	
Iron	336	112	ng/m³ Air		331			1.49	10	GC-BS
Lead	ND	1.28	ng/m³ Air		ND				10	U
Magnesium	ND	448	ng/m³ Air		ND				10	ICS-01, LK, U
Manganese	9.50	5.53	ng/m³ Air		9.40			1.03	10	
Molybdenum	ND	0.989	ng/m³ Air		ND				10	QB-01, U
Nickel	ND	3.72	ng/m³ Air		ND				10	U
Phosphorus	ND	5800	ng/m³ Air		ND				10	GC-BS, ICS-01, LK,
Potassium	ND	176	ng/m³ Air		ND				10	LK, ICS-01, U
Rubidium	0.141	0.0850	ng/m³ Air		0.139			1.05	10	
Selenium	0.150	0.0511	ng/m³ Air		0.152			1.26	10	LJ, QX
Sodium	ND	9290	ng/m³ Air		ND				10	ICS-01, LK, U
Strontium	ND	3.03	ng/m³ Air		ND				10	QB-01, U
Thallium	ND	0.00234	ng/m³ Air		ND				10	U
Thorium	ND	0.0139	ng/m³ Air		ND				10	U
Uranium	ND	0.0789	ng/m³ Air		ND				10	U
Vanadium	0.771	0.228	ng/m³ Air		0.761			1.26	10	
Zinc	ND	454	ng/m³ Air		ND				10	U

CERTIFICATE OF ANALYSIS

Tetra Tech, Inc.
1777 Sentry Pkwy, Bldg 12
Blue Bell, PA 19422
ATTN: Ms. Chelsea Saber
PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 12/04/23 11:41
SUBMITTED: 11/27/23
AQS SITE CODE:
SITE CODE: Maui fires

Notes and Definitions

U	Under Detection Limit
SL	The spike recovery was outside acceptance limits. Reported value may be biased low.
QX	Compound does not meet QC criteria. Results should be considered an estimate.
QM-4X	The MS/MSD recovery exceeds criteria because the parent sample concentration is greater than 4x the spike concentration. Sample results for the QC batch were accepted based on acceptable BS/BSD recoveries.
QM-07	The spike recovery was outside acceptance limits for the MS and/or MSD. The batch was accepted based on acceptable LCS recovery.
QB-01	Analyte exceeds method blank criteria
LK	Analyte identified; Reported value may be biased high.
LJ	Identification of analyte is acceptable; reported value is an estimate.
ICS-01	Interference check exceeds criteria.
GC-BS	Compound exceeds Blank Spike Criteria
FB-01	Analyte exceeds Field Blank criteria.
E	The concentration indicated for this analyte is an estimated value above the calibration range of the instrument. This value is considered an estimate (CLP E-flag).
D-F	Duplicate exceeds DQO criteria.
A-01	Parent Sample >4x Spike amount
ND	Analyte NOT DETECTED
NR	Not Reported
MDL	Method Detection Limit
RPD	Relative Percent Difference

Note: This test is accredited under the 2016 TNI Standard.

Eastern Research Group
601 Keystone Park Drive
Suite 700
Morrisville, NC 27560

December 07, 2023

Ms. Chelsea Saber
Tetra Tech, Inc.
1777 Sentry Pkwy, Bldg 12
Blue Bell, PA 19422
Project Name: Maui fires

Dear Ms. Chelsea Saber,

This report contains the analytical results for the sample(s) received under chain(s) of custody by Eastern Research Group on 11/29/23 13:29.

Values below the MDL for QC results in this report are recorded as ND, however the actual values are reported in the accompanying Excel report with a "U" flag (Under the detection limit). The actual values are reported in AQS.

This test is accredited under the 2016 TNI Standard for Environmental Laboratories (FL DOH Certification # E87673). All analyses were performed as described in the US EPA-approved QAPP, under the contract for National Hazardous Air Pollutant Support (US EPA Contract No. 68HERH22D0002). This cover page is an integral part of this report, and any exceptions or comments are noted on the last page.

Release of the data contained in this data package and in the data submitted in the electronic data deliverable, has been authorized by the Program Manager, or the Program Manager's designee as verified by the following signature.

The issuance of the final Certificate of Analysis takes precedence over any previous Report. If you have any questions, please contact me at 919-468-7924.

Sincerely,

Julie Swift
Program Manager
julie.swift@erg.com

The information contained in this report and its attachment(s) are intended only for the use of the individual to whom it is addressed and may contain information that is privileged, confidential, or exempt from disclosure. If the reader of this message is not the intended recipient, you are hereby notified that any dissemination, distribution, or copying of this report is strictly prohibited. If you have received this report in error, please notify julie.swift@erg.com and delete the report without retaining any copies.

CERTIFICATE OF ANALYSIS

Tetra Tech, Inc.
1777 Sentry Pkwy, Bldg 12
Blue Bell, FA 19422
ATTN: Ms. Chelsea Saber
PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 12/07/23 08:11
SUBMITTED: 11/29/23
AQS SITE CODE:
SITE CODE: Maui fires

ANALYTICAL REPORT FOR SAMPLES

SampleName	LabNumber	Matrix	Sampled	Received
TetraTech Q9541917	3112929-01	Air	11/24/23 23:59	11/29/23 13:29
TetraTech Q9541914	3112929-02	Air	11/24/23 23:59	11/29/23 13:29
TetraTech Q9541912	3112929-03	Air	11/24/23 23:59	11/29/23 13:29
TetraTech Q9541940 FB	3112929-04	Air	11/24/23 00:00	11/29/23 13:29
TetraTech Q9541911	3112929-05	Air	11/25/23 23:59	11/29/23 13:29
TetraTech Q9541229	3112929-06	Air	11/25/23 23:59	11/29/23 13:29
TetraTech Q9541939	3112929-07	Air	11/25/23 23:59	11/29/23 13:29
TetraTech Q9541905 FB	3112929-08	Air	11/25/23 00:00	11/29/23 13:29
TetraTech Q9541938	3112929-09	Air	11/26/23 23:59	11/29/23 13:29
TetraTech Q9541937	3112929-10	Air	11/26/23 23:59	11/29/23 13:29
TetraTech Q9541903	3112929-11	Air	11/26/23 23:59	11/29/23 13:29
TetraTech Q9541228 FB	3112929-12	Air	11/26/23 00:00	11/29/23 13:29

The results in this report apply only to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

CERTIFICATE OF ANALYSIS

Tetra Tech, Inc.
1777 Sentry Pkwy, Bldg 12
Blue Bell, FA 19422
ATTN: Ms. Chelsea Saber
PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 12/07/23 08:11
SUBMITTED: 11/29/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9541917
Matrix: Air
Comments: MFK-AM01-112423-HM

Lab ID: 3112929-01
Sample Volume: 2027.606 m³
Filter ID:

Sampled: 11/24/23 23:59
Received: 11/29/23 13:29
Analysis Date: 12/04/23 20:26

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	**7429-90-5**	**277**		**25.8**
Antimony	**7440-36-0**	**0.0530**	SL	**0.0354**
Arsenic	**7440-38-2**	**0.122**		**0.00766**
Barium	**7440-39-3**	**4.33**		**0.761**
Beryllium	**7440-41-7**	**0.0102**		**0.00266**
Cadmium	7440-43-9	0.00687	U	0.0875
Calcium	**7440-70-2**	**569**	GC-BS, LJ, QB-01	**234**
Chromium	**7440-47-3**	**1.71**		**1.63**
Cobalt	**7440-48-4**	**0.185**	QB-01	**0.0125**
Copper	**7440-50-8**	**22.6**		**2.41**
Iron	**7439-89-6**	**335**		**19.4**
Lead	**7439-92-1**	**0.423**		**0.221**
Magnesium	**7439-95-4**	**199**		**77.4**
Manganese	**7439-96-5**	**8.61**		**0.955**
Molybdenum	**7439-98-7**	**1.28**	QB-01	**0.171**
Nickel	**7440-02-0**	**3.39**		**0.643**
Phosphorus	7723-14-0	365	GC-BS, LJ, U	1000
Potassium	**7440-09-7**	**102**	LJ	**30.5**
Rubidium		**0.138**		**0.0147**
Selenium	**7782-49-2**	**0.133**		**0.00883**
Sodium	**7440-23-5**	**1750**	E	**1600**
Strontium	**7440-24-6**	**3.14**	QB-01	**0.523**
Thallium	**7440-28-0**	**8.04E-4**		**4.04E-4**
Thorium	**7440-29-01**	**0.00900**	LJ, QB-01	**0.00241**
Uranium	NA	0.00793	U	0.0136
Vanadium	**7440-62-2**	**1.44**		**0.0395**
Zinc	7440-66-6	19.5	U	78.4

CERTIFICATE OF ANALYSIS

Tetra Tech, Inc.
1777 Sentry Pkwy, Bldg 12
Blue Bell, FA 19422
ATTN: Ms. Chelsea Saber
PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 12/07/23 08:11
SUBMITTED: 11/29/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9541914
Matrix: Air
Comments: MFK-AM02-112423-HM

Lab ID: 3112929-02
Sample Volume: 2026.064 m³
Filter ID:

Sampled: 11/24/23 23:59
Received: 11/29/23 13:29
Analysis Date: 12/04/23 20:45

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	**7429-90-5**	**325**		**25.8**
Antimony	**7440-36-0**	**0.0525**	SL	**0.0354**
Arsenic	**7440-38-2**	**0.130**		**0.00767**
Barium	**7440-39-3**	**4.72**		**0.761**
Beryllium	**7440-41-7**	**0.0109**		**0.00267**
Cadmium	7440-43-9	0.00775	U	0.0875
Calcium	**7440-70-2**	**546**	GC-BS, LJ, QB-01	**234**
Chromium	**7440-47-3**	**1.69**		**1.63**
Cobalt	**7440-48-4**	**0.290**	QB-01	**0.0125**
Copper	**7440-50-8**	**11.7**		**2.41**
Iron	**7439-89-6**	**377**		**19.4**
Lead	7439-92-1	0.182	U	0.222
Magnesium	**7439-95-4**	**200**		**77.4**
Manganese	**7439-96-5**	**9.58**		**0.956**
Molybdenum	**7439-98-7**	**0.865**	QB-01	**0.171**
Nickel	**7440-02-0**	**0.717**		**0.643**
Phosphorus	7723-14-0	396	GC-BS, LJ, U	1000
Potassium	**7440-09-7**	**138**	LJ	**30.5**
Rubidium		**0.184**		**0.0147**
Selenium	**7782-49-2**	**0.144**		**0.00883**
Sodium	**7440-23-5**	**1750**	E	**1610**
Strontium	**7440-24-6**	**3.11**	QB-01	**0.524**
Thallium	**7440-28-0**	**9.16E-4**		**4.04E-4**
Thorium	**7440-29-01**	**0.0101**	LJ, QB-01	**0.00241**
Uranium	NA	0.00892	U	0.0137
Vanadium	**7440-62-2**	**1.52**		**0.0395**
Zinc	7440-66-6	13.3	U	78.5

CERTIFICATE OF ANALYSIS

ERG

Tetra Tech, Inc.
1777 Sentry Pkwy, Bldg 12
Blue Bell, FA 19422
ATTN: Ms. Chelsea Saber
PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 12/07/23 08:11
SUBMITTED: 11/29/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9541912
Matrix: Air
Comments: MFK-AM03-112423-HM

Lab ID: 3112929-03
Sample Volume: 1838.776 m^3
Filter ID:

Sampled: 11/24/23 23:59
Received: 11/29/23 13:29
Analysis Date: 12/04/23 21:04

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	**7429-90-5**	**205**		**28.4**
Antimony	**7440-36-0**	**0.0584**	SL	**0.0390**
Arsenic	**7440-38-2**	**0.105**		**0.00845**
Barium	**7440-39-3**	**4.19**		**0.839**
Beryllium	**7440-41-7**	**0.00925**		**0.00294**
Cadmium	7440-43-9	0.00637	U	0.0964
Calcium	**7440-70-2**	**616**	GC-BS, LJ, QB-01	**258**
Chromium	**7440-47-3**	**1.86**		**1.80**
Cobalt	**7440-48-4**	**0.178**	QB-01	**0.0138**
Copper	**7440-50-8**	**29.7**		**2.65**
Iron	**7439-89-6**	**288**		**21.4**
Lead	7439-92-1	0.182	U	0.244
Magnesium	**7439-95-4**	**246**		**85.3**
Manganese	**7439-96-5**	**8.04**		**1.05**
Molybdenum	**7439-98-7**	**1.11**	QB-01	**0.188**
Nickel	**7440-02-0**	**0.843**		**0.709**
Phosphorus	7723-14-0	426	GC-BS, LJ, U	1110
Potassium	**7440-09-7**	**162**	LJ	**33.6**
Rubidium		**0.146**		**0.0162**
Selenium	**7782-49-2**	**0.147**		**0.00973**
Sodium	**7440-23-5**	**2220**	E	**1770**
Strontium	**7440-24-6**	**3.20**	QB-01	**0.577**
Thallium	**7440-28-0**	**7.45E-4**		**4.45E-4**
Thorium	**7440-29-01**	**0.00800**	LJ, QB-01	**0.00265**
Uranium	NA	0.00731	U	0.0150
Vanadium	**7440-62-2**	**1.48**		**0.0435**
Zinc	7440-66-6	17.8	U	86.4

CERTIFICATE OF ANALYSIS

Tetra Tech, Inc.
1777 Sentry Pkwy, Bldg 12
Blue Bell, FA 19422
ATTN: Ms. Chelsea Saber
PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 12/07/23 08:11
SUBMITTED: 11/29/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9541940 FB
Matrix: Air
Lab ID: 3112929-04
Sample Volume: 2027.606 m³
Filter ID:
Sampled: 11/24/23 00:00
Received: 11/29/23 13:29
Analysis Date: 12/04/23 21:20

Comments: MFK-FB01-112423-HM Field Blank

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	7429-90-5	11.2	U	25.8
Antimony	7440-36-0	0.00794	SL, U	0.0354
Arsenic	7440-38-2	0.00648	U	0.00766
Barium	7440-39-3	0.606	U	0.761
Beryllium	7440-41-7	0.00106	U	0.00266
Cadmium	7440-43-9	0.00181	U	0.0875
Calcium	**7440-70-2**	**435**	FB-01, GC-BS, LJ, QB-01	**234**
Chromium	7440-47-3	1.45	U	1.63
Cobalt	**7440-48-4**	**0.0295**	FB-01, QB-01	**0.0125**
Copper	7440-50-8	0.310	U	2.41
Iron	7439-89-6	16.6	U	19.4
Lead	7439-92-1	0.0602	U	0.221
Magnesium	7439-95-4	43.8	U	77.4
Manganese	7439-96-5	0.242	U	0.955
Molybdenum	**7439-98-7**	**0.253**	FB-01, QB-01	**0.171**
Nickel	7440-02-0	0.454	U	0.643
Phosphorus	7723-14-0	345	GC-BS, LJ, U	1000
Potassium	**7440-09-7**	**39.9**	FB-01, LJ	**30.5**
Rubidium		**0.0176**	FB-01	**0.0147**
Selenium	7782-49-2	0.00526	U	0.00883
Sodium	7440-23-5	704	U	1600
Strontium	**7440-24-6**	**0.768**	FB-01, QB-01	**0.523**
Thallium	7440-28-0	7.92E-5	U	4.04E-4
Thorium	7440-29-01	0.00240	LJ, QB-01, U	0.00241
Uranium	NA	0.00170	U	0.0136
Vanadium	7440-62-2	0.0116	U	0.0395
Zinc	7440-66-6	11.3	U	78.4

The results in this report apply only to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

CERTIFICATE OF ANALYSIS

Tetra Tech, Inc.
1777 Sentry Pkwy, Bldg 12
Blue Bell, FA 19422
ATTN: Ms. Chelsea Saber
PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 12/07/23 08:11
SUBMITTED: 11/29/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9541911 **Lab ID:** 3112929-05 **Sampled:** 11/25/23 23:59
Matrix: Air **Sample Volume:** 1996.342 m³ **Received:** 11/29/23 13:29
Filter ID: **Analysis Date:** 12/04/23 17:49
Comments: MFK-AM01-112523-HM

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	**7429-90-5**	**325**	QM-4X	**26.2**
Antimony	**7440-36-0**	**0.0515**	SL	**0.0359**
Arsenic	**7440-38-2**	**0.114**		**0.00778**
Barium	**7440-39-3**	**4.40**		**0.773**
Beryllium	**7440-41-7**	**0.0103**		**0.00271**
Cadmium	7440-43-9	0.00693	U	0.0888
Calcium	**7440-70-2**	**608**	GC-BS, LJ, QB-01, QM-4X	**238**
Chromium	**7440-47-3**	**1.81**		**1.65**
Cobalt	**7440-48-4**	**0.194**	QB-01	**0.0127**
Copper	**7440-50-8**	**21.0**		**2.44**
Iron	**7439-89-6**	**367**	QM-4X	**19.7**
Lead	**7439-92-1**	**0.369**		**0.225**
Magnesium	**7439-95-4**	**277**	QM-4X	**78.6**
Manganese	**7439-96-5**	**9.57**		**0.970**
Molybdenum	**7439-98-7**	**1.14**	QB-01	**0.174**
Nickel	**7440-02-0**	**1.07**		**0.653**
Phosphorus	7723-14-0	405	GC-BS, LJ, QM-4X, U	1020
Potassium	**7440-09-7**	**148**	LJ, QM-07	**31.0**
Rubidium		**0.148**		**0.0149**
Selenium	**7782-49-2**	**0.152**		**0.00896**
Sodium	**7440-23-5**	**2420**	E, QM-4X	**1630**
Strontium	**7440-24-6**	**3.77**	QB-01	**0.531**
Thallium	**7440-28-0**	**8.96E-4**		**4.10E-4**
Thorium	**7440-29-01**	**0.00827**	LJ, QB-01, QM-07	**0.00244**
Uranium	NA	0.00842	U	0.0139
Vanadium	**7440-62-2**	**1.68**		**0.0401**
Zinc	7440-66-6	18.7	U	79.6

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CERTIFICATE OF ANALYSIS

Tetra Tech, Inc.
1777 Sentry Pkwy, Bldg 12
Blue Bell, FA 19422
ATTN: Ms. Chelsea Saber
PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 12/07/23 08:11
SUBMITTED: 11/29/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9541229
Matrix: Air
Comments: MFK-AM02-112523-HM

Lab ID: 3112929-06
Sample Volume: 2026.064 m^3
Filter ID:

Sampled: 11/25/23 23:59
Received: 11/29/23 13:29
Analysis Date: 12/04/23 21:35

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	**7429-90-5**	**438**		**25.8**
Antimony	**7440-36-0**	**0.0669**	SL	**0.0354**
Arsenic	**7440-38-2**	**0.153**		**0.00767**
Barium	**7440-39-3**	**5.67**		**0.761**
Beryllium	**7440-41-7**	**0.0136**		**0.00267**
Cadmium	7440-43-9	0.00810	U	0.0875
Calcium	**7440-70-2**	**391**	GC-BS, LJ, QB-01	**234**
Chromium	7440-47-3	1.57	U	1.63
Cobalt	**7440-48-4**	**0.225**	QB-01	**0.0125**
Copper	**7440-50-8**	**12.9**		**2.41**
Iron	**7439-89-6**	**476**		**19.4**
Lead	**7439-92-1**	**0.228**		**0.222**
Magnesium	**7439-95-4**	**294**		**77.4**
Manganese	**7439-96-5**	**11.9**		**0.956**
Molybdenum	**7439-98-7**	**0.813**	QB-01	**0.171**
Nickel	**7440-02-0**	**0.951**		**0.643**
Phosphorus	7723-14-0	381	GC-BS, LJ, U	1000
Potassium	**7440-09-7**	**159**	LJ	**30.5**
Rubidium		**0.172**		**0.0147**
Selenium	**7782-49-2**	**0.175**		**0.00883**
Sodium	**7440-23-5**	**2560**	E	**1610**
Strontium	**7440-24-6**	**3.72**	QB-01	**0.524**
Thallium	**7440-28-0**	**9.33E-4**		**4.04E-4**
Thorium	**7440-29-01**	**0.0115**	LJ, QB-01	**0.00241**
Uranium	NA	0.0105	U	0.0137
Vanadium	**7440-62-2**	**2.04**		**0.0395**
Zinc	7440-66-6	15.1	U	78.5

CERTIFICATE OF ANALYSIS

Tetra Tech, Inc.
1777 Sentry Pkwy, Bldg 12
Blue Bell, FA 19422
ATTN: Ms. Chelsea Saber
PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 12/07/23 08:11
SUBMITTED: 11/29/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9541939
Matrix: Air
Comments: MFK-AM03-112523-HM

Lab ID: 3112929-07
Sample Volume: 1882.131 m³
Filter ID:

Sampled: 11/25/23 23:59
Received: 11/29/23 13:29
Analysis Date: 12/04/23 21:49

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	**7429-90-5**	**295**		**27.7**
Antimony	**7440-36-0**	**0.0643**	SL	**0.0381**
Arsenic	**7440-38-2**	**0.125**		**0.00826**
Barium	**7440-39-3**	**5.53**		**0.819**
Beryllium	**7440-41-7**	**0.0128**		**0.00287**
Cadmium	7440-43-9	0.00703	U	0.0942
Calcium	**7440-70-2**	**681**	GC-BS, LJ, QB-01	**252**
Chromium	**7440-47-3**	**1.86**		**1.75**
Cobalt	**7440-48-4**	**0.208**	QB-01	**0.0135**
Copper	**7440-50-8**	**25.5**		**2.59**
Iron	**7439-89-6**	**389**		**20.9**
Lead	**7439-92-1**	**0.249**		**0.239**
Magnesium	**7439-95-4**	**337**		**83.3**
Manganese	**7439-96-5**	**10.8**		**1.03**
Molybdenum	**7439-98-7**	**0.981**	QB-01	**0.184**
Nickel	**7440-02-0**	**0.963**		**0.692**
Phosphorus	7723-14-0	440	GC-BS, LJ, U	1080
Potassium	**7440-09-7**	**161**	LJ	**32.8**
Rubidium		**0.165**		**0.0158**
Selenium	**7782-49-2**	**0.181**		**0.00951**
Sodium	**7440-23-5**	**2950**	E	**1730**
Strontium	**7440-24-6**	**4.18**	QB-01	**0.564**
Thallium	**7440-28-0**	**8.72E-4**		**4.35E-4**
Thorium	**7440-29-01**	**0.0125**	LJ, QB-01	**0.00259**
Uranium	NA	0.00943	U	0.0147
Vanadium	**7440-62-2**	**2.00**		**0.0425**
Zinc	7440-66-6	13.0	U	84.5

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FILE #: 0000.00
REPORTED: 12/07/23 08:11
SUBMITTED: 11/29/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9541905 FB | **Lab ID:** 3112929-08 | **Sampled:** 11/25/23 00:00
Matrix: Air | **Sample Volume:** 1996.342 m³ | **Received:** 11/29/23 13:29
Filter ID: | **Analysis Date:** 12/04/23 22:06
Comments: MFK-FB01-112523-HM Field Blank

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	7429-90-5	13.0	U	26.2
Antimony	7440-36-0	0.00648	SL, U	0.0359
Arsenic	7440-38-2	0.00585	U	0.00778
Barium	**7440-39-3**	**1.41**	FB-01	**0.773**
Beryllium	7440-41-7	9.25E-4	U	0.00271
Cadmium	7440-43-9	0.00176	U	0.0888
Calcium	**7440-70-2**	**392**	FB-01, GC-BS, LJ, QB-01	**238**
Chromium	7440-47-3	1.49	U	1.65
Cobalt	**7440-48-4**	**0.0271**	FB-01, QB-01	**0.0127**
Copper	7440-50-8	0.249	U	2.44
Iron	7439-89-6	14.7	U	19.7
Lead	7439-92-1	0.0531	U	0.225
Magnesium	7439-95-4	48.0	U	78.6
Manganese	7439-96-5	0.238	U	0.970
Molybdenum	**7439-98-7**	**0.267**	FB-01, QB-01	**0.174**
Nickel	7440-02-0	0.345	U	0.653
Phosphorus	7723-14-0	370	GC-BS, LJ, U	1020
Potassium	**7440-09-7**	**31.9**	FB-01, LJ	**31.0**
Rubidium		**0.0163**	FB-01	**0.0149**
Selenium	7782-49-2	0.00471	U	0.00896
Sodium	7440-23-5	752	U	1630
Strontium	**7440-24-6**	**0.781**	FB-01, QB-01	**0.531**
Thallium	7440-28-0	5.18E-5	U	4.10E-4
Thorium	**7440-29-01**	**0.00251**	FB-01, LJ, QB-01	**0.00244**
Uranium	NA	0.00176	U	0.0139
Vanadium	7440-62-2	0.0116	U	0.0401
Zinc	7440-66-6	7.42	U	79.6

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Blue Bell, FA 19422
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PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 12/07/23 08:11
SUBMITTED: 11/29/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9541938 **Lab ID:** 3112929-09 **Sampled:** 11/26/23 23:59
Matrix: Air **Sample Volume:** 1996.342 m³ **Received:** 11/29/23 13:29
Filter ID: **Analysis Date:** 12/04/23 22:20
Comments: MFK-AM01-112623-HM

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	**7429-90-5**	**299**		**26.2**
Antimony	**7440-36-0**	**0.0636**	SL	**0.0359**
Arsenic	**7440-38-2**	**0.115**		**0.00778**
Barium	**7440-39-3**	**4.74**		**0.773**
Beryllium	**7440-41-7**	**0.0101**		**0.00271**
Cadmium	7440-43-9	0.00605	U	0.0888
Calcium	**7440-70-2**	**584**	GC-BS, LJ, QB-01	**238**
Chromium	**7440-47-3**	**1.70**		**1.65**
Cobalt	**7440-48-4**	**0.197**	QB-01	**0.0127**
Copper	**7440-50-8**	**20.0**		**2.44**
Iron	**7439-89-6**	**363**		**19.7**
Lead	**7439-92-1**	**0.288**		**0.225**
Magnesium	**7439-95-4**	**211**		**78.6**
Manganese	**7439-96-5**	**9.73**		**0.970**
Molybdenum	**7439-98-7**	**1.15**	QB-01	**0.174**
Nickel	**7440-02-0**	**0.655**		**0.653**
Phosphorus	7723-14-0	396	GC-BS, LJ, U	1020
Potassium	**7440-09-7**	**102**	LJ	**31.0**
Rubidium		**0.146**		**0.0149**
Selenium	**7782-49-2**	**0.157**		**0.00896**
Sodium	**7440-23-5**	**1920**	E	**1630**
Strontium	**7440-24-6**	**3.50**	QB-01	**0.531**
Thallium	**7440-28-0**	**8.29E-4**		**4.10E-4**
Thorium	**7440-29-01**	**0.00928**	LJ, QB-01	**0.00244**
Uranium	NA	0.00876	U	0.0139
Vanadium	**7440-62-2**	**1.11**		**0.0401**
Zinc	7440-66-6	10.3	U	79.6

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Blue Bell, FA 19422
ATTN: Ms. Chelsea Saber
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FILE #: 0000.00
REPORTED: 12/07/23 08:11
SUBMITTED: 11/29/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9541937 **Lab ID:** 3112929-10 **Sampled:** 11/26/23 23:59
Matrix: Air **Sample Volume:** 1990.57 m³ **Received:** 11/29/23 13:29
Filter ID: **Analysis Date:** 12/04/23 22:37
Comments: MFK-AM02-112623-HM

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	**7429-90-5**	**578**		**26.2**
Antimony	**7440-36-0**	**0.0706**	SL	**0.0360**
Arsenic	**7440-38-2**	**0.219**		**0.00781**
Barium	**7440-39-3**	**7.77**		**0.775**
Beryllium	**7440-41-7**	**0.0165**		**0.00271**
Cadmium	7440-43-9	0.0124	U	0.0891
Calcium	**7440-70-2**	**787**	GC-BS, LJ, QB-01	**239**
Chromium	**7440-47-3**	**2.03**		**1.66**
Cobalt	**7440-48-4**	**0.276**	QB-01	**0.0128**
Copper	**7440-50-8**	**15.2**		**2.45**
Iron	**7439-89-6**	**606**		**19.8**
Lead	**7439-92-1**	**0.266**		**0.226**
Magnesium	**7439-95-4**	**237**		**78.8**
Manganese	**7439-96-5**	**15.8**		**0.973**
Molybdenum	**7439-98-7**	**0.967**	QB-01	**0.174**
Nickel	**7440-02-0**	**0.786**		**0.655**
Phosphorus	7723-14-0	454	GC-BS, LJ, U	1020
Potassium	**7440-09-7**	**175**	LJ	**31.1**
Rubidium		**0.253**		**0.0150**
Selenium	**7782-49-2**	**0.192**		**0.00899**
Sodium	**7440-23-5**	**1850**	E	**1630**
Strontium	**7440-24-6**	**6.02**	QB-01	**0.533**
Thallium	**7440-28-0**	**0.00139**		**4.11E-4**
Thorium	**7440-29-01**	**0.0163**	LJ, QB-01	**0.00245**
Uranium	**NA**	**0.0160**		**0.0139**
Vanadium	**7440-62-2**	**1.72**		**0.0402**
Zinc	7440-66-6	11.4	U	79.9

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Blue Bell, FA 19422
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FILE #: 0000.00
REPORTED: 12/07/23 08:11
SUBMITTED: 11/29/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9541903 **Lab ID:** 3112929-11 **Sampled:** 11/26/23 23:59
Matrix: Air **Sample Volume:** 1665.355 m^3 **Received:** 11/29/23 13:29
Filter ID: **Analysis Date:** 12/04/23 23:48
Comments: MFK-AM03-112623-HM

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	**7429-90-5**	**260**		**31.4**
Antimony	**7440-36-0**	**0.0738**	SL	**0.0431**
Arsenic	**7440-38-2**	**0.100**		**0.00933**
Barium	**7440-39-3**	**4.54**		**0.926**
Beryllium	**7440-41-7**	**0.0122**		**0.00324**
Cadmium	7440-43-9	0.00706	U	0.106
Calcium	**7440-70-2**	**347**	GC-BS, LJ, QB-01	**285**
Chromium	7440-47-3	1.83	U	1.98
Cobalt	**7440-48-4**	**0.202**	QB-01	**0.0152**
Copper	**7440-50-8**	**33.2**		**2.93**
Iron	**7439-89-6**	**353**		**23.6**
Lead	7439-92-1	0.232	U	0.270
Magnesium	**7439-95-4**	**214**		**94.2**
Manganese	**7439-96-5**	**9.87**		**1.16**
Molybdenum	**7439-98-7**	**0.975**	QB-01	**0.208**
Nickel	7440-02-0	0.704	U	0.783
Phosphorus	7723-14-0	401	GC-BS, LJ, U	1220
Potassium	**7440-09-7**	**107**	LJ	**37.1**
Rubidium		**0.157**		**0.0179**
Selenium	**7782-49-2**	**0.164**		**0.0107**
Sodium	**7440-23-5**	**2080**	E	**1950**
Strontium	**7440-24-6**	**3.05**	QB-01	**0.637**
Thallium	**7440-28-0**	**9.15E-4**		**4.91E-4**
Thorium	**7440-29-01**	**0.00930**	LJ, QB-01	**0.00293**
Uranium	NA	0.00847	U	0.0166
Vanadium	**7440-62-2**	**1.23**		**0.0481**
Zinc	7440-66-6	12.1	U	95.4

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Tetra Tech, Inc.
1777 Sentry Pkwy, Bldg 12
Blue Bell, PA 19422
ATTN: Ms. Chelsea Saber
PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 12/07/23 08:11
SUBMITTED: 11/29/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9541228 FB
Matrix: Air
Lab ID: 3112929-12
Sample Volume: 1996.342 m³
Filter ID:
Sampled: 11/26/23 00:00
Received: 11/29/23 13:29
Analysis Date: 12/05/23 00:05

Comments: MFK-FB01-112623-HM Field Blank

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	7429-90-5	11.7	U	26.2
Antimony	7440-36-0	0.0107	SL, U	0.0359
Arsenic	7440-38-2	0.00553	U	0.00778
Barium	7440-39-3	0.459	U	0.773
Beryllium	7440-41-7	6.80E-4	U	0.00271
Cadmium	7440-43-9	0.00147	U	0.0888
Calcium	7440-70-2	147	GC-BS, LJ, QB-01, U	238
Chromium	7440-47-3	1.37	U	1.65
Cobalt	**7440-48-4**	**0.0259**	FB-01, QB-01	**0.0127**
Copper	7440-50-8	0.266	U	2.44
Iron	7439-89-6	13.1	U	19.7
Lead	7439-92-1	0.0368	U	0.225
Magnesium	7439-95-4	37.1	U	78.6
Manganese	7439-96-5	0.152	U	0.970
Molybdenum	**7439-98-7**	**0.197**	FB-01, QB-01	**0.174**
Nickel	7440-02-0	0.308	U	0.653
Phosphorus	7723-14-0	307	GC-BS, LJ, U	1020
Potassium	**7440-09-7**	**55.5**	FB-01, LJ	**31.0**
Rubidium		0.00991	U	0.0149
Selenium	7782-49-2	0.00205	U	0.00896
Sodium	7440-23-5	738	U	1630
Strontium	7440-24-6	0.365	QB-01, U	0.531
Thallium	7440-28-0	5.73E-5	U	4.10E-4
Thorium	7440-29-01	0.00187	LJ, QB-01, U	0.00244
Uranium	NA	0.00117	U	0.0139
Vanadium	7440-62-2	5.03E-4	U	0.0401
Zinc	7440-66-6	7.43	U	79.6

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ATTN: Ms. Chelsea Saber
PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 12/07/23 08:11
SUBMITTED: 11/29/23
AQS SITE CODE:
SITE CODE: Maui fires

Inorganics by Compendium Method IO-3.5 - Quality Control

Batch 2312007 - B3L0101

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Calibration Blank (2312007-CCB1)				Prepared & Analyzed: 12/04/23						
Aluminum	72.8		ng/l							
Antimony	1.28		ng/l							
Arsenic	15.9		ng/l							
Barium	2.46		ng/l							
Beryllium	1.07		ng/l							
Cadmium	0.878		ng/l							
Calcium	496		ng/l							
Chromium	7.87		ng/l							
Cobalt	1.13		ng/l							
Copper	61.6		ng/l							
Iron	138		ng/l							
Lead	12.4		ng/l							
Magnesium	92.2		ng/l							
Manganese	15.2		ng/l							
Molybdenum	29.1		ng/l							
Nickel	0.382		ng/l							
Phosphorus	-196		ng/l							U
Potassium	3450		ng/l							
Rubidium	-0.595		ng/l							U
Selenium	-6.15		ng/l							U
Sodium	2280		ng/l							
Strontium	0.532		ng/l							
Thallium	0.397		ng/l							
Thorium	0.491		ng/l							
Uranium	0.00336		ng/l							
Vanadium	-47.7		ng/l							U
Zinc	-57.4		ng/l							U
Calibration Blank (2312007-CCB2)				Prepared & Analyzed: 12/04/23						
Aluminum	-96.5		ng/l							U
Antimony	0.940		ng/l							
Arsenic	9.14		ng/l							
Barium	0.966		ng/l							
Beryllium	0.808		ng/l							
Cadmium	0.413		ng/l							
Calcium	-1280		ng/l							U
Chromium	2.85		ng/l							
Cobalt	0.509		ng/l							
Copper	34.7		ng/l							

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FILE #: 0000.00
REPORTED: 12/07/23 08:11
SUBMITTED: 11/29/23
AQS SITE CODE:
SITE CODE: Maui fires

Inorganics by Compendium Method IO-3.5 - Quality Control

Batch 2312007 - B3L0101

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Calibration Blank (2312007-CCB2) Continued				Prepared & Analyzed: 12/04/23						
Iron	-10.9		ng/l							U
Lead	9.28		ng/l							
Magnesium	-42.5		ng/l							U
Manganese	9.66		ng/l							
Molybdenum	6.73		ng/l							
Nickel	-2.87		ng/l							U
Phosphorus	-516		ng/l							U
Potassium	1730		ng/l							
Rubidium	-0.482		ng/l							U
Selenium	-1.85		ng/l							U
Sodium	3880		ng/l							
Strontium	0.266		ng/l							
Thallium	0.246		ng/l							
Thorium	0.583		ng/l							
Uranium	-0.0295		ng/l							U
Vanadium	-53.5		ng/l							U
Zinc	-107		ng/l							U
Calibration Blank (2312007-CCB3)				Prepared & Analyzed: 12/04/23						
Aluminum	-109		ng/l							U
Antimony	0.523		ng/l							
Arsenic	14.0		ng/l							
Barium	-0.760		ng/l							U
Beryllium	-0.511		ng/l							U
Cadmium	0.150		ng/l							
Calcium	-1210		ng/l							U
Chromium	0.355		ng/l							
Cobalt	0.226		ng/l							
Copper	13.0		ng/l							
Iron	-47.6		ng/l							U
Lead	5.45		ng/l							
Magnesium	-21.0		ng/l							U
Manganese	3.68		ng/l							
Molybdenum	6.60		ng/l							
Nickel	-5.14		ng/l							U
Phosphorus	-1070		ng/l							U
Potassium	1960		ng/l							
Rubidium	-0.545		ng/l							U
Selenium	0.410		ng/l							

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Blue Bell, FA 19422
ATTN: Ms. Chelsea Saber
PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 12/07/23 08:11
SUBMITTED: 11/29/23
AQS SITE CODE:
SITE CODE: Maui fires

Inorganics by Compendium Method IO-3.5 - Quality Control

Batch 2312007 - B3L0101

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Calibration Blank (2312007-CCB3) Continued				Prepared & Analyzed: 12/04/23						
Sodium	6960		ng/l							
Strontium	0.564		ng/l							
Thallium	0.266		ng/l							
Thorium	0.317		ng/l							
Uranium	-0.0387		ng/l							U
Vanadium	-62.0		ng/l							U
Zinc	20.6		ng/l							
Calibration Blank (2312007-CCB4)				Prepared: 12/04/23 Analyzed: 12/05/23						
Aluminum	-56.7		ng/l							U
Antimony	1.06		ng/l							
Arsenic	11.2		ng/l							
Barium	-0.220		ng/l							U
Beryllium	-0.287		ng/l							U
Cadmium	0.486		ng/l							
Calcium	-420		ng/l							U
Chromium	3.35		ng/l							
Cobalt	0.530		ng/l							
Copper	32.0		ng/l							
Iron	51.6		ng/l							
Lead	8.90		ng/l							
Magnesium	26.1		ng/l							
Manganese	6.81		ng/l							
Molybdenum	25.1		ng/l							
Nickel	-2.21		ng/l							U
Phosphorus	-63.5		ng/l							U
Potassium	2260		ng/l							
Rubidium	-0.338		ng/l							U
Selenium	-4.92		ng/l							U
Sodium	7750		ng/l							
Strontium	0.333		ng/l							
Thallium	0.358		ng/l							
Thorium	0.276		ng/l							
Uranium	-0.0530		ng/l							U
Vanadium	-60.5		ng/l							U
Zinc	-96.8		ng/l							U
Calibration Check (2312007-CCV1)				Prepared & Analyzed: 12/04/23						
Aluminum	1.60E6		ng/l	1.5000E6		106	90-110			
Antimony	20300		ng/l	20000		101	90-110			

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Tetra Tech, Inc.
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Blue Bell, FA 19422
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PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
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AQS SITE CODE:
SITE CODE: Maui fires

Inorganics by Compendium Method IO-3.5 - Quality Control

Batch 2312007 - B3L0101

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Calibration Check (2312007-CCV1) Continued				Prepared & Analyzed: 12/04/23						
Arsenic	20400		ng/l	20000		102	90-110			
Barium	205000		ng/l	200000		103	90-110			
Beryllium	5150		ng/l	5000.0		103	90-110			
Cadmium	20500		ng/l	20000		103	90-110			
Calcium	2.62E7		ng/l	2.5000E7		105	90-110			
Chromium	230000		ng/l	240000		96.0	90-110			
Cobalt	53400		ng/l	50000		107	90-110			
Copper	2.10E6		ng/l	2.0000E6		105	90-110			
Iron	2.64E6		ng/l	2.5000E6		105	90-110			
Lead	203000		ng/l	200000		102	90-110			
Magnesium	1.08E6		ng/l	1.0000E6		108	90-110			
Manganese	509000		ng/l	500000		102	90-110			
Molybdenum	51200		ng/l	50000		102	90-110			
Nickel	129000		ng/l	120000		107	90-110			
Phosphorus	216000		ng/l	200000		108	90-110			
Potassium	2.61E6		ng/l	2.5000E6		104	90-110			
Rubidium	10100		ng/l	10000		101	90-110			
Selenium	20000		ng/l	20000		99.9	90-110			
Sodium	2.71E6		ng/l	2.5000E6		108	90-110			
Strontium	49900		ng/l	50000		99.7	90-110			
Thallium	512		ng/l	500.00		102	90-110			
Thorium	510		ng/l	500.00		102	90-110			
Uranium	502		ng/l	500.00		100	90-110			
Vanadium	18200		ng/l	20000		91.1	90-110			
Zinc	507000		ng/l	500000		101	90-110			
Calibration Check (2312007-CCV2)				Prepared & Analyzed: 12/04/23						
Aluminum	1.51E6		ng/l	1.5000E6		101	90-110			
Antimony	20200		ng/l	20000		101	90-110			
Arsenic	20300		ng/l	20000		101	90-110			
Barium	208000		ng/l	200000		104	90-110			
Beryllium	5010		ng/l	5000.0		100	90-110			
Cadmium	20500		ng/l	20000		103	90-110			
Calcium	2.57E7		ng/l	2.5000E7		103	90-110			
Chromium	240000		ng/l	240000		99.8	90-110			
Cobalt	52800		ng/l	50000		106	90-110			
Copper	2.11E6		ng/l	2.0000E6		106	90-110			
Iron	2.59E6		ng/l	2.5000E6		104	90-110			
Lead	202000		ng/l	200000		101	90-110			

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Inorganics by Compendium Method IO-3.5 - Quality Control

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Calibration Check (2312007-CCV2) Continued				Prepared & Analyzed: 12/04/23						
Magnesium	1.03E6		ng/l	1.0000E6		103	90-110			
Manganese	510000		ng/l	500000		102	90-110			
Molybdenum	52400		ng/l	50000		105	90-110			
Nickel	128000		ng/l	120000		107	90-110			
Phosphorus	201000		ng/l	200000		100	90-110			
Potassium	2.62E6		ng/l	2.5000E6		105	90-110			
Rubidium	10000		ng/l	10000		100	90-110			
Selenium	19900		ng/l	20000		99.6	90-110			
Sodium	2.59E6		ng/l	2.5000E6		103	90-110			
Strontium	49800		ng/l	50000		99.6	90-110			
Thallium	505		ng/l	500.00		101	90-110			
Thorium	503		ng/l	500.00		101	90-110			
Uranium	495		ng/l	500.00		99.1	90-110			
Vanadium	19600		ng/l	20000		98.2	90-110			
Zinc	534000		ng/l	500000		107	90-110			
Calibration Check (2312007-CCV3)				Prepared & Analyzed: 12/04/23						
Aluminum	1.51E6		ng/l	1.5000E6		101	90-110			
Antimony	20400		ng/l	20000		102	90-110			
Arsenic	20300		ng/l	20000		102	90-110			
Barium	210000		ng/l	200000		105	90-110			
Beryllium	4680		ng/l	5000.0		93.7	90-110			
Cadmium	20900		ng/l	20000		104	90-110			
Calcium	2.61E7		ng/l	2.5000E7		104	90-110			
Chromium	246000		ng/l	240000		102	90-110			
Cobalt	53300		ng/l	50000		107	90-110			
Copper	2.15E6		ng/l	2.0000E6		107	90-110			
Iron	2.61E6		ng/l	2.5000E6		104	90-110			
Lead	204000		ng/l	200000		102	90-110			
Magnesium	1.04E6		ng/l	1.0000E6		104	90-110			
Manganese	516000		ng/l	500000		103	90-110			
Molybdenum	53800		ng/l	50000		108	90-110			
Nickel	130000		ng/l	120000		108	90-110			
Phosphorus	201000		ng/l	200000		100	90-110			
Potassium	2.62E6		ng/l	2.5000E6		105	90-110			
Rubidium	10100		ng/l	10000		101	90-110			
Selenium	19900		ng/l	20000		99.6	90-110			
Sodium	2.64E6		ng/l	2.5000E6		105	90-110			
Strontium	50300		ng/l	50000		101	90-110			

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Batch 2312007 - B3L0101

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Calibration Check (2312007-CCV3) Continued				Prepared & Analyzed: 12/04/23						
Thallium	510		ng/l	500.00		102	90-110			
Thorium	504		ng/l	500.00		101	90-110			
Uranium	502		ng/l	500.00		100	90-110			
Vanadium	20100		ng/l	20000		101	90-110			
Zinc	540000		ng/l	500000		108	90-110			
Calibration Check (2312007-CCV4)				Prepared: 12/04/23 Analyzed: 12/05/23						
Aluminum	1.54E6		ng/l	1.5000E6		103	90-110			
Antimony	20500		ng/l	20000		102	90-110			
Arsenic	20400		ng/l	20000		102	90-110			
Barium	213000		ng/l	200000		106	90-110			
Beryllium	5190		ng/l	5000.0		104	90-110			
Cadmium	20800		ng/l	20000		104	90-110			
Calcium	2.63E7		ng/l	2.5000E7		105	90-110			
Chromium	240000		ng/l	240000		99.9	90-110			
Cobalt	53900		ng/l	50000		108	90-110			
Copper	2.13E6		ng/l	2.0000E6		107	90-110			
Iron	2.64E6		ng/l	2.5000E6		105	90-110			
Lead	203000		ng/l	200000		101	90-110			
Magnesium	1.05E6		ng/l	1.0000E6		105	90-110			
Manganese	513000		ng/l	500000		103	90-110			
Molybdenum	53200		ng/l	50000		106	90-110			
Nickel	131000		ng/l	120000		109	90-110			
Phosphorus	207000		ng/l	200000		103	90-110			
Potassium	2.65E6		ng/l	2.5000E6		106	90-110			
Rubidium	10100		ng/l	10000		101	90-110			
Selenium	20200		ng/l	20000		101	90-110			
Sodium	2.66E6		ng/l	2.5000E6		107	90-110			
Strontium	49700		ng/l	50000		99.4	90-110			
Thallium	514		ng/l	500.00		103	90-110			
Thorium	509		ng/l	500.00		102	90-110			
Uranium	510		ng/l	500.00		102	90-110			
Vanadium	19400		ng/l	20000		97.1	90-110			
Zinc	541000		ng/l	500000		108	90-110			
High Cal Check (2312007-HCV1)				Prepared & Analyzed: 12/04/23						
Aluminum	3.06E6		ng/l	3.0000E6		102	95-105			
Antimony	40800		ng/l	40000		102	95-105			
Arsenic	40700		ng/l	40000		102	95-105			
Barium	411000		ng/l	400000		103	95-105			

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Inorganics by Compendium Method IO-3.5 - Quality Control

Batch 2312007 - B3L0101

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
High Cal Check (2312007-HCV1) Continued				Prepared & Analyzed: 12/04/23						
Beryllium	9610		ng/l	10000		96.1	95-105			
Cadmium	40700		ng/l	40000		102	95-105			
Calcium	5.04E7		ng/l	5.0000E7		101	95-105			
Chromium	479000		ng/l	480000		99.9	95-105			
Cobalt	101000		ng/l	100000		101	95-105			
Copper	4.04E6		ng/l	4.0000E6		101	95-105			
Iron	5.07E6		ng/l	5.0000E6		101	95-105			
Lead	409000		ng/l	400000		102	95-105			
Magnesium	2.02E6		ng/l	2.0000E6		101	95-105			
Manganese	1.02E6		ng/l	1.0000E6		102	95-105			
Molybdenum	103000		ng/l	100000		103	95-105			
Nickel	240000		ng/l	240000		100	95-105			
Phosphorus	408000		ng/l	400000		102	95-105			
Potassium	4.99E6		ng/l	5.0000E6		99.9	95-105			
Rubidium	20200		ng/l	20000		101	95-105			
Selenium	40200		ng/l	40000		100	95-105			
Sodium	5.06E6		ng/l	5.0000E6		101	95-105			
Strontium	102000		ng/l	100000		102	95-105			
Thallium	1020		ng/l	1000.0		102	95-105			
Thorium	1040		ng/l	1000.0		104	95-105			
Uranium	1030		ng/l	1000.0		103	95-105			
Vanadium	39900		ng/l	40000		99.7	95-105			
Zinc	994000		ng/l	1.0000E6		99.4	95-105			
Initial Cal Blank (2312007-ICB1)				Prepared & Analyzed: 12/04/23						
Aluminum	75.4		ng/l							
Antimony	1.45		ng/l							
Arsenic	3.81		ng/l							
Barium	0.219		ng/l							
Beryllium	0.604		ng/l							
Cadmium	0.510		ng/l							
Calcium	605		ng/l							
Chromium	3.96		ng/l							
Cobalt	0.514		ng/l							
Copper	37.4		ng/l							
Iron	95.1		ng/l							
Lead	11.8		ng/l							
Magnesium	71.4		ng/l							
Manganese	9.09		ng/l							

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Batch 2312007 - B3L0101

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Initial Cal Blank (2312007-ICB1) Continued				Prepared & Analyzed: 12/04/23						
Molybdenum	13.3		ng/l							
Nickel	1.36E-4		ng/l							
Phosphorus	-712		ng/l							U
Potassium	1690		ng/l							
Rubidium	-0.195		ng/l							U
Selenium	-6.80		ng/l							U
Sodium	423		ng/l							
Strontium	1.05		ng/l							
Thallium	0.379		ng/l							
Thorium	0.466		ng/l							
Uranium	-0.0197		ng/l							U
Vanadium	-46.2		ng/l							U
Zinc	-62.2		ng/l							U
Initial Cal Check (2312007-ICV1)				Prepared & Analyzed: 12/04/23						
Aluminum	1.48E6		ng/l	1.5000E6		99.0	90-110			
Antimony	19700		ng/l	20000		98.6	90-110			
Arsenic	19800		ng/l	20000		98.9	90-110			
Barium	197000		ng/l	200000		98.6	90-110			
Beryllium	4520		ng/l	5000.0		90.3	90-110			
Cadmium	20700		ng/l	20000		103	90-110			
Calcium	2.51E7		ng/l	2.5000E7		101	90-110			
Chromium	233000		ng/l	240000		97.1	90-110			
Cobalt	50900		ng/l	50000		102	90-110			
Copper	2.00E6		ng/l	2.0000E6		100	90-110			
Iron	2.55E6		ng/l	2.5000E6		102	90-110			
Lead	198000		ng/l	200000		98.8	90-110			
Magnesium	1.00E6		ng/l	1.0000E6		100	90-110			
Manganese	492000		ng/l	500000		98.5	90-110			
Molybdenum	49200		ng/l	50000		98.4	90-110			
Nickel	124000		ng/l	120000		103	90-110			
Phosphorus	197000		ng/l	200000		98.6	90-110			
Potassium	2.62E6		ng/l	2.5000E6		105	90-110			
Rubidium	9630		ng/l	10000		96.3	90-110			
Selenium	20500		ng/l	20000		102	90-110			
Sodium	2.48E6		ng/l	2.5000E6		99.3	90-110			
Strontium	49600		ng/l	50000		99.2	90-110			
Thallium	486		ng/l	500.00		97.1	90-110			
Thorium	486		ng/l	500.00		97.2	90-110			

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Inorganics by Compendium Method IO-3.5 - Quality Control

Batch 2312007 - B3L0101

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Initial Cal Check (2312007-ICV1) Continued				Prepared & Analyzed: 12/04/23						
Uranium	494		ng/l	500.00		98.9	90-110			
Vanadium	19700		ng/l	20000		98.6	90-110			
Zinc	531000		ng/l	500000		106	90-110			
Interference Check A (2312007-IFA1)				Prepared & Analyzed: 12/04/23						
Aluminum	1.61E7		ng/l	1.5000E7		108	80-120			
Antimony	0.00		ng/l				80-120			U
Arsenic	0.00		ng/l				80-120			U
Barium	0.00		ng/l				80-120			U
Beryllium	0.00		ng/l				80-120			U
Cadmium	0.00		ng/l				80-120			U
Calcium	9.84E7		ng/l	1.0040E8		98.0	80-120			
Chromium	0.00		ng/l				80-120			U
Cobalt	0.00		ng/l				80-120			U
Copper	0.00		ng/l				80-120			U
Iron	1.56E7		ng/l	1.5000E7		104	80-120			
Lead	0.00		ng/l				80-120			U
Magnesium	1.58E7		ng/l	1.5000E7		105	80-120			
Manganese	0.00		ng/l				80-120			U
Molybdenum	308000		ng/l	300000		103	80-120			
Nickel	0.00		ng/l				80-120			U
Phosphorus	1.77E7		ng/l	1.5000E7		118	80-120			
Potassium	1.61E7		ng/l	1.5000E7		107	80-120			
Rubidium	0.00		ng/l				80-120			U
Selenium	0.00		ng/l				80-120			U
Sodium	1.65E7		ng/l	1.5000E7		110	80-120			
Strontium	0.00		ng/l				80-120			U
Thallium	0.00		ng/l				80-120			U
Thorium	0.00		ng/l				80-120			U
Uranium	0.00		ng/l				80-120			U
Vanadium	0.00		ng/l				80-120			U
Zinc	0.00		ng/l				80-120			U
Interference Check A (2312007-IFA2)				Prepared: 12/04/23 Analyzed: 12/05/23						
Aluminum	1.53E7		ng/l	1.5000E7		102	80-120			
Antimony	0.00		ng/l				80-120			U
Arsenic	0.00		ng/l				80-120			U
Barium	0.00		ng/l				80-120			U
Beryllium	0.00		ng/l				80-120			U
Cadmium	0.00		ng/l				80-120			U

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Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Interference Check A (2312007-IFA2) Continued				Prepared: 12/04/23 Analyzed: 12/05/23						
Calcium	9.76E7		ng/l	1.0040E8		97.3	80-120			
Chromium	0.00		ng/l				80-120			U
Cobalt	0.00		ng/l				80-120			U
Copper	0.00		ng/l				80-120			U
Iron	1.56E7		ng/l	1.5000E7		104	80-120			
Lead	0.00		ng/l				80-120			U
Magnesium	1.55E7		ng/l	1.5000E7		103	80-120			
Manganese	0.00		ng/l				80-120			U
Molybdenum	326000		ng/l	300000		109	80-120			
Nickel	0.00		ng/l				80-120			U
Phosphorus	1.66E7		ng/l	1.5000E7		111	80-120			
Potassium	1.56E7		ng/l	1.5000E7		104	80-120			
Rubidium	0.00		ng/l				80-120			U
Selenium	0.00		ng/l				80-120			U
Sodium	1.63E7		ng/l	1.5000E7		109	80-120			
Strontium	0.00		ng/l				80-120			U
Thallium	0.00		ng/l				80-120			U
Thorium	0.00		ng/l				80-120			U
Uranium	0.00		ng/l				80-120			U
Vanadium	0.00		ng/l				80-120			U
Zinc	0.00		ng/l				80-120			U
Interference Check B (2312007-IFB1)				Prepared & Analyzed: 12/04/23						
Aluminum	1.84E7		ng/l	1.6500E7		112	80-120			
Antimony	20500		ng/l	20000		102	80-120			
Arsenic	20900		ng/l	20000		104	80-120			
Barium	207000		ng/l	200000		103	80-120			
Beryllium	5530		ng/l	5000.0		111	80-120			
Cadmium	19800		ng/l	20000		99.0	80-120			
Calcium	1.26E8		ng/l	1.2540E8		101	80-120			
Chromium	215000		ng/l	240000		89.6	80-120			
Cobalt	52400		ng/l	50000		105	80-120			
Copper	1.96E6		ng/l	2.0000E6		97.8	80-120			
Iron	1.85E7		ng/l	1.7500E7		106	80-120			
Lead	210000		ng/l	200000		105	80-120			
Magnesium	1.73E7		ng/l	1.6000E7		108	80-120			
Manganese	538000		ng/l	500000		108	80-120			
Molybdenum	360000		ng/l	350000		103	80-120			
Nickel	124000		ng/l	120000		103	80-120			

CERTIFICATE OF ANALYSIS

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Inorganics by Compendium Method IO-3.5 - Quality Control

Batch 2312007 - B3L0101

Interference Check B (2312007-IFB1) Continued — Prepared & Analyzed: 12/04/23

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Phosphorus	1.85E7		ng/l	1.5200E7		122	80-120			
Potassium	1.92E7		ng/l	1.7500E7		110	80-120			
Rubidium	10300		ng/l	10000		103	80-120			
Selenium	19400		ng/l	20000		96.8	80-120			
Sodium	2.02E7		ng/l	1.7500E7		115	80-120			
Strontium	51100		ng/l	50000		102	80-120			
Thallium	530		ng/l	500.00		106	80-120			
Thorium	556		ng/l	500.00		111	80-120			
Uranium	553		ng/l	500.00		111	80-120			
Vanadium	16400		ng/l	20000		81.9	80-120			
Zinc	468000		ng/l	500000		93.6	80-120			

Interference Check B (2312007-IFB2) — Prepared: 12/04/23 Analyzed: 12/05/23

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Aluminum	1.76E7		ng/l	1.6500E7		107	80-120			
Antimony	21100		ng/l	20000		105	80-120			
Arsenic	21100		ng/l	20000		105	80-120			
Barium	218000		ng/l	200000		109	80-120			
Beryllium	5310		ng/l	5000.0		106	80-120			
Cadmium	20300		ng/l	20000		102	80-120			
Calcium	1.25E8		ng/l	1.2540E8		99.4	80-120			
Chromium	224000		ng/l	240000		93.5	80-120			
Cobalt	52700		ng/l	50000		105	80-120			
Copper	2.00E6		ng/l	2.0000E6		99.9	80-120			
Iron	1.85E7		ng/l	1.7500E7		106	80-120			
Lead	215000		ng/l	200000		107	80-120			
Magnesium	1.68E7		ng/l	1.6000E7		105	80-120			
Manganese	537000		ng/l	500000		107	80-120			
Molybdenum	381000		ng/l	350000		109	80-120			
Nickel	124000		ng/l	120000		104	80-120			
Phosphorus	1.75E7		ng/l	1.5200E7		115	80-120			
Potassium	1.88E7		ng/l	1.7500E7		107	80-120			
Rubidium	10400		ng/l	10000		104	80-120			
Selenium	19300		ng/l	20000		96.4	80-120			
Sodium	1.97E7		ng/l	1.7500E7		112	80-120			
Strontium	51000		ng/l	50000		102	80-120			
Thallium	545		ng/l	500.00		109	80-120			
Thorium	568		ng/l	500.00		114	80-120			
Uranium	569		ng/l	500.00		114	80-120			
Vanadium	17700		ng/l	20000		88.7	80-120			

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Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes

Inorganics by Compendium Method IO-3.5 - Quality Control

Batch 2312007 - B3L0101

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Interference Check B (2312007-IFB2) Continued				Prepared: 12/04/23 Analyzed: 12/05/23						
Zinc	492000		ng/l	500000		98.5	80-120			

Batch B3L0101 - ICP-MS Extraction

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (B3L0101-BLK1)				Prepared: 12/01/23 Analyzed: 12/04/23						
Aluminum	ND	32.1	ng/m³ Air							U
Antimony	ND	0.0441	ng/m³ Air							SL, U
Arsenic	ND	0.00955	ng/m³ Air							U
Barium	ND	0.948	ng/m³ Air							U
Beryllium	ND	0.00332	ng/m³ Air							U
Cadmium	ND	0.109	ng/m³ Air							U
Calcium	ND	292	ng/m³ Air							GC-BS, LJ, QB-01, U
Chromium	ND	2.03	ng/m³ Air							U
Cobalt	ND	0.0156	ng/m³ Air							QB-01, U
Copper	ND	3.00	ng/m³ Air							U
Iron	ND	24.2	ng/m³ Air							U
Lead	ND	0.276	ng/m³ Air							U
Magnesium	ND	96.4	ng/m³ Air							U
Manganese	ND	1.19	ng/m³ Air							U
Molybdenum	ND	0.213	ng/m³ Air							QB-01, U
Nickel	ND	0.801	ng/m³ Air							U
Phosphorus	ND	1250	ng/m³ Air							GC-BS, LJ, U
Potassium	ND	38.0	ng/m³ Air							LJ, U
Rubidium	ND	0.0183	ng/m³ Air							U
Selenium	ND	0.0110	ng/m³ Air							U
Sodium	ND	2000	ng/m³ Air							U
Strontium	ND	0.652	ng/m³ Air							QB-01, U
Thallium	ND	5.03E-4	ng/m³ Air							U
Thorium	ND	0.00300	ng/m³ Air							LJ, QB-01, U
Uranium	ND	0.0170	ng/m³ Air							U
Vanadium	ND	0.0492	ng/m³ Air							U
Zinc	ND	97.7	ng/m³ Air							U
LCS (B3L0101-BS1)				Prepared: 12/01/23 Analyzed: 12/04/23						
Aluminum	93.4	32.1	ng/m³ Air	82.975		113	80-120			
Antimony	0.534	0.0441	ng/m³ Air	1.3829		38.6	80-120			SL
Arsenic	2.75	0.00955	ng/m³ Air	2.7658		99.3	80-120			
Barium	28.2	0.948	ng/m³ Air	27.658		102	80-120			
Beryllium	1.35	0.00332	ng/m³ Air	1.3829		97.4	80-120			
Cadmium	1.43	0.109	ng/m³ Air	1.3829		103	80-120			

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Inorganics by Compendium Method IO-3.5 - Quality Control

Batch B3L0101 - ICP-MS Extraction

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
LCS (B3L0101-BS1) Continued				Prepared: 12/01/23 Analyzed: 12/04/23						
Calcium	616	292	ng/m³ Air	69.146		890	80-120			GC-BS, LJ, QB-01
Chromium	16.3	2.03	ng/m³ Air	13.829		118	80-120			
Cobalt	1.47	0.0156	ng/m³ Air	1.3829		106	80-120			QB-01
Copper	31.0	3.00	ng/m³ Air	27.658		112	80-120			
Iron	42.5	24.2	ng/m³ Air	27.658		154	80-120			
Lead	13.9	0.276	ng/m³ Air	13.829		100	80-120			
Magnesium	ND	96.4	ng/m³ Air	27.658			80-120			U
Manganese	8.75	1.19	ng/m³ Air	8.2975		105	80-120			
Molybdenum	1.72	0.213	ng/m³ Air	1.3829		125	80-120			QB-01
Nickel	3.41	0.801	ng/m³ Air	2.7658		123	80-120			
Phosphorus	ND	1250	ng/m³ Air	13.829			80-120			GC-BS, LJ, U
Potassium	70.5	38.0	ng/m³ Air	55.317		127	80-120			LJ
Rubidium	1.36	0.0183	ng/m³ Air	1.3829		98.3	80-120			
Selenium	2.66	0.0110	ng/m³ Air	2.7658		96.2	80-120			
Sodium	ND	2000	ng/m³ Air	55.317			80-120			U
Strontium	2.26	0.652	ng/m³ Air	1.3829		163	80-120			QB-01
Thallium	0.131	5.03E-4	ng/m³ Air	0.13829		95.0	80-120			
Thorium	0.135	0.00300	ng/m³ Air	0.13829		97.6	80-120			LJ, QB-01
Uranium	0.131	0.0170	ng/m³ Air	0.13829		95.1	80-120			
Vanadium	2.73	0.0492	ng/m³ Air	2.7658		98.8	80-120			
Zinc	124	97.7	ng/m³ Air	82.975		150	80-120			
Duplicate (B3L0101-DUP1)		**Source: 3112929-05**		Prepared: 12/01/23 Analyzed: 12/04/23						
Aluminum	324	26.2	ng/m³ Air		325			0.421	10	
Antimony	0.0493	0.0359	ng/m³ Air		0.0515			4.45	10	SL
Arsenic	0.100	0.00778	ng/m³ Air		0.114			12.7	10	
Barium	4.56	0.773	ng/m³ Air		4.40			3.51	10	
Beryllium	0.0105	0.00271	ng/m³ Air		0.0103			2.26	10	
Cadmium	ND	0.0888	ng/m³ Air		ND				10	U
Calcium	619	238	ng/m³ Air		608			1.86	10	GC-BS, LJ, QB-01
Chromium	1.84	1.65	ng/m³ Air		1.81			1.50	10	
Cobalt	0.190	0.0127	ng/m³ Air		0.194			1.83	10	QB-01
Copper	19.1	2.44	ng/m³ Air		21.0			9.22	10	
Iron	373	19.7	ng/m³ Air		367			1.53	10	
Lead	0.334	0.225	ng/m³ Air		0.369			10.1	10	
Magnesium	279	78.6	ng/m³ Air		277			0.677	10	
Manganese	9.45	0.970	ng/m³ Air		9.57			1.29	10	
Molybdenum	1.11	0.174	ng/m³ Air		1.14			2.43	10	QB-01

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Inorganics by Compendium Method IO-3.5 - Quality Control

Batch B3L0101 - ICP-MS Extraction

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Duplicate (B3L0101-DUP1) Continued		**Source: 3112929-05**		Prepared: 12/01/23 Analyzed: 12/04/23						
Nickel	0.870	0.653	ng/m³ Air		1.07			20.8	10	
Phosphorus	ND	1020	ng/m³ Air		ND				10	GC-BS, LJ, U
Potassium	132	31.0	ng/m³ Air		148			11.1	10	LJ
Rubidium	0.149	0.0149	ng/m³ Air		0.148			0.589	10	
Selenium	0.152	0.00896	ng/m³ Air		0.152			0.0617	10	
Sodium	2440	1630	ng/m³ Air		2420			0.598	10	E
Strontium	3.79	0.531	ng/m³ Air		3.77			0.562	10	QB-01
Thallium	8.47E-4	4.10E-4	ng/m³ Air		8.96E-4			5.57	10	
Thorium	0.00835	0.00244	ng/m³ Air		0.00827			0.958	10	LJ, QB-01
Uranium	ND	0.0139	ng/m³ Air		ND				10	U
Vanadium	1.65	0.0401	ng/m³ Air		1.68			1.79	10	
Zinc	ND	79.6	ng/m³ Air		ND				10	U
Duplicate (B3L0101-DUP2)		**Source: 3112929-10**		Prepared: 12/01/23 Analyzed: 12/04/23						
Aluminum	570	26.2	ng/m³ Air		578			1.54	10	
Antimony	0.0705	0.0361	ng/m³ Air		0.0706			0.142	10	SL
Arsenic	0.218	0.00781	ng/m³ Air		0.219			0.555	10	
Barium	7.72	0.775	ng/m³ Air		7.77			0.644	10	
Beryllium	0.0175	0.00271	ng/m³ Air		0.0165			5.50	10	
Cadmium	ND	0.0891	ng/m³ Air		ND				10	U
Calcium	782	239	ng/m³ Air		787			0.680	10	GC-BS, LJ, QB-01
Chromium	2.00	1.66	ng/m³ Air		2.03			1.80	10	
Cobalt	0.272	0.0128	ng/m³ Air		0.276			1.40	10	QB-01
Copper	14.9	2.45	ng/m³ Air		15.2			1.96	10	
Iron	594	19.8	ng/m³ Air		606			1.88	10	
Lead	0.263	0.226	ng/m³ Air		0.266			1.24	10	
Magnesium	234	78.8	ng/m³ Air		237			1.07	10	
Manganese	15.6	0.973	ng/m³ Air		15.8			0.981	10	
Molybdenum	0.966	0.174	ng/m³ Air		0.967			0.121	10	QB-01
Nickel	0.775	0.655	ng/m³ Air		0.786			1.32	10	
Phosphorus	ND	1020	ng/m³ Air		ND				10	GC-BS, LJ, U
Potassium	173	31.1	ng/m³ Air		175			1.09	10	LJ
Rubidium	0.254	0.0150	ng/m³ Air		0.253			0.178	10	
Selenium	0.185	0.00899	ng/m³ Air		0.192			3.25	10	
Sodium	1850	1640	ng/m³ Air		1850			0.355	10	E
Strontium	5.92	0.533	ng/m³ Air		6.02			1.67	10	QB-01
Thallium	0.00146	4.11E-4	ng/m³ Air		0.00139			5.23	10	
Thorium	0.0161	0.00245	ng/m³ Air		0.0163			1.10	10	LJ, QB-01

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Inorganics by Compendium Method IO-3.5 - Quality Control

Batch B3L0101 - ICP-MS Extraction

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Duplicate (B3L0101-DUP2) Continued	**Source: 3112929-10**			Prepared: 12/01/23 Analyzed: 12/04/23						
Uranium	0.0153	0.0139	ng/m³ Air		0.0160			4.12	10	
Vanadium	1.68	0.0402	ng/m³ Air		1.72			2.20	10	
Zinc	ND	79.9	ng/m³ Air		ND				10	U
Matrix Spike (B3L0101-MS1)	**Source: 3112929-05**			Prepared: 12/01/23 Analyzed: 12/04/23						
Aluminum	399	26.2	ng/m³ Air	67.624	325	109	80-120			
Antimony	0.488	0.0359	ng/m³ Air	1.1271	0.0515	38.7	80-120			SL
Arsenic	2.33	0.00778	ng/m³ Air	2.2541	0.114	98.1	80-120			
Barium	27.8	0.773	ng/m³ Air	22.541	4.40	104	80-120			
Beryllium	1.14	0.00271	ng/m³ Air	1.1271	0.0103	101	80-120			
Cadmium	1.17	0.0888	ng/m³ Air	1.1271	ND	104	80-120			
Calcium	684	238	ng/m³ Air	56.353	608	135	80-120			LJ, QB-01, QM-4X, GC-BS
Chromium	13.2	1.65	ng/m³ Air	11.271	1.81	101	80-120			
Cobalt	1.37	0.0127	ng/m³ Air	1.1271	0.194	105	80-120			QB-01
Copper	44.7	2.44	ng/m³ Air	22.541	21.0	105	80-120			
Iron	395	19.7	ng/m³ Air	22.541	367	125	80-120			QM-4X
Lead	11.7	0.225	ng/m³ Air	11.271	0.369	101	80-120			
Magnesium	302	78.6	ng/m³ Air	22.541	277	109	80-120			
Manganese	16.7	0.970	ng/m³ Air	6.7624	9.57	106	80-120			
Molybdenum	2.36	0.174	ng/m³ Air	1.1271	1.14	109	80-120			QB-01
Nickel	3.13	0.653	ng/m³ Air	2.2541	1.07	91.3	80-120			
Phosphorus	ND	1020	ng/m³ Air	11.271	ND		80-120			GC-BS, LJ, QM-4X, U
Potassium	171	31.0	ng/m³ Air	45.082	148	51.2	80-120			LJ, QM-07
Rubidium	1.23	0.0149	ng/m³ Air	1.1271	0.148	95.8	80-120			
Selenium	2.31	0.00896	ng/m³ Air	2.2541	0.152	95.6	80-120			
Sodium	2510	1630	ng/m³ Air	45.082	2420	198	80-120			QM-4X
Strontium	4.88	0.531	ng/m³ Air	1.1271	3.77	98.2	80-120			QB-01
Thallium	0.109	4.10E-4	ng/m³ Air	0.11271	8.96E-4	96.0	80-120			
Thorium	0.0521	0.00244	ng/m³ Air	0.11271	0.00827	38.9	80-120			LJ, QB-01, QM-07
Uranium	0.115	0.0139	ng/m³ Air	0.11271	ND	102	80-120			
Vanadium	3.79	0.0401	ng/m³ Air	2.2541	1.68	93.7	80-120			
Zinc	87.3	79.6	ng/m³ Air	67.624	ND	129	80-120			
Matrix Spike Dup (B3L0101-MSD1)	**Source: 3112929-05**			Prepared: 12/01/23 Analyzed: 12/04/23						
Aluminum	386	26.2	ng/m³ Air	67.624	325	89.3	80-120	3.32	20	
Antimony	0.448	0.0359	ng/m³ Air	1.1271	0.0515	35.2	80-120	8.37	20	SL
Arsenic	2.32	0.00778	ng/m³ Air	2.2541	0.114	97.9	80-120	0.190	20	
Barium	27.2	0.773	ng/m³ Air	22.541	4.40	101	80-120	2.45	20	

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Inorganics by Compendium Method IO-3.5 - Quality Control

Batch B3L0101 - ICP-MS Extraction

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Matrix Spike Dup (B3L0101-MSD1) Continued		**Source: 3112929-05**		Prepared: 12/01/23 Analyzed: 12/04/23						
Beryllium	1.21	0.00271	ng/m³ Air	1.1271	0.0103	107	80-120	6.01	20	
Cadmium	1.14	0.0888	ng/m³ Air	1.1271	ND	101	80-120	2.21	20	
Calcium	669	238	ng/m³ Air	56.353	608	109	80-120	2.15	20	QB-01, GC-BS, LJ
Chromium	12.8	1.65	ng/m³ Air	11.271	1.81	97.5	80-120	2.94	20	
Cobalt	1.35	0.0127	ng/m³ Air	1.1271	0.194	103	80-120	1.61	20	QB-01
Copper	46.1	2.44	ng/m³ Air	22.541	21.0	111	80-120	3.11	20	
Iron	385	19.7	ng/m³ Air	22.541	367	76.7	80-120	2.78	20	QM-4X
Lead	11.6	0.225	ng/m³ Air	11.271	0.369	99.9	80-120	0.640	20	
Magnesium	294	78.6	ng/m³ Air	22.541	277	73.7	80-120	2.69	20	QM-4X
Manganese	16.3	0.970	ng/m³ Air	6.7624	9.57	99.6	80-120	2.47	20	
Molybdenum	2.36	0.174	ng/m³ Air	1.1271	1.14	108	80-120	0.0773	20	QB-01
Nickel	3.11	0.653	ng/m³ Air	2.2541	1.07	90.3	80-120	0.728	20	
Phosphorus	ND	1020	ng/m³ Air	11.271	ND		80-120		20	GC-BS, LJ, QM-4X, U
Potassium	173	31.0	ng/m³ Air	45.082	148	55.6	80-120	1.15	20	LJ, QM-07
Rubidium	1.20	0.0149	ng/m³ Air	1.1271	0.148	93.4	80-120	2.19	20	
Selenium	2.27	0.00896	ng/m³ Air	2.2541	0.152	94.1	80-120	1.42	20	
Sodium	2450	1630	ng/m³ Air	45.082	2420	46.4	80-120	2.76	20	QM-4X
Strontium	4.78	0.531	ng/m³ Air	1.1271	3.77	89.6	80-120	2.02	20	QB-01
Thallium	0.108	4.10E-4	ng/m³ Air	0.11271	8.96E-4	94.8	80-120	1.22	20	
Thorium	0.0484	0.00244	ng/m³ Air	0.11271	0.00827	35.6	80-120	7.25	20	LJ, QB-01, QM-07
Uranium	0.114	0.0139	ng/m³ Air	0.11271	ND	101	80-120	1.37	20	
Vanadium	3.70	0.0401	ng/m³ Air	2.2541	1.68	89.8	80-120	2.36	20	
Zinc	88.8	79.6	ng/m³ Air	67.624	ND	131	80-120	1.74	20	
Post Spike (B3L0101-PS1)		**Source: 3112929-05**		Prepared: 12/01/23 Analyzed: 12/04/23						
Aluminum	347	26.2	ng/m³ Air	22.541	325	96.7	75-125			
Antimony	0.268	0.0359	ng/m³ Air	0.22541	0.0515	96.1	75-125			SL
Arsenic	1.18	0.00778	ng/m³ Air	1.1271	0.114	94.8	75-125			
Barium	6.72	0.773	ng/m³ Air	2.2541	4.40	103	75-125			
Beryllium	0.245	0.00271	ng/m³ Air	0.22541	0.0103	104	75-125			
Cadmium	0.118	0.0888	ng/m³ Air	0.11271	ND	105	75-125			
Calcium	648	238	ng/m³ Air	22.541	608	180	75-125			GC-BS, LJ, QB-01
Chromium	2.87	1.65	ng/m³ Air	1.1271	1.81	93.9	75-125			
Cobalt	0.426	0.0127	ng/m³ Air	0.22541	0.194	103	75-125			QB-01
Copper	32.7	2.44	ng/m³ Air	11.271	21.0	104	75-125			
Iron	395	19.7	ng/m³ Air	22.541	367	123	75-125			

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Tetra Tech, Inc.
1777 Sentry Pkwy, Bldg 12
Blue Bell, FA 19422
ATTN: Ms. Chelsea Saber
PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 12/07/23 08:11
SUBMITTED: 11/29/23
AQS SITE CODE:
SITE CODE: Maui fires

Inorganics by Compendium Method IO-3.5 - Quality Control

Batch B3L0101 - ICP-MS Extraction

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Post Spike (B3L0101-PS1) Continued		**Source: 3112929-05**		Prepared: 12/01/23	Analyzed: 12/04/23					
Lead	22.2	0.225	ng/m³ Air	22.541	0.369	97.0	75-125			
Magnesium	301	78.6	ng/m³ Air	22.541	277	107	75-125			
Manganese	11.9	0.970	ng/m³ Air	2.2541	9.57	102	75-125			
Molybdenum	2.28	0.174	ng/m³ Air	1.1271	1.14	101	75-125			QB-01
Nickel	3.37	0.653	ng/m³ Air	2.2541	1.07	102	75-125			
Phosphorus	ND	1020	ng/m³ Air	4.5082	ND		75-125			A-01, GC-BS, LJ, U
Potassium	171	31.0	ng/m³ Air	22.541	148	102	75-125			LJ
Rubidium	0.254	0.0149	ng/m³ Air	0.11271	0.148	93.7	75-125			
Selenium	1.23	0.00896	ng/m³ Air	1.1271	0.152	95.6	75-125			
Sodium	2470	1630	ng/m³ Air	22.541	2420	221	75-125			A-01
Strontium	4.80	0.531	ng/m³ Air	1.1271	3.77	91.8	75-125			QB-01
Thallium	0.0528	4.10E-4	ng/m³ Air	5.6353E-2	8.96E-4	92.0	75-125			
Thorium	0.0603	0.00244	ng/m³ Air	5.6353E-2	0.00827	92.4	75-125			LJ, QB-01
Uranium	0.0613	0.0139	ng/m³ Air	5.6353E-2	ND	109	75-125			
Vanadium	2.66	0.0401	ng/m³ Air	1.1271	1.68	87.4	75-125			
Zinc	ND	79.6	ng/m³ Air	22.541	ND		75-125			U
Dilution Check (B3L0101-SRL1)		**Source: 3112929-05**		Prepared: 12/01/23	Analyzed: 12/04/23					
Aluminum	321	131	ng/m³ Air		325			1.34	10	
Antimony	ND	0.180	ng/m³ Air		ND				10	SL, U
Arsenic	0.122	0.0389	ng/m³ Air		0.114			7.13	10	
Barium	4.42	3.86	ng/m³ Air		4.40			0.366	10	
Beryllium	ND	0.0135	ng/m³ Air		ND				10	U
Cadmium	ND	0.444	ng/m³ Air		ND				10	U
Calcium	ND	1190	ng/m³ Air		ND				10	GC-BS, LJ, QB-01, U
Chromium	ND	8.27	ng/m³ Air		ND				10	U
Cobalt	0.195	0.0636	ng/m³ Air		0.194			0.471	10	QB-01
Copper	21.4	12.2	ng/m³ Air		21.0			1.74	10	
Iron	365	98.6	ng/m³ Air		367			0.594	10	
Lead	ND	1.12	ng/m³ Air		ND				10	U
Magnesium	ND	393	ng/m³ Air		ND				10	U
Manganese	9.59	4.85	ng/m³ Air		9.57			0.204	10	
Molybdenum	1.16	0.868	ng/m³ Air		1.14			1.64	10	QB-01
Nickel	ND	3.26	ng/m³ Air		ND				10	U
Phosphorus	ND	5090	ng/m³ Air		ND				10	GC-BS, LJ, U
Potassium	ND	155	ng/m³ Air		ND				10	LJ, U
Rubidium	0.154	0.0746	ng/m³ Air		0.148			3.58	10	
Selenium	0.157	0.0448	ng/m³ Air		0.152			3.68	10	

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FILE #: 0000.00
REPORTED: 12/07/23 08:11
SUBMITTED: 11/29/23
AQS SITE CODE:
SITE CODE: Maui fires

Inorganics by Compendium Method IO-3.5 - Quality Control

Batch B3L0101 - ICP-MS Extraction

Dilution Check (B3L0101-SRL1) Continued **Source: 3112929-05** Prepared: 12/01/23 Analyzed: 12/04/23

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Sodium	ND	8150	ng/m³ Air		ND				10	U
Strontium	3.76	2.66	ng/m³ Air		3.77			0.194	10	QB-01
Thallium	ND	0.00205	ng/m³ Air		ND				10	U
Thorium	ND	0.0122	ng/m³ Air		ND				10	LJ, QB-01, U
Uranium	ND	0.0693	ng/m³ Air		ND				10	U
Vanadium	1.62	0.200	ng/m³ Air		1.68			3.58	10	
Zinc	ND	398	ng/m³ Air		ND				10	U

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Notes and Definitions

U	Under Detection Limit
SL	The spike recovery was outside acceptance limits. Reported value may be biased low.
QM-4X	The MS/MSD recovery exceeds criteria because the parent sample concentration is greater than 4x the spike concentration. Sample results for the QC batch were accepted based on acceptable BS/BSD recoveries.
QM-07	The spike recovery was outside acceptance limits for the MS and/or MSD. The batch was accepted based on acceptable LCS recovery.
QB-01	Analyte exceeds method blank criteria
LJ	Identification of analyte is acceptable; reported value is an estimate.
GC-BS	Compound exceeds Blank Spike Criteria
FB-01	Analyte exceeds Field Blank criteria.
E	The concentration indicated for this analyte is an estimated value above the calibration range of the instrument. This value is considered an estimate (CLP E-flag).
A-01	Parent Sample >4x spike amount
ND	Analyte NOT DETECTED
NR	Not Reported
MDL	Method Detection Limit
RPD	Relative Percent Difference

Note: This test is accredited under the 2016 TNI Standard.

Eastern Research Group
601 Keystone Park Drive
Suite 700
Morrisville, NC 27560

December 14, 2023

Ms. Chelsea Saber
Tetra Tech, Inc.
1777 Sentry Pkwy, Bldg 12
Blue Bell, PA 19422
Project Name: Maui fires

Dear Ms. Chelsea Saber,

This report contains the analytical results for the sample(s) received under chain(s) of custody by Eastern Research Group on 12/04/23 12:47.

Values below the MDL for QC results in this report are recorded as ND, however the actual values are reported in the accompanying Excel report with a "U" flag (Under the detection limit). The actual values are reported in AQS.

This test is accredited under the 2016 TNI Standard for Environmental Laboratories (FL DOH Certification # E87673). All analyses were performed as described in the US EPA-approved QAPP, under the contract for National Hazardous Air Pollutant Support (US EPA Contract No. 68HERH22D0002). This cover page is an integral part of this report, and any exceptions or comments are noted on the last page.

Release of the data contained in this data package and in the data submitted in the electronic data deliverable, has been authorized by the Program Manager, or the Program Manager's designee as verified by the following signature.

The issuance of the final Certificate of Analysis takes precedence over any previous Report. If you have any questions, please contact me at 919-468-7924.

Sincerely,

Julie Swift
Program Manager
julie.swift@erg.com

The information contained in this report and its attachment(s) are intended only for the use of the individual to whom it is addressed and may contain information that is privileged, confidential, or exempt from disclosure. If the reader of this message is not the intended recipient, you are hereby notified that any dissemination, distribution, or copying of this report is strictly prohibited. If you have received this report in error, please notify julie.swift@erg.com and delete the report without retaining any copies.

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Blue Bell, PA 19422
ATTN: Ms. Chelsea Saber
PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 12/14/23 11:51
SUBMITTED: 12/04/23
AQS SITE CODE:
SITE CODE: Maui fires

ANALYTICAL REPORT FOR SAMPLES

SampleName	LabNumber	Matrix	Sampled	Received
TetraTech Q9541902	3120430-01	Air	11/27/23 23:59	12/04/23 12:47
TetraTech Q9541901	3120430-02	Air	11/27/23 23:59	12/04/23 12:47
TetraTech Q9541925	3120430-03	Air	11/27/23 23:59	12/04/23 12:47
TetraTech Q9541900 FB	3120430-04	Air	11/27/23 00:00	12/04/23 12:47
TetraTech Q9541923	3120430-05	Air	11/28/23 23:59	12/04/23 12:47
TetraTech Q9541921	3120430-06	Air	11/28/23 23:59	12/04/23 12:47
TetraTech Q9541920	3120430-07	Air	11/28/23 23:59	12/04/23 12:47
TetraTech Q9541919	3120430-08	Air	11/29/23 23:59	12/04/23 12:47
TetraTech Q9541227	3120430-09	Air	11/29/23 23:59	12/04/23 12:47
TetraTech Q9541899	3120430-10	Air	11/29/23 23:59	12/04/23 12:47
TetraTech Q9541909 FB	3120430-11	Air	11/29/23 00:00	12/04/23 12:47
TetraTech Q9541226 FB	3120430-12	Air	11/28/23 00:00	12/04/23 12:47

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FILE #: 0000.00
REPORTED: 12/14/23 11:51
SUBMITTED: 12/04/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9541902
Lab ID: 3120430-01
Sampled: 11/27/23 23:59
Matrix: Air
Sample Volume: 2038.818 m³
Received: 12/04/23 12:47
Filter ID:
Analysis Date: 12/08/23 21:29
Comments: MFK-AM01-112723-HM

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	**7429-90-5**	**6570**	E	**25.6**
Antimony	**7440-36-0**	**0.0770**	SL	**0.0352**
Barium	**7440-39-3**	**35.9**		**0.757**
Beryllium	**7440-41-7**	**0.187**		**0.00265**
Calcium	**7440-70-2**	**1260**	GC-BS, QB-01	**233**
Chromium	**7440-47-3**	**5.66**		**1.62**
Cobalt	**7440-48-4**	**2.20**	QB-01	**0.0124**
Copper	**7440-50-8**	**22.4**		**2.39**
Lead	**7439-92-1**	**1.18**		**0.220**
Magnesium	**7439-95-4**	**414**		**76.9**
Manganese	**7439-96-5**	**151**		**0.950**
Nickel	**7440-02-0**	**2.92**		**0.639**
Phosphorus	7723-14-0	677	U, GC-BS, LJ, QX	998
Potassium	**7440-09-7**	**175**		**30.3**
Sodium	7440-23-5	1510	U, GC-BS	1600
Thallium	**7440-28-0**	**0.00891**		**4.01E-4**
Thorium	**7440-29-01**	**0.162**		**0.00239**
Uranium	**7440-61-1**	**0.118**		**0.0136**
Vanadium	**7440-62-2**	**14.9**	E	**0.0393**
Zinc	7440-66-6	40.5	U	78.0

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FILE #: 0000.00
REPORTED: 12/14/23 11:51
SUBMITTED: 12/04/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9541902
Matrix: Air
Comments: MFK-AM01-112723-HM

Lab ID: 3120430-01RE1
Sample Volume: 2038.818 m^3
Filter ID:

Sampled: 11/27/23 23:59
Received: 12/04/23 12:47
Analysis Date: 12/11/23 22:57

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Arsenic	**7440-38-2**	**0.772**	D	**0.0381**
Cadmium	7440-43-9	0.0422	U, D	0.435
Molybdenum	**7439-98-7**	**1.19**	D, QB-01	**0.850**
Rubidium	**7440-17-7**	**1.00**	D	**0.0730**
Selenium	**7782-49-2**	**1.12**	D	**0.0439**
Strontium	**7440-24-6**	**23.2**	D, QB-01	**2.60**

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Blue Bell, PA 19422
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PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 12/14/23 11:51
SUBMITTED: 12/04/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9541902
Lab ID: 3120430-01RE2
Sampled: 11/27/23 23:59
Matrix: Air
Sample Volume: 2038.818 m³
Received: 12/04/23 12:47
Filter ID:
Analysis Date: 12/11/23 23:12
Comments: MFK-AM01-112723-HM

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Iron	7439-89-6	6400	D	193

Eastern Research Group

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FILE #: 0000.00
REPORTED: 12/14/23 11:51
SUBMITTED: 12/04/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9541901 **Lab ID:** 3120430-02 **Sampled:** 11/27/23 23:59
Matrix: Air **Sample Volume:** 2026.064 m³ **Received:** 12/04/23 12:47
Filter ID: **Analysis Date:** 12/08/23 21:47
Comments: MFK-AM02-112723-HM

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	**7429-90-5**	**707**	E	**25.8**
Antimony	**7440-36-0**	**0.0571**	SL	**0.0354**
Arsenic	**7440-38-2**	**0.457**		**0.00767**
Barium	**7440-39-3**	**7.09**		**0.761**
Beryllium	**7440-41-7**	**0.0213**		**0.00267**
Cadmium	7440-43-9	0.0147	U	0.0875
Calcium	**7440-70-2**	**498**	GC-BS, QB-01	**234**
Chromium	**7440-47-3**	**1.86**		**1.63**
Cobalt	**7440-48-4**	**0.347**	QB-01	**0.0125**
Copper	**7440-50-8**	**22.1**		**2.41**
Iron	**7439-89-6**	**757**	QB-01	**19.4**
Lead	**7439-92-1**	**0.294**		**0.222**
Magnesium	**7439-95-4**	**217**		**77.4**
Manganese	**7439-96-5**	**20.1**		**0.956**
Molybdenum	**7439-98-7**	**1.37**	QB-01	**0.171**
Nickel	**7440-02-0**	**0.939**		**0.643**
Phosphorus	7723-14-0	373	U, GC-BS, LJ, QX	1000
Potassium	**7440-09-7**	**125**		**30.5**
Rubidium	**7440-17-7**	**0.217**		**0.0147**
Selenium	**7782-49-2**	**0.200**		**0.00883**
Sodium	**7440-23-5**	**1700**	E, GC-BS	**1610**
Strontium	**7440-24-6**	**5.06**	QB-01	**0.524**
Thallium	**7440-28-0**	**0.00154**		**4.04E-4**
Thorium	**7440-29-01**	**0.0221**		**0.00241**
Uranium	**7440-61-1**	**0.0165**		**0.0137**
Vanadium	**7440-62-2**	**2.74**		**0.0395**
Zinc	7440-66-6	31.6	U	78.5

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FILE #: 0000.00
REPORTED: 12/14/23 11:51
SUBMITTED: 12/04/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9541925 **Lab ID:** 3120430-03 **Sampled:** 11/27/23 23:59
Matrix: Air **Sample Volume:** 1925.486 m³ **Received:** 12/04/23 12:47
Filter ID: **Analysis Date:** 12/08/23 22:05
Comments: MFK-AM03-112723-HM

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	**7429-90-5**	**329**		**27.1**
Antimony	**7440-36-0**	**0.0715**	SL	**0.0373**
Arsenic	**7440-38-2**	**0.103**		**0.00807**
Barium	**7440-39-3**	**5.19**		**0.801**
Beryllium	**7440-41-7**	**0.0133**		**0.00281**
Cadmium	7440-43-9	0.00668	U	0.0921
Calcium	**7440-70-2**	**603**	GC-BS, QB-01	**247**
Chromium	**7440-47-3**	**1.96**		**1.72**
Cobalt	**7440-48-4**	**0.232**	QB-01	**0.0132**
Copper	**7440-50-8**	**39.5**		**2.53**
Iron	**7439-89-6**	**428**	QB-01	**20.4**
Lead	7439-92-1	0.227	U	0.233
Magnesium	**7439-95-4**	**226**		**81.5**
Manganese	**7439-96-5**	**11.8**		**1.01**
Molybdenum	**7439-98-7**	**1.39**	QB-01	**0.180**
Nickel	**7440-02-0**	**1.00**		**0.677**
Phosphorus	7723-14-0	401	U, GC-BS, LJ, QX	1060
Potassium	**7440-09-7**	**113**		**32.1**
Rubidium	**7440-17-7**	**0.158**		**0.0155**
Selenium	**7782-49-2**	**0.152**		**0.00929**
Sodium	**7440-23-5**	**1950**	E, GC-BS	**1690**
Strontium	**7440-24-6**	**3.52**	QB-01	**0.551**
Thallium	**7440-28-0**	**9.45E-4**		**4.25E-4**
Thorium	**7440-29-01**	**0.0137**		**0.00253**
Uranium	7440-61-1	0.00951	U	0.0144
Vanadium	**7440-62-2**	**2.21**		**0.0416**
Zinc	7440-66-6	30.6	U	82.6

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FILE #: 0000.00
REPORTED: 12/14/23 11:51
SUBMITTED: 12/04/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9541900 FB **Lab ID:** 3120430-04 **Sampled:** 11/27/23 00:00
Matrix: Air **Sample Volume:** 2038.818 m³ **Received:** 12/04/23 12:47
Filter ID: **Analysis Date:** 12/08/23 22:20
Comments: MFK-FB01-112723-HM Field Blank

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	7429-90-5	23.1	U	25.6
Antimony	7440-36-0	0.0100	U, SL	0.0352
Arsenic	7440-38-2	0.00478	U	0.00762
Barium	**7440-39-3**	**0.845**	FB-01	**0.757**
Beryllium	7440-41-7	0.00106	U	0.00265
Cadmium	7440-43-9	0.00145	U	0.0870
Calcium	7440-70-2	173	U, FB-01, GC-BS, QB-01	233
Chromium	7440-47-3	1.13	U	1.62
Cobalt	**7440-48-4**	**0.0292**	QB-01	**0.0124**
Copper	7440-50-8	0.256	U	2.39
Iron	**7439-89-6**	**21.4**	FB-01, QB-01	**19.3**
Lead	7439-92-1	0.0337	U	0.220
Magnesium	7439-95-4	37.8	U	76.9
Manganese	7439-96-5	0.391	U	0.950
Molybdenum	**7439-98-7**	**0.172**	FB-01, QB-01	**0.170**
Nickel	7440-02-0	0.219	U	0.639
Phosphorus	7723-14-0	298	U, GC-BS, LJ, QX	998
Potassium	**7440-09-7**	**43.4**	FB-01	**30.3**
Rubidium	7440-17-7	0.0131	U	0.0146
Selenium	7782-49-2	0.00482	U	0.00878
Sodium	7440-23-5	711	U, GC-BS	1600
Strontium	7440-24-6	0.381	U, QB-01	0.520
Thallium	7440-28-0	1.58E-4	U	4.01E-4
Thorium	7440-29-01	0.00213	U	0.00239
Uranium	7440-61-1	0.00131	U	0.0136
Vanadium	7440-62-2	0.0288	U	0.0393
Zinc	7440-66-6	18.7	U	78.0

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FILE #: 0000.00
REPORTED: 12/14/23 11:51
SUBMITTED: 12/04/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9541923 **Lab ID:** 3120430-05 **Sampled:** 11/28/23 23:59
Matrix: Air **Sample Volume:** 2018.075 m³ **Received:** 12/04/23 12:47
Filter ID: **Analysis Date:** 12/08/23 22:35
Comments: MFK-AM01-112823-HM

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	**7429-90-5**	**2970**	E	**25.9**
Antimony	**7440-36-0**	**0.0518**	SL	**0.0356**
Arsenic	**7440-38-2**	**0.377**		**0.00770**
Barium	**7440-39-3**	**20.3**		**0.764**
Beryllium	**7440-41-7**	**0.0795**		**0.00268**
Cadmium	7440-43-9	0.0212	U	0.0879
Calcium	**7440-70-2**	**984**	GC-BS, QB-01	**235**
Chromium	**7440-47-3**	**3.58**		**1.64**
Cobalt	**7440-48-4**	**1.12**	QB-01	**0.0126**
Copper	**7440-50-8**	**17.6**		**2.42**
Lead	**7439-92-1**	**0.620**		**0.223**
Magnesium	**7439-95-4**	**253**		**77.7**
Manganese	**7439-96-5**	**80.7**		**0.959**
Molybdenum	**7439-98-7**	**0.896**	QB-01	**0.172**
Nickel	**7440-02-0**	**1.61**		**0.646**
Phosphorus	7723-14-0	512	U, GC-BS, LJ, QX	1010
Potassium	**7440-09-7**	**128**		**30.6**
Rubidium	**7440-17-7**	**0.469**		**0.0148**
Selenium	**7782-49-2**	**0.469**		**0.00887**
Sodium	7440-23-5	1190	U, GC-BS	1610
Strontium	**7440-24-6**	**11.8**	QB-01	**0.526**
Thallium	**7440-28-0**	**0.00452**		**4.06E-4**
Thorium	**7440-29-01**	**0.0703**		**0.00242**
Uranium	**7440-61-1**	**0.0519**		**0.0137**
Vanadium	**7440-62-2**	**7.12**		**0.0397**
Zinc	7440-66-6	38.1	U	78.8

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FILE #: 0000.00
REPORTED: 12/14/23 11:51
SUBMITTED: 12/04/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9541923 **Lab ID:** 3120430-05RE1 **Sampled:** 11/28/23 23:59
Matrix: Air **Sample Volume:** 2018.075 m³ **Received:** 12/04/23 12:47
Filter ID: **Analysis Date:** 12/11/23 23:25
Comments: MFK-AM01-112823-HM

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Iron	7439-89-6	2860	D	97.6

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FILE #: 0000.00
REPORTED: 12/14/23 11:51
SUBMITTED: 12/04/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9541921 **Lab ID:** 3120430-06 **Sampled:** 11/28/23 23:59
Matrix: Air **Sample Volume:** 2026.064 m³ **Received:** 12/04/23 12:47
Filter ID: **Analysis Date:** 12/08/23 18:52
Comments: MFK-AM02-112823-HM/MS/MSD

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	**7429-90-5**	**340**	A-01	**25.8**
Antimony	**7440-36-0**	**0.0483**	SL	**0.0354**
Arsenic	**7440-38-2**	**0.169**		**0.00767**
Barium	**7440-39-3**	**4.13**		**0.761**
Beryllium	**7440-41-7**	**0.0113**		**0.00267**
Cadmium	7440-43-9	0.00755	U	0.0875
Calcium	**7440-70-2**	**527**	GC-BS, QB-01	**234**
Chromium	**7440-47-3**	**1.70**		**1.63**
Cobalt	**7440-48-4**	**0.176**	QB-01	**0.0125**
Copper	**7440-50-8**	**13.2**		**2.41**
Iron	**7439-89-6**	**360**	QB-01, QM-4X	**19.4**
Lead	7439-92-1	0.173	U	0.222
Magnesium	**7439-95-4**	**158**		**77.4**
Manganese	**7439-96-5**	**9.44**		**0.956**
Molybdenum	**7439-98-7**	**0.960**	QB-01	**0.171**
Nickel	7440-02-0	0.556	U	0.643
Phosphorus	7723-14-0	384	A-01, GC-BS, LJ, QM-4X, QX, U	1000
Potassium	**7440-09-7**	**116**	QM-07	**30.5**
Rubidium	**7440-17-7**	**0.173**		**0.0147**
Selenium	**7782-49-2**	**0.115**		**0.00883**
Sodium	7440-23-5	1420	A-01, GC-BS, QM-4X, U	1610
Strontium	**7440-24-6**	**3.24**	QB-01	**0.524**
Thallium	**7440-28-0**	**8.68E-4**		**4.04E-4**
Thorium	**7440-29-01**	**0.0114**	QM-07	**0.00241**
Uranium	7440-61-1	0.00844	U	0.0137
Vanadium	**7440-62-2**	**1.20**		**0.0395**
Zinc	7440-66-6	20.8	U	78.5

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SUBMITTED: 12/04/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9541920 **Lab ID:** 3120430-07 **Sampled:** 11/28/23 23:59
Matrix: Air **Sample Volume:** 1892.969 m³ **Received:** 12/04/23 12:47
Filter ID: **Analysis Date:** 12/08/23 22:52
Comments: MFK-AM03-112823-HM

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	**7429-90-5**	**340**		**27.6**
Antimony	**7440-36-0**	**0.0727**	SL	**0.0379**
Arsenic	**7440-38-2**	**0.0950**		**0.00821**
Barium	**7440-39-3**	**6.24**		**0.815**
Beryllium	**7440-41-7**	**0.0148**		**0.00285**
Cadmium	7440-43-9	0.00721	U	0.0937
Calcium	**7440-70-2**	**566**	GC-BS, QB-01	**251**
Chromium	**7440-47-3**	**1.87**		**1.74**
Cobalt	**7440-48-4**	**0.220**	QB-01	**0.0134**
Copper	**7440-50-8**	**27.5**		**2.58**
Iron	**7439-89-6**	**420**	QB-01	**20.8**
Lead	**7439-92-1**	**0.457**		**0.237**
Magnesium	**7439-95-4**	**183**		**82.9**
Manganese	**7439-96-5**	**12.9**		**1.02**
Molybdenum	**7439-98-7**	**1.05**	QB-01	**0.183**
Nickel	7440-02-0	0.556	U	0.688
Phosphorus	7723-14-0	399	GC-BS, U, LJ, QX	1070
Potassium	**7440-09-7**	**101**		**32.7**
Rubidium	**7440-17-7**	**0.175**		**0.0157**
Selenium	**7782-49-2**	**0.132**		**0.00945**
Sodium	7440-23-5	1610	U, GC-BS	1720
Strontium	**7440-24-6**	**4.09**	QB-01	**0.560**
Thallium	**7440-28-0**	**0.00103**		**4.32E-4**
Thorium	**7440-29-01**	**0.0113**		**0.00258**
Uranium	7440-61-1	0.00963	U	0.0146
Vanadium	**7440-62-2**	**1.27**		**0.0423**
Zinc	7440-66-6	25.2	U	84.0

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FILE #: 0000.00
REPORTED: 12/14/23 11:51
SUBMITTED: 12/04/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9541919
Matrix: Air
Lab ID: 3120430-08
Sample Volume: 2041.366 m³
Filter ID:
Sampled: 11/29/23 23:59
Received: 12/04/23 12:47
Analysis Date: 12/08/23 23:08
Comments: MFK-AM01-112923-HM

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	**7429-90-5**	**796**	E	**25.6**
Antimony	**7440-36-0**	**0.0435**	SL	**0.0351**
Arsenic	**7440-38-2**	**0.143**		**0.00761**
Barium	**7440-39-3**	**5.82**		**0.756**
Beryllium	**7440-41-7**	**0.0195**		**0.00265**
Cadmium	7440-43-9	0.00847	U	0.0869
Calcium	**7440-70-2**	**549**	GC-BS, QB-01	**233**
Chromium	**7440-47-3**	**1.93**		**1.62**
Cobalt	**7440-48-4**	**0.296**	QB-01	**0.0124**
Copper	**7440-50-8**	**19.5**		**2.39**
Iron	**7439-89-6**	**755**	QB-01	**19.3**
Lead	**7439-92-1**	**0.313**		**0.220**
Magnesium	**7439-95-4**	**145**		**76.8**
Manganese	**7439-96-5**	**19.8**		**0.948**
Molybdenum	**7439-98-7**	**1.13**	QB-01	**0.170**
Nickel	7440-02-0	0.593	U	0.638
Phosphorus	7723-14-0	402	U, GC-BS, LJ, QX	996
Potassium	**7440-09-7**	**122**		**30.3**
Rubidium	**7440-17-7**	**0.234**		**0.0146**
Selenium	**7782-49-2**	**0.176**		**0.00877**
Sodium	7440-23-5	1200	U, GC-BS	1590
Strontium	**7440-24-6**	**4.41**	QB-01	**0.520**
Thallium	**7440-28-0**	**0.00141**		**4.01E-4**
Thorium	**7440-29-01**	**0.0167**		**0.00239**
Uranium	**7440-61-1**	**0.0143**		**0.0135**
Vanadium	**7440-62-2**	**1.77**		**0.0392**
Zinc	7440-66-6	16.4	U	77.9

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FILE #: 0000.00
REPORTED: 12/14/23 11:51
SUBMITTED: 12/04/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9541227 **Lab ID:** 3120430-09 **Sampled:** 11/29/23 23:59
Matrix: Air **Sample Volume:** 2027.752 m³ **Received:** 12/04/23 12:47
Filter ID: **Analysis Date:** 12/08/23 23:23
Comments: MFK-AM02-112923-HM

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	**7429-90-5**	**121**		**25.8**
Antimony	**7440-36-0**	**0.0488**	SL	**0.0354**
Arsenic	**7440-38-2**	**0.107**		**0.00766**
Barium	**7440-39-3**	**3.20**		**0.761**
Beryllium	**7440-41-7**	**0.00394**		**0.00266**
Cadmium	7440-43-9	0.00481	U	0.0875
Calcium	**7440-70-2**	**243**	GC-BS, QB-01	**234**
Chromium	7440-47-3	1.24	U	1.63
Cobalt	**7440-48-4**	**0.0699**	QB-01	**0.0125**
Copper	**7440-50-8**	**16.2**		**2.41**
Iron	**7439-89-6**	**129**	QB-01	**19.4**
Lead	7439-92-1	0.0826	U	0.221
Magnesium	**7439-95-4**	**120**		**77.3**
Manganese	**7439-96-5**	**3.02**		**0.955**
Molybdenum	**7439-98-7**	**1.15**	QB-01	**0.171**
Nickel	7440-02-0	0.344	U	0.643
Phosphorus	7723-14-0	332	U, LJ, QX, GC-BS	1000
Potassium	**7440-09-7**	**117**		**30.5**
Rubidium	**7440-17-7**	**0.120**		**0.0147**
Selenium	**7782-49-2**	**0.0881**		**0.00883**
Sodium	7440-23-5	1200	U, GC-BS	1600
Strontium	**7440-24-6**	**1.32**	QB-01	**0.523**
Thallium	**7440-28-0**	**5.22E-4**		**4.04E-4**
Thorium	**7440-29-01**	**0.00451**		**0.00241**
Uranium	7440-61-1	0.00337	U	0.0136
Vanadium	**7440-62-2**	**0.319**		**0.0395**
Zinc	7440-66-6	14.8	U	78.4

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REPORTED: 12/14/23 11:51
SUBMITTED: 12/04/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9541899 **Lab ID:** 3120430-10 **Sampled:** 11/29/23 23:59
Matrix: Air **Sample Volume:** 1805.088 m³ **Received:** 12/04/23 12:47
Filter ID: **Analysis Date:** 12/08/23 23:36
Comments: MFK-AM03-112923-HM

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	**7429-90-5**	**155**		**28.9**
Antimony	**7440-36-0**	**0.0878**	SL	**0.0397**
Arsenic	**7440-38-2**	**0.0858**		**0.00861**
Barium	**7440-39-3**	**4.18**		**0.854**
Beryllium	**7440-41-7**	**0.00633**		**0.00299**
Cadmium	7440-43-9	0.00512	U	0.0982
Calcium	**7440-70-2**	**279**	GC-BS, QB-01	**263**
Chromium	7440-47-3	1.49	U	1.83
Cobalt	**7440-48-4**	**0.0929**	QB-01	**0.0141**
Copper	**7440-50-8**	**38.2**		**2.70**
Iron	**7439-89-6**	**184**	QB-01	**21.8**
Lead	7439-92-1	0.157	U	0.249
Magnesium	**7439-95-4**	**135**		**86.9**
Manganese	**7439-96-5**	**4.78**		**1.07**
Molybdenum	**7439-98-7**	**1.20**	QB-01	**0.192**
Nickel	7440-02-0	0.448	U	0.722
Phosphorus	7723-14-0	377	U, GC-BS, LJ, QX	1130
Potassium	**7440-09-7**	**94.3**		**34.3**
Rubidium	**7440-17-7**	**0.103**		**0.0165**
Selenium	**7782-49-2**	**0.123**		**0.00991**
Sodium	7440-23-5	1470	U, GC-BS	1800
Strontium	**7440-24-6**	**1.75**	QB-01	**0.588**
Thallium	**7440-28-0**	**6.73E-4**		**4.53E-4**
Thorium	**7440-29-01**	**0.00607**		**0.00270**
Uranium	7440-61-1	0.00469	U	0.0153
Vanadium	**7440-62-2**	**0.496**		**0.0443**
Zinc	7440-66-6	22.3	U	88.1

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FILE #: 0000.00
REPORTED: 12/14/23 11:51
SUBMITTED: 12/04/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9541909 FB
Lab ID: 3120430-11
Sampled: 11/29/23 00:00
Matrix: Air
Sample Volume: 2041.36(m³
Received: 12/04/23 12:47
Filter ID:
Analysis Date: 12/09/23 01:04
Comments: MFK-FB01-112923-HM Field Blank

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	7429-90-5	17.3	U	25.6
Antimony	7440-36-0	0.00602	U, SL	0.0351
Arsenic	7440-38-2	0.00518	U	0.00761
Barium	7440-39-3	0.626	U	0.756
Beryllium	7440-41-7	0.00115	U	0.00265
Cadmium	7440-43-9	0.00178	U	0.0869
Calcium	**7440-70-2**	**359**	FB-01, GC-BS, QB-01	**233**
Chromium	7440-47-3	1.36	U	1.62
Cobalt	**7440-48-4**	**0.0350**	FB-01, QB-01	**0.0124**
Copper	7440-50-8	0.313	U	2.39
Iron	**7439-89-6**	**21.6**	FB-01, QB-01	**19.3**
Lead	7439-92-1	0.0496	U	0.220
Magnesium	7439-95-4	44.1	U	76.8
Manganese	7439-96-5	0.301	U	0.948
Molybdenum	**7439-98-7**	**0.233**	QB-01, FB-01	**0.170**
Nickel	7440-02-0	0.234	U	0.638
Phosphorus	7723-14-0	348	U, GC-BS, LJ, QX	996
Potassium	7440-09-7	29.8	U	30.3
Rubidium	**7440-17-7**	**0.0165**	FB-01	**0.0146**
Selenium	7782-49-2	0.00728	U	0.00877
Sodium	7440-23-5	712	U, GC-BS	1590
Strontium	**7440-24-6**	**0.738**	FB-01, QB-01	**0.520**
Thallium	7440-28-0	1.21E-4	U	4.01E-4
Thorium	7440-29-01	0.00230	U	0.00239
Uranium	7440-61-1	0.00178	U	0.0135
Vanadium	7440-62-2	0.0147	U	0.0392
Zinc	7440-66-6	10.4	U	77.9

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SUBMITTED: 12/04/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9541226 FB **Lab ID:** 3120430-12 **Sampled:** 11/28/23 00:00
Matrix: Air **Sample Volume:** 2018.075 m³ **Received:** 12/04/23 12:47
Filter ID: **Analysis Date:** 12/09/23 01:19
Comments: MFK-FB01-112823-HM Field Blank

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	7429-90-5	17.8	U	25.9
Antimony	7440-36-0	0.0117	U, SL	0.0356
Arsenic	7440-38-2	0.00456	U	0.00770
Barium	7440-39-3	0.580	U	0.764
Beryllium	7440-41-7	0.00101	U	0.00268
Cadmium	7440-43-9	0.00220	U	0.0879
Calcium	7440-70-2	169	GC-BS, QB-01, U	235
Chromium	7440-47-3	1.16	U	1.64
Cobalt	**7440-48-4**	**0.0316**	FB-01, QB-01	**0.0126**
Copper	7440-50-8	0.268	U	2.42
Iron	7439-89-6	18.5	QB-01, U	19.5
Lead	7439-92-1	0.0445	U	0.223
Magnesium	7439-95-4	36.6	U	77.7
Manganese	7439-96-5	0.351	U	0.959
Molybdenum	**7439-98-7**	**0.181**	FB-01, QB-01	**0.172**
Nickel	7440-02-0	0.273	U	0.646
Phosphorus	7723-14-0	305	GC-BS, LJ, QX, U	1010
Potassium	7440-09-7	14.5	U	30.6
Rubidium	7440-17-7	0.0115	U	0.0148
Selenium	7782-49-2	0.00469	U	0.00887
Sodium	7440-23-5	687	GC-BS, U	1610
Strontium	7440-24-6	0.400	QB-01, U	0.526
Thallium	7440-28-0	1.58E-4	U	4.06E-4
Thorium	7440-29-01	0.00200	U	0.00242
Uranium	7440-61-1	0.00131	U	0.0137
Vanadium	7440-62-2	0.0254	U	0.0397
Zinc	7440-66-6	13.0	U	78.8

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Blue Bell, PA 19422
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Inorganics by Compendium Method IO-3.5 - Quality Control

Batch 2312024 - B3L0605

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Calibration Blank (2312024-CCB1)				Prepared: 12/07/23 Analyzed: 12/08/23						
Aluminum	22.7		ng/l							
Antimony	1.43		ng/l							
Arsenic	2.60		ng/l							
Barium	2.14		ng/l							
Beryllium	1.30		ng/l							
Cadmium	0.788		ng/l							
Calcium	583		ng/l							
Chromium	3.60		ng/l							
Cobalt	0.421		ng/l							
Copper	114		ng/l							
Iron	120		ng/l							
Lead	3.23		ng/l							
Magnesium	22.4		ng/l							
Manganese	6.32		ng/l							
Molybdenum	26.6		ng/l							
Nickel	3.26		ng/l							
Phosphorus	118		ng/l							LJ, QX
Potassium	2310		ng/l							
Rubidium	0.519		ng/l							
Selenium	11.4		ng/l							
Sodium	107		ng/l							
Strontium	0.650		ng/l							
Thallium	0.403		ng/l							
Thorium	0.267		ng/l							
Uranium	-0.0238		ng/l							U
Vanadium	-48.3		ng/l							U
Zinc	16.1		ng/l							
Calibration Blank (2312024-CCB2)				Prepared: 12/07/23 Analyzed: 12/08/23						
Aluminum	-39.2		ng/l							U
Antimony	0.577		ng/l							
Arsenic	-2.80		ng/l							U
Barium	2.41		ng/l							
Beryllium	0.868		ng/l							
Cadmium	0.476		ng/l							
Calcium	409		ng/l							
Chromium	4.62		ng/l							
Cobalt	0.530		ng/l							
Copper	79.1		ng/l							

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Inorganics by Compendium Method IO-3.5 - Quality Control

Batch 2312024 - B3L0605

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Calibration Blank (2312024-CCB2) Contin				Prepared: 12/07/23 Analyzed: 12/08/23						
Iron	90.1		ng/l							
Lead	3.54		ng/l							
Magnesium	57.3		ng/l							
Manganese	8.13		ng/l							
Molybdenum	11.8		ng/l							
Nickel	4.68		ng/l							
Phosphorus	-140		ng/l							LJ, QX, U
Potassium	1510		ng/l							
Rubidium	1.09		ng/l							
Selenium	17.4		ng/l							
Sodium	4.88		ng/l							
Strontium	1.49		ng/l							
Thallium	0.554		ng/l							
Thorium	0.228		ng/l							
Uranium	-0.0186		ng/l							U
Vanadium	-54.6		ng/l							U
Zinc	46.9		ng/l							
Calibration Blank (2312024-CCB3)				Prepared: 12/07/23 Analyzed: 12/09/23						
Aluminum	-29.2		ng/l							U
Antimony	0.769		ng/l							
Arsenic	3.29		ng/l							
Barium	4.74		ng/l							
Beryllium	0.638		ng/l							
Cadmium	0.435		ng/l							
Calcium	635		ng/l							
Chromium	8.92		ng/l							
Cobalt	0.938		ng/l							
Copper	83.1		ng/l							
Iron	306		ng/l							
Lead	4.48		ng/l							
Magnesium	12.0		ng/l							
Manganese	11.4		ng/l							
Molybdenum	13.0		ng/l							
Nickel	7.00		ng/l							
Phosphorus	448		ng/l							LJ, QX
Potassium	1370		ng/l							
Rubidium	1.34		ng/l							
Selenium	19.5		ng/l							

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Inorganics by Compendium Method IO-3.5 - Quality Control

Batch 2312024 - B3L0605

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Calibration Blank (2312024-CCB3) Contin				Prepared: 12/07/23 Analyzed: 12/09/23						
Sodium	-40.6		ng/l							U
Strontium	2.24		ng/l							
Thallium	0.478		ng/l							
Thorium	0.161		ng/l							
Uranium	-0.00840		ng/l							U
Vanadium	-63.5		ng/l							U
Zinc	8.53		ng/l							
Calibration Blank (2312024-CCB4)				Prepared: 12/07/23 Analyzed: 12/09/23						
Aluminum	-27.2		ng/l							U
Antimony	0.628		ng/l							
Arsenic	-1.84		ng/l							U
Barium	2.54		ng/l							
Beryllium	0.732		ng/l							
Cadmium	0.323		ng/l							
Calcium	497		ng/l							
Chromium	5.53		ng/l							
Cobalt	0.699		ng/l							
Copper	63.0		ng/l							
Iron	45.0		ng/l							
Lead	3.14		ng/l							
Magnesium	-3.93		ng/l							U
Manganese	8.06		ng/l							
Molybdenum	9.16		ng/l							
Nickel	3.98		ng/l							
Phosphorus	86.5		ng/l							LJ, QX
Potassium	840		ng/l							
Rubidium	0.219		ng/l							
Selenium	7.92		ng/l							
Sodium	-146		ng/l							U
Strontium	1.17		ng/l							
Thallium	0.405		ng/l							
Thorium	0.0532		ng/l							
Uranium	-0.0161		ng/l							U
Vanadium	-64.8		ng/l							U
Zinc	-5.55		ng/l							U
Calibration Check (2312024-CCV1)				Prepared: 12/07/23 Analyzed: 12/08/23						
Aluminum	1.55E6		ng/l	1.5000E6		103	90-110			
Antimony	20200		ng/l	20000		101	90-110			

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Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes

Inorganics by Compendium Method IO-3.5 - Quality Control

Batch 2312024 - B3L0605

Calibration Check (2312024-CCV1) Contin Prepared: 12/07/23 Analyzed: 12/08/23

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Arsenic	20200		ng/l	20000		101	90-110			
Barium	199000		ng/l	200000		99.4	90-110			
Beryllium	4820		ng/l	5000.0		96.3	90-110			
Cadmium	20400		ng/l	20000		102	90-110			
Calcium	2.49E7		ng/l	2.5000E7		99.8	90-110			
Chromium	237000		ng/l	240000		98.7	90-110			
Cobalt	50700		ng/l	50000		101	90-110			
Copper	2.02E6		ng/l	2.0000E6		101	90-110			
Iron	2.53E6		ng/l	2.5000E6		101	90-110			
Lead	198000		ng/l	200000		99.2	90-110			
Magnesium	1.04E6		ng/l	1.0000E6		104	90-110			
Manganese	499000		ng/l	500000		99.8	90-110			
Molybdenum	50000		ng/l	50000		100	90-110			
Nickel	123000		ng/l	120000		102	90-110			
Phosphorus	207000		ng/l	200000		104	90-110			LJ, QX
Potassium	2.52E6		ng/l	2.5000E6		101	90-110			
Rubidium	9990		ng/l	10000		99.9	90-110			
Selenium	20100		ng/l	20000		100	90-110			
Sodium	2.56E6		ng/l	2.5000E6		103	90-110			
Strontium	49800		ng/l	50000		99.6	90-110			
Thallium	483		ng/l	500.00		96.5	90-110			
Thorium	500		ng/l	500.00		99.9	90-110			
Uranium	489		ng/l	500.00		97.8	90-110			
Vanadium	19800		ng/l	20000		98.8	90-110			
Zinc	520000		ng/l	500000		104	90-110			

Calibration Check (2312024-CCV2) Prepared: 12/07/23 Analyzed: 12/08/23

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Aluminum	1.50E6		ng/l	1.5000E6		99.9	90-110			
Antimony	20300		ng/l	20000		102	90-110			
Arsenic	19900		ng/l	20000		99.4	90-110			
Barium	196000		ng/l	200000		97.8	90-110			
Beryllium	4860		ng/l	5000.0		97.2	90-110			
Cadmium	20500		ng/l	20000		102	90-110			
Calcium	2.47E7		ng/l	2.5000E7		98.9	90-110			
Chromium	248000		ng/l	240000		103	90-110			
Cobalt	49500		ng/l	50000		99.0	90-110			
Copper	1.98E6		ng/l	2.0000E6		99.1	90-110			
Iron	2.48E6		ng/l	2.5000E6		99.3	90-110			
Lead	198000		ng/l	200000		98.8	90-110			

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Inorganics by Compendium Method IO-3.5 - Quality Control

Batch 2312024 - B3L0605

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Calibration Check (2312024-CCV2) Contin				Prepared: 12/07/23		Analyzed: 12/08/23				
Magnesium	1.02E6		ng/l	1.0000E6		102	90-110			
Manganese	492000		ng/l	500000		98.4	90-110			
Molybdenum	49500		ng/l	50000		98.9	90-110			
Nickel	121000		ng/l	120000		100	90-110			
Phosphorus	200000		ng/l	200000		99.8	90-110			LJ, QX
Potassium	2.47E6		ng/l	2.5000E6		99.0	90-110			
Rubidium	10000		ng/l	10000		100	90-110			
Selenium	19700		ng/l	20000		98.6	90-110			
Sodium	2.49E6		ng/l	2.5000E6		99.6	90-110			
Strontium	49400		ng/l	50000		98.8	90-110			
Thallium	479		ng/l	500.00		95.8	90-110			
Thorium	496		ng/l	500.00		99.2	90-110			
Uranium	485		ng/l	500.00		97.0	90-110			
Vanadium	20000		ng/l	20000		100	90-110			
Zinc	516000		ng/l	500000		103	90-110			
Calibration Check (2312024-CCV3)				Prepared: 12/07/23		Analyzed: 12/09/23				
Aluminum	1.45E6		ng/l	1.5000E6		96.8	90-110			
Antimony	20200		ng/l	20000		101	90-110			
Arsenic	19800		ng/l	20000		99.1	90-110			
Barium	199000		ng/l	200000		99.4	90-110			
Beryllium	4530		ng/l	5000.0		90.7	90-110			
Cadmium	20400		ng/l	20000		102	90-110			
Calcium	2.43E7		ng/l	2.5000E7		97.0	90-110			
Chromium	242000		ng/l	240000		101	90-110			
Cobalt	48900		ng/l	50000		97.8	90-110			
Copper	1.98E6		ng/l	2.0000E6		98.9	90-110			
Iron	2.43E6		ng/l	2.5000E6		97.3	90-110			
Lead	195000		ng/l	200000		97.4	90-110			
Magnesium	998000		ng/l	1.0000E6		99.8	90-110			
Manganese	482000		ng/l	500000		96.5	90-110			
Molybdenum	50600		ng/l	50000		101	90-110			
Nickel	119000		ng/l	120000		99.5	90-110			
Phosphorus	195000		ng/l	200000		97.7	90-110			LJ, QX
Potassium	2.42E6		ng/l	2.5000E6		96.8	90-110			
Rubidium	9840		ng/l	10000		98.4	90-110			
Selenium	19700		ng/l	20000		98.7	90-110			
Sodium	2.46E6		ng/l	2.5000E6		98.5	90-110			
Strontium	48600		ng/l	50000		97.2	90-110			

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Inorganics by Compendium Method IO-3.5 - Quality Control

Batch 2312024 - B3L0605

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Calibration Check (2312024-CCV3) Contir				Prepared: 12/07/23		Analyzed: 12/09/23				
Thallium	473		ng/l	500.00		94.6	90-110			
Thorium	491		ng/l	500.00		98.2	90-110			
Uranium	485		ng/l	500.00		97.1	90-110			
Vanadium	19800		ng/l	20000		99.2	90-110			
Zinc	510000		ng/l	500000		102	90-110			
Calibration Check (2312024-CCV4)				Prepared: 12/07/23		Analyzed: 12/09/23				
Aluminum	1.44E6		ng/l	1.5000E6		96.3	90-110			
Antimony	19900		ng/l	20000		99.3	90-110			
Arsenic	19600		ng/l	20000		98.1	90-110			
Barium	198000		ng/l	200000		98.9	90-110			
Beryllium	4720		ng/l	5000.0		94.4	90-110			
Cadmium	20200		ng/l	20000		101	90-110			
Calcium	2.42E7		ng/l	2.5000E7		96.8	90-110			
Chromium	247000		ng/l	240000		103	90-110			
Cobalt	48800		ng/l	50000		97.7	90-110			
Copper	1.98E6		ng/l	2.0000E6		99.2	90-110			
Iron	2.43E6		ng/l	2.5000E6		97.2	90-110			
Lead	195000		ng/l	200000		97.4	90-110			
Magnesium	986000		ng/l	1.0000E6		98.6	90-110			
Manganese	485000		ng/l	500000		97.0	90-110			
Molybdenum	49900		ng/l	50000		99.9	90-110			
Nickel	120000		ng/l	120000		99.8	90-110			
Phosphorus	197000		ng/l	200000		98.6	90-110			LJ, QX
Potassium	2.41E6		ng/l	2.5000E6		96.4	90-110			
Rubidium	9830		ng/l	10000		98.3	90-110			
Selenium	19600		ng/l	20000		98.2	90-110			
Sodium	2.44E6		ng/l	2.5000E6		97.6	90-110			
Strontium	48100		ng/l	50000		96.3	90-110			
Thallium	469		ng/l	500.00		93.7	90-110			
Thorium	485		ng/l	500.00		97.0	90-110			
Uranium	481		ng/l	500.00		96.3	90-110			
Vanadium	19800		ng/l	20000		99.2	90-110			
Zinc	509000		ng/l	500000		102	90-110			
High Cal Check (2312024-HCV1)				Prepared: 12/07/23		Analyzed: 12/08/23				
Aluminum	2.93E6		ng/l	3.0000E6		97.7	95-105			
Antimony	39300		ng/l	40000		98.3	95-105			
Arsenic	39800		ng/l	40000		99.4	95-105			
Barium	393000		ng/l	400000		98.2	95-105			

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Inorganics by Compendium Method IO-3.5 - Quality Control

Batch 2312024 - B3L0605

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
High Cal Check (2312024-HCV1) Continue				Prepared: 12/07/23		Analyzed: 12/08/23				
Beryllium	10200		ng/l	10000		102	95-105			
Cadmium	39300		ng/l	40000		98.3	95-105			
Calcium	4.95E7		ng/l	5.0000E7		98.9	95-105			
Chromium	472000		ng/l	480000		98.3	95-105			
Cobalt	98600		ng/l	100000		98.6	95-105			
Copper	3.91E6		ng/l	4.0000E6		97.8	95-105			
Iron	4.94E6		ng/l	5.0000E6		98.9	95-105			
Lead	395000		ng/l	400000		98.9	95-105			
Magnesium	1.95E6		ng/l	2.0000E6		97.5	95-105			
Manganese	993000		ng/l	1.0000E6		99.3	95-105			
Molybdenum	98400		ng/l	100000		98.4	95-105			
Nickel	235000		ng/l	240000		98.0	95-105			
Phosphorus	397000		ng/l	400000		99.2	95-105			LJ, QX
Potassium	4.97E6		ng/l	5.0000E6		99.4	95-105			
Rubidium	19600		ng/l	20000		98.2	95-105			
Selenium	40000		ng/l	40000		100	95-105			
Sodium	4.91E6		ng/l	5.0000E6		98.3	95-105			
Strontium	98200		ng/l	100000		98.2	95-105			
Thallium	985		ng/l	1000.0		98.5	95-105			
Thorium	989		ng/l	1000.0		98.9	95-105			
Uranium	983		ng/l	1000.0		98.3	95-105			
Vanadium	39800		ng/l	40000		99.5	95-105			
Zinc	1.01E6		ng/l	1.0000E6		101	95-105			
Initial Cal Blank (2312024-ICB1)				Prepared: 12/07/23		Analyzed: 12/08/23				
Aluminum	-0.915		ng/l							U
Antimony	2.30		ng/l							
Arsenic	-2.34		ng/l							U
Barium	3.25		ng/l							
Beryllium	1.62		ng/l							
Cadmium	0.996		ng/l							
Calcium	684		ng/l							
Chromium	3.67		ng/l							
Cobalt	0.808		ng/l							
Copper	102		ng/l							
Iron	84.9		ng/l							
Lead	4.47		ng/l							
Magnesium	6.80		ng/l							
Manganese	9.90		ng/l							

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Blue Bell, PA 19422
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PHONE: (703) 885-5495 **FAX:**

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REPORTED: 12/14/23 11:51
SUBMITTED: 12/04/23
AQS SITE CODE:
SITE CODE: Maui fires

Inorganics by Compendium Method IO-3.5 - Quality Control

Batch 2312024 - B3L0605

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Initial Cal Blank (2312024-ICB1) Continu				Prepared: 12/07/23 Analyzed: 12/08/23						
Molybdenum	11.8		ng/l							
Nickel	-0.595		ng/l							U
Phosphorus	51.2		ng/l							LJ, QX
Potassium	1170		ng/l							
Rubidium	0.668		ng/l							
Selenium	15.6		ng/l							
Sodium	-118		ng/l							U
Strontium	1.84		ng/l							
Thallium	0.475		ng/l							
Thorium	0.354		ng/l							
Uranium	-0.00553		ng/l							U
Vanadium	-42.1		ng/l							U
Zinc	114		ng/l							
Initial Cal Check (2312024-ICV1)				Prepared: 12/07/23 Analyzed: 12/08/23						
Aluminum	1.46E6		ng/l	1.5000E6		97.2	90-110			
Antimony	19600		ng/l	20000		98.2	90-110			
Arsenic	19800		ng/l	20000		99.1	90-110			
Barium	197000		ng/l	200000		98.5	90-110			
Beryllium	4880		ng/l	5000.0		97.6	90-110			
Cadmium	20600		ng/l	20000		103	90-110			
Calcium	2.42E7		ng/l	2.5000E7		96.7	90-110			
Chromium	241000		ng/l	240000		100	90-110			
Cobalt	49800		ng/l	50000		99.6	90-110			
Copper	2.00E6		ng/l	2.0000E6		99.8	90-110			
Iron	2.50E6		ng/l	2.5000E6		100	90-110			
Lead	195000		ng/l	200000		97.7	90-110			
Magnesium	988000		ng/l	1.0000E6		98.8	90-110			
Manganese	489000		ng/l	500000		97.8	90-110			
Molybdenum	49600		ng/l	50000		99.2	90-110			
Nickel	119000		ng/l	120000		99.4	90-110			
Phosphorus	198000		ng/l	200000		99.2	90-110			LJ, QX
Potassium	2.48E6		ng/l	2.5000E6		99.2	90-110			
Rubidium	9590		ng/l	10000		95.9	90-110			
Selenium	20400		ng/l	20000		102	90-110			
Sodium	2.44E6		ng/l	2.5000E6		97.8	90-110			
Strontium	49300		ng/l	50000		98.7	90-110			
Thallium	474		ng/l	500.00		94.7	90-110			
Thorium	482		ng/l	500.00		96.4	90-110			

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Inorganics by Compendium Method IO-3.5 - Quality Control

Batch 2312024 - B3L0605

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Initial Cal Check (2312024-ICV1) Continu				Prepared: 12/07/23		Analyzed: 12/08/23				
Uranium	488		ng/l	500.00		97.5	90-110			
Vanadium	20100		ng/l	20000		100	90-110			
Zinc	518000		ng/l	500000		104	90-110			
Interference Check A (2312024-IFA1)				Prepared: 12/07/23		Analyzed: 12/08/23				
Aluminum	1.47E7		ng/l	1.5000E7		98.0	80-120			
Antimony	0.00		ng/l				80-120			U
Arsenic	0.00		ng/l				80-120			U
Barium	0.00		ng/l				80-120			U
Beryllium	0.00		ng/l				80-120			U
Cadmium	0.00		ng/l				80-120			U
Calcium	9.23E7		ng/l	1.0040E8		91.9	80-120			
Chromium	0.00		ng/l				80-120			U
Cobalt	0.00		ng/l				80-120			U
Copper	0.00		ng/l				80-120			U
Iron	1.47E7		ng/l	1.5000E7		98.1	80-120			
Lead	0.00		ng/l				80-120			U
Magnesium	1.51E7		ng/l	1.5000E7		101	80-120			
Manganese	0.00		ng/l				80-120			U
Molybdenum	301000		ng/l	300000		100	80-120			
Nickel	0.00		ng/l				80-120			U
Phosphorus	1.58E7		ng/l	1.5000E7		105	80-120			LJ, QX
Potassium	1.46E7		ng/l	1.5000E7		97.6	80-120			
Rubidium	0.00		ng/l				80-120			U
Selenium	0.00		ng/l				80-120			U
Sodium	1.51E7		ng/l	1.5000E7		101	80-120			
Strontium	0.00		ng/l				80-120			U
Thallium	0.00		ng/l				80-120			U
Thorium	0.00		ng/l				80-120			U
Uranium	0.00		ng/l				80-120			U
Vanadium	0.00		ng/l				80-120			U
Zinc	0.00		ng/l				80-120			U
Interference Check B (2312024-IFB1)				Prepared: 12/07/23		Analyzed: 12/08/23				
Aluminum	1.64E7		ng/l	1.6500E7		99.6	80-120			
Antimony	20200		ng/l	20000		101	80-120			
Arsenic	20700		ng/l	20000		103	80-120			
Barium	202000		ng/l	200000		101	80-120			
Beryllium	5080		ng/l	5000.0		102	80-120			
Cadmium	19600		ng/l	20000		98.0	80-120			

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Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes

Inorganics by Compendium Method IO-3.5 - Quality Control

Batch 2312024 - B3L0605

Interference Check B (2312024-IFB1) Co Prepared: 12/07/23 Analyzed: 12/08/23

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Calcium	1.17E8		ng/l	1.2540E8		93.3	80-120			
Chromium	233000		ng/l	240000		97.2	80-120			
Cobalt	49600		ng/l	50000		99.1	80-120			
Copper	1.91E6		ng/l	2.0000E6		95.6	80-120			
Iron	1.76E7		ng/l	1.7500E7		101	80-120			
Lead	207000		ng/l	200000		103	80-120			
Magnesium	1.64E7		ng/l	1.6000E7		102	80-120			
Manganese	521000		ng/l	500000		104	80-120			
Molybdenum	358000		ng/l	350000		102	80-120			
Nickel	116000		ng/l	120000		96.9	80-120			
Phosphorus	1.65E7		ng/l	1.5200E7		109	80-120			LJ, QX
Potassium	1.74E7		ng/l	1.7500E7		99.5	80-120			
Rubidium	10200		ng/l	10000		102	80-120			
Selenium	19100		ng/l	20000		95.6	80-120			
Sodium	1.84E7		ng/l	1.7500E7		105	80-120			
Strontium	50800		ng/l	50000		102	80-120			
Thallium	523		ng/l	500.00		105	80-120			
Thorium	541		ng/l	500.00		108	80-120			
Uranium	541		ng/l	500.00		108	80-120			
Vanadium	19500		ng/l	20000		97.5	80-120			
Zinc	476000		ng/l	500000		95.2	80-120			

Batch 2312031 - B3L0605

Calibration Blank (2312031-CCB1) Prepared & Analyzed: 12/11/23

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Aluminum	59.8		ng/l							
Antimony	1.50		ng/l							
Arsenic	3.31		ng/l							
Barium	1.64		ng/l							
Beryllium	1.03		ng/l							
Cadmium	0.307		ng/l							
Calcium	464		ng/l							
Chromium	3.37		ng/l							
Cobalt	0.408		ng/l							
Copper	131		ng/l							
Iron	26.4		ng/l							
Lead	6.23		ng/l							
Magnesium	19.6		ng/l							
Manganese	7.20		ng/l							
Molybdenum	29.3		ng/l							

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Inorganics by Compendium Method IO-3.5 - Quality Control

Batch 2312031 - B3L0605

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Calibration Blank (2312031-CCB1) Contin				Prepared & Analyzed: 12/11/23						
Nickel	0.370		ng/l							
Phosphorus	-845		ng/l							U
Potassium	-973		ng/l							U
Rubidium	0.315		ng/l							
Selenium	0.969		ng/l							
Sodium	-65.2		ng/l							U
Strontium	0.544		ng/l							
Thallium	0.487		ng/l							
Thorium	0.453		ng/l							
Uranium	-0.0185		ng/l							U
Vanadium	-34.9		ng/l							U
Zinc	-12.6		ng/l							U
Calibration Blank (2312031-CCB2)				Prepared & Analyzed: 12/11/23						
Aluminum	32.1		ng/l							
Antimony	0.841		ng/l							
Arsenic	1.40		ng/l							
Barium	5.28		ng/l							
Beryllium	0.261		ng/l							
Cadmium	0.590		ng/l							
Calcium	109		ng/l							
Chromium	6.86		ng/l							
Cobalt	1.31		ng/l							
Copper	78.1		ng/l							
Iron	116		ng/l							
Lead	6.09		ng/l							
Magnesium	29.2		ng/l							
Manganese	12.8		ng/l							
Molybdenum	6.48		ng/l							
Nickel	1.64		ng/l							
Phosphorus	-98.5		ng/l							U
Potassium	-2030		ng/l							U
Rubidium	-0.520		ng/l							U
Selenium	2.55		ng/l							
Sodium	-139		ng/l							U
Strontium	1.31		ng/l							
Thallium	0.342		ng/l							
Thorium	0.775		ng/l							
Uranium	0.00284		ng/l							

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Inorganics by Compendium Method IO-3.5 - Quality Control

Batch 2312031 - B3L0605

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Calibration Blank (2312031-CCB2) Contin				Prepared & Analyzed: 12/11/23						
Vanadium	-27.2		ng/l							U
Zinc	86.5		ng/l							
Calibration Blank (2312031-CCB3)				Prepared & Analyzed: 12/11/23						
Aluminum	93.4		ng/l							
Antimony	1.38		ng/l							
Arsenic	0.532		ng/l							
Barium	9.11		ng/l							
Beryllium	-0.404		ng/l							U
Cadmium	0.751		ng/l							
Calcium	1790		ng/l							
Chromium	8.74		ng/l							
Cobalt	2.10		ng/l							
Copper	103		ng/l							
Iron	89.9		ng/l							
Lead	9.51		ng/l							
Magnesium	57.1		ng/l							
Manganese	19.5		ng/l							
Molybdenum	7.67		ng/l							
Nickel	4.18		ng/l							
Phosphorus	240		ng/l							
Potassium	-1680		ng/l							U
Rubidium	0.833		ng/l							
Selenium	-5.47		ng/l							U
Sodium	35.1		ng/l							
Strontium	1.98		ng/l							
Thallium	0.377		ng/l							
Thorium	0.618		ng/l							
Uranium	0.00625		ng/l							
Vanadium	-34.9		ng/l							U
Zinc	36.8		ng/l							
Calibration Blank (2312031-CCB4)				Prepared: 12/11/23 Analyzed: 12/12/23						
Aluminum	89.9		ng/l							
Antimony	1.68		ng/l							
Arsenic	0.642		ng/l							
Barium	11.3		ng/l							
Beryllium	-0.336		ng/l							U
Cadmium	1.03		ng/l							
Calcium	1970		ng/l							

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Batch 2312031 - B3L0605

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Calibration Blank (2312031-CCB4) Contin				Prepared: 12/11/23 Analyzed: 12/12/23						
Chromium	14.4		ng/l							
Cobalt	2.56		ng/l							
Copper	124		ng/l							
Iron	168		ng/l							
Lead	11.5		ng/l							
Magnesium	77.9		ng/l							
Manganese	25.5		ng/l							
Molybdenum	8.01		ng/l							
Nickel	6.18		ng/l							
Phosphorus	-615		ng/l							U
Potassium	-1600		ng/l							U
Rubidium	0.323		ng/l							
Selenium	-2.85		ng/l							U
Sodium	122		ng/l							
Strontium	3.46		ng/l							
Thallium	0.497		ng/l							
Thorium	0.642		ng/l							
Uranium	0.0164		ng/l							
Vanadium	-34.0		ng/l							U
Zinc	38.0		ng/l							
Calibration Check (2312031-CCV1)				Prepared & Analyzed: 12/11/23						
Aluminum	1.53E6		ng/l	1.5000E6		102	90-110			
Antimony	20200		ng/l	20000		101	90-110			
Arsenic	19900		ng/l	20000		99.7	90-110			
Barium	200000		ng/l	200000		100	90-110			
Beryllium	4940		ng/l	5000.0		98.8	90-110			
Cadmium	20100		ng/l	20000		101	90-110			
Calcium	2.48E7		ng/l	2.5000E7		99.1	90-110			
Chromium	241000		ng/l	240000		101	90-110			
Cobalt	50300		ng/l	50000		101	90-110			
Copper	2.02E6		ng/l	2.0000E6		101	90-110			
Iron	2.49E6		ng/l	2.5000E6		99.7	90-110			
Lead	198000		ng/l	200000		98.8	90-110			
Magnesium	1.03E6		ng/l	1.0000E6		103	90-110			
Manganese	488000		ng/l	500000		97.6	90-110			
Molybdenum	49600		ng/l	50000		99.2	90-110			
Nickel	121000		ng/l	120000		101	90-110			
Phosphorus	198000		ng/l	200000		98.9	90-110			

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Inorganics by Compendium Method IO-3.5 - Quality Control

Batch 2312031 - B3L0605

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Calibration Check (2312031-CCV1) Contin				Prepared & Analyzed: 12/11/23						
Potassium	2.49E6		ng/l	2.5000E6		99.5	90-110			
Rubidium	9990		ng/l	10000		99.9	90-110			
Selenium	19900		ng/l	20000		99.7	90-110			
Sodium	2.61E6		ng/l	2.5000E6		104	90-110			
Strontium	49900		ng/l	50000		99.8	90-110			
Thallium	484		ng/l	500.00		96.8	90-110			
Thorium	496		ng/l	500.00		99.2	90-110			
Uranium	494		ng/l	500.00		98.9	90-110			
Vanadium	19800		ng/l	20000		99.2	90-110			
Zinc	519000		ng/l	500000		104	90-110			
Calibration Check (2312031-CCV2)				Prepared & Analyzed: 12/11/23						
Aluminum	1.47E6		ng/l	1.5000E6		98.2	90-110			
Antimony	19900		ng/l	20000		99.6	90-110			
Arsenic	19600		ng/l	20000		97.8	90-110			
Barium	198000		ng/l	200000		99.1	90-110			
Beryllium	4930		ng/l	5000.0		98.5	90-110			
Cadmium	19800		ng/l	20000		98.9	90-110			
Calcium	2.43E7		ng/l	2.5000E7		97.3	90-110			
Chromium	246000		ng/l	240000		103	90-110			
Cobalt	48800		ng/l	50000		97.6	90-110			
Copper	1.96E6		ng/l	2.0000E6		97.9	90-110			
Iron	2.42E6		ng/l	2.5000E6		96.8	90-110			
Lead	195000		ng/l	200000		97.3	90-110			
Magnesium	982000		ng/l	1.0000E6		98.2	90-110			
Manganese	477000		ng/l	500000		95.3	90-110			
Molybdenum	49000		ng/l	50000		98.1	90-110			
Nickel	118000		ng/l	120000		98.1	90-110			
Phosphorus	186000		ng/l	200000		93.1	90-110			
Potassium	2.42E6		ng/l	2.5000E6		96.7	90-110			
Rubidium	9860		ng/l	10000		98.6	90-110			
Selenium	20000		ng/l	20000		99.9	90-110			
Sodium	2.47E6		ng/l	2.5000E6		98.8	90-110			
Strontium	48800		ng/l	50000		97.6	90-110			
Thallium	471		ng/l	500.00		94.2	90-110			
Thorium	482		ng/l	500.00		96.4	90-110			
Uranium	477		ng/l	500.00		95.5	90-110			
Vanadium	19500		ng/l	20000		97.5	90-110			
Zinc	507000		ng/l	500000		101	90-110			

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Inorganics by Compendium Method IO-3.5 - Quality Control

Batch 2312031 - B3L0605

Calibration Check (2312031-CCV3) Prepared & Analyzed: 12/11/23

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Aluminum	1.49E6		ng/l	1.5000E6		99.5	90-110			
Antimony	20300		ng/l	20000		101	90-110			
Arsenic	19800		ng/l	20000		99.2	90-110			
Barium	199000		ng/l	200000		99.3	90-110			
Beryllium	4560		ng/l	5000.0		91.3	90-110			
Cadmium	20100		ng/l	20000		101	90-110			
Calcium	2.46E7		ng/l	2.5000E7		98.4	90-110			
Chromium	246000		ng/l	240000		103	90-110			
Cobalt	49400		ng/l	50000		98.8	90-110			
Copper	2.01E6		ng/l	2.0000E6		100	90-110			
Iron	2.46E6		ng/l	2.5000E6		98.6	90-110			
Lead	197000		ng/l	200000		98.7	90-110			
Magnesium	1.00E6		ng/l	1.0000E6		100	90-110			
Manganese	487000		ng/l	500000		97.3	90-110			
Molybdenum	49200		ng/l	50000		98.4	90-110			
Nickel	120000		ng/l	120000		99.7	90-110			
Phosphorus	197000		ng/l	200000		98.6	90-110			
Potassium	2.43E6		ng/l	2.5000E6		97.2	90-110			
Rubidium	9930		ng/l	10000		99.3	90-110			
Selenium	20000		ng/l	20000		100	90-110			
Sodium	2.54E6		ng/l	2.5000E6		102	90-110			
Strontium	49700		ng/l	50000		99.3	90-110			
Thallium	480		ng/l	500.00		96.0	90-110			
Thorium	496		ng/l	500.00		99.1	90-110			
Uranium	489		ng/l	500.00		97.7	90-110			
Vanadium	19900		ng/l	20000		99.6	90-110			
Zinc	517000		ng/l	500000		103	90-110			

Calibration Check (2312031-CCV4) Prepared & Analyzed: 12/11/23

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Aluminum	1.50E6		ng/l	1.5000E6		100	90-110			
Antimony	20500		ng/l	20000		102	90-110			
Arsenic	20000		ng/l	20000		99.9	90-110			
Barium	202000		ng/l	200000		101	90-110			
Beryllium	4550		ng/l	5000.0		91.1	90-110			
Cadmium	20300		ng/l	20000		102	90-110			
Calcium	2.49E7		ng/l	2.5000E7		99.6	90-110			
Chromium	254000		ng/l	240000		106	90-110			
Cobalt	49700		ng/l	50000		99.4	90-110			
Copper	2.02E6		ng/l	2.0000E6		101	90-110			

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FILE #: 0000.00
REPORTED: 12/14/23 11:51
SUBMITTED: 12/04/23
AQS SITE CODE:
SITE CODE: Maui fires

Inorganics by Compendium Method IO-3.5 - Quality Control

Batch 2312031 - B3L0605

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Calibration Check (2312031-CCV4) Contin				Prepared & Analyzed: 12/11/23						
Iron	2.48E6		ng/l	2.5000E6		99.2	90-110			
Lead	200000		ng/l	200000		99.9	90-110			
Magnesium	1.00E6		ng/l	1.0000E6		100	90-110			
Manganese	491000		ng/l	500000		98.2	90-110			
Molybdenum	50300		ng/l	50000		101	90-110			
Nickel	120000		ng/l	120000		99.8	90-110			
Phosphorus	193000		ng/l	200000		96.7	90-110			
Potassium	2.45E6		ng/l	2.5000E6		97.9	90-110			
Rubidium	10100		ng/l	10000		101	90-110			
Selenium	20200		ng/l	20000		101	90-110			
Sodium	2.55E6		ng/l	2.5000E6		102	90-110			
Strontium	50300		ng/l	50000		101	90-110			
Thallium	485		ng/l	500.00		97.0	90-110			
Thorium	500		ng/l	500.00		100	90-110			
Uranium	498		ng/l	500.00		99.7	90-110			
Vanadium	20200		ng/l	20000		101	90-110			
Zinc	523000		ng/l	500000		105	90-110			
High Cal Check (2312031-HCV1)				Prepared & Analyzed: 12/11/23						
Aluminum	2.93E6		ng/l	3.0000E6		97.6	95-105			
Antimony	39900		ng/l	40000		99.7	95-105			
Arsenic	39800		ng/l	40000		99.5	95-105			
Barium	400000		ng/l	400000		99.9	95-105			
Beryllium	10300		ng/l	10000		103	95-105			
Cadmium	39300		ng/l	40000		98.3	95-105			
Calcium	4.93E7		ng/l	5.0000E7		98.7	95-105			
Chromium	473000		ng/l	480000		98.5	95-105			
Cobalt	98300		ng/l	100000		98.3	95-105			
Copper	3.94E6		ng/l	4.0000E6		98.5	95-105			
Iron	4.94E6		ng/l	5.0000E6		98.8	95-105			
Lead	397000		ng/l	400000		99.2	95-105			
Magnesium	1.96E6		ng/l	2.0000E6		97.9	95-105			
Manganese	986000		ng/l	1.0000E6		98.6	95-105			
Molybdenum	99400		ng/l	100000		99.4	95-105			
Nickel	235000		ng/l	240000		98.0	95-105			
Phosphorus	394000		ng/l	400000		98.5	95-105			
Potassium	4.90E6		ng/l	5.0000E6		98.1	95-105			
Rubidium	19900		ng/l	20000		99.3	95-105			
Selenium	39600		ng/l	40000		99.0	95-105			

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Inorganics by Compendium Method IO-3.5 - Quality Control

Batch 2312031 - B3L0605

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
High Cal Check (2312031-HCV1) Continue				Prepared & Analyzed: 12/11/23						
Sodium	4.90E6		ng/l	5.0000E6		98.0	95-105			
Strontium	99600		ng/l	100000		99.6	95-105			
Thallium	995		ng/l	1000.0		99.5	95-105			
Thorium	990		ng/l	1000.0		99.0	95-105			
Uranium	996		ng/l	1000.0		99.6	95-105			
Vanadium	39600		ng/l	40000		99.1	95-105			
Zinc	1.02E6		ng/l	1.0000E6		102	95-105			
Initial Cal Blank (2312031-ICB1)				Prepared & Analyzed: 12/11/23						
Aluminum	61.1		ng/l							
Antimony	1.48		ng/l							
Arsenic	-0.519		ng/l							U
Barium	3.07		ng/l							
Beryllium	1.36		ng/l							
Cadmium	0.359		ng/l							
Calcium	888		ng/l							
Chromium	5.64		ng/l							
Cobalt	0.725		ng/l							
Copper	77.3		ng/l							
Iron	99.8		ng/l							
Lead	7.11		ng/l							
Magnesium	0.0695		ng/l							
Manganese	8.48		ng/l							
Molybdenum	13.3		ng/l							
Nickel	0.0933		ng/l							
Phosphorus	-217		ng/l							U
Potassium	-1150		ng/l							U
Rubidium	0.811		ng/l							
Selenium	-2.72		ng/l							U
Sodium	-108		ng/l							U
Strontium	0.976		ng/l							
Thallium	0.339		ng/l							
Thorium	0.469		ng/l							
Uranium	-0.00424		ng/l							U
Vanadium	-32.0		ng/l							U
Zinc	-15.8		ng/l							U
Initial Cal Check (2312031-ICV1)				Prepared & Analyzed: 12/11/23						
Aluminum	1.45E6		ng/l	1.5000E6		96.5	90-110			
Antimony	19500		ng/l	20000		97.3	90-110			

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Inorganics by Compendium Method IO-3.5 - Quality Control

Batch 2312031 - B3L0605

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Initial Cal Check (2312031-ICV1) Continu				Prepared & Analyzed: 12/11/23						
Arsenic	19500		ng/l	20000		97.5	90-110			
Barium	196000		ng/l	200000		98.0	90-110			
Beryllium	5090		ng/l	5000.0		102	90-110			
Cadmium	20100		ng/l	20000		101	90-110			
Calcium	2.40E7		ng/l	2.5000E7		96.1	90-110			
Chromium	246000		ng/l	240000		103	90-110			
Cobalt	49000		ng/l	50000		98.0	90-110			
Copper	1.97E6		ng/l	2.0000E6		98.6	90-110			
Iron	2.45E6		ng/l	2.5000E6		98.2	90-110			
Lead	193000		ng/l	200000		96.4	90-110			
Magnesium	967000		ng/l	1.0000E6		96.7	90-110			
Manganese	479000		ng/l	500000		95.9	90-110			
Molybdenum	48700		ng/l	50000		97.3	90-110			
Nickel	117000		ng/l	120000		97.8	90-110			
Phosphorus	190000		ng/l	200000		95.2	90-110			
Potassium	2.45E6		ng/l	2.5000E6		98.0	90-110			
Rubidium	9540		ng/l	10000		95.4	90-110			
Selenium	20200		ng/l	20000		101	90-110			
Sodium	2.48E6		ng/l	2.5000E6		99.2	90-110			
Strontium	49000		ng/l	50000		98.0	90-110			
Thallium	468		ng/l	500.00		93.7	90-110			
Thorium	474		ng/l	500.00		94.7	90-110			
Uranium	479		ng/l	500.00		95.8	90-110			
Vanadium	19700		ng/l	20000		98.3	90-110			
Zinc	515000		ng/l	500000		103	90-110			
Interference Check A (2312031-IFA1)				Prepared & Analyzed: 12/11/23						
Aluminum	1.45E7		ng/l	1.5000E7		96.4	80-120			
Antimony	0.00		ng/l				80-120			U
Arsenic	0.00		ng/l				80-120			U
Barium	0.00		ng/l				80-120			U
Beryllium	0.00		ng/l				80-120			U
Cadmium	0.00		ng/l				80-120			U
Calcium	9.11E7		ng/l	1.0040E8		90.8	80-120			
Chromium	0.00		ng/l				80-120			U
Cobalt	0.00		ng/l				80-120			U
Copper	0.00		ng/l				80-120			U
Iron	1.44E7		ng/l	1.5000E7		95.9	80-120			
Lead	0.00		ng/l				80-120			U

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Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes

Inorganics by Compendium Method IO-3.5 - Quality Control

Batch 2312031 - B3L0605

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Interference Check A (2312031-IFA1) Co				Prepared & Analyzed: 12/11/23						
Magnesium	1.50E7		ng/l	1.5000E7		99.9	80-120			
Manganese	0.00		ng/l				80-120			U
Molybdenum	293000		ng/l	300000		97.6	80-120			
Nickel	0.00		ng/l				80-120			U
Phosphorus	1.55E7		ng/l	1.5000E7		104	80-120			
Potassium	1.43E7		ng/l	1.5000E7		95.1	80-120			
Rubidium	0.00		ng/l				80-120			U
Selenium	0.00		ng/l				80-120			U
Sodium	1.51E7		ng/l	1.5000E7		101	80-120			
Strontium	0.00		ng/l				80-120			U
Thallium	0.00		ng/l				80-120			U
Thorium	0.00		ng/l				80-120			U
Uranium	0.00		ng/l				80-120			U
Vanadium	0.00		ng/l				80-120			U
Zinc	0.00		ng/l				80-120			U
Interference Check B (2312031-IFB1)				Prepared & Analyzed: 12/11/23						
Aluminum	1.58E7		ng/l	1.6500E7		96.0	80-120			
Antimony	19900		ng/l	20000		99.5	80-120			
Arsenic	20000		ng/l	20000		100	80-120			
Barium	202000		ng/l	200000		101	80-120			
Beryllium	4640		ng/l	5000.0		92.7	80-120			
Cadmium	19200		ng/l	20000		95.8	80-120			
Calcium	1.14E8		ng/l	1.2540E8		90.9	80-120			
Chromium	227000		ng/l	240000		94.4	80-120			
Cobalt	48200		ng/l	50000		96.4	80-120			
Copper	1.86E6		ng/l	2.0000E6		93.1	80-120			
Iron	1.66E7		ng/l	1.7500E7		95.1	80-120			
Lead	205000		ng/l	200000		102	80-120			
Magnesium	1.59E7		ng/l	1.6000E7		99.7	80-120			
Manganese	501000		ng/l	500000		100	80-120			
Molybdenum	341000		ng/l	350000		97.4	80-120			
Nickel	113000		ng/l	120000		93.8	80-120			
Phosphorus	1.58E7		ng/l	1.5200E7		104	80-120			
Potassium	1.69E7		ng/l	1.7500E7		96.3	80-120			
Rubidium	10100		ng/l	10000		101	80-120			
Selenium	18800		ng/l	20000		94.1	80-120			
Sodium	1.79E7		ng/l	1.7500E7		102	80-120			
Strontium	49900		ng/l	50000		99.9	80-120			

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Inorganics by Compendium Method IO-3.5 - Quality Control

Batch 2312031 - B3L0605

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Interference Check B (2312031-IFB1) Co				Prepared & Analyzed: 12/11/23						
Thallium	516		ng/l	500.00		103	80-120			
Thorium	530		ng/l	500.00		106	80-120			
Uranium	539		ng/l	500.00		108	80-120			
Vanadium	19000		ng/l	20000		95.2	80-120			
Zinc	469000		ng/l	500000		93.7	80-120			

Batch B3L0605 - ICP-MS Extraction

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (B3L0605-BLK1)				Prepared: 12/06/23 Analyzed: 12/08/23						
Aluminum	ND	32.1	ng/m³ Air							U
Antimony	ND	0.0441	ng/m³ Air							SL, U
Arsenic	ND	0.00955	ng/m³ Air							U
Barium	ND	0.948	ng/m³ Air							U
Beryllium	ND	0.00332	ng/m³ Air							U
Cadmium	ND	0.109	ng/m³ Air							U
Calcium	ND	292	ng/m³ Air							GC-BS, QB-01 U
Chromium	ND	2.03	ng/m³ Air							U
Cobalt	ND	0.0156	ng/m³ Air							QB-01, U
Copper	ND	3.00	ng/m³ Air							U
Iron	ND	24.2	ng/m³ Air							QB-01, U
Lead	ND	0.276	ng/m³ Air							U
Magnesium	ND	96.4	ng/m³ Air							U
Manganese	ND	1.19	ng/m³ Air							U
Molybdenum	ND	0.213	ng/m³ Air							QB-01, U
Nickel	ND	0.801	ng/m³ Air							U
Phosphorus	ND	1250	ng/m³ Air							GC-BS, LJ, QX U
Potassium	ND	38.0	ng/m³ Air							U
Rubidium	ND	0.0183	ng/m³ Air							U
Selenium	ND	0.0110	ng/m³ Air							U
Sodium	ND	2000	ng/m³ Air							GC-BS, U
Strontium	ND	0.652	ng/m³ Air							QB-01, U
Thallium	ND	5.03E-4	ng/m³ Air							U
Thorium	ND	0.00300	ng/m³ Air							U
Uranium	ND	0.0170	ng/m³ Air							U
Vanadium	ND	0.0492	ng/m³ Air							U
Zinc	ND	97.7	ng/m³ Air							U
LCS (B3L0605-BS1)				Prepared: 12/06/23 Analyzed: 12/08/23						
Aluminum	105	32.1	ng/m³ Air	82.975		126	80-120			

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Inorganics by Compendium Method IO-3.5 - Quality Control

Batch B3L0605 - ICP-MS Extraction

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
LCS (B3L0605-BS1) Continued				Prepared: 12/06/23 Analyzed: 12/08/23						
Antimony	0.541	0.0441	ng/m³ Air	1.3829		39.1	80-120			SL
Arsenic	2.72	0.00955	ng/m³ Air	2.7658		98.2	80-120			
Barium	27.9	0.948	ng/m³ Air	27.658		101	80-120			
Beryllium	1.31	0.00332	ng/m³ Air	1.3829		94.9	80-120			
Cadmium	1.39	0.109	ng/m³ Air	1.3829		101	80-120			
Calcium	580	292	ng/m³ Air	69.146		839	80-120			GC-BS, QB-01
Chromium	15.7	2.03	ng/m³ Air	13.829		114	80-120			
Cobalt	1.38	0.0156	ng/m³ Air	1.3829		99.8	80-120			QB-01
Copper	30.5	3.00	ng/m³ Air	27.658		110	80-120			QB-01
Iron	53.3	24.2	ng/m³ Air	27.658		193	80-120			QB-01
Lead	13.4	0.276	ng/m³ Air	13.829		96.6	80-120			
Magnesium	ND	96.4	ng/m³ Air	27.658			80-120			U
Manganese	8.80	1.19	ng/m³ Air	8.2975		106	80-120			
Molybdenum	1.69	0.213	ng/m³ Air	1.3829		122	80-120			QB-01
Nickel	3.05	0.801	ng/m³ Air	2.7658		110	80-120			
Phosphorus	ND	1250	ng/m³ Air	13.829			80-120			GC-BS, LJ, QX U
Potassium	70.6	38.0	ng/m³ Air	55.317		128	80-120			
Rubidium	1.33	0.0183	ng/m³ Air	1.3829		96.1	80-120			
Selenium	2.71	0.0110	ng/m³ Air	2.7658		97.9	80-120			
Sodium	ND	2000	ng/m³ Air	55.317			80-120			GC-BS, U
Strontium	2.32	0.652	ng/m³ Air	1.3829		168	80-120			QB-01
Thallium	0.129	5.03E-4	ng/m³ Air	0.13829		93.5	80-120			
Thorium	0.127	0.00300	ng/m³ Air	0.13829		91.8	80-120			
Uranium	0.130	0.0170	ng/m³ Air	0.13829		94.3	80-120			
Vanadium	2.75	0.0492	ng/m³ Air	2.7658		99.6	80-120			
Zinc	104	97.7	ng/m³ Air	82.975		125	80-120			
Duplicate (B3L0605-DUP1)		**Source: 3120430-06**		Prepared: 12/06/23 Analyzed: 12/08/23						
Aluminum	331	25.8	ng/m³ Air		340			2.71	10	
Antimony	0.0449	0.0354	ng/m³ Air		0.0483			7.27	10	SL
Arsenic	0.165	0.00767	ng/m³ Air		0.169			2.84	10	
Barium	4.42	0.761	ng/m³ Air		4.13			6.65	10	
Beryllium	0.0119	0.00267	ng/m³ Air		0.0113			4.73	10	
Cadmium	ND	0.0875	ng/m³ Air		ND				10	U
Calcium	525	234	ng/m³ Air		527			0.265	10	GC-BS, QB-01
Chromium	1.75	1.63	ng/m³ Air		1.70			2.73	10	
Cobalt	0.189	0.0125	ng/m³ Air		0.176			7.27	10	QB-01
Copper	13.2	2.41	ng/m³ Air		13.2			0.320	10	

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1777 Sentry Pkwy, Bldg 12
Blue Bell, PA 19422
ATTN: Ms. Chelsea Saber
PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 12/14/23 11:51
SUBMITTED: 12/04/23
AQS SITE CODE:
SITE CODE: Maui fires

Inorganics by Compendium Method IO-3.5 - Quality Control

Batch B3L0605 - ICP-MS Extraction

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Duplicate (B3L0605-DUP1) Continued		**Source: 3120430-06**		Prepared: 12/06/23 Analyzed: 12/08/23						
Iron	352	19.4	ng/m³ Air		360			2.21	10	QB-01
Lead	ND	0.222	ng/m³ Air		ND				10	U
Magnesium	158	77.4	ng/m³ Air		158			0.0230	10	
Manganese	9.52	0.956	ng/m³ Air		9.44			0.883	10	
Molybdenum	0.964	0.171	ng/m³ Air		0.960			0.499	10	QB-01
Nickel	ND	0.643	ng/m³ Air		ND				10	U
Phosphorus	ND	1000	ng/m³ Air		ND				10	U, GC-BS, LJ, QX
Potassium	102	30.5	ng/m³ Air		116			12.1	10	
Rubidium	0.173	0.0147	ng/m³ Air		0.173			0.169	10	
Selenium	0.128	0.00883	ng/m³ Air		0.115			10.7	10	
Sodium	ND	1610	ng/m³ Air		ND				10	U, GC-BS
Strontium	3.24	0.524	ng/m³ Air		3.24			0.0620	10	QB-01
Thallium	7.75E-4	4.04E-4	ng/m³ Air		8.68E-4			11.2	10	
Thorium	0.00976	0.00241	ng/m³ Air		0.0114			15.2	10	
Uranium	ND	0.0137	ng/m³ Air		ND				10	U
Vanadium	1.20	0.0395	ng/m³ Air		1.20			0.623	10	
Zinc	ND	78.5	ng/m³ Air		ND				10	U
Duplicate (B3L0605-DUP2)		**Source: 3120430-10**		Prepared: 12/06/23 Analyzed: 12/08/23						
Aluminum	157	28.9	ng/m³ Air		155			1.57	10	
Antimony	0.0888	0.0397	ng/m³ Air		0.0878			1.04	10	SL
Arsenic	0.0872	0.00861	ng/m³ Air		0.0858			1.58	10	
Barium	4.20	0.854	ng/m³ Air		4.18			0.578	10	
Beryllium	0.00662	0.00299	ng/m³ Air		0.00633			4.49	10	
Cadmium	ND	0.0982	ng/m³ Air		ND				10	U
Calcium	286	263	ng/m³ Air		279			2.47	10	GC-BS, QB-01
Chromium	ND	1.83	ng/m³ Air		ND				10	U
Cobalt	0.0933	0.0141	ng/m³ Air		0.0929			0.444	10	QB-01
Copper	38.7	2.70	ng/m³ Air		38.2			1.41	10	
Iron	185	21.8	ng/m³ Air		184			0.540	10	QB-01
Lead	ND	0.249	ng/m³ Air		ND				10	U
Magnesium	135	86.9	ng/m³ Air		135			0.359	10	
Manganese	4.80	1.07	ng/m³ Air		4.78			0.399	10	
Molybdenum	1.20	0.192	ng/m³ Air		1.20			0.0441	10	QB-01
Nickel	ND	0.722	ng/m³ Air		ND				10	U
Phosphorus	ND	1130	ng/m³ Air		ND				10	U, GC-BS, LJ, QX
Potassium	94.6	34.3	ng/m³ Air		94.3			0.255	10	
Rubidium	0.108	0.0165	ng/m³ Air		0.103			4.97	10	

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Inorganics by Compendium Method IO-3.5 - Quality Control

Batch B3L0605 - ICP-MS Extraction

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Duplicate (B3L0605-DUP2) Continued		**Source: 3120430-10**		Prepared: 12/06/23		Analyzed: 12/08/23				
Selenium	0.117	0.00991	ng/m³ Air		0.123			4.38	10	
Sodium	ND	1800	ng/m³ Air		ND				10	U, GC-BS
Strontium	1.76	0.588	ng/m³ Air		1.75			0.505	10	QB-01
Thallium	7.31E-4	4.53E-4	ng/m³ Air		6.73E-4			8.25	10	
Thorium	0.00605	0.00270	ng/m³ Air		0.00607			0.298	10	
Uranium	ND	0.0153	ng/m³ Air		ND				10	U
Vanadium	0.499	0.0443	ng/m³ Air		0.496			0.696	10	
Zinc	ND	88.1	ng/m³ Air		ND				10	U
Matrix Spike (B3L0605-MS1)		**Source: 3120430-06**		Prepared: 12/06/23		Analyzed: 12/08/23				
Aluminum	409	25.8	ng/m³ Air	66.632	340	103	80-120			
Antimony	0.533	0.0354	ng/m³ Air	1.1105	0.0483	43.6	80-120			SL
Arsenic	2.35	0.00767	ng/m³ Air	2.2211	0.169	98.4	80-120			
Barium	25.5	0.761	ng/m³ Air	22.211	4.13	96.4	80-120			
Beryllium	1.04	0.00267	ng/m³ Air	1.1105	0.0113	92.3	80-120			
Cadmium	1.12	0.0875	ng/m³ Air	1.1105	ND	101	80-120			
Calcium	588	234	ng/m³ Air	55.526	527	111	80-120			GC-BS, QB-01
Chromium	13.1	1.63	ng/m³ Air	11.105	1.70	103	80-120			
Cobalt	1.24	0.0125	ng/m³ Air	1.1105	0.176	96.2	80-120			QB-01
Copper	37.1	2.41	ng/m³ Air	22.211	13.2	108	80-120			QB-01
Iron	383	19.4	ng/m³ Air	22.211	360	102	80-120			QB-01
Lead	10.9	0.222	ng/m³ Air	11.105	ND	98.1	80-120			
Magnesium	183	77.4	ng/m³ Air	22.211	158	111	80-120			
Manganese	16.4	0.956	ng/m³ Air	6.6632	9.44	104	80-120			
Molybdenum	2.04	0.171	ng/m³ Air	1.1105	0.960	97.5	80-120			QB-01
Nickel	2.80	0.643	ng/m³ Air	2.2211	ND	126	80-120			
Phosphorus	ND	1000	ng/m³ Air	11.105	ND		80-120			GC-BS, LJ, QM-4X, QX, U
Potassium	166	30.5	ng/m³ Air	44.421	116	113	80-120			
Rubidium	1.20	0.0147	ng/m³ Air	1.1105	0.173	92.6	80-120			
Selenium	2.26	0.00883	ng/m³ Air	2.2211	0.115	96.7	80-120			
Sodium	ND	1610	ng/m³ Air	44.421	ND		80-120			GC-BS, QM-4X, U
Strontium	4.29	0.524	ng/m³ Air	1.1105	3.24	94.9	80-120			QB-01
Thallium	0.103	4.04E-4	ng/m³ Air	0.11105	8.68E-4	91.7	80-120			
Thorium	0.0619	0.00241	ng/m³ Air	0.11105	0.0114	45.5	80-120			QM-07
Uranium	0.110	0.0137	ng/m³ Air	0.11105	ND	99.2	80-120			
Vanadium	3.42	0.0395	ng/m³ Air	2.2211	1.20	99.7	80-120			
Zinc	85.9	78.5	ng/m³ Air	66.632	ND	129	80-120			

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Inorganics by Compendium Method IO-3.5 - Quality Control

Batch B3L0605 - ICP-MS Extraction

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Matrix Spike Dup (B3L0605-MSD1)	**Source: 3120430-06**		Prepared: 12/06/23	Analyzed: 12/08/23						
Aluminum	403	25.8	ng/m³ Air	66.632	340	94.9	80-120	1.36	20	
Antimony	0.572	0.0354	ng/m³ Air	1.1105	0.0483	47.1	80-120	7.04	20	SL
Arsenic	2.36	0.00767	ng/m³ Air	2.2211	0.169	98.8	80-120	0.348	20	
Barium	25.8	0.761	ng/m³ Air	22.211	4.13	97.5	80-120	0.967	20	
Beryllium	1.02	0.00267	ng/m³ Air	1.1105	0.0113	90.5	80-120	1.94	20	
Cadmium	1.14	0.0875	ng/m³ Air	1.1105	ND	102	80-120	0.957	20	
Calcium	586	234	ng/m³ Air	55.526	527	106	80-120	0.459	20	GC-BS, QB-01
Chromium	12.9	1.63	ng/m³ Air	11.105	1.70	101	80-120	1.43	20	
Cobalt	1.25	0.0125	ng/m³ Air	1.1105	0.176	97.0	80-120	0.741	20	QB-01
Copper	38.5	2.41	ng/m³ Air	22.211	13.2	114	80-120	3.71	20	
Iron	376	19.4	ng/m³ Air	22.211	360	70.6	80-120	1.84	20	QB-01, QM-4X
Lead	11.0	0.222	ng/m³ Air	11.105	ND	99.3	80-120	1.20	20	
Magnesium	180	77.4	ng/m³ Air	22.211	158	98.9	80-120	1.53	20	
Manganese	16.2	0.956	ng/m³ Air	6.6632	9.44	101	80-120	0.981	20	
Molybdenum	2.05	0.171	ng/m³ Air	1.1105	0.960	98.5	80-120	0.530	20	QB-01
Nickel	2.85	0.643	ng/m³ Air	2.2211	ND	128	80-120	1.92	20	
Phosphorus	ND	1000	ng/m³ Air	11.105	ND		80-120		20	GC-BS, LJ, QM-4X, QX, U
Potassium	149	30.5	ng/m³ Air	44.421	116	74.4	80-120	10.8	20	QM-07
Rubidium	1.22	0.0147	ng/m³ Air	1.1105	0.173	94.3	80-120	1.53	20	
Selenium	2.27	0.00883	ng/m³ Air	2.2211	0.115	96.9	80-120	0.172	20	
Sodium	ND	1610	ng/m³ Air	44.421	ND		80-120		20	GC-BS, QM-4X, U
Strontium	4.24	0.524	ng/m³ Air	1.1105	3.24	90.2	80-120	1.21	20	QB-01
Thallium	0.105	4.04E-4	ng/m³ Air	0.11105	8.68E-4	93.8	80-120	2.28	20	
Thorium	0.0637	0.00241	ng/m³ Air	0.11105	0.0114	47.1	80-120	2.85	20	QM-07
Uranium	0.112	0.0137	ng/m³ Air	0.11105	ND	101	80-120	1.90	20	
Vanadium	3.39	0.0395	ng/m³ Air	2.2211	1.20	98.5	80-120	0.743	20	
Zinc	88.0	78.5	ng/m³ Air	66.632	ND	132	80-120	2.51	20	
Post Spike (B3L0605-PS1)	**Source: 3120430-06**		Prepared: 12/06/23	Analyzed: 12/08/23						
Aluminum	368	25.8	ng/m³ Air	22.211	340	125	75-125			A-01
Antimony	0.268	0.0354	ng/m³ Air	0.22211	0.0483	99.1	75-125			SL
Arsenic	1.25	0.00767	ng/m³ Air	1.1105	0.169	96.9	75-125			
Barium	6.28	0.761	ng/m³ Air	2.2211	4.13	96.7	75-125			
Beryllium	0.217	0.00267	ng/m³ Air	0.22211	0.0113	92.4	75-125			
Cadmium	0.119	0.0875	ng/m³ Air	0.11105	ND	108	75-125			
Calcium	565	234	ng/m³ Air	22.211	527	175	75-125			A-01, GC-BS, QB-01
Chromium	2.82	1.63	ng/m³ Air	1.1105	1.70	101	75-125			

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Inorganics by Compendium Method IO-3.5 - Quality Control

Batch B3L0605 - ICP-MS Extraction

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Post Spike (B3L0605-PS1) Continued		**Source: 3120430-06**		Prepared: 12/06/23		Analyzed: 12/08/23				
Cobalt	0.393	0.0125	ng/m³ Air	0.22211	0.176	97.9	75-125			QB-01
Copper	24.6	2.41	ng/m³ Air	11.105	13.2	103	75-125			
Iron	386	19.4	ng/m³ Air	22.211	360	117	75-125			QB-01
Lead	21.8	0.222	ng/m³ Air	22.211	ND	98.3	75-125			
Magnesium	182	77.4	ng/m³ Air	22.211	158	108	75-125			
Manganese	11.8	0.956	ng/m³ Air	2.2211	9.44	105	75-125			
Molybdenum	2.00	0.171	ng/m³ Air	1.1105	0.960	93.7	75-125			QB-01
Nickel	2.73	0.643	ng/m³ Air	2.2211	ND	123	75-125			
Phosphorus	ND	1000	ng/m³ Air	4.4421	ND		75-125			A-01, GC-BS, LJ, QX, U
Potassium	138	30.5	ng/m³ Air	22.211	116	101	75-125			
Rubidium	0.285	0.0147	ng/m³ Air	0.11105	0.173	101	75-125			
Selenium	1.22	0.00883	ng/m³ Air	1.1105	0.115	99.8	75-125			
Sodium	ND	1610	ng/m³ Air	22.211	ND		75-125			A-01, GC-BS, U
Strontium	4.31	0.524	ng/m³ Air	1.1105	3.24	96.1	75-125			QB-01
Thallium	0.0524	4.04E-4	ng/m³ Air	5.5526E-2	8.68E-4	92.8	75-125			
Thorium	0.0627	0.00241	ng/m³ Air	5.5526E-2	0.0114	92.5	75-125			
Uranium	0.0597	0.0137	ng/m³ Air	5.5526E-2	ND	107	75-125			
Vanadium	2.28	0.0395	ng/m³ Air	1.1105	1.20	97.1	75-125			
Zinc	ND	78.5	ng/m³ Air	22.211	ND		75-125			U
Dilution Check (B3L0605-SRL1)		**Source: 3120430-06**		Prepared: 12/06/23		Analyzed: 12/08/23				
Aluminum	341	129	ng/m³ Air		340			0.264	10	
Antimony	ND	0.177	ng/m³ Air		ND				10	SL, U
Arsenic	0.177	0.0383	ng/m³ Air		0.169			4.56	10	
Barium	4.10	3.81	ng/m³ Air		4.13			0.802	10	
Beryllium	ND	0.0133	ng/m³ Air		ND				10	U
Cadmium	ND	0.438	ng/m³ Air		ND				10	U
Calcium	ND	1170	ng/m³ Air		ND				10	QB-01, GC-BS U
Chromium	ND	8.15	ng/m³ Air		ND				10	U
Cobalt	0.175	0.0626	ng/m³ Air		0.176			0.381	10	QB-01
Copper	13.1	12.0	ng/m³ Air		13.2			0.144	10	
Iron	363	97.2	ng/m³ Air		360			0.707	10	QB-01
Lead	ND	1.11	ng/m³ Air		ND				10	U
Magnesium	ND	387	ng/m³ Air		ND				10	U
Manganese	9.48	4.78	ng/m³ Air		9.44			0.420	10	
Molybdenum	0.960	0.855	ng/m³ Air		0.960			2.48E-5	10	QB-01
Nickel	ND	3.22	ng/m³ Air		ND				10	U

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Inorganics by Compendium Method IO-3.5 - Quality Control

Batch B3L0605 - ICP-MS Extraction

Dilution Check (B3L0605-SRL1) Continue Source: 3120430-06 Prepared: 12/06/23 Analyzed: 12/08/23

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Phosphorus	ND	5020	ng/m³ Air		ND				10	GC-BS, LJ, QX U
Potassium	ND	153	ng/m³ Air		ND				10	U
Rubidium	0.186	0.0735	ng/m³ Air		0.173			7.08	10	
Selenium	0.133	0.0442	ng/m³ Air		0.115			14.1	10	
Sodium	ND	8030	ng/m³ Air		ND				10	GC-BS, U
Strontium	3.29	2.62	ng/m³ Air		3.24			1.44	10	QB-01
Thallium	ND	0.00202	ng/m³ Air		ND				10	U
Thorium	ND	0.0120	ng/m³ Air		ND				10	U
Uranium	ND	0.0683	ng/m³ Air		ND				10	U
Vanadium	1.20	0.198	ng/m³ Air		1.20			0.651	10	
Zinc	ND	392	ng/m³ Air		ND				10	U

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Notes and Definitions

U	Under Detection Limit
SL	The spike recovery was outside acceptance limits. Reported value may be biased low.
QX	Compound does not meet QC criteria. Results should be considered an estimate.
QM-4X	The MS/MSD recovery exceeds criteria because the parent sample concentration is greater than 4x the spike concentration. Sample results for the QC batch were accepted based on acceptable BS/BSD recoveries.
QM-07	The spike recovery was outside acceptance limits for the MS and/or MSD. The batch was accepted based on acceptable LCS recovery.
QB-01	Analyte exceeds method blank criteria
LJ	Identification of analyte is acceptable; reported value is an estimate.
GC-BS	Compound exceeds Blank Spike Criteria
FB-01	Analyte exceeds Field Blank criteria.
E	The concentration indicated for this analyte is an estimated value above the calibration range of the instrument. This value is considered an estimate (CLP E-flag).
D	This result obtained by dilution.
A-01	Parent sample >4x spike amount
ND	Analyte NOT DETECTED
NR	Not Reported
MDL	Method Detection Limit
RPD	Relative Percent Difference

Note: This test is accredited under the 2016 TNI Standard.

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Eastern Research Group
601 Keystone Park Drive
Suite 700
Morrisville, NC 27560

December 14, 2023

Ms. Chelsea Saber
Tetra Tech, Inc.
1777 Sentry Pkwy, Bldg 12
Blue Bell, PA 19422
Project Name: Maui fires

Dear Ms. Chelsea Saber,

This report contains the analytical results for the sample(s) received under chain(s) of custody by Eastern Research Group on 12/04/23 12:47.

Values below the MDL for QC results in this report are recorded as ND, however the actual values are reported in the accompanying Excel report with a "U" flag (Under the detection limit). The actual values are reported in AQS.

This test is accredited under the 2016 TNI Standard for Environmental Laboratories (FL DOH Certification # E87673). All analyses were performed as described in the US EPA-approved QAPP, under the contract for National Hazardous Air Pollutant Support (US EPA Contract No. 68HERH22D0002). This cover page is an integral part of this report, and any exceptions or comments are noted on the last page.

Release of the data contained in this data package and in the data submitted in the electronic data deliverable, has been authorized by the Program Manager, or the Program Manager's designee as verified by the following signature.

The issuance of the final Certificate of Analysis takes precedence over any previous Report. If you have any questions, please contact me at 919-468-7924.

Sincerely,

Julie Swift
Program Manager
julie.swift@erg.com

The information contained in this report and its attachment(s) are intended only for the use of the individual to whom it is addressed and may contain information that is privileged, confidential, or exempt from disclosure. If the reader of this message is not the intended recipient, you are hereby notified that any dissemination, distribution, or copying of this report is strictly prohibited. If you have received this report in error, please notify julie.swift@erg.com and delete the report without retaining any copies.

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ANALYTICAL REPORT FOR SAMPLES

SampleName	LabNumber	Matrix	Sampled	Received
TetraTech Q9541902	3120430-01	Air	11/27/23 23:59	12/04/23 12:47
TetraTech Q9541901	3120430-02	Air	11/27/23 23:59	12/04/23 12:47
TetraTech Q9541925	3120430-03	Air	11/27/23 23:59	12/04/23 12:47
TetraTech Q9541900 FB	3120430-04	Air	11/27/23 00:00	12/04/23 12:47
TetraTech Q9541923	3120430-05	Air	11/28/23 23:59	12/04/23 12:47
TetraTech Q9541921	3120430-06	Air	11/28/23 23:59	12/04/23 12:47
TetraTech Q9541920	3120430-07	Air	11/28/23 23:59	12/04/23 12:47
TetraTech Q9541919	3120430-08	Air	11/29/23 23:59	12/04/23 12:47
TetraTech Q9541227	3120430-09	Air	11/29/23 23:59	12/04/23 12:47
TetraTech Q9541899	3120430-10	Air	11/29/23 23:59	12/04/23 12:47
TetraTech Q9541909 FB	3120430-11	Air	11/29/23 00:00	12/04/23 12:47
TetraTech Q9541226 FB	3120430-12	Air	11/28/23 00:00	12/04/23 12:47

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PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 12/14/23 11:51
SUBMITTED: 12/04/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9541902 **Lab ID:** 3120430-01 **Sampled:** 11/27/23 23:59
Matrix: Air **Sample Volume:** 2038.818 m³ **Received:** 12/04/23 12:47
Filter ID: **Analysis Date:** 12/08/23 21:29
Comments: MFK-AM01-112723-HM

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	**7429-90-5**	**6570**	E	**25.6**
Antimony	**7440-36-0**	**0.0770**	SL	**0.0352**
Barium	**7440-39-3**	**35.9**		**0.757**
Beryllium	**7440-41-7**	**0.187**		**0.00265**
Calcium	**7440-70-2**	**1260**	GC-BS, QB-01	**233**
Chromium	**7440-47-3**	**5.66**		**1.62**
Cobalt	**7440-48-4**	**2.20**	QB-01	**0.0124**
Copper	**7440-50-8**	**22.4**		**2.39**
Lead	**7439-92-1**	**1.18**		**0.220**
Magnesium	**7439-95-4**	**414**		**76.9**
Manganese	**7439-96-5**	**151**		**0.950**
Nickel	**7440-02-0**	**2.92**		**0.639**
Phosphorus	7723-14-0	677	U, GC-BS, LJ, QX	998
Potassium	**7440-09-7**	**175**		**30.3**
Sodium	7440-23-5	1510	U, GC-BS	1600
Thallium	**7440-28-0**	**0.00891**		**4.01E-4**
Thorium	**7440-29-01**	**0.162**		**0.00239**
Uranium	**7440-61-1**	**0.118**		**0.0136**
Vanadium	**7440-62-2**	**14.9**	E	**0.0393**
Zinc	7440-66-6	40.5	U	78.0

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FILE #: 0000.00
REPORTED: 12/14/23 11:51
SUBMITTED: 12/04/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9541902
Matrix: Air
Comments: MFK-AM01-112723-HM

Lab ID: 3120430-01RE1
Sample Volume: 2038.818 m^3
Filter ID:

Sampled: 11/27/23 23:59
Received: 12/04/23 12:47
Analysis Date: 12/11/23 22:57

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Arsenic	**7440-38-2**	**0.772**	D	**0.0381**
Cadmium	7440-43-9	0.0422	U, D	0.435
Molybdenum	**7439-98-7**	**1.19**	D, QB-01	**0.850**
Rubidium	**7440-17-7**	**1.00**	D	**0.0730**
Selenium	**7782-49-2**	**1.12**	D	**0.0439**
Strontium	**7440-24-6**	**23.2**	D, QB-01	**2.60**

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SUBMITTED: 12/04/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9541902
Matrix: Air
Comments: MFK-AM01-112723-HM

Lab ID: 3120430-01RE2
Sample Volume: 2038.818 m³
Filter ID:

Sampled: 11/27/23 23:59
Received: 12/04/23 12:47
Analysis Date: 12/11/23 23:12

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Iron	7439-89-6	6400	D	193

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FILE #: 0000.00
REPORTED: 12/14/23 11:51
SUBMITTED: 12/04/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9541901 **Lab ID:** 3120430-02 **Sampled:** 11/27/23 23:59
Matrix: Air **Sample Volume:** 2026.064 m³ **Received:** 12/04/23 12:47
Filter ID: **Analysis Date:** 12/08/23 21:47
Comments: MFK-AM02-112723-HM

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	**7429-90-5**	**707**	E	**25.8**
Antimony	**7440-36-0**	**0.0571**	SL	**0.0354**
Arsenic	**7440-38-2**	**0.457**		**0.00767**
Barium	**7440-39-3**	**7.09**		**0.761**
Beryllium	**7440-41-7**	**0.0213**		**0.00267**
Cadmium	7440-43-9	0.0147	U	0.0875
Calcium	**7440-70-2**	**498**	GC-BS, QB-01	**234**
Chromium	**7440-47-3**	**1.86**		**1.63**
Cobalt	**7440-48-4**	**0.347**	QB-01	**0.0125**
Copper	**7440-50-8**	**22.1**		**2.41**
Iron	**7439-89-6**	**757**	QB-01	**19.4**
Lead	**7439-92-1**	**0.294**		**0.222**
Magnesium	**7439-95-4**	**217**		**77.4**
Manganese	**7439-96-5**	**20.1**		**0.956**
Molybdenum	**7439-98-7**	**1.37**	QB-01	**0.171**
Nickel	**7440-02-0**	**0.939**		**0.643**
Phosphorus	7723-14-0	373	U, GC-BS, LJ, QX	1000
Potassium	**7440-09-7**	**125**		**30.5**
Rubidium	**7440-17-7**	**0.217**		**0.0147**
Selenium	**7782-49-2**	**0.200**		**0.00883**
Sodium	**7440-23-5**	**1700**	E, GC-BS	**1610**
Strontium	**7440-24-6**	**5.06**	QB-01	**0.524**
Thallium	**7440-28-0**	**0.00154**		**4.04E-4**
Thorium	**7440-29-01**	**0.0221**		**0.00241**
Uranium	**7440-61-1**	**0.0165**		**0.0137**
Vanadium	**7440-62-2**	**2.74**		**0.0395**
Zinc	7440-66-6	31.6	U	78.5

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FILE #: 0000.00
REPORTED: 12/14/23 11:51
SUBMITTED: 12/04/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9541925
Matrix: Air
Lab ID: 3120430-03
Sample Volume: 1925.486 m³
Filter ID:
Sampled: 11/27/23 23:59
Received: 12/04/23 12:47
Analysis Date: 12/08/23 22:05
Comments: MFK-AM03-112723-HM

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	**7429-90-5**	**329**		**27.1**
Antimony	**7440-36-0**	**0.0715**	SL	**0.0373**
Arsenic	**7440-38-2**	**0.103**		**0.00807**
Barium	**7440-39-3**	**5.19**		**0.801**
Beryllium	**7440-41-7**	**0.0133**		**0.00281**
Cadmium	7440-43-9	0.00668	U	0.0921
Calcium	**7440-70-2**	**603**	GC-BS, QB-01	**247**
Chromium	**7440-47-3**	**1.96**		**1.72**
Cobalt	**7440-48-4**	**0.232**	QB-01	**0.0132**
Copper	**7440-50-8**	**39.5**		**2.53**
Iron	**7439-89-6**	**428**	QB-01	**20.4**
Lead	7439-92-1	0.227	U	0.233
Magnesium	**7439-95-4**	**226**		**81.5**
Manganese	**7439-96-5**	**11.8**		**1.01**
Molybdenum	**7439-98-7**	**1.39**	QB-01	**0.180**
Nickel	**7440-02-0**	**1.00**		**0.677**
Phosphorus	7723-14-0	401	U, GC-BS, LJ, QX	1060
Potassium	**7440-09-7**	**113**		**32.1**
Rubidium	**7440-17-7**	**0.158**		**0.0155**
Selenium	**7782-49-2**	**0.152**		**0.00929**
Sodium	**7440-23-5**	**1950**	E, GC-BS	**1690**
Strontium	**7440-24-6**	**3.52**	QB-01	**0.551**
Thallium	**7440-28-0**	**9.45E-4**		**4.25E-4**
Thorium	**7440-29-01**	**0.0137**		**0.00253**
Uranium	7440-61-1	0.00951	U	0.0144
Vanadium	**7440-62-2**	**2.21**		**0.0416**
Zinc	7440-66-6	30.6	U	82.6

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FILE #: 0000.00
REPORTED: 12/14/23 11:51
SUBMITTED: 12/04/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9541900 FB **Lab ID:** 3120430-04 **Sampled:** 11/27/23 00:00
Matrix: Air **Sample Volume:** 2038.818 m³ **Received:** 12/04/23 12:47
Filter ID: **Analysis Date:** 12/08/23 22:20
Comments: MFK-FB01-112723-HM Field Blank

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	7429-90-5	23.1	U	25.6
Antimony	7440-36-0	0.0100	U, SL	0.0352
Arsenic	7440-38-2	0.00478	U	0.00762
Barium	**7440-39-3**	**0.845**	FB-01	**0.757**
Beryllium	7440-41-7	0.00106	U	0.00265
Cadmium	7440-43-9	0.00145	U	0.0870
Calcium	7440-70-2	173	U, FB-01, GC-BS, QB-01	233
Chromium	7440-47-3	1.13	U	1.62
Cobalt	**7440-48-4**	**0.0292**	QB-01	**0.0124**
Copper	7440-50-8	0.256	U	2.39
Iron	**7439-89-6**	**21.4**	FB-01, QB-01	**19.3**
Lead	7439-92-1	0.0337	U	0.220
Magnesium	7439-95-4	37.8	U	76.9
Manganese	7439-96-5	0.391	U	0.950
Molybdenum	**7439-98-7**	**0.172**	FB-01, QB-01	**0.170**
Nickel	7440-02-0	0.219	U	0.639
Phosphorus	7723-14-0	298	U, GC-BS, LJ, QX	998
Potassium	**7440-09-7**	**43.4**	FB-01	**30.3**
Rubidium	7440-17-7	0.0131	U	0.0146
Selenium	7782-49-2	0.00482	U	0.00878
Sodium	7440-23-5	711	U, GC-BS	1600
Strontium	7440-24-6	0.381	U, QB-01	0.520
Thallium	7440-28-0	1.58E-4	U	4.01E-4
Thorium	7440-29-01	0.00213	U	0.00239
Uranium	7440-61-1	0.00131	U	0.0136
Vanadium	7440-62-2	0.0288	U	0.0393
Zinc	7440-66-6	18.7	U	78.0

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FILE #: 0000.00
REPORTED: 12/14/23 11:51
SUBMITTED: 12/04/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9541923 **Lab ID:** 3120430-05 **Sampled:** 11/28/23 23:59
Matrix: Air **Sample Volume:** 2018.075 m³ **Received:** 12/04/23 12:47
Filter ID: **Analysis Date:** 12/08/23 22:35
Comments: MFK-AM01-112823-HM

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	**7429-90-5**	**2970**	E	**25.9**
Antimony	**7440-36-0**	**0.0518**	SL	**0.0356**
Arsenic	**7440-38-2**	**0.377**		**0.00770**
Barium	**7440-39-3**	**20.3**		**0.764**
Beryllium	**7440-41-7**	**0.0795**		**0.00268**
Cadmium	7440-43-9	0.0212	U	0.0879
Calcium	**7440-70-2**	**984**	GC-BS, QB-01	**235**
Chromium	**7440-47-3**	**3.58**		**1.64**
Cobalt	**7440-48-4**	**1.12**	QB-01	**0.0126**
Copper	**7440-50-8**	**17.6**		**2.42**
Lead	**7439-92-1**	**0.620**		**0.223**
Magnesium	**7439-95-4**	**253**		**77.7**
Manganese	**7439-96-5**	**80.7**		**0.959**
Molybdenum	**7439-98-7**	**0.896**	QB-01	**0.172**
Nickel	**7440-02-0**	**1.61**		**0.646**
Phosphorus	7723-14-0	512	U, GC-BS, LJ, QX	1010
Potassium	**7440-09-7**	**128**		**30.6**
Rubidium	**7440-17-7**	**0.469**		**0.0148**
Selenium	**7782-49-2**	**0.469**		**0.00887**
Sodium	7440-23-5	1190	U, GC-BS	1610
Strontium	**7440-24-6**	**11.8**	QB-01	**0.526**
Thallium	**7440-28-0**	**0.00452**		**4.06E-4**
Thorium	**7440-29-01**	**0.0703**		**0.00242**
Uranium	**7440-61-1**	**0.0519**		**0.0137**
Vanadium	**7440-62-2**	**7.12**		**0.0397**
Zinc	7440-66-6	38.1	U	78.8

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FILE #: 0000.00
REPORTED: 12/14/23 11:51
SUBMITTED: 12/04/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9541923 **Lab ID:** 3120430-05RE1 **Sampled:** 11/28/23 23:59
Matrix: Air **Sample Volume:** 2018.075 m³ **Received:** 12/04/23 12:47
Filter ID: **Analysis Date:** 12/11/23 23:25
Comments: MFK-AM01-112823-HM

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Iron	**7439-89-6**	**2860**	D	**97.6**

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FILE #: 0000.00
REPORTED: 12/14/23 11:51
SUBMITTED: 12/04/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9541921
Lab ID: 3120430-06
Sampled: 11/28/23 23:59
Matrix: Air
Sample Volume: 2026.064 m^3
Received: 12/04/23 12:47
Filter ID:
Analysis Date: 12/08/23 18:52
Comments: MFK-AM02-112823-HM/MS/MSD

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	**7429-90-5**	**340**	A-01	**25.8**
Antimony	**7440-36-0**	**0.0483**	SL	**0.0354**
Arsenic	**7440-38-2**	**0.169**		**0.00767**
Barium	**7440-39-3**	**4.13**		**0.761**
Beryllium	**7440-41-7**	**0.0113**		**0.00267**
Cadmium	7440-43-9	0.00755	U	0.0875
Calcium	**7440-70-2**	**527**	GC-BS, QB-01	**234**
Chromium	**7440-47-3**	**1.70**		**1.63**
Cobalt	**7440-48-4**	**0.176**	QB-01	**0.0125**
Copper	**7440-50-8**	**13.2**		**2.41**
Iron	**7439-89-6**	**360**	QB-01, QM-4X	**19.4**
Lead	7439-92-1	0.173	U	0.222
Magnesium	**7439-95-4**	**158**		**77.4**
Manganese	**7439-96-5**	**9.44**		**0.956**
Molybdenum	**7439-98-7**	**0.960**	QB-01	**0.171**
Nickel	7440-02-0	0.556	U	0.643
Phosphorus	7723-14-0	384	A-01, GC-BS, LJ, QM-4X, QX, U	1000
Potassium	**7440-09-7**	**116**	QM-07	**30.5**
Rubidium	**7440-17-7**	**0.173**		**0.0147**
Selenium	**7782-49-2**	**0.115**		**0.00883**
Sodium	7440-23-5	1420	A-01, GC-BS, QM-4X, U	1610
Strontium	**7440-24-6**	**3.24**	QB-01	**0.524**
Thallium	**7440-28-0**	**8.68E-4**		**4.04E-4**
Thorium	**7440-29-01**	**0.0114**	QM-07	**0.00241**
Uranium	7440-61-1	0.00844	U	0.0137
Vanadium	**7440-62-2**	**1.20**		**0.0395**
Zinc	7440-66-6	20.8	U	78.5

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FILE #: 0000.00
REPORTED: 12/14/23 11:51
SUBMITTED: 12/04/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9541920 **Lab ID:** 3120430-07 **Sampled:** 11/28/23 23:59
Matrix: Air **Sample Volume:** 1892.969 m³ **Received:** 12/04/23 12:47
Filter ID: **Analysis Date:** 12/08/23 22:52
Comments: MFK-AM03-112823-HM

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	**7429-90-5**	**340**		**27.6**
Antimony	**7440-36-0**	**0.0727**	SL	**0.0379**
Arsenic	**7440-38-2**	**0.0950**		**0.00821**
Barium	**7440-39-3**	**6.24**		**0.815**
Beryllium	**7440-41-7**	**0.0148**		**0.00285**
Cadmium	7440-43-9	0.00721	U	0.0937
Calcium	**7440-70-2**	**566**	GC-BS, QB-01	**251**
Chromium	**7440-47-3**	**1.87**		**1.74**
Cobalt	**7440-48-4**	**0.220**	QB-01	**0.0134**
Copper	**7440-50-8**	**27.5**		**2.58**
Iron	**7439-89-6**	**420**	QB-01	**20.8**
Lead	**7439-92-1**	**0.457**		**0.237**
Magnesium	**7439-95-4**	**183**		**82.9**
Manganese	**7439-96-5**	**12.9**		**1.02**
Molybdenum	**7439-98-7**	**1.05**	QB-01	**0.183**
Nickel	7440-02-0	0.556	U	0.688
Phosphorus	7723-14-0	399	GC-BS, U, LJ, QX	1070
Potassium	**7440-09-7**	**101**		**32.7**
Rubidium	**7440-17-7**	**0.175**		**0.0157**
Selenium	**7782-49-2**	**0.132**		**0.00945**
Sodium	7440-23-5	1610	U, GC-BS	1720
Strontium	**7440-24-6**	**4.09**	QB-01	**0.560**
Thallium	**7440-28-0**	**0.00103**		**4.32E-4**
Thorium	**7440-29-01**	**0.0113**		**0.00258**
Uranium	7440-61-1	0.00963	U	0.0146
Vanadium	**7440-62-2**	**1.27**		**0.0423**
Zinc	7440-66-6	25.2	U	84.0

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FILE #: 0000.00
REPORTED: 12/14/23 11:51
SUBMITTED: 12/04/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9541919
Matrix: Air
Lab ID: 3120430-08
Sample Volume: 2041.36(m³
Filter ID:
Sampled: 11/29/23 23:59
Received: 12/04/23 12:47
Analysis Date: 12/08/23 23:08
Comments: MFK-AM01-112923-HM

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	**7429-90-5**	**796**	E	**25.6**
Antimony	**7440-36-0**	**0.0435**	SL	**0.0351**
Arsenic	**7440-38-2**	**0.143**		**0.00761**
Barium	**7440-39-3**	**5.82**		**0.756**
Beryllium	**7440-41-7**	**0.0195**		**0.00265**
Cadmium	7440-43-9	0.00847	U	0.0869
Calcium	**7440-70-2**	**549**	GC-BS, QB-01	**233**
Chromium	**7440-47-3**	**1.93**		**1.62**
Cobalt	**7440-48-4**	**0.296**	QB-01	**0.0124**
Copper	**7440-50-8**	**19.5**		**2.39**
Iron	**7439-89-6**	**755**	QB-01	**19.3**
Lead	**7439-92-1**	**0.313**		**0.220**
Magnesium	**7439-95-4**	**145**		**76.8**
Manganese	**7439-96-5**	**19.8**		**0.948**
Molybdenum	**7439-98-7**	**1.13**	QB-01	**0.170**
Nickel	7440-02-0	0.593	U	0.638
Phosphorus	7723-14-0	402	U, GC-BS, LJ, QX	996
Potassium	**7440-09-7**	**122**		**30.3**
Rubidium	**7440-17-7**	**0.234**		**0.0146**
Selenium	**7782-49-2**	**0.176**		**0.00877**
Sodium	7440-23-5	1200	U, GC-BS	1590
Strontium	**7440-24-6**	**4.41**	QB-01	**0.520**
Thallium	**7440-28-0**	**0.00141**		**4.01E-4**
Thorium	**7440-29-01**	**0.0167**		**0.00239**
Uranium	**7440-61-1**	**0.0143**		**0.0135**
Vanadium	**7440-62-2**	**1.77**		**0.0392**
Zinc	7440-66-6	16.4	U	77.9

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CERTIFICATE OF ANALYSIS

Tetra Tech, Inc.
1777 Sentry Pkwy, Bldg 12
Blue Bell, PA 19422
ATTN: Ms. Chelsea Saber
PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 12/14/23 11:51
SUBMITTED: 12/04/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9541227 **Lab ID:** 3120430-09 **Sampled:** 11/29/23 23:59
Matrix: Air **Sample Volume:** 2027.752 m³ **Received:** 12/04/23 12:47
Filter ID: **Analysis Date:** 12/08/23 23:23
Comments: MFK-AM02-112923-HM

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	**7429-90-5**	**121**		**25.8**
Antimony	**7440-36-0**	**0.0488**	SL	**0.0354**
Arsenic	**7440-38-2**	**0.107**		**0.00766**
Barium	**7440-39-3**	**3.20**		**0.761**
Beryllium	**7440-41-7**	**0.00394**		**0.00266**
Cadmium	7440-43-9	0.00481	U	0.0875
Calcium	**7440-70-2**	**243**	GC-BS, QB-01	**234**
Chromium	7440-47-3	1.24	U	1.63
Cobalt	**7440-48-4**	**0.0699**	QB-01	**0.0125**
Copper	**7440-50-8**	**16.2**		**2.41**
Iron	**7439-89-6**	**129**	QB-01	**19.4**
Lead	7439-92-1	0.0826	U	0.221
Magnesium	**7439-95-4**	**120**		**77.3**
Manganese	**7439-96-5**	**3.02**		**0.955**
Molybdenum	**7439-98-7**	**1.15**	QB-01	**0.171**
Nickel	7440-02-0	0.344	U	0.643
Phosphorus	7723-14-0	332	U, LJ, QX, GC-BS	1000
Potassium	**7440-09-7**	**117**		**30.5**
Rubidium	**7440-17-7**	**0.120**		**0.0147**
Selenium	**7782-49-2**	**0.0881**		**0.00883**
Sodium	7440-23-5	1200	U, GC-BS	1600
Strontium	**7440-24-6**	**1.32**	QB-01	**0.523**
Thallium	**7440-28-0**	**5.22E-4**		**4.04E-4**
Thorium	**7440-29-01**	**0.00451**		**0.00241**
Uranium	7440-61-1	0.00337	U	0.0136
Vanadium	**7440-62-2**	**0.319**		**0.0395**
Zinc	7440-66-6	14.8	U	78.4

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Blue Bell, PA 19422
ATTN: Ms. Chelsea Saber
PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 12/14/23 11:51
SUBMITTED: 12/04/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9541899
Lab ID: 3120430-10
Sampled: 11/29/23 23:59
Matrix: Air
Sample Volume: 1805.088 m³
Received: 12/04/23 12:47
Filter ID:
Analysis Date: 12/08/23 23:36
Comments: MFK-AM03-112923-HM

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	**7429-90-5**	**155**		**28.9**
Antimony	**7440-36-0**	**0.0878**	SL	**0.0397**
Arsenic	**7440-38-2**	**0.0858**		**0.00861**
Barium	**7440-39-3**	**4.18**		**0.854**
Beryllium	**7440-41-7**	**0.00633**		**0.00299**
Cadmium	7440-43-9	0.00512	U	0.0982
Calcium	**7440-70-2**	**279**	GC-BS, QB-01	**263**
Chromium	7440-47-3	1.49	U	1.83
Cobalt	**7440-48-4**	**0.0929**	QB-01	**0.0141**
Copper	**7440-50-8**	**38.2**		**2.70**
Iron	**7439-89-6**	**184**	QB-01	**21.8**
Lead	7439-92-1	0.157	U	0.249
Magnesium	**7439-95-4**	**135**		**86.9**
Manganese	**7439-96-5**	**4.78**		**1.07**
Molybdenum	**7439-98-7**	**1.20**	QB-01	**0.192**
Nickel	7440-02-0	0.448	U	0.722
Phosphorus	7723-14-0	377	U, GC-BS, LJ, QX	1130
Potassium	**7440-09-7**	**94.3**		**34.3**
Rubidium	**7440-17-7**	**0.103**		**0.0165**
Selenium	**7782-49-2**	**0.123**		**0.00991**
Sodium	7440-23-5	1470	U, GC-BS	1800
Strontium	**7440-24-6**	**1.75**	QB-01	**0.588**
Thallium	**7440-28-0**	**6.73E-4**		**4.53E-4**
Thorium	**7440-29-01**	**0.00607**		**0.00270**
Uranium	7440-61-1	0.00469	U	0.0153
Vanadium	**7440-62-2**	**0.496**		**0.0443**
Zinc	7440-66-6	22.3	U	88.1

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Tetra Tech, Inc.
1777 Sentry Pkwy, Bldg 12
Blue Bell, PA 19422
ATTN: Ms. Chelsea Saber
PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 12/14/23 11:51
SUBMITTED: 12/04/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9541909 FB **Lab ID:** 3120430-11 **Sampled:** 11/29/23 00:00
Matrix: Air **Sample Volume:** 2041.366 m³ **Received:** 12/04/23 12:47
Filter ID: **Analysis Date:** 12/09/23 01:04
Comments: MFK-FB01-112923-HM Field Blank

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	7429-90-5	17.3	U	25.6
Antimony	7440-36-0	0.00602	U, SL	0.0351
Arsenic	7440-38-2	0.00518	U	0.00761
Barium	7440-39-3	0.626	U	0.756
Beryllium	7440-41-7	0.00115	U	0.00265
Cadmium	7440-43-9	0.00178	U	0.0869
Calcium	**7440-70-2**	**359**	FB-01, GC-BS, QB-01	**233**
Chromium	7440-47-3	1.36	U	1.62
Cobalt	**7440-48-4**	**0.0350**	FB-01, QB-01	**0.0124**
Copper	7440-50-8	0.313	U	2.39
Iron	**7439-89-6**	**21.6**	FB-01, QB-01	**19.3**
Lead	7439-92-1	0.0496	U	0.220
Magnesium	7439-95-4	44.1	U	76.8
Manganese	7439-96-5	0.301	U	0.948
Molybdenum	**7439-98-7**	**0.233**	QB-01, FB-01	**0.170**
Nickel	7440-02-0	0.234	U	0.638
Phosphorus	7723-14-0	348	U, GC-BS, LJ, QX	996
Potassium	7440-09-7	29.8	U	30.3
Rubidium	**7440-17-7**	**0.0165**	FB-01	**0.0146**
Selenium	7782-49-2	0.00728	U	0.00877
Sodium	7440-23-5	712	U, GC-BS	1590
Strontium	**7440-24-6**	**0.738**	FB-01, QB-01	**0.520**
Thallium	7440-28-0	1.21E-4	U	4.01E-4
Thorium	7440-29-01	0.00230	U	0.00239
Uranium	7440-61-1	0.00178	U	0.0135
Vanadium	7440-62-2	0.0147	U	0.0392
Zinc	7440-66-6	10.4	U	77.9

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Blue Bell, PA 19422
ATTN: Ms. Chelsea Saber
PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 12/14/23 11:51
SUBMITTED: 12/04/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9541226 FB
Lab ID: 3120430-12
Sampled: 11/28/23 00:00
Matrix: Air
Sample Volume: 2018.075 m³
Received: 12/04/23 12:47
Filter ID:
Analysis Date: 12/09/23 01:19
Comments: MFK-FB01-112823-HM Field Blank

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	7429-90-5	17.8	U	25.9
Antimony	7440-36-0	0.0117	U, SL	0.0356
Arsenic	7440-38-2	0.00456	U	0.00770
Barium	7440-39-3	0.580	U	0.764
Beryllium	7440-41-7	0.00101	U	0.00268
Cadmium	7440-43-9	0.00220	U	0.0879
Calcium	7440-70-2	169	GC-BS, QB-01, U	235
Chromium	7440-47-3	1.16	U	1.64
Cobalt	**7440-48-4**	**0.0316**	FB-01, QB-01	**0.0126**
Copper	7440-50-8	0.268	U	2.42
Iron	7439-89-6	18.5	QB-01, U	19.5
Lead	7439-92-1	0.0445	U	0.223
Magnesium	7439-95-4	36.6	U	77.7
Manganese	7439-96-5	0.351	U	0.959
Molybdenum	**7439-98-7**	**0.181**	FB-01, QB-01	**0.172**
Nickel	7440-02-0	0.273	U	0.646
Phosphorus	7723-14-0	305	GC-BS, LJ, QX, U	1010
Potassium	7440-09-7	14.5	U	30.6
Rubidium	7440-17-7	0.0115	U	0.0148
Selenium	7782-49-2	0.00469	U	0.00887
Sodium	7440-23-5	687	GC-BS, U	1610
Strontium	7440-24-6	0.400	QB-01, U	0.526
Thallium	7440-28-0	1.58E-4	U	4.06E-4
Thorium	7440-29-01	0.00200	U	0.00242
Uranium	7440-61-1	0.00131	U	0.0137
Vanadium	7440-62-2	0.0254	U	0.0397
Zinc	7440-66-6	13.0	U	78.8

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Blue Bell, PA 19422
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PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 12/14/23 11:51
SUBMITTED: 12/04/23
AQS SITE CODE:
SITE CODE: Maui fires

Inorganics by Compendium Method IO-3.5 - Quality Control

Batch 2312024 - B3L0605

Calibration Blank (2312024-CCB1) Prepared: 12/07/23 Analyzed: 12/08/23

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Aluminum	22.7		ng/l							
Antimony	1.43		ng/l							
Arsenic	2.60		ng/l							
Barium	2.14		ng/l							
Beryllium	1.30		ng/l							
Cadmium	0.788		ng/l							
Calcium	583		ng/l							
Chromium	3.60		ng/l							
Cobalt	0.421		ng/l							
Copper	114		ng/l							
Iron	120		ng/l							
Lead	3.23		ng/l							
Magnesium	22.4		ng/l							
Manganese	6.32		ng/l							
Molybdenum	26.6		ng/l							
Nickel	3.26		ng/l							
Phosphorus	118		ng/l							LJ, QX
Potassium	2310		ng/l							
Rubidium	0.519		ng/l							
Selenium	11.4		ng/l							
Sodium	107		ng/l							
Strontium	0.650		ng/l							
Thallium	0.403		ng/l							
Thorium	0.267		ng/l							
Uranium	-0.0238		ng/l							U
Vanadium	-48.3		ng/l							U
Zinc	16.1		ng/l							

Calibration Blank (2312024-CCB2) Prepared: 12/07/23 Analyzed: 12/08/23

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Aluminum	-39.2		ng/l							U
Antimony	0.577		ng/l							
Arsenic	-2.80		ng/l							U
Barium	2.41		ng/l							
Beryllium	0.868		ng/l							
Cadmium	0.476		ng/l							
Calcium	409		ng/l							
Chromium	4.62		ng/l							
Cobalt	0.530		ng/l							
Copper	79.1		ng/l							

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Blue Bell, PA 19422
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PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 12/14/23 11:51
SUBMITTED: 12/04/23
AQS SITE CODE:
SITE CODE: Maui fires

Inorganics by Compendium Method IO-3.5 - Quality Control

Batch 2312024 - B3L0605

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Calibration Blank (2312024-CCB2) Contin				Prepared: 12/07/23 Analyzed: 12/08/23						
Iron	90.1		ng/l							
Lead	3.54		ng/l							
Magnesium	57.3		ng/l							
Manganese	8.13		ng/l							
Molybdenum	11.8		ng/l							
Nickel	4.68		ng/l							
Phosphorus	-140		ng/l							LJ, QX, U
Potassium	1510		ng/l							
Rubidium	1.09		ng/l							
Selenium	17.4		ng/l							
Sodium	4.88		ng/l							
Strontium	1.49		ng/l							
Thallium	0.554		ng/l							
Thorium	0.228		ng/l							
Uranium	-0.0186		ng/l							U
Vanadium	-54.6		ng/l							U
Zinc	46.9		ng/l							
Calibration Blank (2312024-CCB3)				Prepared: 12/07/23 Analyzed: 12/09/23						
Aluminum	-29.2		ng/l							U
Antimony	0.769		ng/l							
Arsenic	3.29		ng/l							
Barium	4.74		ng/l							
Beryllium	0.638		ng/l							
Cadmium	0.435		ng/l							
Calcium	635		ng/l							
Chromium	8.92		ng/l							
Cobalt	0.938		ng/l							
Copper	83.1		ng/l							
Iron	306		ng/l							
Lead	4.48		ng/l							
Magnesium	12.0		ng/l							
Manganese	11.4		ng/l							
Molybdenum	13.0		ng/l							
Nickel	7.00		ng/l							
Phosphorus	448		ng/l							LJ, QX
Potassium	1370		ng/l							
Rubidium	1.34		ng/l							
Selenium	19.5		ng/l							

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PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 12/14/23 11:51
SUBMITTED: 12/04/23
AQS SITE CODE:
SITE CODE: Maui fires

Inorganics by Compendium Method IO-3.5 - Quality Control

Batch 2312024 - B3L0605

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Calibration Blank (2312024-CCB3) Contin				Prepared: 12/07/23 Analyzed: 12/09/23						
Sodium	-40.6		ng/l							U
Strontium	2.24		ng/l							
Thallium	0.478		ng/l							
Thorium	0.161		ng/l							
Uranium	-0.00840		ng/l							U
Vanadium	-63.5		ng/l							U
Zinc	8.53		ng/l							
Calibration Blank (2312024-CCB4)				Prepared: 12/07/23 Analyzed: 12/09/23						
Aluminum	-27.2		ng/l							U
Antimony	0.628		ng/l							
Arsenic	-1.84		ng/l							U
Barium	2.54		ng/l							
Beryllium	0.732		ng/l							
Cadmium	0.323		ng/l							
Calcium	497		ng/l							
Chromium	5.53		ng/l							
Cobalt	0.699		ng/l							
Copper	63.0		ng/l							
Iron	45.0		ng/l							
Lead	3.14		ng/l							
Magnesium	-3.93		ng/l							U
Manganese	8.06		ng/l							
Molybdenum	9.16		ng/l							
Nickel	3.98		ng/l							
Phosphorus	86.5		ng/l							LJ, QX
Potassium	840		ng/l							
Rubidium	0.219		ng/l							
Selenium	7.92		ng/l							
Sodium	-146		ng/l							U
Strontium	1.17		ng/l							
Thallium	0.405		ng/l							
Thorium	0.0532		ng/l							
Uranium	-0.0161		ng/l							U
Vanadium	-64.8		ng/l							U
Zinc	-5.55		ng/l							U
Calibration Check (2312024-CCV1)				Prepared: 12/07/23 Analyzed: 12/08/23						
Aluminum	1.55E6		ng/l	1.5000E6		103	90-110			
Antimony	20200		ng/l	20000		101	90-110			

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Tetra Tech, Inc.
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Blue Bell, PA 19422
ATTN: Ms. Chelsea Saber
PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 12/14/23 11:51
SUBMITTED: 12/04/23
AQS SITE CODE:
SITE CODE: Maui fires

Inorganics by Compendium Method IO-3.5 - Quality Control

Batch 2312024 - B3L0605

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Calibration Check (2312024-CCV1) Contin				Prepared: 12/07/23	Analyzed: 12/08/23					
Arsenic	20200		ng/l	20000		101	90-110			
Barium	199000		ng/l	200000		99.4	90-110			
Beryllium	4820		ng/l	5000.0		96.3	90-110			
Cadmium	20400		ng/l	20000		102	90-110			
Calcium	2.49E7		ng/l	2.5000E7		99.8	90-110			
Chromium	237000		ng/l	240000		98.7	90-110			
Cobalt	50700		ng/l	50000		101	90-110			
Copper	2.02E6		ng/l	2.0000E6		101	90-110			
Iron	2.53E6		ng/l	2.5000E6		101	90-110			
Lead	198000		ng/l	200000		99.2	90-110			
Magnesium	1.04E6		ng/l	1.0000E6		104	90-110			
Manganese	499000		ng/l	500000		99.8	90-110			
Molybdenum	50000		ng/l	50000		100	90-110			
Nickel	123000		ng/l	120000		102	90-110			
Phosphorus	207000		ng/l	200000		104	90-110			LJ, QX
Potassium	2.52E6		ng/l	2.5000E6		101	90-110			
Rubidium	9990		ng/l	10000		99.9	90-110			
Selenium	20100		ng/l	20000		100	90-110			
Sodium	2.56E6		ng/l	2.5000E6		103	90-110			
Strontium	49800		ng/l	50000		99.6	90-110			
Thallium	483		ng/l	500.00		96.5	90-110			
Thorium	500		ng/l	500.00		99.9	90-110			
Uranium	489		ng/l	500.00		97.8	90-110			
Vanadium	19800		ng/l	20000		98.8	90-110			
Zinc	520000		ng/l	500000		104	90-110			
Calibration Check (2312024-CCV2)				Prepared: 12/07/23	Analyzed: 12/08/23					
Aluminum	1.50E6		ng/l	1.5000E6		99.9	90-110			
Antimony	20300		ng/l	20000		102	90-110			
Arsenic	19900		ng/l	20000		99.4	90-110			
Barium	196000		ng/l	200000		97.8	90-110			
Beryllium	4860		ng/l	5000.0		97.2	90-110			
Cadmium	20500		ng/l	20000		102	90-110			
Calcium	2.47E7		ng/l	2.5000E7		98.9	90-110			
Chromium	248000		ng/l	240000		103	90-110			
Cobalt	49500		ng/l	50000		99.0	90-110			
Copper	1.98E6		ng/l	2.0000E6		99.1	90-110			
Iron	2.48E6		ng/l	2.5000E6		99.3	90-110			
Lead	198000		ng/l	200000		98.8	90-110			

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Inorganics by Compendium Method IO-3.5 - Quality Control

Batch 2312024 - B3L0605

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Calibration Check (2312024-CCV2) Contin				Prepared: 12/07/23	Analyzed: 12/08/23					
Magnesium	1.02E6		ng/l	1.0000E6		102	90-110			
Manganese	492000		ng/l	500000		98.4	90-110			
Molybdenum	49500		ng/l	50000		98.9	90-110			
Nickel	121000		ng/l	120000		100	90-110			
Phosphorus	200000		ng/l	200000		99.8	90-110			LJ, QX
Potassium	2.47E6		ng/l	2.5000E6		99.0	90-110			
Rubidium	10000		ng/l	10000		100	90-110			
Selenium	19700		ng/l	20000		98.6	90-110			
Sodium	2.49E6		ng/l	2.5000E6		99.6	90-110			
Strontium	49400		ng/l	50000		98.8	90-110			
Thallium	479		ng/l	500.00		95.8	90-110			
Thorium	496		ng/l	500.00		99.2	90-110			
Uranium	485		ng/l	500.00		97.0	90-110			
Vanadium	20000		ng/l	20000		100	90-110			
Zinc	516000		ng/l	500000		103	90-110			
Calibration Check (2312024-CCV3)				Prepared: 12/07/23	Analyzed: 12/09/23					
Aluminum	1.45E6		ng/l	1.5000E6		96.8	90-110			
Antimony	20200		ng/l	20000		101	90-110			
Arsenic	19800		ng/l	20000		99.1	90-110			
Barium	199000		ng/l	200000		99.4	90-110			
Beryllium	4530		ng/l	5000.0		90.7	90-110			
Cadmium	20400		ng/l	20000		102	90-110			
Calcium	2.43E7		ng/l	2.5000E7		97.0	90-110			
Chromium	242000		ng/l	240000		101	90-110			
Cobalt	48900		ng/l	50000		97.8	90-110			
Copper	1.98E6		ng/l	2.0000E6		98.9	90-110			
Iron	2.43E6		ng/l	2.5000E6		97.3	90-110			
Lead	195000		ng/l	200000		97.4	90-110			
Magnesium	998000		ng/l	1.0000E6		99.8	90-110			
Manganese	482000		ng/l	500000		96.5	90-110			
Molybdenum	50600		ng/l	50000		101	90-110			
Nickel	119000		ng/l	120000		99.5	90-110			
Phosphorus	195000		ng/l	200000		97.7	90-110			LJ, QX
Potassium	2.42E6		ng/l	2.5000E6		96.8	90-110			
Rubidium	9840		ng/l	10000		98.4	90-110			
Selenium	19700		ng/l	20000		98.7	90-110			
Sodium	2.46E6		ng/l	2.5000E6		98.5	90-110			
Strontium	48600		ng/l	50000		97.2	90-110			

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CERTIFICATE OF ANALYSIS

Tetra Tech, Inc.
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Blue Bell, PA 19422
ATTN: Ms. Chelsea Saber
PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 12/14/23 11:51
SUBMITTED: 12/04/23
AQS SITE CODE:
SITE CODE: Maui fires

Inorganics by Compendium Method IO-3.5 - Quality Control

Batch 2312024 - B3L0605

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Calibration Check (2312024-CCV3) Contin				Prepared: 12/07/23		Analyzed: 12/09/23				
Thallium	473		ng/l	500.00		94.6	90-110			
Thorium	491		ng/l	500.00		98.2	90-110			
Uranium	485		ng/l	500.00		97.1	90-110			
Vanadium	19800		ng/l	20000		99.2	90-110			
Zinc	510000		ng/l	500000		102	90-110			
Calibration Check (2312024-CCV4)				Prepared: 12/07/23		Analyzed: 12/09/23				
Aluminum	1.44E6		ng/l	1.5000E6		96.3	90-110			
Antimony	19900		ng/l	20000		99.3	90-110			
Arsenic	19600		ng/l	20000		98.1	90-110			
Barium	198000		ng/l	200000		98.9	90-110			
Beryllium	4720		ng/l	5000.0		94.4	90-110			
Cadmium	20200		ng/l	20000		101	90-110			
Calcium	2.42E7		ng/l	2.5000E7		96.8	90-110			
Chromium	247000		ng/l	240000		103	90-110			
Cobalt	48800		ng/l	50000		97.7	90-110			
Copper	1.98E6		ng/l	2.0000E6		99.2	90-110			
Iron	2.43E6		ng/l	2.5000E6		97.2	90-110			
Lead	195000		ng/l	200000		97.4	90-110			
Magnesium	986000		ng/l	1.0000E6		98.6	90-110			
Manganese	485000		ng/l	500000		97.0	90-110			
Molybdenum	49900		ng/l	50000		99.9	90-110			
Nickel	120000		ng/l	120000		99.8	90-110			
Phosphorus	197000		ng/l	200000		98.6	90-110			LJ, QX
Potassium	2.41E6		ng/l	2.5000E6		96.4	90-110			
Rubidium	9830		ng/l	10000		98.3	90-110			
Selenium	19600		ng/l	20000		98.2	90-110			
Sodium	2.44E6		ng/l	2.5000E6		97.6	90-110			
Strontium	48100		ng/l	50000		96.3	90-110			
Thallium	469		ng/l	500.00		93.7	90-110			
Thorium	485		ng/l	500.00		97.0	90-110			
Uranium	481		ng/l	500.00		96.3	90-110			
Vanadium	19800		ng/l	20000		99.2	90-110			
Zinc	509000		ng/l	500000		102	90-110			
High Cal Check (2312024-HCV1)				Prepared: 12/07/23		Analyzed: 12/08/23				
Aluminum	2.93E6		ng/l	3.0000E6		97.7	95-105			
Antimony	39300		ng/l	40000		98.3	95-105			
Arsenic	39800		ng/l	40000		99.4	95-105			
Barium	393000		ng/l	400000		98.2	95-105			

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Inorganics by Compendium Method IO-3.5 - Quality Control

Batch 2312024 - B3L0605

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
High Cal Check (2312024-HCV1) Continue				Prepared: 12/07/23		Analyzed: 12/08/23				
Beryllium	10200		ng/l	10000		102	95-105			
Cadmium	39300		ng/l	40000		98.3	95-105			
Calcium	4.95E7		ng/l	5.0000E7		98.9	95-105			
Chromium	472000		ng/l	480000		98.3	95-105			
Cobalt	98600		ng/l	100000		98.6	95-105			
Copper	3.91E6		ng/l	4.0000E6		97.8	95-105			
Iron	4.94E6		ng/l	5.0000E6		98.9	95-105			
Lead	395000		ng/l	400000		98.9	95-105			
Magnesium	1.95E6		ng/l	2.0000E6		97.5	95-105			
Manganese	993000		ng/l	1.0000E6		99.3	95-105			
Molybdenum	98400		ng/l	100000		98.4	95-105			
Nickel	235000		ng/l	240000		98.0	95-105			
Phosphorus	397000		ng/l	400000		99.2	95-105			LJ, QX
Potassium	4.97E6		ng/l	5.0000E6		99.4	95-105			
Rubidium	19600		ng/l	20000		98.2	95-105			
Selenium	40000		ng/l	40000		100	95-105			
Sodium	4.91E6		ng/l	5.0000E6		98.3	95-105			
Strontium	98200		ng/l	100000		98.2	95-105			
Thallium	985		ng/l	1000.0		98.5	95-105			
Thorium	989		ng/l	1000.0		98.9	95-105			
Uranium	983		ng/l	1000.0		98.3	95-105			
Vanadium	39800		ng/l	40000		99.5	95-105			
Zinc	1.01E6		ng/l	1.0000E6		101	95-105			
Initial Cal Blank (2312024-ICB1)				Prepared: 12/07/23		Analyzed: 12/08/23				
Aluminum	-0.915		ng/l							U
Antimony	2.30		ng/l							
Arsenic	-2.34		ng/l							U
Barium	3.25		ng/l							
Beryllium	1.62		ng/l							
Cadmium	0.996		ng/l							
Calcium	684		ng/l							
Chromium	3.67		ng/l							
Cobalt	0.808		ng/l							
Copper	102		ng/l							
Iron	84.9		ng/l							
Lead	4.47		ng/l							
Magnesium	6.80		ng/l							
Manganese	9.90		ng/l							

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Inorganics by Compendium Method IO-3.5 - Quality Control

Batch 2312024 - B3L0605

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Initial Cal Blank (2312024-ICB1) Continu				Prepared: 12/07/23 Analyzed: 12/08/23						
Molybdenum	11.8		ng/l							
Nickel	-0.595		ng/l							U
Phosphorus	51.2		ng/l							LJ, QX
Potassium	1170		ng/l							
Rubidium	0.668		ng/l							
Selenium	15.6		ng/l							
Sodium	-118		ng/l							U
Strontium	1.84		ng/l							
Thallium	0.475		ng/l							
Thorium	0.354		ng/l							
Uranium	-0.00553		ng/l							U
Vanadium	-42.1		ng/l							U
Zinc	114		ng/l							
Initial Cal Check (2312024-ICV1)				Prepared: 12/07/23 Analyzed: 12/08/23						
Aluminum	1.46E6		ng/l	1.5000E6		97.2	90-110			
Antimony	19600		ng/l	20000		98.2	90-110			
Arsenic	19800		ng/l	20000		99.1	90-110			
Barium	197000		ng/l	200000		98.5	90-110			
Beryllium	4880		ng/l	5000.0		97.6	90-110			
Cadmium	20600		ng/l	20000		103	90-110			
Calcium	2.42E7		ng/l	2.5000E7		96.7	90-110			
Chromium	241000		ng/l	240000		100	90-110			
Cobalt	49800		ng/l	50000		99.6	90-110			
Copper	2.00E6		ng/l	2.0000E6		99.8	90-110			
Iron	2.50E6		ng/l	2.5000E6		100	90-110			
Lead	195000		ng/l	200000		97.7	90-110			
Magnesium	988000		ng/l	1.0000E6		98.8	90-110			
Manganese	489000		ng/l	500000		97.8	90-110			
Molybdenum	49600		ng/l	50000		99.2	90-110			
Nickel	119000		ng/l	120000		99.4	90-110			
Phosphorus	198000		ng/l	200000		99.2	90-110			LJ, QX
Potassium	2.48E6		ng/l	2.5000E6		99.2	90-110			
Rubidium	9590		ng/l	10000		95.9	90-110			
Selenium	20400		ng/l	20000		102	90-110			
Sodium	2.44E6		ng/l	2.5000E6		97.8	90-110			
Strontium	49300		ng/l	50000		98.7	90-110			
Thallium	474		ng/l	500.00		94.7	90-110			
Thorium	482		ng/l	500.00		96.4	90-110			

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Inorganics by Compendium Method IO-3.5 - Quality Control

Batch 2312024 - B3L0605

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Initial Cal Check (2312024-ICV1) Continu				Prepared: 12/07/23	Analyzed: 12/08/23					
Uranium	488		ng/l	500.00		97.5	90-110			
Vanadium	20100		ng/l	20000		100	90-110			
Zinc	518000		ng/l	500000		104	90-110			
Interference Check A (2312024-IFA1)				Prepared: 12/07/23	Analyzed: 12/08/23					
Aluminum	1.47E7		ng/l	1.5000E7		98.0	80-120			
Antimony	0.00		ng/l				80-120			U
Arsenic	0.00		ng/l				80-120			U
Barium	0.00		ng/l				80-120			U
Beryllium	0.00		ng/l				80-120			U
Cadmium	0.00		ng/l				80-120			U
Calcium	9.23E7		ng/l	1.0040E8		91.9	80-120			
Chromium	0.00		ng/l				80-120			U
Cobalt	0.00		ng/l				80-120			U
Copper	0.00		ng/l				80-120			U
Iron	1.47E7		ng/l	1.5000E7		98.1	80-120			
Lead	0.00		ng/l				80-120			U
Magnesium	1.51E7		ng/l	1.5000E7		101	80-120			
Manganese	0.00		ng/l				80-120			U
Molybdenum	301000		ng/l	300000		100	80-120			
Nickel	0.00		ng/l				80-120			U
Phosphorus	1.58E7		ng/l	1.5000E7		105	80-120			LJ, QX
Potassium	1.46E7		ng/l	1.5000E7		97.6	80-120			
Rubidium	0.00		ng/l				80-120			U
Selenium	0.00		ng/l				80-120			U
Sodium	1.51E7		ng/l	1.5000E7		101	80-120			
Strontium	0.00		ng/l				80-120			U
Thallium	0.00		ng/l				80-120			U
Thorium	0.00		ng/l				80-120			U
Uranium	0.00		ng/l				80-120			U
Vanadium	0.00		ng/l				80-120			U
Zinc	0.00		ng/l				80-120			U
Interference Check B (2312024-IFB1)				Prepared: 12/07/23	Analyzed: 12/08/23					
Aluminum	1.64E7		ng/l	1.6500E7		99.6	80-120			
Antimony	20200		ng/l	20000		101	80-120			
Arsenic	20700		ng/l	20000		103	80-120			
Barium	202000		ng/l	200000		101	80-120			
Beryllium	5080		ng/l	5000.0		102	80-120			
Cadmium	19600		ng/l	20000		98.0	80-120			

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Inorganics by Compendium Method IO-3.5 - Quality Control

Batch 2312024 - B3L0605

Interference Check B (2312024-IFB1) Co — Prepared: 12/07/23 Analyzed: 12/08/23

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Calcium	1.17E8		ng/l	1.2540E8		93.3	80-120			
Chromium	233000		ng/l	240000		97.2	80-120			
Cobalt	49600		ng/l	50000		99.1	80-120			
Copper	1.91E6		ng/l	2.0000E6		95.6	80-120			
Iron	1.76E7		ng/l	1.7500E7		101	80-120			
Lead	207000		ng/l	200000		103	80-120			
Magnesium	1.64E7		ng/l	1.6000E7		102	80-120			
Manganese	521000		ng/l	500000		104	80-120			
Molybdenum	358000		ng/l	350000		102	80-120			
Nickel	116000		ng/l	120000		96.9	80-120			
Phosphorus	1.65E7		ng/l	1.5200E7		109	80-120			LJ, QX
Potassium	1.74E7		ng/l	1.7500E7		99.5	80-120			
Rubidium	10200		ng/l	10000		102	80-120			
Selenium	19100		ng/l	20000		95.6	80-120			
Sodium	1.84E7		ng/l	1.7500E7		105	80-120			
Strontium	50800		ng/l	50000		102	80-120			
Thallium	523		ng/l	500.00		105	80-120			
Thorium	541		ng/l	500.00		108	80-120			
Uranium	541		ng/l	500.00		108	80-120			
Vanadium	19500		ng/l	20000		97.5	80-120			
Zinc	476000		ng/l	500000		95.2	80-120			

Batch 2312031 - B3L0605

Calibration Blank (2312031-CCB1) — Prepared & Analyzed: 12/11/23

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Aluminum	59.8		ng/l							
Antimony	1.50		ng/l							
Arsenic	3.31		ng/l							
Barium	1.64		ng/l							
Beryllium	1.03		ng/l							
Cadmium	0.307		ng/l							
Calcium	464		ng/l							
Chromium	3.37		ng/l							
Cobalt	0.408		ng/l							
Copper	131		ng/l							
Iron	26.4		ng/l							
Lead	6.23		ng/l							
Magnesium	19.6		ng/l							
Manganese	7.20		ng/l							
Molybdenum	29.3		ng/l							

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Inorganics by Compendium Method IO-3.5 - Quality Control

Batch 2312031 - B3L0605

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Calibration Blank (2312031-CCB1) Contin				Prepared & Analyzed: 12/11/23						
Nickel	0.370		ng/l							
Phosphorus	-845		ng/l							U
Potassium	-973		ng/l							U
Rubidium	0.315		ng/l							
Selenium	0.969		ng/l							
Sodium	-65.2		ng/l							U
Strontium	0.544		ng/l							
Thallium	0.487		ng/l							
Thorium	0.453		ng/l							
Uranium	-0.0185		ng/l							U
Vanadium	-34.9		ng/l							U
Zinc	-12.6		ng/l							U
Calibration Blank (2312031-CCB2)				Prepared & Analyzed: 12/11/23						
Aluminum	32.1		ng/l							
Antimony	0.841		ng/l							
Arsenic	1.40		ng/l							
Barium	5.28		ng/l							
Beryllium	0.261		ng/l							
Cadmium	0.590		ng/l							
Calcium	109		ng/l							
Chromium	6.86		ng/l							
Cobalt	1.31		ng/l							
Copper	78.1		ng/l							
Iron	116		ng/l							
Lead	6.09		ng/l							
Magnesium	29.2		ng/l							
Manganese	12.8		ng/l							
Molybdenum	6.48		ng/l							
Nickel	1.64		ng/l							
Phosphorus	-98.5		ng/l							U
Potassium	-2030		ng/l							U
Rubidium	-0.520		ng/l							U
Selenium	2.55		ng/l							
Sodium	-139		ng/l							U
Strontium	1.31		ng/l							
Thallium	0.342		ng/l							
Thorium	0.775		ng/l							
Uranium	0.00284		ng/l							

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Blue Bell, PA 19422
ATTN: Ms. Chelsea Saber
PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 12/14/23 11:51
SUBMITTED: 12/04/23
AQS SITE CODE:
SITE CODE: Maui fires

Inorganics by Compendium Method IO-3.5 - Quality Control

Batch 2312031 - B3L0605

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Calibration Blank (2312031-CCB2) Contin				Prepared & Analyzed: 12/11/23						
Vanadium	-27.2		ng/l							U
Zinc	86.5		ng/l							
Calibration Blank (2312031-CCB3)				Prepared & Analyzed: 12/11/23						
Aluminum	93.4		ng/l							
Antimony	1.38		ng/l							
Arsenic	0.532		ng/l							
Barium	9.11		ng/l							
Beryllium	-0.404		ng/l							U
Cadmium	0.751		ng/l							
Calcium	1790		ng/l							
Chromium	8.74		ng/l							
Cobalt	2.10		ng/l							
Copper	103		ng/l							
Iron	89.9		ng/l							
Lead	9.51		ng/l							
Magnesium	57.1		ng/l							
Manganese	19.5		ng/l							
Molybdenum	7.67		ng/l							
Nickel	4.18		ng/l							
Phosphorus	240		ng/l							
Potassium	-1680		ng/l							U
Rubidium	0.833		ng/l							
Selenium	-5.47		ng/l							U
Sodium	35.1		ng/l							
Strontium	1.98		ng/l							
Thallium	0.377		ng/l							
Thorium	0.618		ng/l							
Uranium	0.00625		ng/l							
Vanadium	-34.9		ng/l							U
Zinc	36.8		ng/l							
Calibration Blank (2312031-CCB4)				Prepared: 12/11/23 Analyzed: 12/12/23						
Aluminum	89.9		ng/l							
Antimony	1.68		ng/l							
Arsenic	0.642		ng/l							
Barium	11.3		ng/l							
Beryllium	-0.336		ng/l							U
Cadmium	1.03		ng/l							
Calcium	1970		ng/l							

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Inorganics by Compendium Method IO-3.5 - Quality Control

Batch 2312031 - B3L0605

Calibration Blank (2312031-CCB4) Contin — Prepared: 12/11/23 Analyzed: 12/12/23

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Chromium	14.4		ng/l							
Cobalt	2.56		ng/l							
Copper	124		ng/l							
Iron	168		ng/l							
Lead	11.5		ng/l							
Magnesium	77.9		ng/l							
Manganese	25.5		ng/l							
Molybdenum	8.01		ng/l							
Nickel	6.18		ng/l							
Phosphorus	-615		ng/l							U
Potassium	-1600		ng/l							U
Rubidium	0.323		ng/l							
Selenium	-2.85		ng/l							U
Sodium	122		ng/l							
Strontium	3.46		ng/l							
Thallium	0.497		ng/l							
Thorium	0.642		ng/l							
Uranium	0.0164		ng/l							
Vanadium	-34.0		ng/l							U
Zinc	38.0		ng/l							

Calibration Check (2312031-CCV1) — Prepared & Analyzed: 12/11/23

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Aluminum	1.53E6		ng/l	1.5000E6		102	90-110			
Antimony	20200		ng/l	20000		101	90-110			
Arsenic	19900		ng/l	20000		99.7	90-110			
Barium	200000		ng/l	200000		100	90-110			
Beryllium	4940		ng/l	5000.0		98.8	90-110			
Cadmium	20100		ng/l	20000		101	90-110			
Calcium	2.48E7		ng/l	2.5000E7		99.1	90-110			
Chromium	241000		ng/l	240000		101	90-110			
Cobalt	50300		ng/l	50000		101	90-110			
Copper	2.02E6		ng/l	2.0000E6		101	90-110			
Iron	2.49E6		ng/l	2.5000E6		99.7	90-110			
Lead	198000		ng/l	200000		98.8	90-110			
Magnesium	1.03E6		ng/l	1.0000E6		103	90-110			
Manganese	488000		ng/l	500000		97.6	90-110			
Molybdenum	49600		ng/l	50000		99.2	90-110			
Nickel	121000		ng/l	120000		101	90-110			
Phosphorus	198000		ng/l	200000		98.9	90-110			

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Inorganics by Compendium Method IO-3.5 - Quality Control

Batch 2312031 - B3L0605

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Calibration Check (2312031-CCV1) Contin				Prepared & Analyzed: 12/11/23						
Potassium	2.49E6		ng/l	2.5000E6		99.5	90-110			
Rubidium	9990		ng/l	10000		99.9	90-110			
Selenium	19900		ng/l	20000		99.7	90-110			
Sodium	2.61E6		ng/l	2.5000E6		104	90-110			
Strontium	49900		ng/l	50000		99.8	90-110			
Thallium	484		ng/l	500.00		96.8	90-110			
Thorium	496		ng/l	500.00		99.2	90-110			
Uranium	494		ng/l	500.00		98.9	90-110			
Vanadium	19800		ng/l	20000		99.2	90-110			
Zinc	519000		ng/l	500000		104	90-110			
Calibration Check (2312031-CCV2)				Prepared & Analyzed: 12/11/23						
Aluminum	1.47E6		ng/l	1.5000E6		98.2	90-110			
Antimony	19900		ng/l	20000		99.6	90-110			
Arsenic	19600		ng/l	20000		97.8	90-110			
Barium	198000		ng/l	200000		99.1	90-110			
Beryllium	4930		ng/l	5000.0		98.5	90-110			
Cadmium	19800		ng/l	20000		98.9	90-110			
Calcium	2.43E7		ng/l	2.5000E7		97.3	90-110			
Chromium	246000		ng/l	240000		103	90-110			
Cobalt	48800		ng/l	50000		97.6	90-110			
Copper	1.96E6		ng/l	2.0000E6		97.9	90-110			
Iron	2.42E6		ng/l	2.5000E6		96.8	90-110			
Lead	195000		ng/l	200000		97.3	90-110			
Magnesium	982000		ng/l	1.0000E6		98.2	90-110			
Manganese	477000		ng/l	500000		95.3	90-110			
Molybdenum	49000		ng/l	50000		98.1	90-110			
Nickel	118000		ng/l	120000		98.1	90-110			
Phosphorus	186000		ng/l	200000		93.1	90-110			
Potassium	2.42E6		ng/l	2.5000E6		96.7	90-110			
Rubidium	9860		ng/l	10000		98.6	90-110			
Selenium	20000		ng/l	20000		99.9	90-110			
Sodium	2.47E6		ng/l	2.5000E6		98.8	90-110			
Strontium	48800		ng/l	50000		97.6	90-110			
Thallium	471		ng/l	500.00		94.2	90-110			
Thorium	482		ng/l	500.00		96.4	90-110			
Uranium	477		ng/l	500.00		95.5	90-110			
Vanadium	19500		ng/l	20000		97.5	90-110			
Zinc	507000		ng/l	500000		101	90-110			

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Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes

Inorganics by Compendium Method IO-3.5 - Quality Control

Batch 2312031 - B3L0605

Calibration Check (2312031-CCV3) Prepared & Analyzed: 12/11/23

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Aluminum	1.49E6		ng/l	1.5000E6		99.5	90-110			
Antimony	20300		ng/l	20000		101	90-110			
Arsenic	19800		ng/l	20000		99.2	90-110			
Barium	199000		ng/l	200000		99.3	90-110			
Beryllium	4560		ng/l	5000.0		91.3	90-110			
Cadmium	20100		ng/l	20000		101	90-110			
Calcium	2.46E7		ng/l	2.5000E7		98.4	90-110			
Chromium	246000		ng/l	240000		103	90-110			
Cobalt	49400		ng/l	50000		98.8	90-110			
Copper	2.01E6		ng/l	2.0000E6		100	90-110			
Iron	2.46E6		ng/l	2.5000E6		98.6	90-110			
Lead	197000		ng/l	200000		98.7	90-110			
Magnesium	1.00E6		ng/l	1.0000E6		100	90-110			
Manganese	487000		ng/l	500000		97.3	90-110			
Molybdenum	49200		ng/l	50000		98.4	90-110			
Nickel	120000		ng/l	120000		99.7	90-110			
Phosphorus	197000		ng/l	200000		98.6	90-110			
Potassium	2.43E6		ng/l	2.5000E6		97.2	90-110			
Rubidium	9930		ng/l	10000		99.3	90-110			
Selenium	20000		ng/l	20000		100	90-110			
Sodium	2.54E6		ng/l	2.5000E6		102	90-110			
Strontium	49700		ng/l	50000		99.3	90-110			
Thallium	480		ng/l	500.00		96.0	90-110			
Thorium	496		ng/l	500.00		99.1	90-110			
Uranium	489		ng/l	500.00		97.7	90-110			
Vanadium	19900		ng/l	20000		99.6	90-110			
Zinc	517000		ng/l	500000		103	90-110			

Calibration Check (2312031-CCV4) Prepared & Analyzed: 12/11/23

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Aluminum	1.50E6		ng/l	1.5000E6		100	90-110			
Antimony	20500		ng/l	20000		102	90-110			
Arsenic	20000		ng/l	20000		99.9	90-110			
Barium	202000		ng/l	200000		101	90-110			
Beryllium	4550		ng/l	5000.0		91.1	90-110			
Cadmium	20300		ng/l	20000		102	90-110			
Calcium	2.49E7		ng/l	2.5000E7		99.6	90-110			
Chromium	254000		ng/l	240000		106	90-110			
Cobalt	49700		ng/l	50000		99.4	90-110			
Copper	2.02E6		ng/l	2.0000E6		101	90-110			

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Inorganics by Compendium Method IO-3.5 - Quality Control

Batch 2312031 - B3L0605

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Calibration Check (2312031-CCV4) Contir				Prepared & Analyzed: 12/11/23						
Iron	2.48E6		ng/l	2.5000E6		99.2	90-110			
Lead	200000		ng/l	200000		99.9	90-110			
Magnesium	1.00E6		ng/l	1.0000E6		100	90-110			
Manganese	491000		ng/l	500000		98.2	90-110			
Molybdenum	50300		ng/l	50000		101	90-110			
Nickel	120000		ng/l	120000		99.8	90-110			
Phosphorus	193000		ng/l	200000		96.7	90-110			
Potassium	2.45E6		ng/l	2.5000E6		97.9	90-110			
Rubidium	10100		ng/l	10000		101	90-110			
Selenium	20200		ng/l	20000		101	90-110			
Sodium	2.55E6		ng/l	2.5000E6		102	90-110			
Strontium	50300		ng/l	50000		101	90-110			
Thallium	485		ng/l	500.00		97.0	90-110			
Thorium	500		ng/l	500.00		100	90-110			
Uranium	498		ng/l	500.00		99.7	90-110			
Vanadium	20200		ng/l	20000		101	90-110			
Zinc	523000		ng/l	500000		105	90-110			
High Cal Check (2312031-HCV1)				Prepared & Analyzed: 12/11/23						
Aluminum	2.93E6		ng/l	3.0000E6		97.6	95-105			
Antimony	39900		ng/l	40000		99.7	95-105			
Arsenic	39800		ng/l	40000		99.5	95-105			
Barium	400000		ng/l	400000		99.9	95-105			
Beryllium	10300		ng/l	10000		103	95-105			
Cadmium	39300		ng/l	40000		98.3	95-105			
Calcium	4.93E7		ng/l	5.0000E7		98.7	95-105			
Chromium	473000		ng/l	480000		98.5	95-105			
Cobalt	98300		ng/l	100000		98.3	95-105			
Copper	3.94E6		ng/l	4.0000E6		98.5	95-105			
Iron	4.94E6		ng/l	5.0000E6		98.8	95-105			
Lead	397000		ng/l	400000		99.2	95-105			
Magnesium	1.96E6		ng/l	2.0000E6		97.9	95-105			
Manganese	986000		ng/l	1.0000E6		98.6	95-105			
Molybdenum	99400		ng/l	100000		99.4	95-105			
Nickel	235000		ng/l	240000		98.0	95-105			
Phosphorus	394000		ng/l	400000		98.5	95-105			
Potassium	4.90E6		ng/l	5.0000E6		98.1	95-105			
Rubidium	19900		ng/l	20000		99.3	95-105			
Selenium	39600		ng/l	40000		99.0	95-105			

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Inorganics by Compendium Method IO-3.5 - Quality Control

Batch 2312031 - B3L0605

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
High Cal Check (2312031-HCV1) Continue				Prepared & Analyzed: 12/11/23						
Sodium	4.90E6		ng/l	5.0000E6		98.0	95-105			
Strontium	99600		ng/l	100000		99.6	95-105			
Thallium	995		ng/l	1000.0		99.5	95-105			
Thorium	990		ng/l	1000.0		99.0	95-105			
Uranium	996		ng/l	1000.0		99.6	95-105			
Vanadium	39600		ng/l	40000		99.1	95-105			
Zinc	1.02E6		ng/l	1.0000E6		102	95-105			
Initial Cal Blank (2312031-ICB1)				Prepared & Analyzed: 12/11/23						
Aluminum	61.1		ng/l							
Antimony	1.48		ng/l							
Arsenic	-0.519		ng/l							U
Barium	3.07		ng/l							
Beryllium	1.36		ng/l							
Cadmium	0.359		ng/l							
Calcium	888		ng/l							
Chromium	5.64		ng/l							
Cobalt	0.725		ng/l							
Copper	77.3		ng/l							
Iron	99.8		ng/l							
Lead	7.11		ng/l							
Magnesium	0.0695		ng/l							
Manganese	8.48		ng/l							
Molybdenum	13.3		ng/l							
Nickel	0.0933		ng/l							
Phosphorus	-217		ng/l							U
Potassium	-1150		ng/l							U
Rubidium	0.811		ng/l							
Selenium	-2.72		ng/l							U
Sodium	-108		ng/l							U
Strontium	0.976		ng/l							
Thallium	0.339		ng/l							
Thorium	0.469		ng/l							
Uranium	-0.00424		ng/l							U
Vanadium	-32.0		ng/l							U
Zinc	-15.8		ng/l							U
Initial Cal Check (2312031-ICV1)				Prepared & Analyzed: 12/11/23						
Aluminum	1.45E6		ng/l	1.5000E6		96.5	90-110			
Antimony	19500		ng/l	20000		97.3	90-110			

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Batch 2312031 - B3L0605

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Initial Cal Check (2312031-ICV1) Continu				Prepared & Analyzed: 12/11/23						
Arsenic	19500		ng/l	20000		97.5	90-110			
Barium	196000		ng/l	200000		98.0	90-110			
Beryllium	5090		ng/l	5000.0		102	90-110			
Cadmium	20100		ng/l	20000		101	90-110			
Calcium	2.40E7		ng/l	2.5000E7		96.1	90-110			
Chromium	246000		ng/l	240000		103	90-110			
Cobalt	49000		ng/l	50000		98.0	90-110			
Copper	1.97E6		ng/l	2.0000E6		98.6	90-110			
Iron	2.45E6		ng/l	2.5000E6		98.2	90-110			
Lead	193000		ng/l	200000		96.4	90-110			
Magnesium	967000		ng/l	1.0000E6		96.7	90-110			
Manganese	479000		ng/l	500000		95.9	90-110			
Molybdenum	48700		ng/l	50000		97.3	90-110			
Nickel	117000		ng/l	120000		97.8	90-110			
Phosphorus	190000		ng/l	200000		95.2	90-110			
Potassium	2.45E6		ng/l	2.5000E6		98.0	90-110			
Rubidium	9540		ng/l	10000		95.4	90-110			
Selenium	20200		ng/l	20000		101	90-110			
Sodium	2.48E6		ng/l	2.5000E6		99.2	90-110			
Strontium	49000		ng/l	50000		98.0	90-110			
Thallium	468		ng/l	500.00		93.7	90-110			
Thorium	474		ng/l	500.00		94.7	90-110			
Uranium	479		ng/l	500.00		95.8	90-110			
Vanadium	19700		ng/l	20000		98.3	90-110			
Zinc	515000		ng/l	500000		103	90-110			
Interference Check A (2312031-IFA1)				Prepared & Analyzed: 12/11/23						
Aluminum	1.45E7		ng/l	1.5000E7		96.4	80-120			
Antimony	0.00		ng/l				80-120			U
Arsenic	0.00		ng/l				80-120			U
Barium	0.00		ng/l				80-120			U
Beryllium	0.00		ng/l				80-120			U
Cadmium	0.00		ng/l				80-120			U
Calcium	9.11E7		ng/l	1.0040E8		90.8	80-120			
Chromium	0.00		ng/l				80-120			U
Cobalt	0.00		ng/l				80-120			U
Copper	0.00		ng/l				80-120			U
Iron	1.44E7		ng/l	1.5000E7		95.9	80-120			
Lead	0.00		ng/l				80-120			U

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PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 12/14/23 11:51
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AQS SITE CODE:
SITE CODE: Maui fires

Inorganics by Compendium Method IO-3.5 - Quality Control

Batch 2312031 - B3L0605

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Interference Check A (2312031-IFA1) Co				Prepared & Analyzed: 12/11/23						
Magnesium	1.50E7		ng/l	1.5000E7		99.9	80-120			
Manganese	0.00		ng/l				80-120			U
Molybdenum	293000		ng/l	300000		97.6	80-120			
Nickel	0.00		ng/l				80-120			U
Phosphorus	1.55E7		ng/l	1.5000E7		104	80-120			
Potassium	1.43E7		ng/l	1.5000E7		95.1	80-120			
Rubidium	0.00		ng/l				80-120			U
Selenium	0.00		ng/l				80-120			U
Sodium	1.51E7		ng/l	1.5000E7		101	80-120			
Strontium	0.00		ng/l				80-120			U
Thallium	0.00		ng/l				80-120			U
Thorium	0.00		ng/l				80-120			U
Uranium	0.00		ng/l				80-120			U
Vanadium	0.00		ng/l				80-120			U
Zinc	0.00		ng/l				80-120			U
Interference Check B (2312031-IFB1)				Prepared & Analyzed: 12/11/23						
Aluminum	1.58E7		ng/l	1.6500E7		96.0	80-120			
Antimony	19900		ng/l	20000		99.5	80-120			
Arsenic	20000		ng/l	20000		100	80-120			
Barium	202000		ng/l	200000		101	80-120			
Beryllium	4640		ng/l	5000.0		92.7	80-120			
Cadmium	19200		ng/l	20000		95.8	80-120			
Calcium	1.14E8		ng/l	1.2540E8		90.9	80-120			
Chromium	227000		ng/l	240000		94.4	80-120			
Cobalt	48200		ng/l	50000		96.4	80-120			
Copper	1.86E6		ng/l	2.0000E6		93.1	80-120			
Iron	1.66E7		ng/l	1.7500E7		95.1	80-120			
Lead	205000		ng/l	200000		102	80-120			
Magnesium	1.59E7		ng/l	1.6000E7		99.7	80-120			
Manganese	501000		ng/l	500000		100	80-120			
Molybdenum	341000		ng/l	350000		97.4	80-120			
Nickel	113000		ng/l	120000		93.8	80-120			
Phosphorus	1.58E7		ng/l	1.5200E7		104	80-120			
Potassium	1.69E7		ng/l	1.7500E7		96.3	80-120			
Rubidium	10100		ng/l	10000		101	80-120			
Selenium	18800		ng/l	20000		94.1	80-120			
Sodium	1.79E7		ng/l	1.7500E7		102	80-120			
Strontium	49900		ng/l	50000		99.9	80-120			

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Inorganics by Compendium Method IO-3.5 - Quality Control

Batch 2312031 - B3L0605

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Interference Check B (2312031-IFB1) Co				Prepared & Analyzed: 12/11/23						
Thallium	516		ng/l	500.00		103	80-120			
Thorium	530		ng/l	500.00		106	80-120			
Uranium	539		ng/l	500.00		108	80-120			
Vanadium	19000		ng/l	20000		95.2	80-120			
Zinc	469000		ng/l	500000		93.7	80-120			

Batch B3L0605 - ICP-MS Extraction

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (B3L0605-BLK1)				Prepared: 12/06/23 Analyzed: 12/08/23						
Aluminum	ND	32.1	ng/m³ Air							U
Antimony	ND	0.0441	ng/m³ Air							SL, U
Arsenic	ND	0.00955	ng/m³ Air							U
Barium	ND	0.948	ng/m³ Air							U
Beryllium	ND	0.00332	ng/m³ Air							U
Cadmium	ND	0.109	ng/m³ Air							U
Calcium	ND	292	ng/m³ Air							GC-BS, QB-01 U
Chromium	ND	2.03	ng/m³ Air							U
Cobalt	ND	0.0156	ng/m³ Air							QB-01, U
Copper	ND	3.00	ng/m³ Air							U
Iron	ND	24.2	ng/m³ Air							QB-01, U
Lead	ND	0.276	ng/m³ Air							U
Magnesium	ND	96.4	ng/m³ Air							U
Manganese	ND	1.19	ng/m³ Air							U
Molybdenum	ND	0.213	ng/m³ Air							QB-01, U
Nickel	ND	0.801	ng/m³ Air							U
Phosphorus	ND	1250	ng/m³ Air							GC-BS, LJ, QX U
Potassium	ND	38.0	ng/m³ Air							U
Rubidium	ND	0.0183	ng/m³ Air							U
Selenium	ND	0.0110	ng/m³ Air							U
Sodium	ND	2000	ng/m³ Air							GC-BS, U
Strontium	ND	0.652	ng/m³ Air							QB-01, U
Thallium	ND	5.03E-4	ng/m³ Air							U
Thorium	ND	0.00300	ng/m³ Air							U
Uranium	ND	0.0170	ng/m³ Air							U
Vanadium	ND	0.0492	ng/m³ Air							U
Zinc	ND	97.7	ng/m³ Air							U
LCS (B3L0605-BS1)				Prepared: 12/06/23 Analyzed: 12/08/23						
Aluminum	105	32.1	ng/m³ Air	82.975		126	80-120			

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Inorganics by Compendium Method IO-3.5 - Quality Control

Batch B3L0605 - ICP-MS Extraction

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
LCS (B3L0605-BS1) Continued				Prepared: 12/06/23	Analyzed: 12/08/23					
Antimony	0.541	0.0441	ng/m³ Air	1.3829		39.1	80-120			SL
Arsenic	2.72	0.00955	ng/m³ Air	2.7658		98.2	80-120			
Barium	27.9	0.948	ng/m³ Air	27.658		101	80-120			
Beryllium	1.31	0.00332	ng/m³ Air	1.3829		94.9	80-120			
Cadmium	1.39	0.109	ng/m³ Air	1.3829		101	80-120			
Calcium	580	292	ng/m³ Air	69.146		839	80-120			GC-BS, QB-01
Chromium	15.7	2.03	ng/m³ Air	13.829		114	80-120			
Cobalt	1.38	0.0156	ng/m³ Air	1.3829		99.8	80-120			QB-01
Copper	30.5	3.00	ng/m³ Air	27.658		110	80-120			QB-01
Iron	53.3	24.2	ng/m³ Air	27.658		193	80-120			QB-01
Lead	13.4	0.276	ng/m³ Air	13.829		96.6	80-120			
Magnesium	ND	96.4	ng/m³ Air	27.658			80-120			U
Manganese	8.80	1.19	ng/m³ Air	8.2975		106	80-120			
Molybdenum	1.69	0.213	ng/m³ Air	1.3829		122	80-120			QB-01
Nickel	3.05	0.801	ng/m³ Air	2.7658		110	80-120			
Phosphorus	ND	1250	ng/m³ Air	13.829			80-120			GC-BS, LJ, QX U
Potassium	70.6	38.0	ng/m³ Air	55.317		128	80-120			
Rubidium	1.33	0.0183	ng/m³ Air	1.3829		96.1	80-120			
Selenium	2.71	0.0110	ng/m³ Air	2.7658		97.9	80-120			
Sodium	ND	2000	ng/m³ Air	55.317			80-120			GC-BS, U
Strontium	2.32	0.652	ng/m³ Air	1.3829		168	80-120			QB-01
Thallium	0.129	5.03E-4	ng/m³ Air	0.13829		93.5	80-120			
Thorium	0.127	0.00300	ng/m³ Air	0.13829		91.8	80-120			
Uranium	0.130	0.0170	ng/m³ Air	0.13829		94.3	80-120			
Vanadium	2.75	0.0492	ng/m³ Air	2.7658		99.6	80-120			
Zinc	104	97.7	ng/m³ Air	82.975		125	80-120			
Duplicate (B3L0605-DUP1)		**Source: 3120430-06**		Prepared: 12/06/23	Analyzed: 12/08/23					
Aluminum	331	25.8	ng/m³ Air		340			2.71	10	
Antimony	0.0449	0.0354	ng/m³ Air		0.0483			7.27	10	SL
Arsenic	0.165	0.00767	ng/m³ Air		0.169			2.84	10	
Barium	4.42	0.761	ng/m³ Air		4.13			6.65	10	
Beryllium	0.0119	0.00267	ng/m³ Air		0.0113			4.73	10	
Cadmium	ND	0.0875	ng/m³ Air		ND				10	U
Calcium	525	234	ng/m³ Air		527			0.265	10	GC-BS, QB-01
Chromium	1.75	1.63	ng/m³ Air		1.70			2.73	10	
Cobalt	0.189	0.0125	ng/m³ Air		0.176			7.27	10	QB-01
Copper	13.2	2.41	ng/m³ Air		13.2			0.320	10	

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Inorganics by Compendium Method IO-3.5 - Quality Control

Batch B3L0605 - ICP-MS Extraction

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Duplicate (B3L0605-DUP1) Continued		**Source: 3120430-06**		Prepared: 12/06/23 Analyzed: 12/08/23						
Iron	352	19.4	ng/m³ Air		360			2.21	10	QB-01
Lead	ND	0.222	ng/m³ Air		ND				10	U
Magnesium	158	77.4	ng/m³ Air		158			0.0230	10	
Manganese	9.52	0.956	ng/m³ Air		9.44			0.883	10	
Molybdenum	0.964	0.171	ng/m³ Air		0.960			0.499	10	QB-01
Nickel	ND	0.643	ng/m³ Air		ND				10	U
Phosphorus	ND	1000	ng/m³ Air		ND				10	U, GC-BS, LJ, QX
Potassium	102	30.5	ng/m³ Air		116			12.1	10	
Rubidium	0.173	0.0147	ng/m³ Air		0.173			0.169	10	
Selenium	0.128	0.00883	ng/m³ Air		0.115			10.7	10	
Sodium	ND	1610	ng/m³ Air		ND				10	U, GC-BS
Strontium	3.24	0.524	ng/m³ Air		3.24			0.0620	10	QB-01
Thallium	7.75E-4	4.04E-4	ng/m³ Air		8.68E-4			11.2	10	
Thorium	0.00976	0.00241	ng/m³ Air		0.0114			15.2	10	
Uranium	ND	0.0137	ng/m³ Air		ND				10	U
Vanadium	1.20	0.0395	ng/m³ Air		1.20			0.623	10	
Zinc	ND	78.5	ng/m³ Air		ND				10	U
Duplicate (B3L0605-DUP2)		**Source: 3120430-10**		Prepared: 12/06/23 Analyzed: 12/08/23						
Aluminum	157	28.9	ng/m³ Air		155			1.57	10	
Antimony	0.0888	0.0397	ng/m³ Air		0.0878			1.04	10	SL
Arsenic	0.0872	0.00861	ng/m³ Air		0.0858			1.58	10	
Barium	4.20	0.854	ng/m³ Air		4.18			0.578	10	
Beryllium	0.00662	0.00299	ng/m³ Air		0.00633			4.49	10	
Cadmium	ND	0.0982	ng/m³ Air		ND				10	U
Calcium	286	263	ng/m³ Air		279			2.47	10	GC-BS, QB-01
Chromium	ND	1.83	ng/m³ Air		ND				10	U
Cobalt	0.0933	0.0141	ng/m³ Air		0.0929			0.444	10	QB-01
Copper	38.7	2.70	ng/m³ Air		38.2			1.41	10	
Iron	185	21.8	ng/m³ Air		184			0.540	10	QB-01
Lead	ND	0.249	ng/m³ Air		ND				10	U
Magnesium	135	86.9	ng/m³ Air		135			0.359	10	
Manganese	4.80	1.07	ng/m³ Air		4.78			0.399	10	
Molybdenum	1.20	0.192	ng/m³ Air		1.20			0.0441	10	QB-01
Nickel	ND	0.722	ng/m³ Air		ND				10	U
Phosphorus	ND	1130	ng/m³ Air		ND				10	U, GC-BS, LJ, QX
Potassium	94.6	34.3	ng/m³ Air		94.3			0.255	10	
Rubidium	0.108	0.0165	ng/m³ Air		0.103			4.97	10	

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Inorganics by Compendium Method IO-3.5 - Quality Control

Batch B3L0605 - ICP-MS Extraction

Duplicate (B3L0605-DUP2) Continued **Source: 3120430-10** Prepared: 12/06/23 Analyzed: 12/08/23

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Selenium	0.117	0.00991	ng/m³ Air		0.123			4.38	10	
Sodium	ND	1800	ng/m³ Air		ND				10	U, GC-BS
Strontium	1.76	0.588	ng/m³ Air		1.75			0.505	10	QB-01
Thallium	7.31E-4	4.53E-4	ng/m³ Air		6.73E-4			8.25	10	
Thorium	0.00605	0.00270	ng/m³ Air		0.00607			0.298	10	
Uranium	ND	0.0153	ng/m³ Air		ND				10	U
Vanadium	0.499	0.0443	ng/m³ Air		0.496			0.696	10	
Zinc	ND	88.1	ng/m³ Air		ND				10	U

Matrix Spike (B3L0605-MS1) **Source: 3120430-06** Prepared: 12/06/23 Analyzed: 12/08/23

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Aluminum	409	25.8	ng/m³ Air	66.632	340	103	80-120			
Antimony	0.533	0.0354	ng/m³ Air	1.1105	0.0483	43.6	80-120			SL
Arsenic	2.35	0.00767	ng/m³ Air	2.2211	0.169	98.4	80-120			
Barium	25.5	0.761	ng/m³ Air	22.211	4.13	96.4	80-120			
Beryllium	1.04	0.00267	ng/m³ Air	1.1105	0.0113	92.3	80-120			
Cadmium	1.12	0.0875	ng/m³ Air	1.1105	ND	101	80-120			
Calcium	588	234	ng/m³ Air	55.526	527	111	80-120			GC-BS, QB-01
Chromium	13.1	1.63	ng/m³ Air	11.105	1.70	103	80-120			
Cobalt	1.24	0.0125	ng/m³ Air	1.1105	0.176	96.2	80-120			QB-01
Copper	37.1	2.41	ng/m³ Air	22.211	13.2	108	80-120			QB-01
Iron	383	19.4	ng/m³ Air	22.211	360	102	80-120			QB-01
Lead	10.9	0.222	ng/m³ Air	11.105	ND	98.1	80-120			
Magnesium	183	77.4	ng/m³ Air	22.211	158	111	80-120			
Manganese	16.4	0.956	ng/m³ Air	6.6632	9.44	104	80-120			
Molybdenum	2.04	0.171	ng/m³ Air	1.1105	0.960	97.5	80-120			QB-01
Nickel	2.80	0.643	ng/m³ Air	2.2211	ND	126	80-120			
Phosphorus	ND	1000	ng/m³ Air	11.105	ND		80-120			GC-BS, LJ, QM-4X, QX, U
Potassium	166	30.5	ng/m³ Air	44.421	116	113	80-120			
Rubidium	1.20	0.0147	ng/m³ Air	1.1105	0.173	92.6	80-120			
Selenium	2.26	0.00883	ng/m³ Air	2.2211	0.115	96.7	80-120			
Sodium	ND	1610	ng/m³ Air	44.421	ND		80-120			GC-BS, QM-4X, U
Strontium	4.29	0.524	ng/m³ Air	1.1105	3.24	94.9	80-120			QB-01
Thallium	0.103	4.04E-4	ng/m³ Air	0.11105	8.68E-4	91.7	80-120			
Thorium	0.0619	0.00241	ng/m³ Air	0.11105	0.0114	45.5	80-120			QM-07
Uranium	0.110	0.0137	ng/m³ Air	0.11105	ND	99.2	80-120			
Vanadium	3.42	0.0395	ng/m³ Air	2.2211	1.20	99.7	80-120			
Zinc	85.9	78.5	ng/m³ Air	66.632	ND	129	80-120			

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Inorganics by Compendium Method IO-3.5 - Quality Control

Batch B3L0605 - ICP-MS Extraction

Matrix Spike Dup (B3L0605-MSD1) **Source: 3120430-06** Prepared: 12/06/23 Analyzed: 12/08/23

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Aluminum	403	25.8	ng/m³ Air	66.632	340	94.9	80-120	1.36	20	
Antimony	0.572	0.0354	ng/m³ Air	1.1105	0.0483	47.1	80-120	7.04	20	SL
Arsenic	2.36	0.00767	ng/m³ Air	2.2211	0.169	98.8	80-120	0.348	20	
Barium	25.8	0.761	ng/m³ Air	22.211	4.13	97.5	80-120	0.967	20	
Beryllium	1.02	0.00267	ng/m³ Air	1.1105	0.0113	90.5	80-120	1.94	20	
Cadmium	1.14	0.0875	ng/m³ Air	1.1105	ND	102	80-120	0.957	20	
Calcium	586	234	ng/m³ Air	55.526	527	106	80-120	0.459	20	GC-BS, QB-01
Chromium	12.9	1.63	ng/m³ Air	11.105	1.70	101	80-120	1.43	20	
Cobalt	1.25	0.0125	ng/m³ Air	1.1105	0.176	97.0	80-120	0.741	20	QB-01
Copper	38.5	2.41	ng/m³ Air	22.211	13.2	114	80-120	3.71	20	
Iron	376	19.4	ng/m³ Air	22.211	360	70.6	80-120	1.84	20	QB-01, QM-4X
Lead	11.0	0.222	ng/m³ Air	11.105	ND	99.3	80-120	1.20	20	
Magnesium	180	77.4	ng/m³ Air	22.211	158	98.9	80-120	1.53	20	
Manganese	16.2	0.956	ng/m³ Air	6.6632	9.44	101	80-120	0.981	20	
Molybdenum	2.05	0.171	ng/m³ Air	1.1105	0.960	98.5	80-120	0.530	20	QB-01
Nickel	2.85	0.643	ng/m³ Air	2.2211	ND	128	80-120	1.92	20	
Phosphorus	ND	1000	ng/m³ Air	11.105	ND		80-120		20	GC-BS, LJ, QM-4X, QX, U
Potassium	149	30.5	ng/m³ Air	44.421	116	74.4	80-120	10.8	20	QM-07
Rubidium	1.22	0.0147	ng/m³ Air	1.1105	0.173	94.3	80-120	1.53	20	
Selenium	2.27	0.00883	ng/m³ Air	2.2211	0.115	96.9	80-120	0.172	20	
Sodium	ND	1610	ng/m³ Air	44.421	ND		80-120		20	GC-BS, QM-4X, U
Strontium	4.24	0.524	ng/m³ Air	1.1105	3.24	90.2	80-120	1.21	20	QB-01
Thallium	0.105	4.04E-4	ng/m³ Air	0.11105	8.68E-4	93.8	80-120	2.28	20	
Thorium	0.0637	0.00241	ng/m³ Air	0.11105	0.0114	47.1	80-120	2.85	20	QM-07
Uranium	0.112	0.0137	ng/m³ Air	0.11105	ND	101	80-120	1.90	20	
Vanadium	3.39	0.0395	ng/m³ Air	2.2211	1.20	98.5	80-120	0.743	20	
Zinc	88.0	78.5	ng/m³ Air	66.632	ND	132	80-120	2.51	20	

Post Spike (B3L0605-PS1) **Source: 3120430-06** Prepared: 12/06/23 Analyzed: 12/08/23

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Aluminum	368	25.8	ng/m³ Air	22.211	340	125	75-125			A-01
Antimony	0.268	0.0354	ng/m³ Air	0.22211	0.0483	99.1	75-125			SL
Arsenic	1.25	0.00767	ng/m³ Air	1.1105	0.169	96.9	75-125			
Barium	6.28	0.761	ng/m³ Air	2.2211	4.13	96.7	75-125			
Beryllium	0.217	0.00267	ng/m³ Air	0.22211	0.0113	92.4	75-125			
Cadmium	0.119	0.0875	ng/m³ Air	0.11105	ND	108	75-125			
Calcium	565	234	ng/m³ Air	22.211	527	175	75-125			A-01, GC-BS, QB-01
Chromium	2.82	1.63	ng/m³ Air	1.1105	1.70	101	75-125			

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CERTIFICATE OF ANALYSIS

Tetra Tech, Inc.
1777 Sentry Pkwy, Bldg 12
Blue Bell, PA 19422
ATTN: Ms. Chelsea Saber
PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 12/14/23 11:51
SUBMITTED: 12/04/23
AQS SITE CODE:
SITE CODE: Maui fires

Inorganics by Compendium Method IO-3.5 - Quality Control

Batch B3L0605 - ICP-MS Extraction

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Post Spike (B3L0605-PS1) Continued		**Source: 3120430-06**		Prepared: 12/06/23	Analyzed: 12/08/23					
Cobalt	0.393	0.0125	ng/m³ Air	0.22211	0.176	97.9	75-125			QB-01
Copper	24.6	2.41	ng/m³ Air	11.105	13.2	103	75-125			
Iron	386	19.4	ng/m³ Air	22.211	360	117	75-125			QB-01
Lead	21.8	0.222	ng/m³ Air	22.211	ND	98.3	75-125			
Magnesium	182	77.4	ng/m³ Air	22.211	158	108	75-125			
Manganese	11.8	0.956	ng/m³ Air	2.2211	9.44	105	75-125			
Molybdenum	2.00	0.171	ng/m³ Air	1.1105	0.960	93.7	75-125			QB-01
Nickel	2.73	0.643	ng/m³ Air	2.2211	ND	123	75-125			
Phosphorus	ND	1000	ng/m³ Air	4.4421	ND		75-125			A-01, GC-BS, LJ, QX, U
Potassium	138	30.5	ng/m³ Air	22.211	116	101	75-125			
Rubidium	0.285	0.0147	ng/m³ Air	0.11105	0.173	101	75-125			
Selenium	1.22	0.00883	ng/m³ Air	1.1105	0.115	99.8	75-125			
Sodium	ND	1610	ng/m³ Air	22.211	ND		75-125			A-01, GC-BS, U
Strontium	4.31	0.524	ng/m³ Air	1.1105	3.24	96.1	75-125			QB-01
Thallium	0.0524	4.04E-4	ng/m³ Air	5.5526E-2	8.68E-4	92.8	75-125			
Thorium	0.0627	0.00241	ng/m³ Air	5.5526E-2	0.0114	92.5	75-125			
Uranium	0.0597	0.0137	ng/m³ Air	5.5526E-2	ND	107	75-125			
Vanadium	2.28	0.0395	ng/m³ Air	1.1105	1.20	97.1	75-125			
Zinc	ND	78.5	ng/m³ Air	22.211	ND		75-125			U
Dilution Check (B3L0605-SRL1)		**Source: 3120430-06**		Prepared: 12/06/23	Analyzed: 12/08/23					
Aluminum	341	129	ng/m³ Air		340			0.264	10	
Antimony	ND	0.177	ng/m³ Air		ND				10	SL, U
Arsenic	0.177	0.0383	ng/m³ Air		0.169			4.56	10	
Barium	4.10	3.81	ng/m³ Air		4.13			0.802	10	
Beryllium	ND	0.0133	ng/m³ Air		ND				10	U
Cadmium	ND	0.438	ng/m³ Air		ND				10	U
Calcium	ND	1170	ng/m³ Air		ND				10	QB-01, GC-BS U
Chromium	ND	8.15	ng/m³ Air		ND				10	U
Cobalt	0.175	0.0626	ng/m³ Air		0.176			0.381	10	QB-01
Copper	13.1	12.0	ng/m³ Air		13.2			0.144	10	
Iron	363	97.2	ng/m³ Air		360			0.707	10	QB-01
Lead	ND	1.11	ng/m³ Air		ND				10	U
Magnesium	ND	387	ng/m³ Air		ND				10	U
Manganese	9.48	4.78	ng/m³ Air		9.44			0.420	10	
Molybdenum	0.960	0.855	ng/m³ Air		0.960			2.48E-5	10	QB-01
Nickel	ND	3.22	ng/m³ Air		ND				10	U

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FILE #: 0000.00
REPORTED: 12/14/23 11:51
SUBMITTED: 12/04/23
AQS SITE CODE:
SITE CODE: Maui fires

Inorganics by Compendium Method IO-3.5 - Quality Control

Batch B3L0605 - ICP-MS Extraction

Dilution Check (B3L0605-SRL1) Continued Source: 3120430-06 Prepared: 12/06/23 Analyzed: 12/08/23

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Phosphorus	ND	5020	ng/m³ Air		ND				10	GC-BS, LJ, QX U
Potassium	ND	153	ng/m³ Air		ND				10	U
Rubidium	0.186	0.0735	ng/m³ Air		0.173			7.08	10	
Selenium	0.133	0.0442	ng/m³ Air		0.115			14.1	10	
Sodium	ND	8030	ng/m³ Air		ND				10	GC-BS, U
Strontium	3.29	2.62	ng/m³ Air		3.24			1.44	10	QB-01
Thallium	ND	0.00202	ng/m³ Air		ND				10	U
Thorium	ND	0.0120	ng/m³ Air		ND				10	U
Uranium	ND	0.0683	ng/m³ Air		ND				10	U
Vanadium	1.20	0.198	ng/m³ Air		1.20			0.651	10	
Zinc	ND	392	ng/m³ Air		ND				10	U

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Notes and Definitions

U	Under Detection Limit
SL	The spike recovery was outside acceptance limits. Reported value may be biased low.
QX	Compound does not meet QC criteria. Results should be considered an estimate.
QM-4X	The MS/MSD recovery exceeds criteria because the parent sample concentration is greater than 4x the spike concentration. Sample results for the QC batch were accepted based on acceptable BS/BSD recoveries.
QM-07	The spike recovery was outside acceptance limits for the MS and/or MSD. The batch was accepted based on acceptable LCS recovery.
QB-01	Analyte exceeds method blank criteria
LJ	Identification of analyte is acceptable; reported value is an estimate.
GC-BS	Compound exceeds Blank Spike Criteria
FB-01	Analyte exceeds Field Blank criteria.
E	The concentration indicated for this analyte is an estimated value above the calibration range of the instrument. This value is considered an estimate (CLP E-flag).
D	This result obtained by dilution.
A-01	Parent sample >4x spike amount
ND	Analyte NOT DETECTED
NR	Not Reported
MDL	Method Detection Limit
RPD	Relative Percent Difference

Note: This test is accredited under the 2016 TNI Standard.

Ambient Community Air Monitoring Weekly Report
For the Hawaii Department of Health – Clean Air Branch

Kula, Maui

11/30/2023-12/6/2023
[Report Updated: 4/12/2024]

As a result of ongoing debris removal operations in response to the Maui Wildfires, a community air monitoring and sampling plan (CAMSP, 2023) has been developed and sampling is being performed at three community locations across the area of Kula.

This approach includes ambient community air monitoring and sampling to monitor conditions and ensure debris removal activities, taking place under the U.S. Army Corps of Engineers (USACE), does not significantly impact air quality in the area of Kula. Data collected is made available to HDOH via online shared site and this weekly report. This approach to air monitoring and sampling will continue until debris removal activities are complete or until HDOH CAB advises otherwise.

Air quality monitoring for particulate matter was collected at all three community locations over a 24-hour period each day in accordance with the CAMSP. Additionally, daily air samples were collected at all community locations for asbestos and heavy metals. Summary analytical data is presented in **Tables 1 and 2**. **Figure 1** depicts the community air monitoring and sampling locations. **Appendix 1** provides detailed analytical results for all community locations where air sampling was performed. Analytical results were compared to site-specific screening levels for particulate matter, asbestos, and heavy metals as published in the CAMSP (Tetra Tech 2023; see Table 2).

Results for Community Locations:
Ambient particulate air monitoring was performed to assess for the presence and concentrations of airborne particulates with a particle size aerodynamic diameter of 2.5 micrometers (µm) and less ($PM_{2.5}$), as well as 10 micrometers (µm) and less (PM_{10}). This particle size diameter is recognized for health evaluations and is identified as "$PM_{2.5}$" and "PM_{10}". The particle size diameters of 2.5 micrometers (µm) and 10 micrometers (µm) are small enough to be inhaled into a person's lungs. Monitoring for $PM_{2.5}$ and PM_{10} was conducted 7 days a week at each of the following locations: Top Property (AM-01) (November 30 – December 6), Middle Property (AM-02) 2 (November 30 – December 6), Lower Property (AM-03) (November 30 – December 6).

The results of PM_{10} monitoring found that screening levels were exceeded at the Top Property air monitoring station on November 30th. The property owner was observed stirring up dry undersoil and dust on the property with use of a Skid Steer. The property owner was also observed spreading woodchips.

The results of $PM_{2.5}$ monitoring found that screening levels were exceeded at the Top Property air monitoring station on November 30th, December 1st and December 5th. The property owner was observed disturbing dry undersoil and dust while felling trees on the property using a Skid Steer. The property owner was also observed spreading woodchips.

None of these exceedances of particulate screening levels are likely to be attributable to USACE debris removal operations.

There were twenty-one samples collected for asbestos fibers at community monitoring locations throughout this time frame. Of the twenty-one samples collected, six were voided. Five were voided as a result of a greater than 10% discrepancy between the pre and post calibration values, as stated in the asbestos sampling SOP; Top Property (AM-01) on 12/2 and 12/4, Middle Property (AM-02) on 12/1, and Lower Property (AM-03) on 12/3 and 12/4. One sample from Middle Property (AM-02) on 11/30 was voided due to insufficient sample volume (L). No asbestos sample returned a value above the laboratory's detection limit, indicating fibers were not present in the air sampled. All asbestos results were below the public health screening level of 0.0034 fibers/cc (as well as the laboratory's detection limits).

Some extremely low levels of heavy metals were detected in ambient air samples at community locations. Although detected, all concentrations were below the public health screening levels for heavy metals. Details for particulates, heavy metal and asbestos sampling data for community locations are found in Attachment 1. The metals lab report 3121111 contains samples outside the range of this report and have been redacted to only show the results pertinent to this reporting period.

This deliverable also includes the data validation checklists for each lab report. All data validation checklists for previous reports have been added to the project folder on Teams. Details for the lab reports and the data validation checklists are found in the Appendix.

Attachments:

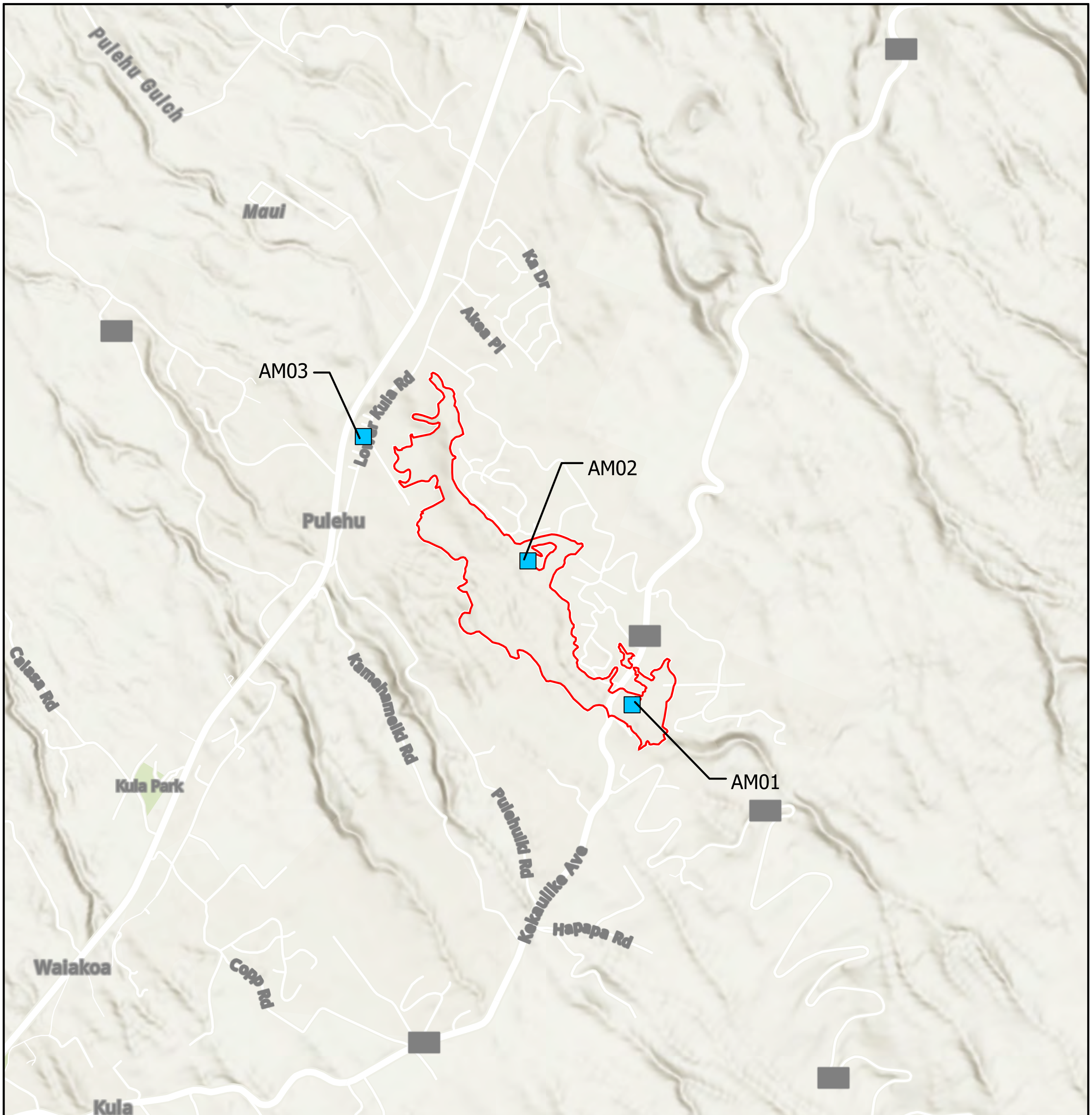
Analytical Sampling Results and Particulate Monitoring Results

Air Monitoring and Sampling Locations

Appendix:

Analytical Reports

Attachments



Air Monitoring Locations

Kula Fire Perimeter

N

0 0.25 0.5
Miles

TETRA TECH

Figure 1
Ambient Community
Air Monitoring Locations

Hawaii DOH
2023 Kula Wildfire

Basemap: ESRI ArcGIS World Street Map

Table 1: HDOH CAB Ambient Community Monitoring and Sampling
Analytical Sampling Results
Maui Wildfire, Kula
11/30/2023-12/6/2023
[Report Updated: 4/12/2024]

Analyte		Asbestos		Antimony	Arsenic	Barium	Beryllium	Cadmium	Chromium	Cobalt	Copper	Lead	Manganese	Molybdenum	Nickel	Selenium	Thallium	Vanadium	Zinc
Units		f/cc	Y/N	$\mu g/m^3$	$\mu g/m^3$	$\mu g/m^3$	$\mu g/m^3$	$\mu g/m^3$	$\mu g/m^3$	$\mu g/m^3$	$\mu g/m^3$	$\mu g/m^3$	$\mu g/m^3$	$\mu g/m^3$	$\mu g/m^3$	$\mu g/m^3$	$\mu g/m^3$	$\mu g/m^3$	$\mu g/m^3$
Screening Level	Location / ID	0.0034 [1]	Confirmed Asbestos [2]	1.4	0.18	2.4	0.1	0.048	24	0.029	480	1.5	0.24	9.6	0.048	96	48	0.48	2400
11/30/2023	Top Property (AM-01)	<0.00129	N	0.0000439	0.000124	0.00377	0.0000142	ND	ND	0.000209	0.0207	0.000264	0.0133	0.000876	0.00087	0.000161	0.000000967	0.00136	ND
	Middle Property (AM-02)	NA	NA	ND	0.000151	0.00217	0.00000544	ND	ND	0.0000869	0.0134	ND	0.004	0.000937	0.0007	0.000106	0.000000462	0.000582	ND
	Lower Property (AM-03)	<0.00053	N	0.0000499	0.000124	0.0023	ND	ND	ND	0.0000532	0.0401	ND	0.00187	0.0013	0.000814	0.0000849	ND	0.000324	ND
12/1/2023	Top Property (AM-01)	<0.00046	N	ND	0.000143	0.00455	0.0000166	ND	0.00189	0.000244	0.0147	0.000393	0.016	0.00073	0.000883	0.000146	0.00000108	0.00185	ND
	Middle Property (AM-02)	NA	NA	0.000039	0.000102	0.00209	0.00000358	ND	0.00167	0.000108	0.012	ND	0.00275	0.000835	0.000831	0.0000721	0.000000494	0.000878	ND
	Lower Property (AM-03)	<0.00049	N	0.0000576	0.0000833	0.00253	0.00000337	ND	ND	0.00006	0.0283	ND	0.00244	0.00109	ND	0.000084	ND	0.00097	ND
12/2/2003	Top Property (AM-01)	NA	NA	ND	0.0000771	0.00265	0.00000589	ND	ND	0.0000953	0.0178	ND	0.0048	0.000962	0.00113	0.0000985	0.000000458	0.000531	ND
	Middle Property (AM-02)	<0.00122	N	ND	0.000104	0.00197	0.00000349	ND	ND	0.0000634	0.0182	ND	0.00265	0.00114	ND	0.0000912	ND	0.000441	ND
	Lower Property (AM-03)	<0.00132	N	0.0000802	0.0000814	0.00311	0.00000399	ND	ND	0.0000758	0.0394	ND	0.00311	0.00123	ND	0.000146	ND	0.000634	ND
12/3/2023	Top Property (AM-01)	<0.00052	N	0.0000384	0.000118	0.00556	0.000017	ND	0.00187	0.000277	0.0186	0.0003	0.019	0.000877	0.00065	0.000221	0.00000137	0.00185	ND
	Middle Property (AM-02)	<0.00138	N	0.0000517	0.0000999	0.0028	0.00000444	ND	ND	0.000081	0.0171	ND	0.00365	0.000866	ND	0.000123	0.00000063	0.000672	ND
	Lower Property (AM-03)	NA	NA	0.0000558	0.0000799	0.00288	0.00000439	ND	0.00191	0.0000855	0.0343	ND	0.00384	0.00117	0.000713	0.000135	0.000000627	0.000704	ND
12/4/2023	Top Property (AM-01)	NA	NA	0.0000524	0.000208	0.00954	0.0000381	ND	0.00245	0.000474	0.0184	0.000417	0.0329	0.000975	0.000915	0.000268	0.00000204	0.00337	ND
	Middle Property (AM-02)	<0.00055	N	0.0000779	0.000176	0.00344	0.00000625	ND	ND	0.000117	0.0185	ND	0.00513	0.00089	ND	0.000104	0.000000619	0.00066	ND
	Lower Property (AM-03)	NA	NA	0.0000734	0.000114	0.00393	0.00000722	ND	ND	0.000111	0.0331	ND	0.00587	0.00105	ND	0.000115	0.000000576	0.000688	ND
12/5/2023	Top Property (AM-01)	<0.00051	N	0.0000469	0.000212	0.0119	0.0000514	ND	0.00287	0.000689	0.02	0.000539	0.0493	0.000702	0.000973	0.000305	0.00000261	0.00423	ND
	Middle Property (AM-02)	<0.00048	N	0.000057	0.000137	0.00416	0.00000921	ND	0.00172	0.000157	0.0139	0.000298	0.00807	0.000615	ND	0.00012	0.000000672	0.000807	ND
	Lower Property (AM-03)	<0.00076	N	0.0000723	0.0000999	0.00572	0.0000121	ND	ND	0.000171	0.0505	0.000563	0.00964	0.0012	ND	0.000127	0.000000706	0.000887	ND
12/6/2023	Top Property (AM-01)	<0.00049	N	0.0000603	0.000345	0.0161	0.0000706	ND	0.00362	0.00105	0.0212	0.000857	0.0692	0.000715	0.00168	0.000438	0.00000381	0.00653	ND
	Middle Property (AM-02)	<0.00036	N	0.0000558	0.000188	0.00574	0.0000181	ND	0.00216	0.000343	0.0149	0.000879	0.0188	0.000652	0.00122	0.000183	0.00000118	0.00194	ND
	Lower Property (AM-03)	<0.00036	N	0.0000719	0.000151	0.00685	0.0000196	ND	0.00253	0.000334	0.0301	0.000418	0.0174	0.000892	0.00126	0.000178	0.00000103	0.00186	ND
95% Upper Confidence Limit[3]		0.00092		0.00006	0.00016	0.00637	0.000025	NA	0.00213	0.00035	0.028	0.00043	0.025	0.00102	0.00093	0.00019	0.0000014	0.0011	NA

Notes:
Asbestos sampling was voided at the Top Property (AM-01) on 12/2 and 12/4 due to the sampling pump not providing a non-fluctuating air flow through the filter and maintain initial volume flow rate within 10% throughout the sampling period.
Asbestos sampling was voided at the Middle Property (AM-02) on 11/30 due to insufficient sample volume (L).
Asbestos sampling was voided at the Middle Property (AM-02) on 12/1 due to the sampling pump not providing a non-fluctuating air flow through the filter and maintain initial volume flow rate within 10% throughout the sampling period.
Asbestos sampling was voided at the Lower Property (AM-03) on 12/3 and 12/4 due to the sampling pump not providing a non-fluctuating air flow through the filter and maintain initial volume flow rate within 10% throughout the sampling period.
NA = Not Available
f/cc = fibers per cubic centimeter
µg/m3= micrograms per cubic meter
ND = Not detected at or above the laboratory reporting limit or method detection limit
[1] Fiber count sample result via Phase Contrast Microscopy
[2] Confirmed asbestos sample result via Transmission Electron Microscopy
[3] 95% UCL determined through 'best fit' lognormal or normal parametric statistics via W test

Table 2: HDOH CAB Ambient Community Monitoring and Sampling
Particulate Monitoring Results
Maui Wildfire, Kula
11/30/2023-12/6/2023
[Report Updated: 4/12/2024]

Particulate Size		PM 2.5	PM 10
Screening Level	**Location / ID**	**35 µg/m^3**	**150 µg/m^3**
11/30/2023	Top Property (AM-01)	100	160
	Middle Property (AM-02)	27	4.5
	Lower Property (AM-03)	5.1	4.2
12/1/2023	Top Property (AM-01)	69	73
	Middle Property (AM-02)	20	6.6
	Lower Property (AM-03)	7.2	12
12/2/2023	Top Property (AM-01)	20	9.7
	Middle Property (AM-02)	15	7.2
	Lower Property (AM-03)	7.0	9.6
12/3/2023	Top Property (AM-01)	27	19
	Middle Property (AM-02)	26	5.8
	Lower Property (AM-03)	5.7	7.2
12/4/2023	Top Property (AM-01)	27	18
	Middle Property (AM-02)	21	8.5
	Lower Property (AM-03)	6.5	7.0
12/5/2023	Top Property (AM-01)	43	41
	Middle Property (AM-02)	21	6.9
	Lower Property (AM-03)	5.6	8.8
12/6/2023	Top Property (AM-01)	30.2	21
	Middle Property (AM-02)	13	6.7
	Lower Property (AM-03)	6.1	9.8

Notes:
The exceedances on 11/30, 12/1 and 12/5 are a result of the use of a skid steer for tree felling, woodchips spread and private operations on the property
Results are based on 24 hour TWA calculation
24 hour TWA calculation is presented in the rule of two significant figures
µg/m3 = micrograms per cubic meter
ND = Not detected at or above the laboratory reporting limit
NA = Not Available
Data for the Top Property (AM-01) on 12/4 has been revised from the prerviously submitted report
Data for the Middle Property (AM-02) on 12/1 has been revised from the prerviously submitted report
Data for the Lower Property (AM-03) on 12/1, 12/2, 12/3, 12/4, and 12/5 has been revised from the prerviously submitted report

Appendix 1

Eurofins J3 Resources, Inc.
6110 W. 34th Street, Houston, Texas 77092
Phone: (713) 290-0221 Fax: (713) 290-0248
j3resources.com

eurofins | J3 Resources

Airborne Asbestos Fiber Analysis by Transmission Electron Microscopy (TEM) ISO 10312 - Ambient Air - Determination of Asbestos Fibers Direct-Transfer Transmission Electron Microscopy Method

Maura McAleese
Tetra Tech
1999 Harrison St, Ste. 500
Oakland, CA 94612

EJ3 Order #: 3474752
Project #: 1.03286E+12
Receipt Date: 7-Dec-2023
Analysis Date: 12-Dec-2023
Report Date: 12-Dec-2023

HDOH Kula Community Air

Sample Number **MFK-AM01-113023-AB**

Air Volume:	2263.269
Effective Filter Area:	385.0 mm^2
Level of Analysis (Chrysotile):	CDQ
Level of Analysis (Amphibole):	ADQ
Magnification Used for Fiber Counting:	20,000
Aspect Ratio for Fiber Definition:	5:1
Mean Dimension of Grid Openings (GOs):	0.0132 mm^2
Initials of Analyst:	TS
Number of GO's Examined:	10
Analytical Sensitivity: f/Liter:	1.28870
Analytical Sensitivity: f/cm3:	0.00129
Number of primary asbestos structures:	0
Number of asbestos structures counted:	0
Number of asbestos structures > 5 um :	0
Number of asbestos fibers and bundles > 5 um:	0
Number of PCM equivalent asbestos structures:	0
Number of PCM equivalent asbestos fibers:	0
Concentration of Asbestos (Chrysotile) f/cm3:	<0.00129
Concentration of Asbestos (Amphibole) f/cm3:	<0.00129
Concentration of PCME Asbestos (Chrysotile) f/cm3:	<0.00129
Concentration of Asbestos (Chrysotile), Str/L:	0
Concentration of Asbestos (Amphibole), Str/L:	0
Lower 95% Confidence Limit (Chrysotile), Str/L:	0
Upper 95% Confidence Limit (Chrysotile), Str/L:	4.8
Lower 95% Confidence Limit (Amphibole), Str/L:	0
Upper 95% Confidence Limit (Amphibole), Str/L:	4.8

Analyst: Taylor Smylie

Scott M. Ward, Ph.D. **Lab Director**

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Airborne Asbestos Fiber Analysis by Transmission Electron Microscopy (TEM) ISO 10312 - Ambient Air - Determination of Asbestos Fibers Direct-Transfer Transmission Electron Microscopy Method

Maura McAleese
Tetra Tech
1999 Harrison St, Ste. 500
Oakland, CA 94612

EJ3 Order #: 3474752
Project #: 1.03286E+12
Receipt Date: 7-Dec-2023
Analysis Date: 12-Dec-2023
Report Date: 12-Dec-2023

HDOH Kula Community Air

Sample Number **MFK-AM02-120223-AB**

Air Volume:	2388.282
Effective Filter Area:	385.0 mm^2
Level of Analysis (Chrysotile):	CDQ
Level of Analysis (Amphibole):	ADQ
Magnification Used for Fiber Counting:	20,000
Aspect Ratio for Fiber Definition:	5:1
Mean Dimension of Grid Openings (GOs):	0.0132 mm^2
Initials of Analyst:	TS
Number of GO's Examined:	10
Analytical Sensitivity: f/Liter:	1.22124
Analytical Sensitivity: f/cm3:	0.00122
Number of primary asbestos structures:	0
Number of asbestos structures counted:	0
Number of asbestos structures > 5 um :	0
Number of asbestos fibers and bundles > 5 um:	0
Number of PCM equivalent asbestos structures:	0
Number of PCM equivalent asbestos fibers:	0
Concentration of Asbestos (Chrysotile) f/cm3:	<0.00122
Concentration of Asbestos (Amphibole) f/cm3:	<0.00122
Concentration of PCME Asbestos (Chrysotile) f/cm3:	<0.00122
Concentration of Asbestos (Chrysotile), Str/L:	0
Concentration of Asbestos (Amphibole), Str/L:	0
Lower 95% Confidence Limit (Chrysotile), Str/L:	0
Upper 95% Confidence Limit (Chrysotile), Str/L:	4.5
Lower 95% Confidence Limit (Amphibole), Str/L:	0
Upper 95% Confidence Limit (Amphibole), Str/L:	4.5

SMWard

Analyst: Taylor Smylie

Scott M. Ward, Ph.D. **Lab Director**

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EJ3 Order #: 3474752
Project #: 1.03286E+12
Receipt Date: 7-Dec-2023
Analysis Date: 12-Dec-2023
Report Date: 12-Dec-2023

HDOH Kula Community Air

Sample Number **MFK-AM03-120223-AB**

Air Volume:	2207.715
Effective Filter Area:	385.0 mm^2
Level of Analysis (Chrysotile):	CDQ
Level of Analysis (Amphibole):	ADQ
Magnification Used for Fiber Counting:	20,000
Aspect Ratio for Fiber Definition:	5:1
Mean Dimension of Grid Openings (GOs):	0.0132 mm^2
Initials of Analyst:	TS
Number of GO's Examined:	10
Analytical Sensitivity: f/Liter:	1.32112
Analytical Sensitivity: f/cm3:	0.00132
Number of primary asbestos structures:	0
Number of asbestos structures counted:	0
Number of asbestos structures > 5 um :	0
Number of asbestos fibers and bundles > 5 um:	0
Number of PCM equivalent asbestos structures:	0
Number of PCM equivalent asbestos fibers:	0
Concentration of Asbestos (Chrysotile) f/cm3:	<0.00132
Concentration of Asbestos (Amphibole) f/cm3:	<0.00132
Concentration of PCME Asbestos (Chrysotile) f/cm3:	<0.00132
Concentration of Asbestos (Chrysotile), Str/L:	0
Concentration of Asbestos (Amphibole), Str/L:	0
Lower 95% Confidence Limit (Chrysotile), Str/L:	0
Upper 95% Confidence Limit (Chrysotile), Str/L:	4.9
Lower 95% Confidence Limit (Amphibole), Str/L:	0
Upper 95% Confidence Limit (Amphibole), Str/L:	4.9

Analyst: Taylor Smylie

SMWard

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Project #: 1.03286E+12
Receipt Date: 7-Dec-2023
Analysis Date: 12-Dec-2023
Report Date: 12-Dec-2023

HDOH Kula Community Air

Sample Number **MFK-FB01-120223-AB**

Air Volume:	0
Effective Filter Area:	385.0 mm^2
Level of Analysis (Chrysotile):	CDQ
Level of Analysis (Amphibole):	ADQ
Magnification Used for Fiber Counting:	20,000
Aspect Ratio for Fiber Definition:	5:1
Mean Dimension of Grid Openings (GOs):	0.0132 mm^2
Initials of Analyst:	TS
Number of GO's Examined:	10
Analytical Sensitivity: f/Liter:	N/A
Analytical Sensitivity: f/cm3:	N/A
Number of primary asbestos structures:	0
Number of asbestos structures counted:	0
Number of asbestos structures > 5 um :	0
Number of asbestos fibers and bundles > 5 um:	0
Number of PCM equivalent asbestos structures:	0
Number of PCM equivalent asbestos fibers:	0
Concentration of Asbestos (Chrysotile) f/cm3:	N/A
Concentration of Asbestos (Amphibole) f/cm3:	N/A
Concentration of PCME Asbestos (Chrysotile) f/cm3:	N/A
Concentration of Asbestos (Chrysotile), Str/L:	N/A
Concentration of Asbestos (Amphibole), Str/L:	N/A
Lower 95% Confidence Limit (Chrysotile), Str/L:	N/A
Upper 95% Confidence Limit (Chrysotile), Str/L:	N/A
Lower 95% Confidence Limit (Amphibole), Str/L:	N/A
Upper 95% Confidence Limit (Amphibole), Str/L:	N/A

Analyst: Taylor Smylie

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Receipt Date: 7-Dec-2023
Analysis Date: 12-Dec-2023
Report Date: 12-Dec-2023

HDOH Kula Community Air

Sample Number **MFK-AM02-120323-AB**

Air Volume:	2106.972
Effective Filter Area:	385.0 mm^2
Level of Analysis (Chrysotile):	CDQ
Level of Analysis (Amphibole):	ADQ
Magnification Used for Fiber Counting:	20,000
Aspect Ratio for Fiber Definition:	5:1
Mean Dimension of Grid Openings (GOs):	0.0132 mm^2
Initials of Analyst:	TS
Number of GO's Examined:	10
Analytical Sensitivity: f/Liter:	1.38429
Analytical Sensitivity: f/cm3:	0.00138
Number of primary asbestos structures:	0
Number of asbestos structures counted:	0
Number of asbestos structures > 5 um :	0
Number of asbestos fibers and bundles > 5 um:	0
Number of PCM equivalent asbestos structures:	0
Number of PCM equivalent asbestos fibers:	0
Concentration of Asbestos (Chrysotile) f/cm3:	<0.00138
Concentration of Asbestos (Amphibole) f/cm3:	<0.00138
Concentration of PCME Asbestos (Chrysotile) f/cm3:	<0.00138
Concentration of Asbestos (Chrysotile), Str/L:	0
Concentration of Asbestos (Amphibole), Str/L:	0
Lower 95% Confidence Limit (Chrysotile), Str/L:	0
Upper 95% Confidence Limit (Chrysotile), Str/L:	5.1
Lower 95% Confidence Limit (Amphibole), Str/L:	0
Upper 95% Confidence Limit (Amphibole), Str/L:	5.1

Analyst: Taylor Smylie

SMWard
Scott M. Ward, Ph.D. **Lab Director**

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Stage 1 Data Verification Checklist – Asbestos

HDOH CAB – Ambient Community Air Sampling – Kula

Task Order No. 23141

Reviewed by:

Talaidh Isaacs 12/13/2023 & Shanna Vasser 12/15/2023

Laboratory: Eurofins Built Environment Testing – Houston, TX

Analysis date: 12/12/2023

Report No: 3474752

√ 1. Chain of custody (CoC) documentation is present.

√ 2. Sample receipt condition information is present and acceptable.

√ 3. Laboratory conducting the analysis is identified.

X 4. All samples submitted to the laboratory are accounted for.

√ 5. Requested analytical methods were performed.

√ 6. Analysis dates are provided.

√ 7. Analyte results are provided.

X 8. Result qualifiers and definitions are provided.

√ 9. Result units are reported.

√ 10. Requested reporting limits are present.

NA 11. Method detection limits are present.

√ 12. Sample collection date and time are present.

Discrepancies:

Sample MFK-AM02-111223-AB was listed and crossed off the CoC, and no results were present in the laboratory data package. No action was necessary for this discrepancy.

Notes: None

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EJ3 Order #: 3473235
Project #: 1.03286E+12
Receipt Date: 6-Dec-2023
Analysis Date: 11-Dec-2023
Report Date: 11-Dec-2023

HDOH Kula Community Air

Sample Number **MFK-AM03-113023-AB**

Air Volume:	5543.868
Effective Filter Area:	385.0 mm^2
Level of Analysis (Chrysotile):	CDQ
Level of Analysis (Amphibole):	ADQ
Magnification Used for Fiber Counting:	20,000
Aspect Ratio for Fiber Definition:	5:1
Mean Dimension of Grid Openings (GOs):	0.0132 mm^2
Initials of Analyst:	TS
Number of GO's Examined:	10
Analytical Sensitivity: f/Liter:	0.52611
Analytical Sensitivity: f/cm3:	0.00053
Number of primary asbestos structures:	0
Number of asbestos structures counted:	0
Number of asbestos structures > 5 um :	0
Number of asbestos fibers and bundles > 5 um:	0
Number of PCM equivalent asbestos structures:	0
Number of PCM equivalent asbestos fibers:	0
Concentration of Asbestos (Chrysotile) f/cm3:	<0.00053
Concentration of Asbestos (Amphibole) f/cm3:	<0.00053
Concentration of PCME Asbestos (Chrysotile) f/cm3:	<0.00053
Concentration of Asbestos (Chrysotile), Str/L:	0
Concentration of Asbestos (Amphibole), Str/L:	0
Lower 95% Confidence Limit (Chrysotile), Str/L:	0
Upper 95% Confidence Limit (Chrysotile), Str/L:	1.9
Lower 95% Confidence Limit (Amphibole), Str/L:	0
Upper 95% Confidence Limit (Amphibole), Str/L:	1.9

Analyst: Taylor Smylie

Scott M. Ward, Ph.D. **Lab Director**

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Receipt Date: 6-Dec-2023
Analysis Date: 11-Dec-2023
Report Date: 11-Dec-2023

HDOH Kula Community Air

Sample Number **MFK-FB01-113023-AB**

Air Volume:	0
Effective Filter Area:	385.0 mm^2
Level of Analysis (Chrysotile):	CDQ
Level of Analysis (Amphibole):	ADQ
Magnification Used for Fiber Counting:	20,000
Aspect Ratio for Fiber Definition:	5:1
Mean Dimension of Grid Openings (GOs):	0.0132 mm^2
Initials of Analyst:	TS
Number of GO's Examined:	10
Analytical Sensitivity: f/Liter:	N/A
Analytical Sensitivity: f/cm3:	N/A
Number of primary asbestos structures:	0
Number of asbestos structures counted:	0
Number of asbestos structures > 5 um :	0
Number of asbestos fibers and bundles > 5 um:	0
Number of PCM equivalent asbestos structures:	0
Number of PCM equivalent asbestos fibers:	0
Concentration of Asbestos (Chrysotile) f/cm3:	N/A
Concentration of Asbestos (Amphibole) f/cm3:	N/A
Concentration of PCME Asbestos (Chrysotile) f/cm3:	N/A
Concentration of Asbestos (Chrysotile), Str/L:	N/A
Concentration of Asbestos (Amphibole), Str/L:	N/A
Lower 95% Confidence Limit (Chrysotile), Str/L:	N/A
Upper 95% Confidence Limit (Chrysotile), Str/L:	N/A
Lower 95% Confidence Limit (Amphibole), Str/L:	N/A
Upper 95% Confidence Limit (Amphibole), Str/L:	N/A

Analyst: Taylor Smylie

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Report Date: 11-Dec-2023

HDOH Kula Community Air

Sample Number **MFK-AM01-120123-AB**

Air Volume:	6318.465
Effective Filter Area:	385.0 mm^2
Level of Analysis (Chrysotile):	CDQ
Level of Analysis (Amphibole):	ADQ
Magnification Used for Fiber Counting:	20,000
Aspect Ratio for Fiber Definition:	5:1
Mean Dimension of Grid Openings (GOs):	0.0132 mm^2
Initials of Analyst:	TS
Number of GO's Examined:	10
Analytical Sensitivity: f/Liter:	0.46161
Analytical Sensitivity: f/cm3:	0.00046
Number of primary asbestos structures:	0
Number of asbestos structures counted:	0
Number of asbestos structures > 5 um :	0
Number of asbestos fibers and bundles > 5 um:	0
Number of PCM equivalent asbestos structures:	0
Number of PCM equivalent asbestos fibers:	0
Concentration of Asbestos (Chrysotile) f/cm3:	<0.00046
Concentration of Asbestos (Amphibole) f/cm3:	<0.00046
Concentration of PCME Asbestos (Chrysotile) f/cm3:	<0.00046
Concentration of Asbestos (Chrysotile), Str/L:	0
Concentration of Asbestos (Amphibole), Str/L:	0
Lower 95% Confidence Limit (Chrysotile), Str/L:	0
Upper 95% Confidence Limit (Chrysotile), Str/L:	1.7
Lower 95% Confidence Limit (Amphibole), Str/L:	0
Upper 95% Confidence Limit (Amphibole), Str/L:	1.7

Analyst: Taylor Smylie

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HDOH Kula Community Air

Sample Number **MFK-AM03-120123-AB**

Air Volume:	5932.815
Effective Filter Area:	385.0 mm^2
Level of Analysis (Chrysotile):	CDQ
Level of Analysis (Amphibole):	ADQ
Magnification Used for Fiber Counting:	20,000
Aspect Ratio for Fiber Definition:	5:1
Mean Dimension of Grid Openings (GOs):	0.0132 mm^2
Initials of Analyst:	TS
Number of GO's Examined:	10
Analytical Sensitivity: f/Liter:	0.49162
Analytical Sensitivity: f/cm3:	0.00049
Number of primary asbestos structures:	0
Number of asbestos structures counted:	0
Number of asbestos structures > 5 um :	0
Number of asbestos fibers and bundles > 5 um:	0
Number of PCM equivalent asbestos structures:	0
Number of PCM equivalent asbestos fibers:	0
Concentration of Asbestos (Chrysotile) f/cm3:	<0.00049
Concentration of Asbestos (Amphibole) f/cm3:	<0.00049
Concentration of PCME Asbestos (Chrysotile) f/cm3:	<0.00049
Concentration of Asbestos (Chrysotile), Str/L:	0
Concentration of Asbestos (Amphibole), Str/L:	0
Lower 95% Confidence Limit (Chrysotile), Str/L:	0
Upper 95% Confidence Limit (Chrysotile), Str/L:	1.8
Lower 95% Confidence Limit (Amphibole), Str/L:	0
Upper 95% Confidence Limit (Amphibole), Str/L:	1.8

Analyst: Taylor Smylie

SMWard
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HDOH Kula Community Air

Sample Number **MFK-FB01-120123-AB**

Air Volume:	0
Effective Filter Area:	385.0 mm^2
Level of Analysis (Chrysotile):	CDQ
Level of Analysis (Amphibole):	ADQ
Magnification Used for Fiber Counting:	20,000
Aspect Ratio for Fiber Definition:	5:1
Mean Dimension of Grid Openings (GOs):	0.0132 mm^2
Initials of Analyst:	TS
Number of GO's Examined:	10
Analytical Sensitivity: f/Liter:	N/A
Analytical Sensitivity: f/cm3:	N/A
Number of primary asbestos structures:	0
Number of asbestos structures counted:	0
Number of asbestos structures > 5 um :	0
Number of asbestos fibers and bundles > 5 um:	0
Number of PCM equivalent asbestos structures:	0
Number of PCM equivalent asbestos fibers:	0
Concentration of Asbestos (Chrysotile) f/cm3:	N/A
Concentration of Asbestos (Amphibole) f/cm3:	N/A
Concentration of PCME Asbestos (Chrysotile) f/cm3:	N/A
Concentration of Asbestos (Chrysotile), Str/L:	N/A
Concentration of Asbestos (Amphibole), Str/L:	N/A
Lower 95% Confidence Limit (Chrysotile), Str/L:	N/A
Upper 95% Confidence Limit (Chrysotile), Str/L:	N/A
Lower 95% Confidence Limit (Amphibole), Str/L:	N/A
Upper 95% Confidence Limit (Amphibole), Str/L:	N/A

Analyst: Taylor Smylie

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Receipt Date: 6-Dec-2023
Analysis Date: 11-Dec-2023
Report Date: 11-Dec-2023

HDOH Kula Community Air

Sample Number **MFK-AM01-120323-AB**

Air Volume:	5629.303
Effective Filter Area:	385.0 mm^2
Level of Analysis (Chrysotile):	CDQ
Level of Analysis (Amphibole):	ADQ
Magnification Used for Fiber Counting:	20,000
Aspect Ratio for Fiber Definition:	5:1
Mean Dimension of Grid Openings (GOs):	0.0132 mm^2
Initials of Analyst:	TS
Number of GO's Examined:	10
Analytical Sensitivity: f/Liter:	0.51812
Analytical Sensitivity: f/cm3:	0.00052
Number of primary asbestos structures:	0
Number of asbestos structures counted:	0
Number of asbestos structures > 5 um :	0
Number of asbestos fibers and bundles > 5 um:	0
Number of PCM equivalent asbestos structures:	0
Number of PCM equivalent asbestos fibers:	0
Concentration of Asbestos (Chrysotile) f/cm3:	<0.00052
Concentration of Asbestos (Amphibole) f/cm3:	<0.00052
Concentration of PCME Asbestos (Chrysotile) f/cm3:	<0.00052
Concentration of Asbestos (Chrysotile), Str/L:	0
Concentration of Asbestos (Amphibole), Str/L:	0
Lower 95% Confidence Limit (Chrysotile), Str/L:	0
Upper 95% Confidence Limit (Chrysotile), Str/L:	1.9
Lower 95% Confidence Limit (Amphibole), Str/L:	0
Upper 95% Confidence Limit (Amphibole), Str/L:	1.9

SMWard

Analyst: Taylor Smylie

Scott M. Ward, Ph.D. **Lab Director**

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NVLAP Lab Code: 200525-0; TDSHS License: 30-0273

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Airborne Asbestos Fiber Analysis by Transmission Electron Microscopy (TEM) ISO 10312 - Ambient Air - Determination of Asbestos Fibers Direct-Transfer Transmission Electron Microscopy Method

Maura McAleese
Tetra Tech
1999 Harrison St, Ste. 500
Oakland, CA 94612

EJ3 Order #: 3473235
Project #: 1.03286E+12
Receipt Date: 6-Dec-2023
Analysis Date: 11-Dec-2023
Report Date: 11-Dec-2023

HDOH Kula Community Air

Sample Number **MFK-FB01-120323-AB**

Air Volume:	0
Effective Filter Area:	385.0 mm^2
Level of Analysis (Chrysotile):	CDQ
Level of Analysis (Amphibole):	ADQ
Magnification Used for Fiber Counting:	20,000
Aspect Ratio for Fiber Definition:	5:1
Mean Dimension of Grid Openings (GOs):	0.0132 mm^2
Initials of Analyst:	TS
Number of GO's Examined:	10
Analytical Sensitivity: f/Liter:	N/A
Analytical Sensitivity: f/cm3:	N/A
Number of primary asbestos structures:	0
Number of asbestos structures counted:	0
Number of asbestos structures > 5 um :	0
Number of asbestos fibers and bundles > 5 um:	0
Number of PCM equivalent asbestos structures:	0
Number of PCM equivalent asbestos fibers:	0
Concentration of Asbestos (Chrysotile) f/cm3:	N/A
Concentration of Asbestos (Amphibole) f/cm3:	N/A
Concentration of PCME Asbestos (Chrysotile) f/cm3:	N/A
Concentration of Asbestos (Chrysotile), Str/L:	N/A
Concentration of Asbestos (Amphibole), Str/L:	N/A
Lower 95% Confidence Limit (Chrysotile), Str/L:	N/A
Upper 95% Confidence Limit (Chrysotile), Str/L:	N/A
Lower 95% Confidence Limit (Amphibole), Str/L:	N/A
Upper 95% Confidence Limit (Amphibole), Str/L:	N/A

Analyst: Taylor Smylie

Scott M. Ward, Ph.D. **Lab Director**

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NVLAP Lab Code: 200525-0; TDSHS License: 30-0273

Stage 1 Data Verification Checklist – Asbestos

HDOH CAB – Ambient Community Air Sampling – Kula

Task Order No. 23141

Reviewed by:

Talaidh Isaacs 12/13/2023 & Shanna Vasser 12/15/2023

Laboratory: Eurofins Built Environment Testing – Houston, TX

Analysis date: 12/11/2023

Report No: 3473235

√ 1. Chain of custody (CoC) documentation is present.

√ 2. Sample receipt condition information is present and acceptable.

√ 3. Laboratory conducting the analysis is identified.

√ 4. All samples submitted to the laboratory are accounted for.

√ 5. Requested analytical methods were performed.

√ 6. Analysis dates are provided.

√ 7. Analyte results are provided.

X 8. Result qualifiers and definitions are provided.

√ 9. Result units are reported.

√ 10. Requested reporting limits are present.

NA 11. Method detection limits are present.

√ 12. Sample collection date and time are present.

Discrepancies:

Samples MFK-AM01-113023-AB, MFK-AM02-113023-AB, MFK-AM02-120123-AB, MFK-AM01-12023-AB, MFK-AM02-120223-AB, MFK-AM03-120323-AB, MFK-FB01-12023-AB, MFK-AM02-120323-AB, and MFK-AM03-120323-AB were listed, but crossed out as void on the CoC; however, no results were present in the laboratory data package because they were never shipped. No action was necessary for this discrepancy.

Notes: None

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Report for:

Maura McAleese
Tetra Tech- Maui Fire
1999 Harrison St. Ste. 500
Oakland, CA 94612

Regarding: Eurofins J3 Resources, Inc.
Project: 103S864023141; HDOH Kula Air Community
EML ID: 3477431

Approved by:

Lab Director
Scott Ward

Dates of Analysis:
Asbestos TEM ISO 10312 / ASTM6281-06: 12-14-2023

All samples were received in acceptable condition unless noted in the Report Comments portion in the body of the report. Due to the nature of the analyses performed, field blank correction of results is not applied. The results relate only to the samples as received and tested.

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Airborne Asbestos Fiber Analysis by Transmission Electron Microscopy (TEM) ISO 10312 - Ambient Air - Determination of Asbestos Fibers Direct-Transfer Transmission Electron Microscopy Method

Maura McAleese
Tetra Tech
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Oakland, CA 94612

EJ3 Order #: 3477431
Project #: 1.03286E+12
Receipt Date: 11-Dec-2023
Analysis Date: 14-Dec-2023
Report Date: 14-Dec-2023

HDOH Kula Community Air

Sample Number **MFK-AM02-120423-AB**

Air Volume:	5268.423
Effective Filter Area:	385.0 mm^2
Level of Analysis (Chrysotile):	CDQ
Level of Analysis (Amphibole):	ADQ
Magnification Used for Fiber Counting:	20,000
Aspect Ratio for Fiber Definition:	5:1
Mean Dimension of Grid Openings (GOs):	0.0132 mm^2
Initials of Analyst:	TS
Number of GO's Examined:	10
Analytical Sensitivity: f/Liter:	0.55361
Analytical Sensitivity: f/cm3:	0.00055
Number of primary asbestos structures:	0
Number of asbestos structures counted:	0
Number of asbestos structures > 5 um :	0
Number of asbestos fibers and bundles > 5 um:	0
Number of PCM equivalent asbestos structures:	0
Number of PCM equivalent asbestos fibers:	0
Concentration of Asbestos (Chrysotile) f/cm3:	<0.00055
Concentration of Asbestos (Amphibole) f/cm3:	<0.00055
Concentration of PCME Asbestos (Chrysotile) f/cm3:	<0.00055
Concentration of Asbestos (Chrysotile), Str/L:	0
Concentration of Asbestos (Amphibole), Str/L:	0
Lower 95% Confidence Limit (Chrysotile), Str/L:	0
Upper 95% Confidence Limit (Chrysotile), Str/L:	2
Lower 95% Confidence Limit (Amphibole), Str/L:	0
Upper 95% Confidence Limit (Amphibole), Str/L:	2

Analyst: Taylor Smylie

Scott M. Ward, Ph.D. **Lab Director**

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EJ3 Order #: 3477431
Project #: 1.03286E+12
Receipt Date: 11-Dec-2023
Analysis Date: 14-Dec-2023
Report Date: 14-Dec-2023

HDOH Kula Community Air

Sample Number **MFK-FB01-120423-AB**

Air Volume:	0
Effective Filter Area:	385.0 mm^2
Level of Analysis (Chrysotile):	CDQ
Level of Analysis (Amphibole):	ADQ
Magnification Used for Fiber Counting:	20,000
Aspect Ratio for Fiber Definition:	5:1
Mean Dimension of Grid Openings (GOs):	0.0132 mm^2
Initials of Analyst:	TS
Number of GO's Examined:	10
Analytical Sensitivity: f/Liter:	N/A
Analytical Sensitivity: f/cm3:	N/A
Number of primary asbestos structures:	0
Number of asbestos structures counted:	0
Number of asbestos structures > 5 um :	0
Number of asbestos fibers and bundles > 5 um:	0
Number of PCM equivalent asbestos structures:	0
Number of PCM equivalent asbestos fibers:	0
Concentration of Asbestos (Chrysotile) f/cm3:	N/A
Concentration of Asbestos (Amphibole) f/cm3:	N/A
Concentration of PCME Asbestos (Chrysotile) f/cm3:	N/A
Concentration of Asbestos (Chrysotile), Str/L:	N/A
Concentration of Asbestos (Amphibole), Str/L:	N/A
Lower 95% Confidence Limit (Chrysotile), Str/L:	N/A
Upper 95% Confidence Limit (Chrysotile), Str/L:	N/A
Lower 95% Confidence Limit (Amphibole), Str/L:	N/A
Upper 95% Confidence Limit (Amphibole), Str/L:	N/A

Analyst: Taylor Smylie

Scott M. Ward, Ph.D. **Lab Director**

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EJ3 Order #: 3477431
Project #: 1.03286E+12
Receipt Date: 11-Dec-2023
Analysis Date: 14-Dec-2023
Report Date: 14-Dec-2023

HDOH Kula Community Air

Sample Number **MFK-AM01-120523-AB**

Air Volume:	5733.535
Effective Filter Area:	385.0 mm^2
Level of Analysis (Chrysotile):	CDQ
Level of Analysis (Amphibole):	ADQ
Magnification Used for Fiber Counting:	20,000
Aspect Ratio for Fiber Definition:	5:1
Mean Dimension of Grid Openings (GOs):	0.0132 mm^2
Initials of Analyst:	TS
Number of GO's Examined:	10
Analytical Sensitivity: f/Liter:	0.50870
Analytical Sensitivity: f/cm3:	0.00051
Number of primary asbestos structures:	0
Number of asbestos structures counted:	0
Number of asbestos structures > 5 um :	0
Number of asbestos fibers and bundles > 5 um:	0
Number of PCM equivalent asbestos structures:	0
Number of PCM equivalent asbestos fibers:	0
Concentration of Asbestos (Chrysotile) f/cm3:	<0.00051
Concentration of Asbestos (Amphibole) f/cm3:	<0.00051
Concentration of PCME Asbestos (Chrysotile) f/cm3:	<0.00051
Concentration of Asbestos (Chrysotile), Str/L:	0
Concentration of Asbestos (Amphibole), Str/L:	0
Lower 95% Confidence Limit (Chrysotile), Str/L:	0
Upper 95% Confidence Limit (Chrysotile), Str/L:	1.9
Lower 95% Confidence Limit (Amphibole), Str/L:	0
Upper 95% Confidence Limit (Amphibole), Str/L:	1.9

Analyst: Taylor Smylie

SMWard

Scott M. Ward, Ph.D. **Lab Director**

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EJ3 Order #: 3477431
Project #: 1.03286E+12
Receipt Date: 11-Dec-2023
Analysis Date: 14-Dec-2023
Report Date: 14-Dec-2023

HDOH Kula Community Air

Sample Number **MFK-AM02-120523-AB**

Air Volume:	6103.497
Effective Filter Area:	385.0 mm^2
Level of Analysis (Chrysotile):	CDQ
Level of Analysis (Amphibole):	ADQ
Magnification Used for Fiber Counting:	20,000
Aspect Ratio for Fiber Definition:	5:1
Mean Dimension of Grid Openings (GOs):	0.0132 mm^2
Initials of Analyst:	TS
Number of GO's Examined:	10
Analytical Sensitivity: f/Liter:	0.47787
Analytical Sensitivity: f/cm3:	0.00048
Number of primary asbestos structures:	0
Number of asbestos structures counted:	0
Number of asbestos structures > 5 um :	0
Number of asbestos fibers and bundles > 5 um:	0
Number of PCM equivalent asbestos structures:	0
Number of PCM equivalent asbestos fibers:	0
Concentration of Asbestos (Chrysotile) f/cm3:	<0.00048
Concentration of Asbestos (Amphibole) f/cm3:	<0.00048
Concentration of PCME Asbestos (Chrysotile) f/cm3:	<0.00048
Concentration of Asbestos (Chrysotile), Str/L:	0
Concentration of Asbestos (Amphibole), Str/L:	0
Lower 95% Confidence Limit (Chrysotile), Str/L:	0
Upper 95% Confidence Limit (Chrysotile), Str/L:	1.8
Lower 95% Confidence Limit (Amphibole), Str/L:	0
Upper 95% Confidence Limit (Amphibole), Str/L:	1.8

Analyst: Taylor Smylie

Scott M. Ward, Ph.D. **Lab Director**

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EJ3 Order #: 3477431
Project #: 1.03286E+12
Receipt Date: 11-Dec-2023
Analysis Date: 14-Dec-2023
Report Date: 14-Dec-2023

HDOH Kula Community Air

Sample Number **MFK-AM03-120523-AB**

Air Volume:	3834.436
Effective Filter Area:	385.0 mm^2
Level of Analysis (Chrysotile):	CDQ
Level of Analysis (Amphibole):	ADQ
Magnification Used for Fiber Counting:	20,000
Aspect Ratio for Fiber Definition:	5:1
Mean Dimension of Grid Openings (GOs):	0.0132 mm^2
Initials of Analyst:	TS
Number of GO's Examined:	10
Analytical Sensitivity: f/Liter:	0.76065
Analytical Sensitivity: f/cm3:	0.00076
Number of primary asbestos structures:	0
Number of asbestos structures counted:	0
Number of asbestos structures > 5 um :	0
Number of asbestos fibers and bundles > 5 um:	0
Number of PCM equivalent asbestos structures:	0
Number of PCM equivalent asbestos fibers:	0
Concentration of Asbestos (Chrysotile) f/cm3:	<0.00076
Concentration of Asbestos (Amphibole) f/cm3:	<0.00076
Concentration of PCME Asbestos (Chrysotile) f/cm3:	<0.00076
Concentration of Asbestos (Chrysotile), Str/L:	0
Concentration of Asbestos (Amphibole), Str/L:	0
Lower 95% Confidence Limit (Chrysotile), Str/L:	0
Upper 95% Confidence Limit (Chrysotile), Str/L:	2.8
Lower 95% Confidence Limit (Amphibole), Str/L:	0
Upper 95% Confidence Limit (Amphibole), Str/L:	2.8

Analyst: Taylor Smylie

Scott M. Ward, Ph.D. **Lab Director**

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EJ3 Order #: 3477431
Project #: 1.03286E+12
Receipt Date: 11-Dec-2023
Analysis Date: 14-Dec-2023
Report Date: 14-Dec-2023

HDOH Kula Community Air

Sample Number **MFK-FB01-120523-AB**

Air Volume:	0
Effective Filter Area:	385.0 mm^2
Level of Analysis (Chrysotile):	CDQ
Level of Analysis (Amphibole):	ADQ
Magnification Used for Fiber Counting:	20,000
Aspect Ratio for Fiber Definition:	5:1
Mean Dimension of Grid Openings (GOs):	0.0132 mm^2
Initials of Analyst:	TS
Number of GO's Examined:	10
Analytical Sensitivity: f/Liter:	N/A
Analytical Sensitivity: f/cm3:	N/A
Number of primary asbestos structures:	0
Number of asbestos structures counted:	0
Number of asbestos structures > 5 um :	0
Number of asbestos fibers and bundles > 5 um:	0
Number of PCM equivalent asbestos structures:	0
Number of PCM equivalent asbestos fibers:	0
Concentration of Asbestos (Chrysotile) f/cm3:	N/A
Concentration of Asbestos (Amphibole) f/cm3:	N/A
Concentration of PCME Asbestos (Chrysotile) f/cm3:	N/A
Concentration of Asbestos (Chrysotile), Str/L:	N/A
Concentration of Asbestos (Amphibole), Str/L:	N/A
Lower 95% Confidence Limit (Chrysotile), Str/L:	N/A
Upper 95% Confidence Limit (Chrysotile), Str/L:	N/A
Lower 95% Confidence Limit (Amphibole), Str/L:	N/A
Upper 95% Confidence Limit (Amphibole), Str/L:	N/A

SMWard

Analyst: Taylor Smylie

Scott M. Ward, Ph.D. **Lab Director**

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Oakland, CA 94612

EJ3 Order #: 3477431
Project #: 1.03286E+12
Receipt Date: 11-Dec-2023
Analysis Date: 14-Dec-2023
Report Date: 14-Dec-2023

HDOH Kula Community Air

Sample Number **MFK-AM01-120623-AB**

Air Volume:	6006.458
Effective Filter Area:	385.0 mm^2
Level of Analysis (Chrysotile):	CDQ
Level of Analysis (Amphibole):	ADQ
Magnification Used for Fiber Counting:	20,000
Aspect Ratio for Fiber Definition:	5:1
Mean Dimension of Grid Openings (GOs):	0.0132 mm^2
Initials of Analyst:	TS
Number of GO's Examined:	10
Analytical Sensitivity: f/Liter:	0.48559
Analytical Sensitivity: f/cm3:	0.00049
Number of primary asbestos structures:	0
Number of asbestos structures counted:	0
Number of asbestos structures > 5 um :	0
Number of asbestos fibers and bundles > 5 um:	0
Number of PCM equivalent asbestos structures:	0
Number of PCM equivalent asbestos fibers:	0
Concentration of Asbestos (Chrysotile) f/cm3:	<0.00049
Concentration of Asbestos (Amphibole) f/cm3:	<0.00049
Concentration of PCME Asbestos (Chrysotile) f/cm3:	<0.00049
Concentration of Asbestos (Chrysotile), Str/L:	0
Concentration of Asbestos (Amphibole), Str/L:	0
Lower 95% Confidence Limit (Chrysotile), Str/L:	0
Upper 95% Confidence Limit (Chrysotile), Str/L:	1.8
Lower 95% Confidence Limit (Amphibole), Str/L:	0
Upper 95% Confidence Limit (Amphibole), Str/L:	1.8

Analyst: Taylor Smylie

Scott M. Ward, Ph.D. **Lab Director**

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Maura McAleese
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Oakland, CA 94612

EJ3 Order #: 3477431
Project #: 1.03286E+12
Receipt Date: 11-Dec-2023
Analysis Date: 14-Dec-2023
Report Date: 14-Dec-2023

HDOH Kula Community Air

Sample Number **MFK-AM02-120623-AB**

Air Volume:	8143.715
Effective Filter Area:	385.0 mm^2
Level of Analysis (Chrysotile):	CDQ
Level of Analysis (Amphibole):	ADQ
Magnification Used for Fiber Counting:	20,000
Aspect Ratio for Fiber Definition:	5:1
Mean Dimension of Grid Openings (GOs):	0.0132 mm^2
Initials of Analyst:	TS
Number of GO's Examined:	10
Analytical Sensitivity: f/Liter:	0.35815
Analytical Sensitivity: f/cm3:	0.00036
Number of primary asbestos structures:	0
Number of asbestos structures counted:	0
Number of asbestos structures > 5 um :	0
Number of asbestos fibers and bundles > 5 um:	0
Number of PCM equivalent asbestos structures:	0
Number of PCM equivalent asbestos fibers:	0
Concentration of Asbestos (Chrysotile) f/cm3:	<0.00036
Concentration of Asbestos (Amphibole) f/cm3:	<0.00036
Concentration of PCME Asbestos (Chrysotile) f/cm3:	<0.00036
Concentration of Asbestos (Chrysotile), Str/L:	0
Concentration of Asbestos (Amphibole), Str/L:	0
Lower 95% Confidence Limit (Chrysotile), Str/L:	0
Upper 95% Confidence Limit (Chrysotile), Str/L:	1.3
Lower 95% Confidence Limit (Amphibole), Str/L:	0
Upper 95% Confidence Limit (Amphibole), Str/L:	1.3

Analyst: Taylor Smylie

Scott M. Ward, Ph.D. **Lab Director**

These results apply to the sample(s) as received. Eurofins J3 Resources, Inc. (EJ3) is not responsible for results reported in fibers or asbestos structures per cubic centimeter, which is dependent on volumes provided by non-laboratory personnel. This report is for the exclusive use of the addressed client and shall not be reproduced except in full, without written approval by EJ3. All samples received in good condition unless otherwise noted. This report shall not be used to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the federal government.

NVLAP Lab Code: 200525-0; TDSHS License: 30-0273

Eurofins J3 Resources, Inc.
6110 W. 34th Street, Houston, Texas 77092
Phone: (713) 290-0221 Fax: (713) 290-0248
j3resources.com

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Airborne Asbestos Fiber Analysis by Transmission Electron Microscopy (TEM) ISO 10312 - Ambient Air - Determination of Asbestos Fibers Direct-Transfer Transmission Electron Microscopy Method

Maura McAleese
Tetra Tech
1999 Harrison St, Ste. 500
Oakland, CA 94612

EJ3 Order #: 3477431
Project #: 1.03286E+12
Receipt Date: 11-Dec-2023
Analysis Date: 14-Dec-2023
Report Date: 14-Dec-2023

HDOH Kula Community Air

Sample Number **MFK-AM03-120623-AB**

Air Volume:	8117.277
Effective Filter Area:	385.0 mm^2
Level of Analysis (Chrysotile):	CDQ
Level of Analysis (Amphibole):	ADQ
Magnification Used for Fiber Counting:	20,000
Aspect Ratio for Fiber Definition:	5:1
Mean Dimension of Grid Openings (GOs):	0.0132 mm^2
Initials of Analyst:	TS
Number of GO's Examined:	10
Analytical Sensitivity: f/Liter:	0.35932
Analytical Sensitivity: f/cm3:	0.00036
Number of primary asbestos structures:	0
Number of asbestos structures counted:	0
Number of asbestos structures > 5 um :	0
Number of asbestos fibers and bundles > 5 um:	0
Number of PCM equivalent asbestos structures:	0
Number of PCM equivalent asbestos fibers:	0
Concentration of Asbestos (Chrysotile) f/cm3:	<0.00036
Concentration of Asbestos (Amphibole) f/cm3:	<0.00036
Concentration of PCME Asbestos (Chrysotile) f/cm3:	<0.00036
Concentration of Asbestos (Chrysotile), Str/L:	0
Concentration of Asbestos (Amphibole), Str/L:	0
Lower 95% Confidence Limit (Chrysotile), Str/L:	0
Upper 95% Confidence Limit (Chrysotile), Str/L:	1.3
Lower 95% Confidence Limit (Amphibole), Str/L:	0
Upper 95% Confidence Limit (Amphibole), Str/L:	1.3

Analyst: Taylor Smylie

Scott M. Ward, Ph.D. **Lab Director**

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Airborne Asbestos Fiber Analysis by Transmission Electron Microscopy (TEM) ISO 10312 - Ambient Air - Determination of Asbestos Fibers Direct-Transfer Transmission Electron Microscopy Method

Maura McAleese
Tetra Tech
1999 Harrison St, Ste. 500
Oakland, CA 94612

EJ3 Order #: 3477431
Project #: 1.03286E+12
Receipt Date: 11-Dec-2023
Analysis Date: 14-Dec-2023
Report Date: 14-Dec-2023

HDOH Kula Community Air

Sample Number **MFK-FB01-120623-AB**

Air Volume:	0
Effective Filter Area:	385.0 mm^2
Level of Analysis (Chrysotile):	CDQ
Level of Analysis (Amphibole):	ADQ
Magnification Used for Fiber Counting:	20,000
Aspect Ratio for Fiber Definition:	5:1
Mean Dimension of Grid Openings (GOs):	0.0132 mm^2
Initials of Analyst:	TS
Number of GO's Examined:	10
Analytical Sensitivity: f/Liter:	N/A
Analytical Sensitivity: f/cm3:	N/A
Number of primary asbestos structures:	0
Number of asbestos structures counted:	0
Number of asbestos structures > 5 um :	0
Number of asbestos fibers and bundles > 5 um:	0
Number of PCM equivalent asbestos structures:	0
Number of PCM equivalent asbestos fibers:	0
Concentration of Asbestos (Chrysotile) f/cm3:	N/A
Concentration of Asbestos (Amphibole) f/cm3:	N/A
Concentration of PCME Asbestos (Chrysotile) f/cm3:	N/A
Concentration of Asbestos (Chrysotile), Str/L:	N/A
Concentration of Asbestos (Amphibole), Str/L:	N/A
Lower 95% Confidence Limit (Chrysotile), Str/L:	N/A
Upper 95% Confidence Limit (Chrysotile), Str/L:	N/A
Lower 95% Confidence Limit (Amphibole), Str/L:	N/A
Upper 95% Confidence Limit (Amphibole), Str/L:	N/A

Analyst: Taylor Smylie

Scott M. Ward, Ph.D. **Lab Director**

These results apply to the sample(s) as received. Eurofins J3 Resources, Inc. (EJ3) is not responsible for results reported in fibers or asbestos structures per cubic centimeter, which is dependent on volumes provided by non-laboratory personnel. This report is for the exclusive use of the addressed client and shall not be reproduced except in full, without written approval by EJ3. All samples received in good condition unless otherwise noted. This report shall not be used to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the federal government.

NVLAP Lab Code: 200525-0; TDSHS License: 30-0273

Stage 1 Data Verification Checklist – Asbestos

HDOH CAB – Ambient Community Air Sampling – Kula

Task Order No. 23141

Reviewed by:

Talaidh Isaacs 12/22/2023 & Shanna Vasser 12/22/2023

Laboratory: Eurofins Built Environment Testing – Houston, TX

Analysis date: 12/14/2023

Report No: 3477431

√ 1. Chain of custody (CoC) documentation is present.

√ 2. Sample receipt condition information is present and acceptable.

√ 3. Laboratory conducting the analysis is identified.

√ 4. All samples submitted to the laboratory are accounted for.

√ 5. Requested analytical methods were performed.

√ 6. Analysis dates are provided.

√ 7. Analyte results are provided.

√ 8. Result qualifiers and definitions are provided.

√ 9. Result units are reported.

√ 10. Requested reporting limits are present.

NA 11. Method detection limits are present.

√ 12. Sample collection date and time are present.

Discrepancies:

Samples MFK-AM01-120423-AB and MFK-AM03-120423-AB are listed and crossed off on the CoC, and no results were present in the laboratory data package. No action was necessary for this discrepancy.

Notes: None

Eastern Research Group
601 Keystone Park Drive
Suite 700
Morrisville, NC 27560

December 14, 2023

Ms. Chelsea Saber
Tetra Tech, Inc.
1777 Sentry Pkwy, Bldg 12
Blue Bell, PA 19422
Project Name: Maui fires

Dear Ms. Chelsea Saber,

This report contains the analytical results for the sample(s) received under chain(s) of custody by Eastern Research Group on 12/06/23 12:52.

Values below the MDL for QC results in this report are recorded as ND, however the actual values are reported in the accompanying Excel report with a "U" flag (Under the detection limit). The actual values are reported in AQS.

This test is accredited under the 2016 TNI Standard for Environmental Laboratories (FL DOH Certification # E87673). All analyses were performed as described in the US EPA-approved QAPP, under the contract for National Hazardous Air Pollutant Support (US EPA Contract No. 68HERH22D0002). This cover page is an integral part of this report, and any exceptions or comments are noted on the last page.

Release of the data contained in this data package and in the data submitted in the electronic data deliverable, has been authorized by the Program Manager, or the Program Manager's designee as verified by the following signature.

The issuance of the final Certificate of Analysis takes precedence over any previous Report. If you have any questions, please contact me at 919-468-7924.

Sincerely,

Julie Swift
Program Manager
julie.swift@erg.com

The information contained in this report and its attachment(s) are intended only for the use of the individual to whom it is addressed and may contain information that is privileged, confidential, or exempt from disclosure. If the reader of this message is not the intended recipient, you are hereby notified that any dissemination, distribution, or copying of this report is strictly prohibited. If you have received this report in error, please notify julie.swift@erg.com and delete the report without retaining any copies.

CERTIFICATE OF ANALYSIS

Tetra Tech, Inc.
1777 Sentry Pkwy, Bldg 12
Blue Bell, PA 19422
ATTN: Ms. Chelsea Saber
PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 12/14/23 10:47
SUBMITTED: 12/06/23
AQS SITE CODE:
SITE CODE: Maui fires

ANALYTICAL REPORT FOR SAMPLES

SampleName	LabNumber	Matrix	Sampled	Received
TetraTech Q9541896	3120629-01	Air	11/30/23 23:59	12/06/23 12:52
TetraTech Q9541910	3120629-02	Air	11/30/23 23:59	12/06/23 12:52
TetraTech Q9541908	3120629-03	Air	11/30/23 23:59	12/06/23 12:52
TetraTech Q9543016 FB	3120629-04	Air	11/30/23 00:00	12/06/23 12:52
TetraTech Q9541907	3120629-05	Air	12/01/23 23:59	12/06/23 12:52
TetraTech Q9543019	3120629-06	Air	12/01/23 23:59	12/06/23 12:52
TetraTech Q9543017	3120629-07	Air	12/01/23 23:59	12/06/23 12:52
TetraTech Q9543012 FB	3120629-08	Air	12/01/23 00:00	12/06/23 12:52
TetraTech Q9543015	3120629-09	Air	12/02/23 23:59	12/06/23 12:52
TetraTech Q9543014	3120629-10	Air	12/02/23 23:59	12/06/23 12:52
TetraTech Q9543013	3120629-11	Air	12/02/23 23:59	12/06/23 12:52
TetraTech Q9543007 FB	3120629-12	Air	12/02/23 00:00	12/06/23 12:52
TetraTech Q9543010	3120629-13	Air	12/03/23 23:59	12/06/23 12:52
TetraTech Q9543009	3120629-14	Air	12/03/23 23:59	12/06/23 12:52
TetraTech Q9543008	3120629-15	Air	12/03/23 23:59	12/06/23 12:52
TetraTech Q9543000 FB	3120629-16	Air	12/03/23 00:00	12/06/23 12:52

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Tetra Tech, Inc.
1777 Sentry Pkwy, Bldg 12
Blue Bell, PA 19422
ATTN: Ms. Chelsea Saber
PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 12/14/23 10:47
SUBMITTED: 12/06/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9541896 **Lab ID:** 3120629-01 **Sampled:** 11/30/23 23:59
Matrix: Air **Sample Volume:** 1919.887 m³ **Received:** 12/06/23 12:52
Filter ID: **Analysis Date:** 12/11/23 18:26
Comments: MFK-AM01-113023-HM

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	**7429-90-5**	**549**		**27.2**
Antimony	**7440-36-0**	**0.0439**	SL	**0.0374**
Arsenic	**7440-38-2**	**0.124**		**0.00809**
Barium	**7440-39-3**	**3.77**		**0.803**
Beryllium	**7440-41-7**	**0.0142**		**0.00281**
Cadmium	7440-43-9	0.00628	U	0.0924
Calcium	**7440-70-2**	**277**	GC-BS, QB-01	**247**
Chromium	7440-47-3	1.58	U	1.72
Cobalt	**7440-48-4**	**0.209**	QB-01	**0.0132**
Copper	**7440-50-8**	**20.7**	QB-01	**2.54**
Iron	**7439-89-6**	**515**		**20.5**
Lead	**7439-92-1**	**0.264**		**0.234**
Magnesium	**7439-95-4**	**98.9**		**81.7**
Manganese	**7439-96-5**	**13.3**		**1.01**
Molybdenum	**7439-98-7**	**0.876**	QB-01	**0.181**
Nickel	**7440-02-0**	**0.870**	GC-BS, QB-01	**0.679**
Phosphorus	7723-14-0	339	GC-BS, U	1060
Potassium	**7440-09-7**	**92.8**		**32.2**
Rubidium	**7440-17-7**	**0.159**		**0.0155**
Selenium	**7782-49-2**	**0.161**		**0.00932**
Sodium	7440-23-5	1000	GC-BS, U	1690
Strontium	**7440-24-6**	**2.88**	QB-01	**0.553**
Thallium	**7440-28-0**	**9.67E-4**		**4.26E-4**
Thorium	**7440-29-01**	**0.0104**		**0.00254**
Uranium	7440-61-1	0.0104	U	0.0144
Vanadium	**7440-62-2**	**1.36**		**0.0417**
Zinc	7440-66-6	11.9	U	82.8

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Tetra Tech, Inc.
1777 Sentry Pkwy, Bldg 12
Blue Bell, PA 19422
ATTN: Ms. Chelsea Saber
PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 12/14/23 10:47
SUBMITTED: 12/06/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9541910 **Lab ID:** 3120629-02 **Sampled:** 11/30/23 23:59
Matrix: Air **Sample Volume:** 1896.058 m³ **Received:** 12/06/23 12:52
Filter ID: **Analysis Date:** 12/11/23 18:42
Comments: MFK-AM02-113023-HM

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	**7429-90-5**	**178**		**27.5**
Antimony	7440-36-0	0.0325	SL, U	0.0378
Arsenic	**7440-38-2**	**0.151**		**0.00819**
Barium	**7440-39-3**	**2.17**		**0.813**
Beryllium	**7440-41-7**	**0.00544**		**0.00285**
Cadmium	7440-43-9	0.00609	U	0.0935
Calcium	**7440-70-2**	**431**	GC-BS, QB-01	**251**
Chromium	7440-47-3	1.56	U	1.74
Cobalt	**7440-48-4**	**0.0869**	QB-01	**0.0134**
Copper	**7440-50-8**	**13.4**	QB-01	**2.57**
Iron	**7439-89-6**	**181**		**20.8**
Lead	7439-92-1	0.111	U	0.237
Magnesium	**7439-95-4**	**95.7**		**82.7**
Manganese	**7439-96-5**	**4.00**		**1.02**
Molybdenum	**7439-98-7**	**0.937**	QB-01	**0.183**
Nickel	**7440-02-0**	**0.700**	GC-BS, QB-01	**0.687**
Phosphorus	7723-14-0	374	GC-BS, U	1070
Potassium	**7440-09-7**	**93.0**		**32.6**
Rubidium	**7440-17-7**	**0.118**		**0.0157**
Selenium	**7782-49-2**	**0.106**		**0.00944**
Sodium	7440-23-5	1010	GC-BS, U	1720
Strontium	**7440-24-6**	**1.87**	QB-01	**0.559**
Thallium	**7440-28-0**	**4.62E-4**		**4.32E-4**
Thorium	**7440-29-01**	**0.00601**		**0.00257**
Uranium	7440-61-1	0.00455	U	0.0146
Vanadium	**7440-62-2**	**0.582**		**0.0422**
Zinc	7440-66-6	11.4	U	83.8

CERTIFICATE OF ANALYSIS

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Blue Bell, PA 19422
ATTN: Ms. Chelsea Saber
PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 12/14/23 10:47
SUBMITTED: 12/06/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9541908 **Lab ID:** 3120629-03 **Sampled:** 11/30/23 23:59
Matrix: Air **Sample Volume:** 1686.199 m³ **Received:** 12/06/23 12:52
Filter ID: **Analysis Date:** 12/11/23 18:56
Comments: MFK-AM03-113023-HM

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	**7429-90-5**	**63.7**		**31.0**
Antimony	**7440-36-0**	**0.0499**	SL	**0.0426**
Arsenic	**7440-38-2**	**0.124**		**0.00921**
Barium	**7440-39-3**	**2.30**		**0.915**
Beryllium	7440-41-7	0.00285	U	0.00320
Cadmium	7440-43-9	0.00430	U	0.105
Calcium	**7440-70-2**	**460**	GC-BS, QB-01	**282**
Chromium	7440-47-3	1.73	U	1.96
Cobalt	**7440-48-4**	**0.0532**	QB-01	**0.0151**
Copper	**7440-50-8**	**40.1**	QB-01	**2.89**
Iron	**7439-89-6**	**72.2**		**23.4**
Lead	7439-92-1	0.116	U	0.266
Magnesium	**7439-95-4**	**103**		**93.0**
Manganese	**7439-96-5**	**1.87**		**1.15**
Molybdenum	**7439-98-7**	**1.30**	QB-01	**0.206**
Nickel	**7440-02-0**	**0.814**	GC-BS, QB-01	**0.773**
Phosphorus	7723-14-0	430	GC-BS, U	1210
Potassium	**7440-09-7**	**98.9**		**36.7**
Rubidium	**7440-17-7**	**0.0835**		**0.0177**
Selenium	**7782-49-2**	**0.0849**		**0.0106**
Sodium	7440-23-5	1150	GC-BS, U	1930
Strontium	**7440-24-6**	**1.51**	QB-01	**0.629**
Thallium	7440-28-0	2.93E-4	U	4.85E-4
Thorium	**7440-29-01**	**0.00301**		**0.00289**
Uranium	7440-61-1	0.00327	U	0.0164
Vanadium	**7440-62-2**	**0.324**		**0.0475**
Zinc	7440-66-6	12.9	U	94.3

CERTIFICATE OF ANALYSIS

Tetra Tech, Inc.
1777 Sentry Pkwy, Bldg 12
Blue Bell, PA 19422
ATTN: Ms. Chelsea Saber
PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 12/14/23 10:47
SUBMITTED: 12/06/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9543016 FB **Lab ID:** 3120629-04 **Sampled:** 11/30/23 00:00
Matrix: Air **Sample Volume:** 1919.887 m^3 **Received:** 12/06/23 12:52
Filter ID: **Analysis Date:** 12/11/23 19:10
Comments: MFK-FB01-113023-HM Field Blank

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	7429-90-5	9.66	U	27.2
Antimony	7440-36-0	0.00759	SL, U	0.0374
Arsenic	7440-38-2	0.00212	U	0.00809
Barium	7440-39-3	0.599	U	0.803
Beryllium	7440-41-7	8.01E-4	U	0.00281
Cadmium	7440-43-9	0.00209	U	0.0924
Calcium	**7440-70-2**	**360**	FB-01, GC-BS, QB-01	**247**
Chromium	7440-47-3	1.36	U	1.72
Cobalt	**7440-48-4**	**0.0201**	FB-01, QB-01	**0.0132**
Copper	7440-50-8	0.608	QB-01, U	2.54
Iron	7439-89-6	11.7	U	20.5
Lead	7439-92-1	0.0515	U	0.234
Magnesium	7439-95-4	42.8	U	81.7
Manganese	7439-96-5	0.142	U	1.01
Molybdenum	**7439-98-7**	**0.227**	FB-01, QB-01	**0.181**
Nickel	7440-02-0	0.479	GC-BS, QB-01, U	0.679
Phosphorus	7723-14-0	337	GC-BS, U	1060
Potassium	7440-09-7	24.6	U	32.2
Rubidium	7440-17-7	0.0144	U	0.0155
Selenium	7782-49-2	0.00181	U	0.00932
Sodium	7440-23-5	723	GC-BS, U	1690
Strontium	**7440-24-6**	**0.710**	FB-01, QB-01	**0.553**
Thallium	7440-28-0	8.16E-5	U	4.26E-4
Thorium	7440-29-01	0.00218	U	0.00254
Uranium	7440-61-1	0.00172	U	0.0144
Vanadium	7440-62-2	0.00346	U	0.0417
Zinc	7440-66-6	8.82	U	82.8

The results in this report apply only to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

CERTIFICATE OF ANALYSIS

Tetra Tech, Inc.
1777 Sentry Pkwy, Bldg 12
Blue Bell, PA 19422
ATTN: Ms. Chelsea Saber
PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 12/14/23 10:47
SUBMITTED: 12/06/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9541907 **Lab ID:** 3120629-05 **Sampled:** 12/01/23 23:59
Matrix: Air **Sample Volume:** 2039.667 m³ **Received:** 12/06/23 12:52
Filter ID: **Analysis Date:** 12/11/23 19:23
Comments: MFK-AM01-120123-HM

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	**7429-90-5**	**668**	E	**25.6**
Antimony	7440-36-0	0.0323	SL, U	0.0352
Arsenic	**7440-38-2**	**0.143**		**0.00762**
Barium	**7440-39-3**	**4.55**		**0.756**
Beryllium	**7440-41-7**	**0.0166**		**0.00265**
Cadmium	7440-43-9	0.00964	U	0.0869
Calcium	**7440-70-2**	**500**	GC-BS, QB-01	**233**
Chromium	**7440-47-3**	**1.89**		**1.62**
Cobalt	**7440-48-4**	**0.244**	QB-01	**0.0124**
Copper	**7440-50-8**	**14.7**	QB-01	**2.39**
Iron	**7439-89-6**	**619**		**19.3**
Lead	**7439-92-1**	**0.393**		**0.220**
Magnesium	**7439-95-4**	**133**		**76.9**
Manganese	**7439-96-5**	**16.0**		**0.949**
Molybdenum	**7439-98-7**	**0.730**	QB-01	**0.170**
Nickel	**7440-02-0**	**0.883**	GC-BS, QB-01	**0.639**
Phosphorus	7723-14-0	373	GC-BS, U	997
Potassium	**7440-09-7**	**84.6**		**30.3**
Rubidium	**7440-17-7**	**0.181**		**0.0146**
Selenium	**7782-49-2**	**0.146**		**0.00877**
Sodium	7440-23-5	1170	GC-BS, U	1600
Strontium	**7440-24-6**	**3.68**	QB-01	**0.520**
Thallium	**7440-28-0**	**0.00108**		**4.01E-4**
Thorium	**7440-29-01**	**0.0130**		**0.00239**
Uranium	7440-61-1	0.0123	U	0.0136
Vanadium	**7440-62-2**	**1.85**		**0.0392**
Zinc	7440-66-6	13.5	U	77.9

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Tetra Tech, Inc.
1777 Sentry Pkwy, Bldg 12
Blue Bell, PA 19422
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PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 12/14/23 10:47
SUBMITTED: 12/06/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9543019 **Lab ID:** 3120629-06 **Sampled:** 12/01/23 23:59
Matrix: Air **Sample Volume:** 2026.064 m³ **Received:** 12/06/23 12:52
Filter ID: **Analysis Date:** 12/11/23 19:38
Comments: MFK-AM02-120123-HM

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	**7429-90-5**	**120**		**25.8**
Antimony	**7440-36-0**	**0.0390**	SL	**0.0354**
Arsenic	**7440-38-2**	**0.102**		**0.00767**
Barium	**7440-39-3**	**2.09**		**0.761**
Beryllium	**7440-41-7**	**0.00358**		**0.00267**
Cadmium	7440-43-9	0.00790	U	0.0875
Calcium	**7440-70-2**	**391**	GC-BS, QB-01	**234**
Chromium	**7440-47-3**	**1.67**		**1.63**
Cobalt	**7440-48-4**	**0.108**	QB-01	**0.0125**
Copper	**7440-50-8**	**12.0**	QB-01	**2.41**
Iron	**7439-89-6**	**122**		**19.4**
Lead	7439-92-1	0.138	U	0.222
Magnesium	**7439-95-4**	**118**		**77.4**
Manganese	**7439-96-5**	**2.75**		**0.956**
Molybdenum	**7439-98-7**	**0.835**	QB-01	**0.171**
Nickel	**7440-02-0**	**0.831**	GC-BS, QB-01	**0.643**
Phosphorus	7723-14-0	341	GC-BS, U	1000
Potassium	**7440-09-7**	**89.7**		**30.5**
Rubidium	**7440-17-7**	**0.122**		**0.0147**
Selenium	**7782-49-2**	**0.0721**		**0.00883**
Sodium	7440-23-5	1210	GC-BS, U	1610
Strontium	**7440-24-6**	**1.69**	QB-01	**0.524**
Thallium	**7440-28-0**	**4.94E-4**		**4.04E-4**
Thorium	**7440-29-01**	**0.00450**		**0.00241**
Uranium	7440-61-1	0.00379	U	0.0137
Vanadium	**7440-62-2**	**0.878**		**0.0395**
Zinc	7440-66-6	10.4	U	78.5

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FILE #: 0000.00
REPORTED: 12/14/23 10:47
SUBMITTED: 12/06/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9543017 **Lab ID:** 3120629-07 **Sampled:** 12/01/23 23:59
Matrix: Air **Sample Volume:** 1925.486 m³ **Received:** 12/06/23 12:52
Filter ID: **Analysis Date:** 12/11/23 19:51
Comments: MFK-AM03-120123-HM

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	**7429-90-5**	**73.1**		**27.1**
Antimony	**7440-36-0**	**0.0576**	SL	**0.0373**
Arsenic	**7440-38-2**	**0.0833**		**0.00807**
Barium	**7440-39-3**	**2.53**		**0.801**
Beryllium	**7440-41-7**	**0.00337**		**0.00281**
Cadmium	7440-43-9	0.00531	U	0.0921
Calcium	**7440-70-2**	**425**	GC-BS, QB-01	**247**
Chromium	7440-47-3	1.53	U	1.72
Cobalt	**7440-48-4**	**0.0600**	QB-01	**0.0132**
Copper	**7440-50-8**	**28.3**	QB-01	**2.53**
Iron	**7439-89-6**	**91.9**		**20.4**
Lead	7439-92-1	0.131	U	0.233
Magnesium	**7439-95-4**	**134**		**81.5**
Manganese	**7439-96-5**	**2.44**		**1.01**
Molybdenum	**7439-98-7**	**1.09**	QB-01	**0.180**
Nickel	7440-02-0	0.672	GC-BS, QB-01, U	0.677
Phosphorus	7723-14-0	377	GC-BS, U	1060
Potassium	**7440-09-7**	**90.7**		**32.1**
Rubidium	**7440-17-7**	**0.0924**		**0.0155**
Selenium	**7782-49-2**	**0.0840**		**0.00929**
Sodium	7440-23-5	1380	GC-BS, U	1690
Strontium	**7440-24-6**	**1.70**	QB-01	**0.551**
Thallium	7440-28-0	2.92E-4	U	4.25E-4
Thorium	**7440-29-01**	**0.00363**		**0.00253**
Uranium	7440-61-1	0.00348	U	0.0144
Vanadium	**7440-62-2**	**0.970**		**0.0416**
Zinc	7440-66-6	8.89	U	82.6

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AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9543012 FB
Matrix: Air
Lab ID: 3120629-08
Sample Volume: 2039.667 m³
Filter ID:
Sampled: 12/01/23 00:00
Received: 12/06/23 12:52
Analysis Date: 12/11/23 20:05
Comments: MFK-FB01-120123-HM Field Blank

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	7429-90-5	9.25	U	25.6
Antimony	7440-36-0	0.00646	SL, U	0.0352
Arsenic	7440-38-2	0.00171	U	0.00762
Barium	7440-39-3	0.556	U	0.756
Beryllium	7440-41-7	8.02E-4	U	0.00265
Cadmium	7440-43-9	0.00249	U	0.0869
Calcium	**7440-70-2**	**334**	FB-01, GC-BS, QB-01	**233**
Chromium	7440-47-3	1.41	U	1.62
Cobalt	**7440-48-4**	**0.0373**	FB-01, QB-01	**0.0124**
Copper	7440-50-8	0.514	QB-01, U	2.39
Iron	7439-89-6	10.1	U	19.3
Lead	7439-92-1	0.0506	U	0.220
Magnesium	7439-95-4	42.0	U	76.9
Manganese	7439-96-5	0.122	U	0.949
Molybdenum	**7439-98-7**	**0.232**	FB-01, QB-01	**0.170**
Nickel	7440-02-0	0.393	GC-BS, QB-01, U	0.639
Phosphorus	7723-14-0	335	GC-BS, U	997
Potassium	7440-09-7	19.8	U	30.3
Rubidium	**7440-17-7**	**0.0153**	FB-01	**0.0146**
Selenium	7782-49-2	0.00238	U	0.00877
Sodium	7440-23-5	697	GC-BS, U	1600
Strontium	**7440-24-6**	**0.683**	FB-01, QB-01	**0.520**
Thallium	7440-28-0	5.67E-5	U	4.01E-4
Thorium	7440-29-01	0.00202	U	0.00239
Uranium	7440-61-1	0.00166	U	0.0136
Vanadium	7440-62-2	0.0150	U	0.0392
Zinc	7440-66-6	5.95	U	77.9

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FILE #: 0000.00
REPORTED: 12/14/23 10:47
SUBMITTED: 12/06/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9543015 **Lab ID:** 3120629-09 **Sampled:** 12/02/23 23:59
Matrix: Air **Sample Volume:** 2038.818 m³ **Received:** 12/06/23 12:52
Filter ID: **Analysis Date:** 12/11/23 16:00
Comments: MFK-AM01-120223-HM

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	**7429-90-5**	**177**	QM-07	**25.6**
Antimony	7440-36-0	0.0266	SL, U	0.0352
Arsenic	**7440-38-2**	**0.0771**	D-F	**0.00762**
Barium	**7440-39-3**	**2.65**		**0.757**
Beryllium	**7440-41-7**	**0.00589**		**0.00265**
Cadmium	7440-43-9	0.00843	U	0.0870
Calcium	**7440-70-2**	**436**	GC-BS, QB-01	**233**
Chromium	7440-47-3	1.52	U	1.62
Cobalt	**7440-48-4**	**0.0953**	QB-01	**0.0124**
Copper	**7440-50-8**	**17.8**	QB-01, QM-07	**2.39**
Iron	**7439-89-6**	**175**	QM-4X	**19.3**
Lead	7439-92-1	0.186	U	0.220
Magnesium	**7439-95-4**	**121**		**76.9**
Manganese	**7439-96-5**	**4.80**		**0.950**
Molybdenum	**7439-98-7**	**0.962**	QB-01	**0.170**
Nickel	**7440-02-0**	**1.13**	GC-BS, QB-01	**0.639**
Phosphorus	7723-14-0	354	A-01, GC-BS, QM-4X, U	998
Potassium	**7440-09-7**	**74.0**		**30.3**
Rubidium	**7440-17-7**	**0.0850**		**0.0146**
Selenium	**7782-49-2**	**0.0985**		**0.00878**
Sodium	7440-23-5	1230	A-01, GC-BS, QM-4X, U	1600
Strontium	**7440-24-6**	**2.04**	QB-01	**0.520**
Thallium	**7440-28-0**	**4.58E-4**		**4.01E-4**
Thorium	**7440-29-01**	**0.00469**	QM-07	**0.00239**
Uranium	7440-61-1	0.00474	U	0.0136
Vanadium	**7440-62-2**	**0.531**		**0.0393**
Zinc	7440-66-6	13.2	U	78.0

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FILE #: 0000.00
REPORTED: 12/14/23 10:47
SUBMITTED: 12/06/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9543014 **Lab ID:** 3120629-10 **Sampled:** 12/02/23 23:59
Matrix: Air **Sample Volume:** 2031.129 m³ **Received:** 12/06/23 12:52
Filter ID: **Analysis Date:** 12/11/23 20:19
Comments: MFK-AM02-120223-HM

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	**7429-90-5**	**103**		**25.7**
Antimony	7440-36-0	0.0314	SL, U	0.0353
Arsenic	**7440-38-2**	**0.104**		**0.00765**
Barium	**7440-39-3**	**1.97**		**0.759**
Beryllium	**7440-41-7**	**0.00349**		**0.00266**
Cadmium	7440-43-9	0.00561	U	0.0873
Calcium	**7440-70-2**	**419**	GC-BS, QB-01	**234**
Chromium	7440-47-3	1.58	U	1.63
Cobalt	**7440-48-4**	**0.0634**	QB-01	**0.0125**
Copper	**7440-50-8**	**18.2**	QB-01	**2.40**
Iron	**7439-89-6**	**113**		**19.4**
Lead	7439-92-1	0.114	U	0.221
Magnesium	**7439-95-4**	**133**		**77.2**
Manganese	**7439-96-5**	**2.65**		**0.953**
Molybdenum	**7439-98-7**	**1.14**	QB-01	**0.171**
Nickel	7440-02-0	0.536	GC-BS, QB-01, U	0.642
Phosphorus	7723-14-0	370	GC-BS, U	1000
Potassium	**7440-09-7**	**108**		**30.4**
Rubidium	**7440-17-7**	**0.159**		**0.0147**
Selenium	**7782-49-2**	**0.0912**		**0.00881**
Sodium	7440-23-5	1330	GC-BS, U	1600
Strontium	**7440-24-6**	**1.83**	QB-01	**0.522**
Thallium	7440-28-0	3.77E-4	U	4.03E-4
Thorium	**7440-29-01**	**0.00470**		**0.00240**
Uranium	7440-61-1	0.00382	U	0.0136
Vanadium	**7440-62-2**	**0.441**		**0.0394**
Zinc	7440-66-6	9.11	U	78.3

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FILE #: 0000.00
REPORTED: 12/14/23 10:47
SUBMITTED: 12/06/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9543013 **Lab ID:** 3120629-11 **Sampled:** 12/02/23 23:59
Matrix: Air **Sample Volume:** 1822.686 m³ **Received:** 12/06/23 12:52
Filter ID: **Analysis Date:** 12/11/23 20:33
Comments: MFK-AM03-120223-HM

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	**7429-90-5**	**83.9**		**28.7**
Antimony	**7440-36-0**	**0.0802**	SL	**0.0394**
Arsenic	**7440-38-2**	**0.0814**		**0.00852**
Barium	**7440-39-3**	**3.11**		**0.846**
Beryllium	**7440-41-7**	**0.00399**		**0.00296**
Cadmium	7440-43-9	0.00704	U	0.0973
Calcium	**7440-70-2**	**473**	GC-BS, QB-01	**261**
Chromium	7440-47-3	1.63	U	1.81
Cobalt	**7440-48-4**	**0.0758**	QB-01	**0.0139**
Copper	**7440-50-8**	**39.4**	QB-01	**2.68**
Iron	**7439-89-6**	**115**		**21.6**
Lead	7439-92-1	0.129	U	0.246
Magnesium	**7439-95-4**	**185**		**86.1**
Manganese	**7439-96-5**	**3.11**		**1.06**
Molybdenum	**7439-98-7**	**1.23**	QB-01	**0.190**
Nickel	7440-02-0	0.581	GC-BS, QB-01, U	0.715
Phosphorus	7723-14-0	394	GC-BS, U	1120
Potassium	**7440-09-7**	**109**		**33.9**
Rubidium	**7440-17-7**	**0.0908**		**0.0163**
Selenium	**7782-49-2**	**0.146**		**0.00982**
Sodium	**7440-23-5**	**1800**	E, GC-BS	**1790**
Strontium	**7440-24-6**	**2.07**	QB-01	**0.582**
Thallium	7440-28-0	4.10E-4	U	4.49E-4
Thorium	**7440-29-01**	**0.00491**		**0.00268**
Uranium	7440-61-1	0.00423	U	0.0152
Vanadium	**7440-62-2**	**0.634**		**0.0439**
Zinc	7440-66-6	15.0	U	87.2

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FILE #: 0000.00
REPORTED: 12/14/23 10:47
SUBMITTED: 12/06/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9543007 FB **Lab ID:** 3120629-12 **Sampled:** 12/02/23 00:00
Matrix: Air **Sample Volume:** 2038.818 m³ **Received:** 12/06/23 12:52
Filter ID: **Analysis Date:** 12/11/23 21:34
Comments: MFK-FB01-120223-HM Field Blank

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	7429-90-5	9.50	U	25.6
Antimony	7440-36-0	0.00689	SL, U	0.0352
Arsenic	7440-38-2	0.00323	U	0.00762
Barium	7440-39-3	0.543	U	0.757
Beryllium	7440-41-7	6.11E-4	U	0.00265
Cadmium	7440-43-9	0.00233	U	0.0870
Calcium	**7440-70-2**	**349**	FB-01, GC-BS, QB-01	**233**
Chromium	7440-47-3	1.37	U	1.62
Cobalt	**7440-48-4**	**0.0420**	FB-01, QB-01	**0.0124**
Copper	7440-50-8	0.368	QB-01, U	2.39
Iron	7439-89-6	16.7	U	19.3
Lead	7439-92-1	0.0472	U	0.220
Magnesium	7439-95-4	41.3	U	76.9
Manganese	7439-96-5	0.156	U	0.950
Molybdenum	**7439-98-7**	**0.234**	FB-01, QB-01	**0.170**
Nickel	7440-02-0	0.302	GC-BS, QB-01, U	0.639
Phosphorus	7723-14-0	330	GC-BS, U	998
Potassium	7440-09-7	13.2	U	30.3
Rubidium	7440-17-7	0.0132	U	0.0146
Selenium	7782-49-2	0.00245	U	0.00878
Sodium	7440-23-5	694	GC-BS, U	1600
Strontium	**7440-24-6**	**0.694**	FB-01, QB-01	**0.520**
Thallium	7440-28-0	6.88E-5	U	4.01E-4
Thorium	7440-29-01	0.00205	U	0.00239
Uranium	7440-61-1	0.00170	U	0.0136
Vanadium	7440-62-2	0.00786	U	0.0393
Zinc	7440-66-6	6.46	U	78.0

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FILE #: 0000.00
REPORTED: 12/14/23 10:47
SUBMITTED: 12/06/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9543010 **Lab ID:** 3120629-13 **Sampled:** 12/03/23 23:59
Matrix: Air **Sample Volume:** 2038.818 m³ **Received:** 12/06/23 12:52
Filter ID: **Analysis Date:** 12/11/23 21:48
Comments: MFK-AM01-120323-HM

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	**7429-90-5**	**686**	E	**25.6**
Antimony	**7440-36-0**	**0.0384**	SL	**0.0352**
Arsenic	**7440-38-2**	**0.118**		**0.00762**
Barium	**7440-39-3**	**5.56**		**0.757**
Beryllium	**7440-41-7**	**0.0170**		**0.00265**
Cadmium	7440-43-9	0.00887	U	0.0870
Calcium	**7440-70-2**	**503**	QB-01, GC-BS	**233**
Chromium	**7440-47-3**	**1.87**		**1.62**
Cobalt	**7440-48-4**	**0.277**	QB-01	**0.0124**
Copper	**7440-50-8**	**18.6**	QB-01	**2.39**
Iron	**7439-89-6**	**668**		**19.3**
Lead	**7439-92-1**	**0.300**		**0.220**
Magnesium	**7439-95-4**	**193**		**76.9**
Manganese	**7439-96-5**	**19.0**		**0.950**
Molybdenum	**7439-98-7**	**0.877**	QB-01	**0.170**
Nickel	**7440-02-0**	**0.650**	GC-BS, QB-01	**0.639**
Phosphorus	7723-14-0	373	GC-BS, U	998
Potassium	**7440-09-7**	**85.4**		**30.3**
Rubidium	**7440-17-7**	**0.178**		**0.0146**
Selenium	**7782-49-2**	**0.221**		**0.00878**
Sodium	**7440-23-5**	**1660**	E, GC-BS	**1600**
Strontium	**7440-24-6**	**3.98**	QB-01	**0.520**
Thallium	**7440-28-0**	**0.00137**		**4.01E-4**
Thorium	**7440-29-01**	**0.0156**		**0.00239**
Uranium	**7440-61-1**	**0.0136**		**0.0136**
Vanadium	**7440-62-2**	**1.85**		**0.0393**
Zinc	7440-66-6	8.61	U	78.0

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Tetra Tech, Inc.
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Blue Bell, PA 19422
ATTN: Ms. Chelsea Saber
PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 12/14/23 10:47
SUBMITTED: 12/06/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9543009 **Lab ID:** 3120629-14 **Sampled:** 12/03/23 23:59
Matrix: Air **Sample Volume:** 2026.064 m³ **Received:** 12/06/23 12:52
Filter ID: **Analysis Date:** 12/11/23 22:02
Comments: MFK-AM02-120323-HM

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	**7429-90-5**	**117**		**25.8**
Antimony	**7440-36-0**	**0.0517**	SL	**0.0354**
Arsenic	**7440-38-2**	**0.0999**		**0.00767**
Barium	**7440-39-3**	**2.80**		**0.761**
Beryllium	**7440-41-7**	**0.00444**		**0.00267**
Cadmium	7440-43-9	0.00692	U	0.0875
Calcium	**7440-70-2**	**440**	GC-BS, QB-01	**234**
Chromium	7440-47-3	1.52	U	1.63
Cobalt	**7440-48-4**	**0.0810**	QB-01	**0.0125**
Copper	**7440-50-8**	**17.1**	QB-01	**2.41**
Iron	**7439-89-6**	**141**		**19.4**
Lead	7439-92-1	0.144	U	0.222
Magnesium	**7439-95-4**	**167**		**77.4**
Manganese	**7439-96-5**	**3.65**		**0.956**
Molybdenum	**7439-98-7**	**0.866**	QB-01	**0.171**
Nickel	7440-02-0	0.525	GC-BS, QB-01, U	0.643
Phosphorus	7723-14-0	371	GC-BS, U	1000
Potassium	**7440-09-7**	**124**		**30.5**
Rubidium	**7440-17-7**	**0.176**		**0.0147**
Selenium	**7782-49-2**	**0.123**		**0.00883**
Sodium	**7440-23-5**	**1620**	E, GC-BS	**1610**
Strontium	**7440-24-6**	**2.14**	QB-01	**0.524**
Thallium	**7440-28-0**	**6.30E-4**		**4.04E-4**
Thorium	**7440-29-01**	**0.00569**		**0.00241**
Uranium	7440-61-1	0.00464	U	0.0137
Vanadium	**7440-62-2**	**0.672**		**0.0395**
Zinc	7440-66-6	8.56	U	78.5

CERTIFICATE OF ANALYSIS

Tetra Tech, Inc.
1777 Sentry Pkwy, Bldg 12
Blue Bell, PA 19422
ATTN: Ms. Chelsea Saber
PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 12/14/23 10:47
SUBMITTED: 12/06/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9543008 **Lab ID:** 3120629-15 **Sampled:** 12/03/23 23:59
Matrix: Air **Sample Volume:** 1842.60€ m³ **Received:** 12/06/23 12:52
Filter ID: **Analysis Date:** 12/11/23 22:16
Comments: MFK-AM03-120323-HM

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	**7429-90-5**	**97.2**		**28.3**
Antimony	**7440-36-0**	**0.0558**	SL	**0.0389**
Arsenic	**7440-38-2**	**0.0799**		**0.00843**
Barium	**7440-39-3**	**2.88**		**0.837**
Beryllium	**7440-41-7**	**0.00439**		**0.00293**
Cadmium	7440-43-9	0.00582	U	0.0962
Calcium	**7440-70-2**	**471**	GC-BS, QB-01	**258**
Chromium	**7440-47-3**	**1.91**		**1.79**
Cobalt	**7440-48-4**	**0.0855**	QB-01	**0.0138**
Copper	**7440-50-8**	**34.3**	QB-01	**2.65**
Iron	**7439-89-6**	**135**		**21.4**
Lead	7439-92-1	0.155	U	0.244
Magnesium	**7439-95-4**	**184**		**85.1**
Manganese	**7439-96-5**	**3.84**		**1.05**
Molybdenum	**7439-98-7**	**1.17**	QB-01	**0.188**
Nickel	**7440-02-0**	**0.713**	GC-BS, QB-01	**0.707**
Phosphorus	7723-14-0	395	GC-BS, U	1100
Potassium	**7440-09-7**	**84.0**		**33.6**
Rubidium	**7440-17-7**	**0.0903**		**0.0162**
Selenium	**7782-49-2**	**0.135**		**0.00971**
Sodium	**7440-23-5**	**1790**	E, GC-BS	**1770**
Strontium	**7440-24-6**	**2.12**	QB-01	**0.576**
Thallium	**7440-28-0**	**6.27E-4**		**4.44E-4**
Thorium	**7440-29-01**	**0.00530**		**0.00265**
Uranium	7440-61-1	0.00463	U	0.0150
Vanadium	**7440-62-2**	**0.704**		**0.0434**
Zinc	7440-66-6	10.1	U	86.3

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FILE #: 0000.00
REPORTED: 12/14/23 10:47
SUBMITTED: 12/06/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9543000 FB **Lab ID:** 3120629-16 **Sampled:** 12/03/23 00:00
Matrix: Air **Sample Volume:** 2038.818 m³ **Received:** 12/06/23 12:52
Filter ID: **Analysis Date:** 12/11/23 22:44
Comments: MFK-FB01-120323-HM Field Blank

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	7429-90-5	8.62	U	25.6
Antimony	7440-36-0	0.00636	SL, U	0.0352
Arsenic	7440-38-2	0.00210	U	0.00762
Barium	7440-39-3	0.550	U	0.757
Beryllium	7440-41-7	6.25E-4	U	0.00265
Cadmium	7440-43-9	0.00220	U	0.0870
Calcium	**7440-70-2**	**325**	FB-01, GC-BS, QB-01	**233**
Chromium	7440-47-3	1.41	U	1.62
Cobalt	**7440-48-4**	**0.0233**	FB-01, QB-01	**0.0124**
Copper	7440-50-8	0.364	QB-01, U	2.39
Iron	7439-89-6	11.4	U	19.3
Lead	7439-92-1	0.0480	U	0.220
Magnesium	7439-95-4	40.4	U	76.9
Manganese	7439-96-5	0.123	U	0.950
Molybdenum	**7439-98-7**	**0.230**	FB-01, QB-01	**0.170**
Nickel	7440-02-0	0.289	GC-BS, QB-01, U	0.639
Phosphorus	7723-14-0	334	GC-BS, U	998
Potassium	7440-09-7	11.9	U	30.3
Rubidium	7440-17-7	0.0128	U	0.0146
Selenium	7782-49-2	0.00240	U	0.00878
Sodium	7440-23-5	695	GC-BS, U	1600
Strontium	**7440-24-6**	**0.671**	FB-01, QB-01	**0.520**
Thallium	7440-28-0	3.85E-5	U	4.01E-4
Thorium	7440-29-01	0.00204	U	0.00239
Uranium	7440-61-1	0.00164	U	0.0136
Vanadium	7440-62-2	0.0132	U	0.0393
Zinc	7440-66-6	5.51	U	78.0

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REPORTED: 12/14/23 10:47
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AQS SITE CODE:
SITE CODE: Maui fires

Inorganics by Compendium Method IO-3.5 - Quality Control

Batch 2312031 - B3L0605

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Calibration Blank (2312031-CCB1)				Prepared & Analyzed: 12/11/23						
Aluminum	59.8		ng/l							
Antimony	1.50		ng/l							
Arsenic	3.31		ng/l							
Barium	1.64		ng/l							
Beryllium	1.03		ng/l							
Cadmium	0.307		ng/l							
Calcium	464		ng/l							
Chromium	3.37		ng/l							
Cobalt	0.408		ng/l							
Copper	131		ng/l							
Iron	26.4		ng/l							
Lead	6.23		ng/l							
Magnesium	19.6		ng/l							
Manganese	7.20		ng/l							
Molybdenum	29.3		ng/l							
Nickel	0.370		ng/l							
Phosphorus	-845		ng/l							U
Potassium	-973		ng/l							U
Rubidium	0.315		ng/l							
Selenium	0.969		ng/l							
Sodium	-65.2		ng/l							U
Strontium	0.544		ng/l							
Thallium	0.487		ng/l							
Thorium	0.453		ng/l							
Uranium	-0.0185		ng/l							U
Vanadium	-34.9		ng/l							U
Zinc	-12.6		ng/l							U
Calibration Blank (2312031-CCB2)				Prepared & Analyzed: 12/11/23						
Aluminum	32.1		ng/l							
Antimony	0.841		ng/l							
Arsenic	1.40		ng/l							
Barium	5.28		ng/l							
Beryllium	0.261		ng/l							
Cadmium	0.590		ng/l							
Calcium	109		ng/l							
Chromium	6.86		ng/l							
Cobalt	1.31		ng/l							
Copper	78.1		ng/l							

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SITE CODE: Maui fires

Inorganics by Compendium Method IO-3.5 - Quality Control

Batch 2312031 - B3L0605

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Calibration Blank (2312031-CCB2) Contin				Prepared & Analyzed: 12/11/23						
Iron	116		ng/l							
Lead	6.09		ng/l							
Magnesium	29.2		ng/l							
Manganese	12.8		ng/l							
Molybdenum	6.48		ng/l							
Nickel	1.64		ng/l							
Phosphorus	-98.5		ng/l							U
Potassium	-2030		ng/l							U
Rubidium	-0.520		ng/l							U
Selenium	2.55		ng/l							
Sodium	-139		ng/l							U
Strontium	1.31		ng/l							
Thallium	0.342		ng/l							
Thorium	0.775		ng/l							
Uranium	0.00284		ng/l							
Vanadium	-27.2		ng/l							U
Zinc	86.5		ng/l							
Calibration Blank (2312031-CCB3)				Prepared & Analyzed: 12/11/23						
Aluminum	93.4		ng/l							
Antimony	1.38		ng/l							
Arsenic	0.532		ng/l							
Barium	9.11		ng/l							
Beryllium	-0.404		ng/l							U
Cadmium	0.751		ng/l							
Calcium	1790		ng/l							
Chromium	8.74		ng/l							
Cobalt	2.10		ng/l							
Copper	103		ng/l							
Iron	89.9		ng/l							
Lead	9.51		ng/l							
Magnesium	57.1		ng/l							
Manganese	19.5		ng/l							
Molybdenum	7.67		ng/l							
Nickel	4.18		ng/l							
Phosphorus	240		ng/l							
Potassium	-1680		ng/l							U
Rubidium	0.833		ng/l							
Selenium	-5.47		ng/l							U

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SITE CODE: Maui fires

Inorganics by Compendium Method IO-3.5 - Quality Control

Batch 2312031 - B3L0605

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Calibration Blank (2312031-CCB3) Contin				Prepared & Analyzed: 12/11/23						
Sodium	35.1		ng/l							
Strontium	1.98		ng/l							
Thallium	0.377		ng/l							
Thorium	0.618		ng/l							
Uranium	0.00625		ng/l							
Vanadium	-34.9		ng/l							U
Zinc	36.8		ng/l							
Calibration Blank (2312031-CCB4)				Prepared: 12/11/23 Analyzed: 12/12/23						
Aluminum	89.9		ng/l							
Antimony	1.68		ng/l							
Arsenic	0.642		ng/l							
Barium	11.3		ng/l							
Beryllium	-0.336		ng/l							U
Cadmium	1.03		ng/l							
Calcium	1970		ng/l							
Chromium	14.4		ng/l							
Cobalt	2.56		ng/l							
Copper	124		ng/l							
Iron	168		ng/l							
Lead	11.5		ng/l							
Magnesium	77.9		ng/l							
Manganese	25.5		ng/l							
Molybdenum	8.01		ng/l							
Nickel	6.18		ng/l							
Phosphorus	-615		ng/l							U
Potassium	-1600		ng/l							U
Rubidium	0.323		ng/l							
Selenium	-2.85		ng/l							U
Sodium	122		ng/l							
Strontium	3.46		ng/l							
Thallium	0.497		ng/l							
Thorium	0.642		ng/l							
Uranium	0.0164		ng/l							
Vanadium	-34.0		ng/l							U
Zinc	38.0		ng/l							
Calibration Check (2312031-CCV1)				Prepared & Analyzed: 12/11/23						
Aluminum	1.53E6		ng/l	1.5000E6		102	90-110			
Antimony	20200		ng/l	20000		101	90-110			

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REPORTED: 12/14/23 10:47
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AQS SITE CODE:
SITE CODE: Maui fires

Inorganics by Compendium Method IO-3.5 - Quality Control

Batch 2312031 - B3L0605

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Calibration Check (2312031-CCV1) Contin				Prepared & Analyzed: 12/11/23						
Arsenic	19900		ng/l	20000		99.7	90-110			
Barium	200000		ng/l	200000		100	90-110			
Beryllium	4940		ng/l	5000.0		98.8	90-110			
Cadmium	20100		ng/l	20000		101	90-110			
Calcium	2.48E7		ng/l	2.5000E7		99.1	90-110			
Chromium	241000		ng/l	240000		101	90-110			
Cobalt	50300		ng/l	50000		101	90-110			
Copper	2.02E6		ng/l	2.0000E6		101	90-110			
Iron	2.49E6		ng/l	2.5000E6		99.7	90-110			
Lead	198000		ng/l	200000		98.8	90-110			
Magnesium	1.03E6		ng/l	1.0000E6		103	90-110			
Manganese	488000		ng/l	500000		97.6	90-110			
Molybdenum	49600		ng/l	50000		99.2	90-110			
Nickel	121000		ng/l	120000		101	90-110			
Phosphorus	198000		ng/l	200000		98.9	90-110			
Potassium	2.49E6		ng/l	2.5000E6		99.5	90-110			
Rubidium	9990		ng/l	10000		99.9	90-110			
Selenium	19900		ng/l	20000		99.7	90-110			
Sodium	2.61E6		ng/l	2.5000E6		104	90-110			
Strontium	49900		ng/l	50000		99.8	90-110			
Thallium	484		ng/l	500.00		96.8	90-110			
Thorium	496		ng/l	500.00		99.2	90-110			
Uranium	494		ng/l	500.00		98.9	90-110			
Vanadium	19800		ng/l	20000		99.2	90-110			
Zinc	519000		ng/l	500000		104	90-110			
Calibration Check (2312031-CCV2)				Prepared & Analyzed: 12/11/23						
Aluminum	1.47E6		ng/l	1.5000E6		98.2	90-110			
Antimony	19900		ng/l	20000		99.6	90-110			
Arsenic	19600		ng/l	20000		97.8	90-110			
Barium	198000		ng/l	200000		99.1	90-110			
Beryllium	4930		ng/l	5000.0		98.5	90-110			
Cadmium	19800		ng/l	20000		98.9	90-110			
Calcium	2.43E7		ng/l	2.5000E7		97.3	90-110			
Chromium	246000		ng/l	240000		103	90-110			
Cobalt	48800		ng/l	50000		97.6	90-110			
Copper	1.96E6		ng/l	2.0000E6		97.9	90-110			
Iron	2.42E6		ng/l	2.5000E6		96.8	90-110			
Lead	195000		ng/l	200000		97.3	90-110			

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FILE #: 0000.00
REPORTED: 12/14/23 10:47
SUBMITTED: 12/06/23
AQS SITE CODE:
SITE CODE: Maui fires

Inorganics by Compendium Method IO-3.5 - Quality Control

Batch 2312031 - B3L0605

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Calibration Check (2312031-CCV2) Contir				Prepared & Analyzed: 12/11/23						
Magnesium	982000		ng/l	1.0000E6		98.2	90-110			
Manganese	477000		ng/l	500000		95.3	90-110			
Molybdenum	49000		ng/l	50000		98.1	90-110			
Nickel	118000		ng/l	120000		98.1	90-110			
Phosphorus	186000		ng/l	200000		93.1	90-110			
Potassium	2.42E6		ng/l	2.5000E6		96.7	90-110			
Rubidium	9860		ng/l	10000		98.6	90-110			
Selenium	20000		ng/l	20000		99.9	90-110			
Sodium	2.47E6		ng/l	2.5000E6		98.8	90-110			
Strontium	48800		ng/l	50000		97.6	90-110			
Thallium	471		ng/l	500.00		94.2	90-110			
Thorium	482		ng/l	500.00		96.4	90-110			
Uranium	477		ng/l	500.00		95.5	90-110			
Vanadium	19500		ng/l	20000		97.5	90-110			
Zinc	507000		ng/l	500000		101	90-110			
Calibration Check (2312031-CCV3)				Prepared & Analyzed: 12/11/23						
Aluminum	1.49E6		ng/l	1.5000E6		99.5	90-110			
Antimony	20300		ng/l	20000		101	90-110			
Arsenic	19800		ng/l	20000		99.2	90-110			
Barium	199000		ng/l	200000		99.3	90-110			
Beryllium	4560		ng/l	5000.0		91.3	90-110			
Cadmium	20100		ng/l	20000		101	90-110			
Calcium	2.46E7		ng/l	2.5000E7		98.4	90-110			
Chromium	246000		ng/l	240000		103	90-110			
Cobalt	49400		ng/l	50000		98.8	90-110			
Copper	2.01E6		ng/l	2.0000E6		100	90-110			
Iron	2.46E6		ng/l	2.5000E6		98.6	90-110			
Lead	197000		ng/l	200000		98.7	90-110			
Magnesium	1.00E6		ng/l	1.0000E6		100	90-110			
Manganese	487000		ng/l	500000		97.3	90-110			
Molybdenum	49200		ng/l	50000		98.4	90-110			
Nickel	120000		ng/l	120000		99.7	90-110			
Phosphorus	197000		ng/l	200000		98.6	90-110			
Potassium	2.43E6		ng/l	2.5000E6		97.2	90-110			
Rubidium	9930		ng/l	10000		99.3	90-110			
Selenium	20000		ng/l	20000		100	90-110			
Sodium	2.54E6		ng/l	2.5000E6		102	90-110			
Strontium	49700		ng/l	50000		99.3	90-110			

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REPORTED: 12/14/23 10:47
SUBMITTED: 12/06/23
AQS SITE CODE:
SITE CODE: Maui fires

Inorganics by Compendium Method IO-3.5 - Quality Control

Batch 2312031 - B3L0605

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Calibration Check (2312031-CCV3) Contin				Prepared & Analyzed: 12/11/23						
Thallium	480		ng/l	500.00		96.0	90-110			
Thorium	496		ng/l	500.00		99.1	90-110			
Uranium	489		ng/l	500.00		97.7	90-110			
Vanadium	19900		ng/l	20000		99.6	90-110			
Zinc	517000		ng/l	500000		103	90-110			
Calibration Check (2312031-CCV4)				Prepared & Analyzed: 12/11/23						
Aluminum	1.50E6		ng/l	1.5000E6		100	90-110			
Antimony	20500		ng/l	20000		102	90-110			
Arsenic	20000		ng/l	20000		99.9	90-110			
Barium	202000		ng/l	200000		101	90-110			
Beryllium	4550		ng/l	5000.0		91.1	90-110			
Cadmium	20300		ng/l	20000		102	90-110			
Calcium	2.49E7		ng/l	2.5000E7		99.6	90-110			
Chromium	254000		ng/l	240000		106	90-110			
Cobalt	49700		ng/l	50000		99.4	90-110			
Copper	2.02E6		ng/l	2.0000E6		101	90-110			
Iron	2.48E6		ng/l	2.5000E6		99.2	90-110			
Lead	200000		ng/l	200000		99.9	90-110			
Magnesium	1.00E6		ng/l	1.0000E6		100	90-110			
Manganese	491000		ng/l	500000		98.2	90-110			
Molybdenum	50300		ng/l	50000		101	90-110			
Nickel	120000		ng/l	120000		99.8	90-110			
Phosphorus	193000		ng/l	200000		96.7	90-110			
Potassium	2.45E6		ng/l	2.5000E6		97.9	90-110			
Rubidium	10100		ng/l	10000		101	90-110			
Selenium	20200		ng/l	20000		101	90-110			
Sodium	2.55E6		ng/l	2.5000E6		102	90-110			
Strontium	50300		ng/l	50000		101	90-110			
Thallium	485		ng/l	500.00		97.0	90-110			
Thorium	500		ng/l	500.00		100	90-110			
Uranium	498		ng/l	500.00		99.7	90-110			
Vanadium	20200		ng/l	20000		101	90-110			
Zinc	523000		ng/l	500000		105	90-110			
High Cal Check (2312031-HCV1)				Prepared & Analyzed: 12/11/23						
Aluminum	2.93E6		ng/l	3.0000E6		97.6	95-105			
Antimony	39900		ng/l	40000		99.7	95-105			
Arsenic	39800		ng/l	40000		99.5	95-105			
Barium	400000		ng/l	400000		99.9	95-105			

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CERTIFICATE OF ANALYSIS

Tetra Tech, Inc.
1777 Sentry Pkwy, Bldg 12
Blue Bell, PA 19422
ATTN: Ms. Chelsea Saber
PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 12/14/23 10:47
SUBMITTED: 12/06/23
AQS SITE CODE:
SITE CODE: Maui fires

Inorganics by Compendium Method IO-3.5 - Quality Control

Batch 2312031 - B3L0605

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
High Cal Check (2312031-HCV1) Continue				Prepared & Analyzed: 12/11/23						
Beryllium	10300		ng/l	10000		103	95-105			
Cadmium	39300		ng/l	40000		98.3	95-105			
Calcium	4.93E7		ng/l	5.0000E7		98.7	95-105			
Chromium	473000		ng/l	480000		98.5	95-105			
Cobalt	98300		ng/l	100000		98.3	95-105			
Copper	3.94E6		ng/l	4.0000E6		98.5	95-105			
Iron	4.94E6		ng/l	5.0000E6		98.8	95-105			
Lead	397000		ng/l	400000		99.2	95-105			
Magnesium	1.96E6		ng/l	2.0000E6		97.9	95-105			
Manganese	986000		ng/l	1.0000E6		98.6	95-105			
Molybdenum	99400		ng/l	100000		99.4	95-105			
Nickel	235000		ng/l	240000		98.0	95-105			
Phosphorus	394000		ng/l	400000		98.5	95-105			
Potassium	4.90E6		ng/l	5.0000E6		98.1	95-105			
Rubidium	19900		ng/l	20000		99.3	95-105			
Selenium	39600		ng/l	40000		99.0	95-105			
Sodium	4.90E6		ng/l	5.0000E6		98.0	95-105			
Strontium	99600		ng/l	100000		99.6	95-105			
Thallium	995		ng/l	1000.0		99.5	95-105			
Thorium	990		ng/l	1000.0		99.0	95-105			
Uranium	996		ng/l	1000.0		99.6	95-105			
Vanadium	39600		ng/l	40000		99.1	95-105			
Zinc	1.02E6		ng/l	1.0000E6		102	95-105			
Initial Cal Blank (2312031-ICB1)				Prepared & Analyzed: 12/11/23						
Aluminum	61.1		ng/l							
Antimony	1.48		ng/l							
Arsenic	-0.519		ng/l							U
Barium	3.07		ng/l							
Beryllium	1.36		ng/l							
Cadmium	0.359		ng/l							
Calcium	888		ng/l							
Chromium	5.64		ng/l							
Cobalt	0.725		ng/l							
Copper	77.3		ng/l							
Iron	99.8		ng/l							
Lead	7.11		ng/l							
Magnesium	0.0695		ng/l							
Manganese	8.48		ng/l							

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Inorganics by Compendium Method IO-3.5 - Quality Control

Batch 2312031 - B3L0605

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Initial Cal Blank (2312031-ICB1) Continu				Prepared & Analyzed: 12/11/23						
Molybdenum	13.3		ng/l							
Nickel	0.0933		ng/l							
Phosphorus	-217		ng/l							U
Potassium	-1150		ng/l							U
Rubidium	0.811		ng/l							
Selenium	-2.72		ng/l							U
Sodium	-108		ng/l							U
Strontium	0.976		ng/l							
Thallium	0.339		ng/l							
Thorium	0.469		ng/l							
Uranium	-0.00424		ng/l							U
Vanadium	-32.0		ng/l							U
Zinc	-15.8		ng/l							U
Initial Cal Check (2312031-ICV1)				Prepared & Analyzed: 12/11/23						
Aluminum	1.45E6		ng/l	1.5000E6		96.5	90-110			
Antimony	19500		ng/l	20000		97.3	90-110			
Arsenic	19500		ng/l	20000		97.5	90-110			
Barium	196000		ng/l	200000		98.0	90-110			
Beryllium	5090		ng/l	5000.0		102	90-110			
Cadmium	20100		ng/l	20000		101	90-110			
Calcium	2.40E7		ng/l	2.5000E7		96.1	90-110			
Chromium	246000		ng/l	240000		103	90-110			
Cobalt	49000		ng/l	50000		98.0	90-110			
Copper	1.97E6		ng/l	2.0000E6		98.6	90-110			
Iron	2.45E6		ng/l	2.5000E6		98.2	90-110			
Lead	193000		ng/l	200000		96.4	90-110			
Magnesium	967000		ng/l	1.0000E6		96.7	90-110			
Manganese	479000		ng/l	500000		95.9	90-110			
Molybdenum	48700		ng/l	50000		97.3	90-110			
Nickel	117000		ng/l	120000		97.8	90-110			
Phosphorus	190000		ng/l	200000		95.2	90-110			
Potassium	2.45E6		ng/l	2.5000E6		98.0	90-110			
Rubidium	9540		ng/l	10000		95.4	90-110			
Selenium	20200		ng/l	20000		101	90-110			
Sodium	2.48E6		ng/l	2.5000E6		99.2	90-110			
Strontium	49000		ng/l	50000		98.0	90-110			
Thallium	468		ng/l	500.00		93.7	90-110			
Thorium	474		ng/l	500.00		94.7	90-110			

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Inorganics by Compendium Method IO-3.5 - Quality Control

Batch 2312031 - B3L0605

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Initial Cal Check (2312031-ICV1) Continu				Prepared & Analyzed: 12/11/23						
Uranium	479		ng/l	500.00		95.8	90-110			
Vanadium	19700		ng/l	20000		98.3	90-110			
Zinc	515000		ng/l	500000		103	90-110			
Interference Check A (2312031-IFA1)				Prepared & Analyzed: 12/11/23						
Aluminum	1.45E7		ng/l	1.5000E7		96.4	80-120			
Antimony	0.00		ng/l				80-120			U
Arsenic	0.00		ng/l				80-120			U
Barium	0.00		ng/l				80-120			U
Beryllium	0.00		ng/l				80-120			U
Cadmium	0.00		ng/l				80-120			U
Calcium	9.11E7		ng/l	1.0040E8		90.8	80-120			
Chromium	0.00		ng/l				80-120			U
Cobalt	0.00		ng/l				80-120			U
Copper	0.00		ng/l				80-120			U
Iron	1.44E7		ng/l	1.5000E7		95.9	80-120			
Lead	0.00		ng/l				80-120			U
Magnesium	1.50E7		ng/l	1.5000E7		99.9	80-120			
Manganese	0.00		ng/l				80-120			U
Molybdenum	293000		ng/l	300000		97.6	80-120			
Nickel	0.00		ng/l				80-120			U
Phosphorus	1.55E7		ng/l	1.5000E7		104	80-120			
Potassium	1.43E7		ng/l	1.5000E7		95.1	80-120			
Rubidium	0.00		ng/l				80-120			U
Selenium	0.00		ng/l				80-120			U
Sodium	1.51E7		ng/l	1.5000E7		101	80-120			
Strontium	0.00		ng/l				80-120			U
Thallium	0.00		ng/l				80-120			U
Thorium	0.00		ng/l				80-120			U
Uranium	0.00		ng/l				80-120			U
Vanadium	0.00		ng/l				80-120			U
Zinc	0.00		ng/l				80-120			U
Interference Check B (2312031-IFB1)				Prepared & Analyzed: 12/11/23						
Aluminum	1.58E7		ng/l	1.6500E7		96.0	80-120			
Antimony	19900		ng/l	20000		99.5	80-120			
Arsenic	20000		ng/l	20000		100	80-120			
Barium	202000		ng/l	200000		101	80-120			
Beryllium	4640		ng/l	5000.0		92.7	80-120			
Cadmium	19200		ng/l	20000		95.8	80-120			

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Inorganics by Compendium Method IO-3.5 - Quality Control

Batch 2312031 - B3L0605

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Interference Check B (2312031-IFB1) Co				Prepared & Analyzed: 12/11/23						
Calcium	1.14E8		ng/l	1.2540E8		90.9	80-120			
Chromium	227000		ng/l	240000		94.4	80-120			
Cobalt	48200		ng/l	50000		96.4	80-120			
Copper	1.86E6		ng/l	2.0000E6		93.1	80-120			
Iron	1.66E7		ng/l	1.7500E7		95.1	80-120			
Lead	205000		ng/l	200000		102	80-120			
Magnesium	1.59E7		ng/l	1.6000E7		99.7	80-120			
Manganese	501000		ng/l	500000		100	80-120			
Molybdenum	341000		ng/l	350000		97.4	80-120			
Nickel	113000		ng/l	120000		93.8	80-120			
Phosphorus	1.58E7		ng/l	1.5200E7		104	80-120			
Potassium	1.69E7		ng/l	1.7500E7		96.3	80-120			
Rubidium	10100		ng/l	10000		101	80-120			
Selenium	18800		ng/l	20000		94.1	80-120			
Sodium	1.79E7		ng/l	1.7500E7		102	80-120			
Strontium	49900		ng/l	50000		99.9	80-120			
Thallium	516		ng/l	500.00		103	80-120			
Thorium	530		ng/l	500.00		106	80-120			
Uranium	539		ng/l	500.00		108	80-120			
Vanadium	19000		ng/l	20000		95.2	80-120			
Zinc	469000		ng/l	500000		93.7	80-120			

Batch B3L0804 - ICP-MS Extraction

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (B3L0804-BLK1)				Prepared: 12/08/23 Analyzed: 12/11/23						
Aluminum	ND	32.1	ng/m³ Air							U
Antimony	ND	0.0441	ng/m³ Air							SL, U
Arsenic	ND	0.00955	ng/m³ Air							U
Barium	ND	0.948	ng/m³ Air							U
Beryllium	ND	0.00332	ng/m³ Air							U
Cadmium	ND	0.109	ng/m³ Air							U
Calcium	ND	292	ng/m³ Air							GC-BS, QB-01 U
Chromium	ND	2.03	ng/m³ Air							U
Cobalt	ND	0.0156	ng/m³ Air							QB-01, U
Copper	ND	3.00	ng/m³ Air							QB-01, U
Iron	ND	24.2	ng/m³ Air							U
Lead	ND	0.276	ng/m³ Air							U
Magnesium	ND	96.4	ng/m³ Air							U
Manganese	ND	1.19	ng/m³ Air							U

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Inorganics by Compendium Method IO-3.5 - Quality Control

Batch B3L0804 - ICP-MS Extraction

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (B3L0804-BLK1) Continued				Prepared: 12/08/23 Analyzed: 12/11/23						
Molybdenum	ND	0.213	ng/m³ Air							QB-01, U
Nickel	ND	0.801	ng/m³ Air							GC-BS, QB-01 U
Phosphorus	ND	1250	ng/m³ Air							GC-BS, U
Potassium	ND	38.0	ng/m³ Air							U
Rubidium	ND	0.0183	ng/m³ Air							U
Selenium	ND	0.0110	ng/m³ Air							U
Sodium	ND	2000	ng/m³ Air							GC-BS, U
Strontium	ND	0.652	ng/m³ Air							QB-01, U
Thallium	ND	5.03E-4	ng/m³ Air							U
Thorium	ND	0.00300	ng/m³ Air							U
Uranium	ND	0.0170	ng/m³ Air							U
Vanadium	ND	0.0492	ng/m³ Air							U
Zinc	ND	97.7	ng/m³ Air							U
LCS (B3L0804-BS1)				Prepared: 12/08/23 Analyzed: 12/11/23						
Aluminum	95.3	32.1	ng/m³ Air	82.975		115	80-120			
Antimony	0.546	0.0441	ng/m³ Air	1.3829		39.5	80-120			SL
Arsenic	2.75	0.00955	ng/m³ Air	2.7658		99.6	80-120			
Barium	28.5	0.948	ng/m³ Air	27.658		103	80-120			
Beryllium	1.33	0.00332	ng/m³ Air	1.3829		95.9	80-120			
Cadmium	1.40	0.109	ng/m³ Air	1.3829		102	80-120			
Calcium	528	292	ng/m³ Air	69.146		764	80-120			GC-BS, QB-01
Chromium	16.4	2.03	ng/m³ Air	13.829		118	80-120			
Cobalt	1.38	0.0156	ng/m³ Air	1.3829		99.7	80-120			QB-01
Copper	34.2	3.00	ng/m³ Air	27.658		124	80-120			QB-01
Iron	40.0	24.2	ng/m³ Air	27.658		145	80-120			
Lead	13.7	0.276	ng/m³ Air	13.829		98.9	80-120			
Magnesium	ND	96.4	ng/m³ Air	27.658			80-120			U
Manganese	8.72	1.19	ng/m³ Air	8.2975		105	80-120			
Molybdenum	1.67	0.213	ng/m³ Air	1.3829		121	80-120			QB-01
Nickel	4.91	0.801	ng/m³ Air	2.7658		178	80-120			GC-BS, QB-01
Phosphorus	ND	1250	ng/m³ Air	13.829			80-120			GC-BS, U
Potassium	70.4	38.0	ng/m³ Air	55.317		127	80-120			
Rubidium	1.35	0.0183	ng/m³ Air	1.3829		97.4	80-120			
Selenium	2.78	0.0110	ng/m³ Air	2.7658		100	80-120			
Sodium	ND	2000	ng/m³ Air	55.317			80-120			GC-BS, U
Strontium	2.22	0.652	ng/m³ Air	1.3829		160	80-120			QB-01
Thallium	0.131	5.03E-4	ng/m³ Air	0.13829		94.7	80-120			

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Inorganics by Compendium Method IO-3.5 - Quality Control

Batch B3L0804 - ICP-MS Extraction

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
LCS (B3L0804-BS1) Continued				Prepared: 12/08/23		Analyzed: 12/11/23				
Thorium	0.135	0.00300	ng/m³ Air	0.13829		97.3	80-120			
Uranium	0.131	0.0170	ng/m³ Air	0.13829		94.4	80-120			
Vanadium	2.80	0.0492	ng/m³ Air	2.7658		101	80-120			
Zinc	108	97.7	ng/m³ Air	82.975		130	80-120			
Duplicate (B3L0804-DUP1)		**Source: 3120629-09**		Prepared: 12/08/23		Analyzed: 12/11/23				
Aluminum	178	25.6	ng/m³ Air		177			0.500	10	
Antimony	ND	0.0352	ng/m³ Air		ND				10	SL, U
Arsenic	0.0622	0.00762	ng/m³ Air		0.0771			21.3	10	D-F
Barium	2.24	0.757	ng/m³ Air		2.65			17.0	10	
Beryllium	0.00559	0.00265	ng/m³ Air		0.00589			5.13	10	
Cadmium	ND	0.0870	ng/m³ Air		ND				10	U
Calcium	435	233	ng/m³ Air		436			0.314	10	GC-BS, QB-01
Chromium	ND	1.62	ng/m³ Air		ND				10	U
Cobalt	0.0922	0.0124	ng/m³ Air		0.0953			3.27	10	QB-01
Copper	18.7	2.39	ng/m³ Air		17.8			4.65	10	QB-01
Iron	176	19.3	ng/m³ Air		175			0.313	10	
Lead	ND	0.220	ng/m³ Air		ND				10	U
Magnesium	122	76.9	ng/m³ Air		121			0.736	10	
Manganese	4.84	0.950	ng/m³ Air		4.80			0.838	10	
Molybdenum	0.964	0.170	ng/m³ Air		0.962			0.154	10	QB-01
Nickel	1.67	0.639	ng/m³ Air		1.13			38.4	10	GC-BS, QB-01
Phosphorus	ND	998	ng/m³ Air		ND				10	GC-BS, U
Potassium	75.5	30.3	ng/m³ Air		74.0			1.89	10	
Rubidium	0.0823	0.0146	ng/m³ Air		0.0850			3.28	10	
Selenium	0.0966	0.00878	ng/m³ Air		0.0985			1.94	10	
Sodium	ND	1600	ng/m³ Air		ND				10	GC-BS, U
Strontium	2.08	0.520	ng/m³ Air		2.04			2.00	10	QB-01
Thallium	4.50E-4	4.01E-4	ng/m³ Air		4.58E-4			1.78	10	
Thorium	0.00460	0.00239	ng/m³ Air		0.00469			2.00	10	
Uranium	ND	0.0136	ng/m³ Air		ND				10	U
Vanadium	0.536	0.0393	ng/m³ Air		0.531			1.03	10	
Zinc	ND	78.0	ng/m³ Air		ND				10	U
Duplicate (B3L0804-DUP2)		**Source: 3120629-15**		Prepared: 12/08/23		Analyzed: 12/11/23				
Aluminum	98.3	28.3	ng/m³ Air		97.2			1.09	10	
Antimony	0.0549	0.0389	ng/m³ Air		0.0558			1.55	10	SL
Arsenic	0.0783	0.00843	ng/m³ Air		0.0799			2.05	10	
Barium	2.88	0.837	ng/m³ Air		2.88			0.121	10	
Beryllium	0.00428	0.00293	ng/m³ Air		0.00439			2.43	10	

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Tetra Tech, Inc.
1777 Sentry Pkwy, Bldg 12
Blue Bell, PA 19422
ATTN: Ms. Chelsea Saber
PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 12/14/23 10:47
SUBMITTED: 12/06/23
AQS SITE CODE:
SITE CODE: Maui fires

Inorganics by Compendium Method IO-3.5 - Quality Control

Batch B3L0804 - ICP-MS Extraction

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Duplicate (B3L0804-DUP2) Continued		**Source: 3120629-15**		Prepared: 12/08/23	Analyzed: 12/11/23					
Cadmium	ND	0.0962	ng/m³ Air		ND				10	U
Calcium	466	258	ng/m³ Air		471			1.12	10	GC-BS, QB-01
Chromium	1.91	1.79	ng/m³ Air		1.91			0.0787	10	
Cobalt	0.0853	0.0138	ng/m³ Air		0.0855			0.310	10	QB-01
Copper	35.0	2.65	ng/m³ Air		34.3			2.04	10	QB-01
Iron	135	21.4	ng/m³ Air		135			0.0815	10	
Lead	ND	0.244	ng/m³ Air		ND				10	U
Magnesium	183	85.1	ng/m³ Air		184			0.324	10	
Manganese	3.86	1.05	ng/m³ Air		3.84			0.405	10	
Molybdenum	1.18	0.188	ng/m³ Air		1.17			0.980	10	QB-01
Nickel	0.721	0.707	ng/m³ Air		0.713			1.12	10	GC-BS, QB-01
Phosphorus	ND	1100	ng/m³ Air		ND				10	GC-BS, U
Potassium	84.2	33.6	ng/m³ Air		84.0			0.286	10	
Rubidium	0.0909	0.0162	ng/m³ Air		0.0903			0.746	10	
Selenium	0.135	0.00971	ng/m³ Air		0.135			0.472	10	
Sodium	1800	1770	ng/m³ Air		1790			0.532	10	E, GC-BS
Strontium	2.12	0.576	ng/m³ Air		2.12			0.113	10	QB-01
Thallium	5.96E-4	4.44E-4	ng/m³ Air		6.27E-4			5.10	10	
Thorium	0.00520	0.00265	ng/m³ Air		0.00530			1.99	10	
Uranium	ND	0.0150	ng/m³ Air		ND				10	U
Vanadium	0.711	0.0434	ng/m³ Air		0.704			0.916	10	
Zinc	ND	86.3	ng/m³ Air		ND				10	U
Matrix Spike (B3L0804-MS1)		**Source: 3120629-09**		Prepared: 12/08/23	Analyzed: 12/11/23					
Aluminum	259	25.6	ng/m³ Air	66.215	177	124	80-120			QM-07
Antimony	0.490	0.0352	ng/m³ Air	1.1036	ND	44.4	80-120			SL
Arsenic	2.24	0.00762	ng/m³ Air	2.2072	0.0771	98.2	80-120			
Barium	24.5	0.757	ng/m³ Air	22.072	2.65	98.8	80-120			
Beryllium	1.06	0.00265	ng/m³ Air	1.1036	0.00589	95.9	80-120			
Cadmium	1.11	0.0870	ng/m³ Air	1.1036	ND	100	80-120			
Calcium	501	233	ng/m³ Air	55.179	436	117	80-120			GC-BS, QB-01
Chromium	13.0	1.62	ng/m³ Air	11.036	ND	118	80-120			
Cobalt	1.17	0.0124	ng/m³ Air	1.1036	0.0953	97.3	80-120			QB-01
Copper	44.0	2.39	ng/m³ Air	22.072	17.8	119	80-120			QB-01
Iron	211	19.3	ng/m³ Air	22.072	175	159	80-120			QM-4X
Lead	11.0	0.220	ng/m³ Air	11.036	ND	100	80-120			
Magnesium	148	76.9	ng/m³ Air	22.072	121	119	80-120			
Manganese	12.1	0.950	ng/m³ Air	6.6215	4.80	110	80-120			
Molybdenum	2.09	0.170	ng/m³ Air	1.1036	0.962	102	80-120			QB-01

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REPORTED: 12/14/23 10:47
SUBMITTED: 12/06/23
AQS SITE CODE:
SITE CODE: Maui fires

Inorganics by Compendium Method IO-3.5 - Quality Control

Batch B3L0804 - ICP-MS Extraction

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Matrix Spike (B3L0804-MS1) Continued	**Source: 3120629-09**		Prepared: 12/08/23	Analyzed: 12/11/23						
Nickel	3.08	0.639	ng/m³ Air	2.2072	1.13	88.4	80-120			GC-BS, QB-01
Phosphorus	ND	998	ng/m³ Air	11.036	ND		80-120			GC-BS, QM-4X, U
Potassium	118	30.3	ng/m³ Air	44.143	74.0	100	80-120			
Rubidium	1.14	0.0146	ng/m³ Air	1.1036	0.0850	95.7	80-120			
Selenium	2.30	0.00878	ng/m³ Air	2.2072	0.0985	99.6	80-120			
Sodium	ND	1600	ng/m³ Air	44.143	ND		80-120			GC-BS, QM-4X, U
Strontium	3.25	0.520	ng/m³ Air	1.1036	2.04	110	80-120			QB-01
Thallium	0.105	4.01E-4	ng/m³ Air	0.11036	4.58E-4	94.7	80-120			
Thorium	0.0518	0.00239	ng/m³ Air	0.11036	0.00469	42.7	80-120			QM-07
Uranium	0.109	0.0136	ng/m³ Air	0.11036	ND	98.5	80-120			
Vanadium	2.76	0.0393	ng/m³ Air	2.2072	0.531	101	80-120			
Zinc	82.4	78.0	ng/m³ Air	66.215	ND	124	80-120			
Matrix Spike Dup (B3L0804-MSD1)	**Source: 3120629-09**		Prepared: 12/08/23	Analyzed: 12/11/23						
Aluminum	254	25.6	ng/m³ Air	66.215	177	116	80-120	2.14	20	
Antimony	0.493	0.0352	ng/m³ Air	1.1036	ND	44.7	80-120	0.512	20	SL
Arsenic	2.22	0.00762	ng/m³ Air	2.2072	0.0771	96.9	80-120	1.27	20	
Barium	24.3	0.757	ng/m³ Air	22.072	2.65	97.9	80-120	0.852	20	
Beryllium	1.05	0.00265	ng/m³ Air	1.1036	0.00589	94.7	80-120	1.23	20	
Cadmium	1.10	0.0870	ng/m³ Air	1.1036	ND	100	80-120	0.197	20	
Calcium	496	233	ng/m³ Air	55.179	436	109	80-120	0.986	20	GC-BS, QB-01
Chromium	12.8	1.62	ng/m³ Air	11.036	ND	116	80-120	1.51	20	
Cobalt	1.16	0.0124	ng/m³ Air	1.1036	0.0953	96.8	80-120	0.547	20	QB-01
Copper	44.4	2.39	ng/m³ Air	22.072	17.8	120	80-120	0.771	20	QB-01, QM-07
Iron	208	19.3	ng/m³ Air	22.072	175	147	80-120	1.20	20	QM-4X
Lead	10.9	0.220	ng/m³ Air	11.036	ND	99.0	80-120	1.05	20	
Magnesium	142	76.9	ng/m³ Air	22.072	121	94.5	80-120	3.69	20	
Manganese	11.9	0.950	ng/m³ Air	6.6215	4.80	107	80-120	1.61	20	
Molybdenum	2.09	0.170	ng/m³ Air	1.1036	0.962	102	80-120	0.172	20	QB-01
Nickel	2.96	0.639	ng/m³ Air	2.2072	1.13	82.7	80-120	4.22	20	GC-BS, QB-01
Phosphorus	ND	998	ng/m³ Air	11.036	ND		80-120		20	GC-BS, QM-4X, U
Potassium	117	30.3	ng/m³ Air	44.143	74.0	97.2	80-120	1.07	20	
Rubidium	1.12	0.0146	ng/m³ Air	1.1036	0.0850	93.8	80-120	1.90	20	
Selenium	2.24	0.00878	ng/m³ Air	2.2072	0.0985	96.9	80-120	2.63	20	
Sodium	ND	1600	ng/m³ Air	44.143	ND		80-120		20	GC-BS, U
Strontium	3.18	0.520	ng/m³ Air	1.1036	2.04	104	80-120	2.13	20	QB-01
Thallium	0.104	4.01E-4	ng/m³ Air	0.11036	4.58E-4	93.4	80-120	1.40	20	

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FILE #: 0000.00
REPORTED: 12/14/23 10:47
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AQS SITE CODE:
SITE CODE: Maui fires

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes

Inorganics by Compendium Method IO-3.5 - Quality Control

Batch B3L0804 - ICP-MS Extraction

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Matrix Spike Dup (B3L0804-MSD1) ContirSource: 3120629-09			Prepared: 12/08/23 Analyzed: 12/11/23							
Thorium	0.0515	0.00239	ng/m³ Air	0.11036	0.00469	42.4	80-120	0.583	20	QM-07
Uranium	0.107	0.0136	ng/m³ Air	0.11036	ND	96.8	80-120	1.73	20	
Vanadium	2.72	0.0393	ng/m³ Air	2.2072	0.531	99.3	80-120	1.29	20	
Zinc	81.7	78.0	ng/m³ Air	66.215	ND	123	80-120	0.879	20	
Post Spike (B3L0804-PS1)		**Source: 3120629-09**	Prepared: 12/08/23 Analyzed: 12/11/23							
Aluminum	199	25.6	ng/m³ Air	22.072	177	97.9	75-125			
Antimony	0.241	0.0352	ng/m³ Air	0.22072	ND	109	75-125			SL
Arsenic	1.13	0.00762	ng/m³ Air	1.1036	0.0771	95.5	75-125			
Barium	4.84	0.757	ng/m³ Air	2.2072	2.65	98.9	75-125			
Beryllium	0.204	0.00265	ng/m³ Air	0.22072	0.00589	89.6	75-125			
Cadmium	0.117	0.0870	ng/m³ Air	0.11036	ND	106	75-125			
Calcium	467	233	ng/m³ Air	22.072	436	141	75-125			A-01, GC-BS, QB-01
Chromium	2.62	1.62	ng/m³ Air	1.1036	ND	237	75-125			
Cobalt	0.306	0.0124	ng/m³ Air	0.22072	0.0953	95.6	75-125			QB-01
Copper	29.5	2.39	ng/m³ Air	11.036	17.8	106	75-125			QB-01
Iron	197	19.3	ng/m³ Air	22.072	175	97.2	75-125			
Lead	21.4	0.220	ng/m³ Air	22.072	ND	96.9	75-125			
Magnesium	143	76.9	ng/m³ Air	22.072	121	95.5	75-125			
Manganese	6.98	0.950	ng/m³ Air	2.2072	4.80	98.5	75-125			
Molybdenum	2.02	0.170	ng/m³ Air	1.1036	0.962	96.3	75-125			QB-01
Nickel	3.24	0.639	ng/m³ Air	2.2072	1.13	95.4	75-125			GC-BS, QB-01
Phosphorus	ND	998	ng/m³ Air	4.4143	ND		75-125			A-01, GC-BS, U
Potassium	93.9	30.3	ng/m³ Air	22.072	74.0	90.1	75-125			
Rubidium	0.184	0.0146	ng/m³ Air	0.11036	0.0850	89.8	75-125			
Selenium	1.17	0.00878	ng/m³ Air	1.1036	0.0985	97.0	75-125			
Sodium	ND	1600	ng/m³ Air	22.072	ND		75-125			A-01, GC-BS, U
Strontium	3.10	0.520	ng/m³ Air	1.1036	2.04	95.8	75-125			QB-01
Thallium	0.0512	4.01E-4	ng/m³ Air	5.5179E-2	4.58E-4	91.9	75-125			
Thorium	0.0525	0.00239	ng/m³ Air	5.5179E-2	0.00469	86.7	75-125			
Uranium	0.0548	0.0136	ng/m³ Air	5.5179E-2	ND	99.3	75-125			
Vanadium	1.59	0.0393	ng/m³ Air	1.1036	0.531	96.2	75-125			
Zinc	ND	78.0	ng/m³ Air	22.072	ND		75-125			U
Dilution Check (B3L0804-SRL1)		**Source: 3120629-09**	Prepared: 12/08/23 Analyzed: 12/11/23							
Aluminum	175	128	ng/m³ Air		177			1.43	10	
Antimony	ND	0.176	ng/m³ Air		ND				10	SL, U
Arsenic	0.0812	0.0381	ng/m³ Air		0.0771			5.23	10	

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AQS SITE CODE:
SITE CODE: Maui fires

Inorganics by Compendium Method IO-3.5 - Quality Control

Batch B3L0804 - ICP-MS Extraction

Dilution Check (B3L0804-SRL1) Continued Source: 3120629-09 Prepared: 12/08/23 Analyzed: 12/11/23

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Barium	ND	3.78	ng/m³ Air		ND				10	U
Beryllium	0.0138	0.0132	ng/m³ Air		ND			80.2	10	
Cadmium	ND	0.435	ng/m³ Air		ND				10	U
Calcium	ND	1170	ng/m³ Air		ND				10	GC-BS, QB-01 U
Chromium	ND	8.10	ng/m³ Air		ND				10	U
Cobalt	0.0955	0.0622	ng/m³ Air		0.0953			0.247	10	QB-01
Copper	17.9	12.0	ng/m³ Air		17.8			0.483	10	QB-01
Iron	172	96.6	ng/m³ Air		175			1.77	10	
Lead	ND	1.10	ng/m³ Air		ND				10	U
Magnesium	ND	385	ng/m³ Air		ND				10	U
Manganese	4.75	4.75	ng/m³ Air		4.80			1.13	10	
Molybdenum	0.965	0.850	ng/m³ Air		0.962			0.292	10	QB-01
Nickel	ND	3.20	ng/m³ Air		ND				10	GC-BS, QB-01 U
Phosphorus	ND	4990	ng/m³ Air		ND				10	GC-BS, U
Potassium	ND	152	ng/m³ Air		ND				10	U
Rubidium	0.0825	0.0730	ng/m³ Air		0.0850			2.95	10	
Selenium	0.0910	0.0439	ng/m³ Air		0.0985			7.87	10	
Sodium	ND	7980	ng/m³ Air		ND				10	GC-BS, U
Strontium	ND	2.60	ng/m³ Air		ND				10	QB-01, U
Thallium	0.00209	0.00201	ng/m³ Air		ND			128	10	
Thorium	ND	0.0120	ng/m³ Air		ND				10	U
Uranium	ND	0.0678	ng/m³ Air		ND				10	U
Vanadium	0.532	0.196	ng/m³ Air		0.531			0.290	10	
Zinc	ND	390	ng/m³ Air		ND				10	U

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REPORTED: 12/14/23 10:47
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AQS SITE CODE:
SITE CODE: Maui fires

Notes and Definitions

U	Under Detection Limit
SL	The spike recovery was outside acceptance limits. Reported value may be biased low.
QM-4X	The MS/MSD recovery exceeds criteria because the parent sample concentration is greater than 4x the spike concentration. Sample results for the QC batch were accepted based on acceptable BS/BSD recoveries.
QM-07	The spike recovery was outside acceptance limits for the MS and/or MSD. The batch was accepted based on acceptable LCS recovery.
QB-01	Analyte exceeds method blank criteria
GC-BS	Compound exceeds Blank Spike Criteria
FB-01	Analyte exceeds Field Blank criteria.
E	The concentration indicated for this analyte is an estimated value above the calibration range of the instrument. This value is considered an estimate (CLP E-flag).
D-F	Duplicate exceeds DQO criteria.
A-01	Parent sample >4x spike amount
ND	Analyte NOT DETECTED
NR	Not Reported
MDL	Method Detection Limit
RPD	Relative Percent Difference

Note: This test is accredited under the 2016 TNI Standard.

Stage 1 Data Verification Checklist – Metals

HDOH CAB – Ambient Community Air Sampling – Kula

Task Order No. 23141

Reviewed by:
Talaidh Isaacs 12/15/2023 & Shanna Vasser 12/15/2023
Laboratory: Eastern Research Group, Inc. – Morrisville, NC
Analysis date: 12/11/2023
Report No: 3120629

√	1.	Chain of custody (CoC) documentation is present.
X	2.	Sample receipt condition information is present and acceptable.
√	3.	Laboratory conducting the analysis is identified.
√	4.	All samples submitted to the laboratory are accounted for.
√	5.	Requested analytical methods were performed.
√	6.	Analysis dates are provided.
√	7.	Analyte results are provided.
√	8.	Result qualifiers and definitions are provided.
√	9.	Result units are reported.
NA	10.	Requested reporting limits are present.
√	11.	Method detection limits are present.
√	12.	Sample collection date and time are present.

Discrepancies: None

Notes:

2. No sample receipt information was presented by the laboratory.

10. No reporting limits were included in this data package.

[redacted]

Eastern Research Group
601 Keystone Park Drive
Suite 700
Morrisville, NC 27560

December 19, 2023

Ms. Chelsea Saber
Tetra Tech, Inc.
1777 Sentry Pkwy, Bldg 12
Blue Bell, PA 19422
Project Name: Maui fires

Dear Ms. Chelsea Saber,

This report contains the analytical results for the sample(s) received under chain(s) of custody by Eastern Research Group on 12/11/23 11:34 through 12/13/23 13:27.

Values below the MDL for QC results in this report are recorded as ND, however the actual values are reported in the accompanying Excel report with a "U" flag (Under the detection limit). The actual values are reported in AQS.

This test is accredited under the 2016 TNI Standard for Environmental Laboratories (FL DOH Certification # E87673). All analyses were performed as described in the US EPA-approved QAPP, under the contract for National Hazardous Air Pollutant Support (US EPA Contract No. 68HERH22D0002). This cover page is an integral part of this report, and any exceptions or comments are noted on the last page.

Release of the data contained in this data package and in the data submitted in the electronic data deliverable, has been authorized by the Program Manager, or the Program Manager's designee as verified by the following signature.

The issuance of the final Certificate of Analysis takes precedence over any previous Report. If you have any questions, please contact me at 919-468-7924.

Sincerely,

Julie Swift
Program Manager
julie.swift@erg.com

The information contained in this report and its attachment(s) are intended only for the use of the individual to whom it is addressed and may contain information that is privileged, confidential, or exempt from disclosure. If the reader of this message is not the intended recipient, you are hereby notified that any dissemination, distribution, or copying of this report is strictly prohibited. If you have received this report in error, please notify julie.swift@erg.com and delete the report without retaining any copies.

[redacted]

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FILE #: 0000.00
REPORTED: 12/19/23 10:54
SUBMITTED: 12/11/23 to 12/13/23
AQS SITE CODE:
SITE CODE: Maui fires

ANALYTICAL REPORT FOR SAMPLES

SampleName	LabNumber	Matrix	Sampled	Received
TetraTech Q9543005	3121111-01	Air	12/04/23 23:59	12/11/23 11:34
TetraTech Q9543004	3121111-02	Air	12/04/23 23:59	12/11/23 11:34
TetraTech Q9543002	3121111-03	Air	12/04/23 23:59	12/11/23 11:34
TetraTech Q9542995 FB	3121111-04	Air	12/04/23 00:00	12/11/23 11:34
TetraTech Q9542999	3121111-05	Air	12/05/23 23:59	12/11/23 11:34
TetraTech Q9542997	3121111-06	Air	12/05/23 23:59	12/11/23 11:34
TetraTech Q9542996	3121111-07	Air	12/05/23 23:59	12/11/23 11:34
TetraTech Q9542989 FB	3121111-08	Air	12/05/23 00:00	12/11/23 11:34
TetraTech Q9542993	3121111-09	Air	12/06/23 23:59	12/11/23 11:34
TetraTech Q9542992	3121111-10	Air	12/06/23 23:59	12/11/23 11:34
TetraTech Q9542991	3121111-11	Air	12/06/23 23:59	12/11/23 11:34
TetraTech Q9542984 FB	3121111-12	Air	12/06/23 00:00	12/11/23 11:34
TetraTech Q9542988	3121332-01	Air	12/07/23 23:59	12/13/23 13:27
TetraTech Q9542986	3121332-02	Air	12/07/23 23:59	12/13/23 13:27
TetraTech Q9542985	3121332-03	Air	12/07/23 23:59	12/13/23 13:27
TetraTech Q9541906	3121332-04	Air	12/08/23 23:59	12/13/23 13:27
TetraTech Q9542982	3121332-05	Air	12/08/23 23:59	12/13/23 13:27
TetraTech Q9542983	3121332-06	Air	12/08/23 23:59	12/13/23 13:27
TetraTech Q9533914	3121332-07	Air	12/09/23 23:59	12/13/23 13:27
TetraTech Q9533913	3121332-08	Air	12/09/23 23:59	12/13/23 13:27
TetraTech Q9533928	3121332-09	Air	12/09/23 23:59	12/13/23 13:27

[redacted]

CERTIFICATE OF ANALYSIS

Tetra Tech, Inc.
1777 Sentry Pkwy, Bldg 12
Blue Bell, PA 19422
ATTN: Ms. Chelsea Saber
PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 12/19/23 10:54
SUBMITTED: 12/11/23 to 12/13/23
AQS SITE CODE:
SITE CODE: Maui fires

TetraTech Q9533920 FB	3121332-10	Air	12/09/23 00:00	12/13/23 13:27
TetraTech Q9533933 LB	3121332-11	Air	12/09/23 00:00	12/13/23 13:27
TetraTech Q9533927	3121332-12	Air	12/10/23 23:59	12/13/23 13:27
TetraTech Q9533925	3121332-13	Air	12/10/23 23:59	12/13/23 13:27
TetraTech Q9533924	3121332-14	Air	12/10/23 23:59	12/13/23 13:27
TetraTech Q9533929 FB	3121332-15	Air	12/10/23 00:00	12/13/23 13:27

[redacted]

CERTIFICATE OF ANALYSIS

Tetra Tech, Inc.
1777 Sentry Pkwy, Bldg 12
Blue Bell, PA 19422
ATTN: Ms. Chelsea Saber
PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 12/19/23 10:54
SUBMITTED: 12/11/23 to 12/13/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9543005 **Lab ID:** 3121111-01 **Sampled:** 12/04/23 23:59
Matrix: Air **Sample Volume:** 1913.94 m^3 **Received:** 12/11/23 11:34
Filter ID: **Analysis Date:** 12/13/23 19:38
Comments: MFK-AM01-120423-HM

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	**7429-90-5**	**1420**	E	**27.3**
Antimony	**7440-36-0**	**0.0524**	SL	**0.0375**
Arsenic	**7440-38-2**	**0.208**		**0.00812**
Barium	**7440-39-3**	**9.54**		**0.806**
Beryllium	**7440-41-7**	**0.0381**		**0.00282**
Cadmium	7440-43-9	0.0134	U	0.0927
Calcium	**7440-70-2**	**701**	LJ, QB-01	**248**
Chromium	**7440-47-3**	**2.45**		**1.73**
Cobalt	**7440-48-4**	**0.474**	QB-01	**0.0133**
Copper	**7440-50-8**	**18.4**		**2.55**
Lead	**7439-92-1**	**0.417**		**0.235**
Magnesium	**7439-95-4**	**186**		**81.9**
Manganese	**7439-96-5**	**32.9**	QB-01	**1.01**
Molybdenum	**7439-98-7**	**0.975**	QB-01	**0.181**
Nickel	**7440-02-0**	**0.915**		**0.681**
Phosphorus	7723-14-0	440	U, GC-BS	1060
Potassium	**7440-09-7**	**136**		**32.3**
Rubidium	**7440-17-7**	**0.332**		**0.0156**
Selenium	**7782-49-2**	**0.268**		**0.00935**
Sodium	7440-23-5	1240	GC-BS, U	1700
Strontium	**7440-24-6**	**6.96**	QB-01	**0.554**
Thallium	**7440-28-0**	**0.00204**		**4.28E-4**
Thorium	**7440-29-01**	**0.0308**		**0.00255**
Uranium	**7440-61-1**	**0.0257**		**0.0145**
Vanadium	**7440-62-2**	**3.37**	QB-01	**0.0418**
Zinc	7440-66-6	13.5	U	83.1

[redacted]

CERTIFICATE OF ANALYSIS

Tetra Tech, Inc.
1777 Sentry Pkwy, Bldg 12
Blue Bell, PA 19422
ATTN: Ms. Chelsea Saber
PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 12/19/23 10:54
SUBMITTED: 12/11/23 to 12/13/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9543005
Matrix: Air
Lab ID: 3121111-01RE1
Sample Volume: 1913.94 m^3
Filter ID:
Sampled: 12/04/23 23:59
Received: 12/11/23 11:34
Analysis Date: 12/15/23 02:50
Comments: MFK-AM01-120423-HM

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Iron	7439-89-6	1380	D	41.1

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CERTIFICATE OF ANALYSIS

Tetra Tech, Inc.
1777 Sentry Pkwy, Bldg 12
Blue Bell, PA 19422
ATTN: Ms. Chelsea Saber
PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 12/19/23 10:54
SUBMITTED: 12/11/23 to 12/13/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9543004 **Lab ID:** 3121111-02 **Sampled:** 12/04/23 23:59
Matrix: Air **Sample Volume:** 1968.659 m³ **Received:** 12/11/23 11:34
Filter ID: **Analysis Date:** 12/13/23 16:53
Comments: MFK-AM02-120423-HM/MS/MSD

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	**7429-90-5**	**159**		**26.5**
Antimony	**7440-36-0**	**0.0779**	SL	**0.0364**
Arsenic	**7440-38-2**	**0.176**		**0.00789**
Barium	**7440-39-3**	**3.44**		**0.783**
Beryllium	**7440-41-7**	**0.00625**		**0.00274**
Cadmium	7440-43-9	0.0118	U	0.0901
Calcium	**7440-70-2**	**467**	LJ, QB-01	**241**
Chromium	7440-47-3	1.65	U	1.68
Cobalt	**7440-48-4**	**0.117**	QB-01	**0.0129**
Copper	**7440-50-8**	**18.5**		**2.48**
Iron	**7439-89-6**	**185**	GC-BS, QM-4X	**20.0**
Lead	7439-92-1	0.202	U	0.228
Magnesium	**7439-95-4**	**136**		**79.7**
Manganese	**7439-96-5**	**5.13**	QB-01	**0.983**
Molybdenum	**7439-98-7**	**0.890**	QB-01	**0.176**
Nickel	7440-02-0	0.533	U, LJ, QX	0.662
Phosphorus	7723-14-0	370	U, GC-BS, QM-4X	1030
Potassium	**7440-09-7**	**85.5**		**31.4**
Rubidium	**7440-17-7**	**0.112**		**0.0151**
Selenium	**7782-49-2**	**0.104**		**0.00909**
Sodium	7440-23-5	1340	U, GC-BS, QM-4X	1650
Strontium	**7440-24-6**	**2.18**	QB-01	**0.539**
Thallium	**7440-28-0**	**6.19E-4**		**4.16E-4**
Thorium	**7440-29-01**	**0.00662**	QM-07	**0.00248**
Uranium	7440-61-1	0.00526	U	0.0140
Vanadium	**7440-62-2**	**0.660**	QB-01	**0.0407**
Zinc	7440-66-6	18.1	U	80.7

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CERTIFICATE OF ANALYSIS

Tetra Tech, Inc.
1777 Sentry Pkwy, Bldg 12
Blue Bell, PA 19422
ATTN: Ms. Chelsea Saber
PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 12/19/23 10:54
SUBMITTED: 12/11/23 to 12/13/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9543002 **Lab ID:** 3121111-03 **Sampled:** 12/04/23 23:59
Matrix: Air **Sample Volume:** 1668.824 m³ **Received:** 12/11/23 11:34
Filter ID: **Analysis Date:** 12/13/23 19:52
Comments: MFK-AM03-120423-HM

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	**7429-90-5**	**148**		**31.3**
Antimony	**7440-36-0**	**0.0734**	SL	**0.0430**
Arsenic	**7440-38-2**	**0.114**		**0.00931**
Barium	**7440-39-3**	**3.93**		**0.924**
Beryllium	**7440-41-7**	**0.00722**		**0.00324**
Cadmium	7440-43-9	0.00793	U	0.106
Calcium	**7440-70-2**	**521**	LJ, QB-01	**285**
Chromium	7440-47-3	1.91	U	1.98
Cobalt	**7440-48-4**	**0.111**	QB-01	**0.0152**
Copper	**7440-50-8**	**33.1**		**2.92**
Iron	**7439-89-6**	**195**	GC-BS	**23.6**
Lead	7439-92-1	0.211	U	0.269
Magnesium	**7439-95-4**	**166**		**94.0**
Manganese	**7439-96-5**	**5.87**	QB-01	**1.16**
Molybdenum	**7439-98-7**	**1.05**	QB-01	**0.208**
Nickel	7440-02-0	0.538	U	0.781
Phosphorus	7723-14-0	441	U, GC-BS	1220
Potassium	**7440-09-7**	**92.1**		**37.0**
Rubidium	**7440-17-7**	**0.114**		**0.0178**
Selenium	**7782-49-2**	**0.115**		**0.0107**
Sodium	7440-23-5	1610	U, GC-BS	1950
Strontium	**7440-24-6**	**2.44**	QB-01	**0.636**
Thallium	**7440-28-0**	**5.76E-4**		**4.90E-4**
Thorium	**7440-29-01**	**0.00695**		**0.00292**
Uranium	7440-61-1	0.00587	U	0.0166
Vanadium	**7440-62-2**	**0.688**	QB-01	**0.0480**
Zinc	7440-66-6	16.0	U	95.3

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Tetra Tech, Inc.
1777 Sentry Pkwy, Bldg 12
Blue Bell, PA 19422
ATTN: Ms. Chelsea Saber
PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 12/19/23 10:54
SUBMITTED: 12/11/23 to 12/13/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9542995 FB
Lab ID: 3121111-04
Sampled: 12/04/23 00:00
Matrix: Air
Sample Volume: 1913.94 m³
Received: 12/11/23 11:34
Filter ID:
Analysis Date: 12/13/23 20:06
Comments: MFK-FB01-120423-HM Field blank

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	7429-90-5	9.28	U	27.3
Antimony	7440-36-0	0.00725	SL, U	0.0375
Arsenic	7440-38-2	0.00186	U	0.00812
Barium	7440-39-3	0.609	U	0.806
Beryllium	7440-41-7	9.42E-4	U	0.00282
Cadmium	7440-43-9	0.00239	U	0.0927
Calcium	**7440-70-2**	**344**	FB-01, LJ, QB-01	**248**
Chromium	7440-47-3	1.50	U	1.73
Cobalt	**7440-48-4**	**0.0265**	FB-01, QB-01	**0.0133**
Copper	7440-50-8	0.296	U	2.55
Iron	7439-89-6	15.9	GC-BS, U	20.6
Lead	7439-92-1	0.0553	U	0.235
Magnesium	7439-95-4	42.8	U	81.9
Manganese	7439-96-5	0.900	QB-01, U	1.01
Molybdenum	**7439-98-7**	**0.245**	FB-01, QB-01	**0.181**
Nickel	7440-02-0	0.309	U	0.681
Phosphorus	7723-14-0	337	GC-BS, U	1060
Potassium	7440-09-7	11.6	U	32.3
Rubidium	7440-17-7	0.0141	U	0.0156
Selenium	7782-49-2	0.00358	U	0.00935
Sodium	7440-23-5	699	GC-BS, U	1700
Strontium	**7440-24-6**	**0.698**	FB-01, QB-01	**0.554**
Thallium	7440-28-0	6.24E-5	U	4.28E-4
Thorium	7440-29-01	0.00219	U	0.00255
Uranium	7440-61-1	0.00171	U	0.0145
Vanadium	**7440-62-2**	**0.0433**	FB-01, QB-01	**0.0418**
Zinc	7440-66-6	8.64	U	83.1

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Tetra Tech, Inc.	**FILE #:** 0000.00
1777 Sentry Pkwy, Bldg 12	**REPORTED:** 12/19/23 10:54
Blue Bell, PA 19422	**SUBMITTED:** 12/11/23 to 12/13/23
ATTN: Ms. Chelsea Saber	**AQS SITE CODE:**
PHONE: (703) 885-5495 **FAX:**	**SITE CODE:** Maui fires

Description:	TetraTech Q9542999	**Lab ID:**	3121111-05	**Sampled:**	12/05/23 23:59
Matrix:	Air	**Sample Volume:**	1986.678 m³	**Received:**	12/11/23 11:34
		Filter ID:		**Analysis Date:**	12/13/23 20:20
Comments:	MFK-AM01-120523-HM				

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	**7429-90-5**	**1900**	E	**26.3**
Antimony	**7440-36-0**	**0.0469**	SL	**0.0361**
Arsenic	**7440-38-2**	**0.212**		**0.00782**
Barium	**7440-39-3**	**11.9**		**0.776**
Beryllium	**7440-41-7**	**0.0514**		**0.00272**
Cadmium	7440-43-9	0.0174	U	0.0893
Calcium	**7440-70-2**	**664**	LJ, QB-01	**239**
Chromium	**7440-47-3**	**2.87**		**1.66**
Cobalt	**7440-48-4**	**0.689**	QB-01	**0.0128**
Copper	**7440-50-8**	**20.0**		**2.46**
Lead	**7439-92-1**	**0.539**		**0.226**
Magnesium	**7439-95-4**	**178**		**78.9**
Manganese	**7439-96-5**	**49.3**	QB-01	**0.975**
Molybdenum	**7439-98-7**	**0.702**	QB-01	**0.174**
Nickel	**7440-02-0**	**0.973**		**0.656**
Phosphorus	7723-14-0	439	GC-BS, U	1020
Potassium	**7440-09-7**	**87.0**		**31.1**
Rubidium	**7440-17-7**	**0.339**		**0.0150**
Selenium	**7782-49-2**	**0.305**		**0.00901**
Sodium	7440-23-5	1150	GC-BS, U	1640
Strontium	**7440-24-6**	**7.08**	QB-01	**0.534**
Thallium	**7440-28-0**	**0.00261**		**4.12E-4**
Thorium	**7440-29-01**	**0.0389**		**0.00246**
Uranium	**7440-61-1**	**0.0334**		**0.0139**
Vanadium	**7440-62-2**	**4.23**	QB-01	**0.0403**
Zinc	7440-66-6	15.2	U	80.0

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CERTIFICATE OF ANALYSIS

Tetra Tech, Inc.		**FILE #:**	0000.00
1777 Sentry Pkwy, Bldg 12		**REPORTED:**	12/19/23 10:54
Blue Bell, PA 19422		**SUBMITTED:**	12/11/23 to 12/13/23
ATTN: Ms. Chelsea Saber		**AQS SITE CODE:**	
PHONE: (703) 885-5495	**FAX:**	**SITE CODE:**	Maui fires

Description:	TetraTech Q9542999	**Lab ID:**	3121111-05RE1	**Sampled:**	12/05/23 23:59
Matrix:	Air	**Sample Volume:**	1986.678 m³	**Received:**	12/11/23 11:34
		Filter ID:		**Analysis Date:**	12/15/23 03:04
Comments:	MFK-AM01-120523-HM				

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Iron	**7439-89-6**	**1790**	D	**99.1**

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CERTIFICATE OF ANALYSIS

Tetra Tech, Inc.
1777 Sentry Pkwy, Bldg 12
Blue Bell, PA 19422
ATTN: Ms. Chelsea Saber
PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 12/19/23 10:54
SUBMITTED: 12/11/23 to 12/13/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9542997 **Lab ID:** 3121111-06 **Sampled:** 12/05/23 23:59
Matrix: Air **Sample Volume:** 1973.767 m³ **Received:** 12/11/23 11:34
Filter ID: **Analysis Date:** 12/13/23 20:34
Comments: MFK-AM02-120523-HM

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	**7429-90-5**	**263**		**26.5**
Antimony	**7440-36-0**	**0.0570**	SL	**0.0364**
Arsenic	**7440-38-2**	**0.137**		**0.00787**
Barium	**7440-39-3**	**4.16**		**0.781**
Beryllium	**7440-41-7**	**0.00921**		**0.00274**
Cadmium	7440-43-9	0.00868	U	0.0899
Calcium	**7440-70-2**	**480**	LJ, QB-01	**241**
Chromium	**7440-47-3**	**1.72**		**1.67**
Cobalt	**7440-48-4**	**0.157**	QB-01	**0.0129**
Copper	**7440-50-8**	**13.9**		**2.47**
Iron	**7439-89-6**	**303**	GC-BS	**19.9**
Lead	**7439-92-1**	**0.298**		**0.228**
Magnesium	**7439-95-4**	**146**		**79.5**
Manganese	**7439-96-5**	**8.07**	QB-01	**0.981**
Molybdenum	**7439-98-7**	**0.615**	QB-01	**0.176**
Nickel	7440-02-0	0.511	U	0.660
Phosphorus	7723-14-0	355	GC-BS, U	1030
Potassium	**7440-09-7**	**93.9**		**31.3**
Rubidium	**7440-17-7**	**0.149**		**0.0151**
Selenium	**7782-49-2**	**0.120**		**0.00907**
Sodium	7440-23-5	1330	GC-BS, U	1650
Strontium	**7440-24-6**	**2.82**	QB-01	**0.537**
Thallium	**7440-28-0**	**6.72E-4**		**4.15E-4**
Thorium	**7440-29-01**	**0.00836**		**0.00247**
Uranium	7440-61-1	0.00746	U	0.0140
Vanadium	**7440-62-2**	**0.807**	QB-01	**0.0406**
Zinc	7440-66-6	14.3	U	80.5

Eastern Research Group

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CERTIFICATE OF ANALYSIS

Tetra Tech, Inc.
1777 Sentry Pkwy, Bldg 12
Blue Bell, PA 19422
ATTN: Ms. Chelsea Saber
PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 12/19/23 10:54
SUBMITTED: 12/11/23 to 12/13/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9542996
Matrix: Air
Lab ID: 3121111-07
Sample Volume: 1619.558 m³
Filter ID:
Sampled: 12/05/23 23:59
Received: 12/11/23 11:34
Analysis Date: 12/13/23 20:48
Comments: MFK-AM03-120523-HM

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	**7429-90-5**	**283**		**32.2**
Antimony	**7440-36-0**	**0.0723**	SL	**0.0443**
Arsenic	**7440-38-2**	**0.0999**		**0.00959**
Barium	**7440-39-3**	**5.72**		**0.952**
Beryllium	**7440-41-7**	**0.0121**		**0.00334**
Cadmium	7440-43-9	0.00759	U	0.110
Calcium	**7440-70-2**	**559**	LJ, QB-01	**293**
Chromium	7440-47-3	2.01	U	2.04
Cobalt	**7440-48-4**	**0.171**	QB-01	**0.0157**
Copper	**7440-50-8**	**50.5**		**3.01**
Iron	**7439-89-6**	**347**	GC-BS	**24.3**
Lead	**7439-92-1**	**0.563**		**0.277**
Magnesium	**7439-95-4**	**170**		**96.8**
Manganese	**7439-96-5**	**9.64**	QB-01	**1.20**
Molybdenum	**7439-98-7**	**1.20**	QB-01	**0.214**
Nickel	7440-02-0	0.494	U	0.805
Phosphorus	7723-14-0	415	GC-BS, U	1260
Potassium	**7440-09-7**	**90.6**		**38.2**
Rubidium	**7440-17-7**	**0.160**		**0.0184**
Selenium	**7782-49-2**	**0.127**		**0.0111**
Sodium	7440-23-5	1510	GC-BS, U	2010
Strontium	**7440-24-6**	**3.18**	QB-01	**0.655**
Thallium	**7440-28-0**	**7.06E-4**		**5.05E-4**
Thorium	**7440-29-01**	**0.0112**		**0.00301**
Uranium	7440-61-1	0.00846	U	0.0171
Vanadium	**7440-62-2**	**0.887**	QB-01	**0.0494**
Zinc	7440-66-6	18.8	U	98.1

[redacted]

CERTIFICATE OF ANALYSIS

Tetra Tech, Inc.
1777 Sentry Pkwy, Bldg 12
Blue Bell, PA 19422
ATTN: Ms. Chelsea Saber
PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 12/19/23 10:54
SUBMITTED: 12/11/23 to 12/13/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9542989 FB
Matrix: Air
Lab ID: 3121111-08
Sample Volume: 1986.678 m³
Filter ID:
Sampled: 12/05/23 00:00
Received: 12/11/23 11:34
Analysis Date: 12/13/23 21:02

Comments: MFK-FB01-120523-HM Field Blank

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	7429-90-5	10.4	U	26.3
Antimony	7440-36-0	0.00607	SL, U	0.0361
Arsenic	7440-38-2	0.00236	U	0.00782
Barium	7440-39-3	0.604	U	0.776
Beryllium	7440-41-7	9.08E-4	U	0.00272
Cadmium	7440-43-9	0.00221	U	0.0893
Calcium	**7440-70-2**	**343**	FB-01, LJ, QB-01	**239**
Chromium	7440-47-3	1.49	U	1.66
Cobalt	**7440-48-4**	**0.0276**	FB-01, QB-01	**0.0128**
Copper	7440-50-8	0.282	U	2.46
Iron	7439-89-6	11.2	GC-BS, U	19.8
Lead	7439-92-1	0.0523	U	0.226
Magnesium	7439-95-4	42.8	U	78.9
Manganese	7439-96-5	0.237	QB-01, U	0.975
Molybdenum	**7439-98-7**	**0.240**	FB-01, QB-01	**0.174**
Nickel	7440-02-0	0.282	U	0.656
Phosphorus	7723-14-0	350	GC-BS, U	1020
Potassium	7440-09-7	10.8	U	31.1
Rubidium	7440-17-7	0.0123	U	0.0150
Selenium	7782-49-2	0.00312	U	0.00901
Sodium	7440-23-5	716	GC-BS, U	1640
Strontium	**7440-24-6**	**0.722**	FB-01, QB-01	**0.534**
Thallium	7440-28-0	5.29E-5	U	4.12E-4
Thorium	7440-29-01	0.00225	U	0.00246
Uranium	7440-61-1	0.00183	U	0.0139
Vanadium	7440-62-2	0.0289	QB-01, U	0.0403
Zinc	7440-66-6	8.58	U	80.0

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CERTIFICATE OF ANALYSIS

Tetra Tech, Inc.
1777 Sentry Pkwy, Bldg 12
Blue Bell, PA 19422
ATTN: Ms. Chelsea Saber
PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 12/19/23 10:54
SUBMITTED: 12/11/23 to 12/13/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9542993
Matrix: Air
Comments: MFK-AM01-120623-HM

Lab ID: 3121111-09
Sample Volume: 2026.096 m³
Filter ID:

Sampled: 12/06/23 23:59
Received: 12/11/23 11:34
Analysis Date: 12/13/23 21:16

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	**7429-90-5**	**2620**	E	**25.8**
Antimony	**7440-36-0**	**0.0603**	SL	**0.0354**
Arsenic	**7440-38-2**	**0.345**		**0.00767**
Barium	**7440-39-3**	**16.1**		**0.761**
Beryllium	**7440-41-7**	**0.0706**		**0.00267**
Cadmium	7440-43-9	0.0255	U	0.0875
Calcium	**7440-70-2**	**1030**	LJ, QB-01	**234**
Chromium	**7440-47-3**	**3.62**		**1.63**
Cobalt	**7440-48-4**	**1.05**	QB-01	**0.0125**
Copper	**7440-50-8**	**21.2**		**2.41**
Lead	**7439-92-1**	**0.857**		**0.222**
Magnesium	**7439-95-4**	**366**		**77.4**
Manganese	**7439-96-5**	**69.2**	QB-01	**0.956**
Molybdenum	**7439-98-7**	**0.715**	QB-01	**0.171**
Nickel	**7440-02-0**	**1.68**		**0.643**
Phosphorus	7723-14-0	484	GC-BS, U	1000
Potassium	**7440-09-7**	**156**		**30.5**
Rubidium	**7440-17-7**	**0.455**		**0.0147**
Selenium	**7782-49-2**	**0.438**		**0.00883**
Sodium	**7440-23-5**	**2170**	E, GC-BS	**1610**
Strontium	**7440-24-6**	**10.4**	QB-01	**0.524**
Thallium	**7440-28-0**	**0.00381**		**4.04E-4**
Thorium	**7440-29-01**	**0.0602**		**0.00241**
Uranium	**7440-61-1**	**0.0492**		**0.0137**
Vanadium	**7440-62-2**	**6.53**	QB-01	**0.0395**
Zinc	7440-66-6	15.9	U	78.5

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CERTIFICATE OF ANALYSIS

Tetra Tech, Inc.
1777 Sentry Pkwy, Bldg 12
Blue Bell, PA 19422
ATTN: Ms. Chelsea Saber
PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 12/19/23 10:54
SUBMITTED: 12/11/23 to 12/13/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9542993
Lab ID: 3121111-09RE1
Sampled: 12/06/23 23:59
Matrix: Air
Sample Volume: 2026.096 m³
Received: 12/11/23 11:34
Filter ID:
Analysis Date: 12/15/23 03:17
Comments: MFK-AM01-120623-HM

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Iron	7439-89-6	2630	D	97.2

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Tetra Tech, Inc.
1777 Sentry Pkwy, Bldg 12
Blue Bell, PA 19422
ATTN: Ms. Chelsea Saber
PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 12/19/23 10:54
SUBMITTED: 12/11/23 to 12/13/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9542992
Matrix: Air
Lab ID: 3121111-10
Sample Volume: 2035.303 m³
Filter ID:
Sampled: 12/06/23 23:59
Received: 12/11/23 11:34
Analysis Date: 12/13/23 22:05
Comments: MFK-AM02-120623-HM

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	**7429-90-5**	**509**		**25.7**
Antimony	**7440-36-0**	**0.0558**	SL	**0.0353**
Arsenic	**7440-38-2**	**0.188**		**0.00763**
Barium	**7440-39-3**	**5.74**		**0.758**
Beryllium	**7440-41-7**	**0.0181**		**0.00265**
Cadmium	7440-43-9	0.0203	U	0.0871
Calcium	**7440-70-2**	**747**	LJ, QB-01	**233**
Chromium	**7440-47-3**	**2.16**		**1.62**
Cobalt	**7440-48-4**	**0.343**	QB-01	**0.0125**
Copper	**7440-50-8**	**14.9**		**2.40**
Iron	**7439-89-6**	**611**	GC-BS	**19.3**
Lead	**7439-92-1**	**0.879**		**0.221**
Magnesium	**7439-95-4**	**294**		**77.1**
Manganese	**7439-96-5**	**18.8**	QB-01	**0.951**
Molybdenum	**7439-98-7**	**0.652**	QB-01	**0.170**
Nickel	**7440-02-0**	**1.22**		**0.640**
Phosphorus	7723-14-0	367	GC-BS, U	999
Potassium	**7440-09-7**	**134**		**30.4**
Rubidium	**7440-17-7**	**0.209**		**0.0146**
Selenium	**7782-49-2**	**0.183**		**0.00879**
Sodium	**7440-23-5**	**2240**	E, GC-BS	**1600**
Strontium	**7440-24-6**	**5.23**	QB-01	**0.521**
Thallium	**7440-28-0**	**0.00118**		**4.02E-4**
Thorium	**7440-29-01**	**0.0151**		**0.00240**
Uranium	**7440-61-1**	**0.0136**		**0.0136**
Vanadium	**7440-62-2**	**1.94**	QB-01	**0.0393**
Zinc	7440-66-6	13.7	U	78.1

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CERTIFICATE OF ANALYSIS

Tetra Tech, Inc.
1777 Sentry Pkwy, Bldg 12
Blue Bell, PA 19422
ATTN: Ms. Chelsea Saber
PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 12/19/23 10:54
SUBMITTED: 12/11/23 to 12/13/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9542991 **Lab ID:** 3121111-11 **Sampled:** 12/06/23 23:59
Matrix: Air **Sample Volume:** 1665.355 m³ **Received:** 12/11/23 11:34
Filter ID: **Analysis Date:** 12/13/23 22:20
Comments: MFK-AM03-120623-HM

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	**7429-90-5**	**441**		**31.4**
Antimony	**7440-36-0**	**0.0719**	SL	**0.0431**
Arsenic	**7440-38-2**	**0.151**		**0.00933**
Barium	**7440-39-3**	**6.85**		**0.926**
Beryllium	**7440-41-7**	**0.0196**		**0.00324**
Cadmium	7440-43-9	0.0101	U	0.106
Calcium	**7440-70-2**	**798**	LJ, QB-01	**285**
Chromium	**7440-47-3**	**2.53**		**1.98**
Cobalt	**7440-48-4**	**0.334**	QB-01	**0.0152**
Copper	**7440-50-8**	**30.1**		**2.93**
Iron	**7439-89-6**	**584**	GC-BS	**23.6**
Lead	**7439-92-1**	**0.418**		**0.270**
Magnesium	**7439-95-4**	**317**		**94.2**
Manganese	**7439-96-5**	**17.4**	QB-01	**1.16**
Molybdenum	**7439-98-7**	**0.892**	QB-01	**0.208**
Nickel	**7440-02-0**	**1.26**		**0.783**
Phosphorus	7723-14-0	438	GC-BS, U	1220
Potassium	**7440-09-7**	**133**		**37.1**
Rubidium	**7440-17-7**	**0.208**		**0.0179**
Selenium	**7782-49-2**	**0.178**		**0.0107**
Sodium	**7440-23-5**	**2500**	E, GC-BS	**1950**
Strontium	**7440-24-6**	**5.38**	QB-01	**0.637**
Thallium	**7440-28-0**	**0.00103**		**4.91E-4**
Thorium	**7440-29-01**	**0.0153**		**0.00293**
Uranium	7440-61-1	0.0128	U	0.0166
Vanadium	**7440-62-2**	**1.86**	QB-01	**0.0481**
Zinc	7440-66-6	15.1	U	95.4

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CERTIFICATE OF ANALYSIS

Tetra Tech, Inc.
1777 Sentry Pkwy, Bldg 12
Blue Bell, PA 19422
ATTN: Ms. Chelsea Saber
PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 12/19/23 10:54
SUBMITTED: 12/11/23 to 12/13/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9542984 FB
Lab ID: 3121111-12
Sampled: 12/06/23 00:00
Matrix: Air
Sample Volume: 2026.096 m³
Received: 12/11/23 11:34
Filter ID:
Analysis Date: 12/13/23 22:34
Comments: MFK-FB01-120623-HM Field Blank

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	7429-90-5	10.2	U	25.8
Antimony	7440-36-0	0.00667	SL, U	0.0354
Arsenic	7440-38-2	0.00157	U	0.00767
Barium	7440-39-3	0.598	U	0.761
Beryllium	7440-41-7	8.35E-4	U	0.00267
Cadmium	7440-43-9	0.00205	U	0.0875
Calcium	**7440-70-2**	**333**	FB-01, LJ, QB-01	**234**
Chromium	7440-47-3	1.41	U	1.63
Cobalt	**7440-48-4**	**0.0229**	FB-01, QB-01	**0.0125**
Copper	7440-50-8	0.331	U	2.41
Iron	7439-89-6	10.9	GC-BS, U	19.4
Lead	7439-92-1	0.0493	U	0.222
Magnesium	7439-95-4	41.3	U	77.4
Manganese	7439-96-5	0.285	QB-01, U	0.956
Molybdenum	**7439-98-7**	**0.234**	FB-01, QB-01	**0.171**
Nickel	7440-02-0	0.262	U	0.643
Phosphorus	7723-14-0	337	GC-BS, U	1000
Potassium	7440-09-7	9.45	U	30.5
Rubidium	7440-17-7	0.0135	U	0.0147
Selenium	7782-49-2	0.00412	U	0.00883
Sodium	7440-23-5	692	GC-BS, U	1610
Strontium	**7440-24-6**	**0.714**	FB-01, QB-01	**0.524**
Thallium	7440-28-0	4.18E-5	U	4.04E-4
Thorium	7440-29-01	0.00219	U	0.00241
Uranium	7440-61-1	0.00179	U	0.0137
Vanadium	7440-62-2	0.0234	QB-01, U	0.0395
Zinc	7440-66-6	6.27	U	78.5

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CERTIFICATE OF ANALYSIS

Tetra Tech, Inc.
1777 Sentry Pkwy, Bldg 12
Blue Bell, PA 19422
ATTN: Ms. Chelsea Saber
PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 12/19/23 10:54
SUBMITTED: 12/11/23 to 12/13/23
AQS SITE CODE:
SITE CODE: Maui fires

Inorganics by Compendium Method IO-3.5 - Quality Control

Batch 2312039 - B3L1203

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Calibration Blank (2312039-CCB1)				Prepared & Analyzed: 12/13/23						
Aluminum	25.4		ng/l							
Antimony	1.30		ng/l							
Arsenic	-1.44		ng/l							U
Barium	-1.73		ng/l							U
Beryllium	1.11		ng/l							
Cadmium	1.09		ng/l							
Calcium	1190		ng/l							
Chromium	6.40		ng/l							
Cobalt	0.872		ng/l							
Copper	171		ng/l							
Iron	117		ng/l							
Lead	8.89		ng/l							
Magnesium	61.3		ng/l							
Manganese	18.9		ng/l							
Molybdenum	26.2		ng/l							
Nickel	1.67		ng/l							
Phosphorus	-373		ng/l							U
Potassium	694		ng/l							
Rubidium	1.66		ng/l							
Selenium	6.80		ng/l							
Sodium	18.6		ng/l							
Strontium	0.978		ng/l							
Thallium	0.600		ng/l							
Thorium	0.426		ng/l							
Uranium	0.00938		ng/l							
Vanadium	66.0		ng/l							
Zinc	-23.7		ng/l							U
Calibration Blank (2312039-CCB2)				Prepared & Analyzed: 12/13/23						
Aluminum	-57.6		ng/l							U
Antimony	0.943		ng/l							
Arsenic	-3.91		ng/l							U
Barium	-3.39		ng/l							U
Beryllium	0.580		ng/l							LJ, QX
Cadmium	0.559		ng/l							
Calcium	960		ng/l							
Chromium	5.15		ng/l							
Cobalt	0.778		ng/l							
Copper	59.8		ng/l							

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Tetra Tech, Inc.
1777 Sentry Pkwy, Bldg 12
Blue Bell, PA 19422
ATTN: Ms. Chelsea Saber
PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 12/19/23 10:54
SUBMITTED: 12/11/23 to 12/13/23
AQS SITE CODE:
SITE CODE: Maui fires

Inorganics by Compendium Method IO-3.5 - Quality Control

Batch 2312039 - B3L1203

Calibration Blank (2312039-CCB2) Contin — Prepared & Analyzed: 12/13/23

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Iron	-10.2		ng/l							U
Lead	4.27		ng/l							
Magnesium	-12.6		ng/l							U
Manganese	10.5		ng/l							
Molybdenum	10.0		ng/l							
Nickel	2.29		ng/l							
Phosphorus	-455		ng/l							U
Potassium	67.4		ng/l							
Rubidium	0.856		ng/l							
Selenium	4.40		ng/l							
Sodium	-288		ng/l							U
Strontium	2.23		ng/l							
Thallium	0.468		ng/l							
Thorium	0.305		ng/l							
Uranium	0.00576		ng/l							
Vanadium	31.9		ng/l							
Zinc	-35.0		ng/l							U

Calibration Blank (2312039-CCB3) — Prepared & Analyzed: 12/13/23

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Aluminum	-21.7		ng/l							U
Antimony	1.02		ng/l							
Arsenic	-1.85		ng/l							U
Barium	-4.22		ng/l							U
Beryllium	-0.196		ng/l							U
Cadmium	0.261		ng/l							
Calcium	622		ng/l							
Chromium	0.812		ng/l							
Cobalt	0.202		ng/l							
Copper	36.0		ng/l							
Iron	22.7		ng/l							
Lead	2.44		ng/l							
Magnesium	-14.0		ng/l							U
Manganese	4.54		ng/l							
Molybdenum	9.03		ng/l							
Nickel	2.52		ng/l							
Phosphorus	-831		ng/l							U
Potassium	-626		ng/l							U
Rubidium	0.575		ng/l							
Selenium	15.1		ng/l							

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CERTIFICATE OF ANALYSIS

Tetra Tech, Inc.
1777 Sentry Pkwy, Bldg 12
Blue Bell, PA 19422
ATTN: Ms. Chelsea Saber
PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 12/19/23 10:54
SUBMITTED: 12/11/23 to 12/13/23
AQS SITE CODE:
SITE CODE: Maui fires

Inorganics by Compendium Method IO-3.5 - Quality Control

Batch 2312039 - B3L1203

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Calibration Blank (2312039-CCB3) Contin				Prepared & Analyzed: 12/13/23						
Sodium	-255		ng/l							U
Strontium	0.470		ng/l							
Thallium	0.374		ng/l							
Thorium	0.255		ng/l							
Uranium	0.00335		ng/l							
Vanadium	2.19		ng/l							
Zinc	-45.0		ng/l							U
Calibration Blank (2312039-CCB4)				Prepared & Analyzed: 12/13/23						
Aluminum	-65.9		ng/l							U
Antimony	0.696		ng/l							
Arsenic	-2.29		ng/l							U
Barium	-5.77		ng/l							U
Beryllium	-0.0548		ng/l							LJ, QX, U
Cadmium	0.189		ng/l							
Calcium	985		ng/l							
Chromium	1.11		ng/l							
Cobalt	0.302		ng/l							
Copper	25.5		ng/l							
Iron	-32.4		ng/l							U
Lead	2.01		ng/l							
Magnesium	-47.8		ng/l							U
Manganese	3.62		ng/l							
Molybdenum	8.33		ng/l							
Nickel	3.02		ng/l							
Phosphorus	-513		ng/l							U
Potassium	-432		ng/l							U
Rubidium	0.791		ng/l							
Selenium	-0.974		ng/l							U
Sodium	-292		ng/l							U
Strontium	1.09		ng/l							
Thallium	0.336		ng/l							
Thorium	0.384		ng/l							
Uranium	0.00637		ng/l							
Vanadium	3.02		ng/l							
Zinc	-64.3		ng/l							U
Calibration Check (2312039-CCV1)				Prepared & Analyzed: 12/13/23						
Aluminum	1.51E6		ng/l	1.5000E6		100	90-110			
Antimony	20200		ng/l	20000		101	90-110			

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CERTIFICATE OF ANALYSIS

Tetra Tech, Inc.
1777 Sentry Pkwy, Bldg 12
Blue Bell, PA 19422
ATTN: Ms. Chelsea Saber
PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 12/19/23 10:54
SUBMITTED: 12/11/23 to 12/13/23
AQS SITE CODE:
SITE CODE: Maui fires

Inorganics by Compendium Method IO-3.5 - Quality Control

Batch 2312039 - B3L1203

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Calibration Check (2312039-CCV1) Contin				Prepared & Analyzed: 12/13/23						
Arsenic	19700		ng/l	20000		98.6	90-110			
Barium	197000		ng/l	200000		98.7	90-110			
Beryllium	4910		ng/l	5000.0		98.3	90-110			
Cadmium	20100		ng/l	20000		101	90-110			
Calcium	2.49E7		ng/l	2.5000E7		99.8	90-110			
Chromium	234000		ng/l	240000		97.4	90-110			
Cobalt	49300		ng/l	50000		98.6	90-110			
Copper	1.98E6		ng/l	2.0000E6		98.8	90-110			
Iron	2.47E6		ng/l	2.5000E6		98.8	90-110			
Lead	198000		ng/l	200000		98.8	90-110			
Magnesium	1.01E6		ng/l	1.0000E6		101	90-110			
Manganese	492000		ng/l	500000		98.4	90-110			
Molybdenum	49100		ng/l	50000		98.1	90-110			
Nickel	119000		ng/l	120000		99.6	90-110			
Phosphorus	201000		ng/l	200000		101	90-110			
Potassium	2.59E6		ng/l	2.5000E6		104	90-110			
Rubidium	9990		ng/l	10000		99.9	90-110			
Selenium	19900		ng/l	20000		99.5	90-110			
Sodium	2.48E6		ng/l	2.5000E6		99.2	90-110			
Strontium	49800		ng/l	50000		99.5	90-110			
Thallium	484		ng/l	500.00		96.9	90-110			
Thorium	501		ng/l	500.00		100	90-110			
Uranium	492		ng/l	500.00		98.4	90-110			
Vanadium	19700		ng/l	20000		98.4	90-110			
Zinc	521000		ng/l	500000		104	90-110			
Calibration Check (2312039-CCV2)				Prepared & Analyzed: 12/13/23						
Aluminum	1.45E6		ng/l	1.5000E6		96.8	90-110			
Antimony	20000		ng/l	20000		100	90-110			
Arsenic	19500		ng/l	20000		97.7	90-110			
Barium	202000		ng/l	200000		101	90-110			
Beryllium	5030		ng/l	5000.0		101	90-110			
Cadmium	19900		ng/l	20000		99.5	90-110			
Calcium	2.43E7		ng/l	2.5000E7		97.3	90-110			
Chromium	233000		ng/l	240000		97.0	90-110			
Cobalt	48300		ng/l	50000		96.6	90-110			
Copper	1.95E6		ng/l	2.0000E6		97.6	90-110			
Iron	2.42E6		ng/l	2.5000E6		96.9	90-110			
Lead	195000		ng/l	200000		97.6	90-110			

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Inorganics by Compendium Method IO-3.5 - Quality Control

Batch 2312039 - B3L1203

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Calibration Check (2312039-CCV2) Contin				Prepared & Analyzed: 12/13/23						
Magnesium	974000		ng/l	1.0000E6		97.4	90-110			
Manganese	483000		ng/l	500000		96.6	90-110			
Molybdenum	49400		ng/l	50000		98.8	90-110			
Nickel	117000		ng/l	120000		97.8	90-110			
Phosphorus	183000		ng/l	200000		91.6	90-110			
Potassium	2.50E6		ng/l	2.5000E6		99.9	90-110			
Rubidium	9970		ng/l	10000		99.7	90-110			
Selenium	19900		ng/l	20000		99.5	90-110			
Sodium	2.40E6		ng/l	2.5000E6		96.2	90-110			
Strontium	49500		ng/l	50000		99.0	90-110			
Thallium	479		ng/l	500.00		95.8	90-110			
Thorium	488		ng/l	500.00		97.6	90-110			
Uranium	482		ng/l	500.00		96.3	90-110			
Vanadium	19600		ng/l	20000		97.9	90-110			
Zinc	516000		ng/l	500000		103	90-110			
Calibration Check (2312039-CCV3)				Prepared & Analyzed: 12/13/23						
Aluminum	1.45E6		ng/l	1.5000E6		97.0	90-110			
Antimony	20200		ng/l	20000		101	90-110			
Arsenic	19700		ng/l	20000		98.4	90-110			
Barium	204000		ng/l	200000		102	90-110			
Beryllium	5150		ng/l	5000.0		103	90-110			
Cadmium	20200		ng/l	20000		101	90-110			
Calcium	2.45E7		ng/l	2.5000E7		98.2	90-110			
Chromium	239000		ng/l	240000		99.6	90-110			
Cobalt	48800		ng/l	50000		97.6	90-110			
Copper	1.98E6		ng/l	2.0000E6		99.2	90-110			
Iron	2.45E6		ng/l	2.5000E6		97.9	90-110			
Lead	199000		ng/l	200000		99.7	90-110			
Magnesium	976000		ng/l	1.0000E6		97.6	90-110			
Manganese	489000		ng/l	500000		97.9	90-110			
Molybdenum	50500		ng/l	50000		101	90-110			
Nickel	119000		ng/l	120000		99.1	90-110			
Phosphorus	190000		ng/l	200000		94.8	90-110			
Potassium	2.51E6		ng/l	2.5000E6		100	90-110			
Rubidium	10000		ng/l	10000		100	90-110			
Selenium	20200		ng/l	20000		101	90-110			
Sodium	2.41E6		ng/l	2.5000E6		96.6	90-110			
Strontium	50100		ng/l	50000		100	90-110			

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Inorganics by Compendium Method IO-3.5 - Quality Control

Batch 2312039 - B3L1203

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Calibration Check (2312039-CCV3) Contin				Prepared & Analyzed: 12/13/23						
Thallium	483		ng/l	500.00		96.6	90-110			
Thorium	496		ng/l	500.00		99.1	90-110			
Uranium	493		ng/l	500.00		98.5	90-110			
Vanadium	20000		ng/l	20000		99.9	90-110			
Zinc	525000		ng/l	500000		105	90-110			
Calibration Check (2312039-CCV4)				Prepared & Analyzed: 12/13/23						
Aluminum	1.47E6		ng/l	1.5000E6		97.8	90-110			
Antimony	20500		ng/l	20000		102	90-110			
Arsenic	20000		ng/l	20000		100	90-110			
Barium	208000		ng/l	200000		104	90-110			
Beryllium	5280		ng/l	5000.0		106	90-110			
Cadmium	20500		ng/l	20000		102	90-110			
Calcium	2.47E7		ng/l	2.5000E7		99.0	90-110			
Chromium	239000		ng/l	240000		99.7	90-110			
Cobalt	49400		ng/l	50000		98.9	90-110			
Copper	2.01E6		ng/l	2.0000E6		101	90-110			
Iron	2.47E6		ng/l	2.5000E6		98.7	90-110			
Lead	202000		ng/l	200000		101	90-110			
Magnesium	979000		ng/l	1.0000E6		97.9	90-110			
Manganese	491000		ng/l	500000		98.1	90-110			
Molybdenum	50900		ng/l	50000		102	90-110			
Nickel	121000		ng/l	120000		100	90-110			
Phosphorus	193000		ng/l	200000		96.4	90-110			
Potassium	2.51E6		ng/l	2.5000E6		100	90-110			
Rubidium	10100		ng/l	10000		101	90-110			
Selenium	20200		ng/l	20000		101	90-110			
Sodium	2.42E6		ng/l	2.5000E6		97.0	90-110			
Strontium	50600		ng/l	50000		101	90-110			
Thallium	489		ng/l	500.00		97.8	90-110			
Thorium	505		ng/l	500.00		101	90-110			
Uranium	496		ng/l	500.00		99.1	90-110			
Vanadium	19900		ng/l	20000		99.6	90-110			
Zinc	530000		ng/l	500000		106	90-110			
High Cal Check (2312039-HCV1)				Prepared & Analyzed: 12/13/23						
Aluminum	2.91E6		ng/l	3.0000E6		97.0	95-105			
Antimony	39700		ng/l	40000		99.2	95-105			
Arsenic	39200		ng/l	40000		98.1	95-105			
Barium	399000		ng/l	400000		99.8	95-105			

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AQS SITE CODE:
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Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes

Inorganics by Compendium Method IO-3.5 - Quality Control

Batch 2312039 - B3L1203

High Cal Check (2312039-HCV1) Continue Prepared & Analyzed: 12/13/23

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Beryllium	9560		ng/l	10000		95.6	95-105			
Cadmium	39300		ng/l	40000		98.2	95-105			
Calcium	4.96E7		ng/l	5.0000E7		99.1	95-105			
Chromium	471000		ng/l	480000		98.2	95-105			
Cobalt	97400		ng/l	100000		97.4	95-105			
Copper	3.88E6		ng/l	4.0000E6		97.0	95-105			
Iron	4.91E6		ng/l	5.0000E6		98.2	95-105			
Lead	399000		ng/l	400000		99.8	95-105			
Magnesium	1.94E6		ng/l	2.0000E6		96.9	95-105			
Manganese	981000		ng/l	1.0000E6		98.1	95-105			
Molybdenum	98300		ng/l	100000		98.3	95-105			
Nickel	233000		ng/l	240000		97.0	95-105			
Phosphorus	386000		ng/l	400000		96.4	95-105			
Potassium	4.85E6		ng/l	5.0000E6		97.0	95-105			
Rubidium	19900		ng/l	20000		99.5	95-105			
Selenium	39700		ng/l	40000		99.3	95-105			
Sodium	4.88E6		ng/l	5.0000E6		97.5	95-105			
Strontium	99900		ng/l	100000		99.9	95-105			
Thallium	1000		ng/l	1000.0		100	95-105			
Thorium	1000		ng/l	1000.0		100	95-105			
Uranium	1000		ng/l	1000.0		100	95-105			
Vanadium	39500		ng/l	40000		98.7	95-105			
Zinc	966000		ng/l	1.0000E6		96.6	95-105			

Initial Cal Blank (2312039-ICB1) Prepared & Analyzed: 12/13/23

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Aluminum	-33.9		ng/l							U
Antimony	5.72		ng/l							
Arsenic	-4.22		ng/l							U
Barium	-5.71		ng/l							U
Beryllium	0.926		ng/l							
Cadmium	0.334		ng/l							
Calcium	967		ng/l							
Chromium	2.07		ng/l							
Cobalt	0.293		ng/l							
Copper	58.2		ng/l							
Iron	-70.6		ng/l							U
Lead	4.98		ng/l							
Magnesium	-8.64		ng/l							U
Manganese	7.96		ng/l							

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Inorganics by Compendium Method IO-3.5 - Quality Control

Batch 2312039 - B3L1203

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Initial Cal Blank (2312039-ICB1) Continu				Prepared & Analyzed: 12/13/23						
Molybdenum	14.5		ng/l							
Nickel	-2.26		ng/l							U
Phosphorus	-347		ng/l							U
Potassium	274		ng/l							
Rubidium	0.773		ng/l							
Selenium	20.9		ng/l							
Sodium	-230		ng/l							U
Strontium	0.119		ng/l							
Thallium	0.445		ng/l							
Thorium	0.576		ng/l							
Uranium	0.0124		ng/l							
Vanadium	71.4		ng/l							
Zinc	-25.0		ng/l							U
Initial Cal Check (2312039-ICV1)				Prepared & Analyzed: 12/13/23						
Aluminum	1.43E6		ng/l	1.5000E6		95.6	90-110			
Antimony	19400		ng/l	20000		97.2	90-110			
Arsenic	19500		ng/l	20000		97.4	90-110			
Barium	196000		ng/l	200000		97.8	90-110			
Beryllium	4970		ng/l	5000.0		99.3	90-110			
Cadmium	20300		ng/l	20000		101	90-110			
Calcium	2.41E7		ng/l	2.5000E7		96.4	90-110			
Chromium	231000		ng/l	240000		96.4	90-110			
Cobalt	48900		ng/l	50000		97.9	90-110			
Copper	1.98E6		ng/l	2.0000E6		98.8	90-110			
Iron	2.45E6		ng/l	2.5000E6		97.8	90-110			
Lead	195000		ng/l	200000		97.6	90-110			
Magnesium	963000		ng/l	1.0000E6		96.3	90-110			
Manganese	485000		ng/l	500000		97.1	90-110			
Molybdenum	48800		ng/l	50000		97.7	90-110			
Nickel	118000		ng/l	120000		98.1	90-110			
Phosphorus	191000		ng/l	200000		95.3	90-110			
Potassium	2.54E6		ng/l	2.5000E6		102	90-110			
Rubidium	9650		ng/l	10000		96.5	90-110			
Selenium	20500		ng/l	20000		102	90-110			
Sodium	2.40E6		ng/l	2.5000E6		96.0	90-110			
Strontium	49500		ng/l	50000		99.1	90-110			
Thallium	480		ng/l	500.00		96.0	90-110			
Thorium	487		ng/l	500.00		97.5	90-110			

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Inorganics by Compendium Method IO-3.5 - Quality Control

Batch 2312039 - B3L1203

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Initial Cal Check (2312039-ICV1) Continu				Prepared & Analyzed: 12/13/23						
Uranium	483		ng/l	500.00		96.7	90-110			
Vanadium	19700		ng/l	20000		98.4	90-110			
Zinc	522000		ng/l	500000		104	90-110			
Interference Check A (2312039-IFA1)				Prepared & Analyzed: 12/13/23						
Aluminum	1.45E7		ng/l	1.5000E7		96.5	80-120			
Antimony	0.00		ng/l				80-120			U
Arsenic	0.00		ng/l				80-120			U
Barium	0.00		ng/l				80-120			U
Beryllium	0.00		ng/l				80-120			U
Cadmium	0.00		ng/l				80-120			U
Calcium	9.27E7		ng/l	1.0040E8		92.4	80-120			
Chromium	0.00		ng/l				80-120			U
Cobalt	0.00		ng/l				80-120			U
Copper	0.00		ng/l				80-120			U
Iron	1.45E7		ng/l	1.5000E7		96.4	80-120			
Lead	0.00		ng/l				80-120			U
Magnesium	1.50E7		ng/l	1.5000E7		99.8	80-120			
Manganese	0.00		ng/l				80-120			U
Molybdenum	293000		ng/l	300000		97.7	80-120			
Nickel	0.00		ng/l				80-120			U
Phosphorus	1.54E7		ng/l	1.5000E7		102	80-120			
Potassium	1.49E7		ng/l	1.5000E7		99.2	80-120			
Rubidium	0.00		ng/l				80-120			U
Selenium	0.00		ng/l				80-120			U
Sodium	1.50E7		ng/l	1.5000E7		99.7	80-120			
Strontium	0.00		ng/l				80-120			U
Thallium	0.00		ng/l				80-120			U
Thorium	0.00		ng/l				80-120			U
Uranium	0.00		ng/l				80-120			U
Vanadium	0.00		ng/l				80-120			U
Zinc	0.00		ng/l				80-120			U
Interference Check B (2312039-IFB1)				Prepared & Analyzed: 12/13/23						
Aluminum	1.61E7		ng/l	1.6500E7		97.7	80-120			
Antimony	20000		ng/l	20000		100	80-120			
Arsenic	20200		ng/l	20000		101	80-120			
Barium	199000		ng/l	200000		99.4	80-120			
Beryllium	4790		ng/l	5000.0		95.9	80-120			
Cadmium	19300		ng/l	20000		96.7	80-120			

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Inorganics by Compendium Method IO-3.5 - Quality Control

Batch 2312039 - B3L1203

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Interference Check B (2312039-IFB1) Co				Prepared & Analyzed: 12/13/23						
Calcium	1.16E8		ng/l	1.2540E8		92.6	80-120			
Chromium	226000		ng/l	240000		94.3	80-120			
Cobalt	48500		ng/l	50000		97.1	80-120			
Copper	1.85E6		ng/l	2.0000E6		92.4	80-120			
Iron	1.69E7		ng/l	1.7500E7		96.4	80-120			
Lead	203000		ng/l	200000		102	80-120			
Magnesium	1.60E7		ng/l	1.6000E7		99.7	80-120			
Manganese	504000		ng/l	500000		101	80-120			
Molybdenum	339000		ng/l	350000		96.9	80-120			
Nickel	114000		ng/l	120000		95.4	80-120			
Phosphorus	1.57E7		ng/l	1.5200E7		103	80-120			
Potassium	1.77E7		ng/l	1.7500E7		101	80-120			
Rubidium	10100		ng/l	10000		101	80-120			
Selenium	19000		ng/l	20000		94.8	80-120			
Sodium	1.78E7		ng/l	1.7500E7		102	80-120			
Strontium	50200		ng/l	50000		100	80-120			
Thallium	506		ng/l	500.00		101	80-120			
Thorium	539		ng/l	500.00		108	80-120			
Uranium	534		ng/l	500.00		107	80-120			
Vanadium	19100		ng/l	20000		95.6	80-120			
Zinc	473000		ng/l	500000		94.7	80-120			
Serial Dilution (2312039-SRD1)		**Source: 3121111-02**		Prepared: 12/12/23 Analyzed: 12/13/23						
Aluminum	159	133	ng/m³ Air		159			0.182	10	
Antimony	ND	0.182	ng/m³ Air		ND				10	SL, U
Arsenic	0.167	0.0395	ng/m³ Air		0.176			4.76	10	
Barium	ND	3.92	ng/m³ Air		ND				10	U
Beryllium	ND	0.0137	ng/m³ Air		ND				10	U
Cadmium	ND	0.450	ng/m³ Air		ND				10	U
Calcium	ND	1210	ng/m³ Air		ND				10	LJ, QB-01, U
Chromium	ND	8.39	ng/m³ Air		ND				10	U
Cobalt	0.115	0.0645	ng/m³ Air		0.117			1.93	10	QB-01
Copper	18.5	12.4	ng/m³ Air		18.5			0.259	10	
Iron	184	100	ng/m³ Air		185			0.398	10	GC-BS
Lead	ND	1.14	ng/m³ Air		ND				10	U
Magnesium	ND	398	ng/m³ Air		ND				10	U
Manganese	5.10	4.92	ng/m³ Air		5.13			0.542	10	QB-01
Molybdenum	0.891	0.880	ng/m³ Air		0.890			0.109	10	QB-01
Nickel	ND	3.31	ng/m³ Air		ND				10	U

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1777 Sentry Pkwy, Bldg 12
Blue Bell, PA 19422
ATTN: Ms. Chelsea Saber
PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 12/19/23 10:54
SUBMITTED: 12/11/23 to 12/13/23
AQS SITE CODE:
SITE CODE: Maui fires

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes

Inorganics by Compendium Method IO-3.5 - Quality Control

Batch 2312039 - B3L1203

Serial Dilution (2312039-SRD1) Continued **Source: 3121111-02** Prepared: 12/12/23 Analyzed: 12/13/23

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Phosphorus	ND	5170	ng/m³ Air		ND				10	GC-BS, U
Potassium	ND	157	ng/m³ Air		ND				10	U
Rubidium	0.110	0.0756	ng/m³ Air		0.112			1.84	10	
Selenium	0.0986	0.0455	ng/m³ Air		0.104			5.10	10	
Sodium	ND	8260	ng/m³ Air		ND				10	GC-BS, U
Strontium	ND	2.69	ng/m³ Air		ND				10	QB-01, U
Thallium	ND	0.00208	ng/m³ Air		ND				10	U
Thorium	ND	0.0124	ng/m³ Air		ND				10	U
Uranium	ND	0.0702	ng/m³ Air		ND				10	U
Vanadium	0.722	0.203	ng/m³ Air		0.660			9.05	10	QB-01
Zinc	ND	404	ng/m³ Air		ND				10	U

Batch 2312044 - B3L1203

Calibration Blank (2312044-CCB1) Prepared & Analyzed: 12/14/23

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Aluminum	125		ng/l							
Antimony	1.21		ng/l							
Arsenic	6.90		ng/l							
Barium	0.658		ng/l							
Beryllium	0.347		ng/l							
Cadmium	0.268		ng/l							
Calcium	294		ng/l							
Chromium	3.74		ng/l							
Cobalt	0.565		ng/l							
Copper	252		ng/l							
Iron	12.8		ng/l							
Lead	5.89		ng/l							
Magnesium	57.2		ng/l							
Manganese	9.93		ng/l							
Molybdenum	16.7		ng/l							
Nickel	30.3		ng/l							
Phosphorus	227		ng/l							
Potassium	1970		ng/l							
Rubidium	1.31		ng/l							
Selenium	6.84		ng/l							
Sodium	118		ng/l							
Strontium	-0.106		ng/l							U
Thallium	0.632		ng/l							
Thorium	0.212		ng/l							
Uranium	0.00146		ng/l							

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Inorganics by Compendium Method IO-3.5 - Quality Control

Batch 2312044 - B3L1203

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Calibration Blank (2312044-CCB1) Contin				Prepared & Analyzed: 12/14/23						
Vanadium	-88.1		ng/l							U
Zinc	-215		ng/l							U
Calibration Blank (2312044-CCB2)				Prepared & Analyzed: 12/14/23						
Aluminum	28.6		ng/l							
Antimony	0.958		ng/l							
Arsenic	3.58		ng/l							
Barium	0.565		ng/l							
Beryllium	0.395		ng/l							
Cadmium	0.145		ng/l							
Calcium	471		ng/l							
Chromium	5.52		ng/l							
Cobalt	0.567		ng/l							
Copper	98.6		ng/l							
Iron	161		ng/l							
Lead	3.82		ng/l							
Magnesium	5.49		ng/l							
Manganese	8.99		ng/l							
Molybdenum	8.90		ng/l							
Nickel	39.6		ng/l							
Phosphorus	598		ng/l							
Potassium	552		ng/l							
Rubidium	1.25		ng/l							
Selenium	1.74		ng/l							
Sodium	-175		ng/l							U
Strontium	-0.333		ng/l							U
Thallium	0.764		ng/l							
Thorium	0.530		ng/l							
Uranium	0.0223		ng/l							
Vanadium	-92.8		ng/l							U
Zinc	-229		ng/l							U
Calibration Blank (2312044-CCB3)				Prepared: 12/14/23 Analyzed: 12/15/23						
Aluminum	113		ng/l							
Antimony	1.22		ng/l							
Arsenic	3.82		ng/l							
Barium	2.58		ng/l							
Beryllium	0.113		ng/l							
Cadmium	0.0243		ng/l							
Calcium	159		ng/l							

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Inorganics by Compendium Method IO-3.5 - Quality Control

Batch 2312044 - B3L1203

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Calibration Blank (2312044-CCB3) Contin				Prepared: 12/14/23 Analyzed: 12/15/23						
Chromium	8.72		ng/l							
Cobalt	1.10		ng/l							
Copper	94.3		ng/l							
Iron	78.3		ng/l							
Lead	4.12		ng/l							
Magnesium	21.9		ng/l							
Manganese	14.8		ng/l							
Molybdenum	6.10		ng/l							
Nickel	42.1		ng/l							
Phosphorus	588		ng/l							
Potassium	964		ng/l							
Rubidium	1.07		ng/l							
Selenium	7.11		ng/l							
Sodium	110		ng/l							
Strontium	0.747		ng/l							
Thallium	0.433		ng/l							
Thorium	0.133		ng/l							
Uranium	-0.0128		ng/l							U
Vanadium	-94.8		ng/l							U
Zinc	-203		ng/l							U
Calibration Blank (2312044-CCB4)				Prepared: 12/14/23 Analyzed: 12/15/23						
Aluminum	91.9		ng/l							
Antimony	0.652		ng/l							
Arsenic	5.24		ng/l							
Barium	0.957		ng/l							
Beryllium	0.201		ng/l							
Cadmium	-0.0525		ng/l							U
Calcium	-200		ng/l							U
Chromium	7.02		ng/l							
Cobalt	0.754		ng/l							
Copper	73.9		ng/l							
Iron	61.0		ng/l							
Lead	3.30		ng/l							
Magnesium	19.8		ng/l							
Manganese	11.1		ng/l							
Molybdenum	6.84		ng/l							
Nickel	39.8		ng/l							
Phosphorus	-289		ng/l							U

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Inorganics by Compendium Method IO-3.5 - Quality Control

Batch 2312044 - B3L1203

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Calibration Blank (2312044-CCB4) Contin				Prepared: 12/14/23 Analyzed: 12/15/23						
Potassium	1150		ng/l							
Rubidium	0.262		ng/l							
Selenium	8.49		ng/l							
Sodium	106		ng/l							
Strontium	1.09		ng/l							
Thallium	0.382		ng/l							
Thorium	0.117		ng/l							
Uranium	0.00185		ng/l							
Vanadium	-95.5		ng/l							U
Zinc	-226		ng/l							U
Calibration Check (2312044-CCV1)				Prepared & Analyzed: 12/14/23						
Aluminum	1.54E6		ng/l	1.5000E6		103	90-110			
Antimony	20300		ng/l	20000		102	90-110			
Arsenic	20100		ng/l	20000		100	90-110			
Barium	202000		ng/l	200000		101	90-110			
Beryllium	4790		ng/l	5000.0		95.8	90-110			
Cadmium	20500		ng/l	20000		103	90-110			
Calcium	2.50E7		ng/l	2.5000E7		100	90-110			
Chromium	238000		ng/l	240000		99.2	90-110			
Cobalt	51300		ng/l	50000		103	90-110			
Copper	2.04E6		ng/l	2.0000E6		102	90-110			
Iron	2.56E6		ng/l	2.5000E6		102	90-110			
Lead	198000		ng/l	200000		99.0	90-110			
Magnesium	1.05E6		ng/l	1.0000E6		105	90-110			
Manganese	494000		ng/l	500000		98.8	90-110			
Molybdenum	51000		ng/l	50000		102	90-110			
Nickel	123000		ng/l	120000		102	90-110			
Phosphorus	207000		ng/l	200000		103	90-110			
Potassium	2.64E6		ng/l	2.5000E6		106	90-110			
Rubidium	10100		ng/l	10000		101	90-110			
Selenium	20000		ng/l	20000		100	90-110			
Sodium	2.60E6		ng/l	2.5000E6		104	90-110			
Strontium	49900		ng/l	50000		99.9	90-110			
Thallium	485		ng/l	500.00		97.0	90-110			
Thorium	503		ng/l	500.00		101	90-110			
Uranium	492		ng/l	500.00		98.4	90-110			
Vanadium	19600		ng/l	20000		97.9	90-110			
Zinc	531000		ng/l	500000		106	90-110			

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Inorganics by Compendium Method IO-3.5 - Quality Control

Batch 2312044 - B3L1203

Calibration Check (2312044-CCV2) Prepared & Analyzed: 12/14/23

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Aluminum	1.52E6		ng/l	1.5000E6		101	90-110			
Antimony	20400		ng/l	20000		102	90-110			
Arsenic	20300		ng/l	20000		101	90-110			
Barium	201000		ng/l	200000		101	90-110			
Beryllium	5520		ng/l	5000.0		110	90-110			
Cadmium	20800		ng/l	20000		104	90-110			
Calcium	2.51E7		ng/l	2.5000E7		100	90-110			
Chromium	240000		ng/l	240000		100	90-110			
Cobalt	51000		ng/l	50000		102	90-110			
Copper	2.05E6		ng/l	2.0000E6		103	90-110			
Iron	2.55E6		ng/l	2.5000E6		102	90-110			
Lead	201000		ng/l	200000		100	90-110			
Magnesium	1.04E6		ng/l	1.0000E6		104	90-110			
Manganese	496000		ng/l	500000		99.1	90-110			
Molybdenum	51600		ng/l	50000		103	90-110			
Nickel	123000		ng/l	120000		103	90-110			
Phosphorus	208000		ng/l	200000		104	90-110			
Potassium	2.63E6		ng/l	2.5000E6		105	90-110			
Rubidium	10100		ng/l	10000		101	90-110			
Selenium	20100		ng/l	20000		101	90-110			
Sodium	2.60E6		ng/l	2.5000E6		104	90-110			
Strontium	49700		ng/l	50000		99.3	90-110			
Thallium	491		ng/l	500.00		98.2	90-110			
Thorium	504		ng/l	500.00		101	90-110			
Uranium	496		ng/l	500.00		99.1	90-110			
Vanadium	19900		ng/l	20000		99.5	90-110			
Zinc	534000		ng/l	500000		107	90-110			

Calibration Check (2312044-CCV3) Prepared: 12/14/23 Analyzed: 12/15/23

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Aluminum	1.48E6		ng/l	1.5000E6		99.0	90-110			
Antimony	20200		ng/l	20000		101	90-110			
Arsenic	19900		ng/l	20000		99.6	90-110			
Barium	198000		ng/l	200000		99.2	90-110			
Beryllium	5330		ng/l	5000.0		107	90-110			
Cadmium	20500		ng/l	20000		103	90-110			
Calcium	2.47E7		ng/l	2.5000E7		98.8	90-110			
Chromium	241000		ng/l	240000		101	90-110			
Cobalt	50500		ng/l	50000		101	90-110			
Copper	2.06E6		ng/l	2.0000E6		103	90-110			

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Inorganics by Compendium Method IO-3.5 - Quality Control

Batch 2312044 - B3L1203

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Calibration Check (2312044-CCV3) Contin					Prepared: 12/14/23	Analyzed: 12/15/23				
Iron	2.52E6		ng/l	2.5000E6		101	90-110			
Lead	198000		ng/l	200000		99.2	90-110			
Magnesium	1.03E6		ng/l	1.0000E6		103	90-110			
Manganese	494000		ng/l	500000		98.8	90-110			
Molybdenum	51000		ng/l	50000		102	90-110			
Nickel	123000		ng/l	120000		103	90-110			
Phosphorus	205000		ng/l	200000		102	90-110			
Potassium	2.62E6		ng/l	2.5000E6		105	90-110			
Rubidium	10000		ng/l	10000		100	90-110			
Selenium	20000		ng/l	20000		99.8	90-110			
Sodium	2.61E6		ng/l	2.5000E6		105	90-110			
Strontium	48900		ng/l	50000		97.8	90-110			
Thallium	480		ng/l	500.00		95.9	90-110			
Thorium	491		ng/l	500.00		98.2	90-110			
Uranium	478		ng/l	500.00		95.7	90-110			
Vanadium	19800		ng/l	20000		99.1	90-110			
Zinc	528000		ng/l	500000		106	90-110			
Calibration Check (2312044-CCV4)					Prepared: 12/14/23	Analyzed: 12/15/23				
Aluminum	1.50E6		ng/l	1.5000E6		100	90-110			
Antimony	20400		ng/l	20000		102	90-110			
Arsenic	20200		ng/l	20000		101	90-110			
Barium	198000		ng/l	200000		98.9	90-110			
Beryllium	5320		ng/l	5000.0		106	90-110			
Cadmium	20500		ng/l	20000		102	90-110			
Calcium	2.49E7		ng/l	2.5000E7		99.5	90-110			
Chromium	242000		ng/l	240000		101	90-110			
Cobalt	50900		ng/l	50000		102	90-110			
Copper	2.08E6		ng/l	2.0000E6		104	90-110			
Iron	2.53E6		ng/l	2.5000E6		101	90-110			
Lead	199000		ng/l	200000		99.4	90-110			
Magnesium	1.04E6		ng/l	1.0000E6		104	90-110			
Manganese	498000		ng/l	500000		99.7	90-110			
Molybdenum	50900		ng/l	50000		102	90-110			
Nickel	124000		ng/l	120000		103	90-110			
Phosphorus	206000		ng/l	200000		103	90-110			
Potassium	2.64E6		ng/l	2.5000E6		106	90-110			
Rubidium	10100		ng/l	10000		101	90-110			
Selenium	19800		ng/l	20000		99.2	90-110			

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Batch 2312044 - B3L1203

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Calibration Check (2312044-CCV4) Contin				Prepared: 12/14/23 Analyzed: 12/15/23						
Sodium	2.61E6		ng/l	2.5000E6		104	90-110			
Strontium	49300		ng/l	50000		98.5	90-110			
Thallium	474		ng/l	500.00		94.9	90-110			
Thorium	493		ng/l	500.00		98.5	90-110			
Uranium	486		ng/l	500.00		97.2	90-110			
Vanadium	19900		ng/l	20000		99.5	90-110			
Zinc	533000		ng/l	500000		107	90-110			
High Cal Check (2312044-HCV1)				Prepared & Analyzed: 12/14/23						
Aluminum	2.93E6		ng/l	3.0000E6		97.5	95-105			
Antimony	39300		ng/l	40000		98.4	95-105			
Arsenic	39500		ng/l	40000		98.9	95-105			
Barium	398000		ng/l	400000		99.5	95-105			
Beryllium	10300		ng/l	10000		103	95-105			
Cadmium	39100		ng/l	40000		97.7	95-105			
Calcium	4.93E7		ng/l	5.0000E7		98.6	95-105			
Chromium	464000		ng/l	480000		96.6	95-105			
Cobalt	98500		ng/l	100000		98.5	95-105			
Copper	3.88E6		ng/l	4.0000E6		97.1	95-105			
Iron	4.95E6		ng/l	5.0000E6		98.9	95-105			
Lead	393000		ng/l	400000		98.3	95-105			
Magnesium	1.97E6		ng/l	2.0000E6		98.3	95-105			
Manganese	971000		ng/l	1.0000E6		97.1	95-105			
Molybdenum	99100		ng/l	100000		99.1	95-105			
Nickel	235000		ng/l	240000		97.8	95-105			
Phosphorus	401000		ng/l	400000		100	95-105			
Potassium	4.87E6		ng/l	5.0000E6		97.4	95-105			
Rubidium	19600		ng/l	20000		98.0	95-105			
Selenium	39100		ng/l	40000		97.7	95-105			
Sodium	4.95E6		ng/l	5.0000E6		99.1	95-105			
Strontium	96500		ng/l	100000		96.5	95-105			
Thallium	987		ng/l	1000.0		98.7	95-105			
Thorium	988		ng/l	1000.0		98.8	95-105			
Uranium	993		ng/l	1000.0		99.3	95-105			
Vanadium	39200		ng/l	40000		98.0	95-105			
Zinc	953000		ng/l	1.0000E6		95.3	95-105			
Initial Cal Blank (2312044-ICB1)				Prepared & Analyzed: 12/14/23						
Aluminum	49.1		ng/l							
Antimony	1.91		ng/l							

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CERTIFICATE OF ANALYSIS

Tetra Tech, Inc.
1777 Sentry Pkwy, Bldg 12
Blue Bell, PA 19422
ATTN: Ms. Chelsea Saber
PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 12/19/23 10:54
SUBMITTED: 12/11/23 to 12/13/23
AQS SITE CODE:
SITE CODE: Maui fires

Inorganics by Compendium Method IO-3.5 - Quality Control

Batch 2312044 - B3L1203

Initial Cal Blank (2312044-ICB1) Continu — Prepared & Analyzed: 12/14/23

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Arsenic	1.34		ng/l							
Barium	5.75		ng/l							
Beryllium	0.590		ng/l							
Cadmium	0.717		ng/l							
Calcium	152		ng/l							
Chromium	6.75		ng/l							
Cobalt	1.19		ng/l							
Copper	197		ng/l							
Iron	5.45		ng/l							
Lead	8.67		ng/l							
Magnesium	41.8		ng/l							
Manganese	16.5		ng/l							
Molybdenum	13.6		ng/l							
Nickel	63.6		ng/l							
Phosphorus	233		ng/l							
Potassium	729		ng/l							
Rubidium	0.939		ng/l							
Selenium	4.77		ng/l							
Sodium	-153		ng/l							U
Strontium	-0.858		ng/l							U
Thallium	0.602		ng/l							
Thorium	0.506		ng/l							
Uranium	0.0195		ng/l							
Vanadium	-88.2		ng/l							U
Zinc	-216		ng/l							U

Initial Cal Check (2312044-ICV1) — Prepared & Analyzed: 12/14/23

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Aluminum	1.45E6		ng/l	1.5000E6		96.7	90-110			
Antimony	19500		ng/l	20000		97.6	90-110			
Arsenic	19600		ng/l	20000		97.8	90-110			
Barium	195000		ng/l	200000		97.7	90-110			
Beryllium	4610		ng/l	5000.0		92.2	90-110			
Cadmium	20300		ng/l	20000		101	90-110			
Calcium	2.40E7		ng/l	2.5000E7		96.0	90-110			
Chromium	231000		ng/l	240000		96.1	90-110			
Cobalt	49200		ng/l	50000		98.4	90-110			
Copper	1.97E6		ng/l	2.0000E6		98.5	90-110			
Iron	2.46E6		ng/l	2.5000E6		98.3	90-110			
Lead	194000		ng/l	200000		96.9	90-110			

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Inorganics by Compendium Method IO-3.5 - Quality Control

Batch 2312044 - B3L1203

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Initial Cal Check (2312044-ICV1) Continu				Prepared & Analyzed: 12/14/23						
Magnesium	980000		ng/l	1.0000E6		98.0	90-110			
Manganese	481000		ng/l	500000		96.1	90-110			
Molybdenum	49000		ng/l	50000		98.0	90-110			
Nickel	118000		ng/l	120000		98.3	90-110			
Phosphorus	196000		ng/l	200000		97.9	90-110			
Potassium	2.62E6		ng/l	2.5000E6		105	90-110			
Rubidium	9560		ng/l	10000		95.6	90-110			
Selenium	20200		ng/l	20000		101	90-110			
Sodium	2.46E6		ng/l	2.5000E6		98.5	90-110			
Strontium	48900		ng/l	50000		97.8	90-110			
Thallium	470		ng/l	500.00		93.9	90-110			
Thorium	487		ng/l	500.00		97.4	90-110			
Uranium	475		ng/l	500.00		95.1	90-110			
Vanadium	19700		ng/l	20000		98.7	90-110			
Zinc	523000		ng/l	500000		105	90-110			
Interference Check A (2312044-IFA1)				Prepared & Analyzed: 12/14/23						
Aluminum	1.49E7		ng/l	1.5000E7		99.4	80-120			
Antimony	0.00		ng/l				80-120			U
Arsenic	0.00		ng/l				80-120			U
Barium	0.00		ng/l				80-120			U
Beryllium	0.00		ng/l				80-120			U
Cadmium	0.00		ng/l				80-120			U
Calcium	9.35E7		ng/l	1.0040E8		93.1	80-120			
Chromium	0.00		ng/l				80-120			U
Cobalt	0.00		ng/l				80-120			U
Copper	0.00		ng/l				80-120			U
Iron	1.50E7		ng/l	1.5000E7		99.7	80-120			
Lead	0.00		ng/l				80-120			U
Magnesium	1.59E7		ng/l	1.5000E7		106	80-120			
Manganese	0.00		ng/l				80-120			U
Molybdenum	296000		ng/l	300000		98.7	80-120			
Nickel	0.00		ng/l				80-120			U
Phosphorus	1.64E7		ng/l	1.5000E7		109	80-120			
Potassium	1.55E7		ng/l	1.5000E7		103	80-120			
Rubidium	0.00		ng/l				80-120			U
Selenium	0.00		ng/l				80-120			U
Sodium	1.59E7		ng/l	1.5000E7		106	80-120			
Strontium	0.00		ng/l				80-120			U

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Inorganics by Compendium Method IO-3.5 - Quality Control

Batch 2312044 - B3L1203

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Interference Check A (2312044-IFA1) Co				Prepared & Analyzed: 12/14/23						
Thallium	0.00		ng/l				80-120			U
Thorium	0.00		ng/l				80-120			U
Uranium	0.00		ng/l				80-120			U
Vanadium	0.00		ng/l				80-120			U
Zinc	0.00		ng/l				80-120			U
Interference Check B (2312044-IFB1)				Prepared & Analyzed: 12/14/23						
Aluminum	1.65E7		ng/l	1.6500E7		99.8	80-120			
Antimony	19800		ng/l	20000		98.9	80-120			
Arsenic	20200		ng/l	20000		101	80-120			
Barium	198000		ng/l	200000		99.1	80-120			
Beryllium	5010		ng/l	5000.0		100	80-120			
Cadmium	19300		ng/l	20000		96.5	80-120			
Calcium	1.16E8		ng/l	1.2540E8		92.3	80-120			
Chromium	228000		ng/l	240000		95.1	80-120			
Cobalt	50000		ng/l	50000		100	80-120			
Copper	1.90E6		ng/l	2.0000E6		95.2	80-120			
Iron	1.72E7		ng/l	1.7500E7		98.4	80-120			
Lead	203000		ng/l	200000		101	80-120			
Magnesium	1.69E7		ng/l	1.6000E7		106	80-120			
Manganese	512000		ng/l	500000		102	80-120			
Molybdenum	339000		ng/l	350000		96.7	80-120			
Nickel	117000		ng/l	120000		97.2	80-120			
Phosphorus	1.67E7		ng/l	1.5200E7		110	80-120			
Potassium	1.82E7		ng/l	1.7500E7		104	80-120			
Rubidium	10100		ng/l	10000		101	80-120			
Selenium	18700		ng/l	20000		93.3	80-120			
Sodium	1.89E7		ng/l	1.7500E7		108	80-120			
Strontium	49400		ng/l	50000		98.8	80-120			
Thallium	500		ng/l	500.00		100	80-120			
Thorium	534		ng/l	500.00		107	80-120			
Uranium	527		ng/l	500.00		105	80-120			
Vanadium	18300		ng/l	20000		91.4	80-120			
Zinc	484000		ng/l	500000		96.8	80-120			
Serial Dilution (2312044-SRD1)	**Source: 3121332-06**			Prepared & Analyzed: 12/14/23						
Aluminum	380	151	ng/m³ Air		383			0.776	10	
Antimony	ND	0.207	ng/m³ Air		ND				10	SL, U
Arsenic	0.107	0.0448	ng/m³ Air		0.101			5.31	10	
Barium	7.41	4.45	ng/m³ Air		7.62			2.74	10	

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Inorganics by Compendium Method IO-3.5 - Quality Control

Batch 2312044 - B3L1203

Serial Dilution (2312044-SRD1) Continued **Source: 3121332-06** Prepared & Analyzed: 12/14/23

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Beryllium	0.0187	0.0156	ng/m³ Air		0.0182			2.23	10	
Cadmium	ND	0.511	ng/m³ Air		ND				10	U
Calcium	ND	1370	ng/m³ Air		ND				10	LJ, QB-01, U
Chromium	ND	9.52	ng/m³ Air		ND				10	U
Cobalt	0.234	0.0732	ng/m³ Air		0.237			1.26	10	QB-01
Copper	34.6	14.1	ng/m³ Air		34.8			0.687	10	
Iron	471	113	ng/m³ Air		478			1.46	10	
Lead	ND	1.29	ng/m³ Air		ND				10	U
Magnesium	ND	452	ng/m³ Air		ND				10	U
Manganese	15.0	5.58	ng/m³ Air		15.1			0.897	10	
Molybdenum	1.04	0.999	ng/m³ Air		1.05			0.734	10	B, QB-01
Nickel	ND	3.76	ng/m³ Air		ND				10	U
Phosphorus	ND	5860	ng/m³ Air		ND				10	U
Potassium	ND	178	ng/m³ Air		ND				10	B, U
Rubidium	0.175	0.0858	ng/m³ Air		0.185			5.24	10	
Selenium	0.155	0.0516	ng/m³ Air		0.162			4.42	10	
Sodium	ND	9380	ng/m³ Air		ND				10	U
Strontium	4.62	3.06	ng/m³ Air		4.71			1.97	10	QB-01
Thallium	ND	0.00236	ng/m³ Air		ND				10	U
Thorium	ND	0.0141	ng/m³ Air		0.0143				10	U
Uranium	ND	0.0797	ng/m³ Air		ND				10	U
Vanadium	1.30	0.231	ng/m³ Air		1.36			4.18	10	
Zinc	ND	458	ng/m³ Air		ND				10	U

Batch B3L1203 - ICP-MS Extraction

Blank (B3L1203-BLK1) Prepared: 12/12/23 Analyzed: 12/13/23

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Aluminum	ND	32.1	ng/m³ Air							U
Antimony	ND	0.0441	ng/m³ Air							SL, U
Arsenic	ND	0.00955	ng/m³ Air							U
Barium	ND	0.948	ng/m³ Air							U
Beryllium	ND	0.00332	ng/m³ Air							U
Cadmium	ND	0.109	ng/m³ Air							U
Calcium	ND	292	ng/m³ Air							LJ, QB-01, U
Chromium	ND	2.03	ng/m³ Air							U
Cobalt	ND	0.0156	ng/m³ Air							QB-01, U
Copper	ND	3.00	ng/m³ Air							U
Iron	ND	24.2	ng/m³ Air							GC-BS, U
Lead	ND	0.276	ng/m³ Air							U
Magnesium	ND	96.4	ng/m³ Air							U

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Inorganics by Compendium Method IO-3.5 - Quality Control

Batch B3L1203 - ICP-MS Extraction

Blank (B3L1203-BLK1) Continued Prepared: 12/12/23 Analyzed: 12/13/23

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Manganese	ND	1.19	ng/m³ Air							QB-01, U
Molybdenum	ND	0.213	ng/m³ Air							QB-01, U
Nickel	ND	0.801	ng/m³ Air							U
Phosphorus	ND	1250	ng/m³ Air							GC-BS, U
Potassium	ND	38.0	ng/m³ Air							U
Rubidium	ND	0.0183	ng/m³ Air							U
Selenium	ND	0.0110	ng/m³ Air							U
Sodium	ND	2000	ng/m³ Air							GC-BS, U
Strontium	ND	0.652	ng/m³ Air							QB-01, U
Thallium	ND	5.03E-4	ng/m³ Air							U
Thorium	ND	0.00300	ng/m³ Air							U
Uranium	ND	0.0170	ng/m³ Air							U
Vanadium	ND	0.0492	ng/m³ Air							QB-01, U
Zinc	ND	97.7	ng/m³ Air							U

LCS (B3L1203-BS1) Prepared: 12/12/23 Analyzed: 12/13/23

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Aluminum	92.8	32.1	ng/m³ Air	82.975		112	80-120			
Antimony	0.550	0.0441	ng/m³ Air	1.3829		39.8	80-120			SL
Arsenic	2.72	0.00955	ng/m³ Air	2.7658		98.3	80-120			
Barium	28.2	0.948	ng/m³ Air	27.658		102	80-120			
Beryllium	1.37	0.00332	ng/m³ Air	1.3829		98.8	80-120			
Cadmium	1.39	0.109	ng/m³ Air	1.3829		101	80-120			
Calcium	547	292	ng/m³ Air	69.146		791	80-120			LJ, QB-01
Chromium	15.7	2.03	ng/m³ Air	13.829		113	80-120			
Cobalt	1.35	0.0156	ng/m³ Air	1.3829		97.6	80-120			QB-01
Copper	31.0	3.00	ng/m³ Air	27.658		112	80-120			
Iron	42.9	24.2	ng/m³ Air	27.658		155	80-120			GC-BS
Lead	13.5	0.276	ng/m³ Air	13.829		98.0	80-120			
Magnesium	ND	96.4	ng/m³ Air	27.658			80-120			U
Manganese	9.10	1.19	ng/m³ Air	8.2975		110	80-120			QB-01
Molybdenum	1.59	0.213	ng/m³ Air	1.3829		115	80-120			B, QB-01
Nickel	3.09	0.801	ng/m³ Air	2.7658		112	80-120			
Phosphorus	ND	1250	ng/m³ Air	13.829			80-120			GC-BS, U
Potassium	73.3	38.0	ng/m³ Air	55.317		132	80-120			B
Rubidium	1.35	0.0183	ng/m³ Air	1.3829		97.9	80-120			
Selenium	2.74	0.0110	ng/m³ Air	2.7658		99.1	80-120			
Sodium	ND	2000	ng/m³ Air	55.317			80-120			GC-BS, U
Strontium	2.24	0.652	ng/m³ Air	1.3829		162	80-120			QB-01
Thallium	0.132	5.03E-4	ng/m³ Air	0.13829		95.6	80-120			

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AQS SITE CODE:
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Inorganics by Compendium Method IO-3.5 - Quality Control

Batch B3L1203 - ICP-MS Extraction

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
LCS (B3L1203-BS1) Continued						Prepared: 12/12/23	Analyzed: 12/13/23			
Thorium	0.133	0.00300	ng/m³ Air	0.13829		96.0	80-120			
Uranium	0.130	0.0170	ng/m³ Air	0.13829		93.9	80-120			
Vanadium	2.75	0.0492	ng/m³ Air	2.7658		99.4	80-120			QB-01
Zinc	113	97.7	ng/m³ Air	82.975		137	80-120			
Duplicate (B3L1203-DUP1)		**Source: 3121111-02**				Prepared: 12/12/23	Analyzed: 12/13/23			
Aluminum	159	26.5	ng/m³ Air		159			0.260	10	
Antimony	0.0878	0.0364	ng/m³ Air		0.0779			12.0	10	SL
Arsenic	0.195	0.00789	ng/m³ Air		0.176			10.5	10	
Barium	3.11	0.783	ng/m³ Air		3.44			10.0	10	
Beryllium	0.00599	0.00274	ng/m³ Air		0.00625			4.26	10	
Cadmium	ND	0.0901	ng/m³ Air		ND				10	U
Calcium	477	241	ng/m³ Air		467			2.19	10	LJ, QB-01
Chromium	1.71	1.68	ng/m³ Air		ND				10	
Cobalt	0.116	0.0129	ng/m³ Air		0.117			1.07	10	QB-01
Copper	19.4	2.48	ng/m³ Air		18.5			4.71	10	
Iron	179	20.0	ng/m³ Air		185			3.25	10	GC-BS
Lead	ND	0.228	ng/m³ Air		ND				10	U
Magnesium	140	79.7	ng/m³ Air		136			2.74	10	
Manganese	5.33	0.983	ng/m³ Air		5.13			3.92	10	QB-01
Molybdenum	0.892	0.176	ng/m³ Air		0.890			0.233	10	QB-01
Nickel	ND	0.662	ng/m³ Air		ND				10	U
Phosphorus	ND	1030	ng/m³ Air		ND				10	GC-BS, U
Potassium	87.0	31.4	ng/m³ Air		85.5			1.70	10	
Rubidium	0.110	0.0151	ng/m³ Air		0.112			2.37	10	
Selenium	0.0963	0.00909	ng/m³ Air		0.104			7.50	10	
Sodium	ND	1650	ng/m³ Air		ND				10	GC-BS, U
Strontium	2.21	0.539	ng/m³ Air		2.18			1.28	10	QB-01
Thallium	5.94E-4	4.16E-4	ng/m³ Air		6.19E-4			4.10	10	
Thorium	0.00600	0.00248	ng/m³ Air		0.00662			9.77	10	
Uranium	ND	0.0140	ng/m³ Air		ND				10	U
Vanadium	0.670	0.0407	ng/m³ Air		0.660			1.52	10	QB-01
Zinc	ND	80.7	ng/m³ Air		ND				10	U
Matrix Spike (B3L1203-MS1)		**Source: 3121111-02**				Prepared: 12/12/23	Analyzed: 12/13/23			
Aluminum	225	26.5	ng/m³ Air	68.575	159	95.6	80-120			
Antimony	0.569	0.0364	ng/m³ Air	1.1429	0.0779	42.9	80-120			SL
Arsenic	2.39	0.00789	ng/m³ Air	2.2858	0.176	97.0	80-120			
Barium	26.2	0.783	ng/m³ Air	22.858	3.44	99.8	80-120			
Beryllium	1.12	0.00274	ng/m³ Air	1.1429	0.00625	97.9	80-120			

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Inorganics by Compendium Method IO-3.5 - Quality Control

Batch B3L1203 - ICP-MS Extraction

Matrix Spike (B3L1203-MS1) Continued **Source: 3121111-02** Prepared: 12/12/23 Analyzed: 12/13/23

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Cadmium	1.16	0.0901	ng/m³ Air	1.1429	ND	101	80-120			
Calcium	533	241	ng/m³ Air	57.146	467	115	80-120			LJ, QB-01
Chromium	13.2	1.68	ng/m³ Air	11.429	ND	116	80-120			
Cobalt	1.20	0.0129	ng/m³ Air	1.1429	0.117	94.7	80-120			QB-01
Copper	45.1	2.48	ng/m³ Air	22.858	18.5	116	80-120			
Iron	201	20.0	ng/m³ Air	22.858	185	70.5	80-120			GC-BS, QM-4X
Lead	11.4	0.228	ng/m³ Air	11.429	ND	99.4	80-120			
Magnesium	160	79.7	ng/m³ Air	22.858	136	108	80-120			
Manganese	12.2	0.983	ng/m³ Air	6.8575	5.13	104	80-120			QB-01
Molybdenum	1.98	0.176	ng/m³ Air	1.1429	0.890	95.1	80-120			B, QB-01
Nickel	2.73	0.662	ng/m³ Air	2.2858	ND	119	80-120			
Phosphorus	ND	1030	ng/m³ Air	11.429	ND		80-120			GC-BS, U
Potassium	130	31.4	ng/m³ Air	45.716	85.5	96.7	80-120			B
Rubidium	1.20	0.0151	ng/m³ Air	1.1429	0.112	94.9	80-120			
Selenium	2.38	0.00909	ng/m³ Air	2.2858	0.104	99.5	80-120			
Sodium	ND	1650	ng/m³ Air	45.716	ND		80-120			GC-BS, U
Strontium	3.30	0.539	ng/m³ Air	1.1429	2.18	98.1	80-120			QB-01
Thallium	0.109	4.16E-4	ng/m³ Air	0.11429	6.19E-4	94.9	80-120			
Thorium	0.0575	0.00248	ng/m³ Air	0.11429	0.00662	44.5	80-120			QM-07
Uranium	0.112	0.0140	ng/m³ Air	0.11429	ND	97.7	80-120			
Vanadium	2.90	0.0407	ng/m³ Air	2.2858	0.660	98.2	80-120			QB-01
Zinc	88.0	80.7	ng/m³ Air	68.575	ND	128	80-120			

Matrix Spike Dup (B3L1203-MSD1) **Source: 3121111-02** Prepared: 12/12/23 Analyzed: 12/13/23

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Aluminum	226	26.5	ng/m³ Air	68.575	159	97.0	80-120	0.432	20	
Antimony	0.568	0.0364	ng/m³ Air	1.1429	0.0779	42.9	80-120	0.0979	20	SL
Arsenic	2.43	0.00789	ng/m³ Air	2.2858	0.176	98.4	80-120	1.37	20	
Barium	26.1	0.783	ng/m³ Air	22.858	3.44	99.3	80-120	0.414	20	
Beryllium	1.13	0.00274	ng/m³ Air	1.1429	0.00625	98.4	80-120	0.509	20	
Cadmium	1.16	0.0901	ng/m³ Air	1.1429	ND	102	80-120	0.445	20	
Calcium	523	241	ng/m³ Air	57.146	467	99.1	80-120	1.77	20	LJ, QB-01
Chromium	14.5	1.68	ng/m³ Air	11.429	ND	127	80-120	9.47	20	
Cobalt	1.22	0.0129	ng/m³ Air	1.1429	0.117	96.8	80-120	2.00	20	QB-01
Copper	45.5	2.48	ng/m³ Air	22.858	18.5	118	80-120	0.813	20	
Iron	209	20.0	ng/m³ Air	22.858	185	106	80-120	4.00	20	GC-BS
Lead	11.5	0.228	ng/m³ Air	11.429	ND	101	80-120	1.33	20	
Magnesium	160	79.7	ng/m³ Air	22.858	136	105	80-120	0.409	20	
Manganese	12.3	0.983	ng/m³ Air	6.8575	5.13	105	80-120	0.443	20	QB-01
Molybdenum	2.17	0.176	ng/m³ Air	1.1429	0.890	112	80-120	9.29	20	QB-01

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CERTIFICATE OF ANALYSIS

Tetra Tech, Inc.
1777 Sentry Pkwy, Bldg 12
Blue Bell, PA 19422
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FILE #: 0000.00
REPORTED: 12/19/23 10:54
SUBMITTED: 12/11/23 to 12/13/23
AQS SITE CODE:
SITE CODE: Maui fires

Inorganics by Compendium Method IO-3.5 - Quality Control

Batch B3L1203 - ICP-MS Extraction

Matrix Spike Dup (B3L1203-MSD1) Contir Source: 3121111-02 Prepared: 12/12/23 Analyzed: 12/13/23

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Nickel	3.60	0.662	ng/m³ Air	2.2858	ND	158	80-120	27.7	20	LJ, QM-06, Q
Phosphorus	ND	1030	ng/m³ Air	11.429	ND		80-120		20	GC-BS, QM-4X, U
Potassium	131	31.4	ng/m³ Air	45.716	85.5	99.7	80-120	1.03	20	
Rubidium	1.23	0.0151	ng/m³ Air	1.1429	0.112	98.0	80-120	2.90	20	
Selenium	2.39	0.00909	ng/m³ Air	2.2858	0.104	100	80-120	0.674	20	
Sodium	ND	1650	ng/m³ Air	45.716	ND		80-120		20	GC-BS, QM-4X, U
Strontium	3.38	0.539	ng/m³ Air	1.1429	2.18	105	80-120	2.33	20	QB-01
Thallium	0.110	4.16E-4	ng/m³ Air	0.11429	6.19E-4	95.5	80-120	0.633	20	
Thorium	0.0641	0.00248	ng/m³ Air	0.11429	0.00662	50.3	80-120	10.9	20	QM-07
Uranium	0.114	0.0140	ng/m³ Air	0.11429	ND	99.5	80-120	1.76	20	
Vanadium	2.92	0.0407	ng/m³ Air	2.2858	0.660	98.7	80-120	0.363	20	QB-01
Zinc	87.4	80.7	ng/m³ Air	68.575	ND	127	80-120	0.668	20	

Post Spike (B3L1203-PS1) Source: 3121111-02 Prepared: 12/12/23 Analyzed: 12/13/23

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Aluminum	179	26.5	ng/m³ Air	22.858	159	89.0	75-125			
Antimony	0.304	0.0364	ng/m³ Air	0.22858	0.0779	98.8	75-125			SL
Arsenic	1.27	0.00789	ng/m³ Air	1.1429	0.176	96.2	75-125			
Barium	5.73	0.783	ng/m³ Air	2.2858	3.44	101	75-125			
Beryllium	0.220	0.00274	ng/m³ Air	0.22858	0.00625	93.4	75-125			
Cadmium	0.126	0.0901	ng/m³ Air	0.11429	ND	110	75-125			
Calcium	497	241	ng/m³ Air	22.858	467	132	75-125			A-01a, LJ, QB-01
Chromium	2.77	1.68	ng/m³ Air	1.1429	ND	243	75-125			
Cobalt	0.337	0.0129	ng/m³ Air	0.22858	0.117	96.2	75-125			QB-01
Copper	30.5	2.48	ng/m³ Air	11.429	18.5	105	75-125			
Iron	208	20.0	ng/m³ Air	22.858	185	98.2	75-125			GC-BS
Lead	22.5	0.228	ng/m³ Air	22.858	ND	98.4	75-125			
Magnesium	158	79.7	ng/m³ Air	22.858	136	97.1	75-125			
Manganese	7.38	0.983	ng/m³ Air	2.2858	5.13	98.7	75-125			QB-01
Molybdenum	1.98	0.176	ng/m³ Air	1.1429	0.890	95.1	75-125			QB-01
Nickel	2.73	0.662	ng/m³ Air	2.2858	ND	119	75-125			
Phosphorus	ND	1030	ng/m³ Air	4.5716	ND		75-125			A-01a, GC-BS U
Potassium	107	31.4	ng/m³ Air	22.858	85.5	96.0	75-125			
Rubidium	0.217	0.0151	ng/m³ Air	0.11429	0.112	91.4	75-125			
Selenium	1.24	0.00909	ng/m³ Air	1.1429	0.104	99.1	75-125			
Sodium	ND	1650	ng/m³ Air	22.858	ND		75-125			A-01a, GC-BS U

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Tetra Tech, Inc.
1777 Sentry Pkwy, Bldg 12
Blue Bell, PA 19422
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PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 12/19/23 10:54
SUBMITTED: 12/11/23 to 12/13/23
AQS SITE CODE:
SITE CODE: Maui fires

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes

Inorganics by Compendium Method IO-3.5 - Quality Control

Batch B3L1203 - ICP-MS Extraction

Post Spike (B3L1203-PS1) Continued **Source: 3121111-02** Prepared: 12/12/23 Analyzed: 12/13/23

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Strontium	3.31	0.539	ng/m³ Air	1.1429	2.18	98.7	75-125			QB-01
Thallium	0.0542	4.16E-4	ng/m³ Air	5.7146E-2	6.19E-4	93.8	75-125			
Thorium	0.0584	0.00248	ng/m³ Air	5.7146E-2	0.00662	90.6	75-125			
Uranium	0.0582	0.0140	ng/m³ Air	5.7146E-2	ND	102	75-125			
Vanadium	1.78	0.0407	ng/m³ Air	1.1429	0.660	97.6	75-125			QB-01
Zinc	ND	80.7	ng/m³ Air	22.858	ND		75-125			U

Batch B3L1403 - ICP-MS Extraction

Blank (B3L1403-BLK1) Prepared & Analyzed: 12/14/23

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Aluminum	ND	32.1	ng/m³ Air							U
Antimony	ND	0.0441	ng/m³ Air							SL, U
Arsenic	ND	0.00955	ng/m³ Air							U
Barium	ND	0.948	ng/m³ Air							U
Beryllium	ND	0.00332	ng/m³ Air							U
Cadmium	ND	0.109	ng/m³ Air							U
Calcium	ND	292	ng/m³ Air							LJ, QB-01, U
Chromium	ND	2.03	ng/m³ Air							U
Cobalt	ND	0.0156	ng/m³ Air							QB-01, U
Copper	ND	3.00	ng/m³ Air							U
Iron	ND	24.2	ng/m³ Air							U
Lead	ND	0.276	ng/m³ Air							U
Magnesium	ND	96.4	ng/m³ Air							U
Manganese	ND	1.19	ng/m³ Air							U
Molybdenum	ND	0.213	ng/m³ Air							B, QB-01, U
Nickel	ND	0.801	ng/m³ Air							U
Phosphorus	ND	1250	ng/m³ Air							U
Potassium	ND	38.0	ng/m³ Air							B, U
Rubidium	ND	0.0183	ng/m³ Air							U
Selenium	ND	0.0110	ng/m³ Air							U
Sodium	ND	2000	ng/m³ Air							U
Strontium	ND	0.652	ng/m³ Air							QB-01, U
Thallium	ND	5.03E-4	ng/m³ Air							U
Thorium	ND	0.00300	ng/m³ Air							U
Uranium	ND	0.0170	ng/m³ Air							U
Vanadium	ND	0.0492	ng/m³ Air							U
Zinc	ND	97.7	ng/m³ Air							U

LCS (B3L1403-BS1) Prepared & Analyzed: 12/14/23

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Aluminum	94.6	32.1	ng/m³ Air	82.975		114	80-120			
Antimony	0.539	0.0441	ng/m³ Air	1.3829		39.0	80-120			SL

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SITE CODE: Maui fires

Inorganics by Compendium Method IO-3.5 - Quality Control

Batch B3L1403 - ICP-MS Extraction

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
LCS (B3L1403-BS1) Continued				Prepared & Analyzed: 12/14/23						
Arsenic	2.74	0.00955	ng/m³ Air	2.7658		99.0	80-120			
Barium	28.0	0.948	ng/m³ Air	27.658		101	80-120			
Beryllium	1.35	0.00332	ng/m³ Air	1.3829		97.7	80-120			
Cadmium	1.41	0.109	ng/m³ Air	1.3829		102	80-120			
Calcium	564	292	ng/m³ Air	69.146		815	80-120			LJ, QB-01
Chromium	16.3	2.03	ng/m³ Air	13.829		118	80-120			
Cobalt	1.40	0.0156	ng/m³ Air	1.3829		101	80-120			QB-01
Copper	32.3	3.00	ng/m³ Air	27.658		117	80-120			
Iron	41.9	24.2	ng/m³ Air	27.658		152	80-120			
Lead	13.6	0.276	ng/m³ Air	13.829		98.2	80-120			
Magnesium	ND	96.4	ng/m³ Air	27.658			80-120			U
Manganese	8.80	1.19	ng/m³ Air	8.2975		106	80-120			
Molybdenum	1.66	0.213	ng/m³ Air	1.3829		120	80-120			B, QB-01
Nickel	3.19	0.801	ng/m³ Air	2.7658		115	80-120			
Phosphorus	ND	1250	ng/m³ Air	13.829			80-120			U
Potassium	72.6	38.0	ng/m³ Air	55.317		131	80-120			B
Rubidium	1.32	0.0183	ng/m³ Air	1.3829		95.5	80-120			
Selenium	2.72	0.0110	ng/m³ Air	2.7658		98.3	80-120			
Sodium	ND	2000	ng/m³ Air	55.317			80-120			U
Strontium	2.19	0.652	ng/m³ Air	1.3829		158	80-120			QB-01
Thallium	0.132	5.03E-4	ng/m³ Air	0.13829		95.3	80-120			
Thorium	0.132	0.00300	ng/m³ Air	0.13829		95.3	80-120			
Uranium	0.130	0.0170	ng/m³ Air	0.13829		94.2	80-120			
Vanadium	2.75	0.0492	ng/m³ Air	2.7658		99.3	80-120			
Zinc	125	97.7	ng/m³ Air	82.975		151	80-120			
Duplicate (B3L1403-DUP1)		**Source: 3121332-06**		Prepared & Analyzed: 12/14/23						
Aluminum	378	30.1	ng/m³ Air		383			1.17	10	
Antimony	0.0764	0.0414	ng/m³ Air		0.0839			9.31	10	SL
Arsenic	0.101	0.00896	ng/m³ Air		0.101			0.656	10	
Barium	7.37	0.889	ng/m³ Air		7.62			3.28	10	
Beryllium	0.0206	0.00311	ng/m³ Air		0.0182			12.3	10	
Cadmium	ND	0.102	ng/m³ Air		ND				10	U
Calcium	628	274	ng/m³ Air		623			0.807	10	LJ, QB-01
Chromium	2.18	1.90	ng/m³ Air		2.10			3.88	10	
Cobalt	0.238	0.0146	ng/m³ Air		0.237			0.384	10	QB-01
Copper	34.4	2.81	ng/m³ Air		34.8			1.14	10	
Iron	475	22.7	ng/m³ Air		478			0.780	10	
Lead	0.363	0.259	ng/m³ Air		0.343			5.71	10	

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AQS SITE CODE:
SITE CODE: Maui fires

Inorganics by Compendium Method IO-3.5 - Quality Control

Batch B3L1403 - ICP-MS Extraction

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Duplicate (B3L1403-DUP1) Continued		**Source: 3121332-06**		Prepared & Analyzed: 12/14/23						
Magnesium	250	90.4	ng/m³ Air		254			1.26	10	
Manganese	15.1	1.12	ng/m³ Air		15.1			0.186	10	
Molybdenum	1.04	0.200	ng/m³ Air		1.05			0.480	10	B, QB-01
Nickel	ND	0.751	ng/m³ Air		ND				10	U
Phosphorus	ND	1170	ng/m³ Air		ND				10	U
Potassium	108	35.6	ng/m³ Air		105			2.78	10	B
Rubidium	0.183	0.0172	ng/m³ Air		0.185			1.18	10	
Selenium	0.168	0.0103	ng/m³ Air		0.162			3.77	10	
Sodium	2170	1880	ng/m³ Air		2200			1.32	10	E
Strontium	4.65	0.612	ng/m³ Air		4.71			1.32	10	QB-01
Thallium	0.00135	4.72E-4	ng/m³ Air		0.00143			5.78	10	
Thorium	0.0137	0.00281	ng/m³ Air		0.0143			4.60	10	
Uranium	ND	0.0159	ng/m³ Air		ND				10	U
Vanadium	1.32	0.0461	ng/m³ Air		1.36			2.65	10	
Zinc	ND	91.6	ng/m³ Air		ND				10	U
Duplicate (B3L1403-DUP2)		**Source: 3121332-12**		Prepared: 12/14/23 Analyzed: 12/15/23						
Aluminum	531	25.4	ng/m³ Air		528			0.675	10	
Antimony	0.0541	0.0349	ng/m³ Air		0.0546			0.953	10	SL
Arsenic	0.141	0.00755	ng/m³ Air		0.143			1.23	10	
Barium	5.12	0.750	ng/m³ Air		5.17			0.912	10	
Beryllium	0.0179	0.00263	ng/m³ Air		0.0186			3.68	10	
Cadmium	ND	0.0862	ng/m³ Air		ND				10	U
Calcium	419	231	ng/m³ Air		424			1.14	10	LJ, QB-01
Chromium	1.98	1.61	ng/m³ Air		1.97			0.508	10	
Cobalt	0.295	0.0123	ng/m³ Air		0.293			0.697	10	QB-01
Copper	22.8	2.37	ng/m³ Air		22.7			0.602	10	
Iron	590	19.1	ng/m³ Air		586			0.594	10	
Lead	0.691	0.218	ng/m³ Air		0.697			1.00	10	
Magnesium	135	76.3	ng/m³ Air		134			0.571	10	
Manganese	16.5	0.941	ng/m³ Air		16.6			0.215	10	
Molybdenum	0.723	0.168	ng/m³ Air		0.723			0.0941	10	B, QB-01
Nickel	ND	0.634	ng/m³ Air		ND				10	U
Phosphorus	ND	989	ng/m³ Air		ND				10	U
Potassium	65.2	30.1	ng/m³ Air		65.5			0.549	10	B
Rubidium	0.171	0.0145	ng/m³ Air		0.173			1.00	10	
Selenium	0.131	0.00870	ng/m³ Air		0.137			4.96	10	
Sodium	ND	1580	ng/m³ Air		ND				10	U
Strontium	3.34	0.516	ng/m³ Air		3.37			1.01	10	QB-01

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AQS SITE CODE:
SITE CODE: Maui fires

Inorganics by Compendium Method IO-3.5 - Quality Control

Batch B3L1403 - ICP-MS Extraction

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Duplicate (B3L1403-DUP2) Continued		**Source: 3121332-12**		Prepared: 12/14/23 Analyzed: 12/15/23						
Thallium	0.00110	3.98E-4	ng/m³ Air		0.00110			0.0815	10	
Thorium	0.0158	0.00237	ng/m³ Air		0.0158			0.0139	10	
Uranium	ND	0.0134	ng/m³ Air		ND				10	U
Vanadium	1.48	0.0389	ng/m³ Air		1.48			0.242	10	
Zinc	ND	77.3	ng/m³ Air		ND				10	U
Matrix Spike (B3L1403-MS1)		**Source: 3121332-06**		Prepared & Analyzed: 12/14/23						
Aluminum	463	30.1	ng/m³ Air	77.823	383	103	80-120			
Antimony	0.652	0.0414	ng/m³ Air	1.2970	0.0839	43.8	80-120			SL
Arsenic	2.64	0.00896	ng/m³ Air	2.5941	0.101	97.7	80-120			
Barium	33.3	0.889	ng/m³ Air	25.941	7.62	98.8	80-120			
Beryllium	1.27	0.00311	ng/m³ Air	1.2970	0.0182	96.1	80-120			
Cadmium	1.33	0.102	ng/m³ Air	1.2970	ND	102	80-120			
Calcium	688	274	ng/m³ Air	64.852	623	100	80-120			LJ, QB-01
Chromium	15.7	1.90	ng/m³ Air	12.970	2.10	105	80-120			
Cobalt	1.53	0.0146	ng/m³ Air	1.2970	0.237	99.8	80-120			QB-01
Copper	62.8	2.81	ng/m³ Air	25.941	34.8	108	80-120			
Iron	512	22.7	ng/m³ Air	25.941	478	129	80-120			QM-4X
Lead	13.2	0.259	ng/m³ Air	12.970	0.343	98.9	80-120			
Magnesium	278	90.4	ng/m³ Air	25.941	254	96.0	80-120			
Manganese	23.1	1.12	ng/m³ Air	7.7823	15.1	103	80-120			
Molybdenum	2.41	0.200	ng/m³ Air	1.2970	1.05	105	80-120			B, QB-01
Nickel	3.33	0.751	ng/m³ Air	2.5941	ND	128	80-120			
Phosphorus	ND	1170	ng/m³ Air	12.970	ND		80-120			QM-4X, U
Potassium	171	35.6	ng/m³ Air	51.882	105	127	80-120			B, QM-07
Rubidium	1.38	0.0172	ng/m³ Air	1.2970	0.185	91.8	80-120			
Selenium	2.68	0.0103	ng/m³ Air	2.5941	0.162	97.1	80-120			
Sodium	2280	1880	ng/m³ Air	51.882	2200	155	80-120			QM-4X
Strontium	5.83	0.612	ng/m³ Air	1.2970	4.71	86.3	80-120			QB-01
Thallium	0.125	4.72E-4	ng/m³ Air	0.12970	0.00143	95.0	80-120			
Thorium	0.0695	0.00281	ng/m³ Air	0.12970	0.0143	42.5	80-120			QM-07
Uranium	0.134	0.0159	ng/m³ Air	0.12970	ND	103	80-120			
Vanadium	3.90	0.0461	ng/m³ Air	2.5941	1.36	97.8	80-120			
Zinc	109	91.6	ng/m³ Air	77.823	ND	140	80-120			
Matrix Spike Dup (B3L1403-MSD1)		**Source: 3121332-06**		Prepared & Analyzed: 12/14/23						
Aluminum	465	30.1	ng/m³ Air	77.823	383	106	80-120	0.629	20	
Antimony	0.642	0.0414	ng/m³ Air	1.2970	0.0839	43.0	80-120	1.59	20	SL
Arsenic	2.64	0.00896	ng/m³ Air	2.5941	0.101	97.8	80-120	0.0407	20	
Barium	32.8	0.889	ng/m³ Air	25.941	7.62	97.1	80-120	1.35	20	

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[redacted]

CERTIFICATE OF ANALYSIS

Tetra Tech, Inc.
1777 Sentry Pkwy, Bldg 12
Blue Bell, PA 19422
ATTN: Ms. Chelsea Saber
PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 12/19/23 10:54
SUBMITTED: 12/11/23 to 12/13/23
AQS SITE CODE:
SITE CODE: Maui fires

Inorganics by Compendium Method IO-3.5 - Quality Control

Batch B3L1403 - ICP-MS Extraction

Matrix Spike Dup (B3L1403-MSD1) ContirSource: 3121332-06 Prepared & Analyzed: 12/14/23

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Beryllium	1.21	0.00311	ng/m³ Air	1.2970	0.0182	92.1	80-120	4.19	20	
Cadmium	1.33	0.102	ng/m³ Air	1.2970	ND	103	80-120	0.534	20	
Calcium	682	274	ng/m³ Air	64.852	623	92.2	80-120	0.754	20	LJ, QB-01
Chromium	15.6	1.90	ng/m³ Air	12.970	2.10	104	80-120	0.875	20	
Cobalt	1.52	0.0146	ng/m³ Air	1.2970	0.237	99.2	80-120	0.505	20	QB-01
Copper	63.2	2.81	ng/m³ Air	25.941	34.8	109	80-120	0.672	20	
Iron	506	22.7	ng/m³ Air	25.941	478	107	80-120	1.14	20	
Lead	13.1	0.259	ng/m³ Air	12.970	0.343	98.6	80-120	0.278	20	
Magnesium	279	90.4	ng/m³ Air	25.941	254	96.4	80-120	0.0399	20	
Manganese	23.1	1.12	ng/m³ Air	7.7823	15.1	103	80-120	0.0337	20	
Molybdenum	2.30	0.200	ng/m³ Air	1.2970	1.05	96.3	80-120	4.98	20	B, QB-01
Nickel	3.34	0.751	ng/m³ Air	2.5941	ND	129	80-120	0.377	20	
Phosphorus	ND	1170	ng/m³ Air	12.970	ND		80-120		20	QM-4X, U
Potassium	154	35.6	ng/m³ Air	51.882	105	94.0	80-120	10.5	20	B
Rubidium	1.40	0.0172	ng/m³ Air	1.2970	0.185	93.7	80-120	1.74	20	
Selenium	2.72	0.0103	ng/m³ Air	2.5941	0.162	98.5	80-120	1.35	20	
Sodium	2240	1880	ng/m³ Air	51.882	2200	87.3	80-120	1.54	20	
Strontium	5.89	0.612	ng/m³ Air	1.2970	4.71	90.8	80-120	0.998	20	QB-01
Thallium	0.125	4.72E-4	ng/m³ Air	0.12970	0.00143	95.7	80-120	0.649	20	
Thorium	0.0709	0.00281	ng/m³ Air	0.12970	0.0143	43.7	80-120	2.11	20	QM-07
Uranium	0.134	0.0159	ng/m³ Air	0.12970	ND	103	80-120	0.230	20	
Vanadium	3.91	0.0461	ng/m³ Air	2.5941	1.36	98.2	80-120	0.257	20	
Zinc	105	91.6	ng/m³ Air	77.823	ND	135	80-120	3.71	20	

Post Spike (B3L1403-PS1) Source: 3121332-06 Prepared & Analyzed: 12/14/23

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Aluminum	406	30.1	ng/m³ Air	25.941	383	89.1	75-125			
Antimony	0.334	0.0414	ng/m³ Air	0.25941	0.0839	96.4	75-125			SL
Arsenic	1.32	0.00896	ng/m³ Air	1.2970	0.101	94.1	75-125			
Barium	9.88	0.889	ng/m³ Air	2.5941	7.62	87.2	75-125			
Beryllium	0.265	0.00311	ng/m³ Air	0.25941	0.0182	95.0	75-125			
Cadmium	0.137	0.102	ng/m³ Air	0.12970	ND	106	75-125			
Calcium	660	274	ng/m³ Air	25.941	623	143	75-125			A-01, LJ, QB-01
Chromium	3.37	1.90	ng/m³ Air	1.2970	2.10	98.2	75-125			
Cobalt	0.492	0.0146	ng/m³ Air	0.25941	0.237	98.3	75-125			QB-01
Copper	48.5	2.81	ng/m³ Air	12.970	34.8	105	75-125			
Iron	504	22.7	ng/m³ Air	25.941	478	99.9	75-125			
Lead	25.3	0.259	ng/m³ Air	25.941	0.343	96.3	75-125			
Magnesium	281	90.4	ng/m³ Air	25.941	254	105	75-125			

[redacted]

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AQS SITE CODE:
SITE CODE: Maui fires

Inorganics by Compendium Method IO-3.5 - Quality Control

Batch B3L1403 - ICP-MS Extraction

Post Spike (B3L1403-PS1) Continued **Source: 3121332-06** Prepared & Analyzed: 12/14/23

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Manganese	17.7	1.12	ng/m³ Air	2.5941	15.1	99.6	75-125			
Molybdenum	2.26	0.200	ng/m³ Air	1.2970	1.05	93.0	75-125			B, QB-01
Nickel	3.17	0.751	ng/m³ Air	2.5941	ND	122	75-125			
Phosphorus	ND	1170	ng/m³ Air	5.1882	ND		75-125			U
Potassium	132	35.6	ng/m³ Air	25.941	105	104	75-125			B
Rubidium	0.295	0.0172	ng/m³ Air	0.12970	0.185	85.1	75-125			
Selenium	1.37	0.0103	ng/m³ Air	1.2970	0.162	93.3	75-125			
Sodium	2260	1880	ng/m³ Air	25.941	2200	232	75-125			A-01
Strontium	5.78	0.612	ng/m³ Air	1.2970	4.71	82.7	75-125			QB-01
Thallium	0.0611	4.72E-4	ng/m³ Air	6.4852E-2	0.00143	92.0	75-125			
Thorium	0.0728	0.00281	ng/m³ Air	6.4852E-2	0.0143	90.1	75-125			
Uranium	0.0704	0.0159	ng/m³ Air	6.4852E-2	ND	109	75-125			
Vanadium	2.58	0.0461	ng/m³ Air	1.2970	1.36	94.5	75-125			
Zinc	ND	91.6	ng/m³ Air	25.941	ND		75-125			U

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[redacted]

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AQS SITE CODE:
SITE CODE: Maui fires

Notes and Definitions

U	Under Detection Limit
SL	The spike recovery was outside acceptance limits. Reported value may be biased low.
QX	Compound does not meet QC criteria. Results should be considered an estimate.
QM-4X	The MS/MSD recovery exceeds criteria because the parent sample concentration is greater than 4x the spike concentration. Sample results for the QC batch were accepted based on acceptable BS/BSD recoveries.
QM-07	The spike recovery was outside acceptance limits for the MS and/or MSD. The batch was accepted based on acceptable LCS recovery.
QM-06	Due to noted non-homogeneity of the QC sample matrix, the MS/MSD did not provide reliable results for accuracy and precision. Sample results for the QC batch were accepted based on LCS/LCSD percent recoveries and RPD values.
QB-01	Analyte exceeds method blank criteria
LJ	Identification of analyte is acceptable; reported value is an estimate.
GC-BS	Compound exceeds Blank Spike Criteria
FB-01	Analyte exceeds Field Blank criteria.
E	The concentration indicated for this analyte is an estimated value above the calibration range of the instrument. This value is considered an estimate (CLP E-flag).
D	This result obtained by dilution.
B	Analyte is found in the associated blank as well as in the sample (CLP B-flag).
A-01a	Parent sample >4x spike amount
A-01	Parent sample >4x spike
ND	Analyte NOT DETECTED
NR	Not Reported
MDL	Method Detection Limit
RPD	Relative Percent Difference

Note: This test is accredited under the 2016 TNI Standard.

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Stage 1 Data Verification Checklist – Metals

HDOH CAB – Ambient Community Air Sampling – Kula

Task Order No. 23141

Reviewed by:

Talaidh Isaacs 12/22/2023 & Shanna Vasser 12/22/2023

Laboratory: Eastern Research Group – Morrisville, NC

Analysis date: 12/13/2023, 12/14/2023, and 12/15/2023

Report No: 3121111

√	1.	Chain of custody (CoC) documentation is present.
X	2.	Sample receipt condition information is present and acceptable.
√	3.	Laboratory conducting the analysis is identified.
√	4.	All samples submitted to the laboratory are accounted for.
√	5.	Requested analytical methods were performed.
√	6.	Analysis dates are provided.
√	7.	Analyte results are provided.
√	8.	Result qualifiers and definitions are provided.
√	9.	Result units are reported.
NA	10.	Requested reporting limits are present.
√	11.	Method detection limits are present.
√	12.	Sample collection date and time are present.

Discrepancies:

The CoC noted, "No field blanks for 12/07/23 and 12/08/23 samples due to late arrival of new filters."

Notes:

2. No sample receipt information was presented by the laboratory.

10. No reporting limits were included in this data package.

Ambient Community Air Monitoring Weekly Report
For the Hawaii Department of Health – Clean Air Branch

Kula, Maui

12/7/2023-12/13/2023
[Report Updated: 4/12/2024]

As a result of ongoing debris removal operations in response to the Maui Wildfires, a community air monitoring and sampling plan (CAMSP, 2023) has been developed and sampling is being performed at three community locations across the area of Kula.

This approach includes ambient community air monitoring and sampling to monitor conditions and ensure debris removal activities, taking place under the U.S. Army Corps of Engineers (USACE), does not significantly impact air quality in the area of Kula. Data collected is made available to HDOH via online shared site and this weekly report. This approach to air monitoring and sampling will continue until debris removal activities are complete or until HDOH CAB advises otherwise.

Air quality monitoring for particulate matter was collected at all three community locations over a 24-hour period each day in accordance with the CAMSP. Additionally, daily air samples were collected at all community locations for asbestos and heavy metals. Summary analytical data is presented in **Tables 1 and 2**. **Figure 1** depicts the community air monitoring and sampling locations. **Appendix 1** provides detailed analytical results for all community locations where air sampling was performed. Analytical results were compared to site-specific screening levels for particulate matter, asbestos, and heavy metals as published in the CAMSP (Tetra Tech 2023; see Table 2).

Results for Community Locations:
Ambient particulate air monitoring was performed to assess for the presence and concentrations of airborne particulates with a particle size aerodynamic diameter of 2.5 micrometers (µm) and less ($PM_{2.5}$), as well as 10 micrometers (µm) and less (PM_{10}). This particle size diameter is recognized for health evaluations and is identified as "$PM_{2.5}$" and "PM_{10}". The particle size diameters of 2.5 micrometers (µm) and 10 micrometers (µm) are small enough to be inhaled into a person's lungs. Monitoring for $PM_{2.5}$ and PM_{10} was conducted 7 days a week at each of the following locations: Top Property (AM-01) (December 7 – 13), Middle Property (AM-02) 2 (December 7 – 13), Lower Property (AM-03) (December 7 – 13).

The results of PM_{10} monitoring found that screening levels were not exceeded during the duration of this reporting period.

The results of $PM_{2.5}$ monitoring found that screening levels were exceeded at the Top Property air monitoring station on December 7, 9, 12 and 13. The property owner was also observed spreading woodchips and clearing brush on December 7 and 13. The exceedances on December 9 and 12 were confirmed to not be related to USACE crew activities, as the exceedances took place at times when the USACE crews were not present at site. No observations were made by field teams pointing to the source of the exceedances on Dec 9 and 12. The property owner and other local activities could not be confirmed during those time periods.

None of these exceedances of particulate screening levels are likely to be attributable to USACE debris removal operations.

There were twenty-one samples collected for asbestos fibers at community monitoring locations throughout this time frame. Of the twenty-one samples collected, five were voided. Five were voided due to greater than 10% discrepancy between the pre and post calibration values, as stated in the asbestos sampling SOP. The voided samples were from the Middle Property (AM-02) on 12/10, and Lower Property (AM-03) on 12/7, 12/8, 12/9, and 12/12. No asbestos sample returned a value above the laboratory's detection limit, indicating fibers were not present in air sampled. All asbestos results were below the public health screening level of 0.0034 fibers/cc (as well as the laboratory's detection limits), and therefore not a concern.

Some extremely low levels of heavy metals were detected in ambient air samples at community locations. Although detected, all concentrations were below the public health screening levels for heavy metals. Details for particulates, heavy metal and asbestos sampling data for community locations are found in Attachment 1. The metals lab report 3121111 contains samples outside the range of this report and have been redacted to only show the results pertinent to this reporting period.

Attachments:

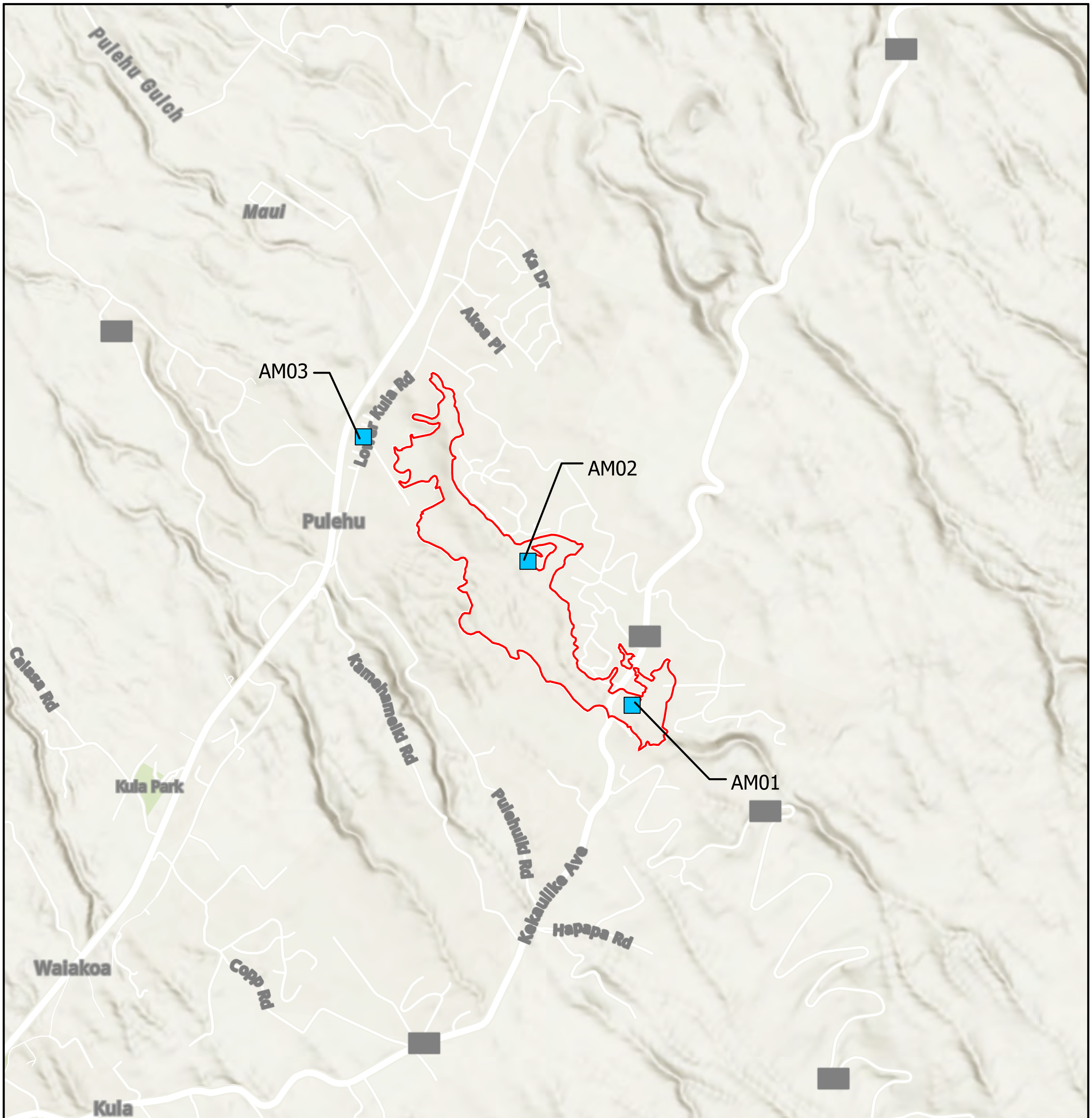
Analytical Sampling Results and Particulate Monitoring Results

Air Monitoring and Sampling Locations

Appendix:

Analytical Reports

Attachments



Air Monitoring Locations

Kula Fire Perimeter

N

0 0.25 0.5
Miles

TETRA TECH

Figure 1
Ambient Community
Air Monitoring Locations

Hawaii DOH
2023 Kula Wildfire

Basemap: ESRI ArcGIS World Street Map

Table 1: HDOH CAB Ambient Community Monitoring and Sampling
Analytical Sampling Results
Maui Wildfire, Kula
12/7/2023-12/13/2023
[Report Updated: 4/12/2024]

Analyte		Asbestos		Antimony	Arsenic	Barium	Beryllium	Cadmium	Chromium	Cobalt	Copper	Lead	Manganese	Molybdenum	Nickel	Selenium	Thallium	Vanadium	Zinc
Units		f/cc	Y/N	$\mu g/m^3$	$\mu g/m^3$	$\mu g/m^3$	$\mu g/m^3$	$\mu g/m^3$	$\mu g/m^3$	$\mu g/m^3$	$\mu g/m^3$	$\mu g/m^3$	$\mu g/m^3$	$\mu g/m^3$	$\mu g/m^3$	$\mu g/m^3$	$\mu g/m^3$	$\mu g/m^3$	$\mu g/m^3$
Screening Level	Location / ID	0.0034 [1]	Confirmed Asbestos [2]	1.4	0.18	2.4	0.1	0.048	24	0.029	480	1.5	0.24	9.6	0.048	96	48	0.48	2400
12/7/2023	Top Property (AM-01)	<0.00050	N	0.0000502	0.00016	0.00661	0.0000252	ND	0.00229	0.000391	0.0265	0.000804	0.0234	0.000845	0.000996	0.000239	0.00000154	0.00247	ND
	Middle Property (AM-02)	<0.00047	N	0.0000469	0.000121	0.00385	0.0000109	ND	0.00185	0.000187	0.0352	0.000871	0.00912	0.000939	0.000737	0.000186	0.000000703	0.00126	ND
	Lower Property (AM-03)	NA	NA	0.0000784	0.000147	0.00734	0.0000211	ND	0.00234	0.00029	0.0629	0.000618	0.0166	0.00165	0.000936	0.000207	0.00000126	0.00179	ND
12/8/2023	Top Property (AM-01)	<0.00048	N	0.000044	0.000119	0.0054	0.0000175	ND	0.00206	0.00026	0.0148	0.000454	0.016	0.00074	0.000792	0.000193	0.00000114	0.00153	ND
	Middle Property (AM-02)	<0.00118	N	0.0000722	0.000194	0.00541	0.0000131	ND	0.00183	0.000189	0.0155	0.000337	0.0106	0.00072	0.000878	0.000157	0.000000926	0.00118	ND
	Lower Property (AM-03)	NA	NA	0.0000839	0.000101	0.00762	0.0000182	ND	0.0021	0.000237	0.0348	0.000343	0.0151	0.00105	ND	0.000162	0.00000143	0.00136	ND
12/9/2003	Top Property (AM-01)	<0.00092	N	0.0000404	0.000204	0.00501	0.0000154	ND	0.00202	0.000238	0.0168	0.000429	0.0143	0.000763	0.000631	0.000146	0.000000993	0.0014	ND
	Middle Property (AM-02)	<0.00089	N	0.0000532	0.000385	0.00635	0.0000202	ND	0.00207	0.000288	0.0159	0.00044	0.0166	0.000721	0.000649	0.000146	0.00000117	0.00168	ND
	Lower Property (AM-03)	NA	NA	0.000089	0.000239	0.0112	0.0000343	ND	0.00288	0.000429	0.0345	0.000686	0.0281	0.000978	0.000803	0.000178	0.00000192	0.00214	ND
12/10/2023	Top Property (AM-01)	<0.00050	N	0.0000546	0.000143	0.00517	0.0000186	ND	0.00197	0.000293	0.0227	0.000697	0.0166	0.000723	ND	0.000137	0.0000011	0.00148	ND
	Middle Property (AM-02)	NA	NA	0.000071	0.00015	0.00724	0.000018	ND	0.00201	0.000288	0.0127	0.000344	0.0166	0.000692	0.000732	0.000138	0.00000105	0.00151	ND
	Lower Property (AM-03)	<0.00050	N	0.0000885	0.000124	0.00717	0.0000195	ND	0.00221	0.000282	0.0274	0.000366	0.0165	0.000819	ND	0.000141	0.00000103	0.00134	ND
12/11/2023	Top Property (AM-01)	<0.00107	N	0.0000624	0.000204	0.00538	0.000019	ND	0.00214	0.000268	0.0157	0.000471	0.0163	0.000721	0.00082	0.000193	0.00000127	0.002	ND
	Middle Property (AM-02)	<0.00049	N	0.0000913	0.00036	0.0113	0.0000263	ND	0.00224	0.000374	0.0167	0.0004	0.0252	0.00101	0.000947	0.000247	0.00000179	0.00269	ND
	Lower Property (AM-03)	<0.00086	N	0.000131	0.000105	0.00599	0.0000144	ND	0.0022	0.000222	0.0593	0.000358	0.0119	0.0016	ND	0.000197	0.000000924	0.00177	ND
12/12/2023	Top Property (AM-01)	<0.00119	N	0.0000606	0.000564	0.00759	0.000032	ND	0.00242	0.000437	0.0146	0.000527	0.0276	0.000813	0.00114	0.000235	0.00000162	0.00284	ND
	Middle Property (AM-02)	<0.00112	N	0.0000597	0.000326	0.00709	0.0000257	0.000191	0.00208	0.000361	0.0161	0.000423	0.0196	0.000987	0.000887	0.000197	0.00000139	0.00242	ND
	Lower Property (AM-03)	NA	NA	0.0000915	0.000166	0.00793	0.0000262	ND	0.00212	0.000353	0.0374	0.000576	0.0211	0.000908	0.000881	0.000179	0.00000138	0.0021	ND
12/13/2023	Top Property (AM-01)	<0.00068	N	0.0000688	0.000318	0.0103	0.0000448	ND	0.0026	0.000636	0.0181	0.000625	0.0388	0.000994	0.00122	0.000253	0.00000218	0.00357	ND
	Middle Property (AM-02)	<0.00052	N	0.0000454	0.000254	0.00708	0.0000268	ND	0.00219	0.000421	0.0238	0.000519	0.0235	0.00121	0.00092	0.000194	0.00000132	0.00252	ND
	Lower Property (AM-03)	<0.00043	N	0.0000871	0.000163	0.0103	0.000034	ND	0.00262	0.000472	0.0418	0.000464	0.0301	0.00114	0.00102	0.000208	0.0000018	0.00255	ND
95% Upper Confidence Limit[3]		0.00092		0.00008	0.00027	0.00808	0.00002	NA	0.0023	0.00038	0.033	0.00058	0.023	0.00105	0.00096	0.0002	0.0000015	0.00225	NA

Notes:

Asbestos sampling was voided at the Middle Property (AM-02) on 12/10 due to the sampling pump not providing a non-fluctuating air flow through the filter and maintain initial volume flow rate within 10% throughout the sampling period.

Asbestos sampling was voided at the Lower Property (AM-03) on 12/7, 12/8, 12/9 and 12/12 due to the sampling pump not providing a non-fluctuating air flow through the filter and maintain initial volume flow rate within 10% throughout the sampling period.

NA = Not Available

f/cc = fibers per cubic centimeter

µg/m3= micrograms per cubic meter

ND = Not detected at or above the laboratory reporting limit or method detection limit

1 Fiber count sample result via Phase Contrast Microscopy

2 Confirmed asbestos sample result via Transmission Electron Microscopy

3 95% UCL determined through 'best fit' lognormal or normal parametric statistics via W test

Table 2: HDOH CAB Ambient Community Monitoring and Sampling
Particulate Monitoring Results
Maui Wildfire, Kula
12/7/2023-12/13/2023
[Report Updated: 4/12/2024]

Particulate Size		PM 2.5	PM 10
Screening Level	**Location / ID**	**35 µg/m^3**	**150 µg/m^3**
12/7/2023	Top Property (AM-01)	36	13
	Middle Property (AM-02)	26	7.8
	Lower Property (AM-03)	6.2	9.0
12/8/2023	Top Property (AM-01)	34	23
	Middle Property (AM-02)	20	5.8
	Lower Property (AM-03)	7.3	8.7
12/9/2003	Top Property (AM-01)	41	21
	Middle Property (AM-02)	30	6.4
	Lower Property (AM-03)	5.4	7.2
12/10/2023	Top Property (AM-01)	20	23
	Middle Property (AM-02)	11	7.1
	Lower Property (AM-03)	8.4	7.9
12/11/2023	Top Property (AM-01)	29	15
	Middle Property (AM-02)	16	7.4
	Lower Property (AM-03)	7.2	8.7
12/12/2023	Top Property (AM-01)	40	18
	Middle Property (AM-02)	16	7.1
	Lower Property (AM-03)	7.3	7.5
12/13/2023	Top Property (AM-01)	37	34
	Middle Property (AM-02)	32	6.9
	Lower Property (AM-03)	6.3	9.3

Notes:
The exceedances on 12/7, and 12/13 are a result of the use of a brush clearing, and woodchips spread and private operations on the property.
The exceedances on 12/9, and 12/12 were not related to USACE crew activities. Exceedances took place after crew hours, no observations from field members could confirm cause.
Results are based on 24 hour TWA calculation
24 hour TWA calculation is presented in two significant figures
µg/m3 = micrograms per cubic meter
ND = Not detected at or above the laboratory reporting limit
NA = Not Available
Data for the Top Property (AM-01) on 12/13 has been revised from the prerviously submitted report
Data for the MiddleProperty (AM-02) on 12/13 has been revised from the prerviously submitted report
Data for the Lower Property (AM-03) on 12/7 , 12/11, and 12/13 has been revised from the prerviously submitted report

Appendix 1

Eurofins J3 Resources, Inc.
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j3resources.com

Airborne Asbestos Fiber Analysis by Transmission Electron Microscopy (TEM) ISO 10312 - Ambient Air - Determination of Asbestos Fibers Direct-Transfer Transmission Electron Microscopy Method

Maura McAleese
Tetra Tech
1999 Harrison St, Ste. 500
Oakland, CA 94612

EJ3 Order #: 3480279
Project #: 103S864023141
Receipt Date: 13-Dec-2023
Analysis Date: 18-Dec-2023
Report Date: 18-Dec-2023

HDOH Kula Community Air

Sample Number **MFK-AM01-120723-AB**

Air Volume:	5847.007
Effective Filter Area:	385.0 mm^2
Level of Analysis (Chrysotile):	CDQ
Level of Analysis (Amphibole):	ADQ
Magnification Used for Fiber Counting:	20,000
Aspect Ratio for Fiber Definition:	5:1
Mean Dimension of Grid Openings (GOs):	0.0132 mm^2
Initials of Analyst:	TS
Number of GO's Examined:	10
Analytical Sensitivity: f/Liter:	0.49883
Analytical Sensitivity: f/cm3:	0.00050
Number of primary asbestos structures:	0
Number of asbestos structures counted:	0
Number of asbestos structures > 5 um :	0
Number of asbestos fibers and bundles > 5 um:	0
Number of PCM equivalent asbestos structures:	0
Number of PCM equivalent asbestos fibers:	0
Concentration of Asbestos (Chrysotile) f/cm3:	<0.00050
Concentration of Asbestos (Amphibole) f/cm3:	<0.00050
Concentration of PCME Asbestos (Chrysotile) f/cm3:	<0.00050
Concentration of Asbestos (Chrysotile), Str/L:	0
Concentration of Asbestos (Amphibole), Str/L:	0
Lower 95% Confidence Limit (Chrysotile), Str/L:	0
Upper 95% Confidence Limit (Chrysotile), Str/L:	1.8
Lower 95% Confidence Limit (Amphibole), Str/L:	0
Upper 95% Confidence Limit (Amphibole), Str/L:	1.8

Analyst: Taylor Smylie

Scott M. Ward, Ph.D. **Lab Director**

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Receipt Date: 13-Dec-2023
Analysis Date: 18-Dec-2023
Report Date: 18-Dec-2023

HDOH Kula Community Air

Sample Number **MFK-AM02-120723-AB**

Air Volume:	6252.266
Effective Filter Area:	385.0 mm^2
Level of Analysis (Chrysotile):	CDQ
Level of Analysis (Amphibole):	ADQ
Magnification Used for Fiber Counting:	20,000
Aspect Ratio for Fiber Definition:	5:1
Mean Dimension of Grid Openings (GOs):	0.0132 mm^2
Initials of Analyst:	TS
Number of GO's Examined:	10
Analytical Sensitivity: f/Liter:	0.46650
Analytical Sensitivity: f/cm3:	0.00047
Number of primary asbestos structures:	0
Number of asbestos structures counted:	0
Number of asbestos structures > 5 um :	0
Number of asbestos fibers and bundles > 5 um:	0
Number of PCM equivalent asbestos structures:	0
Number of PCM equivalent asbestos fibers:	0
Concentration of Asbestos (Chrysotile) f/cm3:	<0.00047
Concentration of Asbestos (Amphibole) f/cm3:	<0.00047
Concentration of PCME Asbestos (Chrysotile) f/cm3:	<0.00047
Concentration of Asbestos (Chrysotile), Str/L:	0
Concentration of Asbestos (Amphibole), Str/L:	0
Lower 95% Confidence Limit (Chrysotile), Str/L:	0
Upper 95% Confidence Limit (Chrysotile), Str/L:	1.7
Lower 95% Confidence Limit (Amphibole), Str/L:	0
Upper 95% Confidence Limit (Amphibole), Str/L:	1.7

Analyst: Taylor Smylie

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Report Date: 18-Dec-2023

HDOH Kula Community Air

Sample Number **MFK-FB01-120723-AB**

Air Volume:	0
Effective Filter Area:	385.0 mm^2
Level of Analysis (Chrysotile):	CDQ
Level of Analysis (Amphibole):	ADQ
Magnification Used for Fiber Counting:	20,000
Aspect Ratio for Fiber Definition:	5:1
Mean Dimension of Grid Openings (GOs):	0.0132 mm^2
Initials of Analyst:	TS
Number of GO's Examined:	10
Analytical Sensitivity: f/Liter:	N/A
Analytical Sensitivity: f/cm3:	N/A
Number of primary asbestos structures:	0
Number of asbestos structures counted:	0
Number of asbestos structures > 5 um :	0
Number of asbestos fibers and bundles > 5 um:	0
Number of PCM equivalent asbestos structures:	0
Number of PCM equivalent asbestos fibers:	0
Concentration of Asbestos (Chrysotile) f/cm3:	N/A
Concentration of Asbestos (Amphibole) f/cm3:	N/A
Concentration of PCME Asbestos (Chrysotile) f/cm3:	N/A
Concentration of Asbestos (Chrysotile), Str/L:	N/A
Concentration of Asbestos (Amphibole), Str/L:	N/A
Lower 95% Confidence Limit (Chrysotile), Str/L:	N/A
Upper 95% Confidence Limit (Chrysotile), Str/L:	N/A
Lower 95% Confidence Limit (Amphibole), Str/L:	N/A
Upper 95% Confidence Limit (Amphibole), Str/L:	N/A

Analyst: Taylor Smylie

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Analysis Date: 18-Dec-2023
Report Date: 18-Dec-2023

HDOH Kula Community Air

Sample Number **MFK-AM01-120823-AB**

Air Volume:	6110.793
Effective Filter Area:	385.0 mm^2
Level of Analysis (Chrysotile):	CDQ
Level of Analysis (Amphibole):	ADQ
Magnification Used for Fiber Counting:	20,000
Aspect Ratio for Fiber Definition:	5:1
Mean Dimension of Grid Openings (GOs):	0.0132 mm^2
Initials of Analyst:	TS
Number of GO's Examined:	10
Analytical Sensitivity: f/Liter:	0.47730
Analytical Sensitivity: f/cm3:	0.00048
Number of primary asbestos structures:	0
Number of asbestos structures counted:	0
Number of asbestos structures > 5 um :	0
Number of asbestos fibers and bundles > 5 um:	0
Number of PCM equivalent asbestos structures:	0
Number of PCM equivalent asbestos fibers:	0
Concentration of Asbestos (Chrysotile) f/cm3:	<0.00048
Concentration of Asbestos (Amphibole) f/cm3:	<0.00048
Concentration of PCME Asbestos (Chrysotile) f/cm3:	<0.00048
Concentration of Asbestos (Chrysotile), Str/L:	0
Concentration of Asbestos (Amphibole), Str/L:	0
Lower 95% Confidence Limit (Chrysotile), Str/L:	0
Upper 95% Confidence Limit (Chrysotile), Str/L:	1.8
Lower 95% Confidence Limit (Amphibole), Str/L:	0
Upper 95% Confidence Limit (Amphibole), Str/L:	1.8

Analyst: Taylor Smylie

Scott M. Ward, Ph.D. **Lab Director**

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HDOH Kula Community Air

Sample Number **MFK-AM02-120823-AB**

Air Volume:	2468.729
Effective Filter Area:	385.0 mm^2
Level of Analysis (Chrysotile):	CDQ
Level of Analysis (Amphibole):	ADQ
Magnification Used for Fiber Counting:	20,000
Aspect Ratio for Fiber Definition:	5:1
Mean Dimension of Grid Openings (GOs):	0.0132 mm^2
Initials of Analyst:	
Number of GO’s Examined:	10
Analytical Sensitivity: f/Liter:	1.18144
Analytical Sensitivity: f/cm3:	0.00118
Number of primary asbestos structures:	0
Number of asbestos structures counted:	0
Number of asbestos structures > 5 um :	0
Number of asbestos fibers and bundles > 5 um:	0
Number of PCM equivalent asbestos structures:	0
Number of PCM equivalent asbestos fibers:	0
Concentration of Asbestos (Chrysotile) f/cm3:	<0.00118
Concentration of Asbestos (Amphibole) f/cm3:	<0.00118
Concentration of PCME Asbestos (Chrysotile) f/cm3:	<0.00118
Concentration of Asbestos (Chrysotile), Str/L:	0
Concentration of Asbestos (Amphibole), Str/L:	0
Lower 95% Confidence Limit (Chrysotile), Str/L:	0
Upper 95% Confidence Limit (Chrysotile), Str/L:	4.4
Lower 95% Confidence Limit (Amphibole), Str/L:	0
Upper 95% Confidence Limit (Amphibole), Str/L:	4.4

Analyst: Taylor Smylie

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Receipt Date: 13-Dec-2023
Analysis Date: 18-Dec-2023
Report Date: 18-Dec-2023

HDOH Kula Community Air

Sample Number **MFK-FB01-120823-AB**

Air Volume:	0
Effective Filter Area:	385.0 mm^2
Level of Analysis (Chrysotile):	CDQ
Level of Analysis (Amphibole):	ADQ
Magnification Used for Fiber Counting:	20,000
Aspect Ratio for Fiber Definition:	5:1
Mean Dimension of Grid Openings (GOs):	0.0132 mm^2
Initials of Analyst:	TS
Number of GO's Examined:	10
Analytical Sensitivity: f/Liter:	N/A
Analytical Sensitivity: f/cm3:	N/A
Number of primary asbestos structures:	0
Number of asbestos structures counted:	0
Number of asbestos structures > 5 um :	0
Number of asbestos fibers and bundles > 5 um:	0
Number of PCM equivalent asbestos structures:	0
Number of PCM equivalent asbestos fibers:	0
Concentration of Asbestos (Chrysotile) f/cm3:	N/A
Concentration of Asbestos (Amphibole) f/cm3:	N/A
Concentration of PCME Asbestos (Chrysotile) f/cm3:	N/A
Concentration of Asbestos (Chrysotile), Str/L:	N/A
Concentration of Asbestos (Amphibole), Str/L:	N/A
Lower 95% Confidence Limit (Chrysotile), Str/L:	N/A
Upper 95% Confidence Limit (Chrysotile), Str/L:	N/A
Lower 95% Confidence Limit (Amphibole), Str/L:	N/A
Upper 95% Confidence Limit (Amphibole), Str/L:	N/A

Analyst: Taylor Smylie

Scott M. Ward, Ph.D. **Lab Director**

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Receipt Date: 13-Dec-2023
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Report Date: 18-Dec-2023

HDOH Kula Community Air

Sample Number **MFK-AM01-120923-AB**

Air Volume:	3184.383
Effective Filter Area:	385.0 mm^2
Level of Analysis (Chrysotile):	CDQ
Level of Analysis (Amphibole):	ADQ
Magnification Used for Fiber Counting:	20,000
Aspect Ratio for Fiber Definition:	5:1
Mean Dimension of Grid Openings (GOs):	0.0132 mm^2
Initials of Analyst:	TS
Number of GO's Examined:	10
Analytical Sensitivity: f/Liter:	0.91593
Analytical Sensitivity: f/cm3:	0.00092
Number of primary asbestos structures:	0
Number of asbestos structures counted:	0
Number of asbestos structures > 5 um :	0
Number of asbestos fibers and bundles > 5 um:	0
Number of PCM equivalent asbestos structures:	0
Number of PCM equivalent asbestos fibers:	0
Concentration of Asbestos (Chrysotile) f/cm3:	<0.00092
Concentration of Asbestos (Amphibole) f/cm3:	<0.00092
Concentration of PCME Asbestos (Chrysotile) f/cm3:	<0.00092
Concentration of Asbestos (Chrysotile), Str/L:	0
Concentration of Asbestos (Amphibole), Str/L:	0
Lower 95% Confidence Limit (Chrysotile), Str/L:	0
Upper 95% Confidence Limit (Chrysotile), Str/L:	3.4
Lower 95% Confidence Limit (Amphibole), Str/L:	0
Upper 95% Confidence Limit (Amphibole), Str/L:	3.4

Analyst: Taylor Smylie

Scott M. Ward, Ph.D. **Lab Director**

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Report Date: 18-Dec-2023

HDOH Kula Community Air

Sample Number **MFK-AM02-120923-AB**

Air Volume:	3293.601
Effective Filter Area:	385.0 mm^2
Level of Analysis (Chrysotile):	CDQ
Level of Analysis (Amphibole):	ADQ
Magnification Used for Fiber Counting:	20,000
Aspect Ratio for Fiber Definition:	5:1
Mean Dimension of Grid Openings (GOs):	0.0132 mm^2
Initials of Analyst:	TS
Number of GO's Examined:	10
Analytical Sensitivity: f/Liter:	0.88556
Analytical Sensitivity: f/cm3:	0.00089
Number of primary asbestos structures:	0
Number of asbestos structures counted:	0
Number of asbestos structures > 5 um :	0
Number of asbestos fibers and bundles > 5 um:	0
Number of PCM equivalent asbestos structures:	0
Number of PCM equivalent asbestos fibers:	0
Concentration of Asbestos (Chrysotile) f/cm3:	<0.00089
Concentration of Asbestos (Amphibole) f/cm3:	<0.00089
Concentration of PCME Asbestos (Chrysotile) f/cm3:	<0.00089
Concentration of Asbestos (Chrysotile), Str/L:	0
Concentration of Asbestos (Amphibole), Str/L:	0
Lower 95% Confidence Limit (Chrysotile), Str/L:	0
Upper 95% Confidence Limit (Chrysotile), Str/L:	3.3
Lower 95% Confidence Limit (Amphibole), Str/L:	0
Upper 95% Confidence Limit (Amphibole), Str/L:	3.3

Analyst: Taylor Smylie

Scott M. Ward, Ph.D. **Lab Director**

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Receipt Date: 13-Dec-2023
Analysis Date: 18-Dec-2023
Report Date: 18-Dec-2023

HDOH Kula Community Air

Sample Number **MFK-FB01-120923-AB**

Air Volume:	0
Effective Filter Area:	385.0 mm^2
Level of Analysis (Chrysotile):	CDQ
Level of Analysis (Amphibole):	ADQ
Magnification Used for Fiber Counting:	20,000
Aspect Ratio for Fiber Definition:	5:1
Mean Dimension of Grid Openings (GOs):	0.0132 mm^2
Initials of Analyst:	TS
Number of GO's Examined:	10
Analytical Sensitivity: f/Liter:	N/A
Analytical Sensitivity: f/cm3:	N/A
Number of primary asbestos structures:	0
Number of asbestos structures counted:	0
Number of asbestos structures > 5 um :	0
Number of asbestos fibers and bundles > 5 um:	0
Number of PCM equivalent asbestos structures:	0
Number of PCM equivalent asbestos fibers:	0
Concentration of Asbestos (Chrysotile) f/cm3:	N/A
Concentration of Asbestos (Amphibole) f/cm3:	N/A
Concentration of PCME Asbestos (Chrysotile) f/cm3:	N/A
Concentration of Asbestos (Chrysotile), Str/L:	N/A
Concentration of Asbestos (Amphibole), Str/L:	N/A
Lower 95% Confidence Limit (Chrysotile), Str/L:	N/A
Upper 95% Confidence Limit (Chrysotile), Str/L:	N/A
Lower 95% Confidence Limit (Amphibole), Str/L:	N/A
Upper 95% Confidence Limit (Amphibole), Str/L:	N/A

Analyst: Taylor Smylie

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1999 Harrison St, Ste. 500	**Receipt Date:** 13-Dec-2023
Oakland, CA 94612	**Analysis Date:** 18-Dec-2023
	Report Date: 18-Dec-2023

HDOH Kula Community Air

Sample Number **MFK-AM01-121023-AB**

Air Volume:	5841.036
Effective Filter Area:	385.0 mm^2
Level of Analysis (Chrysotile):	CDQ
Level of Analysis (Amphibole):	ADQ
Magnification Used for Fiber Counting:	20,000
Aspect Ratio for Fiber Definition:	5:1
Mean Dimension of Grid Openings (GOs):	0.0132 mm^2
Initials of Analyst:	TS
Number of GO's Examined:	10
Analytical Sensitivity: f/Liter:	0.49934
Analytical Sensitivity: f/cm3:	0.00050
Number of primary asbestos structures:	0
Number of asbestos structures counted:	0
Number of asbestos structures > 5 um :	0
Number of asbestos fibers and bundles > 5 um:	0
Number of PCM equivalent asbestos structures:	0
Number of PCM equivalent asbestos fibers:	0
Concentration of Asbestos (Chrysotile) f/cm3:	<0.00050
Concentration of Asbestos (Amphibole) f/cm3:	<0.00050
Concentration of PCME Asbestos (Chrysotile) f/cm3:	<0.00050
Concentration of Asbestos (Chrysotile), Str/L:	0
Concentration of Asbestos (Amphibole), Str/L:	0
Lower 95% Confidence Limit (Chrysotile), Str/L:	0
Upper 95% Confidence Limit (Chrysotile), Str/L:	1.8
Lower 95% Confidence Limit (Amphibole), Str/L:	0
Upper 95% Confidence Limit (Amphibole), Str/L:	1.8

Analyst: Taylor Smylie

Scott M. Ward, Ph.D. **Lab Director**

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Airborne Asbestos Fiber Analysis
by Transmission Electron Microscopy (TEM)
ISO 10312 - Ambient Air - Determination of Asbestos Fibers
Direct-Transfer Transmission Electron Microscopy Method

Maura McAleese		**EJ3 Order #:**	3480279
Tetra Tech		**Project #:**	103S864023141
1999 Harrison St, Ste. 500		**Receipt Date:**	13-Dec-2023
Oakland, CA 94612		**Analysis Date:**	18-Dec-2023
		Report Date:	18-Dec-2023

HDOH Kula Community Air

Sample Number **MFK-AM03-121023-AB**

Air Volume:	5832.724
Effective Filter Area:	385.0 mm^2
Level of Analysis (Chrysotile):	CDQ
Level of Analysis (Amphibole):	ADQ
Magnification Used for Fiber Counting:	20,000
Aspect Ratio for Fiber Definition:	5:1
Mean Dimension of Grid Openings (GOs):	0.0132 mm^2
Initials of Analyst:	TS
Number of GO's Examined:	10
Analytical Sensitivity: f/Liter:	0.50005
Analytical Sensitivity: f/cm3:	0.00050
Number of primary asbestos structures:	0
Number of asbestos structures counted:	0
Number of asbestos structures > 5 um :	0
Number of asbestos fibers and bundles > 5 um:	0
Number of PCM equivalent asbestos structures:	0
Number of PCM equivalent asbestos fibers:	0
Concentration of Asbestos (Chrysotile) f/cm3:	<0.00050
Concentration of Asbestos (Amphibole) f/cm3:	<0.00050
Concentration of PCME Asbestos (Chrysotile) f/cm3:	<0.00050
Concentration of Asbestos (Chrysotile), Str/L:	0
Concentration of Asbestos (Amphibole), Str/L:	0
Lower 95% Confidence Limit (Chrysotile), Str/L:	0
Upper 95% Confidence Limit (Chrysotile), Str/L:	1.8
Lower 95% Confidence Limit (Amphibole), Str/L:	0
Upper 95% Confidence Limit (Amphibole), Str/L:	1.8

Analyst: Taylor Smylie

SMWard

Scott M. Ward, Ph.D. **Lab Director**

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Maura McAleese
Tetra Tech
1999 Harrison St, Ste. 500
Oakland, CA 94612

EJ3 Order #: 3480279
Project #: 103S864023141
Receipt Date: 13-Dec-2023
Analysis Date: 18-Dec-2023
Report Date: 18-Dec-2023

HDOH Kula Community Air

Sample Number **MFK-FB01-121023-AB**

Air Volume:	0
Effective Filter Area:	385.0 mm^2
Level of Analysis (Chrysotile):	CDQ
Level of Analysis (Amphibole):	ADQ
Magnification Used for Fiber Counting:	20,000
Aspect Ratio for Fiber Definition:	5:1
Mean Dimension of Grid Openings (GOs):	0.0132 mm^2
Initials of Analyst:	TS
Number of GO's Examined:	10
Analytical Sensitivity: f/Liter:	N/A
Analytical Sensitivity: f/cm3:	N/A
Number of primary asbestos structures:	0
Number of asbestos structures counted:	0
Number of asbestos structures > 5 um :	0
Number of asbestos fibers and bundles > 5 um:	0
Number of PCM equivalent asbestos structures:	0
Number of PCM equivalent asbestos fibers:	0
Concentration of Asbestos (Chrysotile) f/cm3:	N/A
Concentration of Asbestos (Amphibole) f/cm3:	N/A
Concentration of PCME Asbestos (Chrysotile) f/cm3:	N/A
Concentration of Asbestos (Chrysotile), Str/L:	N/A
Concentration of Asbestos (Amphibole), Str/L:	N/A
Lower 95% Confidence Limit (Chrysotile), Str/L:	N/A
Upper 95% Confidence Limit (Chrysotile), Str/L:	N/A
Lower 95% Confidence Limit (Amphibole), Str/L:	N/A
Upper 95% Confidence Limit (Amphibole), Str/L:	N/A

Analyst: Taylor Smylie

Scott M. Ward, Ph.D. **Lab Director**

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Stage 1 Data Verification Checklist – Asbestos

HDOH CAB – Ambient Community Air Sampling – Kula

Task Order No. 23141

Reviewed by:

Talaidh Isaacs 12/19/2023 & Shanna Vasser 12/20/2023

Laboratory: Eurofins Built Environment Testing – Houston, TX

Analysis date: 12/18/2023

Report No: 3480279

√	1.	Chain of custody (CoC) documentation is present.
√	2.	Sample receipt condition information is present and acceptable.
√	3.	Laboratory conducting the analysis is identified.
X	4.	All samples submitted to the laboratory are accounted for.
√	5.	Requested analytical methods were performed.
√	6.	Analysis dates are provided.
√	7.	Analyte results are provided.
NA	8.	Result qualifiers and definitions are provided.
√	9.	Result units are reported.
√	10.	Requested reporting limits are present.
NA	11.	Method detection limits are present.
√	12.	Sample collection date and time are present.

Discrepancies:

MFK-AM03-120723-AB, MFK-AM03-120823-AB, MFK-AM03-120923-AB, and MFK-AM02-121023-AB were listed and crossed off the CoC, and no results were present in the laboratory data package. No action was necessary for this discrepancy.

Notes: None

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Airborne Asbestos Fiber Analysis by Transmission Electron Microscopy (TEM) ISO 10312 - Ambient Air - Determination of Asbestos Fibers Direct-Transfer Transmission Electron Microscopy Method

Maura McAleese
Tetra Tech
1999 Harrison St, Ste. 500
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EJ3 Order #: 3484617
Project #: 103S864023141
Receipt Date: 18-Dec-2023
Analysis Date: 21-Dec-2023
Report Date: 21-Dec-2023

HDOH Kula Community Air

Sample Number **MFK-AM01-121123-AB**

Air Volume:	2727.594
Effective Filter Area:	385.0 mm^2
Level of Analysis (Chrysotile):	CDQ
Level of Analysis (Amphibole):	ADQ
Magnification Used for Fiber Counting:	20,000
Aspect Ratio for Fiber Definition:	5:1
Mean Dimension of Grid Openings (GOs):	0.0132 mm^2
Initials of Analyst:	TS
Number of GO's Examined:	10
Analytical Sensitivity: f/Liter:	1.06932
Analytical Sensitivity: f/cm3:	0.00107
Number of primary asbestos structures:	0
Number of asbestos structures counted:	0
Number of asbestos structures > 5 um :	0
Number of asbestos fibers and bundles > 5 um:	0
Number of PCM equivalent asbestos structures:	0
Number of PCM equivalent asbestos fibers:	0
Concentration of Asbestos (Chrysotile) f/cm3:	<0.00107
Concentration of Asbestos (Amphibole) f/cm3:	<0.00107
Concentration of PCME Asbestos (Chrysotile) f/cm3:	<0.00107
Concentration of Asbestos (Chrysotile), Str/L:	0
Concentration of Asbestos (Amphibole), Str/L:	0
Lower 95% Confidence Limit (Chrysotile), Str/L:	0
Upper 95% Confidence Limit (Chrysotile), Str/L:	3.9
Lower 95% Confidence Limit (Amphibole), Str/L:	0
Upper 95% Confidence Limit (Amphibole), Str/L:	3.9

Analyst: Taylor Smylie

Scott M. Ward, Ph.D. **Lab Director**

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EJ3 Order #: 3484617
Project #: 103S864023141
Receipt Date: 18-Dec-2023
Analysis Date: 21-Dec-2023
Report Date: 21-Dec-2023

HDOH Kula Community Air

Sample Number **MFK-AM02-121123-AB**

Air Volume:	6013.504
Effective Filter Area:	385.0 mm^2
Level of Analysis (Chrysotile):	CDQ
Level of Analysis (Amphibole):	ADQ
Magnification Used for Fiber Counting:	20,000
Aspect Ratio for Fiber Definition:	5:1
Mean Dimension of Grid Openings (GOs):	0.0132 mm^2
Initials of Analyst:	TS
Number of GO's Examined:	10
Analytical Sensitivity: f/Liter:	0.48502
Analytical Sensitivity: f/cm3:	0.00049
Number of primary asbestos structures:	0
Number of asbestos structures counted:	0
Number of asbestos structures > 5 um :	0
Number of asbestos fibers and bundles > 5 um:	0
Number of PCM equivalent asbestos structures:	0
Number of PCM equivalent asbestos fibers:	0
Concentration of Asbestos (Chrysotile) f/cm3:	<0.00049
Concentration of Asbestos (Amphibole) f/cm3:	<0.00049
Concentration of PCME Asbestos (Chrysotile) f/cm3:	<0.00049
Concentration of Asbestos (Chrysotile), Str/L:	0
Concentration of Asbestos (Amphibole), Str/L:	0
Lower 95% Confidence Limit (Chrysotile), Str/L:	0
Upper 95% Confidence Limit (Chrysotile), Str/L:	1.8
Lower 95% Confidence Limit (Amphibole), Str/L:	0
Upper 95% Confidence Limit (Amphibole), Str/L:	1.8

Analyst: Taylor Smylie

Scott M. Ward, Ph.D. **Lab Director**

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EJ3 Order #: 3484617
Project #: 103S864023141
Receipt Date: 18-Dec-2023
Analysis Date: 21-Dec-2023
Report Date: 21-Dec-2023

HDOH Kula Community Air

Sample Number **MFK-AM03-121123-AB**

Air Volume:	3395.72
Effective Filter Area:	385.0 mm^2
Level of Analysis (Chrysotile):	CDQ
Level of Analysis (Amphibole):	ADQ
Magnification Used for Fiber Counting:	20,000
Aspect Ratio for Fiber Definition:	5:1
Mean Dimension of Grid Openings (GOs):	0.0132 mm^2
Initials of Analyst:	TS
Number of GO's Examined:	10
Analytical Sensitivity: f/Liter:	0.85892
Analytical Sensitivity: f/cm3:	0.00086
Number of primary asbestos structures:	0
Number of asbestos structures counted:	0
Number of asbestos structures > 5 um :	0
Number of asbestos fibers and bundles > 5 um:	0
Number of PCM equivalent asbestos structures:	0
Number of PCM equivalent asbestos fibers:	0
Concentration of Asbestos (Chrysotile) f/cm3:	<0.00086
Concentration of Asbestos (Amphibole) f/cm3:	<0.00086
Concentration of PCME Asbestos (Chrysotile) f/cm3:	<0.00086
Concentration of Asbestos (Chrysotile), Str/L:	0
Concentration of Asbestos (Amphibole), Str/L:	0
Lower 95% Confidence Limit (Chrysotile), Str/L:	0
Upper 95% Confidence Limit (Chrysotile), Str/L:	3.2
Lower 95% Confidence Limit (Amphibole), Str/L:	0
Upper 95% Confidence Limit (Amphibole), Str/L:	3.2

Analyst: Taylor Smylie

Scott M. Ward, Ph.D. **Lab Director**

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Tetra Tech
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Oakland, CA 94612

EJ3 Order #: 3484617
Project #: 103S864023141
Receipt Date: 18-Dec-2023
Analysis Date: 21-Dec-2023
Report Date: 21-Dec-2023

HDOH Kula Community Air

Sample Number **MFK-FB01-121123-AB**

Air Volume:	0
Effective Filter Area:	385.0 mm^2
Level of Analysis (Chrysotile):	CDQ
Level of Analysis (Amphibole):	ADQ
Magnification Used for Fiber Counting:	20,000
Aspect Ratio for Fiber Definition:	5:1
Mean Dimension of Grid Openings (GOs):	0.0132 mm^2
Initials of Analyst:	TS
Number of GO's Examined:	10
Analytical Sensitivity: f/Liter:	N/A
Analytical Sensitivity: f/cm3:	N/A
Number of primary asbestos structures:	0
Number of asbestos structures counted:	0
Number of asbestos structures > 5 um :	0
Number of asbestos fibers and bundles > 5 um:	0
Number of PCM equivalent asbestos structures:	0
Number of PCM equivalent asbestos fibers:	0
Concentration of Asbestos (Chrysotile) f/cm3:	N/A
Concentration of Asbestos (Amphibole) f/cm3:	N/A
Concentration of PCME Asbestos (Chrysotile) f/cm3:	N/A
Concentration of Asbestos (Chrysotile), Str/L:	N/A
Concentration of Asbestos (Amphibole), Str/L:	N/A
Lower 95% Confidence Limit (Chrysotile), Str/L:	N/A
Upper 95% Confidence Limit (Chrysotile), Str/L:	N/A
Lower 95% Confidence Limit (Amphibole), Str/L:	N/A
Upper 95% Confidence Limit (Amphibole), Str/L:	N/A

Analyst: Taylor Smylie

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EJ3 Order #: 3484617
Project #: 103S864023141
Receipt Date: 18-Dec-2023
Analysis Date: 21-Dec-2023
Report Date: 21-Dec-2023

HDOH Kula Community Air

Sample Number **MFK-AM01-121223-AB**

Air Volume:	2441.473
Effective Filter Area:	385.0 mm^2
Level of Analysis (Chrysotile):	CDQ
Level of Analysis (Amphibole):	ADQ
Magnification Used for Fiber Counting:	20,000
Aspect Ratio for Fiber Definition:	5:1
Mean Dimension of Grid Openings (GOs):	0.0132 mm^2
Initials of Analyst:	TS
Number of GO’s Examined:	10
Analytical Sensitivity: f/Liter:	1.19463
Analytical Sensitivity: f/cm3:	0.00119
Number of primary asbestos structures:	0
Number of asbestos structures counted:	0
Number of asbestos structures > 5 um :	0
Number of asbestos fibers and bundles > 5 um:	0
Number of PCM equivalent asbestos structures:	0
Number of PCM equivalent asbestos fibers:	0
Concentration of Asbestos (Chrysotile) f/cm3:	<0.00119
Concentration of Asbestos (Amphibole) f/cm3:	<0.00119
Concentration of PCME Asbestos (Chrysotile) f/cm3:	<0.00119
Concentration of Asbestos (Chrysotile), Str/L:	0
Concentration of Asbestos (Amphibole), Str/L:	0
Lower 95% Confidence Limit (Chrysotile), Str/L:	0
Upper 95% Confidence Limit (Chrysotile), Str/L:	4.4
Lower 95% Confidence Limit (Amphibole), Str/L:	0
Upper 95% Confidence Limit (Amphibole), Str/L:	4.4

Analyst: Taylor Smylie

Scott M. Ward, Ph.D. **Lab Director**

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EJ3 Order #: 3484617
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Receipt Date: 18-Dec-2023
Analysis Date: 21-Dec-2023
Report Date: 21-Dec-2023

HDOH Kula Community Air

Sample Number **MFK-AM02-121223-AB**

Air Volume:	2607.576
Effective Filter Area:	385.0 mm^2
Level of Analysis (Chrysotile):	CDQ
Level of Analysis (Amphibole):	ADQ
Magnification Used for Fiber Counting:	20,000
Aspect Ratio for Fiber Definition:	5:1
Mean Dimension of Grid Openings (GOs):	0.0132 mm^2
Initials of Analyst:	TS
Number of GO's Examined:	10
Analytical Sensitivity: f/Liter:	1.11854
Analytical Sensitivity: f/cm3:	0.00112
Number of primary asbestos structures:	0
Number of asbestos structures counted:	0
Number of asbestos structures > 5 um :	0
Number of asbestos fibers and bundles > 5 um:	0
Number of PCM equivalent asbestos structures:	0
Number of PCM equivalent asbestos fibers:	0
Concentration of Asbestos (Chrysotile) f/cm3:	<0.00112
Concentration of Asbestos (Amphibole) f/cm3:	<0.00112
Concentration of PCME Asbestos (Chrysotile) f/cm3:	<0.00112
Concentration of Asbestos (Chrysotile), Str/L:	0
Concentration of Asbestos (Amphibole), Str/L:	0
Lower 95% Confidence Limit (Chrysotile), Str/L:	0
Upper 95% Confidence Limit (Chrysotile), Str/L:	4.1
Lower 95% Confidence Limit (Amphibole), Str/L:	0
Upper 95% Confidence Limit (Amphibole), Str/L:	4.1

Analyst: Taylor Smylie

Scott M. Ward, Ph.D. **Lab Director**

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1999 Harrison St, Ste. 500
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EJ3 Order #: 3484617
Project #: 103S864023141
Receipt Date: 18-Dec-2023
Analysis Date: 21-Dec-2023
Report Date: 21-Dec-2023

HDOH Kula Community Air

Sample Number **MFK-FB01-121223-AB**

Air Volume:	0
Effective Filter Area:	385.0 mm^2
Level of Analysis (Chrysotile):	CDQ
Level of Analysis (Amphibole):	ADQ
Magnification Used for Fiber Counting:	20,000
Aspect Ratio for Fiber Definition:	5:1
Mean Dimension of Grid Openings (GOs):	0.0132 mm^2
Initials of Analyst:	TS
Number of GO’s Examined:	10
Analytical Sensitivity: f/Liter:	N/A
Analytical Sensitivity: f/cm3:	N/A
Number of primary asbestos structures:	0
Number of asbestos structures counted:	0
Number of asbestos structures > 5 um :	0
Number of asbestos fibers and bundles > 5 um:	0
Number of PCM equivalent asbestos structures:	0
Number of PCM equivalent asbestos fibers:	0
Concentration of Asbestos (Chrysotile) f/cm3:	N/A
Concentration of Asbestos (Amphibole) f/cm3:	N/A
Concentration of PCME Asbestos (Chrysotile) f/cm3:	N/A
Concentration of Asbestos (Chrysotile), Str/L:	N/A
Concentration of Asbestos (Amphibole), Str/L:	N/A
Lower 95% Confidence Limit (Chrysotile), Str/L:	N/A
Upper 95% Confidence Limit (Chrysotile), Str/L:	N/A
Lower 95% Confidence Limit (Amphibole), Str/L:	N/A
Upper 95% Confidence Limit (Amphibole), Str/L:	N/A

Analyst: Taylor Smylie

Scott M. Ward, Ph.D. **Lab Director**

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NVLAP Lab Code: 200525-0; TDSHS License: 30-0273

Eurofins J3 Resources, Inc.
6110 W. 34th Street, Houston, Texas 77092
Phone: (713) 290-0221   Fax: (713) 290-0248
j3resources.com

Airborne Asbestos Fiber Analysis
by Transmission Electron Microscopy (TEM)
ISO 10312 - Ambient Air - Determination of Asbestos Fibers
Direct-Transfer Transmission Electron Microscopy Method

Maura McAleese
Tetra Tech
1999 Harrison St, Ste. 500
Oakland, CA 94612

EJ3 Order #: 3484617
Project #: 103S864023141
Receipt Date: 18-Dec-2023
Analysis Date: 21-Dec-2023
Report Date: 21-Dec-2023

HDOH Kula Community Air

Sample Number **MFK-AM01-121323-AB**

Air Volume:	4279.203
Effective Filter Area:	385.0 mm^2
Level of Analysis (Chrysotile):	CDQ
Level of Analysis (Amphibole):	ADQ
Magnification Used for Fiber Counting:	20,000
Aspect Ratio for Fiber Definition:	5:1
Mean Dimension of Grid Openings (GOs):	0.0132 mm^2
Initials of Analyst:	TS
Number of GO's Examined:	10
Analytical Sensitivity: f/Liter:	0.68159
Analytical Sensitivity: f/cm3:	0.00068
Number of primary asbestos structures:	0
Number of asbestos structures counted:	0
Number of asbestos structures > 5 um :	0
Number of asbestos fibers and bundles > 5 um:	0
Number of PCM equivalent asbestos structures:	0
Number of PCM equivalent asbestos fibers:	0
Concentration of Asbestos (Chrysotile) f/cm3:	<0.00068
Concentration of Asbestos (Amphibole) f/cm3:	<0.00068
Concentration of PCME Asbestos (Chrysotile) f/cm3:	<0.00068
Concentration of Asbestos (Chrysotile), Str/L:	0
Concentration of Asbestos (Amphibole), Str/L:	0
Lower 95% Confidence Limit (Chrysotile), Str/L:	0
Upper 95% Confidence Limit (Chrysotile), Str/L:	2.5
Lower 95% Confidence Limit (Amphibole), Str/L:	0
Upper 95% Confidence Limit (Amphibole), Str/L:	2.5

Analyst: Taylor Smylie

Scott M. Ward, Ph.D. **Lab Director**

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Airborne Asbestos Fiber Analysis by Transmission Electron Microscopy (TEM) ISO 10312 - Ambient Air - Determination of Asbestos Fibers Direct-Transfer Transmission Electron Microscopy Method

Maura McAleese
Tetra Tech
1999 Harrison St, Ste. 500
Oakland, CA 94612

EJ3 Order #: 3484617
Project #: 103S864023141
Receipt Date: 18-Dec-2023
Analysis Date: 21-Dec-2023
Report Date: 21-Dec-2023

HDOH Kula Community Air

Sample Number **MFK-AM02-121323-AB**

Air Volume:	5596.052
Effective Filter Area:	385.0 mm^2
Level of Analysis (Chrysotile):	CDQ
Level of Analysis (Amphibole):	ADQ
Magnification Used for Fiber Counting:	20,000
Aspect Ratio for Fiber Definition:	5:1
Mean Dimension of Grid Openings (GOs):	0.0132 mm^2
Initials of Analyst:	TS
Number of GO's Examined:	10
Analytical Sensitivity: f/Liter:	0.52120
Analytical Sensitivity: f/cm3:	0.00052
Number of primary asbestos structures:	0
Number of asbestos structures counted:	0
Number of asbestos structures > 5 um :	0
Number of asbestos fibers and bundles > 5 um:	0
Number of PCM equivalent asbestos structures:	0
Number of PCM equivalent asbestos fibers:	0
Concentration of Asbestos (Chrysotile) f/cm3:	<0.00052
Concentration of Asbestos (Amphibole) f/cm3:	<0.00052
Concentration of PCME Asbestos (Chrysotile) f/cm3:	<0.00052
Concentration of Asbestos (Chrysotile), Str/L:	0
Concentration of Asbestos (Amphibole), Str/L:	0
Lower 95% Confidence Limit (Chrysotile), Str/L:	0
Upper 95% Confidence Limit (Chrysotile), Str/L:	1.9
Lower 95% Confidence Limit (Amphibole), Str/L:	0
Upper 95% Confidence Limit (Amphibole), Str/L:	1.9

Analyst: Taylor Smylie

Scott M. Ward, Ph.D. **Lab Director**

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Oakland, CA 94612

EJ3 Order #: 3484617
Project #: 103S864023141
Receipt Date: 18-Dec-2023
Analysis Date: 21-Dec-2023
Report Date: 21-Dec-2023

HDOH Kula Community Air

Sample Number **MFK-AM03-121323-AB**

Air Volume:	6722.751
Effective Filter Area:	385.0 mm^2
Level of Analysis (Chrysotile):	CDQ
Level of Analysis (Amphibole):	ADQ
Magnification Used for Fiber Counting:	20,000
Aspect Ratio for Fiber Definition:	5:1
Mean Dimension of Grid Openings (GOs):	0.0132 mm^2
Initials of Analyst:	TS
Number of GO's Examined:	10
Analytical Sensitivity: f/Liter:	0.43385
Analytical Sensitivity: f/cm3:	0.00043
Number of primary asbestos structures:	0
Number of asbestos structures counted:	0
Number of asbestos structures > 5 um :	0
Number of asbestos fibers and bundles > 5 um:	0
Number of PCM equivalent asbestos structures:	0
Number of PCM equivalent asbestos fibers:	0
Concentration of Asbestos (Chrysotile) f/cm3:	<0.00043
Concentration of Asbestos (Amphibole) f/cm3:	<0.00043
Concentration of PCME Asbestos (Chrysotile) f/cm3:	<0.00043
Concentration of Asbestos (Chrysotile), Str/L:	0
Concentration of Asbestos (Amphibole), Str/L:	0
Lower 95% Confidence Limit (Chrysotile), Str/L:	0
Upper 95% Confidence Limit (Chrysotile), Str/L:	1.6
Lower 95% Confidence Limit (Amphibole), Str/L:	0
Upper 95% Confidence Limit (Amphibole), Str/L:	1.6

Analyst: Taylor Smylie

Scott M. Ward, Ph.D. **Lab Director**

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Maura McAleese
Tetra Tech
1999 Harrison St, Ste. 500
Oakland, CA 94612

EJ3 Order #: 3484617
Project #: 103S864023141
Receipt Date: 18-Dec-2023
Analysis Date: 21-Dec-2023
Report Date: 21-Dec-2023

HDOH Kula Community Air

Sample Number **MFK-FB01-121323-AB**

Air Volume:	0
Effective Filter Area:	385.0 mm^2
Level of Analysis (Chrysotile):	CDQ
Level of Analysis (Amphibole):	ADQ
Magnification Used for Fiber Counting:	20,000
Aspect Ratio for Fiber Definition:	5:1
Mean Dimension of Grid Openings (GOs):	0.0132 mm^2
Initials of Analyst:	TS
Number of GO's Examined:	10
Analytical Sensitivity: f/Liter:	N/A
Analytical Sensitivity: f/cm3:	N/A
Number of primary asbestos structures:	0
Number of asbestos structures counted:	0
Number of asbestos structures > 5 um :	0
Number of asbestos fibers and bundles > 5 um:	0
Number of PCM equivalent asbestos structures:	0
Number of PCM equivalent asbestos fibers:	0
Concentration of Asbestos (Chrysotile) f/cm3:	N/A
Concentration of Asbestos (Amphibole) f/cm3:	N/A
Concentration of PCME Asbestos (Chrysotile) f/cm3:	N/A
Concentration of Asbestos (Chrysotile), Str/L:	N/A
Concentration of Asbestos (Amphibole), Str/L:	N/A
Lower 95% Confidence Limit (Chrysotile), Str/L:	N/A
Upper 95% Confidence Limit (Chrysotile), Str/L:	N/A
Lower 95% Confidence Limit (Amphibole), Str/L:	N/A
Upper 95% Confidence Limit (Amphibole), Str/L:	N/A

Analyst: Taylor Smylie

Scott M. Ward, Ph.D. **Lab Director**

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Maura McAleese
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1999 Harrison St, Ste. 500
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EJ3 Order #: 3484617
Project #: 103S864023141
Receipt Date: 18-Dec-2023
Analysis Date: 21-Dec-2023
Report Date: 21-Dec-2023

HDOH Kula Community Air

Sample Number **MFK-LB01-121323-AB**

Air Volume:	0
Effective Filter Area:	385.0 mm^2
Level of Analysis (Chrysotile):	CDQ
Level of Analysis (Amphibole):	ADQ
Magnification Used for Fiber Counting:	20,000
Aspect Ratio for Fiber Definition:	5:1
Mean Dimension of Grid Openings (GOs):	0.0132 mm^2
Initials of Analyst:	TS
Number of GO's Examined:	10
Analytical Sensitivity: f/Liter:	N/A
Analytical Sensitivity: f/cm3:	N/A
Number of primary asbestos structures:	0
Number of asbestos structures counted:	0
Number of asbestos structures > 5 um :	0
Number of asbestos fibers and bundles > 5 um:	0
Number of PCM equivalent asbestos structures:	0
Number of PCM equivalent asbestos fibers:	0
Concentration of Asbestos (Chrysotile) f/cm3:	N/A
Concentration of Asbestos (Amphibole) f/cm3:	N/A
Concentration of PCME Asbestos (Chrysotile) f/cm3:	N/A
Concentration of Asbestos (Chrysotile), Str/L:	N/A
Concentration of Asbestos (Amphibole), Str/L:	N/A
Lower 95% Confidence Limit (Chrysotile), Str/L:	N/A
Upper 95% Confidence Limit (Chrysotile), Str/L:	N/A
Lower 95% Confidence Limit (Amphibole), Str/L:	N/A
Upper 95% Confidence Limit (Amphibole), Str/L:	N/A

Analyst: Taylor Smylie

Scott M. Ward, Ph.D. **Lab Director**

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1999 Harrison St, Ste. 500
Oakland, CA 94612

EJ3 Order #: 3484617
Project #: 103S864023141
Receipt Date: 18-Dec-2023
Analysis Date: 21-Dec-2023
Report Date: 21-Dec-2023

HDOH Kula Community Air

Sample Number **MFK-AM01-112223-AB**

Air Volume:	2146.56
Effective Filter Area:	385.0 mm^2
Level of Analysis (Chrysotile):	CDQ
Level of Analysis (Amphibole):	ADQ
Magnification Used for Fiber Counting:	20,000
Aspect Ratio for Fiber Definition:	5:1
Mean Dimension of Grid Openings (GOs):	0.0132 mm^2
Initials of Analyst:	TS
Number of GO's Examined:	10
Analytical Sensitivity: f/Liter:	1.35876
Analytical Sensitivity: f/cm3:	0.00136
Number of primary asbestos structures:	0
Number of asbestos structures counted:	0
Number of asbestos structures > 5 um :	0
Number of asbestos fibers and bundles > 5 um:	0
Number of PCM equivalent asbestos structures:	0
Number of PCM equivalent asbestos fibers:	0
Concentration of Asbestos (Chrysotile) f/cm3:	<0.00136
Concentration of Asbestos (Amphibole) f/cm3:	<0.00136
Concentration of PCME Asbestos (Chrysotile) f/cm3:	<0.00136
Concentration of Asbestos (Chrysotile), Str/L:	0
Concentration of Asbestos (Amphibole), Str/L:	0
Lower 95% Confidence Limit (Chrysotile), Str/L:	0
Upper 95% Confidence Limit (Chrysotile), Str/L:	5
Lower 95% Confidence Limit (Amphibole), Str/L:	0
Upper 95% Confidence Limit (Amphibole), Str/L:	5

Analyst: Taylor Smylie

Scott M. Ward, Ph.D. **Lab Director**

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Stage 1 Data Verification Checklist – Asbestos

HDOH CAB – Ambient Community Air Sampling – Kula

Task Order No. 23141

Reviewed by:

Trinh Vu 12/27/2023 & Shanna Vasser 12/27/2023

Laboratory: Eurofins Built Environment Testing – Houston, TX

Analysis date: 12/21/2023

Report No: 3484617

√	1.	Chain of custody (CoC) documentation is present.
√	2.	Sample receipt condition information is present and acceptable.
√	3.	Laboratory conducting the analysis is identified.
√	4.	All samples submitted to the laboratory are accounted for.
√	5.	Requested analytical methods were performed.
√	6.	Analysis dates are provided.
√	7.	Analyte results are provided.
NA	8.	Result qualifiers and definitions are provided.
√	9.	Result units are reported.
√	10.	Requested reporting limits are present.
NA	11.	Method detection limits are present.
√	12.	Sample collection date and time are present.

Discrepancies:

MFK-AM03-121223-AB was listed on the CoC but crossed off and noted that it was void and not sent to the laboratory. No results were present in the laboratory report for this sample because it was not sent. No action was required.

Notes:

The CoC noted, “MFK-AM01-112223-AB corresponds to previously sent FB MFK-FB01-112223-AB.”

Eastern Research Group
601 Keystone Park Drive
Suite 700
Morrisville, NC 27560

December 19, 2023

Ms. Chelsea Saber
Tetra Tech, Inc.
1777 Sentry Pkwy, Bldg 12
Blue Bell, PA 19422
Project Name: Maui fires

Dear Ms. Chelsea Saber,

This report contains the analytical results for the sample(s) received under chain(s) of custody by Eastern Research Group on 12/11/23 11:34 through 12/13/23 13:27.

Values below the MDL for QC results in this report are recorded as ND, however the actual values are reported in the accompanying Excel report with a "U" flag (Under the detection limit). The actual values are reported in AQS.

This test is accredited under the 2016 TNI Standard for Environmental Laboratories (FL DOH Certification # E87673). All analyses were performed as described in the US EPA-approved QAPP, under the contract for National Hazardous Air Pollutant Support (US EPA Contract No. 68HERH22D0002). This cover page is an integral part of this report, and any exceptions or comments are noted on the last page.

Release of the data contained in this data package and in the data submitted in the electronic data deliverable, has been authorized by the Program Manager, or the Program Manager's designee as verified by the following signature.

The issuance of the final Certificate of Analysis takes precedence over any previous Report. If you have any questions, please contact me at 919-468-7924.

Sincerely,

Julie Swift
Program Manager
julie.swift@erg.com

The information contained in this report and its attachment(s) are intended only for the use of the individual to whom it is addressed and may contain information that is privileged, confidential, or exempt from disclosure. If the reader of this message is not the intended recipient, you are hereby notified that any dissemination, distribution, or copying of this report is strictly prohibited. If you have received this report in error, please notify julie.swift@erg.com and delete the report without retaining any copies.

CERTIFICATE OF ANALYSIS

Tetra Tech, Inc.
1777 Sentry Pkwy, Bldg 12
Blue Bell, PA 19422
ATTN: Ms. Chelsea Saber
PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 12/19/23 10:54
SUBMITTED: 12/11/23 to 12/13/23
AQS SITE CODE:
SITE CODE: Maui fires

ANALYTICAL REPORT FOR SAMPLES

SampleName	LabNumber	Matrix	Sampled	Received
TetraTech Q9543005	3121111-01	Air	12/04/23 23:59	12/11/23 11:34
TetraTech Q9543004	3121111-02	Air	12/04/23 23:59	12/11/23 11:34
TetraTech Q9543002	3121111-03	Air	12/04/23 23:59	12/11/23 11:34
TetraTech Q9542995 FB	3121111-04	Air	12/04/23 00:00	12/11/23 11:34
TetraTech Q9542999	3121111-05	Air	12/05/23 23:59	12/11/23 11:34
TetraTech Q9542997	3121111-06	Air	12/05/23 23:59	12/11/23 11:34
TetraTech Q9542996	3121111-07	Air	12/05/23 23:59	12/11/23 11:34
TetraTech Q9542989 FB	3121111-08	Air	12/05/23 00:00	12/11/23 11:34
TetraTech Q9542993	3121111-09	Air	12/06/23 23:59	12/11/23 11:34
TetraTech Q9542992	3121111-10	Air	12/06/23 23:59	12/11/23 11:34
TetraTech Q9542991	3121111-11	Air	12/06/23 23:59	12/11/23 11:34
TetraTech Q9542984 FB	3121111-12	Air	12/06/23 00:00	12/11/23 11:34
TetraTech Q9542988	3121332-01	Air	12/07/23 23:59	12/13/23 13:27
TetraTech Q9542986	3121332-02	Air	12/07/23 23:59	12/13/23 13:27
TetraTech Q9542985	3121332-03	Air	12/07/23 23:59	12/13/23 13:27
TetraTech Q9541906	3121332-04	Air	12/08/23 23:59	12/13/23 13:27
TetraTech Q9542982	3121332-05	Air	12/08/23 23:59	12/13/23 13:27
TetraTech Q9542983	3121332-06	Air	12/08/23 23:59	12/13/23 13:27
TetraTech Q9533914	3121332-07	Air	12/09/23 23:59	12/13/23 13:27
TetraTech Q9533913	3121332-08	Air	12/09/23 23:59	12/13/23 13:27
TetraTech Q9533928	3121332-09	Air	12/09/23 23:59	12/13/23 13:27

The results in this report apply only to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

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Tetra Tech, Inc.
1777 Sentry Pkwy, Bldg 12
Blue Bell, PA 19422
ATTN: Ms. Chelsea Saber
PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 12/19/23 10:54
SUBMITTED: 12/11/23 to 12/13/23
AQS SITE CODE:
SITE CODE: Maui fires

TetraTech Q9533920 FB	3121332-10	Air	12/09/23 00:00	12/13/23 13:27
TetraTech Q9533933 LB	3121332-11	Air	12/09/23 00:00	12/13/23 13:27
TetraTech Q9533927	3121332-12	Air	12/10/23 23:59	12/13/23 13:27
TetraTech Q9533925	3121332-13	Air	12/10/23 23:59	12/13/23 13:27
TetraTech Q9533924	3121332-14	Air	12/10/23 23:59	12/13/23 13:27
TetraTech Q9533929 FB	3121332-15	Air	12/10/23 00:00	12/13/23 13:27

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FILE #: 0000.00
REPORTED: 12/19/23 10:54
SUBMITTED: 12/11/23 to 12/13/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9543005
Matrix: Air
Lab ID: 3121111-01
Sample Volume: 1913.94 m^3
Filter ID:
Sampled: 12/04/23 23:59
Received: 12/11/23 11:34
Analysis Date: 12/13/23 19:38
Comments: MFK-AM01-120423-HM

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	**7429-90-5**	**1420**	E	**27.3**
Antimony	**7440-36-0**	**0.0524**	SL	**0.0375**
Arsenic	**7440-38-2**	**0.208**		**0.00812**
Barium	**7440-39-3**	**9.54**		**0.806**
Beryllium	**7440-41-7**	**0.0381**		**0.00282**
Cadmium	7440-43-9	0.0134	U	0.0927
Calcium	**7440-70-2**	**701**	LJ, QB-01	**248**
Chromium	**7440-47-3**	**2.45**		**1.73**
Cobalt	**7440-48-4**	**0.474**	QB-01	**0.0133**
Copper	**7440-50-8**	**18.4**		**2.55**
Lead	**7439-92-1**	**0.417**		**0.235**
Magnesium	**7439-95-4**	**186**		**81.9**
Manganese	**7439-96-5**	**32.9**	QB-01	**1.01**
Molybdenum	**7439-98-7**	**0.975**	QB-01	**0.181**
Nickel	**7440-02-0**	**0.915**		**0.681**
Phosphorus	7723-14-0	440	U, GC-BS	1060
Potassium	**7440-09-7**	**136**		**32.3**
Rubidium	**7440-17-7**	**0.332**		**0.0156**
Selenium	**7782-49-2**	**0.268**		**0.00935**
Sodium	7440-23-5	1240	GC-BS, U	1700
Strontium	**7440-24-6**	**6.96**	QB-01	**0.554**
Thallium	**7440-28-0**	**0.00204**		**4.28E-4**
Thorium	**7440-29-01**	**0.0308**		**0.00255**
Uranium	**7440-61-1**	**0.0257**		**0.0145**
Vanadium	**7440-62-2**	**3.37**	QB-01	**0.0418**
Zinc	7440-66-6	13.5	U	83.1

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SUBMITTED: 12/11/23 to 12/13/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9543005 **Lab ID:** 3121111-01RE1 **Sampled:** 12/04/23 23:59
Matrix: Air **Sample Volume:** 1913.94 m^3 **Received:** 12/11/23 11:34
Filter ID: **Analysis Date:** 12/15/23 02:50
Comments: MFK-AM01-120423-HM

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m^3 Air	Flag	MDL ng/m^3 Air
Iron	7439-89-6	1380	D	41.1

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FILE #: 0000.00
REPORTED: 12/19/23 10:54
SUBMITTED: 12/11/23 to 12/13/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9543004 **Lab ID:** 3121111-02 **Sampled:** 12/04/23 23:59
Matrix: Air **Sample Volume:** 1968.659 m³ **Received:** 12/11/23 11:34
Filter ID: **Analysis Date:** 12/13/23 16:53
Comments: MFK-AM02-120423-HM/MS/MSD

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	**7429-90-5**	**159**		**26.5**
Antimony	**7440-36-0**	**0.0779**	SL	**0.0364**
Arsenic	**7440-38-2**	**0.176**		**0.00789**
Barium	**7440-39-3**	**3.44**		**0.783**
Beryllium	**7440-41-7**	**0.00625**		**0.00274**
Cadmium	7440-43-9	0.0118	U	0.0901
Calcium	**7440-70-2**	**467**	LJ, QB-01	**241**
Chromium	7440-47-3	1.65	U	1.68
Cobalt	**7440-48-4**	**0.117**	QB-01	**0.0129**
Copper	**7440-50-8**	**18.5**		**2.48**
Iron	**7439-89-6**	**185**	GC-BS, QM-4X	**20.0**
Lead	7439-92-1	0.202	U	0.228
Magnesium	**7439-95-4**	**136**		**79.7**
Manganese	**7439-96-5**	**5.13**	QB-01	**0.983**
Molybdenum	**7439-98-7**	**0.890**	QB-01	**0.176**
Nickel	7440-02-0	0.533	U, LJ, QX	0.662
Phosphorus	7723-14-0	370	U, GC-BS, QM-4X	1030
Potassium	**7440-09-7**	**85.5**		**31.4**
Rubidium	**7440-17-7**	**0.112**		**0.0151**
Selenium	**7782-49-2**	**0.104**		**0.00909**
Sodium	7440-23-5	1340	U, GC-BS, QM-4X	1650
Strontium	**7440-24-6**	**2.18**	QB-01	**0.539**
Thallium	**7440-28-0**	**6.19E-4**		**4.16E-4**
Thorium	**7440-29-01**	**0.00662**	QM-07	**0.00248**
Uranium	7440-61-1	0.00526	U	0.0140
Vanadium	**7440-62-2**	**0.660**	QB-01	**0.0407**
Zinc	7440-66-6	18.1	U	80.7

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FILE #: 0000.00
REPORTED: 12/19/23 10:54
SUBMITTED: 12/11/23 to 12/13/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9543002 **Lab ID:** 3121111-03 **Sampled:** 12/04/23 23:59
Matrix: Air **Sample Volume:** 1668.824 m³ **Received:** 12/11/23 11:34
Filter ID: **Analysis Date:** 12/13/23 19:52
Comments: MFK-AM03-120423-HM

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	**7429-90-5**	**148**		**31.3**
Antimony	**7440-36-0**	**0.0734**	SL	**0.0430**
Arsenic	**7440-38-2**	**0.114**		**0.00931**
Barium	**7440-39-3**	**3.93**		**0.924**
Beryllium	**7440-41-7**	**0.00722**		**0.00324**
Cadmium	7440-43-9	0.00793	U	0.106
Calcium	**7440-70-2**	**521**	LJ, QB-01	**285**
Chromium	7440-47-3	1.91	U	1.98
Cobalt	**7440-48-4**	**0.111**	QB-01	**0.0152**
Copper	**7440-50-8**	**33.1**		**2.92**
Iron	**7439-89-6**	**195**	GC-BS	**23.6**
Lead	7439-92-1	0.211	U	0.269
Magnesium	**7439-95-4**	**166**		**94.0**
Manganese	**7439-96-5**	**5.87**	QB-01	**1.16**
Molybdenum	**7439-98-7**	**1.05**	QB-01	**0.208**
Nickel	7440-02-0	0.538	U	0.781
Phosphorus	7723-14-0	441	U, GC-BS	1220
Potassium	**7440-09-7**	**92.1**		**37.0**
Rubidium	**7440-17-7**	**0.114**		**0.0178**
Selenium	**7782-49-2**	**0.115**		**0.0107**
Sodium	7440-23-5	1610	U, GC-BS	1950
Strontium	**7440-24-6**	**2.44**	QB-01	**0.636**
Thallium	**7440-28-0**	**5.76E-4**		**4.90E-4**
Thorium	**7440-29-01**	**0.00695**		**0.00292**
Uranium	7440-61-1	0.00587	U	0.0166
Vanadium	**7440-62-2**	**0.688**	QB-01	**0.0480**
Zinc	7440-66-6	16.0	U	95.3

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FILE #: 0000.00
REPORTED: 12/19/23 10:54
SUBMITTED: 12/11/23 to 12/13/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9542995 FB **Lab ID:** 3121111-04 **Sampled:** 12/04/23 00:00
Matrix: Air **Sample Volume:** 1913.94 m³ **Received:** 12/11/23 11:34
Filter ID: **Analysis Date:** 12/13/23 20:06
Comments: MFK-FB01-120423-HM Field blank

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	7429-90-5	9.28	U	27.3
Antimony	7440-36-0	0.00725	SL, U	0.0375
Arsenic	7440-38-2	0.00186	U	0.00812
Barium	7440-39-3	0.609	U	0.806
Beryllium	7440-41-7	9.42E-4	U	0.00282
Cadmium	7440-43-9	0.00239	U	0.0927
Calcium	**7440-70-2**	**344**	FB-01, LJ, QB-01	**248**
Chromium	7440-47-3	1.50	U	1.73
Cobalt	**7440-48-4**	**0.0265**	FB-01, QB-01	**0.0133**
Copper	7440-50-8	0.296	U	2.55
Iron	7439-89-6	15.9	GC-BS, U	20.6
Lead	7439-92-1	0.0553	U	0.235
Magnesium	7439-95-4	42.8	U	81.9
Manganese	7439-96-5	0.900	QB-01, U	1.01
Molybdenum	**7439-98-7**	**0.245**	FB-01, QB-01	**0.181**
Nickel	7440-02-0	0.309	U	0.681
Phosphorus	7723-14-0	337	GC-BS, U	1060
Potassium	7440-09-7	11.6	U	32.3
Rubidium	7440-17-7	0.0141	U	0.0156
Selenium	7782-49-2	0.00358	U	0.00935
Sodium	7440-23-5	699	GC-BS, U	1700
Strontium	**7440-24-6**	**0.698**	FB-01, QB-01	**0.554**
Thallium	7440-28-0	6.24E-5	U	4.28E-4
Thorium	7440-29-01	0.00219	U	0.00255
Uranium	7440-61-1	0.00171	U	0.0145
Vanadium	**7440-62-2**	**0.0433**	FB-01, QB-01	**0.0418**
Zinc	7440-66-6	8.64	U	83.1

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FILE #: 0000.00
REPORTED: 12/19/23 10:54
SUBMITTED: 12/11/23 to 12/13/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9542999 **Lab ID:** 3121111-05 **Sampled:** 12/05/23 23:59
Matrix: Air **Sample Volume:** 1986.678 m³ **Received:** 12/11/23 11:34
Filter ID: **Analysis Date:** 12/13/23 20:20
Comments: MFK-AM01-120523-HM

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	**7429-90-5**	**1900**	E	**26.3**
Antimony	**7440-36-0**	**0.0469**	SL	**0.0361**
Arsenic	**7440-38-2**	**0.212**		**0.00782**
Barium	**7440-39-3**	**11.9**		**0.776**
Beryllium	**7440-41-7**	**0.0514**		**0.00272**
Cadmium	7440-43-9	0.0174	U	0.0893
Calcium	**7440-70-2**	**664**	LJ, QB-01	**239**
Chromium	**7440-47-3**	**2.87**		**1.66**
Cobalt	**7440-48-4**	**0.689**	QB-01	**0.0128**
Copper	**7440-50-8**	**20.0**		**2.46**
Lead	**7439-92-1**	**0.539**		**0.226**
Magnesium	**7439-95-4**	**178**		**78.9**
Manganese	**7439-96-5**	**49.3**	QB-01	**0.975**
Molybdenum	**7439-98-7**	**0.702**	QB-01	**0.174**
Nickel	**7440-02-0**	**0.973**		**0.656**
Phosphorus	7723-14-0	439	GC-BS, U	1020
Potassium	**7440-09-7**	**87.0**		**31.1**
Rubidium	**7440-17-7**	**0.339**		**0.0150**
Selenium	**7782-49-2**	**0.305**		**0.00901**
Sodium	7440-23-5	1150	GC-BS, U	1640
Strontium	**7440-24-6**	**7.08**	QB-01	**0.534**
Thallium	**7440-28-0**	**0.00261**		**4.12E-4**
Thorium	**7440-29-01**	**0.0389**		**0.00246**
Uranium	**7440-61-1**	**0.0334**		**0.0139**
Vanadium	**7440-62-2**	**4.23**	QB-01	**0.0403**
Zinc	7440-66-6	15.2	U	80.0

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FILE #: 0000.00
REPORTED: 12/19/23 10:54
SUBMITTED: 12/11/23 to 12/13/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9542999 **Lab ID:** 3121111-05RE1 **Sampled:** 12/05/23 23:59
Matrix: Air **Sample Volume:** 1986.678 m³ **Received:** 12/11/23 11:34
Filter ID: **Analysis Date:** 12/15/23 03:04
Comments: MFK-AM01-120523-HM

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Iron	7439-89-6	1790	D	99.1

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FILE #: 0000.00
REPORTED: 12/19/23 10:54
SUBMITTED: 12/11/23 to 12/13/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9542997 **Lab ID:** 3121111-06 **Sampled:** 12/05/23 23:59
Matrix: Air **Sample Volume:** 1973.767 m³ **Received:** 12/11/23 11:34
Filter ID: **Analysis Date:** 12/13/23 20:34
Comments: MFK-AM02-120523-HM

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	**7429-90-5**	**263**		**26.5**
Antimony	**7440-36-0**	**0.0570**	SL	**0.0364**
Arsenic	**7440-38-2**	**0.137**		**0.00787**
Barium	**7440-39-3**	**4.16**		**0.781**
Beryllium	**7440-41-7**	**0.00921**		**0.00274**
Cadmium	7440-43-9	0.00868	U	0.0899
Calcium	**7440-70-2**	**480**	LJ, QB-01	**241**
Chromium	**7440-47-3**	**1.72**		**1.67**
Cobalt	**7440-48-4**	**0.157**	QB-01	**0.0129**
Copper	**7440-50-8**	**13.9**		**2.47**
Iron	**7439-89-6**	**303**	GC-BS	**19.9**
Lead	**7439-92-1**	**0.298**		**0.228**
Magnesium	**7439-95-4**	**146**		**79.5**
Manganese	**7439-96-5**	**8.07**	QB-01	**0.981**
Molybdenum	**7439-98-7**	**0.615**	QB-01	**0.176**
Nickel	7440-02-0	0.511	U	0.660
Phosphorus	7723-14-0	355	GC-BS, U	1030
Potassium	**7440-09-7**	**93.9**		**31.3**
Rubidium	**7440-17-7**	**0.149**		**0.0151**
Selenium	**7782-49-2**	**0.120**		**0.00907**
Sodium	7440-23-5	1330	GC-BS, U	1650
Strontium	**7440-24-6**	**2.82**	QB-01	**0.537**
Thallium	**7440-28-0**	**6.72E-4**		**4.15E-4**
Thorium	**7440-29-01**	**0.00836**		**0.00247**
Uranium	7440-61-1	0.00746	U	0.0140
Vanadium	**7440-62-2**	**0.807**	QB-01	**0.0406**
Zinc	7440-66-6	14.3	U	80.5

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FILE #: 0000.00
REPORTED: 12/19/23 10:54
SUBMITTED: 12/11/23 to 12/13/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9542996
Matrix: Air
Lab ID: 3121111-07
Sample Volume: 1619.558 m³
Filter ID:
Sampled: 12/05/23 23:59
Received: 12/11/23 11:34
Analysis Date: 12/13/23 20:48
Comments: MFK-AM03-120523-HM

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	**7429-90-5**	**283**		**32.2**
Antimony	**7440-36-0**	**0.0723**	SL	**0.0443**
Arsenic	**7440-38-2**	**0.0999**		**0.00959**
Barium	**7440-39-3**	**5.72**		**0.952**
Beryllium	**7440-41-7**	**0.0121**		**0.00334**
Cadmium	7440-43-9	0.00759	U	0.110
Calcium	**7440-70-2**	**559**	LJ, QB-01	**293**
Chromium	7440-47-3	2.01	U	2.04
Cobalt	**7440-48-4**	**0.171**	QB-01	**0.0157**
Copper	**7440-50-8**	**50.5**		**3.01**
Iron	**7439-89-6**	**347**	GC-BS	**24.3**
Lead	**7439-92-1**	**0.563**		**0.277**
Magnesium	**7439-95-4**	**170**		**96.8**
Manganese	**7439-96-5**	**9.64**	QB-01	**1.20**
Molybdenum	**7439-98-7**	**1.20**	QB-01	**0.214**
Nickel	7440-02-0	0.494	U	0.805
Phosphorus	7723-14-0	415	GC-BS, U	1260
Potassium	**7440-09-7**	**90.6**		**38.2**
Rubidium	**7440-17-7**	**0.160**		**0.0184**
Selenium	**7782-49-2**	**0.127**		**0.0111**
Sodium	7440-23-5	1510	GC-BS, U	2010
Strontium	**7440-24-6**	**3.18**	QB-01	**0.655**
Thallium	**7440-28-0**	**7.06E-4**		**5.05E-4**
Thorium	**7440-29-01**	**0.0112**		**0.00301**
Uranium	7440-61-1	0.00846	U	0.0171
Vanadium	**7440-62-2**	**0.887**	QB-01	**0.0494**
Zinc	7440-66-6	18.8	U	98.1

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FILE #: 0000.00
REPORTED: 12/19/23 10:54
SUBMITTED: 12/11/23 to 12/13/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9542989 FB **Lab ID:** 3121111-08 **Sampled:** 12/05/23 00:00
Matrix: Air **Sample Volume:** 1986.678 m³ **Received:** 12/11/23 11:34
Filter ID: **Analysis Date:** 12/13/23 21:02
Comments: MFK-FB01-120523-HM Field Blank

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	7429-90-5	10.4	U	26.3
Antimony	7440-36-0	0.00607	SL, U	0.0361
Arsenic	7440-38-2	0.00236	U	0.00782
Barium	7440-39-3	0.604	U	0.776
Beryllium	7440-41-7	9.08E-4	U	0.00272
Cadmium	7440-43-9	0.00221	U	0.0893
Calcium	**7440-70-2**	**343**	FB-01, LJ, QB-01	**239**
Chromium	7440-47-3	1.49	U	1.66
Cobalt	**7440-48-4**	**0.0276**	FB-01, QB-01	**0.0128**
Copper	7440-50-8	0.282	U	2.46
Iron	7439-89-6	11.2	GC-BS, U	19.8
Lead	7439-92-1	0.0523	U	0.226
Magnesium	7439-95-4	42.8	U	78.9
Manganese	7439-96-5	0.237	QB-01, U	0.975
Molybdenum	**7439-98-7**	**0.240**	FB-01, QB-01	**0.174**
Nickel	7440-02-0	0.282	U	0.656
Phosphorus	7723-14-0	350	GC-BS, U	1020
Potassium	7440-09-7	10.8	U	31.1
Rubidium	7440-17-7	0.0123	U	0.0150
Selenium	7782-49-2	0.00312	U	0.00901
Sodium	7440-23-5	716	GC-BS, U	1640
Strontium	**7440-24-6**	**0.722**	FB-01, QB-01	**0.534**
Thallium	7440-28-0	5.29E-5	U	4.12E-4
Thorium	7440-29-01	0.00225	U	0.00246
Uranium	7440-61-1	0.00183	U	0.0139
Vanadium	7440-62-2	0.0289	QB-01, U	0.0403
Zinc	7440-66-6	8.58	U	80.0

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FILE #: 0000.00
REPORTED: 12/19/23 10:54
SUBMITTED: 12/11/23 to 12/13/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9542993 **Lab ID:** 3121111-09 **Sampled:** 12/06/23 23:59
Matrix: Air **Sample Volume:** 2026.096 m³ **Received:** 12/11/23 11:34
Filter ID: **Analysis Date:** 12/13/23 21:16
Comments: MFK-AM01-120623-HM

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	**7429-90-5**	**2620**	E	**25.8**
Antimony	**7440-36-0**	**0.0603**	SL	**0.0354**
Arsenic	**7440-38-2**	**0.345**		**0.00767**
Barium	**7440-39-3**	**16.1**		**0.761**
Beryllium	**7440-41-7**	**0.0706**		**0.00267**
Cadmium	7440-43-9	0.0255	U	0.0875
Calcium	**7440-70-2**	**1030**	LJ, QB-01	**234**
Chromium	**7440-47-3**	**3.62**		**1.63**
Cobalt	**7440-48-4**	**1.05**	QB-01	**0.0125**
Copper	**7440-50-8**	**21.2**		**2.41**
Lead	**7439-92-1**	**0.857**		**0.222**
Magnesium	**7439-95-4**	**366**		**77.4**
Manganese	**7439-96-5**	**69.2**	QB-01	**0.956**
Molybdenum	**7439-98-7**	**0.715**	QB-01	**0.171**
Nickel	**7440-02-0**	**1.68**		**0.643**
Phosphorus	7723-14-0	484	GC-BS, U	1000
Potassium	**7440-09-7**	**156**		**30.5**
Rubidium	**7440-17-7**	**0.455**		**0.0147**
Selenium	**7782-49-2**	**0.438**		**0.00883**
Sodium	**7440-23-5**	**2170**	E, GC-BS	**1610**
Strontium	**7440-24-6**	**10.4**	QB-01	**0.524**
Thallium	**7440-28-0**	**0.00381**		**4.04E-4**
Thorium	**7440-29-01**	**0.0602**		**0.00241**
Uranium	**7440-61-1**	**0.0492**		**0.0137**
Vanadium	**7440-62-2**	**6.53**	QB-01	**0.0395**
Zinc	7440-66-6	15.9	U	78.5

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Tetra Tech, Inc.
1777 Sentry Pkwy, Bldg 12
Blue Bell, PA 19422
ATTN: Ms. Chelsea Saber
PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 12/19/23 10:54
SUBMITTED: 12/11/23 to 12/13/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9542993
Matrix: Air
Comments: MFK-AM01-120623-HM

Lab ID: 3121111-09RE1
Sample Volume: 2026.096 m³
Filter ID:

Sampled: 12/06/23 23:59
Received: 12/11/23 11:34
Analysis Date: 12/15/23 03:17

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Iron	7439-89-6	2630	D	97.2

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FILE #: 0000.00
REPORTED: 12/19/23 10:54
SUBMITTED: 12/11/23 to 12/13/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9542992 **Lab ID:** 3121111-10 **Sampled:** 12/06/23 23:59
Matrix: Air **Sample Volume:** 2035.303 m³ **Received:** 12/11/23 11:34
Filter ID: **Analysis Date:** 12/13/23 22:05
Comments: MFK-AM02-120623-HM

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	**7429-90-5**	**509**		**25.7**
Antimony	**7440-36-0**	**0.0558**	SL	**0.0353**
Arsenic	**7440-38-2**	**0.188**		**0.00763**
Barium	**7440-39-3**	**5.74**		**0.758**
Beryllium	**7440-41-7**	**0.0181**		**0.00265**
Cadmium	7440-43-9	0.0203	U	0.0871
Calcium	**7440-70-2**	**747**	LJ, QB-01	**233**
Chromium	**7440-47-3**	**2.16**		**1.62**
Cobalt	**7440-48-4**	**0.343**	QB-01	**0.0125**
Copper	**7440-50-8**	**14.9**		**2.40**
Iron	**7439-89-6**	**611**	GC-BS	**19.3**
Lead	**7439-92-1**	**0.879**		**0.221**
Magnesium	**7439-95-4**	**294**		**77.1**
Manganese	**7439-96-5**	**18.8**	QB-01	**0.951**
Molybdenum	**7439-98-7**	**0.652**	QB-01	**0.170**
Nickel	**7440-02-0**	**1.22**		**0.640**
Phosphorus	7723-14-0	367	GC-BS, U	999
Potassium	**7440-09-7**	**134**		**30.4**
Rubidium	**7440-17-7**	**0.209**		**0.0146**
Selenium	**7782-49-2**	**0.183**		**0.00879**
Sodium	**7440-23-5**	**2240**	E, GC-BS	**1600**
Strontium	**7440-24-6**	**5.23**	QB-01	**0.521**
Thallium	**7440-28-0**	**0.00118**		**4.02E-4**
Thorium	**7440-29-01**	**0.0151**		**0.00240**
Uranium	**7440-61-1**	**0.0136**		**0.0136**
Vanadium	**7440-62-2**	**1.94**	QB-01	**0.0393**
Zinc	7440-66-6	13.7	U	78.1

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FILE #: 0000.00
REPORTED: 12/19/23 10:54
SUBMITTED: 12/11/23 to 12/13/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9542991 **Lab ID:** 3121111-11 **Sampled:** 12/06/23 23:59
Matrix: Air **Sample Volume:** 1665.355 m³ **Received:** 12/11/23 11:34
Filter ID: **Analysis Date:** 12/13/23 22:20
Comments: MFK-AM03-120623-HM

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	**7429-90-5**	**441**		**31.4**
Antimony	**7440-36-0**	**0.0719**	SL	**0.0431**
Arsenic	**7440-38-2**	**0.151**		**0.00933**
Barium	**7440-39-3**	**6.85**		**0.926**
Beryllium	**7440-41-7**	**0.0196**		**0.00324**
Cadmium	7440-43-9	0.0101	U	0.106
Calcium	**7440-70-2**	**798**	LJ, QB-01	**285**
Chromium	**7440-47-3**	**2.53**		**1.98**
Cobalt	**7440-48-4**	**0.334**	QB-01	**0.0152**
Copper	**7440-50-8**	**30.1**		**2.93**
Iron	**7439-89-6**	**584**	GC-BS	**23.6**
Lead	**7439-92-1**	**0.418**		**0.270**
Magnesium	**7439-95-4**	**317**		**94.2**
Manganese	**7439-96-5**	**17.4**	QB-01	**1.16**
Molybdenum	**7439-98-7**	**0.892**	QB-01	**0.208**
Nickel	**7440-02-0**	**1.26**		**0.783**
Phosphorus	7723-14-0	438	GC-BS, U	1220
Potassium	**7440-09-7**	**133**		**37.1**
Rubidium	**7440-17-7**	**0.208**		**0.0179**
Selenium	**7782-49-2**	**0.178**		**0.0107**
Sodium	**7440-23-5**	**2500**	E, GC-BS	**1950**
Strontium	**7440-24-6**	**5.38**	QB-01	**0.637**
Thallium	**7440-28-0**	**0.00103**		**4.91E-4**
Thorium	**7440-29-01**	**0.0153**		**0.00293**
Uranium	7440-61-1	0.0128	U	0.0166
Vanadium	**7440-62-2**	**1.86**	QB-01	**0.0481**
Zinc	7440-66-6	15.1	U	95.4

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FILE #: 0000.00
REPORTED: 12/19/23 10:54
SUBMITTED: 12/11/23 to 12/13/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9542984 FB **Lab ID:** 3121111-12 **Sampled:** 12/06/23 00:00
Matrix: Air **Sample Volume:** 2026.096 m³ **Received:** 12/11/23 11:34
Filter ID: **Analysis Date:** 12/13/23 22:34
Comments: MFK-FB01-120623-HM Field Blank

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	7429-90-5	10.2	U	25.8
Antimony	7440-36-0	0.00667	SL, U	0.0354
Arsenic	7440-38-2	0.00157	U	0.00767
Barium	7440-39-3	0.598	U	0.761
Beryllium	7440-41-7	8.35E-4	U	0.00267
Cadmium	7440-43-9	0.00205	U	0.0875
Calcium	**7440-70-2**	**333**	FB-01, LJ, QB-01	**234**
Chromium	7440-47-3	1.41	U	1.63
Cobalt	**7440-48-4**	**0.0229**	FB-01, QB-01	**0.0125**
Copper	7440-50-8	0.331	U	2.41
Iron	7439-89-6	10.9	GC-BS, U	19.4
Lead	7439-92-1	0.0493	U	0.222
Magnesium	7439-95-4	41.3	U	77.4
Manganese	7439-96-5	0.285	QB-01, U	0.956
Molybdenum	**7439-98-7**	**0.234**	FB-01, QB-01	**0.171**
Nickel	7440-02-0	0.262	U	0.643
Phosphorus	7723-14-0	337	GC-BS, U	1000
Potassium	7440-09-7	9.45	U	30.5
Rubidium	7440-17-7	0.0135	U	0.0147
Selenium	7782-49-2	0.00412	U	0.00883
Sodium	7440-23-5	692	GC-BS, U	1610
Strontium	**7440-24-6**	**0.714**	FB-01, QB-01	**0.524**
Thallium	7440-28-0	4.18E-5	U	4.04E-4
Thorium	7440-29-01	0.00219	U	0.00241
Uranium	7440-61-1	0.00179	U	0.0137
Vanadium	7440-62-2	0.0234	QB-01, U	0.0395
Zinc	7440-66-6	6.27	U	78.5

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FILE #: 0000.00
REPORTED: 12/19/23 10:54
SUBMITTED: 12/11/23 to 12/13/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9542988
Matrix: Air
Lab ID: 3121332-01
Sample Volume: 1968.546 m³
Filter ID:
Sampled: 12/07/23 23:59
Received: 12/13/23 13:27
Analysis Date: 12/14/23 22:37
Comments: MFK-AM01-120723-HM

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	**7429-90-5**	**885**	E	**26.5**
Antimony	**7440-36-0**	**0.0502**	SL	**0.0364**
Arsenic	**7440-38-2**	**0.160**		**0.00789**
Barium	**7440-39-3**	**6.61**		**0.784**
Beryllium	**7440-41-7**	**0.0252**		**0.00274**
Cadmium	7440-43-9	0.0113	U	0.0901
Calcium	**7440-70-2**	**680**	LJ, QB-01	**241**
Chromium	**7440-47-3**	**2.29**		**1.68**
Cobalt	**7440-48-4**	**0.391**	QB-01	**0.0129**
Copper	**7440-50-8**	**26.5**		**2.48**
Iron	**7439-89-6**	**883**		**20.0**
Lead	**7439-92-1**	**0.804**		**0.228**
Magnesium	**7439-95-4**	**365**		**79.7**
Manganese	**7439-96-5**	**23.4**		**0.984**
Molybdenum	**7439-98-7**	**0.845**	B, QB-01	**0.176**
Nickel	**7440-02-0**	**0.996**		**0.662**
Phosphorus	7723-14-0	415	U	1030
Potassium	**7440-09-7**	**144**	B	**31.4**
Rubidium	**7440-17-7**	**0.229**		**0.0151**
Selenium	**7782-49-2**	**0.239**		**0.00909**
Sodium	**7440-23-5**	**2950**	E	**1650**
Strontium	**7440-24-6**	**5.61**	QB-01	**0.539**
Thallium	**7440-28-0**	**0.00154**		**4.16E-4**
Thorium	**7440-29-01**	**0.0206**		**0.00248**
Uranium	**7440-61-1**	**0.0180**		**0.0141**
Vanadium	**7440-62-2**	**2.47**		**0.0407**
Zinc	7440-66-6	25.5	U	80.7

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PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 12/19/23 10:54
SUBMITTED: 12/11/23 to 12/13/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9542986
Matrix: Air
Lab ID: 3121332-02
Sample Volume: 2068.806 m³
Filter ID:
Sampled: 12/07/23 23:59
Received: 12/13/23 13:27
Analysis Date: 12/14/23 22:52
Comments: MFK-AM02-120723-HM

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	**7429-90-5**	**300**		**25.2**
Antimony	**7440-36-0**	**0.0469**	SL	**0.0347**
Arsenic	**7440-38-2**	**0.121**		**0.00751**
Barium	**7440-39-3**	**3.85**		**0.746**
Beryllium	**7440-41-7**	**0.0109**		**0.00261**
Cadmium	7440-43-9	0.0103	U	0.0857
Calcium	**7440-70-2**	**601**	LJ, QB-01	**230**
Chromium	**7440-47-3**	**1.85**		**1.60**
Cobalt	**7440-48-4**	**0.187**	QB-01	**0.0123**
Copper	**7440-50-8**	**35.2**		**2.36**
Iron	**7439-89-6**	**348**		**19.0**
Lead	**7439-92-1**	**0.871**		**0.217**
Magnesium	**7439-95-4**	**384**		**75.8**
Manganese	**7439-96-5**	**9.12**		**0.936**
Molybdenum	**7439-98-7**	**0.939**	B, QB-01	**0.168**
Nickel	**7440-02-0**	**0.737**		**0.630**
Phosphorus	7723-14-0	384	U	983
Potassium	**7440-09-7**	**155**	B	**29.9**
Rubidium	**7440-17-7**	**0.143**		**0.0144**
Selenium	**7782-49-2**	**0.186**		**0.00865**
Sodium	**7440-23-5**	**3300**	E	**1570**
Strontium	**7440-24-6**	**4.29**	QB-01	**0.513**
Thallium	**7440-28-0**	**7.03E-4**		**3.96E-4**
Thorium	**7440-29-01**	**0.0119**		**0.00236**
Uranium	7440-61-1	0.00886	U	0.0134
Vanadium	**7440-62-2**	**1.26**		**0.0387**
Zinc	7440-66-6	23.8	U	76.8

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ATTN: Ms. Chelsea Saber
PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 12/19/23 10:54
SUBMITTED: 12/11/23 to 12/13/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9542985 **Lab ID:** 3121332-03 **Sampled:** 12/07/23 23:59
Matrix: Air **Sample Volume:** 1666.743 m³ **Received:** 12/13/23 13:27
Filter ID: **Analysis Date:** 12/14/23 23:07
Comments: MFK-AM03-120723-HM

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	**7429-90-5**	**464**		**31.3**
Antimony	**7440-36-0**	**0.0784**	SL	**0.0430**
Arsenic	**7440-38-2**	**0.147**		**0.00932**
Barium	**7440-39-3**	**7.34**		**0.925**
Beryllium	**7440-41-7**	**0.0211**		**0.00324**
Cadmium	7440-43-9	0.00886	U	0.106
Calcium	**7440-70-2**	**750**	LJ, QB-01	**285**
Chromium	**7440-47-3**	**2.34**		**1.98**
Cobalt	**7440-48-4**	**0.290**	QB-01	**0.0152**
Copper	**7440-50-8**	**62.9**		**2.93**
Iron	**7439-89-6**	**559**		**23.6**
Lead	**7439-92-1**	**0.618**		**0.269**
Magnesium	**7439-95-4**	**453**		**94.1**
Manganese	**7439-96-5**	**16.6**		**1.16**
Molybdenum	**7439-98-7**	**1.65**	B, QB-01	**0.208**
Nickel	**7440-02-0**	**0.936**		**0.782**
Phosphorus	7723-14-0	485	U	1220
Potassium	**7440-09-7**	**162**	B	**37.1**
Rubidium	**7440-17-7**	**0.205**		**0.0179**
Selenium	**7782-49-2**	**0.207**		**0.0107**
Sodium	**7440-23-5**	**3830**	E	**1950**
Strontium	**7440-24-6**	**5.91**	QB-01	**0.636**
Thallium	**7440-28-0**	**0.00126**		**4.91E-4**
Thorium	**7440-29-01**	**0.0191**		**0.00293**
Uranium	7440-61-1	0.0130	U	0.0166
Vanadium	**7440-62-2**	**1.79**		**0.0480**
Zinc	7440-66-6	22.6	U	95.4

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PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 12/19/23 10:54
SUBMITTED: 12/11/23 to 12/13/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9541906
Matrix: Air
Lab ID: 3121332-04
Sample Volume: 2028.629 m³
Filter ID:
Sampled: 12/08/23 23:59
Received: 12/13/23 13:27
Analysis Date: 12/14/23 23:21
Comments: MFK-AM01-120823-HM

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	**7429-90-5**	**601**		**25.7**
Antimony	**7440-36-0**	**0.0440**	SL	**0.0354**
Arsenic	**7440-38-2**	**0.119**		**0.00766**
Barium	**7440-39-3**	**5.40**		**0.760**
Beryllium	**7440-41-7**	**0.0175**		**0.00266**
Cadmium	7440-43-9	0.00818	U	0.0874
Calcium	**7440-70-2**	**590**	LJ, QB-01	**234**
Chromium	**7440-47-3**	**2.06**		**1.63**
Cobalt	**7440-48-4**	**0.260**	QB-01	**0.0125**
Copper	**7440-50-8**	**14.8**		**2.41**
Iron	**7439-89-6**	**594**		**19.4**
Lead	**7439-92-1**	**0.454**		**0.221**
Magnesium	**7439-95-4**	**228**		**77.3**
Manganese	**7439-96-5**	**16.0**		**0.954**
Molybdenum	**7439-98-7**	**0.740**	B, QB-01	**0.171**
Nickel	**7440-02-0**	**0.792**		**0.642**
Phosphorus	7723-14-0	403	U	1000
Potassium	**7440-09-7**	**96.6**	B	**30.5**
Rubidium	**7440-17-7**	**0.172**		**0.0147**
Selenium	**7782-49-2**	**0.193**		**0.00882**
Sodium	**7440-23-5**	**1940**	E	**1600**
Strontium	**7440-24-6**	**4.19**	QB-01	**0.523**
Thallium	**7440-28-0**	**0.00114**		**4.03E-4**
Thorium	**7440-29-01**	**0.0136**		**0.00241**
Uranium	7440-61-1	0.0129	U	0.0136
Vanadium	**7440-62-2**	**1.53**		**0.0395**
Zinc	7440-66-6	16.9	U	78.4

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Blue Bell, PA 19422
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PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 12/19/23 10:54
SUBMITTED: 12/11/23 to 12/13/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9542982 **Lab ID:** 3121332-05 **Sampled:** 12/08/23 23:59
Matrix: Air **Sample Volume:** 2051.56(m³ **Received:** 12/13/23 13:27
Filter ID: **Analysis Date:** 12/14/23 23:37
Comments: MFK-AM02-120823-HM

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	**7429-90-5**	**381**		**25.5**
Antimony	**7440-36-0**	**0.0722**	SL	**0.0350**
Arsenic	**7440-38-2**	**0.194**		**0.00757**
Barium	**7440-39-3**	**5.41**		**0.752**
Beryllium	**7440-41-7**	**0.0131**		**0.00263**
Cadmium	7440-43-9	0.0186	U	0.0864
Calcium	**7440-70-2**	**574**	LJ, QB-01	**232**
Chromium	**7440-47-3**	**1.83**		**1.61**
Cobalt	**7440-48-4**	**0.189**	QB-01	**0.0124**
Copper	**7440-50-8**	**15.5**		**2.38**
Iron	**7439-89-6**	**388**		**19.2**
Lead	**7439-92-1**	**0.337**		**0.219**
Magnesium	**7439-95-4**	**227**		**76.5**
Manganese	**7439-96-5**	**10.6**		**0.944**
Molybdenum	**7439-98-7**	**0.720**	B, QB-01	**0.169**
Nickel	**7440-02-0**	**0.878**		**0.635**
Phosphorus	7723-14-0	404	U	991
Potassium	**7440-09-7**	**122**	B	**30.1**
Rubidium	**7440-17-7**	**0.163**		**0.0145**
Selenium	**7782-49-2**	**0.157**		**0.00872**
Sodium	**7440-23-5**	**1990**	E	**1590**
Strontium	**7440-24-6**	**4.21**	QB-01	**0.517**
Thallium	**7440-28-0**	**9.26E-4**		**3.99E-4**
Thorium	**7440-29-01**	**0.0118**		**0.00238**
Uranium	7440-61-1	0.0101	U	0.0135
Vanadium	**7440-62-2**	**1.18**		**0.0390**
Zinc	7440-66-6	15.3	U	77.5

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CERTIFICATE OF ANALYSIS

Tetra Tech, Inc.
1777 Sentry Pkwy, Bldg 12
Blue Bell, PA 19422
ATTN: Ms. Chelsea Saber
PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 12/19/23 10:54
SUBMITTED: 12/11/23 to 12/13/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9542983 **Lab ID:** 3121332-06 **Sampled:** 12/08/23 23:59
Matrix: Air **Sample Volume:** 1734.714 m³ **Received:** 12/13/23 13:27
Filter ID: **Analysis Date:** 12/14/23 19:58
Comments: MFK-AM03-120823-HM

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	**7429-90-5**	**383**		**30.1**
Antimony	**7440-36-0**	**0.0839**	SL	**0.0414**
Arsenic	**7440-38-2**	**0.101**		**0.00896**
Barium	**7440-39-3**	**7.62**		**0.889**
Beryllium	**7440-41-7**	**0.0182**		**0.00311**
Cadmium	7440-43-9	0.00833	U	0.102
Calcium	**7440-70-2**	**623**	A-01, LJ, QB-01	**274**
Chromium	**7440-47-3**	**2.10**		**1.90**
Cobalt	**7440-48-4**	**0.237**	QB-01	**0.0146**
Copper	**7440-50-8**	**34.8**		**2.81**
Iron	**7439-89-6**	**478**	QM-4X	**22.7**
Lead	**7439-92-1**	**0.343**		**0.259**
Magnesium	**7439-95-4**	**254**		**90.4**
Manganese	**7439-96-5**	**15.1**		**1.12**
Molybdenum	**7439-98-7**	**1.05**	B, QB-01	**0.200**
Nickel	7440-02-0	0.621	U	0.751
Phosphorus	7723-14-0	461	QM-4X, U	1170
Potassium	**7440-09-7**	**105**	B, QM-07	**35.6**
Rubidium	**7440-17-7**	**0.185**		**0.0172**
Selenium	**7782-49-2**	**0.162**		**0.0103**
Sodium	**7440-23-5**	**2200**	A-01, E, QM-4X	**1880**
Strontium	**7440-24-6**	**4.71**	QB-01	**0.612**
Thallium	**7440-28-0**	**0.00143**		**4.72E-4**
Thorium	**7440-29-01**	**0.0143**	QM-07	**0.00281**
Uranium	7440-61-1	0.0119	U	0.0159
Vanadium	**7440-62-2**	**1.36**		**0.0461**
Zinc	7440-66-6	30.0	U	91.6

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1777 Sentry Pkwy, Bldg 12
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PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 12/19/23 10:54
SUBMITTED: 12/11/23 to 12/13/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9533914
Lab ID: 3121332-07
Sampled: 12/09/23 23:59
Matrix: Air
Sample Volume: 2065.514 m³
Received: 12/13/23 13:27
Filter ID:
Analysis Date: 12/14/23 23:52
Comments: MFK-AM01-120923-HM

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	**7429-90-5**	**484**		**25.3**
Antimony	**7440-36-0**	**0.0404**	SL	**0.0347**
Arsenic	**7440-38-2**	**0.204**		**0.00752**
Barium	**7440-39-3**	**5.01**		**0.747**
Beryllium	**7440-41-7**	**0.0154**		**0.00262**
Cadmium	7440-43-9	0.00852	U	0.0859
Calcium	**7440-70-2**	**437**	QB-01, LJ	**230**
Chromium	**7440-47-3**	**2.02**		**1.60**
Cobalt	**7440-48-4**	**0.238**	QB-01	**0.0123**
Copper	**7440-50-8**	**16.8**		**2.36**
Iron	**7439-89-6**	**517**		**19.1**
Lead	**7439-92-1**	**0.429**		**0.217**
Magnesium	**7439-95-4**	**161**		**75.9**
Manganese	**7439-96-5**	**14.3**		**0.937**
Molybdenum	**7439-98-7**	**0.763**	B, QB-01	**0.168**
Nickel	**7440-02-0**	**0.631**		**0.631**
Phosphorus	7723-14-0	331	U	985
Potassium	**7440-09-7**	**71.2**	B	**29.9**
Rubidium	**7440-17-7**	**0.149**		**0.0144**
Selenium	**7782-49-2**	**0.146**		**0.00866**
Sodium	7440-23-5	1380	U	1580
Strontium	**7440-24-6**	**3.22**	QB-01	**0.514**
Thallium	**7440-28-0**	**9.93E-4**		**3.96E-4**
Thorium	**7440-29-01**	**0.0126**		**0.00236**
Uranium	7440-61-1	0.0110	U	0.0134
Vanadium	**7440-62-2**	**1.40**		**0.0388**
Zinc	7440-66-6	15.2	U	77.0

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Blue Bell, PA 19422
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PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 12/19/23 10:54
SUBMITTED: 12/11/23 to 12/13/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9533913
Matrix: Air
Lab ID: 3121332-08
Sample Volume: 2068.806 m³
Filter ID:
Sampled: 12/09/23 23:59
Received: 12/13/23 13:27
Analysis Date: 12/15/23 00:06
Comments: MFK-AM02-120923-HM

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	**7429-90-5**	**605**		**25.2**
Antimony	**7440-36-0**	**0.0532**	SL	**0.0347**
Arsenic	**7440-38-2**	**0.385**		**0.00751**
Barium	**7440-39-3**	**6.35**		**0.746**
Beryllium	**7440-41-7**	**0.0202**		**0.00261**
Cadmium	7440-43-9	0.0186	U	0.0857
Calcium	**7440-70-2**	**481**	LJ, QB-01	**230**
Chromium	**7440-47-3**	**2.07**		**1.60**
Cobalt	**7440-48-4**	**0.288**	QB-01	**0.0123**
Copper	**7440-50-8**	**15.9**		**2.36**
Iron	**7439-89-6**	**633**		**19.0**
Lead	**7439-92-1**	**0.440**		**0.217**
Magnesium	**7439-95-4**	**174**		**75.8**
Manganese	**7439-96-5**	**16.6**		**0.936**
Molybdenum	**7439-98-7**	**0.721**	B, QB-01	**0.168**
Nickel	**7440-02-0**	**0.649**		**0.630**
Phosphorus	7723-14-0	334	U	983
Potassium	**7440-09-7**	**136**	B	**29.9**
Rubidium	**7440-17-7**	**0.253**		**0.0144**
Selenium	**7782-49-2**	**0.146**		**0.00865**
Sodium	7440-23-5	1370	U	1570
Strontium	**7440-24-6**	**3.98**	QB-01	**0.513**
Thallium	**7440-28-0**	**0.00117**		**3.96E-4**
Thorium	**7440-29-01**	**0.0185**		**0.00236**
Uranium	**7440-61-1**	**0.0138**		**0.0134**
Vanadium	**7440-62-2**	**1.68**		**0.0387**
Zinc	7440-66-6	14.8	U	76.8

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Tetra Tech, Inc.
1777 Sentry Pkwy, Bldg 12
Blue Bell, PA 19422
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PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 12/19/23 10:54
SUBMITTED: 12/11/23 to 12/13/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9533928 **Lab ID:** 3121332-09 **Sampled:** 12/09/23 23:59
Matrix: Air **Sample Volume:** 1795.42 m^3 **Received:** 12/13/23 13:27
Filter ID: **Analysis Date:** 12/15/23 00:20
Comments: MFK-AM03-120923-HM

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	**7429-90-5**	**720**		**29.1**
Antimony	**7440-36-0**	**0.0890**	SL	**0.0400**
Arsenic	**7440-38-2**	**0.239**		**0.00865**
Barium	**7440-39-3**	**11.2**		**0.859**
Beryllium	**7440-41-7**	**0.0343**		**0.00301**
Cadmium	7440-43-9	0.0151	U	0.0988
Calcium	**7440-70-2**	**585**	LJ, QB-01	**265**
Chromium	**7440-47-3**	**2.88**		**1.84**
Cobalt	**7440-48-4**	**0.429**	QB-01	**0.0141**
Copper	**7440-50-8**	**34.5**		**2.72**
Iron	**7439-89-6**	**881**		**21.9**
Lead	**7439-92-1**	**0.686**		**0.250**
Magnesium	**7439-95-4**	**207**		**87.4**
Manganese	**7439-96-5**	**28.1**		**1.08**
Molybdenum	**7439-98-7**	**0.978**	B, QB-01	**0.193**
Nickel	**7440-02-0**	**0.803**		**0.726**
Phosphorus	7723-14-0	387	U	1130
Potassium	**7440-09-7**	**115**	B	**34.4**
Rubidium	**7440-17-7**	**0.289**		**0.0166**
Selenium	**7782-49-2**	**0.178**		**0.00997**
Sodium	7440-23-5	1450	U	1810
Strontium	**7440-24-6**	**6.70**	QB-01	**0.591**
Thallium	**7440-28-0**	**0.00192**		**4.56E-4**
Thorium	**7440-29-01**	**0.0250**		**0.00272**
Uranium	**7440-61-1**	**0.0186**		**0.0154**
Vanadium	**7440-62-2**	**2.14**		**0.0446**
Zinc	7440-66-6	20.9	U	88.5

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1777 Sentry Pkwy, Bldg 12
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PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 12/19/23 10:54
SUBMITTED: 12/11/23 to 12/13/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9533920 FB **Lab ID:** 3121332-10 **Sampled:** 12/09/23 00:00
Matrix: Air **Sample Volume:** 2065.514 m³ **Received:** 12/13/23 13:27
Filter ID: **Analysis Date:** 12/15/23 00:35
Comments: MFK-FB01-120923-HM Field Blank

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	7429-90-5	9.67	U	25.3
Antimony	7440-36-0	0.00576	SL, U	0.0347
Arsenic	**7440-38-2**	**0.00973**	FB-01	**0.00752**
Barium	7440-39-3	0.561	U	0.747
Beryllium	7440-41-7	8.68E-4	U	0.00262
Cadmium	7440-43-9	0.00230	U	0.0859
Calcium	**7440-70-2**	**235**	FB-01, LJ, QB-01	**230**
Chromium	7440-47-3	1.45	U	1.60
Cobalt	**7440-48-4**	**0.0498**	FB-01, QB-01	**0.0123**
Copper	7440-50-8	0.548	U	2.36
Iron	7439-89-6	10.7	U	19.1
Lead	7439-92-1	0.0515	U	0.217
Magnesium	7439-95-4	36.9	U	75.9
Manganese	7439-96-5	0.156	U	0.937
Molybdenum	**7439-98-7**	**0.222**	B, FB-01, QB-01	**0.168**
Nickel	7440-02-0	0.306	U	0.631
Phosphorus	7723-14-0	275	U	985
Potassium	7440-09-7	12.0	B, U	29.9
Rubidium	7440-17-7	0.0103	U	0.0144
Selenium	7782-49-2	0.00248	U	0.00866
Sodium	7440-23-5	636	U	1580
Strontium	7440-24-6	0.499	QB-01, U	0.514
Thallium	7440-28-0	7.26E-5	U	3.96E-4
Thorium	7440-29-01	0.00189	U	0.00236
Uranium	7440-61-1	0.00145	U	0.0134
Vanadium	7440-62-2	0.00206	U	0.0388
Zinc	7440-66-6	7.69	U	77.0

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Tetra Tech, Inc.
1777 Sentry Pkwy, Bldg 12
Blue Bell, PA 19422
ATTN: Ms. Chelsea Saber
PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 12/19/23 10:54
SUBMITTED: 12/11/23 to 12/13/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9533933 LB **Lab ID:** 3121332-11 **Sampled:** 12/09/23 00:00
Matrix: Air **Sample Volume:** 2065.514 m³ **Received:** 12/13/23 13:27
Filter ID: **Analysis Date:** 12/15/23 00:49
Comments: MFK-LB01-120923-HM Lot Blank

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	7429-90-5	9.32	U	25.3
Antimony	7440-36-0	0.00651	SL, U	0.0347
Arsenic	7440-38-2	0.00347	U	0.00752
Barium	**7440-39-3**	**0.815**	FB-01	**0.747**
Beryllium	7440-41-7	8.58E-4	U	0.00262
Cadmium	7440-43-9	0.00271	U	0.0859
Calcium	**7440-70-2**	**238**	FB-01, LJ, QB-01	**230**
Chromium	7440-47-3	1.56	U	1.60
Cobalt	**7440-48-4**	**0.0438**	FB-01, QB-01	**0.0123**
Copper	7440-50-8	0.297	U	2.36
Iron	7439-89-6	10.9	U	19.1
Lead	7439-92-1	0.0467	U	0.217
Magnesium	7439-95-4	38.0	U	75.9
Manganese	7439-96-5	0.136	U	0.937
Molybdenum	**7439-98-7**	**0.231**	B, FB-01, QB-01	**0.168**
Nickel	7440-02-0	0.308	U	0.631
Phosphorus	7723-14-0	282	U	985
Potassium	7440-09-7	12.7	B, U	29.9
Rubidium	7440-17-7	0.0109	U	0.0144
Selenium	7782-49-2	0.00146	U	0.00866
Sodium	7440-23-5	649	U	1580
Strontium	**7440-24-6**	**0.514**	QB-01	**0.514**
Thallium	7440-28-0	7.54E-5	U	3.96E-4
Thorium	7440-29-01	0.00192	U	0.00236
Uranium	7440-61-1	0.00144	U	0.0134
Vanadium	7440-62-2	0.00378	U	0.0388
Zinc	7440-66-6	7.94	U	77.0

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Tetra Tech, Inc.
1777 Sentry Pkwy, Bldg 12
Blue Bell, PA 19422
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PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 12/19/23 10:54
SUBMITTED: 12/11/23 to 12/13/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9533927
Matrix: Air
Lab ID: 3121332-12
Sample Volume: 2056.907 m³
Filter ID:
Sampled: 12/10/23 23:59
Received: 12/13/23 13:27
Analysis Date: 12/15/23 01:36
Comments: MFK-AM01-121023-HM

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	**7429-90-5**	**528**		**25.4**
Antimony	**7440-36-0**	**0.0546**	SL	**0.0349**
Arsenic	**7440-38-2**	**0.143**		**0.00755**
Barium	**7440-39-3**	**5.17**		**0.750**
Beryllium	**7440-41-7**	**0.0186**		**0.00263**
Cadmium	7440-43-9	0.00883	U	0.0862
Calcium	**7440-70-2**	**424**	LJ, QB-01	**231**
Chromium	**7440-47-3**	**1.97**		**1.61**
Cobalt	**7440-48-4**	**0.293**	QB-01	**0.0123**
Copper	**7440-50-8**	**22.7**		**2.37**
Iron	**7439-89-6**	**586**		**19.1**
Lead	**7439-92-1**	**0.697**		**0.218**
Magnesium	**7439-95-4**	**134**		**76.3**
Manganese	**7439-96-5**	**16.6**		**0.941**
Molybdenum	**7439-98-7**	**0.723**	B, QB-01	**0.168**
Nickel	7440-02-0	0.592	U	0.634
Phosphorus	7723-14-0	309	U	989
Potassium	**7440-09-7**	**65.5**	B	**30.1**
Rubidium	**7440-17-7**	**0.173**		**0.0145**
Selenium	**7782-49-2**	**0.137**		**0.00870**
Sodium	7440-23-5	1050	U	1580
Strontium	**7440-24-6**	**3.37**	QB-01	**0.516**
Thallium	**7440-28-0**	**0.00110**		**3.98E-4**
Thorium	**7440-29-01**	**0.0158**		**0.00237**
Uranium	7440-61-1	0.0123	U	0.0134
Vanadium	**7440-62-2**	**1.48**		**0.0389**
Zinc	7440-66-6	15.5	U	77.3

CERTIFICATE OF ANALYSIS

Tetra Tech, Inc.
1777 Sentry Pkwy, Bldg 12
Blue Bell, PA 19422
ATTN: Ms. Chelsea Saber
PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 12/19/23 10:54
SUBMITTED: 12/11/23 to 12/13/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9533925 **Lab ID:** 3121332-13 **Sampled:** 12/10/23 23:59
Matrix: Air **Sample Volume:** 2040.36 m^3 **Received:** 12/13/23 13:27
Filter ID: **Analysis Date:** 12/15/23 02:06
Comments: MFK-AM02-121023-HM

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	**7429-90-5**	**522**		**25.6**
Antimony	**7440-36-0**	**0.0710**	SL	**0.0352**
Arsenic	**7440-38-2**	**0.150**		**0.00762**
Barium	**7440-39-3**	**7.24**		**0.756**
Beryllium	**7440-41-7**	**0.0180**		**0.00265**
Cadmium	7440-43-9	0.0113	U	0.0869
Calcium	**7440-70-2**	**447**	LJ, QB-01	**233**
Chromium	**7440-47-3**	**2.01**		**1.62**
Cobalt	**7440-48-4**	**0.288**	QB-01	**0.0124**
Copper	**7440-50-8**	**12.7**		**2.39**
Iron	**7439-89-6**	**601**		**19.3**
Lead	**7439-92-1**	**0.344**		**0.220**
Magnesium	**7439-95-4**	**146**		**76.9**
Manganese	**7439-96-5**	**16.6**		**0.949**
Molybdenum	**7439-98-7**	**0.692**	B, QB-01	**0.170**
Nickel	**7440-02-0**	**0.732**		**0.639**
Phosphorus	7723-14-0	322	U	997
Potassium	**7440-09-7**	**92.9**	B	**30.3**
Rubidium	**7440-17-7**	**0.190**		**0.0146**
Selenium	**7782-49-2**	**0.138**		**0.00877**
Sodium	7440-23-5	1140	U	1590
Strontium	**7440-24-6**	**4.30**	QB-01	**0.520**
Thallium	**7440-28-0**	**0.00105**		**4.01E-4**
Thorium	**7440-29-01**	**0.0179**		**0.00239**
Uranium	7440-61-1	0.0121	U	0.0136
Vanadium	**7440-62-2**	**1.51**		**0.0392**
Zinc	7440-66-6	13.0	U	77.9

CERTIFICATE OF ANALYSIS

Tetra Tech, Inc.
1777 Sentry Pkwy, Bldg 12
Blue Bell, PA 19422
ATTN: Ms. Chelsea Saber
PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 12/19/23 10:54
SUBMITTED: 12/11/23 to 12/13/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9533924
Matrix: Air
Lab ID: 3121332-14
Sample Volume: 1713.084 m³
Filter ID:
Sampled: 12/10/23 23:59
Received: 12/13/23 13:27
Analysis Date: 12/15/23 02:22
Comments: MFK-AM03-121023-HM

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	**7429-90-5**	**416**		**30.5**
Antimony	**7440-36-0**	**0.0885**	SL	**0.0419**
Arsenic	**7440-38-2**	**0.124**		**0.00907**
Barium	**7440-39-3**	**7.17**		**0.900**
Beryllium	**7440-41-7**	**0.0195**		**0.00315**
Cadmium	7440-43-9	0.00875	U	0.104
Calcium	**7440-70-2**	**488**	LJ, QB-01	**277**
Chromium	**7440-47-3**	**2.21**		**1.93**
Cobalt	**7440-48-4**	**0.282**	QB-01	**0.0148**
Copper	**7440-50-8**	**27.4**		**2.85**
Iron	**7439-89-6**	**530**		**23.0**
Lead	**7439-92-1**	**0.366**		**0.262**
Magnesium	**7439-95-4**	**168**		**91.6**
Manganese	**7439-96-5**	**16.5**		**1.13**
Molybdenum	**7439-98-7**	**0.819**	B, QB-01	**0.202**
Nickel	7440-02-0	0.720	U	0.761
Phosphorus	7723-14-0	373	U	1190
Potassium	**7440-09-7**	**83.5**	B	**36.1**
Rubidium	**7440-17-7**	**0.185**		**0.0174**
Selenium	**7782-49-2**	**0.141**		**0.0104**
Sodium	7440-23-5	1380	U	1900
Strontium	**7440-24-6**	**4.00**	QB-01	**0.619**
Thallium	**7440-28-0**	**0.00103**		**4.78E-4**
Thorium	**7440-29-01**	**0.0166**		**0.00285**
Uranium	7440-61-1	0.0118	U	0.0161
Vanadium	**7440-62-2**	**1.34**		**0.0467**
Zinc	7440-66-6	13.2	U	92.8

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FILE #: 0000.00
REPORTED: 12/19/23 10:54
SUBMITTED: 12/11/23 to 12/13/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9533929 FB
Matrix: Air
Lab ID: 3121332-15
Sample Volume: 2056.907 m³
Filter ID:
Sampled: 12/10/23 00:00
Received: 12/13/23 13:27
Analysis Date: 12/15/23 02:36

Comments: MFK-FB01-121023-HM Field Blank

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	7429-90-5	11.5	U	25.4
Antimony	7440-36-0	0.00721	SL, U	0.0349
Arsenic	7440-38-2	0.00711	U	0.00755
Barium	**7440-39-3**	**1.10**	FB-01	**0.750**
Beryllium	7440-41-7	9.75E-4	U	0.00263
Cadmium	7440-43-9	0.0297	U	0.0862
Calcium	**7440-70-2**	**250**	FB-01, LJ, QB-01	**231**
Chromium	**7440-47-3**	**3.16**	FB-01	**1.61**
Cobalt	**7440-48-4**	**0.0617**	FB-01, QB-01	**0.0123**
Copper	7440-50-8	1.24	U	2.37
Iron	7439-89-6	13.7	U	19.1
Lead	7439-92-1	0.111	U	0.218
Magnesium	7439-95-4	38.6	U	76.3
Manganese	7439-96-5	0.407	U	0.941
Molybdenum	**7439-98-7**	**1.44**	B, FB-01, QB-01	**0.168**
Nickel	7440-02-0	0.391	U	0.634
Phosphorus	7723-14-0	286	U	989
Potassium	7440-09-7	11.1	B, U	30.1
Rubidium	7440-17-7	0.0129	U	0.0145
Selenium	7782-49-2	0.00512	U	0.00870
Sodium	7440-23-5	657	U	1580
Strontium	**7440-24-6**	**0.548**	FB-01, QB-01	**0.516**
Thallium	7440-28-0	8.27E-5	U	3.98E-4
Thorium	7440-29-01	0.00234	U	0.00237
Uranium	7440-61-1	0.00174	U	0.0134
Vanadium	7440-62-2	0.0132	U	0.0389
Zinc	7440-66-6	9.52	U	77.3

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AQS SITE CODE:
SITE CODE: Maui fires

Inorganics by Compendium Method IO-3.5 - Quality Control

Batch 2312039 - B3L1203

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Calibration Blank (2312039-CCB1)				Prepared & Analyzed: 12/13/23						
Aluminum	25.4		ng/l							
Antimony	1.30		ng/l							
Arsenic	-1.44		ng/l							U
Barium	-1.73		ng/l							U
Beryllium	1.11		ng/l							
Cadmium	1.09		ng/l							
Calcium	1190		ng/l							
Chromium	6.40		ng/l							
Cobalt	0.872		ng/l							
Copper	171		ng/l							
Iron	117		ng/l							
Lead	8.89		ng/l							
Magnesium	61.3		ng/l							
Manganese	18.9		ng/l							
Molybdenum	26.2		ng/l							
Nickel	1.67		ng/l							
Phosphorus	-373		ng/l							U
Potassium	694		ng/l							
Rubidium	1.66		ng/l							
Selenium	6.80		ng/l							
Sodium	18.6		ng/l							
Strontium	0.978		ng/l							
Thallium	0.600		ng/l							
Thorium	0.426		ng/l							
Uranium	0.00938		ng/l							
Vanadium	66.0		ng/l							
Zinc	-23.7		ng/l							U
Calibration Blank (2312039-CCB2)				Prepared & Analyzed: 12/13/23						
Aluminum	-57.6		ng/l							U
Antimony	0.943		ng/l							
Arsenic	-3.91		ng/l							U
Barium	-3.39		ng/l							U
Beryllium	0.580		ng/l							LJ, QX
Cadmium	0.559		ng/l							
Calcium	960		ng/l							
Chromium	5.15		ng/l							
Cobalt	0.778		ng/l							
Copper	59.8		ng/l							

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Inorganics by Compendium Method IO-3.5 - Quality Control

Batch 2312039 - B3L1203

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Calibration Blank (2312039-CCB2) Contin				Prepared & Analyzed: 12/13/23						
Iron	-10.2		ng/l							U
Lead	4.27		ng/l							
Magnesium	-12.6		ng/l							U
Manganese	10.5		ng/l							
Molybdenum	10.0		ng/l							
Nickel	2.29		ng/l							
Phosphorus	-455		ng/l							U
Potassium	67.4		ng/l							
Rubidium	0.856		ng/l							
Selenium	4.40		ng/l							
Sodium	-288		ng/l							U
Strontium	2.23		ng/l							
Thallium	0.468		ng/l							
Thorium	0.305		ng/l							
Uranium	0.00576		ng/l							
Vanadium	31.9		ng/l							
Zinc	-35.0		ng/l							U
Calibration Blank (2312039-CCB3)				Prepared & Analyzed: 12/13/23						
Aluminum	-21.7		ng/l							U
Antimony	1.02		ng/l							
Arsenic	-1.85		ng/l							U
Barium	-4.22		ng/l							U
Beryllium	-0.196		ng/l							U
Cadmium	0.261		ng/l							
Calcium	622		ng/l							
Chromium	0.812		ng/l							
Cobalt	0.202		ng/l							
Copper	36.0		ng/l							
Iron	22.7		ng/l							
Lead	2.44		ng/l							
Magnesium	-14.0		ng/l							U
Manganese	4.54		ng/l							
Molybdenum	9.03		ng/l							
Nickel	2.52		ng/l							
Phosphorus	-831		ng/l							U
Potassium	-626		ng/l							U
Rubidium	0.575		ng/l							
Selenium	15.1		ng/l							

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Inorganics by Compendium Method IO-3.5 - Quality Control

Batch 2312039 - B3L1203

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Calibration Blank (2312039-CCB3) Contin				Prepared & Analyzed: 12/13/23						
Sodium	-255		ng/l							U
Strontium	0.470		ng/l							
Thallium	0.374		ng/l							
Thorium	0.255		ng/l							
Uranium	0.00335		ng/l							
Vanadium	2.19		ng/l							
Zinc	-45.0		ng/l							U
Calibration Blank (2312039-CCB4)				Prepared & Analyzed: 12/13/23						
Aluminum	-65.9		ng/l							U
Antimony	0.696		ng/l							
Arsenic	-2.29		ng/l							U
Barium	-5.77		ng/l							U
Beryllium	-0.0548		ng/l							LJ, QX, U
Cadmium	0.189		ng/l							
Calcium	985		ng/l							
Chromium	1.11		ng/l							
Cobalt	0.302		ng/l							
Copper	25.5		ng/l							
Iron	-32.4		ng/l							U
Lead	2.01		ng/l							
Magnesium	-47.8		ng/l							U
Manganese	3.62		ng/l							
Molybdenum	8.33		ng/l							
Nickel	3.02		ng/l							
Phosphorus	-513		ng/l							U
Potassium	-432		ng/l							U
Rubidium	0.791		ng/l							
Selenium	-0.974		ng/l							U
Sodium	-292		ng/l							U
Strontium	1.09		ng/l							
Thallium	0.336		ng/l							
Thorium	0.384		ng/l							
Uranium	0.00637		ng/l							
Vanadium	3.02		ng/l							
Zinc	-64.3		ng/l							U
Calibration Check (2312039-CCV1)				Prepared & Analyzed: 12/13/23						
Aluminum	1.51E6		ng/l	1.5000E6		100	90-110			
Antimony	20200		ng/l	20000		101	90-110			

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AQS SITE CODE:
SITE CODE: Maui fires

Inorganics by Compendium Method IO-3.5 - Quality Control

Batch 2312039 - B3L1203

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Calibration Check (2312039-CCV1) Contir				Prepared & Analyzed: 12/13/23						
Arsenic	19700		ng/l	20000		98.6	90-110			
Barium	197000		ng/l	200000		98.7	90-110			
Beryllium	4910		ng/l	5000.0		98.3	90-110			
Cadmium	20100		ng/l	20000		101	90-110			
Calcium	2.49E7		ng/l	2.5000E7		99.8	90-110			
Chromium	234000		ng/l	240000		97.4	90-110			
Cobalt	49300		ng/l	50000		98.6	90-110			
Copper	1.98E6		ng/l	2.0000E6		98.8	90-110			
Iron	2.47E6		ng/l	2.5000E6		98.8	90-110			
Lead	198000		ng/l	200000		98.8	90-110			
Magnesium	1.01E6		ng/l	1.0000E6		101	90-110			
Manganese	492000		ng/l	500000		98.4	90-110			
Molybdenum	49100		ng/l	50000		98.1	90-110			
Nickel	119000		ng/l	120000		99.6	90-110			
Phosphorus	201000		ng/l	200000		101	90-110			
Potassium	2.59E6		ng/l	2.5000E6		104	90-110			
Rubidium	9990		ng/l	10000		99.9	90-110			
Selenium	19900		ng/l	20000		99.5	90-110			
Sodium	2.48E6		ng/l	2.5000E6		99.2	90-110			
Strontium	49800		ng/l	50000		99.5	90-110			
Thallium	484		ng/l	500.00		96.9	90-110			
Thorium	501		ng/l	500.00		100	90-110			
Uranium	492		ng/l	500.00		98.4	90-110			
Vanadium	19700		ng/l	20000		98.4	90-110			
Zinc	521000		ng/l	500000		104	90-110			
Calibration Check (2312039-CCV2)				Prepared & Analyzed: 12/13/23						
Aluminum	1.45E6		ng/l	1.5000E6		96.8	90-110			
Antimony	20000		ng/l	20000		100	90-110			
Arsenic	19500		ng/l	20000		97.7	90-110			
Barium	202000		ng/l	200000		101	90-110			
Beryllium	5030		ng/l	5000.0		101	90-110			
Cadmium	19900		ng/l	20000		99.5	90-110			
Calcium	2.43E7		ng/l	2.5000E7		97.3	90-110			
Chromium	233000		ng/l	240000		97.0	90-110			
Cobalt	48300		ng/l	50000		96.6	90-110			
Copper	1.95E6		ng/l	2.0000E6		97.6	90-110			
Iron	2.42E6		ng/l	2.5000E6		96.9	90-110			
Lead	195000		ng/l	200000		97.6	90-110			

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REPORTED: 12/19/23 10:54
SUBMITTED: 12/11/23 to 12/13/23
AQS SITE CODE:
SITE CODE: Maui fires

Inorganics by Compendium Method IO-3.5 - Quality Control

Batch 2312039 - B3L1203

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Calibration Check (2312039-CCV2) Contin				Prepared & Analyzed: 12/13/23						
Magnesium	974000		ng/l	1.0000E6		97.4	90-110			
Manganese	483000		ng/l	500000		96.6	90-110			
Molybdenum	49400		ng/l	50000		98.8	90-110			
Nickel	117000		ng/l	120000		97.8	90-110			
Phosphorus	183000		ng/l	200000		91.6	90-110			
Potassium	2.50E6		ng/l	2.5000E6		99.9	90-110			
Rubidium	9970		ng/l	10000		99.7	90-110			
Selenium	19900		ng/l	20000		99.5	90-110			
Sodium	2.40E6		ng/l	2.5000E6		96.2	90-110			
Strontium	49500		ng/l	50000		99.0	90-110			
Thallium	479		ng/l	500.00		95.8	90-110			
Thorium	488		ng/l	500.00		97.6	90-110			
Uranium	482		ng/l	500.00		96.3	90-110			
Vanadium	19600		ng/l	20000		97.9	90-110			
Zinc	516000		ng/l	500000		103	90-110			
Calibration Check (2312039-CCV3)				Prepared & Analyzed: 12/13/23						
Aluminum	1.45E6		ng/l	1.5000E6		97.0	90-110			
Antimony	20200		ng/l	20000		101	90-110			
Arsenic	19700		ng/l	20000		98.4	90-110			
Barium	204000		ng/l	200000		102	90-110			
Beryllium	5150		ng/l	5000.0		103	90-110			
Cadmium	20200		ng/l	20000		101	90-110			
Calcium	2.45E7		ng/l	2.5000E7		98.2	90-110			
Chromium	239000		ng/l	240000		99.6	90-110			
Cobalt	48800		ng/l	50000		97.6	90-110			
Copper	1.98E6		ng/l	2.0000E6		99.2	90-110			
Iron	2.45E6		ng/l	2.5000E6		97.9	90-110			
Lead	199000		ng/l	200000		99.7	90-110			
Magnesium	976000		ng/l	1.0000E6		97.6	90-110			
Manganese	489000		ng/l	500000		97.9	90-110			
Molybdenum	50500		ng/l	50000		101	90-110			
Nickel	119000		ng/l	120000		99.1	90-110			
Phosphorus	190000		ng/l	200000		94.8	90-110			
Potassium	2.51E6		ng/l	2.5000E6		100	90-110			
Rubidium	10000		ng/l	10000		100	90-110			
Selenium	20200		ng/l	20000		101	90-110			
Sodium	2.41E6		ng/l	2.5000E6		96.6	90-110			
Strontium	50100		ng/l	50000		100	90-110			

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Inorganics by Compendium Method IO-3.5 - Quality Control

Batch 2312039 - B3L1203

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Calibration Check (2312039-CCV3) Contin				Prepared & Analyzed: 12/13/23						
Thallium	483		ng/l	500.00		96.6	90-110			
Thorium	496		ng/l	500.00		99.1	90-110			
Uranium	493		ng/l	500.00		98.5	90-110			
Vanadium	20000		ng/l	20000		99.9	90-110			
Zinc	525000		ng/l	500000		105	90-110			
Calibration Check (2312039-CCV4)				Prepared & Analyzed: 12/13/23						
Aluminum	1.47E6		ng/l	1.5000E6		97.8	90-110			
Antimony	20500		ng/l	20000		102	90-110			
Arsenic	20000		ng/l	20000		100	90-110			
Barium	208000		ng/l	200000		104	90-110			
Beryllium	5280		ng/l	5000.0		106	90-110			
Cadmium	20500		ng/l	20000		102	90-110			
Calcium	2.47E7		ng/l	2.5000E7		99.0	90-110			
Chromium	239000		ng/l	240000		99.7	90-110			
Cobalt	49400		ng/l	50000		98.9	90-110			
Copper	2.01E6		ng/l	2.0000E6		101	90-110			
Iron	2.47E6		ng/l	2.5000E6		98.7	90-110			
Lead	202000		ng/l	200000		101	90-110			
Magnesium	979000		ng/l	1.0000E6		97.9	90-110			
Manganese	491000		ng/l	500000		98.1	90-110			
Molybdenum	50900		ng/l	50000		102	90-110			
Nickel	121000		ng/l	120000		100	90-110			
Phosphorus	193000		ng/l	200000		96.4	90-110			
Potassium	2.51E6		ng/l	2.5000E6		100	90-110			
Rubidium	10100		ng/l	10000		101	90-110			
Selenium	20200		ng/l	20000		101	90-110			
Sodium	2.42E6		ng/l	2.5000E6		97.0	90-110			
Strontium	50600		ng/l	50000		101	90-110			
Thallium	489		ng/l	500.00		97.8	90-110			
Thorium	505		ng/l	500.00		101	90-110			
Uranium	496		ng/l	500.00		99.1	90-110			
Vanadium	19900		ng/l	20000		99.6	90-110			
Zinc	530000		ng/l	500000		106	90-110			
High Cal Check (2312039-HCV1)				Prepared & Analyzed: 12/13/23						
Aluminum	2.91E6		ng/l	3.0000E6		97.0	95-105			
Antimony	39700		ng/l	40000		99.2	95-105			
Arsenic	39200		ng/l	40000		98.1	95-105			
Barium	399000		ng/l	400000		99.8	95-105			

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REPORTED: 12/19/23 10:54
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AQS SITE CODE:
SITE CODE: Maui fires

Inorganics by Compendium Method IO-3.5 - Quality Control

Batch 2312039 - B3L1203

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
High Cal Check (2312039-HCV1) Continue				Prepared & Analyzed: 12/13/23						
Beryllium	9560		ng/l	10000		95.6	95-105			
Cadmium	39300		ng/l	40000		98.2	95-105			
Calcium	4.96E7		ng/l	5.0000E7		99.1	95-105			
Chromium	471000		ng/l	480000		98.2	95-105			
Cobalt	97400		ng/l	100000		97.4	95-105			
Copper	3.88E6		ng/l	4.0000E6		97.0	95-105			
Iron	4.91E6		ng/l	5.0000E6		98.2	95-105			
Lead	399000		ng/l	400000		99.8	95-105			
Magnesium	1.94E6		ng/l	2.0000E6		96.9	95-105			
Manganese	981000		ng/l	1.0000E6		98.1	95-105			
Molybdenum	98300		ng/l	100000		98.3	95-105			
Nickel	233000		ng/l	240000		97.0	95-105			
Phosphorus	386000		ng/l	400000		96.4	95-105			
Potassium	4.85E6		ng/l	5.0000E6		97.0	95-105			
Rubidium	19900		ng/l	20000		99.5	95-105			
Selenium	39700		ng/l	40000		99.3	95-105			
Sodium	4.88E6		ng/l	5.0000E6		97.5	95-105			
Strontium	99900		ng/l	100000		99.9	95-105			
Thallium	1000		ng/l	1000.0		100	95-105			
Thorium	1000		ng/l	1000.0		100	95-105			
Uranium	1000		ng/l	1000.0		100	95-105			
Vanadium	39500		ng/l	40000		98.7	95-105			
Zinc	966000		ng/l	1.0000E6		96.6	95-105			
Initial Cal Blank (2312039-ICB1)				Prepared & Analyzed: 12/13/23						
Aluminum	-33.9		ng/l							U
Antimony	5.72		ng/l							
Arsenic	-4.22		ng/l							U
Barium	-5.71		ng/l							U
Beryllium	0.926		ng/l							
Cadmium	0.334		ng/l							
Calcium	967		ng/l							
Chromium	2.07		ng/l							
Cobalt	0.293		ng/l							
Copper	58.2		ng/l							
Iron	-70.6		ng/l							U
Lead	4.98		ng/l							
Magnesium	-8.64		ng/l							U
Manganese	7.96		ng/l							

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Inorganics by Compendium Method IO-3.5 - Quality Control

Batch 2312039 - B3L1203

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Initial Cal Blank (2312039-ICB1) Continu				Prepared & Analyzed: 12/13/23						
Molybdenum	14.5		ng/l							
Nickel	-2.26		ng/l							U
Phosphorus	-347		ng/l							U
Potassium	274		ng/l							
Rubidium	0.773		ng/l							
Selenium	20.9		ng/l							
Sodium	-230		ng/l							U
Strontium	0.119		ng/l							
Thallium	0.445		ng/l							
Thorium	0.576		ng/l							
Uranium	0.0124		ng/l							
Vanadium	71.4		ng/l							
Zinc	-25.0		ng/l							U
Initial Cal Check (2312039-ICV1)				Prepared & Analyzed: 12/13/23						
Aluminum	1.43E6		ng/l	1.5000E6		95.6	90-110			
Antimony	19400		ng/l	20000		97.2	90-110			
Arsenic	19500		ng/l	20000		97.4	90-110			
Barium	196000		ng/l	200000		97.8	90-110			
Beryllium	4970		ng/l	5000.0		99.3	90-110			
Cadmium	20300		ng/l	20000		101	90-110			
Calcium	2.41E7		ng/l	2.5000E7		96.4	90-110			
Chromium	231000		ng/l	240000		96.4	90-110			
Cobalt	48900		ng/l	50000		97.9	90-110			
Copper	1.98E6		ng/l	2.0000E6		98.8	90-110			
Iron	2.45E6		ng/l	2.5000E6		97.8	90-110			
Lead	195000		ng/l	200000		97.6	90-110			
Magnesium	963000		ng/l	1.0000E6		96.3	90-110			
Manganese	485000		ng/l	500000		97.1	90-110			
Molybdenum	48800		ng/l	50000		97.7	90-110			
Nickel	118000		ng/l	120000		98.1	90-110			
Phosphorus	191000		ng/l	200000		95.3	90-110			
Potassium	2.54E6		ng/l	2.5000E6		102	90-110			
Rubidium	9650		ng/l	10000		96.5	90-110			
Selenium	20500		ng/l	20000		102	90-110			
Sodium	2.40E6		ng/l	2.5000E6		96.0	90-110			
Strontium	49500		ng/l	50000		99.1	90-110			
Thallium	480		ng/l	500.00		96.0	90-110			
Thorium	487		ng/l	500.00		97.5	90-110			

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Inorganics by Compendium Method IO-3.5 - Quality Control

Batch 2312039 - B3L1203

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Initial Cal Check (2312039-ICV1) Continu				Prepared & Analyzed: 12/13/23						
Uranium	483		ng/l	500.00		96.7	90-110			
Vanadium	19700		ng/l	20000		98.4	90-110			
Zinc	522000		ng/l	500000		104	90-110			
Interference Check A (2312039-IFA1)				Prepared & Analyzed: 12/13/23						
Aluminum	1.45E7		ng/l	1.5000E7		96.5	80-120			
Antimony	0.00		ng/l				80-120			U
Arsenic	0.00		ng/l				80-120			U
Barium	0.00		ng/l				80-120			U
Beryllium	0.00		ng/l				80-120			U
Cadmium	0.00		ng/l				80-120			U
Calcium	9.27E7		ng/l	1.0040E8		92.4	80-120			
Chromium	0.00		ng/l				80-120			U
Cobalt	0.00		ng/l				80-120			U
Copper	0.00		ng/l				80-120			U
Iron	1.45E7		ng/l	1.5000E7		96.4	80-120			
Lead	0.00		ng/l				80-120			U
Magnesium	1.50E7		ng/l	1.5000E7		99.8	80-120			
Manganese	0.00		ng/l				80-120			U
Molybdenum	293000		ng/l	300000		97.7	80-120			
Nickel	0.00		ng/l				80-120			U
Phosphorus	1.54E7		ng/l	1.5000E7		102	80-120			
Potassium	1.49E7		ng/l	1.5000E7		99.2	80-120			
Rubidium	0.00		ng/l				80-120			U
Selenium	0.00		ng/l				80-120			U
Sodium	1.50E7		ng/l	1.5000E7		99.7	80-120			
Strontium	0.00		ng/l				80-120			U
Thallium	0.00		ng/l				80-120			U
Thorium	0.00		ng/l				80-120			U
Uranium	0.00		ng/l				80-120			U
Vanadium	0.00		ng/l				80-120			U
Zinc	0.00		ng/l				80-120			U
Interference Check B (2312039-IFB1)				Prepared & Analyzed: 12/13/23						
Aluminum	1.61E7		ng/l	1.6500E7		97.7	80-120			
Antimony	20000		ng/l	20000		100	80-120			
Arsenic	20200		ng/l	20000		101	80-120			
Barium	199000		ng/l	200000		99.4	80-120			
Beryllium	4790		ng/l	5000.0		95.9	80-120			
Cadmium	19300		ng/l	20000		96.7	80-120			

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Inorganics by Compendium Method IO-3.5 - Quality Control

Batch 2312039 - B3L1203

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Interference Check B (2312039-IFB1) Co				Prepared & Analyzed: 12/13/23						
Calcium	1.16E8		ng/l	1.2540E8		92.6	80-120			
Chromium	226000		ng/l	240000		94.3	80-120			
Cobalt	48500		ng/l	50000		97.1	80-120			
Copper	1.85E6		ng/l	2.0000E6		92.4	80-120			
Iron	1.69E7		ng/l	1.7500E7		96.4	80-120			
Lead	203000		ng/l	200000		102	80-120			
Magnesium	1.60E7		ng/l	1.6000E7		99.7	80-120			
Manganese	504000		ng/l	500000		101	80-120			
Molybdenum	339000		ng/l	350000		96.9	80-120			
Nickel	114000		ng/l	120000		95.4	80-120			
Phosphorus	1.57E7		ng/l	1.5200E7		103	80-120			
Potassium	1.77E7		ng/l	1.7500E7		101	80-120			
Rubidium	10100		ng/l	10000		101	80-120			
Selenium	19000		ng/l	20000		94.8	80-120			
Sodium	1.78E7		ng/l	1.7500E7		102	80-120			
Strontium	50200		ng/l	50000		100	80-120			
Thallium	506		ng/l	500.00		101	80-120			
Thorium	539		ng/l	500.00		108	80-120			
Uranium	534		ng/l	500.00		107	80-120			
Vanadium	19100		ng/l	20000		95.6	80-120			
Zinc	473000		ng/l	500000		94.7	80-120			
Serial Dilution (2312039-SRD1)		**Source: 3121111-02**		Prepared: 12/12/23 Analyzed: 12/13/23						
Aluminum	159	133	ng/m³ Air		159			0.182	10	
Antimony	ND	0.182	ng/m³ Air		ND				10	SL, U
Arsenic	0.167	0.0395	ng/m³ Air		0.176			4.76	10	
Barium	ND	3.92	ng/m³ Air		ND				10	U
Beryllium	ND	0.0137	ng/m³ Air		ND				10	U
Cadmium	ND	0.450	ng/m³ Air		ND				10	U
Calcium	ND	1210	ng/m³ Air		ND				10	LJ, QB-01, U
Chromium	ND	8.39	ng/m³ Air		ND				10	U
Cobalt	0.115	0.0645	ng/m³ Air		0.117			1.93	10	QB-01
Copper	18.5	12.4	ng/m³ Air		18.5			0.259	10	
Iron	184	100	ng/m³ Air		185			0.398	10	GC-BS
Lead	ND	1.14	ng/m³ Air		ND				10	U
Magnesium	ND	398	ng/m³ Air		ND				10	U
Manganese	5.10	4.92	ng/m³ Air		5.13			0.542	10	QB-01
Molybdenum	0.891	0.880	ng/m³ Air		0.890			0.109	10	QB-01
Nickel	ND	3.31	ng/m³ Air		ND				10	U

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Inorganics by Compendium Method IO-3.5 - Quality Control

Batch 2312039 - B3L1203

Serial Dilution (2312039-SRD1) Continue Source: 3121111-02 Prepared: 12/12/23 Analyzed: 12/13/23

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Phosphorus	ND	5170	ng/m³ Air		ND				10	GC-BS, U
Potassium	ND	157	ng/m³ Air		ND				10	U
Rubidium	0.110	0.0756	ng/m³ Air		0.112			1.84	10	
Selenium	0.0986	0.0455	ng/m³ Air		0.104			5.10	10	
Sodium	ND	8260	ng/m³ Air		ND				10	GC-BS, U
Strontium	ND	2.69	ng/m³ Air		ND				10	QB-01, U
Thallium	ND	0.00208	ng/m³ Air		ND				10	U
Thorium	ND	0.0124	ng/m³ Air		ND				10	U
Uranium	ND	0.0702	ng/m³ Air		ND				10	U
Vanadium	0.722	0.203	ng/m³ Air		0.660			9.05	10	QB-01
Zinc	ND	404	ng/m³ Air		ND				10	U

Batch 2312044 - B3L1203

Calibration Blank (2312044-CCB1) Prepared & Analyzed: 12/14/23

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Aluminum	125		ng/l							
Antimony	1.21		ng/l							
Arsenic	6.90		ng/l							
Barium	0.658		ng/l							
Beryllium	0.347		ng/l							
Cadmium	0.268		ng/l							
Calcium	294		ng/l							
Chromium	3.74		ng/l							
Cobalt	0.565		ng/l							
Copper	252		ng/l							
Iron	12.8		ng/l							
Lead	5.89		ng/l							
Magnesium	57.2		ng/l							
Manganese	9.93		ng/l							
Molybdenum	16.7		ng/l							
Nickel	30.3		ng/l							
Phosphorus	227		ng/l							
Potassium	1970		ng/l							
Rubidium	1.31		ng/l							
Selenium	6.84		ng/l							
Sodium	118		ng/l							
Strontium	-0.106		ng/l							U
Thallium	0.632		ng/l							
Thorium	0.212		ng/l							
Uranium	0.00146		ng/l							

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Inorganics by Compendium Method IO-3.5 - Quality Control

Batch 2312044 - B3L1203

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Calibration Blank (2312044-CCB1) Contin				Prepared & Analyzed: 12/14/23						
Vanadium	-88.1		ng/l							U
Zinc	-215		ng/l							U
Calibration Blank (2312044-CCB2)				Prepared & Analyzed: 12/14/23						
Aluminum	28.6		ng/l							
Antimony	0.958		ng/l							
Arsenic	3.58		ng/l							
Barium	0.565		ng/l							
Beryllium	0.395		ng/l							
Cadmium	0.145		ng/l							
Calcium	471		ng/l							
Chromium	5.52		ng/l							
Cobalt	0.567		ng/l							
Copper	98.6		ng/l							
Iron	161		ng/l							
Lead	3.82		ng/l							
Magnesium	5.49		ng/l							
Manganese	8.99		ng/l							
Molybdenum	8.90		ng/l							
Nickel	39.6		ng/l							
Phosphorus	598		ng/l							
Potassium	552		ng/l							
Rubidium	1.25		ng/l							
Selenium	1.74		ng/l							
Sodium	-175		ng/l							U
Strontium	-0.333		ng/l							U
Thallium	0.764		ng/l							
Thorium	0.530		ng/l							
Uranium	0.0223		ng/l							
Vanadium	-92.8		ng/l							U
Zinc	-229		ng/l							U
Calibration Blank (2312044-CCB3)				Prepared: 12/14/23 Analyzed: 12/15/23						
Aluminum	113		ng/l							
Antimony	1.22		ng/l							
Arsenic	3.82		ng/l							
Barium	2.58		ng/l							
Beryllium	0.113		ng/l							
Cadmium	0.0243		ng/l							
Calcium	159		ng/l							

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Inorganics by Compendium Method IO-3.5 - Quality Control

Batch 2312044 - B3L1203

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Calibration Blank (2312044-CCB3) Contin				Prepared: 12/14/23 Analyzed: 12/15/23						
Chromium	8.72		ng/l							
Cobalt	1.10		ng/l							
Copper	94.3		ng/l							
Iron	78.3		ng/l							
Lead	4.12		ng/l							
Magnesium	21.9		ng/l							
Manganese	14.8		ng/l							
Molybdenum	6.10		ng/l							
Nickel	42.1		ng/l							
Phosphorus	588		ng/l							
Potassium	964		ng/l							
Rubidium	1.07		ng/l							
Selenium	7.11		ng/l							
Sodium	110		ng/l							
Strontium	0.747		ng/l							
Thallium	0.433		ng/l							
Thorium	0.133		ng/l							
Uranium	-0.0128		ng/l							U
Vanadium	-94.8		ng/l							U
Zinc	-203		ng/l							U
Calibration Blank (2312044-CCB4)				Prepared: 12/14/23 Analyzed: 12/15/23						
Aluminum	91.9		ng/l							
Antimony	0.652		ng/l							
Arsenic	5.24		ng/l							
Barium	0.957		ng/l							
Beryllium	0.201		ng/l							
Cadmium	-0.0525		ng/l							U
Calcium	-200		ng/l							U
Chromium	7.02		ng/l							
Cobalt	0.754		ng/l							
Copper	73.9		ng/l							
Iron	61.0		ng/l							
Lead	3.30		ng/l							
Magnesium	19.8		ng/l							
Manganese	11.1		ng/l							
Molybdenum	6.84		ng/l							
Nickel	39.8		ng/l							
Phosphorus	-289		ng/l							U

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Inorganics by Compendium Method IO-3.5 - Quality Control

Batch 2312044 - B3L1203

Calibration Blank (2312044-CCB4) Contin — Prepared: 12/14/23 Analyzed: 12/15/23

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Potassium	1150		ng/l							
Rubidium	0.262		ng/l							
Selenium	8.49		ng/l							
Sodium	106		ng/l							
Strontium	1.09		ng/l							
Thallium	0.382		ng/l							
Thorium	0.117		ng/l							
Uranium	0.00185		ng/l							
Vanadium	-95.5		ng/l							U
Zinc	-226		ng/l							U

Calibration Check (2312044-CCV1) — Prepared & Analyzed: 12/14/23

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Aluminum	1.54E6		ng/l	1.5000E6		103	90-110			
Antimony	20300		ng/l	20000		102	90-110			
Arsenic	20100		ng/l	20000		100	90-110			
Barium	202000		ng/l	200000		101	90-110			
Beryllium	4790		ng/l	5000.0		95.8	90-110			
Cadmium	20500		ng/l	20000		103	90-110			
Calcium	2.50E7		ng/l	2.5000E7		100	90-110			
Chromium	238000		ng/l	240000		99.2	90-110			
Cobalt	51300		ng/l	50000		103	90-110			
Copper	2.04E6		ng/l	2.0000E6		102	90-110			
Iron	2.56E6		ng/l	2.5000E6		102	90-110			
Lead	198000		ng/l	200000		99.0	90-110			
Magnesium	1.05E6		ng/l	1.0000E6		105	90-110			
Manganese	494000		ng/l	500000		98.8	90-110			
Molybdenum	51000		ng/l	50000		102	90-110			
Nickel	123000		ng/l	120000		102	90-110			
Phosphorus	207000		ng/l	200000		103	90-110			
Potassium	2.64E6		ng/l	2.5000E6		106	90-110			
Rubidium	10100		ng/l	10000		101	90-110			
Selenium	20000		ng/l	20000		100	90-110			
Sodium	2.60E6		ng/l	2.5000E6		104	90-110			
Strontium	49900		ng/l	50000		99.9	90-110			
Thallium	485		ng/l	500.00		97.0	90-110			
Thorium	503		ng/l	500.00		101	90-110			
Uranium	492		ng/l	500.00		98.4	90-110			
Vanadium	19600		ng/l	20000		97.9	90-110			
Zinc	531000		ng/l	500000		106	90-110			

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Inorganics by Compendium Method IO-3.5 - Quality Control

Batch 2312044 - B3L1203

Calibration Check (2312044-CCV2) Prepared & Analyzed: 12/14/23

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Aluminum	1.52E6		ng/l	1.5000E6		101	90-110			
Antimony	20400		ng/l	20000		102	90-110			
Arsenic	20300		ng/l	20000		101	90-110			
Barium	201000		ng/l	200000		101	90-110			
Beryllium	5520		ng/l	5000.0		110	90-110			
Cadmium	20800		ng/l	20000		104	90-110			
Calcium	2.51E7		ng/l	2.5000E7		100	90-110			
Chromium	240000		ng/l	240000		100	90-110			
Cobalt	51000		ng/l	50000		102	90-110			
Copper	2.05E6		ng/l	2.0000E6		103	90-110			
Iron	2.55E6		ng/l	2.5000E6		102	90-110			
Lead	201000		ng/l	200000		100	90-110			
Magnesium	1.04E6		ng/l	1.0000E6		104	90-110			
Manganese	496000		ng/l	500000		99.1	90-110			
Molybdenum	51600		ng/l	50000		103	90-110			
Nickel	123000		ng/l	120000		103	90-110			
Phosphorus	208000		ng/l	200000		104	90-110			
Potassium	2.63E6		ng/l	2.5000E6		105	90-110			
Rubidium	10100		ng/l	10000		101	90-110			
Selenium	20100		ng/l	20000		101	90-110			
Sodium	2.60E6		ng/l	2.5000E6		104	90-110			
Strontium	49700		ng/l	50000		99.3	90-110			
Thallium	491		ng/l	500.00		98.2	90-110			
Thorium	504		ng/l	500.00		101	90-110			
Uranium	496		ng/l	500.00		99.1	90-110			
Vanadium	19900		ng/l	20000		99.5	90-110			
Zinc	534000		ng/l	500000		107	90-110			

Calibration Check (2312044-CCV3) Prepared: 12/14/23 Analyzed: 12/15/23

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Aluminum	1.48E6		ng/l	1.5000E6		99.0	90-110			
Antimony	20200		ng/l	20000		101	90-110			
Arsenic	19900		ng/l	20000		99.6	90-110			
Barium	198000		ng/l	200000		99.2	90-110			
Beryllium	5330		ng/l	5000.0		107	90-110			
Cadmium	20500		ng/l	20000		103	90-110			
Calcium	2.47E7		ng/l	2.5000E7		98.8	90-110			
Chromium	241000		ng/l	240000		101	90-110			
Cobalt	50500		ng/l	50000		101	90-110			
Copper	2.06E6		ng/l	2.0000E6		103	90-110			

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Inorganics by Compendium Method IO-3.5 - Quality Control

Batch 2312044 - B3L1203

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Calibration Check (2312044-CCV3) Contin						Prepared: 12/14/23	Analyzed: 12/15/23			
Iron	2.52E6		ng/l	2.5000E6		101	90-110			
Lead	198000		ng/l	200000		99.2	90-110			
Magnesium	1.03E6		ng/l	1.0000E6		103	90-110			
Manganese	494000		ng/l	500000		98.8	90-110			
Molybdenum	51000		ng/l	50000		102	90-110			
Nickel	123000		ng/l	120000		103	90-110			
Phosphorus	205000		ng/l	200000		102	90-110			
Potassium	2.62E6		ng/l	2.5000E6		105	90-110			
Rubidium	10000		ng/l	10000		100	90-110			
Selenium	20000		ng/l	20000		99.8	90-110			
Sodium	2.61E6		ng/l	2.5000E6		105	90-110			
Strontium	48900		ng/l	50000		97.8	90-110			
Thallium	480		ng/l	500.00		95.9	90-110			
Thorium	491		ng/l	500.00		98.2	90-110			
Uranium	478		ng/l	500.00		95.7	90-110			
Vanadium	19800		ng/l	20000		99.1	90-110			
Zinc	528000		ng/l	500000		106	90-110			
Calibration Check (2312044-CCV4)						Prepared: 12/14/23	Analyzed: 12/15/23			
Aluminum	1.50E6		ng/l	1.5000E6		100	90-110			
Antimony	20400		ng/l	20000		102	90-110			
Arsenic	20200		ng/l	20000		101	90-110			
Barium	198000		ng/l	200000		98.9	90-110			
Beryllium	5320		ng/l	5000.0		106	90-110			
Cadmium	20500		ng/l	20000		102	90-110			
Calcium	2.49E7		ng/l	2.5000E7		99.5	90-110			
Chromium	242000		ng/l	240000		101	90-110			
Cobalt	50900		ng/l	50000		102	90-110			
Copper	2.08E6		ng/l	2.0000E6		104	90-110			
Iron	2.53E6		ng/l	2.5000E6		101	90-110			
Lead	199000		ng/l	200000		99.4	90-110			
Magnesium	1.04E6		ng/l	1.0000E6		104	90-110			
Manganese	498000		ng/l	500000		99.7	90-110			
Molybdenum	50900		ng/l	50000		102	90-110			
Nickel	124000		ng/l	120000		103	90-110			
Phosphorus	206000		ng/l	200000		103	90-110			
Potassium	2.64E6		ng/l	2.5000E6		106	90-110			
Rubidium	10100		ng/l	10000		101	90-110			
Selenium	19800		ng/l	20000		99.2	90-110			

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Inorganics by Compendium Method IO-3.5 - Quality Control

Batch 2312044 - B3L1203

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Calibration Check (2312044-CCV4) Contin				Prepared: 12/14/23 Analyzed: 12/15/23						
Sodium	2.61E6		ng/l	2.5000E6		104	90-110			
Strontium	49300		ng/l	50000		98.5	90-110			
Thallium	474		ng/l	500.00		94.9	90-110			
Thorium	493		ng/l	500.00		98.5	90-110			
Uranium	486		ng/l	500.00		97.2	90-110			
Vanadium	19900		ng/l	20000		99.5	90-110			
Zinc	533000		ng/l	500000		107	90-110			
High Cal Check (2312044-HCV1)				Prepared & Analyzed: 12/14/23						
Aluminum	2.93E6		ng/l	3.0000E6		97.5	95-105			
Antimony	39300		ng/l	40000		98.4	95-105			
Arsenic	39500		ng/l	40000		98.9	95-105			
Barium	398000		ng/l	400000		99.5	95-105			
Beryllium	10300		ng/l	10000		103	95-105			
Cadmium	39100		ng/l	40000		97.7	95-105			
Calcium	4.93E7		ng/l	5.0000E7		98.6	95-105			
Chromium	464000		ng/l	480000		96.6	95-105			
Cobalt	98500		ng/l	100000		98.5	95-105			
Copper	3.88E6		ng/l	4.0000E6		97.1	95-105			
Iron	4.95E6		ng/l	5.0000E6		98.9	95-105			
Lead	393000		ng/l	400000		98.3	95-105			
Magnesium	1.97E6		ng/l	2.0000E6		98.3	95-105			
Manganese	971000		ng/l	1.0000E6		97.1	95-105			
Molybdenum	99100		ng/l	100000		99.1	95-105			
Nickel	235000		ng/l	240000		97.8	95-105			
Phosphorus	401000		ng/l	400000		100	95-105			
Potassium	4.87E6		ng/l	5.0000E6		97.4	95-105			
Rubidium	19600		ng/l	20000		98.0	95-105			
Selenium	39100		ng/l	40000		97.7	95-105			
Sodium	4.95E6		ng/l	5.0000E6		99.1	95-105			
Strontium	96500		ng/l	100000		96.5	95-105			
Thallium	987		ng/l	1000.0		98.7	95-105			
Thorium	988		ng/l	1000.0		98.8	95-105			
Uranium	993		ng/l	1000.0		99.3	95-105			
Vanadium	39200		ng/l	40000		98.0	95-105			
Zinc	953000		ng/l	1.0000E6		95.3	95-105			
Initial Cal Blank (2312044-ICB1)				Prepared & Analyzed: 12/14/23						
Aluminum	49.1		ng/l							
Antimony	1.91		ng/l							

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Inorganics by Compendium Method IO-3.5 - Quality Control

Batch 2312044 - B3L1203

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Initial Cal Blank (2312044-ICB1) Continu				Prepared & Analyzed: 12/14/23						
Arsenic	1.34		ng/l							
Barium	5.75		ng/l							
Beryllium	0.590		ng/l							
Cadmium	0.717		ng/l							
Calcium	152		ng/l							
Chromium	6.75		ng/l							
Cobalt	1.19		ng/l							
Copper	197		ng/l							
Iron	5.45		ng/l							
Lead	8.67		ng/l							
Magnesium	41.8		ng/l							
Manganese	16.5		ng/l							
Molybdenum	13.6		ng/l							
Nickel	63.6		ng/l							
Phosphorus	233		ng/l							
Potassium	729		ng/l							
Rubidium	0.939		ng/l							
Selenium	4.77		ng/l							
Sodium	-153		ng/l							U
Strontium	-0.858		ng/l							U
Thallium	0.602		ng/l							
Thorium	0.506		ng/l							
Uranium	0.0195		ng/l							
Vanadium	-88.2		ng/l							U
Zinc	-216		ng/l							U
Initial Cal Check (2312044-ICV1)				Prepared & Analyzed: 12/14/23						
Aluminum	1.45E6		ng/l	1.5000E6		96.7	90-110			
Antimony	19500		ng/l	20000		97.6	90-110			
Arsenic	19600		ng/l	20000		97.8	90-110			
Barium	195000		ng/l	200000		97.7	90-110			
Beryllium	4610		ng/l	5000.0		92.2	90-110			
Cadmium	20300		ng/l	20000		101	90-110			
Calcium	2.40E7		ng/l	2.5000E7		96.0	90-110			
Chromium	231000		ng/l	240000		96.1	90-110			
Cobalt	49200		ng/l	50000		98.4	90-110			
Copper	1.97E6		ng/l	2.0000E6		98.5	90-110			
Iron	2.46E6		ng/l	2.5000E6		98.3	90-110			
Lead	194000		ng/l	200000		96.9	90-110			

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Inorganics by Compendium Method IO-3.5 - Quality Control

Batch 2312044 - B3L1203

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Initial Cal Check (2312044-ICV1) Continu				Prepared & Analyzed: 12/14/23						
Magnesium	980000		ng/l	1.0000E6		98.0	90-110			
Manganese	481000		ng/l	500000		96.1	90-110			
Molybdenum	49000		ng/l	50000		98.0	90-110			
Nickel	118000		ng/l	120000		98.3	90-110			
Phosphorus	196000		ng/l	200000		97.9	90-110			
Potassium	2.62E6		ng/l	2.5000E6		105	90-110			
Rubidium	9560		ng/l	10000		95.6	90-110			
Selenium	20200		ng/l	20000		101	90-110			
Sodium	2.46E6		ng/l	2.5000E6		98.5	90-110			
Strontium	48900		ng/l	50000		97.8	90-110			
Thallium	470		ng/l	500.00		93.9	90-110			
Thorium	487		ng/l	500.00		97.4	90-110			
Uranium	475		ng/l	500.00		95.1	90-110			
Vanadium	19700		ng/l	20000		98.7	90-110			
Zinc	523000		ng/l	500000		105	90-110			
Interference Check A (2312044-IFA1)				Prepared & Analyzed: 12/14/23						
Aluminum	1.49E7		ng/l	1.5000E7		99.4	80-120			
Antimony	0.00		ng/l				80-120			U
Arsenic	0.00		ng/l				80-120			U
Barium	0.00		ng/l				80-120			U
Beryllium	0.00		ng/l				80-120			U
Cadmium	0.00		ng/l				80-120			U
Calcium	9.35E7		ng/l	1.0040E8		93.1	80-120			
Chromium	0.00		ng/l				80-120			U
Cobalt	0.00		ng/l				80-120			U
Copper	0.00		ng/l				80-120			U
Iron	1.50E7		ng/l	1.5000E7		99.7	80-120			
Lead	0.00		ng/l				80-120			U
Magnesium	1.59E7		ng/l	1.5000E7		106	80-120			
Manganese	0.00		ng/l				80-120			U
Molybdenum	296000		ng/l	300000		98.7	80-120			
Nickel	0.00		ng/l				80-120			U
Phosphorus	1.64E7		ng/l	1.5000E7		109	80-120			
Potassium	1.55E7		ng/l	1.5000E7		103	80-120			
Rubidium	0.00		ng/l				80-120			U
Selenium	0.00		ng/l				80-120			U
Sodium	1.59E7		ng/l	1.5000E7		106	80-120			
Strontium	0.00		ng/l				80-120			U

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Inorganics by Compendium Method IO-3.5 - Quality Control

Batch 2312044 - B3L1203

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Interference Check A (2312044-IFA1) Co				Prepared & Analyzed: 12/14/23						
Thallium	0.00		ng/l				80-120			U
Thorium	0.00		ng/l				80-120			U
Uranium	0.00		ng/l				80-120			U
Vanadium	0.00		ng/l				80-120			U
Zinc	0.00		ng/l				80-120			U
Interference Check B (2312044-IFB1)				Prepared & Analyzed: 12/14/23						
Aluminum	1.65E7		ng/l	1.6500E7		99.8	80-120			
Antimony	19800		ng/l	20000		98.9	80-120			
Arsenic	20200		ng/l	20000		101	80-120			
Barium	198000		ng/l	200000		99.1	80-120			
Beryllium	5010		ng/l	5000.0		100	80-120			
Cadmium	19300		ng/l	20000		96.5	80-120			
Calcium	1.16E8		ng/l	1.2540E8		92.3	80-120			
Chromium	228000		ng/l	240000		95.1	80-120			
Cobalt	50000		ng/l	50000		100	80-120			
Copper	1.90E6		ng/l	2.0000E6		95.2	80-120			
Iron	1.72E7		ng/l	1.7500E7		98.4	80-120			
Lead	203000		ng/l	200000		101	80-120			
Magnesium	1.69E7		ng/l	1.6000E7		106	80-120			
Manganese	512000		ng/l	500000		102	80-120			
Molybdenum	339000		ng/l	350000		96.7	80-120			
Nickel	117000		ng/l	120000		97.2	80-120			
Phosphorus	1.67E7		ng/l	1.5200E7		110	80-120			
Potassium	1.82E7		ng/l	1.7500E7		104	80-120			
Rubidium	10100		ng/l	10000		101	80-120			
Selenium	18700		ng/l	20000		93.3	80-120			
Sodium	1.89E7		ng/l	1.7500E7		108	80-120			
Strontium	49400		ng/l	50000		98.8	80-120			
Thallium	500		ng/l	500.00		100	80-120			
Thorium	534		ng/l	500.00		107	80-120			
Uranium	527		ng/l	500.00		105	80-120			
Vanadium	18300		ng/l	20000		91.4	80-120			
Zinc	484000		ng/l	500000		96.8	80-120			
Serial Dilution (2312044-SRD1)		**Source: 3121332-06**		Prepared & Analyzed: 12/14/23						
Aluminum	380	151	ng/m³ Air		383			0.776	10	
Antimony	ND	0.207	ng/m³ Air		ND				10	SL, U
Arsenic	0.107	0.0448	ng/m³ Air		0.101			5.31	10	
Barium	7.41	4.45	ng/m³ Air		7.62			2.74	10	

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Inorganics by Compendium Method IO-3.5 - Quality Control

Batch 2312044 - B3L1203

Serial Dilution (2312044-SRD1) Continued **Source: 3121332-06** Prepared & Analyzed: 12/14/23

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Beryllium	0.0187	0.0156	ng/m³ Air		0.0182			2.23	10	
Cadmium	ND	0.511	ng/m³ Air		ND				10	U
Calcium	ND	1370	ng/m³ Air		ND				10	LJ, QB-01, U
Chromium	ND	9.52	ng/m³ Air		ND				10	U
Cobalt	0.234	0.0732	ng/m³ Air		0.237			1.26	10	QB-01
Copper	34.6	14.1	ng/m³ Air		34.8			0.687	10	
Iron	471	113	ng/m³ Air		478			1.46	10	
Lead	ND	1.29	ng/m³ Air		ND				10	U
Magnesium	ND	452	ng/m³ Air		ND				10	U
Manganese	15.0	5.58	ng/m³ Air		15.1			0.897	10	
Molybdenum	1.04	0.999	ng/m³ Air		1.05			0.734	10	B, QB-01
Nickel	ND	3.76	ng/m³ Air		ND				10	U
Phosphorus	ND	5860	ng/m³ Air		ND				10	U
Potassium	ND	178	ng/m³ Air		ND				10	B, U
Rubidium	0.175	0.0858	ng/m³ Air		0.185			5.24	10	
Selenium	0.155	0.0516	ng/m³ Air		0.162			4.42	10	
Sodium	ND	9380	ng/m³ Air		ND				10	U
Strontium	4.62	3.06	ng/m³ Air		4.71			1.97	10	QB-01
Thallium	ND	0.00236	ng/m³ Air		ND				10	U
Thorium	ND	0.0141	ng/m³ Air		0.0143				10	U
Uranium	ND	0.0797	ng/m³ Air		ND				10	U
Vanadium	1.30	0.231	ng/m³ Air		1.36			4.18	10	
Zinc	ND	458	ng/m³ Air		ND				10	U

Batch B3L1203 - ICP-MS Extraction

Blank (B3L1203-BLK1) Prepared: 12/12/23 Analyzed: 12/13/23

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Aluminum	ND	32.1	ng/m³ Air							U
Antimony	ND	0.0441	ng/m³ Air							SL, U
Arsenic	ND	0.00955	ng/m³ Air							U
Barium	ND	0.948	ng/m³ Air							U
Beryllium	ND	0.00332	ng/m³ Air							U
Cadmium	ND	0.109	ng/m³ Air							U
Calcium	ND	292	ng/m³ Air							LJ, QB-01, U
Chromium	ND	2.03	ng/m³ Air							U
Cobalt	ND	0.0156	ng/m³ Air							QB-01, U
Copper	ND	3.00	ng/m³ Air							U
Iron	ND	24.2	ng/m³ Air							GC-BS, U
Lead	ND	0.276	ng/m³ Air							U
Magnesium	ND	96.4	ng/m³ Air							U

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Inorganics by Compendium Method IO-3.5 - Quality Control

Batch B3L1203 - ICP-MS Extraction

Blank (B3L1203-BLK1) Continued Prepared: 12/12/23 Analyzed: 12/13/23

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Manganese	ND	1.19	ng/m³ Air							QB-01, U
Molybdenum	ND	0.213	ng/m³ Air							QB-01, U
Nickel	ND	0.801	ng/m³ Air							U
Phosphorus	ND	1250	ng/m³ Air							GC-BS, U
Potassium	ND	38.0	ng/m³ Air							U
Rubidium	ND	0.0183	ng/m³ Air							U
Selenium	ND	0.0110	ng/m³ Air							U
Sodium	ND	2000	ng/m³ Air							GC-BS, U
Strontium	ND	0.652	ng/m³ Air							QB-01, U
Thallium	ND	5.03E-4	ng/m³ Air							U
Thorium	ND	0.00300	ng/m³ Air							U
Uranium	ND	0.0170	ng/m³ Air							U
Vanadium	ND	0.0492	ng/m³ Air							QB-01, U
Zinc	ND	97.7	ng/m³ Air							U

LCS (B3L1203-BS1) Prepared: 12/12/23 Analyzed: 12/13/23

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Aluminum	92.8	32.1	ng/m³ Air	82.975		112	80-120			
Antimony	0.550	0.0441	ng/m³ Air	1.3829		39.8	80-120			SL
Arsenic	2.72	0.00955	ng/m³ Air	2.7658		98.3	80-120			
Barium	28.2	0.948	ng/m³ Air	27.658		102	80-120			
Beryllium	1.37	0.00332	ng/m³ Air	1.3829		98.8	80-120			
Cadmium	1.39	0.109	ng/m³ Air	1.3829		101	80-120			
Calcium	547	292	ng/m³ Air	69.146		791	80-120			LJ, QB-01
Chromium	15.7	2.03	ng/m³ Air	13.829		113	80-120			
Cobalt	1.35	0.0156	ng/m³ Air	1.3829		97.6	80-120			QB-01
Copper	31.0	3.00	ng/m³ Air	27.658		112	80-120			
Iron	42.9	24.2	ng/m³ Air	27.658		155	80-120			GC-BS
Lead	13.5	0.276	ng/m³ Air	13.829		98.0	80-120			
Magnesium	ND	96.4	ng/m³ Air	27.658			80-120			U
Manganese	9.10	1.19	ng/m³ Air	8.2975		110	80-120			QB-01
Molybdenum	1.59	0.213	ng/m³ Air	1.3829		115	80-120			B, QB-01
Nickel	3.09	0.801	ng/m³ Air	2.7658		112	80-120			
Phosphorus	ND	1250	ng/m³ Air	13.829			80-120			GC-BS, U
Potassium	73.3	38.0	ng/m³ Air	55.317		132	80-120			B
Rubidium	1.35	0.0183	ng/m³ Air	1.3829		97.9	80-120			
Selenium	2.74	0.0110	ng/m³ Air	2.7658		99.1	80-120			
Sodium	ND	2000	ng/m³ Air	55.317			80-120			GC-BS, U
Strontium	2.24	0.652	ng/m³ Air	1.3829		162	80-120			QB-01
Thallium	0.132	5.03E-4	ng/m³ Air	0.13829		95.6	80-120			

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Inorganics by Compendium Method IO-3.5 - Quality Control

Batch B3L1203 - ICP-MS Extraction

LCS (B3L1203-BS1) Continued — Prepared: 12/12/23 Analyzed: 12/13/23

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Thorium	0.133	0.00300	ng/m³ Air	0.13829		96.0	80-120			
Uranium	0.130	0.0170	ng/m³ Air	0.13829		93.9	80-120			
Vanadium	2.75	0.0492	ng/m³ Air	2.7658		99.4	80-120			QB-01
Zinc	113	97.7	ng/m³ Air	82.975		137	80-120			

Duplicate (B3L1203-DUP1) — **Source: 3121111-02** — Prepared: 12/12/23 Analyzed: 12/13/23

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Aluminum	159	26.5	ng/m³ Air		159			0.260	10	
Antimony	0.0878	0.0364	ng/m³ Air		0.0779			12.0	10	SL
Arsenic	0.195	0.00789	ng/m³ Air		0.176			10.5	10	
Barium	3.11	0.783	ng/m³ Air		3.44			10.0	10	
Beryllium	0.00599	0.00274	ng/m³ Air		0.00625			4.26	10	
Cadmium	ND	0.0901	ng/m³ Air		ND				10	U
Calcium	477	241	ng/m³ Air		467			2.19	10	LJ, QB-01
Chromium	1.71	1.68	ng/m³ Air		ND				10	
Cobalt	0.116	0.0129	ng/m³ Air		0.117			1.07	10	QB-01
Copper	19.4	2.48	ng/m³ Air		18.5			4.71	10	
Iron	179	20.0	ng/m³ Air		185			3.25	10	GC-BS
Lead	ND	0.228	ng/m³ Air		ND				10	U
Magnesium	140	79.7	ng/m³ Air		136			2.74	10	
Manganese	5.33	0.983	ng/m³ Air		5.13			3.92	10	QB-01
Molybdenum	0.892	0.176	ng/m³ Air		0.890			0.233	10	QB-01
Nickel	ND	0.662	ng/m³ Air		ND				10	U
Phosphorus	ND	1030	ng/m³ Air		ND				10	GC-BS, U
Potassium	87.0	31.4	ng/m³ Air		85.5			1.70	10	
Rubidium	0.110	0.0151	ng/m³ Air		0.112			2.37	10	
Selenium	0.0963	0.00909	ng/m³ Air		0.104			7.50	10	
Sodium	ND	1650	ng/m³ Air		ND				10	GC-BS, U
Strontium	2.21	0.539	ng/m³ Air		2.18			1.28	10	QB-01
Thallium	5.94E-4	4.16E-4	ng/m³ Air		6.19E-4			4.10	10	
Thorium	0.00600	0.00248	ng/m³ Air		0.00662			9.77	10	
Uranium	ND	0.0140	ng/m³ Air		ND				10	U
Vanadium	0.670	0.0407	ng/m³ Air		0.660			1.52	10	QB-01
Zinc	ND	80.7	ng/m³ Air		ND				10	U

Matrix Spike (B3L1203-MS1) — **Source: 3121111-02** — Prepared: 12/12/23 Analyzed: 12/13/23

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Aluminum	225	26.5	ng/m³ Air	68.575	159	95.6	80-120			
Antimony	0.569	0.0364	ng/m³ Air	1.1429	0.0779	42.9	80-120			SL
Arsenic	2.39	0.00789	ng/m³ Air	2.2858	0.176	97.0	80-120			
Barium	26.2	0.783	ng/m³ Air	22.858	3.44	99.8	80-120			
Beryllium	1.12	0.00274	ng/m³ Air	1.1429	0.00625	97.9	80-120			

CERTIFICATE OF ANALYSIS

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Inorganics by Compendium Method IO-3.5 - Quality Control

Batch B3L1203 - ICP-MS Extraction

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Matrix Spike (B3L1203-MS1) Continued	**Source: 3121111-02**		Prepared: 12/12/23	Analyzed: 12/13/23						
Cadmium	1.16	0.0901	ng/m³ Air	1.1429	ND	101	80-120			
Calcium	533	241	ng/m³ Air	57.146	467	115	80-120			LJ, QB-01
Chromium	13.2	1.68	ng/m³ Air	11.429	ND	116	80-120			
Cobalt	1.20	0.0129	ng/m³ Air	1.1429	0.117	94.7	80-120			QB-01
Copper	45.1	2.48	ng/m³ Air	22.858	18.5	116	80-120			
Iron	201	20.0	ng/m³ Air	22.858	185	70.5	80-120			GC-BS, QM-4X
Lead	11.4	0.228	ng/m³ Air	11.429	ND	99.4	80-120			
Magnesium	160	79.7	ng/m³ Air	22.858	136	108	80-120			
Manganese	12.2	0.983	ng/m³ Air	6.8575	5.13	104	80-120			QB-01
Molybdenum	1.98	0.176	ng/m³ Air	1.1429	0.890	95.1	80-120			B, QB-01
Nickel	2.73	0.662	ng/m³ Air	2.2858	ND	119	80-120			
Phosphorus	ND	1030	ng/m³ Air	11.429	ND		80-120			GC-BS, U
Potassium	130	31.4	ng/m³ Air	45.716	85.5	96.7	80-120			B
Rubidium	1.20	0.0151	ng/m³ Air	1.1429	0.112	94.9	80-120			
Selenium	2.38	0.00909	ng/m³ Air	2.2858	0.104	99.5	80-120			
Sodium	ND	1650	ng/m³ Air	45.716	ND		80-120			GC-BS, U
Strontium	3.30	0.539	ng/m³ Air	1.1429	2.18	98.1	80-120			QB-01
Thallium	0.109	4.16E-4	ng/m³ Air	0.11429	6.19E-4	94.9	80-120			
Thorium	0.0575	0.00248	ng/m³ Air	0.11429	0.00662	44.5	80-120			QM-07
Uranium	0.112	0.0140	ng/m³ Air	0.11429	ND	97.7	80-120			
Vanadium	2.90	0.0407	ng/m³ Air	2.2858	0.660	98.2	80-120			QB-01
Zinc	88.0	80.7	ng/m³ Air	68.575	ND	128	80-120			
Matrix Spike Dup (B3L1203-MSD1)	**Source: 3121111-02**		Prepared: 12/12/23	Analyzed: 12/13/23						
Aluminum	226	26.5	ng/m³ Air	68.575	159	97.0	80-120	0.432	20	
Antimony	0.568	0.0364	ng/m³ Air	1.1429	0.0779	42.9	80-120	0.0979	20	SL
Arsenic	2.43	0.00789	ng/m³ Air	2.2858	0.176	98.4	80-120	1.37	20	
Barium	26.1	0.783	ng/m³ Air	22.858	3.44	99.3	80-120	0.414	20	
Beryllium	1.13	0.00274	ng/m³ Air	1.1429	0.00625	98.4	80-120	0.509	20	
Cadmium	1.16	0.0901	ng/m³ Air	1.1429	ND	102	80-120	0.445	20	
Calcium	523	241	ng/m³ Air	57.146	467	99.1	80-120	1.77	20	LJ, QB-01
Chromium	14.5	1.68	ng/m³ Air	11.429	ND	127	80-120	9.47	20	
Cobalt	1.22	0.0129	ng/m³ Air	1.1429	0.117	96.8	80-120	2.00	20	QB-01
Copper	45.5	2.48	ng/m³ Air	22.858	18.5	118	80-120	0.813	20	
Iron	209	20.0	ng/m³ Air	22.858	185	106	80-120	4.00	20	GC-BS
Lead	11.5	0.228	ng/m³ Air	11.429	ND	101	80-120	1.33	20	
Magnesium	160	79.7	ng/m³ Air	22.858	136	105	80-120	0.409	20	
Manganese	12.3	0.983	ng/m³ Air	6.8575	5.13	105	80-120	0.443	20	QB-01
Molybdenum	2.17	0.176	ng/m³ Air	1.1429	0.890	112	80-120	9.29	20	QB-01

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Inorganics by Compendium Method IO-3.5 - Quality Control

Batch B3L1203 - ICP-MS Extraction

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Matrix Spike Dup (B3L1203-MSD1) ContirSource: 3121111-02				Prepared: 12/12/23	Analyzed: 12/13/23					
Nickel	3.60	0.662	ng/m³ Air	2.2858	ND	158	80-120	27.7	20	LJ, QM-06, Q)
Phosphorus	ND	1030	ng/m³ Air	11.429	ND		80-120		20	GC-BS, QM-4X, U
Potassium	131	31.4	ng/m³ Air	45.716	85.5	99.7	80-120	1.03	20	
Rubidium	1.23	0.0151	ng/m³ Air	1.1429	0.112	98.0	80-120	2.90	20	
Selenium	2.39	0.00909	ng/m³ Air	2.2858	0.104	100	80-120	0.674	20	
Sodium	ND	1650	ng/m³ Air	45.716	ND		80-120		20	GC-BS, QM-4X, U
Strontium	3.38	0.539	ng/m³ Air	1.1429	2.18	105	80-120	2.33	20	QB-01
Thallium	0.110	4.16E-4	ng/m³ Air	0.11429	6.19E-4	95.5	80-120	0.633	20	
Thorium	0.0641	0.00248	ng/m³ Air	0.11429	0.00662	50.3	80-120	10.9	20	QM-07
Uranium	0.114	0.0140	ng/m³ Air	0.11429	ND	99.5	80-120	1.76	20	
Vanadium	2.92	0.0407	ng/m³ Air	2.2858	0.660	98.7	80-120	0.363	20	QB-01
Zinc	87.4	80.7	ng/m³ Air	68.575	ND	127	80-120	0.668	20	
Post Spike (B3L1203-PS1)	**Source: 3121111-02**			Prepared: 12/12/23	Analyzed: 12/13/23					
Aluminum	179	26.5	ng/m³ Air	22.858	159	89.0	75-125			
Antimony	0.304	0.0364	ng/m³ Air	0.22858	0.0779	98.8	75-125			SL
Arsenic	1.27	0.00789	ng/m³ Air	1.1429	0.176	96.2	75-125			
Barium	5.73	0.783	ng/m³ Air	2.2858	3.44	101	75-125			
Beryllium	0.220	0.00274	ng/m³ Air	0.22858	0.00625	93.4	75-125			
Cadmium	0.126	0.0901	ng/m³ Air	0.11429	ND	110	75-125			
Calcium	497	241	ng/m³ Air	22.858	467	132	75-125			A-01a, LJ, QB-01
Chromium	2.77	1.68	ng/m³ Air	1.1429	ND	243	75-125			
Cobalt	0.337	0.0129	ng/m³ Air	0.22858	0.117	96.2	75-125			QB-01
Copper	30.5	2.48	ng/m³ Air	11.429	18.5	105	75-125			
Iron	208	20.0	ng/m³ Air	22.858	185	98.2	75-125			GC-BS
Lead	22.5	0.228	ng/m³ Air	22.858	ND	98.4	75-125			
Magnesium	158	79.7	ng/m³ Air	22.858	136	97.1	75-125			
Manganese	7.38	0.983	ng/m³ Air	2.2858	5.13	98.7	75-125			QB-01
Molybdenum	1.98	0.176	ng/m³ Air	1.1429	0.890	95.1	75-125			QB-01
Nickel	2.73	0.662	ng/m³ Air	2.2858	ND	119	75-125			
Phosphorus	ND	1030	ng/m³ Air	4.5716	ND		75-125			A-01a, GC-BS U
Potassium	107	31.4	ng/m³ Air	22.858	85.5	96.0	75-125			
Rubidium	0.217	0.0151	ng/m³ Air	0.11429	0.112	91.4	75-125			
Selenium	1.24	0.00909	ng/m³ Air	1.1429	0.104	99.1	75-125			
Sodium	ND	1650	ng/m³ Air	22.858	ND		75-125			A-01a, GC-BS U

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Inorganics by Compendium Method IO-3.5 - Quality Control

Batch B3L1203 - ICP-MS Extraction

Post Spike (B3L1203-PS1) Continued **Source: 3121111-02** Prepared: 12/12/23 Analyzed: 12/13/23

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Strontium	3.31	0.539	ng/m³ Air	1.1429	2.18	98.7	75-125			QB-01
Thallium	0.0542	4.16E-4	ng/m³ Air	5.7146E-2	6.19E-4	93.8	75-125			
Thorium	0.0584	0.00248	ng/m³ Air	5.7146E-2	0.00662	90.6	75-125			
Uranium	0.0582	0.0140	ng/m³ Air	5.7146E-2	ND	102	75-125			
Vanadium	1.78	0.0407	ng/m³ Air	1.1429	0.660	97.6	75-125			QB-01
Zinc	ND	80.7	ng/m³ Air	22.858	ND		75-125			U

Batch B3L1403 - ICP-MS Extraction

Blank (B3L1403-BLK1) Prepared & Analyzed: 12/14/23

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Aluminum	ND	32.1	ng/m³ Air							U
Antimony	ND	0.0441	ng/m³ Air							SL, U
Arsenic	ND	0.00955	ng/m³ Air							U
Barium	ND	0.948	ng/m³ Air							U
Beryllium	ND	0.00332	ng/m³ Air							U
Cadmium	ND	0.109	ng/m³ Air							U
Calcium	ND	292	ng/m³ Air							LJ, QB-01, U
Chromium	ND	2.03	ng/m³ Air							U
Cobalt	ND	0.0156	ng/m³ Air							QB-01, U
Copper	ND	3.00	ng/m³ Air							U
Iron	ND	24.2	ng/m³ Air							U
Lead	ND	0.276	ng/m³ Air							U
Magnesium	ND	96.4	ng/m³ Air							U
Manganese	ND	1.19	ng/m³ Air							U
Molybdenum	ND	0.213	ng/m³ Air							B, QB-01, U
Nickel	ND	0.801	ng/m³ Air							U
Phosphorus	ND	1250	ng/m³ Air							U
Potassium	ND	38.0	ng/m³ Air							B, U
Rubidium	ND	0.0183	ng/m³ Air							U
Selenium	ND	0.0110	ng/m³ Air							U
Sodium	ND	2000	ng/m³ Air							U
Strontium	ND	0.652	ng/m³ Air							QB-01, U
Thallium	ND	5.03E-4	ng/m³ Air							U
Thorium	ND	0.00300	ng/m³ Air							U
Uranium	ND	0.0170	ng/m³ Air							U
Vanadium	ND	0.0492	ng/m³ Air							U
Zinc	ND	97.7	ng/m³ Air							U

LCS (B3L1403-BS1) Prepared & Analyzed: 12/14/23

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Aluminum	94.6	32.1	ng/m³ Air	82.975		114	80-120			
Antimony	0.539	0.0441	ng/m³ Air	1.3829		39.0	80-120			SL

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1777 Sentry Pkwy, Bldg 12
Blue Bell, PA 19422
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REPORTED: 12/19/23 10:54
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AQS SITE CODE:
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Inorganics by Compendium Method IO-3.5 - Quality Control

Batch B3L1403 - ICP-MS Extraction

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
LCS (B3L1403-BS1) Continued				Prepared & Analyzed: 12/14/23						
Arsenic	2.74	0.00955	ng/m³ Air	2.7658		99.0	80-120			
Barium	28.0	0.948	ng/m³ Air	27.658		101	80-120			
Beryllium	1.35	0.00332	ng/m³ Air	1.3829		97.7	80-120			
Cadmium	1.41	0.109	ng/m³ Air	1.3829		102	80-120			
Calcium	564	292	ng/m³ Air	69.146		815	80-120			LJ, QB-01
Chromium	16.3	2.03	ng/m³ Air	13.829		118	80-120			
Cobalt	1.40	0.0156	ng/m³ Air	1.3829		101	80-120			QB-01
Copper	32.3	3.00	ng/m³ Air	27.658		117	80-120			
Iron	41.9	24.2	ng/m³ Air	27.658		152	80-120			
Lead	13.6	0.276	ng/m³ Air	13.829		98.2	80-120			
Magnesium	ND	96.4	ng/m³ Air	27.658			80-120			U
Manganese	8.80	1.19	ng/m³ Air	8.2975		106	80-120			
Molybdenum	1.66	0.213	ng/m³ Air	1.3829		120	80-120			B, QB-01
Nickel	3.19	0.801	ng/m³ Air	2.7658		115	80-120			
Phosphorus	ND	1250	ng/m³ Air	13.829			80-120			U
Potassium	72.6	38.0	ng/m³ Air	55.317		131	80-120			B
Rubidium	1.32	0.0183	ng/m³ Air	1.3829		95.5	80-120			
Selenium	2.72	0.0110	ng/m³ Air	2.7658		98.3	80-120			
Sodium	ND	2000	ng/m³ Air	55.317			80-120			U
Strontium	2.19	0.652	ng/m³ Air	1.3829		158	80-120			QB-01
Thallium	0.132	5.03E-4	ng/m³ Air	0.13829		95.3	80-120			
Thorium	0.132	0.00300	ng/m³ Air	0.13829		95.3	80-120			
Uranium	0.130	0.0170	ng/m³ Air	0.13829		94.2	80-120			
Vanadium	2.75	0.0492	ng/m³ Air	2.7658		99.3	80-120			
Zinc	125	97.7	ng/m³ Air	82.975		151	80-120			
Duplicate (B3L1403-DUP1)		**Source: 3121332-06**		Prepared & Analyzed: 12/14/23						
Aluminum	378	30.1	ng/m³ Air		383			1.17	10	
Antimony	0.0764	0.0414	ng/m³ Air		0.0839			9.31	10	SL
Arsenic	0.101	0.00896	ng/m³ Air		0.101			0.656	10	
Barium	7.37	0.889	ng/m³ Air		7.62			3.28	10	
Beryllium	0.0206	0.00311	ng/m³ Air		0.0182			12.3	10	
Cadmium	ND	0.102	ng/m³ Air		ND				10	U
Calcium	628	274	ng/m³ Air		623			0.807	10	LJ, QB-01
Chromium	2.18	1.90	ng/m³ Air		2.10			3.88	10	
Cobalt	0.238	0.0146	ng/m³ Air		0.237			0.384	10	QB-01
Copper	34.4	2.81	ng/m³ Air		34.8			1.14	10	
Iron	475	22.7	ng/m³ Air		478			0.780	10	
Lead	0.363	0.259	ng/m³ Air		0.343			5.71	10	

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Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes

Inorganics by Compendium Method IO-3.5 - Quality Control

Batch B3L1403 - ICP-MS Extraction

Duplicate (B3L1403-DUP1) Continued **Source: 3121332-06** Prepared & Analyzed: 12/14/23

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Magnesium	250	90.4	ng/m³ Air		254			1.26	10	
Manganese	15.1	1.12	ng/m³ Air		15.1			0.186	10	
Molybdenum	1.04	0.200	ng/m³ Air		1.05			0.480	10	B, QB-01
Nickel	ND	0.751	ng/m³ Air		ND				10	U
Phosphorus	ND	1170	ng/m³ Air		ND				10	U
Potassium	108	35.6	ng/m³ Air		105			2.78	10	B
Rubidium	0.183	0.0172	ng/m³ Air		0.185			1.18	10	
Selenium	0.168	0.0103	ng/m³ Air		0.162			3.77	10	
Sodium	2170	1880	ng/m³ Air		2200			1.32	10	E
Strontium	4.65	0.612	ng/m³ Air		4.71			1.32	10	QB-01
Thallium	0.00135	4.72E-4	ng/m³ Air		0.00143			5.78	10	
Thorium	0.0137	0.00281	ng/m³ Air		0.0143			4.60	10	
Uranium	ND	0.0159	ng/m³ Air		ND				10	U
Vanadium	1.32	0.0461	ng/m³ Air		1.36			2.65	10	
Zinc	ND	91.6	ng/m³ Air		ND				10	U

Duplicate (B3L1403-DUP2) **Source: 3121332-12** Prepared: 12/14/23 Analyzed: 12/15/23

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Aluminum	531	25.4	ng/m³ Air		528			0.675	10	
Antimony	0.0541	0.0349	ng/m³ Air		0.0546			0.953	10	SL
Arsenic	0.141	0.00755	ng/m³ Air		0.143			1.23	10	
Barium	5.12	0.750	ng/m³ Air		5.17			0.912	10	
Beryllium	0.0179	0.00263	ng/m³ Air		0.0186			3.68	10	
Cadmium	ND	0.0862	ng/m³ Air		ND				10	U
Calcium	419	231	ng/m³ Air		424			1.14	10	LJ, QB-01
Chromium	1.98	1.61	ng/m³ Air		1.97			0.508	10	
Cobalt	0.295	0.0123	ng/m³ Air		0.293			0.697	10	QB-01
Copper	22.8	2.37	ng/m³ Air		22.7			0.602	10	
Iron	590	19.1	ng/m³ Air		586			0.594	10	
Lead	0.691	0.218	ng/m³ Air		0.697			1.00	10	
Magnesium	135	76.3	ng/m³ Air		134			0.571	10	
Manganese	16.5	0.941	ng/m³ Air		16.6			0.215	10	
Molybdenum	0.723	0.168	ng/m³ Air		0.723			0.0941	10	B, QB-01
Nickel	ND	0.634	ng/m³ Air		ND				10	U
Phosphorus	ND	989	ng/m³ Air		ND				10	U
Potassium	65.2	30.1	ng/m³ Air		65.5			0.549	10	B
Rubidium	0.171	0.0145	ng/m³ Air		0.173			1.00	10	
Selenium	0.131	0.00870	ng/m³ Air		0.137			4.96	10	
Sodium	ND	1580	ng/m³ Air		ND				10	U
Strontium	3.34	0.516	ng/m³ Air		3.37			1.01	10	QB-01

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Inorganics by Compendium Method IO-3.5 - Quality Control

Batch B3L1403 - ICP-MS Extraction

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Duplicate (B3L1403-DUP2) Continued		**Source: 3121332-12**		Prepared: 12/14/23 Analyzed: 12/15/23						
Thallium	0.00110	3.98E-4	ng/m³ Air		0.00110			0.0815	10	
Thorium	0.0158	0.00237	ng/m³ Air		0.0158			0.0139	10	
Uranium	ND	0.0134	ng/m³ Air		ND				10	U
Vanadium	1.48	0.0389	ng/m³ Air		1.48			0.242	10	
Zinc	ND	77.3	ng/m³ Air		ND				10	U
Matrix Spike (B3L1403-MS1)		**Source: 3121332-06**		Prepared & Analyzed: 12/14/23						
Aluminum	463	30.1	ng/m³ Air	77.823	383	103	80-120			
Antimony	0.652	0.0414	ng/m³ Air	1.2970	0.0839	43.8	80-120			SL
Arsenic	2.64	0.00896	ng/m³ Air	2.5941	0.101	97.7	80-120			
Barium	33.3	0.889	ng/m³ Air	25.941	7.62	98.8	80-120			
Beryllium	1.27	0.00311	ng/m³ Air	1.2970	0.0182	96.1	80-120			
Cadmium	1.33	0.102	ng/m³ Air	1.2970	ND	102	80-120			
Calcium	688	274	ng/m³ Air	64.852	623	100	80-120			LJ, QB-01
Chromium	15.7	1.90	ng/m³ Air	12.970	2.10	105	80-120			
Cobalt	1.53	0.0146	ng/m³ Air	1.2970	0.237	99.8	80-120			QB-01
Copper	62.8	2.81	ng/m³ Air	25.941	34.8	108	80-120			
Iron	512	22.7	ng/m³ Air	25.941	478	129	80-120			QM-4X
Lead	13.2	0.259	ng/m³ Air	12.970	0.343	98.9	80-120			
Magnesium	278	90.4	ng/m³ Air	25.941	254	96.0	80-120			
Manganese	23.1	1.12	ng/m³ Air	7.7823	15.1	103	80-120			
Molybdenum	2.41	0.200	ng/m³ Air	1.2970	1.05	105	80-120			B, QB-01
Nickel	3.33	0.751	ng/m³ Air	2.5941	ND	128	80-120			
Phosphorus	ND	1170	ng/m³ Air	12.970	ND		80-120			QM-4X, U
Potassium	171	35.6	ng/m³ Air	51.882	105	127	80-120			B, QM-07
Rubidium	1.38	0.0172	ng/m³ Air	1.2970	0.185	91.8	80-120			
Selenium	2.68	0.0103	ng/m³ Air	2.5941	0.162	97.1	80-120			
Sodium	2280	1880	ng/m³ Air	51.882	2200	155	80-120			QM-4X
Strontium	5.83	0.612	ng/m³ Air	1.2970	4.71	86.3	80-120			QB-01
Thallium	0.125	4.72E-4	ng/m³ Air	0.12970	0.00143	95.0	80-120			
Thorium	0.0695	0.00281	ng/m³ Air	0.12970	0.0143	42.5	80-120			QM-07
Uranium	0.134	0.0159	ng/m³ Air	0.12970	ND	103	80-120			
Vanadium	3.90	0.0461	ng/m³ Air	2.5941	1.36	97.8	80-120			
Zinc	109	91.6	ng/m³ Air	77.823	ND	140	80-120			
Matrix Spike Dup (B3L1403-MSD1)		**Source: 3121332-06**		Prepared & Analyzed: 12/14/23						
Aluminum	465	30.1	ng/m³ Air	77.823	383	106	80-120	0.629	20	
Antimony	0.642	0.0414	ng/m³ Air	1.2970	0.0839	43.0	80-120	1.59	20	SL
Arsenic	2.64	0.00896	ng/m³ Air	2.5941	0.101	97.8	80-120	0.0407	20	
Barium	32.8	0.889	ng/m³ Air	25.941	7.62	97.1	80-120	1.35	20	

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AQS SITE CODE:
SITE CODE: Maui fires

Inorganics by Compendium Method IO-3.5 - Quality Control

Batch B3L1403 - ICP-MS Extraction

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Matrix Spike Dup (B3L1403-MSD1) ContiSource: 3121332-06				Prepared & Analyzed: 12/14/23						
Beryllium	1.21	0.00311	ng/m³ Air	1.2970	0.0182	92.1	80-120	4.19	20	
Cadmium	1.33	0.102	ng/m³ Air	1.2970	ND	103	80-120	0.534	20	
Calcium	682	274	ng/m³ Air	64.852	623	92.2	80-120	0.754	20	LJ, QB-01
Chromium	15.6	1.90	ng/m³ Air	12.970	2.10	104	80-120	0.875	20	
Cobalt	1.52	0.0146	ng/m³ Air	1.2970	0.237	99.2	80-120	0.505	20	QB-01
Copper	63.2	2.81	ng/m³ Air	25.941	34.8	109	80-120	0.672	20	
Iron	506	22.7	ng/m³ Air	25.941	478	107	80-120	1.14	20	
Lead	13.1	0.259	ng/m³ Air	12.970	0.343	98.6	80-120	0.278	20	
Magnesium	279	90.4	ng/m³ Air	25.941	254	96.4	80-120	0.0399	20	
Manganese	23.1	1.12	ng/m³ Air	7.7823	15.1	103	80-120	0.0337	20	
Molybdenum	2.30	0.200	ng/m³ Air	1.2970	1.05	96.3	80-120	4.98	20	B, QB-01
Nickel	3.34	0.751	ng/m³ Air	2.5941	ND	129	80-120	0.377	20	
Phosphorus	ND	1170	ng/m³ Air	12.970	ND		80-120		20	QM-4X, U
Potassium	154	35.6	ng/m³ Air	51.882	105	94.0	80-120	10.5	20	B
Rubidium	1.40	0.0172	ng/m³ Air	1.2970	0.185	93.7	80-120	1.74	20	
Selenium	2.72	0.0103	ng/m³ Air	2.5941	0.162	98.5	80-120	1.35	20	
Sodium	2240	1880	ng/m³ Air	51.882	2200	87.3	80-120	1.54	20	
Strontium	5.89	0.612	ng/m³ Air	1.2970	4.71	90.8	80-120	0.998	20	QB-01
Thallium	0.125	4.72E-4	ng/m³ Air	0.12970	0.00143	95.7	80-120	0.649	20	
Thorium	0.0709	0.00281	ng/m³ Air	0.12970	0.0143	43.7	80-120	2.11	20	QM-07
Uranium	0.134	0.0159	ng/m³ Air	0.12970	ND	103	80-120	0.230	20	
Vanadium	3.91	0.0461	ng/m³ Air	2.5941	1.36	98.2	80-120	0.257	20	
Zinc	105	91.6	ng/m³ Air	77.823	ND	135	80-120	3.71	20	
Post Spike (B3L1403-PS1)	**Source: 3121332-06**			Prepared & Analyzed: 12/14/23						
Aluminum	406	30.1	ng/m³ Air	25.941	383	89.1	75-125			
Antimony	0.334	0.0414	ng/m³ Air	0.25941	0.0839	96.4	75-125			SL
Arsenic	1.32	0.00896	ng/m³ Air	1.2970	0.101	94.1	75-125			
Barium	9.88	0.889	ng/m³ Air	2.5941	7.62	87.2	75-125			
Beryllium	0.265	0.00311	ng/m³ Air	0.25941	0.0182	95.0	75-125			
Cadmium	0.137	0.102	ng/m³ Air	0.12970	ND	106	75-125			
Calcium	660	274	ng/m³ Air	25.941	623	143	75-125			A-01, LJ, QB-01
Chromium	3.37	1.90	ng/m³ Air	1.2970	2.10	98.2	75-125			
Cobalt	0.492	0.0146	ng/m³ Air	0.25941	0.237	98.3	75-125			QB-01
Copper	48.5	2.81	ng/m³ Air	12.970	34.8	105	75-125			
Iron	504	22.7	ng/m³ Air	25.941	478	99.9	75-125			
Lead	25.3	0.259	ng/m³ Air	25.941	0.343	96.3	75-125			
Magnesium	281	90.4	ng/m³ Air	25.941	254	105	75-125			

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Inorganics by Compendium Method IO-3.5 - Quality Control

Batch B3L1403 - ICP-MS Extraction

Post Spike (B3L1403-PS1) Continued **Source: 3121332-06** Prepared & Analyzed: 12/14/23

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Manganese	17.7	1.12	ng/m³ Air	2.5941	15.1	99.6	75-125			
Molybdenum	2.26	0.200	ng/m³ Air	1.2970	1.05	93.0	75-125			B, QB-01
Nickel	3.17	0.751	ng/m³ Air	2.5941	ND	122	75-125			
Phosphorus	ND	1170	ng/m³ Air	5.1882	ND		75-125			U
Potassium	132	35.6	ng/m³ Air	25.941	105	104	75-125			B
Rubidium	0.295	0.0172	ng/m³ Air	0.12970	0.185	85.1	75-125			
Selenium	1.37	0.0103	ng/m³ Air	1.2970	0.162	93.3	75-125			
Sodium	2260	1880	ng/m³ Air	25.941	2200	232	75-125			A-01
Strontium	5.78	0.612	ng/m³ Air	1.2970	4.71	82.7	75-125			QB-01
Thallium	0.0611	4.72E-4	ng/m³ Air	6.4852E-2	0.00143	92.0	75-125			
Thorium	0.0728	0.00281	ng/m³ Air	6.4852E-2	0.0143	90.1	75-125			
Uranium	0.0704	0.0159	ng/m³ Air	6.4852E-2	ND	109	75-125			
Vanadium	2.58	0.0461	ng/m³ Air	1.2970	1.36	94.5	75-125			
Zinc	ND	91.6	ng/m³ Air	25.941	ND		75-125			U

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Notes and Definitions

U	Under Detection Limit
SL	The spike recovery was outside acceptance limits. Reported value may be biased low.
QX	Compound does not meet QC criteria. Results should be considered an estimate.
QM-4X	The MS/MSD recovery exceeds criteria because the parent sample concentration is greater than 4x the spike concentration. Sample results for the QC batch were accepted based on acceptable BS/BSD recoveries.
QM-07	The spike recovery was outside acceptance limits for the MS and/or MSD. The batch was accepted based on acceptable LCS recovery.
QM-06	Due to noted non-homogeneity of the QC sample matrix, the MS/MSD did not provide reliable results for accuracy and precision. Sample results for the QC batch were accepted based on LCS/LCSD percent recoveries and RPD values.
QB-01	Analyte exceeds method blank criteria
LJ	Identification of analyte is acceptable; reported value is an estimate.
GC-BS	Compound exceeds Blank Spike Criteria
FB-01	Analyte exceeds Field Blank criteria.
E	The concentration indicated for this analyte is an estimated value above the calibration range of the instrument. This value is considered an estimate (CLP E-flag).
D	This result obtained by dilution.
B	Analyte is found in the associated blank as well as in the sample (CLP B-flag).
A-01a	Parent sample >4x spike amount
A-01	Parent sample >4x spike
ND	Analyte NOT DETECTED
NR	Not Reported
MDL	Method Detection Limit
RPD	Relative Percent Difference

Note: This test is accredited under the 2016 TNI Standard.

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Stage 1 Data Verification Checklist – Metals

HDOH CAB – Ambient Community Air Sampling – Kula

Task Order No. 23141

Reviewed by:
Talaidh Isaacs 12/22/2023 & Shanna Vasser 12/22/2023
Laboratory: Eastern Research Group – Morrisville, NC
Analysis date: 12/13/2023, 12/14/2023, and 12/15/2023
Report No: 3121111

√ 1. Chain of custody (CoC) documentation is present.

X 2. Sample receipt condition information is present and acceptable.

√ 3. Laboratory conducting the analysis is identified.

√ 4. All samples submitted to the laboratory are accounted for.

√ 5. Requested analytical methods were performed.

√ 6. Analysis dates are provided.

√ 7. Analyte results are provided.

√ 8. Result qualifiers and definitions are provided.

√ 9. Result units are reported.

NA 10. Requested reporting limits are present.

√ 11. Method detection limits are present.

√ 12. Sample collection date and time are present.

Discrepancies:

The CoC noted, "No field blanks for 12/07/23 and 12/08/23 samples due to late arrival of new filters."

Notes:

2. No sample receipt information was presented by the laboratory.

10. No reporting limits were included in this data package.

Eastern Research Group
601 Keystone Park Drive
Suite 700
Morrisville, NC 27560

December 21, 2023

Ms. Chelsea Saber
Tetra Tech, Inc.
1777 Sentry Pkwy, Bldg 12
Blue Bell, PA 19422
Project Name: Maui fires

Dear Ms. Chelsea Saber,

This report contains the analytical results for the sample(s) received under chain(s) of custody by Eastern Research Group on 12/18/23 12:00.

Values below the MDL for QC results in this report are recorded as ND, however the actual values are reported in the accompanying Excel report with a "U" flag (Under the detection limit). The actual values are reported in AQS.

This test is accredited under the 2016 TNI Standard for Environmental Laboratories (FL DOH Certification # E87673). All analyses were performed as described in the US EPA-approved QAPP, under the contract for National Hazardous Air Pollutant Support (US EPA Contract No. 68HERH22D0002). This cover page is an integral part of this report, and any exceptions or comments are noted on the last page.

Release of the data contained in this data package and in the data submitted in the electronic data deliverable, has been authorized by the Program Manager, or the Program Manager's designee as verified by the following signature.

The issuance of the final Certificate of Analysis takes precedence over any previous Report. If you have any questions, please contact me at 919-468-7924.

Sincerely,

Julie Swift
Program Manager
julie.swift@erg.com

The information contained in this report and its attachment(s) are intended only for the use of the individual to whom it is addressed and may contain information that is privileged, confidential, or exempt from disclosure. If the reader of this message is not the intended recipient, you are hereby notified that any dissemination, distribution, or copying of this report is strictly prohibited. If you have received this report in error, please notify julie.swift@erg.com and delete the report without retaining any copies.

CERTIFICATE OF ANALYSIS

Tetra Tech, Inc.
1777 Sentry Pkwy, Bldg 12
Blue Bell, PA 19422
ATTN: Ms. Chelsea Saber
PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 12/21/23 13:36
SUBMITTED: 12/18/23
AQS SITE CODE:
SITE CODE: Maui fires

ANALYTICAL REPORT FOR SAMPLES

SampleName	LabNumber	Matrix	Sampled	Received
TetraTech Q9533919	3121831-01	Air	12/11/23 23:59	12/18/23 12:00
TetraTech Q9533918	3121831-02	Air	12/11/23 23:59	12/18/23 12:00
TetraTech Q9533916	3121831-03	Air	12/11/23 23:59	12/18/23 12:00
TetraTech Q9533945 FB	3121831-04	Air	12/11/23 00:00	12/18/23 12:00
TetraTech Q9533932	3121831-05	Air	12/12/23 23:59	12/18/23 12:00
TetraTech Q9533931	3121831-06	Air	12/12/23 23:59	12/18/23 12:00
TetraTech Q9533930	3121831-07	Air	12/12/23 23:59	12/18/23 12:00
TetraTech Q9533939 FB	3121831-08	Air	12/12/23 00:00	12/18/23 12:00
TetraTech Q9533944	3121831-09	Air	12/13/23 23:59	12/18/23 12:00
TetraTech Q9533943	3121831-10	Air	12/13/23 23:59	12/18/23 12:00
TetraTech Q9533941	3121831-11	Air	12/13/23 23:59	12/18/23 12:00
TetraTech Q9533936 FB	3121831-12	Air	12/13/23 00:00	12/18/23 12:00

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Blue Bell, PA 19422
ATTN: Ms. Chelsea Saber
PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 12/21/23 13:36
SUBMITTED: 12/18/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9533919 **Lab ID:** 3121831-01 **Sampled:** 12/11/23 23:59
Matrix: Air **Sample Volume:** 2024.203 m^3 **Received:** 12/18/23 12:00
Filter ID: **Analysis Date:** 12/19/23 22:16
Comments: MFK-AM01-121123-HM

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m^3 Air	Flag	MDL ng/m^3 Air
Aluminum	**7429-90-5**	**620**		**25.8**
Antimony	**7440-36-0**	**0.0624**	SL	**0.0354**
Arsenic	**7440-38-2**	**0.204**		**0.00768**
Barium	**7440-39-3**	**5.38**		**0.762**
Beryllium	**7440-41-7**	**0.0190**		**0.00267**
Cadmium	7440-43-9	0.0102	U	0.0876
Calcium	**7440-70-2**	**531**	QB-01	**235**
Chromium	**7440-47-3**	**2.14**		**1.63**
Cobalt	**7440-48-4**	**0.268**	QB-01	**0.0125**
Copper	**7440-50-8**	**15.7**		**2.41**
Iron	**7439-89-6**	**615**		**19.5**
Lead	**7439-92-1**	**0.471**		**0.222**
Magnesium	**7439-95-4**	**203**		**77.5**
Manganese	**7439-96-5**	**16.3**		**0.956**
Molybdenum	**7439-98-7**	**0.721**	QB-01	**0.171**
Nickel	**7440-02-0**	**0.820**		**0.644**
Phosphorus	7723-14-0	328	U, GC-BS, LJ, QX	1000
Potassium	**7440-09-7**	**94.0**		**30.5**
Rubidium	**7440-17-7**	**0.185**		**0.0147**
Selenium	**7782-49-2**	**0.193**	LJ, QX	**0.00884**
Sodium	**7440-23-5**	**1670**	E, GC-BS	**1610**
Strontium	**7440-24-6**	**3.86**	QB-01	**0.524**
Thallium	**7440-28-0**	**0.00127**		**4.04E-4**
Thorium	**7440-29-01**	**0.0152**		**0.00241**
Uranium	7440-61-1	0.0128	U	0.0137
Vanadium	**7440-62-2**	**2.00**		**0.0395**
Zinc	7440-66-6	38.1	U	78.5

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Tetra Tech, Inc.
1777 Sentry Pkwy, Bldg 12
Blue Bell, PA 19422
ATTN: Ms. Chelsea Saber
PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 12/21/23 13:36
SUBMITTED: 12/18/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9533918 **Lab ID:** 3121831-02 **Sampled:** 12/11/23 23:59
Matrix: Air **Sample Volume:** 2036.912 m³ **Received:** 12/18/23 12:00
Filter ID: **Analysis Date:** 12/19/23 22:32
Comments: MFK-AM02-121123-HM

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	**7429-90-5**	**899**	E	**25.6**
Antimony	**7440-36-0**	**0.0913**	SL	**0.0352**
Arsenic	**7440-38-2**	**0.360**		**0.00763**
Barium	**7440-39-3**	**11.3**		**0.757**
Beryllium	**7440-41-7**	**0.0263**		**0.00265**
Cadmium	7440-43-9	0.0511	U	0.0871
Calcium	**7440-70-2**	**741**	QB-01	**233**
Chromium	**7440-47-3**	**2.24**		**1.62**
Cobalt	**7440-48-4**	**0.374**	QB-01	**0.0125**
Copper	**7440-50-8**	**16.7**		**2.40**
Iron	**7439-89-6**	**867**		**19.3**
Lead	**7439-92-1**	**0.400**		**0.220**
Magnesium	**7439-95-4**	**284**		**77.0**
Manganese	**7439-96-5**	**25.2**		**0.951**
Molybdenum	**7439-98-7**	**1.01**	QB-01	**0.170**
Nickel	**7440-02-0**	**0.947**		**0.640**
Phosphorus	7723-14-0	395	U, GC-BS, LJ, QX	998
Potassium	**7440-09-7**	**172**		**30.4**
Rubidium	**7440-17-7**	**0.311**		**0.0146**
Selenium	**7782-49-2**	**0.247**	LJ, QX	**0.00879**
Sodium	**7440-23-5**	**1950**	E, GC-BS	**1600**
Strontium	**7440-24-6**	**7.71**	QB-01	**0.521**
Thallium	**7440-28-0**	**0.00179**		**4.02E-4**
Thorium	**7440-29-01**	**0.0215**		**0.00240**
Uranium	**7440-61-1**	**0.0201**		**0.0136**
Vanadium	**7440-62-2**	**2.69**		**0.0393**
Zinc	7440-66-6	33.0	U	78.0

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CERTIFICATE OF ANALYSIS

Tetra Tech, Inc.
1777 Sentry Pkwy, Bldg 12
Blue Bell, PA 19422
ATTN: Ms. Chelsea Saber
PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 12/21/23 13:36
SUBMITTED: 12/18/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9533916 **Lab ID:** 3121831-03 **Sampled:** 12/11/23 23:59
Matrix: Air **Sample Volume:** 1628.578 m³ **Received:** 12/18/23 12:00
Filter ID: **Analysis Date:** 12/19/23 22:48
Comments: MFK-AM03-121123-HM

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	**7429-90-5**	**331**		**32.1**
Antimony	**7440-36-0**	**0.131**	SL	**0.0441**
Arsenic	**7440-38-2**	**0.105**		**0.00954**
Barium	**7440-39-3**	**5.99**		**0.947**
Beryllium	**7440-41-7**	**0.0144**		**0.00332**
Cadmium	7440-43-9	0.00875	U	0.109
Calcium	**7440-70-2**	**584**	QB-01	**292**
Chromium	**7440-47-3**	**2.20**		**2.03**
Cobalt	**7440-48-4**	**0.222**	QB-01	**0.0156**
Copper	**7440-50-8**	**59.3**		**3.00**
Iron	**7439-89-6**	**421**		**24.2**
Lead	**7439-92-1**	**0.358**		**0.276**
Magnesium	**7439-95-4**	**282**		**96.3**
Manganese	**7439-96-5**	**11.9**		**1.19**
Molybdenum	**7439-98-7**	**1.60**	QB-01	**0.213**
Nickel	7440-02-0	0.798	U	0.800
Phosphorus	7723-14-0	404	U, GC-BS, LJ, QX	1250
Potassium	**7440-09-7**	**114**		**38.0**
Rubidium	**7440-17-7**	**0.159**		**0.0183**
Selenium	**7782-49-2**	**0.197**	LJ, QX	**0.0110**
Sodium	**7440-23-5**	**2470**	E, GC-BS	**2000**
Strontium	**7440-24-6**	**3.63**	QB-01	**0.651**
Thallium	**7440-28-0**	**9.24E-4**		**5.03E-4**
Thorium	**7440-29-01**	**0.0131**		**0.00300**
Uranium	7440-61-1	0.00947	U	0.0170
Vanadium	**7440-62-2**	**1.77**		**0.0492**
Zinc	7440-66-6	34.7	U	97.6

CERTIFICATE OF ANALYSIS

Tetra Tech, Inc.
1777 Sentry Pkwy, Bldg 12
Blue Bell, PA 19422
ATTN: Ms. Chelsea Saber
PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 12/21/23 13:36
SUBMITTED: 12/18/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9533945 FB **Lab ID:** 3121831-04 **Sampled:** 12/11/23 00:00
Matrix: Air **Sample Volume:** 2024.203 m³ **Received:** 12/18/23 12:00
Filter ID: **Analysis Date:** 12/19/23 23:03
Comments: MFK-FB01-121123-HM Field Blank

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	7429-90-5	9.90	U	25.8
Antimony	7440-36-0	0.00736	U, SL	0.0354
Arsenic	7440-38-2	0.00599	U	0.00768
Barium	7440-39-3	0.635	U	0.762
Beryllium	7440-41-7	8.48E-4	U	0.00267
Cadmium	7440-43-9	0.00291	U	0.0876
Calcium	**7440-70-2**	**305**	FB-01, QB-01	**235**
Chromium	7440-47-3	1.49	U	1.63
Cobalt	**7440-48-4**	**0.0286**	FB-01, QB-01	**0.0125**
Copper	7440-50-8	0.409	U	2.41
Iron	7439-89-6	13.6	U	19.5
Lead	7439-92-1	0.0542	U	0.222
Magnesium	7439-95-4	36.7	U	77.5
Manganese	7439-96-5	0.211	U	0.956
Molybdenum	**7439-98-7**	**0.239**	FB-01, QB-01	**0.171**
Nickel	7440-02-0	0.269	U	0.644
Phosphorus	7723-14-0	294	U, GC-BS, LJ, QX	1000
Potassium	7440-09-7	12.7	U	30.5
Rubidium	7440-17-7	0.0118	U	0.0147
Selenium	7782-49-2	0.00367	U, LJ, QX	0.00884
Sodium	7440-23-5	638	U, GC-BS	1610
Strontium	**7440-24-6**	**0.549**	FB-01, QB-01	**0.524**
Thallium	7440-28-0	1.23E-4	U	4.04E-4
Thorium	7440-29-01	0.00172	U	0.00241
Uranium	7440-61-1	0.00151	U	0.0137
Vanadium	7440-62-2	0.0100	U	0.0395
Zinc	7440-66-6	22.3	U	78.5

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CERTIFICATE OF ANALYSIS

Tetra Tech, Inc.
1777 Sentry Pkwy, Bldg 12
Blue Bell, PA 19422
ATTN: Ms. Chelsea Saber
PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 12/21/23 13:36
SUBMITTED: 12/18/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9533932 **Lab ID:** 3121831-05 **Sampled:** 12/12/23 23:59
Matrix: Air **Sample Volume:** 2065.514 m³ **Received:** 12/18/23 12:00
Filter ID: **Analysis Date:** 12/19/23 23:17
Comments: MFK-AM01-121223-HM

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	**7429-90-5**	**1090**	E	**25.3**
Antimony	**7440-36-0**	**0.0606**	SL	**0.0347**
Arsenic	**7440-38-2**	**0.564**		**0.00752**
Barium	**7440-39-3**	**7.59**		**0.747**
Beryllium	**7440-41-7**	**0.0320**		**0.00262**
Cadmium	7440-43-9	0.0124	U	0.0859
Calcium	**7440-70-2**	**619**	QB-01	**230**
Chromium	**7440-47-3**	**2.42**		**1.60**
Cobalt	**7440-48-4**	**0.437**	QB-01	**0.0123**
Copper	**7440-50-8**	**14.6**		**2.36**
Iron	**7439-89-6**	**1050**		**19.1**
Lead	**7439-92-1**	**0.527**		**0.217**
Magnesium	**7439-95-4**	**233**		**75.9**
Manganese	**7439-96-5**	**27.6**		**0.937**
Molybdenum	**7439-98-7**	**0.813**	QB-01	**0.168**
Nickel	**7440-02-0**	**1.14**		**0.631**
Phosphorus	7723-14-0	351	GC-BS, LJ, QX, U	985
Potassium	**7440-09-7**	**106**		**29.9**
Rubidium	**7440-17-7**	**0.236**		**0.0144**
Selenium	**7782-49-2**	**0.235**	LJ, QX	**0.00866**
Sodium	**7440-23-5**	**1680**	E, GC-BS	**1580**
Strontium	**7440-24-6**	**5.17**	QB-01	**0.514**
Thallium	**7440-28-0**	**0.00162**		**3.96E-4**
Thorium	**7440-29-01**	**0.0243**		**0.00236**
Uranium	**7440-61-1**	**0.0204**		**0.0134**
Vanadium	**7440-62-2**	**2.84**		**0.0388**
Zinc	7440-66-6	23.8	U	77.0

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1777 Sentry Pkwy, Bldg 12
Blue Bell, PA 19422
ATTN: Ms. Chelsea Saber
PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 12/21/23 13:36
SUBMITTED: 12/18/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9533931 **Lab ID:** 3121831-06 **Sampled:** 12/12/23 23:59
Matrix: Air **Sample Volume:** 2068.806 m³ **Received:** 12/18/23 12:00
Filter ID: **Analysis Date:** 12/19/23 19:57
Comments: MFK-AM02-121223-HM/MS/MSD

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	**7429-90-5**	**768**	E, QM-4X	**25.2**
Antimony	**7440-36-0**	**0.0597**	SL	**0.0347**
Arsenic	**7440-38-2**	**0.326**		**0.00751**
Barium	**7440-39-3**	**7.09**		**0.746**
Beryllium	**7440-41-7**	**0.0257**		**0.00261**
Cadmium	**7440-43-9**	**0.191**	LJ, QX	**0.0857**
Calcium	**7440-70-2**	**652**	QB-01, QM-4X	**230**
Chromium	**7440-47-3**	**2.08**		**1.60**
Cobalt	**7440-48-4**	**0.361**	QB-01	**0.0123**
Copper	**7440-50-8**	**16.1**	QM-07	**2.36**
Iron	**7439-89-6**	**777**	QM-4X	**19.0**
Lead	**7439-92-1**	**0.423**		**0.217**
Magnesium	**7439-95-4**	**242**		**75.8**
Manganese	**7439-96-5**	**19.6**		**0.936**
Molybdenum	**7439-98-7**	**0.987**	QB-01	**0.168**
Nickel	**7440-02-0**	**0.887**		**0.630**
Phosphorus	7723-14-0	336	GC-BS, LJ, QX, U	983
Potassium	**7440-09-7**	**119**		**29.9**
Rubidium	**7440-17-7**	**0.222**		**0.0144**
Selenium	**7782-49-2**	**0.197**	LJ, QX	**0.00865**
Sodium	**7440-23-5**	**1750**	E, GC-BS, QM-4X	**1570**
Strontium	**7440-24-6**	**4.93**	QB-01	**0.513**
Thallium	**7440-28-0**	**0.00139**		**3.96E-4**
Thorium	**7440-29-01**	**0.0213**	QM-07	**0.00236**
Uranium	**7440-61-1**	**0.0168**		**0.0134**
Vanadium	**7440-62-2**	**2.42**		**0.0387**
Zinc	7440-66-6	35.3	U	76.8

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1777 Sentry Pkwy, Bldg 12
Blue Bell, PA 19422
ATTN: Ms. Chelsea Saber
PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 12/21/23 13:36
SUBMITTED: 12/18/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9533930 **Lab ID:** 3121831-07 **Sampled:** 12/12/23 23:59
Matrix: Air **Sample Volume:** 1969.662 m³ **Received:** 12/18/23 12:00
Filter ID: **Analysis Date:** 12/19/23 23:31
Comments: MFK-AM03-121223-HM

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	**7429-90-5**	**593**		**26.5**
Antimony	**7440-36-0**	**0.0915**	SL	**0.0364**
Arsenic	**7440-38-2**	**0.166**		**0.00789**
Barium	**7440-39-3**	**7.93**		**0.783**
Beryllium	**7440-41-7**	**0.0262**		**0.00274**
Cadmium	7440-43-9	0.0108	U	0.0900
Calcium	**7440-70-2**	**792**	QB-01	**241**
Chromium	**7440-47-3**	**2.12**		**1.68**
Cobalt	**7440-48-4**	**0.353**	QB-01	**0.0129**
Copper	**7440-50-8**	**37.4**		**2.48**
Iron	**7439-89-6**	**682**		**20.0**
Lead	**7439-92-1**	**0.576**		**0.228**
Magnesium	**7439-95-4**	**268**		**79.6**
Manganese	**7439-96-5**	**21.1**		**0.983**
Molybdenum	**7439-98-7**	**0.908**	QB-01	**0.176**
Nickel	**7440-02-0**	**0.881**		**0.662**
Phosphorus	7723-14-0	362	GC-BS, LJ, QX, U	1030
Potassium	**7440-09-7**	**120**		**31.4**
Rubidium	**7440-17-7**	**0.222**		**0.0151**
Selenium	**7782-49-2**	**0.179**	LJ, QX	**0.00909**
Sodium	**7440-23-5**	**1980**	E, GC-BS	**1650**
Strontium	**7440-24-6**	**5.37**	QB-01	**0.539**
Thallium	**7440-28-0**	**0.00138**		**4.15E-4**
Thorium	**7440-29-01**	**0.0179**		**0.00248**
Uranium	**7440-61-1**	**0.0154**		**0.0140**
Vanadium	**7440-62-2**	**2.10**		**0.0406**
Zinc	7440-66-6	35.4	U	80.7

CERTIFICATE OF ANALYSIS

Tetra Tech, Inc.
1777 Sentry Pkwy, Bldg 12
Blue Bell, PA 19422
ATTN: Ms. Chelsea Saber
PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 12/21/23 13:36
SUBMITTED: 12/18/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9533939 FB
Matrix: Air
Lab ID: 3121831-08
Sample Volume: 2065.514 m^3
Filter ID:
Sampled: 12/12/23 00:00
Received: 12/18/23 12:00
Analysis Date: 12/19/23 23:47
Comments: MFK-FB01-121223-HM Field Blank

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	7429-90-5	14.7	U	25.3
Antimony	7440-36-0	0.00728	SL, U	0.0347
Arsenic	7440-38-2	0.00532	U	0.00752
Barium	**7440-39-3**	**0.813**	FB-01	**0.747**
Beryllium	7440-41-7	0.00106	U	0.00262
Cadmium	7440-43-9	0.00293	U	0.0859
Calcium	**7440-70-2**	**279**	FB-01, QB-01	**230**
Chromium	7440-47-3	1.47	U	1.60
Cobalt	**7440-48-4**	**0.0239**	FB-01, QB-01	**0.0123**
Copper	7440-50-8	0.662	U	2.36
Iron	7439-89-6	16.8	U	19.1
Lead	7439-92-1	0.0590	U	0.217
Magnesium	7439-95-4	39.6	U	75.9
Manganese	7439-96-5	0.278	U	0.937
Molybdenum	**7439-98-7**	**0.231**	FB-01, QB-01	**0.168**
Nickel	7440-02-0	0.314	U	0.631
Phosphorus	7723-14-0	290	GC-BS, LJ, QX, U	985
Potassium	**7440-09-7**	**41.8**	FB-01	**29.9**
Rubidium	**7440-17-7**	**0.0161**	FB-01	**0.0144**
Selenium	7782-49-2	0.00478	LJ, QX, U	0.00866
Sodium	7440-23-5	675	GC-BS, U	1580
Strontium	**7440-24-6**	**0.549**	FB-01, QB-01	**0.514**
Thallium	7440-28-0	1.13E-4	U	3.96E-4
Thorium	7440-29-01	0.00210	U	0.00236
Uranium	7440-61-1	0.00160	U	0.0134
Vanadium	7440-62-2	0.0181	U	0.0388
Zinc	7440-66-6	19.5	U	77.0

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FILE #: 0000.00
REPORTED: 12/21/23 13:36
SUBMITTED: 12/18/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9533944 **Lab ID:** 3121831-09 **Sampled:** 12/13/23 23:59
Matrix: Air **Sample Volume:** 2065.514 m³ **Received:** 12/18/23 12:00
Filter ID: **Analysis Date:** 12/20/23 00:01
Comments: MFK-AM01-121323-HM

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	**7429-90-5**	**1390**	E	**25.3**
Antimony	**7440-36-0**	**0.0688**	SL	**0.0347**
Arsenic	**7440-38-2**	**0.318**		**0.00752**
Barium	**7440-39-3**	**10.3**		**0.747**
Beryllium	**7440-41-7**	**0.0448**	R-F	**0.00262**
Cadmium	7440-43-9	0.0169	U	0.0859
Calcium	**7440-70-2**	**808**	QB-01	**230**
Chromium	**7440-47-3**	**2.60**		**1.60**
Cobalt	**7440-48-4**	**0.636**	QB-01	**0.0123**
Copper	**7440-50-8**	**18.1**		**2.36**
Lead	**7439-92-1**	**0.625**		**0.217**
Magnesium	**7439-95-4**	**293**		**75.9**
Manganese	**7439-96-5**	**38.8**		**0.937**
Molybdenum	**7439-98-7**	**0.994**	QB-01	**0.168**
Nickel	**7440-02-0**	**1.22**		**0.631**
Phosphorus	7723-14-0	382	GC-BS, LJ, QX, U	985
Potassium	**7440-09-7**	**142**		**29.9**
Rubidium	**7440-17-7**	**0.315**		**0.0144**
Selenium	**7782-49-2**	**0.253**	LJ, QX	**0.00866**
Sodium	**7440-23-5**	**1910**	E, GC-BS	**1580**
Strontium	**7440-24-6**	**7.35**	QB-01	**0.514**
Thallium	**7440-28-0**	**0.00218**		**3.96E-4**
Thorium	**7440-29-01**	**0.0369**		**0.00236**
Uranium	**7440-61-1**	**0.0273**		**0.0134**
Vanadium	**7440-62-2**	**3.57**		**0.0388**
Zinc	7440-66-6	26.8	U	77.0

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Blue Bell, PA 19422
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PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 12/21/23 13:36
SUBMITTED: 12/18/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9533944
Lab ID: 3121831-09RE1
Sampled: 12/13/23 23:59
Matrix: Air
Sample Volume: 2065.514 m³
Received: 12/18/23 12:00
Filter ID:
Analysis Date: 12/21/23 00:16
Comments: MFK-AM01-121323-HM

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Iron	7439-89-6	1330	D	38.1

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FILE #: 0000.00
REPORTED: 12/21/23 13:36
SUBMITTED: 12/18/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9533943 **Lab ID:** 3121831-10 **Sampled:** 12/13/23 23:59
Matrix: Air **Sample Volume:** 2070.53 m³ **Received:** 12/18/23 12:00
Filter ID: **Analysis Date:** 12/20/23 00:32
Comments: MFK-AM02-121323-HM

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	**7429-90-5**	**832**	E	**25.2**
Antimony	**7440-36-0**	**0.0454**	SL	**0.0347**
Arsenic	**7440-38-2**	**0.254**		**0.00750**
Barium	**7440-39-3**	**7.08**		**0.745**
Beryllium	**7440-41-7**	**0.0268**		**0.00261**
Cadmium	7440-43-9	0.0258	U	0.0857
Calcium	**7440-70-2**	**659**	QB-01	**229**
Chromium	**7440-47-3**	**2.19**		**1.60**
Cobalt	**7440-48-4**	**0.421**	QB-01	**0.0123**
Copper	**7440-50-8**	**23.8**		**2.36**
Iron	**7439-89-6**	**896**		**19.0**
Lead	**7439-92-1**	**0.519**		**0.217**
Magnesium	**7439-95-4**	**279**		**75.8**
Manganese	**7439-96-5**	**23.5**		**0.935**
Molybdenum	**7439-98-7**	**1.21**	QB-01	**0.167**
Nickel	**7440-02-0**	**0.920**		**0.629**
Phosphorus	7723-14-0	341	GC-BS, LJ, QX, U	982
Potassium	**7440-09-7**	**139**		**29.9**
Rubidium	**7440-17-7**	**0.269**		**0.0144**
Selenium	**7782-49-2**	**0.194**	LJ, QX	**0.00864**
Sodium	**7440-23-5**	**1990**	E, GC-BS	**1570**
Strontium	**7440-24-6**	**5.46**	QB-01	**0.512**
Thallium	**7440-28-0**	**0.00132**		**3.95E-4**
Thorium	**7440-29-01**	**0.0259**		**0.00236**
Uranium	**7440-61-1**	**0.0177**		**0.0134**
Vanadium	**7440-62-2**	**2.52**		**0.0387**
Zinc	7440-66-6	20.4	U	76.8

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FILE #: 0000.00
REPORTED: 12/21/23 13:36
SUBMITTED: 12/18/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9533941 **Lab ID:** 3121831-11 **Sampled:** 12/13/23 23:59
Matrix: Air **Sample Volume:** 1791.68 m^3 **Received:** 12/18/23 12:00
Filter ID: **Analysis Date:** 12/20/23 01:20
Comments: MFK-AM03-121323-HM

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	**7429-90-5**	**811**	E	**29.1**
Antimony	**7440-36-0**	**0.0871**	SL	**0.0400**
Arsenic	**7440-38-2**	**0.163**		**0.00867**
Barium	**7440-39-3**	**10.3**		**0.861**
Beryllium	**7440-41-7**	**0.0340**		**0.00301**
Cadmium	7440-43-9	0.0133	U	0.0990
Calcium	**7440-70-2**	**714**	QB-01	**265**
Chromium	**7440-47-3**	**2.62**		**1.84**
Cobalt	**7440-48-4**	**0.472**	QB-01	**0.0142**
Copper	**7440-50-8**	**41.8**		**2.72**
Iron	**7439-89-6**	**978**		**22.0**
Lead	**7439-92-1**	**0.464**		**0.251**
Magnesium	**7439-95-4**	**302**		**87.5**
Manganese	**7439-96-5**	**30.1**		**1.08**
Molybdenum	**7439-98-7**	**1.14**	QB-01	**0.193**
Nickel	**7440-02-0**	**1.02**		**0.727**
Phosphorus	7723-14-0	391	QX, GC-BS, LJ, U	1140
Potassium	**7440-09-7**	**152**		**34.5**
Rubidium	**7440-17-7**	**0.286**		**0.0166**
Selenium	**7782-49-2**	**0.208**	LJ, QX	**0.00999**
Sodium	**7440-23-5**	**2150**	E, GC-BS	**1820**
Strontium	**7440-24-6**	**6.11**	QB-01	**0.592**
Thallium	**7440-28-0**	**0.00180**		**4.57E-4**
Thorium	**7440-29-01**	**0.0350**		**0.00272**
Uranium	**7440-61-1**	**0.0213**		**0.0154**
Vanadium	**7440-62-2**	**2.55**		**0.0447**
Zinc	7440-66-6	26.9	U	88.7

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Blue Bell, PA 19422
ATTN: Ms. Chelsea Saber
PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 12/21/23 13:36
SUBMITTED: 12/18/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9533936 FB **Lab ID:** 3121831-12 **Sampled:** 12/13/23 00:00
Matrix: Air **Sample Volume:** 2065.514 m³ **Received:** 12/18/23 12:00
Filter ID: **Analysis Date:** 12/20/23 01:38
Comments: MFK-FB01-121323-HM Field Blank

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	7429-90-5	14.2	U	25.3
Antimony	7440-36-0	0.00651	SL, U	0.0347
Arsenic	7440-38-2	0.00618	U	0.00752
Barium	7440-39-3	0.631	U	0.747
Beryllium	7440-41-7	9.55E-4	U	0.00262
Cadmium	7440-43-9	0.00268	U	0.0859
Calcium	**7440-70-2**	**269**	FB-01, QB-01	**230**
Chromium	7440-47-3	1.44	U	1.60
Cobalt	**7440-48-4**	**0.0277**	FB-01, QB-01	**0.0123**
Copper	7440-50-8	1.76	U	2.36
Iron	7439-89-6	16.5	U	19.1
Lead	7439-92-1	0.0979	U	0.217
Magnesium	7439-95-4	39.5	U	75.9
Manganese	7439-96-5	0.260	U	0.937
Molybdenum	**7439-98-7**	**0.249**	FB-01, QB-01	**0.168**
Nickel	7440-02-0	0.269	U	0.631
Phosphorus	7723-14-0	292	GC-BS, LJ, QX, U	985
Potassium	**7440-09-7**	**36.8**	FB-01	**29.9**
Rubidium	7440-17-7	0.0140	U	0.0144
Selenium	7782-49-2	0.00248	LJ, QX, U	0.00866
Sodium	7440-23-5	651	GC-BS, U	1580
Strontium	**7440-24-6**	**0.563**	FB-01, QB-01	**0.514**
Thallium	7440-28-0	7.40E-5	U	3.96E-4
Thorium	7440-29-01	0.00212	U	0.00236
Uranium	7440-61-1	0.00161	U	0.0134
Vanadium	7440-62-2	0.0103	U	0.0388
Zinc	7440-66-6	14.4	U	77.0

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Blue Bell, PA 19422
ATTN: Ms. Chelsea Saber
PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 12/21/23 13:36
SUBMITTED: 12/18/23
AQS SITE CODE:
SITE CODE: Maui fires

Inorganics by Compendium Method IO-3.5 - Quality Control

Batch 2312060 - B3L1903

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Calibration Blank (2312060-CCB1)				Prepared & Analyzed: 12/19/23						
Aluminum	41.9		ng/l							
Antimony	1.56		ng/l							
Arsenic	5.70		ng/l							
Barium	3.15		ng/l							
Beryllium	0.236		ng/l							
Cadmium	0.292		ng/l							
Calcium	628		ng/l							
Chromium	5.59		ng/l							
Cobalt	0.468		ng/l							
Copper	41.3		ng/l							
Iron	149		ng/l							
Lead	11.3		ng/l							
Magnesium	68.9		ng/l							
Manganese	7.99		ng/l							
Molybdenum	21.6		ng/l							
Nickel	-3.11		ng/l							U
Phosphorus	556		ng/l							LJ, QX
Potassium	579		ng/l							
Rubidium	-0.331		ng/l							U
Selenium	-4.19		ng/l							LJ, QX, U
Sodium	84.5		ng/l							
Strontium	0.0166		ng/l							
Thallium	0.459		ng/l							
Thorium	0.354		ng/l							
Uranium	-0.00917		ng/l							U
Vanadium	-70.5		ng/l							U
Zinc	-10.6		ng/l							U
Calibration Blank (2312060-CCB2)				Prepared & Analyzed: 12/19/23						
Aluminum	8.82		ng/l							
Antimony	0.743		ng/l							
Arsenic	8.28		ng/l							
Barium	2.83		ng/l							
Beryllium	0.0551		ng/l							
Cadmium	0.396		ng/l							
Calcium	228		ng/l							
Chromium	5.08		ng/l							
Cobalt	0.647		ng/l							
Copper	38.4		ng/l							

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FILE #: 0000.00
REPORTED: 12/21/23 13:36
SUBMITTED: 12/18/23
AQS SITE CODE:
SITE CODE: Maui fires

Inorganics by Compendium Method IO-3.5 - Quality Control

Batch 2312060 - B3L1903

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Calibration Blank (2312060-CCB2) Contin				Prepared & Analyzed: 12/19/23						
Iron	104		ng/l							
Lead	8.82		ng/l							
Magnesium	50.5		ng/l							
Manganese	6.55		ng/l							
Molybdenum	7.15		ng/l							
Nickel	-7.16		ng/l							U
Phosphorus	46.4		ng/l							LJ, QX
Potassium	1010		ng/l							
Rubidium	0.614		ng/l							
Selenium	8.87		ng/l							LJ, QX
Sodium	168		ng/l							
Strontium	-0.374		ng/l							U
Thallium	0.446		ng/l							
Thorium	0.619		ng/l							
Uranium	-0.0147		ng/l							U
Vanadium	-80.3		ng/l							U
Zinc	-19.9		ng/l							U
Calibration Blank (2312060-CCB3)				Prepared: 12/19/23 Analyzed: 12/20/23						
Aluminum	70.7		ng/l							
Antimony	0.629		ng/l							
Arsenic	7.63		ng/l							
Barium	2.65		ng/l							
Beryllium	0.0865		ng/l							
Cadmium	0.428		ng/l							
Calcium	502		ng/l							
Chromium	4.16		ng/l							
Cobalt	0.379		ng/l							
Copper	28.8		ng/l							
Iron	208		ng/l							
Lead	8.29		ng/l							
Magnesium	47.3		ng/l							
Manganese	6.04		ng/l							
Molybdenum	7.64		ng/l							
Nickel	-0.814		ng/l							U
Phosphorus	241		ng/l							LJ, QX
Potassium	1570		ng/l							
Rubidium	-0.0825		ng/l							U
Selenium	-4.95		ng/l							LJ, QX, U

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FILE #: 0000.00
REPORTED: 12/21/23 13:36
SUBMITTED: 12/18/23
AQS SITE CODE:
SITE CODE: Maui fires

Inorganics by Compendium Method IO-3.5 - Quality Control

Batch 2312060 - B3L1903

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Calibration Blank (2312060-CCB3) Contin				Prepared: 12/19/23 Analyzed: 12/20/23						
Sodium	524		ng/l							
Strontium	-0.403		ng/l							U
Thallium	0.345		ng/l							
Thorium	0.410		ng/l							
Uranium	0.0103		ng/l							
Vanadium	-76.4		ng/l							U
Zinc	6.16		ng/l							
Calibration Blank (2312060-CCB4)				Prepared: 12/19/23 Analyzed: 12/20/23						
Aluminum	23.5		ng/l							
Antimony	1.24		ng/l							
Arsenic	5.78		ng/l							
Barium	3.58		ng/l							
Beryllium	0.222		ng/l							
Cadmium	0.561		ng/l							
Calcium	1170		ng/l							
Chromium	5.06		ng/l							
Cobalt	0.711		ng/l							
Copper	33.3		ng/l							
Iron	157		ng/l							
Lead	7.96		ng/l							
Magnesium	37.5		ng/l							
Manganese	6.86		ng/l							
Molybdenum	7.18		ng/l							
Nickel	-1.39		ng/l							U
Phosphorus	58.9		ng/l							LJ, QX
Potassium	1830		ng/l							
Rubidium	0.0329		ng/l							
Selenium	-1.43		ng/l							LJ, QX, U
Sodium	345		ng/l							
Strontium	0.234		ng/l							
Thallium	0.419		ng/l							
Thorium	0.187		ng/l							
Uranium	-0.0332		ng/l							U
Vanadium	-82.0		ng/l							U
Zinc	-14.0		ng/l							U
Calibration Check (2312060-CCV1)				Prepared & Analyzed: 12/19/23						
Aluminum	1.61E6		ng/l	1.5000E6		107	90-110			
Antimony	20300		ng/l	20000		101	90-110			

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CERTIFICATE OF ANALYSIS

Tetra Tech, Inc.
1777 Sentry Pkwy, Bldg 12
Blue Bell, PA 19422
ATTN: Ms. Chelsea Saber
PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 12/21/23 13:36
SUBMITTED: 12/18/23
AQS SITE CODE:
SITE CODE: Maui fires

Inorganics by Compendium Method IO-3.5 - Quality Control

Batch 2312060 - B3L1903

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Calibration Check (2312060-CCV1) Contir				Prepared & Analyzed: 12/19/23						
Arsenic	20100		ng/l	20000		100	90-110			
Barium	201000		ng/l	200000		101	90-110			
Beryllium	5180		ng/l	5000.0		104	90-110			
Cadmium	20400		ng/l	20000		102	90-110			
Calcium	2.58E7		ng/l	2.5000E7		103	90-110			
Chromium	240000		ng/l	240000		99.8	90-110			
Cobalt	51900		ng/l	50000		104	90-110			
Copper	2.07E6		ng/l	2.0000E6		104	90-110			
Iron	2.60E6		ng/l	2.5000E6		104	90-110			
Lead	202000		ng/l	200000		101	90-110			
Magnesium	1.08E6		ng/l	1.0000E6		108	90-110			
Manganese	519000		ng/l	500000		104	90-110			
Molybdenum	50100		ng/l	50000		100	90-110			
Nickel	125000		ng/l	120000		104	90-110			
Phosphorus	213000		ng/l	200000		107	90-110			LJ, QX
Potassium	2.64E6		ng/l	2.5000E6		105	90-110			
Rubidium	9980		ng/l	10000		99.8	90-110			
Selenium	20100		ng/l	20000		101	90-110			LJ, QX
Sodium	2.69E6		ng/l	2.5000E6		108	90-110			
Strontium	49800		ng/l	50000		99.6	90-110			
Thallium	504		ng/l	500.00		101	90-110			
Thorium	496		ng/l	500.00		99.2	90-110			
Uranium	500		ng/l	500.00		100	90-110			
Vanadium	19900		ng/l	20000		99.5	90-110			
Zinc	535000		ng/l	500000		107	90-110			
Calibration Check (2312060-CCV2)				Prepared & Analyzed: 12/19/23						
Aluminum	1.51E6		ng/l	1.5000E6		101	90-110			
Antimony	19600		ng/l	20000		98.1	90-110			
Arsenic	19700		ng/l	20000		98.6	90-110			
Barium	195000		ng/l	200000		97.7	90-110			
Beryllium	5060		ng/l	5000.0		101	90-110			
Cadmium	19900		ng/l	20000		99.3	90-110			
Calcium	2.45E7		ng/l	2.5000E7		97.9	90-110			
Chromium	236000		ng/l	240000		98.2	90-110			
Cobalt	50100		ng/l	50000		100	90-110			
Copper	2.01E6		ng/l	2.0000E6		100	90-110			
Iron	2.52E6		ng/l	2.5000E6		101	90-110			
Lead	197000		ng/l	200000		98.3	90-110			

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Inorganics by Compendium Method IO-3.5 - Quality Control

Batch 2312060 - B3L1903

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Calibration Check (2312060-CCV2) Contir				Prepared & Analyzed: 12/19/23						
Magnesium	1.03E6		ng/l	1.0000E6		103	90-110			
Manganese	507000		ng/l	500000		101	90-110			
Molybdenum	48600		ng/l	50000		97.1	90-110			
Nickel	120000		ng/l	120000		100	90-110			
Phosphorus	204000		ng/l	200000		102	90-110			LJ, QX
Potassium	2.52E6		ng/l	2.5000E6		101	90-110			
Rubidium	9800		ng/l	10000		98.0	90-110			
Selenium	19800		ng/l	20000		99.2	90-110			LJ, QX
Sodium	2.59E6		ng/l	2.5000E6		104	90-110			
Strontium	48500		ng/l	50000		97.0	90-110			
Thallium	488		ng/l	500.00		97.6	90-110			
Thorium	477		ng/l	500.00		95.4	90-110			
Uranium	478		ng/l	500.00		95.6	90-110			
Vanadium	19500		ng/l	20000		97.3	90-110			
Zinc	520000		ng/l	500000		104	90-110			
Calibration Check (2312060-CCV3)				Prepared: 12/19/23 Analyzed: 12/20/23						
Aluminum	1.57E6		ng/l	1.5000E6		105	90-110			
Antimony	20200		ng/l	20000		101	90-110			
Arsenic	20200		ng/l	20000		101	90-110			
Barium	199000		ng/l	200000		99.4	90-110			
Beryllium	4720		ng/l	5000.0		94.4	90-110			
Cadmium	20500		ng/l	20000		102	90-110			
Calcium	2.54E7		ng/l	2.5000E7		102	90-110			
Chromium	243000		ng/l	240000		101	90-110			
Cobalt	51400		ng/l	50000		103	90-110			
Copper	2.07E6		ng/l	2.0000E6		104	90-110			
Iron	2.59E6		ng/l	2.5000E6		104	90-110			
Lead	201000		ng/l	200000		101	90-110			
Magnesium	1.07E6		ng/l	1.0000E6		107	90-110			
Manganese	520000		ng/l	500000		104	90-110			
Molybdenum	50600		ng/l	50000		101	90-110			
Nickel	124000		ng/l	120000		103	90-110			
Phosphorus	209000		ng/l	200000		105	90-110			LJ, QX
Potassium	2.61E6		ng/l	2.5000E6		104	90-110			
Rubidium	10000		ng/l	10000		100	90-110			
Selenium	20100		ng/l	20000		101	90-110			LJ, QX
Sodium	2.69E6		ng/l	2.5000E6		108	90-110			
Strontium	49900		ng/l	50000		99.7	90-110			

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Inorganics by Compendium Method IO-3.5 - Quality Control

Batch 2312060 - B3L1903

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Calibration Check (2312060-CCV3) Contin				Prepared: 12/19/23 Analyzed: 12/20/23						
Thallium	490		ng/l	500.00		98.0	90-110			
Thorium	488		ng/l	500.00		97.6	90-110			
Uranium	486		ng/l	500.00		97.1	90-110			
Vanadium	20000		ng/l	20000		99.8	90-110			
Zinc	533000		ng/l	500000		107	90-110			
Calibration Check (2312060-CCV4)				Prepared: 12/19/23 Analyzed: 12/20/23						
Aluminum	1.55E6		ng/l	1.5000E6		103	90-110			
Antimony	20100		ng/l	20000		101	90-110			
Arsenic	20000		ng/l	20000		100	90-110			
Barium	197000		ng/l	200000		98.7	90-110			
Beryllium	5010		ng/l	5000.0		100	90-110			
Cadmium	20300		ng/l	20000		102	90-110			
Calcium	2.52E7		ng/l	2.5000E7		101	90-110			
Chromium	240000		ng/l	240000		99.8	90-110			
Cobalt	50600		ng/l	50000		101	90-110			
Copper	2.04E6		ng/l	2.0000E6		102	90-110			
Iron	2.55E6		ng/l	2.5000E6		102	90-110			
Lead	199000		ng/l	200000		99.7	90-110			
Magnesium	1.04E6		ng/l	1.0000E6		104	90-110			
Manganese	514000		ng/l	500000		103	90-110			
Molybdenum	49800		ng/l	50000		99.6	90-110			
Nickel	122000		ng/l	120000		102	90-110			
Phosphorus	201000		ng/l	200000		101	90-110			LJ, QX
Potassium	2.60E6		ng/l	2.5000E6		104	90-110			
Rubidium	9980		ng/l	10000		99.8	90-110			
Selenium	20100		ng/l	20000		101	90-110			LJ, QX
Sodium	2.62E6		ng/l	2.5000E6		105	90-110			
Strontium	49700		ng/l	50000		99.3	90-110			
Thallium	497		ng/l	500.00		99.4	90-110			
Thorium	483		ng/l	500.00		96.7	90-110			
Uranium	487		ng/l	500.00		97.4	90-110			
Vanadium	19800		ng/l	20000		99.0	90-110			
Zinc	528000		ng/l	500000		106	90-110			
High Cal Check (2312060-HCV1)				Prepared & Analyzed: 12/19/23						
Aluminum	3.00E6		ng/l	3.0000E6		99.9	95-105			
Antimony	40300		ng/l	40000		101	95-105			
Arsenic	40200		ng/l	40000		101	95-105			
Barium	405000		ng/l	400000		101	95-105			

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Inorganics by Compendium Method IO-3.5 - Quality Control

Batch 2312060 - B3L1903

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
High Cal Check (2312060-HCV1) Continue				Prepared & Analyzed: 12/19/23						
Beryllium	10100		ng/l	10000		101	95-105			
Cadmium	40000		ng/l	40000		100	95-105			
Calcium	5.01E7		ng/l	5.0000E7		100	95-105			
Chromium	478000		ng/l	480000		99.7	95-105			
Cobalt	100000		ng/l	100000		100	95-105			
Copper	3.95E6		ng/l	4.0000E6		98.8	95-105			
Iron	5.02E6		ng/l	5.0000E6		100	95-105			
Lead	403000		ng/l	400000		101	95-105			
Magnesium	1.98E6		ng/l	2.0000E6		98.9	95-105			
Manganese	998000		ng/l	1.0000E6		99.8	95-105			
Molybdenum	100000		ng/l	100000		100	95-105			
Nickel	239000		ng/l	240000		99.6	95-105			
Phosphorus	404000		ng/l	400000		101	95-105			LJ, QX
Potassium	4.99E6		ng/l	5.0000E6		99.8	95-105			
Rubidium	20100		ng/l	20000		101	95-105			
Selenium	40400		ng/l	40000		101	95-105			LJ, QX
Sodium	4.96E6		ng/l	5.0000E6		99.2	95-105			
Strontium	101000		ng/l	100000		101	95-105			
Thallium	1010		ng/l	1000.0		101	95-105			
Thorium	1010		ng/l	1000.0		101	95-105			
Uranium	1010		ng/l	1000.0		101	95-105			
Vanadium	40200		ng/l	40000		101	95-105			
Zinc	985000		ng/l	1.0000E6		98.5	95-105			
Initial Cal Blank (2312060-ICB1)				Prepared & Analyzed: 12/19/23						
Aluminum	-20.4		ng/l							U
Antimony	1.24		ng/l							
Arsenic	1.64		ng/l							
Barium	2.18		ng/l							
Beryllium	0.178		ng/l							
Cadmium	0.347		ng/l							
Calcium	47.8		ng/l							
Chromium	5.14		ng/l							
Cobalt	0.579		ng/l							
Copper	57.7		ng/l							
Iron	81.0		ng/l							
Lead	18.7		ng/l							
Magnesium	13.3		ng/l							
Manganese	10.1		ng/l							

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Inorganics by Compendium Method IO-3.5 - Quality Control

Batch 2312060 - B3L1903

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Initial Cal Blank (2312060-ICB1) Continu				Prepared & Analyzed: 12/19/23						
Molybdenum	11.4		ng/l							
Nickel	-3.89		ng/l							U
Phosphorus	-179		ng/l							LJ, QX, U
Potassium	789		ng/l							
Rubidium	0.0415		ng/l							
Selenium	-4.31		ng/l							LJ, QX, U
Sodium	-174		ng/l							U
Strontium	-0.619		ng/l							U
Thallium	0.459		ng/l							
Thorium	0.532		ng/l							
Uranium	-0.0217		ng/l							U
Vanadium	-78.9		ng/l							U
Zinc	14.9		ng/l							
Initial Cal Check (2312060-ICV1)				Prepared & Analyzed: 12/19/23						
Aluminum	1.43E6		ng/l	1.5000E6		95.6	90-110			
Antimony	19300		ng/l	20000		96.7	90-110			
Arsenic	19700		ng/l	20000		98.6	90-110			
Barium	197000		ng/l	200000		98.4	90-110			
Beryllium	4840		ng/l	5000.0		96.8	90-110			
Cadmium	20100		ng/l	20000		101	90-110			
Calcium	2.42E7		ng/l	2.5000E7		96.9	90-110			
Chromium	233000		ng/l	240000		97.1	90-110			
Cobalt	49500		ng/l	50000		99.1	90-110			
Copper	1.99E6		ng/l	2.0000E6		99.7	90-110			
Iron	2.48E6		ng/l	2.5000E6		99.0	90-110			
Lead	195000		ng/l	200000		97.7	90-110			
Magnesium	972000		ng/l	1.0000E6		97.2	90-110			
Manganese	489000		ng/l	500000		97.8	90-110			
Molybdenum	48800		ng/l	50000		97.6	90-110			
Nickel	118000		ng/l	120000		98.3	90-110			
Phosphorus	200000		ng/l	200000		99.9	90-110			LJ, QX
Potassium	2.51E6		ng/l	2.5000E6		101	90-110			
Rubidium	9700		ng/l	10000		97.0	90-110			
Selenium	20500		ng/l	20000		103	90-110			LJ, QX
Sodium	2.44E6		ng/l	2.5000E6		97.7	90-110			
Strontium	49400		ng/l	50000		98.8	90-110			
Thallium	485		ng/l	500.00		97.0	90-110			
Thorium	476		ng/l	500.00		95.3	90-110			

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Inorganics by Compendium Method IO-3.5 - Quality Control

Batch 2312060 - B3L1903

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Initial Cal Check (2312060-ICV1) Continu				Prepared & Analyzed: 12/19/23						
Uranium	483		ng/l	500.00		96.6	90-110			
Vanadium	20000		ng/l	20000		99.8	90-110			
Zinc	522000		ng/l	500000		104	90-110			
Interference Check A (2312060-IFA1)				Prepared & Analyzed: 12/19/23						
Aluminum	1.52E7		ng/l	1.5000E7		101	80-120			
Antimony	0.00		ng/l				80-120			U
Arsenic	0.00		ng/l				80-120			U
Barium	0.00		ng/l				80-120			U
Beryllium	0.00		ng/l				80-120			U
Cadmium	0.00		ng/l				80-120			U
Calcium	9.41E7		ng/l	1.0040E8		93.7	80-120			
Chromium	0.00		ng/l				80-120			U
Cobalt	0.00		ng/l				80-120			U
Copper	0.00		ng/l				80-120			U
Iron	1.50E7		ng/l	1.5000E7		99.9	80-120			
Lead	0.00		ng/l				80-120			U
Magnesium	1.57E7		ng/l	1.5000E7		105	80-120			
Manganese	0.00		ng/l				80-120			U
Molybdenum	298000		ng/l	300000		99.3	80-120			
Nickel	0.00		ng/l				80-120			U
Phosphorus	1.65E7		ng/l	1.5000E7		110	80-120			LJ, QX
Potassium	1.51E7		ng/l	1.5000E7		101	80-120			
Rubidium	0.00		ng/l				80-120			U
Selenium	0.00		ng/l				80-120			LJ, QX, U
Sodium	1.60E7		ng/l	1.5000E7		107	80-120			
Strontium	0.00		ng/l				80-120			U
Thallium	0.00		ng/l				80-120			U
Thorium	0.00		ng/l				80-120			U
Uranium	0.00		ng/l				80-120			U
Vanadium	0.00		ng/l				80-120			U
Zinc	0.00		ng/l				80-120			U
Interference Check B (2312060-IFB1)				Prepared & Analyzed: 12/19/23						
Aluminum	1.77E7		ng/l	1.6500E7		107	80-120			
Antimony	20500		ng/l	20000		102	80-120			
Arsenic	20500		ng/l	20000		103	80-120			
Barium	202000		ng/l	200000		101	80-120			
Beryllium	4910		ng/l	5000.0		98.1	80-120			
Cadmium	19700		ng/l	20000		98.6	80-120			

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Inorganics by Compendium Method IO-3.5 - Quality Control

Batch 2312060 - B3L1903

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Interference Check B (2312060-IFB1) Co				Prepared & Analyzed: 12/19/23						
Calcium	1.23E8		ng/l	1.2540E8		97.7	80-120			
Chromium	237000		ng/l	240000		98.7	80-120			
Cobalt	50900		ng/l	50000		102	80-120			
Copper	1.93E6		ng/l	2.0000E6		96.4	80-120			
Iron	1.81E7		ng/l	1.7500E7		104	80-120			
Lead	206000		ng/l	200000		103	80-120			
Magnesium	1.78E7		ng/l	1.6000E7		111	80-120			
Manganese	544000		ng/l	500000		109	80-120			
Molybdenum	346000		ng/l	350000		99.0	80-120			
Nickel	120000		ng/l	120000		99.7	80-120			
Phosphorus	1.79E7		ng/l	1.5200E7		118	80-120			LJ, QX
Potassium	1.85E7		ng/l	1.7500E7		106	80-120			
Rubidium	10200		ng/l	10000		102	80-120			
Selenium	19200		ng/l	20000		96.2	80-120			LJ, QX
Sodium	2.01E7		ng/l	1.7500E7		115	80-120			
Strontium	50500		ng/l	50000		101	80-120			
Thallium	519		ng/l	500.00		104	80-120			
Thorium	544		ng/l	500.00		109	80-120			
Uranium	548		ng/l	500.00		110	80-120			
Vanadium	19500		ng/l	20000		97.3	80-120			
Zinc	494000		ng/l	500000		98.9	80-120			
Serial Dilution (2312060-SRD1)		**Source: 3121831-06**		Prepared & Analyzed: 12/19/23						
Aluminum	772	126	ng/m³ Air		768			0.494	10	
Antimony	ND	0.173	ng/m³ Air		ND				10	SL, U
Arsenic	0.330	0.0376	ng/m³ Air		0.326			1.46	10	
Barium	7.06	3.73	ng/m³ Air		7.09			0.432	10	
Beryllium	0.0272	0.0131	ng/m³ Air		0.0257			5.86	10	
Cadmium	ND	0.429	ng/m³ Air		ND				10	U
Calcium	ND	1150	ng/m³ Air		ND				10	QB-01, U
Chromium	ND	7.98	ng/m³ Air		ND				10	U
Cobalt	0.368	0.0613	ng/m³ Air		0.361			1.80	10	QB-01
Copper	16.5	11.8	ng/m³ Air		16.1			2.87	10	
Iron	788	95.2	ng/m³ Air		777			1.40	10	
Lead	ND	1.09	ng/m³ Air		ND				10	U
Magnesium	ND	379	ng/m³ Air		ND				10	U
Manganese	20.0	4.68	ng/m³ Air		19.6			1.84	10	
Molybdenum	0.992	0.838	ng/m³ Air		0.987			0.415	10	QB-01
Nickel	ND	3.15	ng/m³ Air		ND				10	U

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FILE #: 0000.00
REPORTED: 12/21/23 13:36
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AQS SITE CODE:
SITE CODE: Maui fires

Inorganics by Compendium Method IO-3.5 - Quality Control

Batch 2312060 - B3L1903

Serial Dilution (2312060-SRD1) Continued Source: 3121831-06 Prepared & Analyzed: 12/19/23

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Phosphorus	ND	4920	ng/m³ Air		ND				10	GC-BS, LJ, QX U
Potassium	ND	149	ng/m³ Air		ND				10	U
Rubidium	0.223	0.0720	ng/m³ Air		0.222			0.354	10	
Selenium	0.193	0.0433	ng/m³ Air		0.197			2.00	10	LJ, QX
Sodium	ND	7860	ng/m³ Air		ND				10	GC-BS, U
Strontium	5.06	2.56	ng/m³ Air		4.93			2.74	10	QB-01
Thallium	ND	0.00198	ng/m³ Air		ND				10	U
Thorium	0.0207	0.0118	ng/m³ Air		0.0213			2.75	10	
Uranium	ND	0.0668	ng/m³ Air		ND				10	U
Vanadium	2.40	0.193	ng/m³ Air		2.42			1.15	10	
Zinc	ND	384	ng/m³ Air		ND				10	U

Batch 2312062 - B3L1903

Calibration Blank (2312062-CCB1) Prepared & Analyzed: 12/20/23

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Aluminum	-41.2		ng/l							U
Antimony	1.23		ng/l							
Arsenic	-2.22		ng/l							U
Barium	0.571		ng/l							
Beryllium	0.0232		ng/l							
Cadmium	0.565		ng/l							
Calcium	1040		ng/l							
Chromium	8.80		ng/l							
Cobalt	0.403		ng/l							
Copper	13.5		ng/l							
Iron	124		ng/l							
Lead	10.2		ng/l							
Magnesium	6.91		ng/l							
Manganese	7.23		ng/l							
Molybdenum	24.6		ng/l							
Nickel	-0.971		ng/l							U
Phosphorus	-101		ng/l							U
Potassium	-1750		ng/l							U
Rubidium	-0.246		ng/l							U
Selenium	-3.73		ng/l							U
Sodium	-167		ng/l							U
Strontium	1.32		ng/l							
Thallium	0.680		ng/l							
Thorium	0.375		ng/l							

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Inorganics by Compendium Method IO-3.5 - Quality Control

Batch 2312062 - B3L1903

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Calibration Blank (2312062-CCB1) Contin				Prepared & Analyzed: 12/20/23						
Uranium	0.0155		ng/l							
Vanadium	-50.8		ng/l							U
Zinc	-12.2		ng/l							U
Calibration Blank (2312062-CCB2)				Prepared & Analyzed: 12/20/23						
Aluminum	-53.2		ng/l							U
Antimony	1.10		ng/l							
Arsenic	-2.80		ng/l							U
Barium	1.87		ng/l							
Beryllium	-0.0766		ng/l							U
Cadmium	0.387		ng/l							
Calcium	648		ng/l							
Chromium	3.35		ng/l							
Cobalt	0.551		ng/l							
Copper	10.0		ng/l							
Iron	-30.8		ng/l							U
Lead	8.05		ng/l							
Magnesium	-46.8		ng/l							U
Manganese	5.50		ng/l							
Molybdenum	9.41		ng/l							
Nickel	-1.04		ng/l							U
Phosphorus	-67.8		ng/l							U
Potassium	-1790		ng/l							U
Rubidium	0.0293		ng/l							
Selenium	2.64		ng/l							
Sodium	-238		ng/l							U
Strontium	1.39		ng/l							
Thallium	1.18		ng/l							
Thorium	0.353		ng/l							
Uranium	0.0209		ng/l							
Vanadium	-56.7		ng/l							U
Zinc	-9.96		ng/l							U
Calibration Blank (2312062-CCB3)				Prepared & Analyzed: 12/20/23						
Aluminum	-86.6		ng/l							U
Antimony	1.25		ng/l							
Arsenic	-3.85		ng/l							U
Barium	2.48		ng/l							
Beryllium	0.268		ng/l							
Cadmium	0.661		ng/l							

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Inorganics by Compendium Method IO-3.5 - Quality Control

Batch 2312062 - B3L1903

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Calibration Blank (2312062-CCB3) Contin				Prepared & Analyzed: 12/20/23						
Calcium	1910		ng/l							
Chromium	3.48		ng/l							
Cobalt	0.658		ng/l							
Copper	22.5		ng/l							
Iron	-29.5		ng/l							U
Lead	8.45		ng/l							
Magnesium	-32.3		ng/l							U
Manganese	6.14		ng/l							
Molybdenum	9.11		ng/l							
Nickel	0.280		ng/l							
Phosphorus	194		ng/l							
Potassium	-2010		ng/l							U
Rubidium	0.517		ng/l							
Selenium	-6.17		ng/l							U
Sodium	-104		ng/l							U
Strontium	1.33		ng/l							
Thallium	0.582		ng/l							
Thorium	0.377		ng/l							
Uranium	0.00318		ng/l							
Vanadium	-58.4		ng/l							U
Zinc	-31.9		ng/l							U
Calibration Blank (2312062-CCB4)				Prepared: 12/20/23 Analyzed: 12/21/23						
Aluminum	1.73		ng/l							
Antimony	1.71		ng/l							
Arsenic	-4.57		ng/l							U
Barium	2.60		ng/l							
Beryllium	0.103		ng/l							
Cadmium	0.589		ng/l							
Calcium	667		ng/l							
Chromium	3.52		ng/l							
Cobalt	0.872		ng/l							
Copper	20.2		ng/l							
Iron	-1.24		ng/l							U
Lead	10.2		ng/l							
Magnesium	-16.5		ng/l							U
Manganese	7.78		ng/l							
Molybdenum	11.6		ng/l							
Nickel	0.149		ng/l							

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Inorganics by Compendium Method IO-3.5 - Quality Control

Batch 2312062 - B3L1903

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Calibration Blank (2312062-CCB4) Contin				Prepared: 12/20/23 Analyzed: 12/21/23						
Phosphorus	51.0		ng/l							
Potassium	-2400		ng/l							U
Rubidium	-0.213		ng/l							U
Selenium	0.720		ng/l							
Sodium	-77.4		ng/l							U
Strontium	0.961		ng/l							
Thallium	0.680		ng/l							
Thorium	0.247		ng/l							
Uranium	0.0205		ng/l							
Vanadium	-60.5		ng/l							U
Zinc	-14.0		ng/l							U
Calibration Check (2312062-CCV1)				Prepared & Analyzed: 12/20/23						
Aluminum	1.49E6		ng/l	1.5000E6		99.4	90-110			
Antimony	19300		ng/l	20000		96.7	90-110			
Arsenic	19600		ng/l	20000		97.8	90-110			
Barium	194000		ng/l	200000		96.8	90-110			
Beryllium	5140		ng/l	5000.0		103	90-110			
Cadmium	19400		ng/l	20000		97.2	90-110			
Calcium	2.43E7		ng/l	2.5000E7		97.2	90-110			
Chromium	227000		ng/l	240000		94.7	90-110			
Cobalt	49100		ng/l	50000		98.3	90-110			
Copper	1.97E6		ng/l	2.0000E6		98.7	90-110			
Iron	2.45E6		ng/l	2.5000E6		98.2	90-110			
Lead	193000		ng/l	200000		96.7	90-110			
Magnesium	1.01E6		ng/l	1.0000E6		101	90-110			
Manganese	484000		ng/l	500000		96.8	90-110			
Molybdenum	48400		ng/l	50000		96.7	90-110			
Nickel	118000		ng/l	120000		98.4	90-110			
Phosphorus	195000		ng/l	200000		97.4	90-110			
Potassium	2.49E6		ng/l	2.5000E6		99.7	90-110			
Rubidium	9790		ng/l	10000		97.9	90-110			
Selenium	19700		ng/l	20000		98.5	90-110			
Sodium	2.50E6		ng/l	2.5000E6		99.9	90-110			
Strontium	48000		ng/l	50000		96.0	90-110			
Thallium	488		ng/l	500.00		97.6	90-110			
Thorium	478		ng/l	500.00		95.6	90-110			
Uranium	482		ng/l	500.00		96.5	90-110			
Vanadium	19100		ng/l	20000		95.6	90-110			

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Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes

Inorganics by Compendium Method IO-3.5 - Quality Control

Batch 2312062 - B3L1903

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Calibration Check (2312062-CCV1) Contin				Prepared & Analyzed: 12/20/23						
Zinc	512000		ng/l	500000		102	90-110			
Calibration Check (2312062-CCV2)				Prepared & Analyzed: 12/20/23						
Aluminum	1.48E6		ng/l	1.5000E6		98.8	90-110			
Antimony	19800		ng/l	20000		99.2	90-110			
Arsenic	20000		ng/l	20000		99.9	90-110			
Barium	198000		ng/l	200000		98.9	90-110			
Beryllium	5370		ng/l	5000.0		107	90-110			
Cadmium	20100		ng/l	20000		101	90-110			
Calcium	2.44E7		ng/l	2.5000E7		97.7	90-110			
Chromium	236000		ng/l	240000		98.2	90-110			
Cobalt	49600		ng/l	50000		99.2	90-110			
Copper	2.03E6		ng/l	2.0000E6		102	90-110			
Iron	2.47E6		ng/l	2.5000E6		98.9	90-110			
Lead	197000		ng/l	200000		98.3	90-110			
Magnesium	1.02E6		ng/l	1.0000E6		102	90-110			
Manganese	492000		ng/l	500000		98.4	90-110			
Molybdenum	49700		ng/l	50000		99.3	90-110			
Nickel	120000		ng/l	120000		99.9	90-110			
Phosphorus	196000		ng/l	200000		97.9	90-110			
Potassium	2.50E6		ng/l	2.5000E6		100	90-110			
Rubidium	9880		ng/l	10000		98.8	90-110			
Selenium	20100		ng/l	20000		100	90-110			
Sodium	2.53E6		ng/l	2.5000E6		101	90-110			
Strontium	49000		ng/l	50000		98.0	90-110			
Thallium	491		ng/l	500.00		98.1	90-110			
Thorium	480		ng/l	500.00		96.1	90-110			
Uranium	484		ng/l	500.00		96.8	90-110			
Vanadium	19600		ng/l	20000		98.1	90-110			
Zinc	527000		ng/l	500000		105	90-110			
Calibration Check (2312062-CCV3)				Prepared & Analyzed: 12/20/23						
Aluminum	1.53E6		ng/l	1.5000E6		102	90-110			
Antimony	20200		ng/l	20000		101	90-110			
Arsenic	20200		ng/l	20000		101	90-110			
Barium	198000		ng/l	200000		99.2	90-110			
Beryllium	5220		ng/l	5000.0		104	90-110			
Cadmium	20600		ng/l	20000		103	90-110			
Calcium	2.51E7		ng/l	2.5000E7		100	90-110			
Chromium	245000		ng/l	240000		102	90-110			

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Inorganics by Compendium Method IO-3.5 - Quality Control

Batch 2312062 - B3L1903

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Calibration Check (2312062-CCV3) Contin				Prepared & Analyzed: 12/20/23						
Cobalt	50800		ng/l	50000		102	90-110			
Copper	2.11E6		ng/l	2.0000E6		106	90-110			
Iron	2.55E6		ng/l	2.5000E6		102	90-110			
Lead	200000		ng/l	200000		100	90-110			
Magnesium	1.05E6		ng/l	1.0000E6		105	90-110			
Manganese	516000		ng/l	500000		103	90-110			
Molybdenum	51300		ng/l	50000		103	90-110			
Nickel	123000		ng/l	120000		103	90-110			
Phosphorus	201000		ng/l	200000		100	90-110			
Potassium	2.57E6		ng/l	2.5000E6		103	90-110			
Rubidium	10000		ng/l	10000		100	90-110			
Selenium	20200		ng/l	20000		101	90-110			
Sodium	2.68E6		ng/l	2.5000E6		107	90-110			
Strontium	49400		ng/l	50000		98.8	90-110			
Thallium	482		ng/l	500.00		96.4	90-110			
Thorium	479		ng/l	500.00		95.8	90-110			
Uranium	486		ng/l	500.00		97.3	90-110			
Vanadium	20000		ng/l	20000		99.9	90-110			
Zinc	538000		ng/l	500000		108	90-110			
Calibration Check (2312062-CCV4)				Prepared: 12/20/23 Analyzed: 12/21/23						
Aluminum	1.53E6		ng/l	1.5000E6		102	90-110			
Antimony	20700		ng/l	20000		103	90-110			
Arsenic	20400		ng/l	20000		102	90-110			
Barium	203000		ng/l	200000		101	90-110			
Beryllium	4860		ng/l	5000.0		97.2	90-110			
Cadmium	21000		ng/l	20000		105	90-110			
Calcium	2.53E7		ng/l	2.5000E7		101	90-110			
Chromium	248000		ng/l	240000		103	90-110			
Cobalt	51100		ng/l	50000		102	90-110			
Copper	2.10E6		ng/l	2.0000E6		105	90-110			
Iron	2.55E6		ng/l	2.5000E6		102	90-110			
Lead	205000		ng/l	200000		102	90-110			
Magnesium	1.04E6		ng/l	1.0000E6		104	90-110			
Manganese	510000		ng/l	500000		102	90-110			
Molybdenum	52400		ng/l	50000		105	90-110			
Nickel	124000		ng/l	120000		103	90-110			
Phosphorus	204000		ng/l	200000		102	90-110			
Potassium	2.55E6		ng/l	2.5000E6		102	90-110			

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Inorganics by Compendium Method IO-3.5 - Quality Control

Batch 2312062 - B3L1903

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Calibration Check (2312062-CCV4) Contin				Prepared: 12/20/23 Analyzed: 12/21/23						
Rubidium	10200		ng/l	10000		102	90-110			
Selenium	20800		ng/l	20000		104	90-110			
Sodium	2.62E6		ng/l	2.5000E6		105	90-110			
Strontium	51000		ng/l	50000		102	90-110			
Thallium	506		ng/l	500.00		101	90-110			
Thorium	502		ng/l	500.00		100	90-110			
Uranium	505		ng/l	500.00		101	90-110			
Vanadium	20400		ng/l	20000		102	90-110			
Zinc	545000		ng/l	500000		109	90-110			
High Cal Check (2312062-HCV1)				Prepared & Analyzed: 12/20/23						
Aluminum	2.91E6		ng/l	3.0000E6		97.2	95-105			
Antimony	39700		ng/l	40000		99.3	95-105			
Arsenic	39700		ng/l	40000		99.3	95-105			
Barium	401000		ng/l	400000		100	95-105			
Beryllium	10200		ng/l	10000		102	95-105			
Cadmium	39300		ng/l	40000		98.3	95-105			
Calcium	4.89E7		ng/l	5.0000E7		97.8	95-105			
Chromium	463000		ng/l	480000		96.5	95-105			
Cobalt	97500		ng/l	100000		97.5	95-105			
Copper	3.85E6		ng/l	4.0000E6		96.2	95-105			
Iron	4.86E6		ng/l	5.0000E6		97.1	95-105			
Lead	396000		ng/l	400000		98.9	95-105			
Magnesium	1.92E6		ng/l	2.0000E6		96.2	95-105			
Manganese	958000		ng/l	1.0000E6		95.8	95-105			
Molybdenum	99300		ng/l	100000		99.3	95-105			
Nickel	233000		ng/l	240000		97.0	95-105			
Phosphorus	384000		ng/l	400000		96.0	95-105			
Potassium	4.88E6		ng/l	5.0000E6		97.6	95-105			
Rubidium	20000		ng/l	20000		100	95-105			
Selenium	40400		ng/l	40000		101	95-105			
Sodium	4.76E6		ng/l	5.0000E6		95.3	95-105			
Strontium	99100		ng/l	100000		99.1	95-105			
Thallium	1000		ng/l	1000.0		100	95-105			
Thorium	1010		ng/l	1000.0		101	95-105			
Uranium	1010		ng/l	1000.0		101	95-105			
Vanadium	39500		ng/l	40000		98.7	95-105			
Zinc	964000		ng/l	1.0000E6		96.4	95-105			
Initial Cal Blank (2312062-ICB1)				Prepared & Analyzed: 12/20/23						

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ATTN: Ms. Chelsea Saber
PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 12/21/23 13:36
SUBMITTED: 12/18/23
AQS SITE CODE:
SITE CODE: Maui fires

Inorganics by Compendium Method IO-3.5 - Quality Control

Batch 2312062 - B3L1903

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Initial Cal Blank (2312062-ICB1) Continu				Prepared & Analyzed: 12/20/23						
Aluminum	-70.8		ng/l							U
Antimony	0.816		ng/l							
Arsenic	-4.35		ng/l							U
Barium	2.03		ng/l							
Beryllium	0.0294		ng/l							
Cadmium	0.350		ng/l							
Calcium	1620		ng/l							
Chromium	5.43		ng/l							
Cobalt	0.688		ng/l							
Copper	35.5		ng/l							
Iron	-57.2		ng/l							U
Lead	14.0		ng/l							
Magnesium	-9.61		ng/l							U
Manganese	10.9		ng/l							
Molybdenum	13.0		ng/l							
Nickel	-0.0216		ng/l							U
Phosphorus	-16.3		ng/l							U
Potassium	-2040		ng/l							U
Rubidium	-0.0358		ng/l							U
Selenium	-3.80		ng/l							U
Sodium	-487		ng/l							U
Strontium	1.13		ng/l							
Thallium	0.563		ng/l							
Thorium	0.446		ng/l							
Uranium	0.0299		ng/l							
Vanadium	-55.2		ng/l							U
Zinc	-16.2		ng/l							U
Initial Cal Check (2312062-ICV1)				Prepared & Analyzed: 12/20/23						
Aluminum	1.46E6		ng/l	1.5000E6		97.6	90-110			
Antimony	19900		ng/l	20000		99.4	90-110			
Arsenic	20000		ng/l	20000		100	90-110			
Barium	203000		ng/l	200000		102	90-110			
Beryllium	5220		ng/l	5000.0		104	90-110			
Cadmium	20700		ng/l	20000		103	90-110			
Calcium	2.47E7		ng/l	2.5000E7		98.7	90-110			
Chromium	236000		ng/l	240000		98.5	90-110			
Cobalt	49800		ng/l	50000		99.6	90-110			
Copper	2.03E6		ng/l	2.0000E6		101	90-110			

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CERTIFICATE OF ANALYSIS

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Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes

Inorganics by Compendium Method IO-3.5 - Quality Control

Batch 2312062 - B3L1903

Initial Cal Check (2312062-ICV1) Continu Prepared & Analyzed: 12/20/23

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Iron	2.50E6		ng/l	2.5000E6		99.9	90-110			
Lead	200000		ng/l	200000		99.8	90-110			
Magnesium	990000		ng/l	1.0000E6		99.0	90-110			
Manganese	494000		ng/l	500000		98.7	90-110			
Molybdenum	50100		ng/l	50000		100	90-110			
Nickel	119000		ng/l	120000		99.3	90-110			
Phosphorus	194000		ng/l	200000		96.8	90-110			
Potassium	2.57E6		ng/l	2.5000E6		103	90-110			
Rubidium	9850		ng/l	10000		98.5	90-110			
Selenium	20800		ng/l	20000		104	90-110			
Sodium	2.49E6		ng/l	2.5000E6		99.4	90-110			
Strontium	50200		ng/l	50000		100	90-110			
Thallium	495		ng/l	500.00		99.0	90-110			
Thorium	491		ng/l	500.00		98.3	90-110			
Uranium	500		ng/l	500.00		100	90-110			
Vanadium	20300		ng/l	20000		101	90-110			
Zinc	527000		ng/l	500000		105	90-110			

Interference Check A (2312062-IFA1) Prepared & Analyzed: 12/20/23

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Aluminum	1.47E7		ng/l	1.5000E7		97.8	80-120			
Antimony	0.00		ng/l				80-120			U
Arsenic	0.00		ng/l				80-120			U
Barium	0.00		ng/l				80-120			U
Beryllium	0.00		ng/l				80-120			U
Cadmium	0.00		ng/l				80-120			U
Calcium	9.27E7		ng/l	1.0040E8		92.3	80-120			
Chromium	0.00		ng/l				80-120			U
Cobalt	0.00		ng/l				80-120			U
Copper	0.00		ng/l				80-120			U
Iron	1.46E7		ng/l	1.5000E7		97.4	80-120			
Lead	0.00		ng/l				80-120			U
Magnesium	1.53E7		ng/l	1.5000E7		102	80-120			
Manganese	0.00		ng/l				80-120			U
Molybdenum	299000		ng/l	300000		99.8	80-120			
Nickel	0.00		ng/l				80-120			U
Phosphorus	1.60E7		ng/l	1.5000E7		106	80-120			
Potassium	1.49E7		ng/l	1.5000E7		99.3	80-120			
Rubidium	0.00		ng/l				80-120			U
Selenium	0.00		ng/l				80-120			U

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Inorganics by Compendium Method IO-3.5 - Quality Control

Batch 2312062 - B3L1903

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Interference Check A (2312062-IFA1) Co				Prepared & Analyzed: 12/20/23						
Sodium	1.53E7		ng/l	1.5000E7		102	80-120			
Strontium	0.00		ng/l				80-120			U
Thallium	0.00		ng/l				80-120			U
Thorium	0.00		ng/l				80-120			U
Uranium	0.00		ng/l				80-120			U
Vanadium	0.00		ng/l				80-120			U
Zinc	0.00		ng/l				80-120			U
Interference Check B (2312062-IFB1)				Prepared & Analyzed: 12/20/23						
Aluminum	1.66E7		ng/l	1.6500E7		101	80-120			
Antimony	20000		ng/l	20000		99.9	80-120			
Arsenic	20000		ng/l	20000		100	80-120			
Barium	201000		ng/l	200000		100	80-120			
Beryllium	4780		ng/l	5000.0		95.7	80-120			
Cadmium	19300		ng/l	20000		96.3	80-120			
Calcium	1.17E8		ng/l	1.2540E8		93.1	80-120			
Chromium	229000		ng/l	240000		95.6	80-120			
Cobalt	49300		ng/l	50000		98.6	80-120			
Copper	1.88E6		ng/l	2.0000E6		94.1	80-120			
Iron	1.73E7		ng/l	1.7500E7		98.8	80-120			
Lead	203000		ng/l	200000		102	80-120			
Magnesium	1.67E7		ng/l	1.6000E7		104	80-120			
Manganese	516000		ng/l	500000		103	80-120			
Molybdenum	337000		ng/l	350000		96.2	80-120			
Nickel	116000		ng/l	120000		96.3	80-120			
Phosphorus	1.65E7		ng/l	1.5200E7		108	80-120			
Potassium	1.77E7		ng/l	1.7500E7		101	80-120			
Rubidium	10100		ng/l	10000		101	80-120			
Selenium	19200		ng/l	20000		95.8	80-120			
Sodium	1.88E7		ng/l	1.7500E7		108	80-120			
Strontium	49600		ng/l	50000		99.3	80-120			
Thallium	519		ng/l	500.00		104	80-120			
Thorium	539		ng/l	500.00		108	80-120			
Uranium	543		ng/l	500.00		109	80-120			
Vanadium	19100		ng/l	20000		95.3	80-120			
Zinc	484000		ng/l	500000		96.7	80-120			

Batch B3L1903 - ICP-MS Extraction

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (B3L1903-BLK1)				Prepared & Analyzed: 12/19/23						
Aluminum	ND	32.1	ng/m³ Air							U

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Inorganics by Compendium Method IO-3.5 - Quality Control

Batch B3L1903 - ICP-MS Extraction

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (B3L1903-BLK1) Continued				Prepared & Analyzed: 12/19/23						
Antimony	ND	0.0441	ng/m³ Air							SL, U
Arsenic	ND	0.00955	ng/m³ Air							U
Barium	ND	0.948	ng/m³ Air							U
Beryllium	ND	0.00332	ng/m³ Air							U
Cadmium	ND	0.109	ng/m³ Air							U
Calcium	ND	292	ng/m³ Air							QB-01, U
Chromium	ND	2.03	ng/m³ Air							U
Cobalt	ND	0.0156	ng/m³ Air							QB-01, U
Copper	ND	3.00	ng/m³ Air							U
Iron	ND	24.2	ng/m³ Air							U
Lead	ND	0.276	ng/m³ Air							U
Magnesium	ND	96.4	ng/m³ Air							U
Manganese	ND	1.19	ng/m³ Air							U
Molybdenum	ND	0.213	ng/m³ Air							QB-01, U
Nickel	ND	0.801	ng/m³ Air							U
Phosphorus	ND	1250	ng/m³ Air							GC-BS, LJ, QX U
Potassium	ND	38.0	ng/m³ Air							U
Rubidium	ND	0.0183	ng/m³ Air							U
Selenium	ND	0.0110	ng/m³ Air							LJ, QX, U
Sodium	ND	2000	ng/m³ Air							GC-BS, U
Strontium	ND	0.652	ng/m³ Air							QB-01, U
Thallium	ND	5.03E-4	ng/m³ Air							U
Thorium	ND	0.00300	ng/m³ Air							U
Uranium	ND	0.0170	ng/m³ Air							U
Vanadium	ND	0.0492	ng/m³ Air							U
Zinc	ND	97.7	ng/m³ Air							U
LCS (B3L1903-BS1)				Prepared & Analyzed: 12/19/23						
Aluminum	95.4	32.1	ng/m³ Air	82.975		115	80-120			
Antimony	0.473	0.0441	ng/m³ Air	1.3829		34.2	80-120			SL
Arsenic	2.67	0.00955	ng/m³ Air	2.7658		96.7	80-120			
Barium	27.5	0.948	ng/m³ Air	27.658		99.6	80-120			
Beryllium	1.38	0.00332	ng/m³ Air	1.3829		99.7	80-120			
Cadmium	1.37	0.109	ng/m³ Air	1.3829		99.1	80-120			
Calcium	669	292	ng/m³ Air	69.146		968	80-120			QB-01
Chromium	15.9	2.03	ng/m³ Air	13.829		115	80-120			
Cobalt	1.37	0.0156	ng/m³ Air	1.3829		99.1	80-120			QB-01
Copper	31.3	3.00	ng/m³ Air	27.658		113	80-120			

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Inorganics by Compendium Method IO-3.5 - Quality Control

Batch B3L1903 - ICP-MS Extraction

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
LCS (B3L1903-BS1) Continued				Prepared & Analyzed: 12/19/23						
Iron	41.7	24.2	ng/m³ Air	27.658		151	80-120			
Lead	13.4	0.276	ng/m³ Air	13.829		97.1	80-120			
Magnesium	ND	96.4	ng/m³ Air	27.658			80-120			U
Manganese	8.90	1.19	ng/m³ Air	8.2975		107	80-120			
Molybdenum	1.62	0.213	ng/m³ Air	1.3829		117	80-120			QB-01
Nickel	3.17	0.801	ng/m³ Air	2.7658		115	80-120			
Phosphorus	ND	1250	ng/m³ Air	13.829			80-120			GC-BS, LJ, QX, U
Potassium	71.1	38.0	ng/m³ Air	55.317		129	80-120			
Rubidium	1.30	0.0183	ng/m³ Air	1.3829		94.3	80-120			
Selenium	2.68	0.0110	ng/m³ Air	2.7658		97.1	80-120			LJ, QX
Sodium	ND	2000	ng/m³ Air	55.317			80-120			GC-BS, U
Strontium	2.24	0.652	ng/m³ Air	1.3829		162	80-120			QB-01
Thallium	0.132	5.03E-4	ng/m³ Air	0.13829		95.1	80-120			
Thorium	0.129	0.00300	ng/m³ Air	0.13829		93.3	80-120			
Uranium	0.129	0.0170	ng/m³ Air	0.13829		93.2	80-120			
Vanadium	2.72	0.0492	ng/m³ Air	2.7658		98.2	80-120			
Zinc	137	97.7	ng/m³ Air	82.975		166	80-120			
Duplicate (B3L1903-DUP1)		**Source: 3121831-06**		Prepared & Analyzed: 12/19/23						
Aluminum	722	25.2	ng/m³ Air		768			6.18	10	E
Antimony	0.0543	0.0347	ng/m³ Air		0.0597			9.36	10	SL
Arsenic	0.320	0.00751	ng/m³ Air		0.326			1.64	10	
Barium	6.86	0.746	ng/m³ Air		7.09			3.24	10	
Beryllium	0.0242	0.00261	ng/m³ Air		0.0257			5.66	10	
Cadmium	ND	0.0857	ng/m³ Air		0.191				10	U
Calcium	631	230	ng/m³ Air		652			3.19	10	QB-01
Chromium	2.00	1.60	ng/m³ Air		2.08			3.83	10	
Cobalt	0.340	0.0123	ng/m³ Air		0.361			6.04	10	QB-01
Copper	15.3	2.36	ng/m³ Air		16.1			5.16	10	
Iron	723	19.0	ng/m³ Air		777			7.17	10	
Lead	0.422	0.217	ng/m³ Air		0.423			0.289	10	
Magnesium	238	75.8	ng/m³ Air		242			1.99	10	
Manganese	18.7	0.936	ng/m³ Air		19.6			4.66	10	
Molybdenum	0.968	0.168	ng/m³ Air		0.987			1.94	10	QB-01
Nickel	0.989	0.630	ng/m³ Air		0.887			10.9	10	
Phosphorus	ND	983	ng/m³ Air		ND				10	GC-BS, LJ, QX, U
Potassium	123	29.9	ng/m³ Air		119			3.32	10	
Rubidium	0.208	0.0144	ng/m³ Air		0.222			6.28	10	

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Inorganics by Compendium Method IO-3.5 - Quality Control

Batch B3L1903 - ICP-MS Extraction

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Duplicate (B3L1903-DUP1) Continued	**Source: 3121831-06**		Prepared & Analyzed: 12/19/23							
Selenium	0.191	0.00865	ng/m³ Air		0.197			2.87	10	LJ, QX
Sodium	1750	1570	ng/m³ Air		1750			0.361	10	E, GC-BS
Strontium	4.70	0.513	ng/m³ Air		4.93			4.71	10	QB-01
Thallium	0.00130	3.96E-4	ng/m³ Air		0.00139			7.18	10	
Thorium	0.0185	0.00236	ng/m³ Air		0.0213			14.0	10	
Uranium	0.0157	0.0134	ng/m³ Air		0.0168			7.12	10	
Vanadium	2.30	0.0387	ng/m³ Air		2.42			5.06	10	
Zinc	ND	76.8	ng/m³ Air		ND				10	U
Duplicate (B3L1903-DUP2)	**Source: 3121831-09**		Prepared: 12/19/23 Analyzed: 12/20/23							
Aluminum	1380	25.3	ng/m³ Air		1390			0.487	10	E
Antimony	0.0680	0.0347	ng/m³ Air		0.0688			1.16	10	SL
Arsenic	0.321	0.00752	ng/m³ Air		0.318			0.671	10	
Barium	10.2	0.747	ng/m³ Air		10.3			0.737	10	
Beryllium	0.0379	0.00262	ng/m³ Air		0.0448			16.7	10	R-F
Cadmium	ND	0.0859	ng/m³ Air		ND				10	U
Calcium	809	230	ng/m³ Air		808			0.0881	10	QB-01
Chromium	2.59	1.60	ng/m³ Air		2.60			0.253	10	
Cobalt	0.634	0.0123	ng/m³ Air		0.636			0.235	10	QB-01
Copper	18.1	2.36	ng/m³ Air		18.1			0.168	10	
Iron	1390	19.1	ng/m³ Air		1400			0.897	10	
Lead	0.623	0.217	ng/m³ Air		0.625			0.308	10	
Magnesium	293	75.9	ng/m³ Air		293			0.121	10	
Manganese	38.3	0.937	ng/m³ Air		38.8			1.33	10	
Molybdenum	0.985	0.168	ng/m³ Air		0.994			0.852	10	QB-01
Nickel	1.21	0.631	ng/m³ Air		1.22			0.988	10	
Phosphorus	ND	985	ng/m³ Air		ND				10	GC-BS, LJ, QX U
Potassium	142	29.9	ng/m³ Air		142			0.139	10	
Rubidium	0.317	0.0144	ng/m³ Air		0.315			0.539	10	
Selenium	0.253	0.00866	ng/m³ Air		0.253			0.0290	10	LJ, QX
Sodium	1920	1580	ng/m³ Air		1910			0.573	10	E, GC-BS
Strontium	7.45	0.514	ng/m³ Air		7.35			1.26	10	QB-01
Thallium	0.00209	3.96E-4	ng/m³ Air		0.00218			4.42	10	
Thorium	0.0368	0.00236	ng/m³ Air		0.0369			0.0698	10	
Uranium	0.0272	0.0134	ng/m³ Air		0.0273			0.118	10	
Vanadium	3.55	0.0388	ng/m³ Air		3.57			0.592	10	
Zinc	ND	77.0	ng/m³ Air		ND				10	U
Matrix Spike (B3L1903-MS1)	**Source: 3121831-06**		Prepared & Analyzed: 12/19/23							

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Inorganics by Compendium Method IO-3.5 - Quality Control

Batch B3L1903 - ICP-MS Extraction

Matrix Spike (B3L1903-MS1) Continued **Source: 3121831-06** Prepared & Analyzed: 12/19/23

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Aluminum	819	25.2	ng/m³ Air	65.255	768	78.7	80-120			QM-4X
Antimony	0.541	0.0347	ng/m³ Air	1.0876	0.0597	44.2	80-120			SL
Arsenic	2.35	0.00751	ng/m³ Air	2.1752	0.326	92.9	80-120			
Barium	28.0	0.746	ng/m³ Air	21.752	7.09	96.0	80-120			
Beryllium	1.18	0.00261	ng/m³ Air	1.0876	0.0257	107	80-120			
Cadmium	2.05	0.0857	ng/m³ Air	1.0876	0.191	171	80-120			QM-07
Calcium	689	230	ng/m³ Air	54.379	652	69.0	80-120			QB-01, QM-4X
Chromium	12.9	1.60	ng/m³ Air	10.876	2.08	99.8	80-120			
Cobalt	1.41	0.0123	ng/m³ Air	1.0876	0.361	96.5	80-120			QB-01
Copper	42.5	2.36	ng/m³ Air	21.752	16.1	121	80-120			QM-07
Iron	776	19.0	ng/m³ Air	21.752	777	NR	80-120			QM-4X
Lead	10.9	0.217	ng/m³ Air	10.876	0.423	96.4	80-120			
Magnesium	267	75.8	ng/m³ Air	21.752	242	113	80-120			
Manganese	26.3	0.936	ng/m³ Air	6.5255	19.6	101	80-120			
Molybdenum	1.98	0.168	ng/m³ Air	1.0876	0.987	91.1	80-120			QB-01
Nickel	3.24	0.630	ng/m³ Air	2.1752	0.887	108	80-120			
Phosphorus	ND	983	ng/m³ Air	10.876	ND		80-120			GC-BS, LJ, QX, U
Potassium	163	29.9	ng/m³ Air	43.503	119	99.8	80-120			
Rubidium	1.18	0.0144	ng/m³ Air	1.0876	0.222	88.4	80-120			
Selenium	2.24	0.00865	ng/m³ Air	2.1752	0.197	93.8	80-120			QX, LJ
Sodium	1850	1570	ng/m³ Air	43.503	1750	218	80-120			GC-BS, QM-4X
Strontium	5.85	0.513	ng/m³ Air	1.0876	4.93	84.6	80-120			QB-01
Thallium	0.104	3.96E-4	ng/m³ Air	0.10876	0.00139	94.5	80-120			
Thorium	0.0607	0.00236	ng/m³ Air	0.10876	0.0213	36.2	80-120			QM-07
Uranium	0.117	0.0134	ng/m³ Air	0.10876	0.0168	91.8	80-120			
Vanadium	4.47	0.0387	ng/m³ Air	2.1752	2.42	93.9	80-120			
Zinc	96.9	76.8	ng/m³ Air	65.255	ND	149	80-120			

Matrix Spike Dup (B3L1903-MSD1) **Source: 3121831-06** Prepared & Analyzed: 12/19/23

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Aluminum	887	25.2	ng/m³ Air	65.255	768	182	80-120	7.90	20	QM-4X
Antimony	0.542	0.0347	ng/m³ Air	1.0876	0.0597	44.4	80-120	0.315	20	SL
Arsenic	2.41	0.00751	ng/m³ Air	2.1752	0.326	95.7	80-120	2.49	20	
Barium	28.5	0.746	ng/m³ Air	21.752	7.09	98.7	80-120	2.02	20	
Beryllium	1.07	0.00261	ng/m³ Air	1.0876	0.0257	96.4	80-120	9.79	20	
Cadmium	1.12	0.0857	ng/m³ Air	1.0876	0.191	85.6	80-120	58.5	20	LJ, QX
Calcium	719	230	ng/m³ Air	54.379	652	123	80-120	4.17	20	QB-01, QM-4X
Chromium	13.2	1.60	ng/m³ Air	10.876	2.08	102	80-120	1.83	20	
Cobalt	1.42	0.0123	ng/m³ Air	1.0876	0.361	97.5	80-120	0.799	20	QB-01

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Blue Bell, PA 19422
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PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 12/21/23 13:36
SUBMITTED: 12/18/23
AQS SITE CODE:
SITE CODE: Maui fires

Inorganics by Compendium Method IO-3.5 - Quality Control

Batch B3L1903 - ICP-MS Extraction

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Matrix Spike Dup (B3L1903-MSD1) ContirSource: 3121831-06			Prepared & Analyzed: 12/19/23							
Copper	44.9	2.36	ng/m³ Air	21.752	16.1	132	80-120	5.50	20	QM-07
Iron	835	19.0	ng/m³ Air	21.752	777	268	80-120	7.35	20	QM-4X
Lead	11.2	0.217	ng/m³ Air	10.876	0.423	98.9	80-120	2.40	20	
Magnesium	273	75.8	ng/m³ Air	21.752	242	142	80-120	2.34	20	QM-4X
Manganese	27.2	0.936	ng/m³ Air	6.5255	19.6	116	80-120	3.55	20	
Molybdenum	2.04	0.168	ng/m³ Air	1.0876	0.987	96.5	80-120	2.93	20	QB-01
Nickel	3.11	0.630	ng/m³ Air	2.1752	0.887	102	80-120	3.85	20	
Phosphorus	ND	983	ng/m³ Air	10.876	ND		80-120		20	QM-4X, QX, GC-BS, LJ, U
Potassium	168	29.9	ng/m³ Air	43.503	119	112	80-120	3.31	20	
Rubidium	1.19	0.0144	ng/m³ Air	1.0876	0.222	89.0	80-120	0.503	20	
Selenium	2.26	0.00865	ng/m³ Air	2.1752	0.197	94.9	80-120	1.07	20	LJ, QX
Sodium	1870	1570	ng/m³ Air	43.503	1750	268	80-120	1.18	20	GC-BS, QM-4)
Strontium	5.94	0.513	ng/m³ Air	1.0876	4.93	93.0	80-120	1.56	20	QB-01
Thallium	0.105	3.96E-4	ng/m³ Air	0.10876	0.00139	95.3	80-120	0.868	20	
Thorium	0.0687	0.00236	ng/m³ Air	0.10876	0.0213	43.6	80-120	12.3	20	QM-07
Uranium	0.118	0.0134	ng/m³ Air	0.10876	0.0168	93.1	80-120	1.20	20	
Vanadium	4.62	0.0387	ng/m³ Air	2.1752	2.42	101	80-120	3.28	20	
Zinc	99.4	76.8	ng/m³ Air	65.255	ND	152	80-120	2.49	20	
Post Spike (B3L1903-PS1)	**Source: 3121831-06**		Prepared & Analyzed: 12/19/23							
Aluminum	812	25.2	ng/m³ Air	21.752	768	204	75-125			A-01
Antimony	0.265	0.0347	ng/m³ Air	0.21752	0.0597	94.4	75-125			SL
Arsenic	1.33	0.00751	ng/m³ Air	1.0876	0.326	92.3	75-125			
Barium	9.10	0.746	ng/m³ Air	2.1752	7.09	92.5	75-125			
Beryllium	0.244	0.00261	ng/m³ Air	0.21752	0.0257	100	75-125			
Cadmium	0.298	0.0857	ng/m³ Air	0.10876	0.191	98.0	75-125			
Calcium	685	230	ng/m³ Air	21.752	652	154	75-125			A-01, QB-01
Chromium	3.16	1.60	ng/m³ Air	1.0876	2.08	99.2	75-125			
Cobalt	0.578	0.0123	ng/m³ Air	0.21752	0.361	99.8	75-125			QB-01
Copper	27.5	2.36	ng/m³ Air	10.876	16.1	105	75-125			
Iron	812	19.0	ng/m³ Air	21.752	777	160	75-125			A-01
Lead	21.2	0.217	ng/m³ Air	21.752	0.423	95.5	75-125			
Magnesium	273	75.8	ng/m³ Air	21.752	242	140	75-125			A-01
Manganese	22.4	0.936	ng/m³ Air	2.1752	19.6	126	75-125			A-01
Molybdenum	1.96	0.168	ng/m³ Air	1.0876	0.987	89.1	75-125			QB-01
Nickel	2.99	0.630	ng/m³ Air	2.1752	0.887	96.6	75-125			
Phosphorus	ND	983	ng/m³ Air	4.3503	ND		75-125			A-01, GC-BS, LJ, QX, U
Potassium	141	29.9	ng/m³ Air	21.752	119	102	75-125			

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AQS SITE CODE:
SITE CODE: Maui fires

Inorganics by Compendium Method IO-3.5 - Quality Control

Batch B3L1903 - ICP-MS Extraction

Post Spike (B3L1903-PS1) Continued **Source: 3121831-06** Prepared & Analyzed: 12/19/23

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Rubidium	0.315	0.0144	ng/m³ Air	0.10876	0.222	85.5	75-125			
Selenium	1.20	0.00865	ng/m³ Air	1.0876	0.197	91.9	75-125			LJ, QX
Sodium	1860	1570	ng/m³ Air	21.752	1750	480	75-125			A-01, GC-BS
Strontium	5.93	0.513	ng/m³ Air	1.0876	4.93	91.9	75-125			QB-01
Thallium	0.0514	3.96E-4	ng/m³ Air	5.4379E-2	0.00139	91.9	75-125			
Thorium	0.0703	0.00236	ng/m³ Air	5.4379E-2	0.0213	90.1	75-125			
Uranium	0.0663	0.0134	ng/m³ Air	5.4379E-2	0.0168	90.9	75-125			
Vanadium	3.47	0.0387	ng/m³ Air	1.0876	2.42	96.5	75-125			
Zinc	ND	76.8	ng/m³ Air	21.752	ND		75-125			U

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SITE CODE: Maui fires

Notes and Definitions

U	Under Detection Limit
SL	The spike recovery was outside acceptance limits. Reported value may be biased low.
R-F	Replicate exceeds DQO criteria.
QX	Compound does not meet QC criteria. Results should be considered an estimate.
QM-4X	The MS/MSD recovery exceeds criteria because the parent sample concentration is greater than 4x the spike concentration. Sample results for the QC batch were accepted based on acceptable BS/BSD recoveries.
QM-07	The spike recovery was outside acceptance limits for the MS and/or MSD. The batch was accepted based on acceptable LCS recovery.
QB-01	Analyte exceeds method blank criteria
LJ	Identification of analyte is acceptable; reported value is an estimate.
GC-BS	Compound exceeds Blank Spike Criteria
FB-01	Analyte exceeds Field Blank criteria.
E	The concentration indicated for this analyte is an estimated value above the calibration range of the instrument. This value is considered an estimate (CLP E-flag).
D	This result obtained by dilution.
A-01	Parent sample >4x spike amount
ND	Analyte NOT DETECTED
NR	Not Reported
MDL	Method Detection Limit
RPD	Relative Percent Difference

Note: This test is accredited under the 2016 TNI Standard.

Stage 1 Data Verification Checklist – Metals

HDOH CAB – Ambient Community Air Sampling – Kula

Task Order No. 23141

Reviewed by:
Talaidh Isaacs 12/22/2023 & Shanna Vasser 12/22/2023
Laboratory: Eastern Research Group – Morrisville, NC
Analysis date: 12/19/2023, 12/20/2023, and 12/21/2023
Report No: 3121831

√ 1. Chain of custody (CoC) documentation is present.

X 2. Sample receipt condition information is present and acceptable.

√ 3. Laboratory conducting the analysis is identified.

√ 4. All samples submitted to the laboratory are accounted for.

√ 5. Requested analytical methods were performed.

√ 6. Analysis dates are provided.

√ 7. Analyte results are provided.

√ 8. Result qualifiers and definitions are provided.

√ 9. Result units are reported.

NA 10. Requested reporting limits are present.

√ 11. Method detection limits are present.

√ 12. Sample collection date and time are present.

Discrepancies: None

Notes:

2. No sample receipt information was presented by the laboratory.

10. No reporting limits were included in this data package.

Ambient Community Air Monitoring Weekly Report
For the Hawaii Department of Health – Clean Air Branch

Kula, Maui

12/14/2023-12/20/2023
[Report Updated: 4/12/2024]

Due to ongoing debris removal operations in response to the Maui Wildfires, a community air monitoring and sampling plan (CAMSP, 2023) has been developed and sampling is being performed at three community locations across Kula.

This approach includes ambient community air monitoring and sampling to monitor conditions and ensure debris removal activities, taking place under the U.S. Army Corps of Engineers (USACE), does not significantly impact air quality in the area of Kula. Data collected is made available to HDOH via online shared site and this weekly report. This approach to air monitoring and sampling will continue until debris removal activities are complete or until HDOH CAB advises otherwise.

Air quality monitoring for particulate matter was collected at all three community locations over a 24-hour period each day in accordance with the CAMSP. Additionally, daily air samples were collected at all community locations for asbestos and heavy metals. Summary analytical data is presented in **Tables 1 and 2**. **Figure 1** depicts the community air monitoring and sampling locations. **Appendix 1** provides detailed analytical results for all community locations where air sampling was performed. Analytical results were compared to site-specific screening levels for particulate matter, asbestos, and heavy metals as published in the CAMSP (Tetra Tech 2023; see Table 2).

Results for Community Locations:
Ambient particulate air monitoring was performed to assess for the presence and concentrations of airborne particulates with a particle size aerodynamic diameter of 2.5 micrometers (µm) and less ($PM_{2.5}$), as well as 10 micrometers (µm) and less (PM_{10}). This particle size diameter is recognized for health evaluations and is identified as "$PM_{2.5}$" and "PM_{10}". The particle size diameters of 2.5 micrometers (µm) and 10 micrometers (µm) are small enough to be inhaled into a person's lungs. Monitoring for $PM_{2.5}$ and PM_{10} was conducted 7 days a week at each of the following locations: Top Property (AM-01) (December 14 – 20), Middle Property (AM-02) (December 14 – 20), Lower Property (AM-03) (December 14 – 20).

The results of PM_{10} monitoring found that screening levels were exceeded at the Top Property air monitoring station on December 14. The property owner was observed clearing brush, tree cutting, and wood chipping on the property. The property owner was also observed spreading woodchips. High winds were also documented throughout the day, picking up heavy amounts of dust and disturbed ground cover.

The results of $PM_{2.5}$ monitoring found that screening levels were exceeded at the Top Property air monitoring station on December 14, 15, 16, 18, and 20. The property owner was also observed spreading woodchips and clearing brush on December 14. On Dec 15, USACE crew work was being conducted approximately ¼ mile west of the property. No heavy equipment was moving, or visible dust being produced from their activities. This exceedance is likely due to factors unrelated to debris operations. Hazy conditions were present that day at the site and may have contributed to the exceedance. On December 16, USACE crews were conducting erosion control activities approximately 300 meters (about 984.25 ft) west of the sampling site. These activities along with observed and documented high winds at the site likely contributed to this exceedance. The exceedances on December 18 and 20 appear to be related to property owner activities. The property owners were observed with a large truck dumping woodchips off at the property along with multiple cars driving on the property. Visible dust was being kicked up by property owners and private contractor vehicles. This report was updated to include an exceedance at the Top Property air monitoring station on December 17. There were no USACE debris removal activities or property owner activities taking place at the site. The smell of smoke was noted in the surrounding area, which potentially caused the exceedance at this station.

The results of $PM_{2.5}$ monitoring found that screening levels were exceeded at the Middle Property air monitoring station on December 15, 16, and 17. The property owner was also observed spreading woodchips around the property on December 15 and 17. The exceedance on December 16 is likely due to factors unrelated to debris operations. The exceedances took place in the early morning and late evening outside operational hours of the debris crew. It was also noted by the field teams that the smell of smoke was in the air near the station.

There were twenty-one samples collected for asbestos fibers at community monitoring locations throughout this time frame. Of the twenty-one samples collected, one was voided due to equipment failure. The voided sample was from the Middle Property (AM-02) on December 14. No asbestos sample returned a value above the laboratory's detection limit, indicating fibers were not present in the air sampled. All asbestos results were below the public health screening level of 0.0034 fibers/cc (as well as the laboratory's detection limits).

Some extremely low levels of heavy metals were detected in ambient air samples at community locations. Although detected, all concentrations were below the public health screening levels for heavy metals. Details for particulates, heavy metal and asbestos sampling data for community locations are found in Attachment 1.

Attachments:

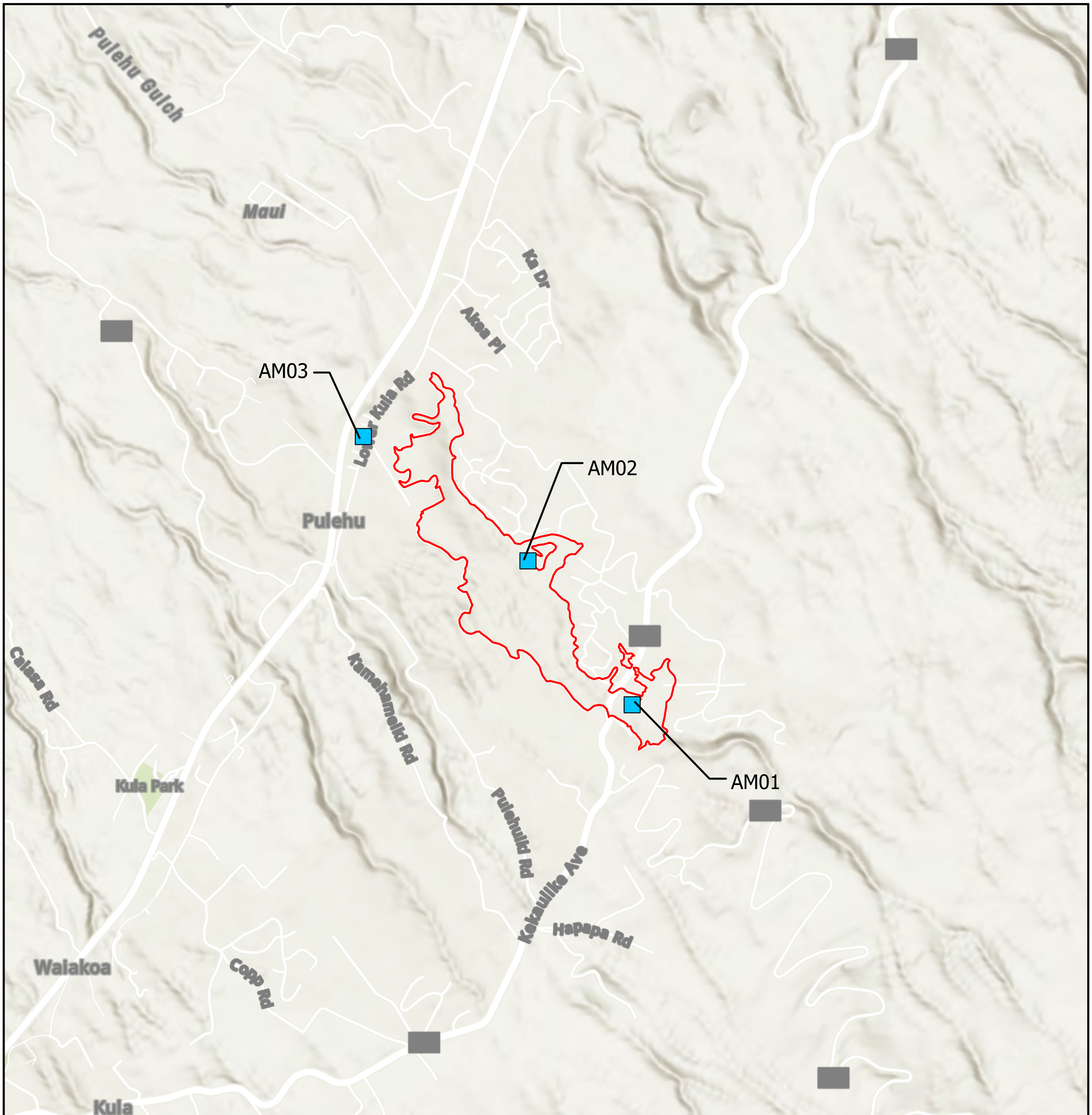
Analytical Sampling Results and Particulate Monitoring Results

Air Monitoring and Sampling Locations

Appendix:

Analytical Reports

Attachments



Air Monitoring Locations

Kula Fire Perimeter

N

0 0.25 0.5
Miles

TETRA TECH

Figure 1
Ambient Community
Air Monitoring Locations

Hawaii DOH
2023 Kula Wildfire

Basemap: ESRI ArcGIS World Street Map

Table 1: HDOH CAB Ambient Community Monitoring and Sampling
Analytical Sampling Results
Maui Wildfire, Kula
12/14/2023-12/20/2023
[Report Updated: 4/12/2024]

Analyte		Asbestos		Antimony	Arsenic	Barium	Beryllium	Cadmium	Chromium	Cobalt	Copper	Lead	Manganese	Molybdenum	Nickel	Selenium	Thallium	Vanadium
Units		f/cc	Y/N	μg/m³	μg/m³	μg/m³	μg/m³	μg/m³	μg/m³	μg/m³	μg/m³	μg/m³	μg/m³	μg/m³	μg/m³	μg/m³	μg/m³	μg/m³
Screening Level	Location / ID	0.0034 [1]	Confirmed Asbestos [2]	1.4	0.18	2.4	0.1	0.048	24	0.029	480	1.5	0.24	9.6	0.048	96	48	0.48
12/14/2023	Top Property (AM-01)	<0.00040	N	ND	0.000158	0.00417	0.0000164	ND	0.00181	0.000216	0.0141	0.000769	0.014	0.00063	ND	0.000109	0.00000188	0.00126
	Middle Property (AM-02)	NA	NA	ND	0.0000912	0.00348	0.0000111	ND	0.00162	0.00014	0.0109	0.000435	0.00795	0.00056	0.000623	0.0000965	0.00000191	0.000756
	Lower Property (AM-03)	<0.00072	N	0.0000462	0.000142	0.00548	0.0000171	ND	0.00214	0.000203	0.0176	0.000488	0.0142	0.000565	0.000761	0.00013	0.00000265	0.000942
12/15/2023	Top Property (AM-01)	<0.00040	N	ND	0.0000956	0.00282	0.00000639	ND	0.0018	0.000121	0.0165	0.00046	0.00548	0.00088	ND	0.000117	0.00000157	0.000492
	Middle Property (AM-02)	<0.00039	N	ND	0.0001	0.00308	0.00000691	ND	0.00185	0.000117	0.01	0.000296	0.00537	0.000698	ND	0.000127	0.00000162	0.000522
	Lower Property (AM-03)	<0.00050	N	0.0000633	0.000105	0.00478	0.0000119	ND	0.00214	0.000177	0.0272	0.000435	0.00978	0.000798	0.00094	0.000127	0.0000019	0.000683
12/16/2003	Top Property (AM-01)	<0.00036	N	0.0000604	0.000098	0.00403	0.00000826	ND	0.00165	0.000158	0.0166	0.000305	0.00803	0.00105	0.000713	0.000105	0.00000121	0.000712
	Middle Property (AM-02)	<0.00095	N	0.0000588	0.0000969	0.00393	0.00000857	ND	0.00167	0.000169	0.0137	0.00029	0.00742	0.000855	ND	0.0000989	0.00000132	0.000665
	Lower Property (AM-03)	<0.00071	N	0.0000535	0.0000708	0.00434	0.00000989	ND	0.00197	0.000142	0.0366	0.000403	0.00825	0.000935	ND	0.0000987	0.00000154	0.000604
12/17/2023	Top Property (AM-01)	<0.00040	N	0.0000496	0.0000803	0.00397	0.00000861	ND	0.00164	0.00014	0.0199	0.000442	0.00742	0.000976	ND	0.000107	0.00000419	0.000714
	Middle Property (AM-02)	<0.00132	N	0.0000631	0.00009	0.00377	0.00000921	ND	0.00167	0.000141	0.0168	0.000289	0.00714	0.000893	ND	0.000103	0.00000462	0.000655
	Lower Property (AM-03)	<0.00036	N	ND	0.0000661	0.00362	0.00000964	ND	ND	0.000142	0.0218	0.00035	0.00796	0.000802	ND	0.0000804	0.00000377	0.000545
12/18/2023	Top Property (AM-01)	<0.00040	N	0.0000709	0.000156	0.00376	0.00000765	ND	ND	0.000118	0.0191	0.000313	0.00615	0.00106	ND	0.0000676	0.00000116	0.000543
	Middle Property (AM-02)	<0.00077	N	0.0000642	0.000216	0.00378	0.00000747	ND	0.00181	0.000116	0.0162	ND	0.00588	0.000991	ND	0.0000741	0.00000111	0.000558
	Lower Property (AM-03)	<0.00087	N	0.000065	0.000171	0.00362	0.00000772	ND	0.00235	0.000149	0.0244	ND	0.00546	0.00129	ND	0.0000622	0.000000896	0.000441
12/19/2023	Top Property (AM-01)	<0.00037	N	0.0000598	0.000208	0.00522	0.0000156	ND	0.00195	0.000249	0.02	0.000312	0.0135	0.00111	ND	0.000137	0.00000111	0.00126
	Middle Property (AM-02)	<0.00045	N	0.0000613	0.000167	0.00528	0.0000156	ND	0.00182	0.000216	0.0242	0.00036	0.0115	0.00123	ND	0.000134	0.000000953	0.00111
	Lower Property (AM-03)	<0.00053	N	0.0000801	0.000151	0.00568	0.0000145	ND	0.00197	0.000201	0.0359	0.000623	0.0112	0.00126	0.000771	0.000139	0.00000091	0.000937
12/20/2023	Top Property (AM-01)	<0.00037	N	0.000104	0.000303	0.00605	0.0000189	ND	ND	0.0003	0.025	0.000423	0.0167	0.000771	ND	0.000173	0.00000128	0.00153
	Middle Property (AM-02)	<0.00074	N	0.0000535	0.000139	0.0054	0.0000184	ND	0.00177	0.000275	0.0155	0.000347	0.0146	0.000974	0.00067	0.000183	0.00000104	0.0014
	Lower Property (AM-03)	<0.00067	N	0.00013	0.000111	0.0065	0.0000178	ND	ND	0.000249	0.0179	0.000212	0.0141	0.000702	ND	0.000171	0.00000104	0.00134
95% Upper Confidence Limit[3]		0.00069		0.00008	0.00016	0.00484	0.000014	NA	0.00195	0.0002	0.023	0.00045	0.011	0.001	0.00085	0.00013	0.0000022	0.00099

Notes:
Asbestos sampling was voided at the Middle Property (AM-02) on 12/14 due to equipment failure.
NA = Not Available
f/cc = fibers per cubic centimeter
μg/m3= micrograms per cubic meter
ND = Not detected at or above the laboratory reporting limit or method detection limit
1 Fiber count sample result via Phase Contrast Microscopy
2 Confirmed asbestos sample result via Transmission Electron Microscopy
3 95% UCL determined through 'best fit' lognormal or normal parametric statistics via W test

Table 1: HDOH CAB Ambient Community Monitoring and Sampling
Analytical Sampling Results
Maui Wildfire, Kula
12/14/2023-12/20/2023
[Report Updated: 4/12/2024]

Zinc
$\mu g/m^3$
2400
ND
ND
ND
ND
ND
ND
ND
ND
ND
ND
ND
ND
ND
ND
ND
ND
ND
ND
ND
ND
ND
NA

Table 2: HDOH CAB Ambient Community Monitoring and Sampling
Particulate Monitoring Results
Maui Wildfire, Kula
12/14/2023-12/20/2023
[Report Updated: 4/12/2024]

Particulate Size		PM 2.5	PM 10
Screening Level	**Location / ID**	**35 µg/m³**	**150 µg/m³**
12/14/2023	Top Property (AM-01)	76	190
	Middle Property (AM-02)	35*	8.0
	Lower Property (AM-03)	4.8	8.7
12/15/2023	Top Property (AM-01)	42	31
	Middle Property (AM-02)	66	7.5
	Lower Property (AM-03)	5.2	9.7
12/16/2003	Top Property (AM-01)	44	38
	Middle Property (AM-02)	42	11
	Lower Property (AM-03)	6.3	7.9
12/17/2023	Top Property (AM-01)	45	34
	Middle Property (AM-02)	66	7.6
	Lower Property (AM-03)	5.6	6.8
12/18/2023	Top Property (AM-01)	41	36
	Middle Property (AM-02)	21	5.1
	Lower Property (AM-03)	6.1	6.2
12/19/2023	Top Property (AM-01)	29	20
	Middle Property (AM-02)	22	4.7
	Lower Property (AM-03)	4.6	6.3
12/20/2023	Top Property (AM-01)	36	26
	Middle Property (AM-02)	15	4.0
	Lower Property (AM-03)	5.1	6.1

Notes:
The exceedances at the Top Property on 12/14, 12/18and 12/20 are a result of private operations on the property.
The exceedances at the Top Property on 12/16 are a result of USACE operations and high winds near the property.
The exceedances at the Middle Property on 12/15 and 12/17 are a result of private operations on the property.
The exceedances on 12/16 at the Middle Property were not related to USACE crew activities, no observations from field members could confirm cause.
The exceedances on 12/17 at the Top Property were not related to USACE crew activities, no observations from field members could confirm cause.
The exceedances on 12/15 at the Top Property were not related to USACE crew activities, Hazy conditions were present and likely contributed to the exceedance.
* = The middle Property PM2.5 24hr TWA on 12/14 is rounded up from 34.5 and not considered a true exceedance.
Results are based on 24 hour TWA calculation
24 hour TWA calculation is presented in two significant figures
µg/m3 = micrograms per cubic meter
ND = Not detected at or above the laboratory reporting limit
NA = Not Available
Data for the Top Property (AM-01) on 12/15, 12/16, and 12/17, has been revised from the prerviously submitted report
Data for the Middle Property (AM-02) on 12/15 and 12/16 has been revised from the prerviously submitted report
Data for the Lower Property (AM-03) on 12/15, 12/16, and 12/19 has been revised from the prerviously submitted report

Appendix 1

Eurofins J3 Resources, Inc.
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Airborne Asbestos Fiber Analysis by Transmission Electron Microscopy (TEM)
ISO 10312 - Ambient Air - Determination of Asbestos Fibers Direct-Transfer Transmission Electron Microscopy Method

Maura McAleese
Tetra Tech
1999 Harrison St, Ste. 500
Oakland, CA 94612

EJ3 Order #: 3488212
Project #: 103S864023141
Receipt Date: 20-Dec-2023
Analysis Date: 27-Dec-2023
Report Date: 27-Dec-2023

HDOH Kula Community Air

Sample Number **MFK-AM01-121423-AB**

Air Volume:	7225.747
Effective Filter Area:	385.0 mm^2
Level of Analysis (Chrysotile):	CDQ
Level of Analysis (Amphibole):	ADQ
Magnification Used for Fiber Counting:	20,000
Aspect Ratio for Fiber Definition:	5:1
Mean Dimension of Grid Openings (GOs):	0.0132 mm^2
Initials of Analyst:	TS
Number of GO's Examined:	10
Analytical Sensitivity: f/Liter:	0.40365
Analytical Sensitivity: f/cm3:	0.00040
Number of primary asbestos structures:	0
Number of asbestos structures counted:	0
Number of asbestos structures > 5 um :	0
Number of asbestos fibers and bundles > 5 um:	0
Number of PCM equivalent asbestos structures:	0
Number of PCM equivalent asbestos fibers:	0
Concentration of Asbestos (Chrysotile) f/cm3:	<0.00040
Concentration of Asbestos (Amphibole) f/cm3:	<0.00040
Concentration of PCME Asbestos (Chrysotile) f/cm3:	<0.00040
Concentration of Asbestos (Chrysotile), Str/L:	0
Concentration of Asbestos (Amphibole), Str/L:	0
Lower 95% Confidence Limit (Chrysotile), Str/L:	0
Upper 95% Confidence Limit (Chrysotile), Str/L:	1.5
Lower 95% Confidence Limit (Amphibole), Str/L:	0
Upper 95% Confidence Limit (Amphibole), Str/L:	1.5

Analyst: Taylor Smylie

Scott M. Ward, Ph.D. **Lab Director**

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HDOH Kula Community Air

Sample Number **MFK-AM03-121423-AB**

Air Volume:	4049.983
Effective Filter Area:	385.0 mm^2
Level of Analysis (Chrysotile):	CDQ
Level of Analysis (Amphibole):	ADQ
Magnification Used for Fiber Counting:	20,000
Aspect Ratio for Fiber Definition:	5:1
Mean Dimension of Grid Openings (GOs):	0.0132 mm^2
Initials of Analyst:	TS
Number of GO's Examined:	10
Analytical Sensitivity: f/Liter:	0.72017
Analytical Sensitivity: f/cm3:	0.00072
Number of primary asbestos structures:	0
Number of asbestos structures counted:	0
Number of asbestos structures > 5 um :	0
Number of asbestos fibers and bundles > 5 um:	0
Number of PCM equivalent asbestos structures:	0
Number of PCM equivalent asbestos fibers:	0
Concentration of Asbestos (Chrysotile) f/cm3:	<0.00072
Concentration of Asbestos (Amphibole) f/cm3:	<0.00072
Concentration of PCME Asbestos (Chrysotile) f/cm3:	<0.00072
Concentration of Asbestos (Chrysotile), Str/L:	0
Concentration of Asbestos (Amphibole), Str/L:	0
Lower 95% Confidence Limit (Chrysotile), Str/L:	0
Upper 95% Confidence Limit (Chrysotile), Str/L:	2.7
Lower 95% Confidence Limit (Amphibole), Str/L:	0
Upper 95% Confidence Limit (Amphibole), Str/L:	2.7

Analyst: Taylor Smylie

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HDOH Kula Community Air

Sample Number **MFK-FB01-121423-AB**

Air Volume:	0
Effective Filter Area:	385.0 mm^2
Level of Analysis (Chrysotile):	CDQ
Level of Analysis (Amphibole):	ADQ
Magnification Used for Fiber Counting:	20,000
Aspect Ratio for Fiber Definition:	5:1
Mean Dimension of Grid Openings (GOs):	0.0132 mm^2
Initials of Analyst:	TS
Number of GO's Examined:	10
Analytical Sensitivity: f/Liter:	N/A
Analytical Sensitivity: f/cm3:	N/A
Number of primary asbestos structures:	0
Number of asbestos structures counted:	0
Number of asbestos structures > 5 um :	0
Number of asbestos fibers and bundles > 5 um:	0
Number of PCM equivalent asbestos structures:	0
Number of PCM equivalent asbestos fibers:	0
Concentration of Asbestos (Chrysotile) f/cm3:	N/A
Concentration of Asbestos (Amphibole) f/cm3:	N/A
Concentration of PCME Asbestos (Chrysotile) f/cm3:	N/A
Concentration of Asbestos (Chrysotile), Str/L:	N/A
Concentration of Asbestos (Amphibole), Str/L:	N/A
Lower 95% Confidence Limit (Chrysotile), Str/L:	N/A
Upper 95% Confidence Limit (Chrysotile), Str/L:	N/A
Lower 95% Confidence Limit (Amphibole), Str/L:	N/A
Upper 95% Confidence Limit (Amphibole), Str/L:	N/A

Analyst: Taylor Smylie

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Report Date: 27-Dec-2023

HDOH Kula Community Air

Sample Number **MFK-AM01-121523-AB**

Air Volume:	7316.594
Effective Filter Area:	385.0 mm^2
Level of Analysis (Chrysotile):	CDQ
Level of Analysis (Amphibole):	ADQ
Magnification Used for Fiber Counting:	20,000
Aspect Ratio for Fiber Definition:	5:1
Mean Dimension of Grid Openings (GOs):	0.0132 mm^2
Initials of Analyst:	TS
Number of GO's Examined:	10
Analytical Sensitivity: f/Liter:	0.39864
Analytical Sensitivity: f/cm3:	0.00040
Number of primary asbestos structures:	0
Number of asbestos structures counted:	0
Number of asbestos structures > 5 um :	0
Number of asbestos fibers and bundles > 5 um:	0
Number of PCM equivalent asbestos structures:	0
Number of PCM equivalent asbestos fibers:	0
Concentration of Asbestos (Chrysotile) f/cm3:	<0.00040
Concentration of Asbestos (Amphibole) f/cm3:	<0.00040
Concentration of PCME Asbestos (Chrysotile) f/cm3:	<0.00040
Concentration of Asbestos (Chrysotile), Str/L:	0
Concentration of Asbestos (Amphibole), Str/L:	0
Lower 95% Confidence Limit (Chrysotile), Str/L:	0
Upper 95% Confidence Limit (Chrysotile), Str/L:	1.5
Lower 95% Confidence Limit (Amphibole), Str/L:	0
Upper 95% Confidence Limit (Amphibole), Str/L:	1.5

Analyst: Taylor Smylie

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HDOH Kula Community Air

Sample Number **MFK-AM02-121523-AB**

Air Volume:	7445.514
Effective Filter Area:	385.0 mm^2
Level of Analysis (Chrysotile):	CDQ
Level of Analysis (Amphibole):	ADQ
Magnification Used for Fiber Counting:	20,000
Aspect Ratio for Fiber Definition:	5:1
Mean Dimension of Grid Openings (GOs):	0.0132 mm^2
Initials of Analyst:	ts
Number of GO’s Examined:	10
Analytical Sensitivity: f/Liter:	0.39173
Analytical Sensitivity: f/cm3:	0.00039
Number of primary asbestos structures:	0
Number of asbestos structures counted:	0
Number of asbestos structures > 5 um :	0
Number of asbestos fibers and bundles > 5 um:	0
Number of PCM equivalent asbestos structures:	0
Number of PCM equivalent asbestos fibers:	0
Concentration of Asbestos (Chrysotile) f/cm3:	<0.00039
Concentration of Asbestos (Amphibole) f/cm3:	<0.00039
Concentration of PCME Asbestos (Chrysotile) f/cm3:	<0.00039
Concentration of Asbestos (Chrysotile), Str/L:	0
Concentration of Asbestos (Amphibole), Str/L:	0
Lower 95% Confidence Limit (Chrysotile), Str/L:	0
Upper 95% Confidence Limit (Chrysotile), Str/L:	1.4
Lower 95% Confidence Limit (Amphibole), Str/L:	0
Upper 95% Confidence Limit (Amphibole), Str/L:	1.4

Analyst: Taylor Smylie

Scott M. Ward, Ph.D. **Lab Director**

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Report Date: 27-Dec-2023

HDOH Kula Community Air

Sample Number **MFK-AM03-121523-AB**

Air Volume:	5853.24
Effective Filter Area:	385.0 mm^2
Level of Analysis (Chrysotile):	CDQ
Level of Analysis (Amphibole):	ADQ
Magnification Used for Fiber Counting:	20,000
Aspect Ratio for Fiber Definition:	5:1
Mean Dimension of Grid Openings (GOs):	0.0132 mm^2
Initials of Analyst:	ts
Number of GO's Examined:	10
Analytical Sensitivity: f/Liter:	0.49830
Analytical Sensitivity: f/cm3:	0.00050
Number of primary asbestos structures:	0
Number of asbestos structures counted:	0
Number of asbestos structures > 5 um :	0
Number of asbestos fibers and bundles > 5 um:	0
Number of PCM equivalent asbestos structures:	0
Number of PCM equivalent asbestos fibers:	0
Concentration of Asbestos (Chrysotile) f/cm3:	<0.00050
Concentration of Asbestos (Amphibole) f/cm3:	<0.00050
Concentration of PCME Asbestos (Chrysotile) f/cm3:	<0.00050
Concentration of Asbestos (Chrysotile), Str/L:	0
Concentration of Asbestos (Amphibole), Str/L:	0
Lower 95% Confidence Limit (Chrysotile), Str/L:	0
Upper 95% Confidence Limit (Chrysotile), Str/L:	1.8
Lower 95% Confidence Limit (Amphibole), Str/L:	0
Upper 95% Confidence Limit (Amphibole), Str/L:	1.8

Analyst: Taylor Smylie

Scott M. Ward, Ph.D. **Lab Director**

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HDOH Kula Community Air

Sample Number **MFK-FB01-121523-AB**

Air Volume:	0
Effective Filter Area:	385.0 mm^2
Level of Analysis (Chrysotile):	CDQ
Level of Analysis (Amphibole):	ADQ
Magnification Used for Fiber Counting:	20,000
Aspect Ratio for Fiber Definition:	5:1
Mean Dimension of Grid Openings (GOs):	0.0132 mm^2
Initials of Analyst:	
Number of GO's Examined:	10
Analytical Sensitivity: f/Liter:	N/A
Analytical Sensitivity: f/cm3:	N/A
Number of primary asbestos structures:	0
Number of asbestos structures counted:	0
Number of asbestos structures > 5 um :	0
Number of asbestos fibers and bundles > 5 um:	0
Number of PCM equivalent asbestos structures:	0
Number of PCM equivalent asbestos fibers:	0
Concentration of Asbestos (Chrysotile) f/cm3:	N/A
Concentration of Asbestos (Amphibole) f/cm3:	N/A
Concentration of PCME Asbestos (Chrysotile) f/cm3:	N/A
Concentration of Asbestos (Chrysotile), Str/L:	N/A
Concentration of Asbestos (Amphibole), Str/L:	N/A
Lower 95% Confidence Limit (Chrysotile), Str/L:	N/A
Upper 95% Confidence Limit (Chrysotile), Str/L:	N/A
Lower 95% Confidence Limit (Amphibole), Str/L:	N/A
Upper 95% Confidence Limit (Amphibole), Str/L:	N/A

Analyst: Taylor Smylie**:**

Scott M. Ward, Ph.D. **Lab Director**

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HDOH Kula Community Air

Sample Number **MFK-AM01-121623-AB**

Air Volume:	8105.184
Effective Filter Area:	385.0 mm^2
Level of Analysis (Chrysotile):	CDQ
Level of Analysis (Amphibole):	ADQ
Magnification Used for Fiber Counting:	20,000
Aspect Ratio for Fiber Definition:	5:1
Mean Dimension of Grid Openings (GOs):	0.0132 mm^2
Initials of Analyst:	TS
Number of GO's Examined:	10
Analytical Sensitivity: f/Liter:	0.35985
Analytical Sensitivity: f/cm3:	0.00036
Number of primary asbestos structures:	0
Number of asbestos structures counted:	0
Number of asbestos structures > 5 um :	0
Number of asbestos fibers and bundles > 5 um:	0
Number of PCM equivalent asbestos structures:	0
Number of PCM equivalent asbestos fibers:	0
Concentration of Asbestos (Chrysotile) f/cm3:	<0.00036
Concentration of Asbestos (Amphibole) f/cm3:	<0.00036
Concentration of PCME Asbestos (Chrysotile) f/cm3:	<0.00036
Concentration of Asbestos (Chrysotile), Str/L:	0
Concentration of Asbestos (Amphibole), Str/L:	0
Lower 95% Confidence Limit (Chrysotile), Str/L:	0
Upper 95% Confidence Limit (Chrysotile), Str/L:	1.3
Lower 95% Confidence Limit (Amphibole), Str/L:	0
Upper 95% Confidence Limit (Amphibole), Str/L:	1.3

Analyst: Taylor Smylie

Scott M. Ward, Ph.D. **Lab Director**

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HDOH Kula Community Air

Sample Number **MFK-AM02-121623-AB**

Air Volume:	2783.804
Effective Filter Area:	385.0 mm^2
Level of Analysis (Chrysotile):	CDQ
Level of Analysis (Amphibole):	ADQ
Magnification Used for Fiber Counting:	20,000
Aspect Ratio for Fiber Definition:	5:1
Mean Dimension of Grid Openings (GOs):	0.0132 mm^2
Initials of Analyst:	ts
Number of GO's Examined:	11
Analytical Sensitivity: f/Liter:	0.95248
Analytical Sensitivity: f/cm3:	0.00095
Number of primary asbestos structures:	0
Number of asbestos structures counted:	0
Number of asbestos structures > 5 um :	0
Number of asbestos fibers and bundles > 5 um:	0
Number of PCM equivalent asbestos structures:	0
Number of PCM equivalent asbestos fibers:	0
Concentration of Asbestos (Chrysotile) f/cm3:	<0.00095
Concentration of Asbestos (Amphibole) f/cm3:	<0.00095
Concentration of PCME Asbestos (Chrysotile) f/cm3:	<0.00095
Concentration of Asbestos (Chrysotile), Str/L:	0
Concentration of Asbestos (Amphibole), Str/L:	0
Lower 95% Confidence Limit (Chrysotile), Str/L:	0
Upper 95% Confidence Limit (Chrysotile), Str/L:	3.5
Lower 95% Confidence Limit (Amphibole), Str/L:	0
Upper 95% Confidence Limit (Amphibole), Str/L:	3.5

Analyst: Taylor Smylie

Scott M. Ward, Ph.D. **Lab Director**

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HDOH Kula Community Air

Sample Number **MFK-AM03-121623-AB**

Air Volume:	4136.605
Effective Filter Area:	385.0 mm^2
Level of Analysis (Chrysotile):	CDQ
Level of Analysis (Amphibole):	ADQ
Magnification Used for Fiber Counting:	20,000
Aspect Ratio for Fiber Definition:	5:1
Mean Dimension of Grid Openings (GOs):	0.0132 mm^2
Initials of Analyst:	ts
Number of GO's Examined:	10
Analytical Sensitivity: f/Liter:	0.70509
Analytical Sensitivity: f/cm3:	0.00071
Number of primary asbestos structures:	0
Number of asbestos structures counted:	0
Number of asbestos structures > 5 um :	0
Number of asbestos fibers and bundles > 5 um:	0
Number of PCM equivalent asbestos structures:	0
Number of PCM equivalent asbestos fibers:	0
Concentration of Asbestos (Chrysotile) f/cm3:	<0.00071
Concentration of Asbestos (Amphibole) f/cm3:	<0.00071
Concentration of PCME Asbestos (Chrysotile) f/cm3:	<0.00071
Concentration of Asbestos (Chrysotile), Str/L:	0
Concentration of Asbestos (Amphibole), Str/L:	0
Lower 95% Confidence Limit (Chrysotile), Str/L:	0
Upper 95% Confidence Limit (Chrysotile), Str/L:	2.6
Lower 95% Confidence Limit (Amphibole), Str/L:	0
Upper 95% Confidence Limit (Amphibole), Str/L:	2.6

Analyst: Taylor Smylie

Scott M. Ward, Ph.D. **Lab Director**

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Airborne Asbestos Fiber Analysis by Transmission Electron Microscopy (TEM) ISO 10312 - Ambient Air - Determination of Asbestos Fibers Direct-Transfer Transmission Electron Microscopy Method

Maura McAleese
Tetra Tech
1999 Harrison St, Ste. 500
Oakland, CA 94612

EJ3 Order #: 3488212
Project #: 103S864023141
Receipt Date: 20-Dec-2023
Analysis Date: 27-Dec-2023
Report Date: 27-Dec-2023

HDOH Kula Community Air

Sample Number **MFK-FB01-121623-AB**

Air Volume:	0
Effective Filter Area:	385.0 mm^2
Level of Analysis (Chrysotile):	CDQ
Level of Analysis (Amphibole):	ADQ
Magnification Used for Fiber Counting:	20,000
Aspect Ratio for Fiber Definition:	5:1
Mean Dimension of Grid Openings (GOs):	0.0132 mm^2
Initials of Analyst:	ts
Number of GO's Examined:	10
Analytical Sensitivity: f/Liter:	N/A
Analytical Sensitivity: f/cm3:	N/A
Number of primary asbestos structures:	0
Number of asbestos structures counted:	0
Number of asbestos structures > 5 um :	0
Number of asbestos fibers and bundles > 5 um:	0
Number of PCM equivalent asbestos structures:	0
Number of PCM equivalent asbestos fibers:	0
Concentration of Asbestos (Chrysotile) f/cm3:	N/A
Concentration of Asbestos (Amphibole) f/cm3:	N/A
Concentration of PCME Asbestos (Chrysotile) f/cm3:	N/A
Concentration of Asbestos (Chrysotile), Str/L:	N/A
Concentration of Asbestos (Amphibole), Str/L:	N/A
Lower 95% Confidence Limit (Chrysotile), Str/L:	N/A
Upper 95% Confidence Limit (Chrysotile), Str/L:	N/A
Lower 95% Confidence Limit (Amphibole), Str/L:	N/A
Upper 95% Confidence Limit (Amphibole), Str/L:	N/A

Analyst: Taylor Smylie

Scott M. Ward, Ph.D. **Lab Director**

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EJ3 Order #: 3488212
Project #: 103S864023141
Receipt Date: 20-Dec-2023
Analysis Date: 27-Dec-2023
Report Date: 27-Dec-2023

HDOH Kula Community Air

Sample Number **MFK-AM01-121723-AB**

Air Volume:	7339.695
Effective Filter Area:	385.0 mm^2
Level of Analysis (Chrysotile):	CDQ
Level of Analysis (Amphibole):	ADQ
Magnification Used for Fiber Counting:	20,000
Aspect Ratio for Fiber Definition:	5:1
Mean Dimension of Grid Openings (GOs):	0.0132 mm^2
Initials of Analyst:	TS
Number of GO’s Examined:	10
Analytical Sensitivity: f/Liter:	0.39738
Analytical Sensitivity: f/cm3:	0.00040
Number of primary asbestos structures:	0
Number of asbestos structures counted:	0
Number of asbestos structures > 5 um :	0
Number of asbestos fibers and bundles > 5 um:	0
Number of PCM equivalent asbestos structures:	0
Number of PCM equivalent asbestos fibers:	0
Concentration of Asbestos (Chrysotile) f/cm3:	<0.00040
Concentration of Asbestos (Amphibole) f/cm3:	<0.00040
Concentration of PCME Asbestos (Chrysotile) f/cm3:	<0.00040
Concentration of Asbestos (Chrysotile), Str/L:	0
Concentration of Asbestos (Amphibole), Str/L:	0
Lower 95% Confidence Limit (Chrysotile), Str/L:	0
Upper 95% Confidence Limit (Chrysotile), Str/L:	1.5
Lower 95% Confidence Limit (Amphibole), Str/L:	0
Upper 95% Confidence Limit (Amphibole), Str/L:	1.5

Analyst: Taylor Smylie

Scott M. Ward, Ph.D. **Lab Director**

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EJ3 Order #: 3488212
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Analysis Date: 27-Dec-2023
Report Date: 27-Dec-2023

HDOH Kula Community Air

Sample Number **MFK-AM02-121723-AB**

Air Volume:	2207.932
Effective Filter Area:	385.0 mm^2
Level of Analysis (Chrysotile):	CDQ
Level of Analysis (Amphibole):	ADQ
Magnification Used for Fiber Counting:	20,000
Aspect Ratio for Fiber Definition:	5:1
Mean Dimension of Grid Openings (GOs):	0.0132 mm^2
Initials of Analyst:	TS
Number of GO's Examined:	10
Analytical Sensitivity: f/Liter:	1.32099
Analytical Sensitivity: f/cm3:	0.00132
Number of primary asbestos structures:	0
Number of asbestos structures counted:	0
Number of asbestos structures > 5 um :	0
Number of asbestos fibers and bundles > 5 um:	0
Number of PCM equivalent asbestos structures:	0
Number of PCM equivalent asbestos fibers:	0
Concentration of Asbestos (Chrysotile) f/cm3:	<0.00132
Concentration of Asbestos (Amphibole) f/cm3:	<0.00132
Concentration of PCME Asbestos (Chrysotile) f/cm3:	<0.00132
Concentration of Asbestos (Chrysotile), Str/L:	0
Concentration of Asbestos (Amphibole), Str/L:	0
Lower 95% Confidence Limit (Chrysotile), Str/L:	0
Upper 95% Confidence Limit (Chrysotile), Str/L:	4.9
Lower 95% Confidence Limit (Amphibole), Str/L:	0
Upper 95% Confidence Limit (Amphibole), Str/L:	4.9

Analyst: Tyalor Smylie

Scott M. Ward, Ph.D. **Lab Director**

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Receipt Date: 20-Dec-2023
Analysis Date: 27-Dec-2023
Report Date: 27-Dec-2023

HDOH Kula Community Air

Sample Number **MFK-AM03-121723-AB**

Air Volume:	8032.999
Effective Filter Area:	385.0 mm^2
Level of Analysis (Chrysotile):	CDQ
Level of Analysis (Amphibole):	ADQ
Magnification Used for Fiber Counting:	20,000
Aspect Ratio for Fiber Definition:	5:1
Mean Dimension of Grid Openings (GOs):	0.0132 mm^2
Initials of Analyst:	ts
Number of GO's Examined:	10
Analytical Sensitivity: f/Liter:	0.36309
Analytical Sensitivity: f/cm3:	0.00036
Number of primary asbestos structures:	0
Number of asbestos structures counted:	0
Number of asbestos structures > 5 um :	0
Number of asbestos fibers and bundles > 5 um:	0
Number of PCM equivalent asbestos structures:	0
Number of PCM equivalent asbestos fibers:	0
Concentration of Asbestos (Chrysotile) f/cm3:	<0.00036
Concentration of Asbestos (Amphibole) f/cm3:	<0.00036
Concentration of PCME Asbestos (Chrysotile) f/cm3:	<0.00036
Concentration of Asbestos (Chrysotile), Str/L:	0
Concentration of Asbestos (Amphibole), Str/L:	0
Lower 95% Confidence Limit (Chrysotile), Str/L:	0
Upper 95% Confidence Limit (Chrysotile), Str/L:	1.3
Lower 95% Confidence Limit (Amphibole), Str/L:	0
Upper 95% Confidence Limit (Amphibole), Str/L:	1.3

Analyst: Taylor Smylie

Scott M. Ward, Ph.D. **Lab Director**

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Airborne Asbestos Fiber Analysis
by Transmission Electron Microscopy (TEM)
ISO 10312 - Ambient Air - Determination of Asbestos Fibers
Direct-Transfer Transmission Electron Microscopy Method

Maura McAleese
Tetra Tech
1999 Harrison St, Ste. 500
Oakland, CA 94612

EJ3 Order #: 3488212
Project #: 103S864023141
Receipt Date: 20-Dec-2023
Analysis Date: 27-Dec-2023
Report Date: 27-Dec-2023

HDOH Kula Community Air

Sample Number **MFK-FB01-121723-AB**

Air Volume:	0
Effective Filter Area:	385.0 mm^2
Level of Analysis (Chrysotile):	CDQ
Level of Analysis (Amphibole):	ADQ
Magnification Used for Fiber Counting:	20,000
Aspect Ratio for Fiber Definition:	5:1
Mean Dimension of Grid Openings (GOs):	0.0132 mm^2
Initials of Analyst:	TS
Number of GO’s Examined:	10
Analytical Sensitivity: f/Liter:	N/A
Analytical Sensitivity: f/cm3:	N/A
Number of primary asbestos structures:	0
Number of asbestos structures counted:	0
Number of asbestos structures > 5 um :	0
Number of asbestos fibers and bundles > 5 um:	0
Number of PCM equivalent asbestos structures:	0
Number of PCM equivalent asbestos fibers:	0
Concentration of Asbestos (Chrysotile) f/cm3:	N/A
Concentration of Asbestos (Amphibole) f/cm3:	N/A
Concentration of PCME Asbestos (Chrysotile) f/cm3:	N/A
Concentration of Asbestos (Chrysotile), Str/L:	N/A
Concentration of Asbestos (Amphibole), Str/L:	N/A
Lower 95% Confidence Limit (Chrysotile), Str/L:	N/A
Upper 95% Confidence Limit (Chrysotile), Str/L:	N/A
Lower 95% Confidence Limit (Amphibole), Str/L:	N/A
Upper 95% Confidence Limit (Amphibole), Str/L:	N/A

Analyst: Taylor Smylie

Scott M. Ward, Ph.D. **Lab Director**

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Stage 1 Data Verification Checklist – Asbestos

HDOH CAB – Ambient Community Air Sampling – Kula

Task Order No. 23141

Reviewed by:
Trinh Vu 12/28/2023 & Shanna Vasser 12/28/2023
Laboratory: Eurofins Built Environment Testing – Houston, TX
Analysis date: 12/27/2023
Report No: 3488212

√	1.	Chain of custody (CoC) documentation is present.
√	2.	Sample receipt condition information is present and acceptable.
√	3.	Laboratory conducting the analysis is identified.
√	4.	All samples submitted to the laboratory are accounted for.
√	5.	Requested analytical methods were performed.
√	6.	Analysis dates are provided.
√	7.	Analyte results are provided.
NA	8.	Result qualifiers and definitions are provided.
√	9.	Result units are reported.
√	10.	Requested reporting limits are present.
NA	11.	Method detection limits are present.
√	12.	Sample collection date and time are present.

Discrepancies:

MFK-AM02-121423-AB was listed on the CoC but crossed off and noted that it was void and not shipped to the laboratory. No results were present in the laboratory report for this sample because it was not shipped. No action was required.

Notes: None

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Maura McAleese
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EJ3 Order #: 3492635
Project #: 103S864023141
Receipt Date: 27-Dec-2023
Analysis Date: 2-Jan-2024
Report Date: 2-Jan-2024

HDOH Kula Community Air

Sample Number **MFK-AM01-121823-AB**

Air Volume:	7331.264
Effective Filter Area:	385.0 mm^2
Level of Analysis (Chrysotile):	CDQ
Level of Analysis (Amphibole):	ADQ
Magnification Used for Fiber Counting:	20,000
Aspect Ratio for Fiber Definition:	5:1
Mean Dimension of Grid Openings (GOs):	0.0132 mm^2
Initials of Analyst:	AF
Number of GO's Examined:	10
Analytical Sensitivity: f/Liter:	0.39784
Analytical Sensitivity: f/cm3:	0.00040
Number of primary asbestos structures:	0
Number of asbestos structures counted:	0
Number of asbestos structures > 5 um :	0
Number of asbestos fibers and bundles > 5 um:	0
Number of PCM equivalent asbestos structures:	0
Number of PCM equivalent asbestos fibers:	0
Concentration of Asbestos (Chrysotile) f/cm3:	<0.00040
Concentration of Asbestos (Amphibole) f/cm3:	<0.00040
Concentration of PCME Asbestos (Chrysotile) f/cm3:	<0.00040
Concentration of Asbestos (Chrysotile), Str/L:	0
Concentration of Asbestos (Amphibole), Str/L:	0
Lower 95% Confidence Limit (Chrysotile), Str/L:	0
Upper 95% Confidence Limit (Chrysotile), Str/L:	1.5
Lower 95% Confidence Limit (Amphibole), Str/L:	0
Upper 95% Confidence Limit (Amphibole), Str/L:	1.5

Analyst: Arnold Flores

Scott M. Ward, Ph.D. **Lab Director**

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Report Date: 2-Jan-2024

HDOH Kula Community Air

Sample Number **MFK-AM02-121823-AB**

Air Volume:	3776.906
Effective Filter Area:	385.0 mm^2
Level of Analysis (Chrysotile):	CDQ
Level of Analysis (Amphibole):	ADQ
Magnification Used for Fiber Counting:	20,000
Aspect Ratio for Fiber Definition:	5:1
Mean Dimension of Grid Openings (GOs):	0.0132 mm^2
Initials of Analyst:	AF
Number of GO's Examined:	10
Analytical Sensitivity: f/Liter:	0.77224
Analytical Sensitivity: f/cm3:	0.00077
Number of primary asbestos structures:	0
Number of asbestos structures counted:	0
Number of asbestos structures > 5 um :	0
Number of asbestos fibers and bundles > 5 um:	0
Number of PCM equivalent asbestos structures:	0
Number of PCM equivalent asbestos fibers:	0
Concentration of Asbestos (Chrysotile) f/cm3:	<0.00077
Concentration of Asbestos (Amphibole) f/cm3:	<0.00077
Concentration of PCME Asbestos (Chrysotile) f/cm3:	<0.00077
Concentration of Asbestos (Chrysotile), Str/L:	0
Concentration of Asbestos (Amphibole), Str/L:	0
Lower 95% Confidence Limit (Chrysotile), Str/L:	0
Upper 95% Confidence Limit (Chrysotile), Str/L:	2.8
Lower 95% Confidence Limit (Amphibole), Str/L:	0
Upper 95% Confidence Limit (Amphibole), Str/L:	2.8

Analyst: Arnold Flores

Scott M. Ward, Ph.D. **Lab Director**

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Receipt Date: 27-Dec-2023
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Report Date: 2-Jan-2024

HDOH Kula Community Air

Sample Number **MFK-AM03-121823-AB**

Air Volume:	3356.77
Effective Filter Area:	385.0 mm^2
Level of Analysis (Chrysotile):	CDQ
Level of Analysis (Amphibole):	ADQ
Magnification Used for Fiber Counting:	20,000
Aspect Ratio for Fiber Definition:	5:1
Mean Dimension of Grid Openings (GOs):	0.0132 mm^2
Initials of Analyst:	AF
Number of GO's Examined:	10
Analytical Sensitivity: f/Liter:	0.86889
Analytical Sensitivity: f/cm3:	0.00087
Number of primary asbestos structures:	0
Number of asbestos structures counted:	0
Number of asbestos structures > 5 um :	0
Number of asbestos fibers and bundles > 5 um:	0
Number of PCM equivalent asbestos structures:	0
Number of PCM equivalent asbestos fibers:	0
Concentration of Asbestos (Chrysotile) f/cm3:	<0.00087
Concentration of Asbestos (Amphibole) f/cm3:	<0.00087
Concentration of PCME Asbestos (Chrysotile) f/cm3:	<0.00087
Concentration of Asbestos (Chrysotile), Str/L:	0
Concentration of Asbestos (Amphibole), Str/L:	0
Lower 95% Confidence Limit (Chrysotile), Str/L:	0
Upper 95% Confidence Limit (Chrysotile), Str/L:	3.2
Lower 95% Confidence Limit (Amphibole), Str/L:	0
Upper 95% Confidence Limit (Amphibole), Str/L:	3.2

Analyst: Arnold Flores

Scott M. Ward, Ph.D. **Lab Director**

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Receipt Date: 27-Dec-2023
Analysis Date: 2-Jan-2024
Report Date: 2-Jan-2024

HDOH Kula Community Air

Sample Number **MFK-FB01-121823-AB**

Air Volume:	0
Effective Filter Area:	385.0 mm^2
Level of Analysis (Chrysotile):	CDQ
Level of Analysis (Amphibole):	ADQ
Magnification Used for Fiber Counting:	20,000
Aspect Ratio for Fiber Definition:	5:1
Mean Dimension of Grid Openings (GOs):	0.0132 mm^2
Initials of Analyst:	AF
Number of GO's Examined:	10
Analytical Sensitivity: f/Liter:	N/A
Analytical Sensitivity: f/cm3:	N/A
Number of primary asbestos structures:	0
Number of asbestos structures counted:	0
Number of asbestos structures > 5 um :	0
Number of asbestos fibers and bundles > 5 um:	0
Number of PCM equivalent asbestos structures:	0
Number of PCM equivalent asbestos fibers:	0
Concentration of Asbestos (Chrysotile) f/cm3:	N/A
Concentration of Asbestos (Amphibole) f/cm3:	N/A
Concentration of PCME Asbestos (Chrysotile) f/cm3:	N/A
Concentration of Asbestos (Chrysotile), Str/L:	N/A
Concentration of Asbestos (Amphibole), Str/L:	N/A
Lower 95% Confidence Limit (Chrysotile), Str/L:	N/A
Upper 95% Confidence Limit (Chrysotile), Str/L:	N/A
Lower 95% Confidence Limit (Amphibole), Str/L:	N/A
Upper 95% Confidence Limit (Amphibole), Str/L:	N/A

Analyst: Arnold Flores

Scott M. Ward, Ph.D. **Lab Director**

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NVLAP Lab Code: 200525-0; TDSHS License: 30-0273

Eurofins J3 Resources, Inc.
6110 W. 34th Street, Houston, Texas 77092
Phone: (713) 290-0221 Fax: (713) 290-0248
j3resources.com

Airborne Asbestos Fiber Analysis by Transmission Electron Microscopy (TEM) ISO 10312 - Ambient Air - Determination of Asbestos Fibers Direct-Transfer Transmission Electron Microscopy Method

Maura McAleese
Tetra Tech - Maui Fire
1999 Harrison St. Ste. 500
Oakland, CA 94612

EJ3 Order #: 3492635
Project #: 103S864023141
Receipt Date: 27-Dec-2023
Analysis Date: 2-Jan-2024
Report Date: 2-Jan-2024

HDOH Kula Community Air

Sample Number **MFK-AM01-121923-AB**

Air Volume:	7927.423
Effective Filter Area:	385.0 mm^2
Level of Analysis (Chrysotile):	CDQ
Level of Analysis (Amphibole):	ADQ
Magnification Used for Fiber Counting:	20,000
Aspect Ratio for Fiber Definition:	5:1
Mean Dimension of Grid Openings (GOs):	0.0132 mm^2
Initials of Analyst:	AF
Number of GO's Examined:	10
Analytical Sensitivity: f/Liter:	0.36792
Analytical Sensitivity: f/cm3:	0.00037
Number of primary asbestos structures:	0
Number of asbestos structures counted:	0
Number of asbestos structures > 5 um :	0
Number of asbestos fibers and bundles > 5 um:	0
Number of PCM equivalent asbestos structures:	0
Number of PCM equivalent asbestos fibers:	0
Concentration of Asbestos (Chrysotile) f/cm3:	<0.00037
Concentration of Asbestos (Amphibole) f/cm3:	<0.00037
Concentration of PCME Asbestos (Chrysotile) f/cm3:	<0.00037
Concentration of Asbestos (Chrysotile), Str/L:	0
Concentration of Asbestos (Amphibole), Str/L:	0
Lower 95% Confidence Limit (Chrysotile), Str/L:	0
Upper 95% Confidence Limit (Chrysotile), Str/L:	1.4
Lower 95% Confidence Limit (Amphibole), Str/L:	0
Upper 95% Confidence Limit (Amphibole), Str/L:	1.4

Analyst: Arnold Flores

Scott M. Ward, Ph.D. **Lab Director**

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Maura McAleese
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1999 Harrison St. Ste. 500
Oakland, CA 94612

EJ3 Order #: 3492635
Project #: 103S864023141
Receipt Date: 27-Dec-2023
Analysis Date: 2-Jan-2024
Report Date: 2-Jan-2024

HDOH Kula Community Air

Sample Number **MFK-AM02-121923-AB**

Air Volume:	6446.633
Effective Filter Area:	385.0 mm^2
Level of Analysis (Chrysotile):	CDQ
Level of Analysis (Amphibole):	ADQ
Magnification Used for Fiber Counting:	20,000
Aspect Ratio for Fiber Definition:	5:1
Mean Dimension of Grid Openings (GOs):	0.0132 mm^2
Initials of Analyst:	AF
Number of GO's Examined:	10
Analytical Sensitivity: f/Liter:	0.45243
Analytical Sensitivity: f/cm3:	0.00045
Number of primary asbestos structures:	0
Number of asbestos structures counted:	0
Number of asbestos structures > 5 um :	0
Number of asbestos fibers and bundles > 5 um:	0
Number of PCM equivalent asbestos structures:	0
Number of PCM equivalent asbestos fibers:	0
Concentration of Asbestos (Chrysotile) f/cm3:	<0.00045
Concentration of Asbestos (Amphibole) f/cm3:	<0.00045
Concentration of PCME Asbestos (Chrysotile) f/cm3:	<0.00045
Concentration of Asbestos (Chrysotile), Str/L:	0
Concentration of Asbestos (Amphibole), Str/L:	0
Lower 95% Confidence Limit (Chrysotile), Str/L:	0
Upper 95% Confidence Limit (Chrysotile), Str/L:	1.7
Lower 95% Confidence Limit (Amphibole), Str/L:	0
Upper 95% Confidence Limit (Amphibole), Str/L:	1.7

Analyst: Arnold Flores

Scott M. Ward, Ph.D. **Lab Director**

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Maura McAleese
Tetra Tech - Maui Fire
1999 Harrison St. Ste. 500
Oakland, CA 94612

EJ3 Order #: 3492635
Project #: 103S864023141
Receipt Date: 27-Dec-2023
Analysis Date: 2-Jan-2024
Report Date: 2-Jan-2024

HDOH Kula Community Air

Sample Number **MFK-AM03-121923-AB**

Air Volume:	5509.867
Effective Filter Area:	385.0 mm^2
Level of Analysis (Chrysotile):	CDQ
Level of Analysis (Amphibole):	ADQ
Magnification Used for Fiber Counting:	20,000
Aspect Ratio for Fiber Definition:	5:1
Mean Dimension of Grid Openings (GOs):	0.0132 mm^2
Initials of Analyst:	AF
Number of GO's Examined:	10
Analytical Sensitivity: f/Liter:	0.52935
Analytical Sensitivity: f/cm3:	0.00053
Number of primary asbestos structures:	0
Number of asbestos structures counted:	0
Number of asbestos structures > 5 um :	0
Number of asbestos fibers and bundles > 5 um:	0
Number of PCM equivalent asbestos structures:	0
Number of PCM equivalent asbestos fibers:	0
Concentration of Asbestos (Chrysotile) f/cm3:	<0.00053
Concentration of Asbestos (Amphibole) f/cm3:	<0.00053
Concentration of PCME Asbestos (Chrysotile) f/cm3:	<0.00053
Concentration of Asbestos (Chrysotile), Str/L:	0
Concentration of Asbestos (Amphibole), Str/L:	0
Lower 95% Confidence Limit (Chrysotile), Str/L:	0
Upper 95% Confidence Limit (Chrysotile), Str/L:	2
Lower 95% Confidence Limit (Amphibole), Str/L:	0
Upper 95% Confidence Limit (Amphibole), Str/L:	2

Analyst: Arnold Flores

Scott M. Ward, Ph.D. **Lab Director**

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Maura McAleese
Tetra Tech - Maui Fire
1999 Harrison St. Ste. 500
Oakland, CA 94612

EJ3 Order #: 3492635
Project #: 103S864023141
Receipt Date: 27-Dec-2023
Analysis Date: 2-Jan-2024
Report Date: 2-Jan-2024

HDOH Kula Community Air

Sample Number **MFK-FB01-121923-AB**

Air Volume:	0
Effective Filter Area:	385.0 mm^2
Level of Analysis (Chrysotile):	CDQ
Level of Analysis (Amphibole):	ADQ
Magnification Used for Fiber Counting:	20,000
Aspect Ratio for Fiber Definition:	5:1
Mean Dimension of Grid Openings (GOs):	0.0132 mm^2
Initials of Analyst:	AF
Number of GO’s Examined:	10
Analytical Sensitivity: f/Liter:	N/A
Analytical Sensitivity: f/cm3:	N/A
Number of primary asbestos structures:	0
Number of asbestos structures counted:	0
Number of asbestos structures > 5 um :	0
Number of asbestos fibers and bundles > 5 um:	0
Number of PCM equivalent asbestos structures:	0
Number of PCM equivalent asbestos fibers:	0
Concentration of Asbestos (Chrysotile) f/cm3:	N/A
Concentration of Asbestos (Amphibole) f/cm3:	N/A
Concentration of PCME Asbestos (Chrysotile) f/cm3:	N/A
Concentration of Asbestos (Chrysotile), Str/L:	N/A
Concentration of Asbestos (Amphibole), Str/L:	N/A
Lower 95% Confidence Limit (Chrysotile), Str/L:	N/A
Upper 95% Confidence Limit (Chrysotile), Str/L:	N/A
Lower 95% Confidence Limit (Amphibole), Str/L:	N/A
Upper 95% Confidence Limit (Amphibole), Str/L:	N/A

Analyst: Arnold Flores

Scott M. Ward, Ph.D. **Lab Director**

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Maura McAleese
Tetra Tech - Maui Fire
1999 Harrison St. Ste. 500
Oakland, CA 94612

EJ3 Order #: 3492635
Project #: 103S864023141
Receipt Date: 27-Dec-2023
Analysis Date: 2-Jan-2024
Report Date: 2-Jan-2024

HDOH Kula Community Air

Sample Number **MFK-AM01-122023-AB**

Air Volume:	7875.824
Effective Filter Area:	385.0 mm^2
Level of Analysis (Chrysotile):	CDQ
Level of Analysis (Amphibole):	ADQ
Magnification Used for Fiber Counting:	20,000
Aspect Ratio for Fiber Definition:	5:1
Mean Dimension of Grid Openings (GOs):	0.0132 mm^2
Initials of Analyst:	AF
Number of GO's Examined:	10
Analytical Sensitivity: f/Liter:	0.37033
Analytical Sensitivity: f/cm3:	0.00037
Number of primary asbestos structures:	0
Number of asbestos structures counted:	0
Number of asbestos structures > 5 um :	0
Number of asbestos fibers and bundles > 5 um:	0
Number of PCM equivalent asbestos structures:	0
Number of PCM equivalent asbestos fibers:	0
Concentration of Asbestos (Chrysotile) f/cm3:	<0.00037
Concentration of Asbestos (Amphibole) f/cm3:	<0.00037
Concentration of PCME Asbestos (Chrysotile) f/cm3:	<0.00037
Concentration of Asbestos (Chrysotile), Str/L:	0
Concentration of Asbestos (Amphibole), Str/L:	0
Lower 95% Confidence Limit (Chrysotile), Str/L:	0
Upper 95% Confidence Limit (Chrysotile), Str/L:	1.4
Lower 95% Confidence Limit (Amphibole), Str/L:	0
Upper 95% Confidence Limit (Amphibole), Str/L:	1.4

Analyst: Arnold Flores

Scott M. Ward, Ph.D. **Lab Director**

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Oakland, CA 94612

EJ3 Order #: 3492635
Project #: 103S864023141
Receipt Date: 27-Dec-2023
Analysis Date: 2-Jan-2024
Report Date: 2-Jan-2024

HDOH Kula Community Air

Sample Number **MFK-AM02-122023-AB**

Air Volume:	3924.248
Effective Filter Area:	385.0 mm^2
Level of Analysis (Chrysotile):	CDQ
Level of Analysis (Amphibole):	ADQ
Magnification Used for Fiber Counting:	20,000
Aspect Ratio for Fiber Definition:	5:1
Mean Dimension of Grid Openings (GOs):	0.0132 mm^2
Initials of Analyst:	AF
Number of GO's Examined:	10
Analytical Sensitivity: f/Liter:	0.74324
Analytical Sensitivity: f/cm3:	0.00074
Number of primary asbestos structures:	0
Number of asbestos structures counted:	0
Number of asbestos structures > 5 um :	0
Number of asbestos fibers and bundles > 5 um:	0
Number of PCM equivalent asbestos structures:	0
Number of PCM equivalent asbestos fibers:	0
Concentration of Asbestos (Chrysotile) f/cm3:	<0.00074
Concentration of Asbestos (Amphibole) f/cm3:	<0.00074
Concentration of PCME Asbestos (Chrysotile) f/cm3:	<0.00074
Concentration of Asbestos (Chrysotile), Str/L:	0
Concentration of Asbestos (Amphibole), Str/L:	0
Lower 95% Confidence Limit (Chrysotile), Str/L:	0
Upper 95% Confidence Limit (Chrysotile), Str/L:	2.7
Lower 95% Confidence Limit (Amphibole), Str/L:	0
Upper 95% Confidence Limit (Amphibole), Str/L:	2.7

Analyst: Arnold Flores

Scott M. Ward, Ph.D. **Lab Director**

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Maura McAleese
Tetra Tech - Maui Fire
1999 Harrison St. Ste. 500
Oakland, CA 94612

EJ3 Order #: 3492635
Project #: 103S864023141
Receipt Date: 27-Dec-2023
Analysis Date: 2-Jan-2024
Report Date: 2-Jan-2024

HDOH Kula Community Air

Sample Number **MFK-AM03-122023-AB**

Air Volume:	4328.274
Effective Filter Area:	385.0 mm^2
Level of Analysis (Chrysotile):	CDQ
Level of Analysis (Amphibole):	ADQ
Magnification Used for Fiber Counting:	20,000
Aspect Ratio for Fiber Definition:	5:1
Mean Dimension of Grid Openings (GOs):	0.0132 mm^2
Initials of Analyst:	AF
Number of GO's Examined:	10
Analytical Sensitivity: f/Liter:	0.67386
Analytical Sensitivity: f/cm3:	0.00067
Number of primary asbestos structures:	0
Number of asbestos structures counted:	0
Number of asbestos structures > 5 um :	0
Number of asbestos fibers and bundles > 5 um:	0
Number of PCM equivalent asbestos structures:	0
Number of PCM equivalent asbestos fibers:	0
Concentration of Asbestos (Chrysotile) f/cm3:	<0.00067
Concentration of Asbestos (Amphibole) f/cm3:	<0.00067
Concentration of PCME Asbestos (Chrysotile) f/cm3:	<0.00067
Concentration of Asbestos (Chrysotile), Str/L:	0
Concentration of Asbestos (Amphibole), Str/L:	0
Lower 95% Confidence Limit (Chrysotile), Str/L:	0
Upper 95% Confidence Limit (Chrysotile), Str/L:	2.5
Lower 95% Confidence Limit (Amphibole), Str/L:	0
Upper 95% Confidence Limit (Amphibole), Str/L:	2.5

Analyst: Arnold Flores

Scott M. Ward, Ph.D. **Lab Director**

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Oakland, CA 94612

EJ3 Order #: 3492635
Project #: 103S864023141
Receipt Date: 27-Dec-2023
Analysis Date: 2-Jan-2024
Report Date: 2-Jan-2024

HDOH Kula Community Air

Sample Number **MFK-FB01-122023-AB**

Air Volume:	0
Effective Filter Area:	385.0 mm^2
Level of Analysis (Chrysotile):	CDQ
Level of Analysis (Amphibole):	ADQ
Magnification Used for Fiber Counting:	20,000
Aspect Ratio for Fiber Definition:	5:1
Mean Dimension of Grid Openings (GOs):	0.0132 mm^2
Initials of Analyst:	AF
Number of GO's Examined:	10
Analytical Sensitivity: f/Liter:	N/A
Analytical Sensitivity: f/cm3:	N/A
Number of primary asbestos structures:	0
Number of asbestos structures counted:	0
Number of asbestos structures > 5 um :	0
Number of asbestos fibers and bundles > 5 um:	0
Number of PCM equivalent asbestos structures:	0
Number of PCM equivalent asbestos fibers:	0
Concentration of Asbestos (Chrysotile) f/cm3:	N/A
Concentration of Asbestos (Amphibole) f/cm3:	N/A
Concentration of PCME Asbestos (Chrysotile) f/cm3:	N/A
Concentration of Asbestos (Chrysotile), Str/L:	N/A
Concentration of Asbestos (Amphibole), Str/L:	N/A
Lower 95% Confidence Limit (Chrysotile), Str/L:	N/A
Upper 95% Confidence Limit (Chrysotile), Str/L:	N/A
Lower 95% Confidence Limit (Amphibole), Str/L:	N/A
Upper 95% Confidence Limit (Amphibole), Str/L:	N/A

Analyst: Arnold Flores

Scott M. Ward, Ph.D. **Lab Director**

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Stage 1 Data Verification Checklist – Asbestos

HDOH CAB – Ambient Community Air Sampling – Kula

Task Order No. 23141

Reviewed by:
Trinh Vu 01/03/2024 & Shanna Vasser 1/3/2024
Laboratory: Eurofins Built Environment Testing – Houston, TX
Analysis date: 01/02/2024
Report No: 3492635

√ 1. Chain of custody (CoC) documentation is present.

√ 2. Sample receipt condition information is present and acceptable.

√ 3. Laboratory conducting the analysis is identified.

√ 4. All samples submitted to the laboratory are accounted for.

√ 5. Requested analytical methods were performed.

√ 6. Analysis dates are provided.

√ 7. Analyte results are provided.

NA 8. Result qualifiers and definitions are provided.

√ 9. Result units are reported.

√ 10. Requested reporting limits are present.

NA 11. Method detection limits are present.

√ 12. Sample collection date and time are present.

Discrepancies: None

Notes: None

Eastern Research Group
601 Keystone Park Drive
Suite 700
Morrisville, NC 27560

January 03, 2024

Ms. Chelsea Saber
Tetra Tech, Inc.
1777 Sentry Pkwy, Bldg 12
Blue Bell, PA 19422
Project Name: Maui fires

Dear Ms. Chelsea Saber,

This report contains the analytical results for the sample(s) received under chain(s) of custody by Eastern Research Group on 12/26/23 12:07.

Values below the MDL for QC results in this report are recorded as ND, however the actual values are reported in the accompanying Excel report with a "U" flag (Under the detection limit). The actual values are reported in AQS.

This test is accredited under the 2016 TNI Standard for Environmental Laboratories (FL DOH Certification # E87673). All analyses were performed as described in the US EPA-approved QAPP, under the contract for National Hazardous Air Pollutant Support (US EPA Contract No. 68HERH22D0002). This cover page is an integral part of this report, and any exceptions or comments are noted on the last page.

Release of the data contained in this data package and in the data submitted in the electronic data deliverable, has been authorized by the Program Manager, or the Program Manager's designee as verified by the following signature.

The issuance of the final Certificate of Analysis takes precedence over any previous Report. If you have any questions, please contact me at 919-468-7924.

Sincerely,

Julie Swift
Program Manager
julie.swift@erg.com

The information contained in this report and its attachment(s) are intended only for the use of the individual to whom it is addressed and may contain information that is privileged, confidential, or exempt from disclosure. If the reader of this message is not the intended recipient, you are hereby notified that any dissemination, distribution, or copying of this report is strictly prohibited. If you have received this report in error, please notify julie.swift@erg.com and delete the report without retaining any copies.

CERTIFICATE OF ANALYSIS

Tetra Tech, Inc.
1777 Sentry Pkwy, Bldg 12
Blue Bell, PA 19422
ATTN: Ms. Chelsea Saber
PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 01/03/24 09:12
SUBMITTED: 12/26/23
AQS SITE CODE:
SITE CODE: Maui fires

ANALYTICAL REPORT FOR SAMPLES

SampleName	LabNumber	Matrix	Sampled	Received
TetraTech Q9533907	3122607-01	Air	12/18/23 23:59	12/26/23 12:07
TetraTech Q9533906	3122607-02	Air	12/18/23 23:59	12/26/23 12:07
TetraTech Q9533904	3122607-03	Air	12/18/23 23:59	12/26/23 12:07
TetraTech Q9533903 FB	3122607-04	Air	12/18/23 00:00	12/26/23 12:07
TetraTech Q9533902	3122607-05	Air	12/19/23 23:59	12/26/23 12:07
TetraTech Q9533901	3122607-06	Air	12/19/23 23:59	12/26/23 12:07
TetraTech Q9533899	3122607-07	Air	12/19/23 23:59	12/26/23 12:07
TetraTech Q9533897 FB	3122607-08	Air	12/19/23 00:00	12/26/23 12:07
TetraTech Q9524476	3122607-09	Air	12/20/23 23:59	12/26/23 12:07
TetraTech Q9551127	3122607-10	Air	12/20/23 23:59	12/26/23 12:07
TetraTech Q9524475	3122607-11	Air	12/20/23 23:59	12/26/23 12:07
TetraTech Q9524488 FB	3122607-12	Air	12/20/23 00:00	12/26/23 12:07

The results in this report apply only to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

CERTIFICATE OF ANALYSIS

Tetra Tech, Inc.
1777 Sentry Pkwy, Bldg 12
Blue Bell, PA 19422
ATTN: Ms. Chelsea Saber
PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 01/03/24 09:12
SUBMITTED: 12/26/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9533907 **Lab ID:** 3122607-01 **Sampled:** 12/18/23 23:59
Matrix: Air **Sample Volume:** 2014.265 m³ **Received:** 12/26/23 12:07
Filter ID: **Analysis Date:** 12/27/23 22:09
Comments: MFK-AM01-121823-HM

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	**7429-90-5**	**221**		**25.9**
Antimony	**7440-36-0**	**0.0709**	SL	**0.0356**
Arsenic	**7440-38-2**	**0.156**		**0.00771**
Barium	**7440-39-3**	**3.76**		**0.766**
Beryllium	**7440-41-7**	**0.00765**		**0.00268**
Cadmium	7440-43-9	0.00600	U	0.0880
Calcium	**7440-70-2**	**415**	LJ, QB-01	**236**
Chromium	7440-47-3	1.62	U	1.64
Cobalt	**7440-48-4**	**0.118**	QB-01	**0.0126**
Copper	**7440-50-8**	**19.1**		**2.42**
Iron	**7439-89-6**	**236**		**19.5**
Lead	**7439-92-1**	**0.313**		**0.223**
Magnesium	**7439-95-4**	**110**		**77.9**
Manganese	**7439-96-5**	**6.15**		**0.961**
Molybdenum	**7439-98-7**	**1.06**	QB-01	**0.172**
Nickel	7440-02-0	0.486	U	0.647
Phosphorus	7723-14-0	297	GC-BS, U	1010
Potassium	**7440-09-7**	**71.9**		**30.7**
Rubidium	**7440-17-7**	**0.108**		**0.0148**
Selenium	**7782-49-2**	**0.0676**		**0.00889**
Sodium	7440-23-5	1080	U	1620
Strontium	**7440-24-6**	**2.07**	QB-01	**0.527**
Thallium	**7440-28-0**	**0.00116**		**4.06E-4**
Thorium	**7440-29-01**	**0.00571**		**0.00242**
Uranium	7440-61-1	0.00591	U	0.0137
Vanadium	**7440-62-2**	**0.543**		**0.0397**
Zinc	7440-66-6	30.5	U	78.9

CERTIFICATE OF ANALYSIS

Tetra Tech, Inc.
1777 Sentry Pkwy, Bldg 12
Blue Bell, PA 19422
ATTN: Ms. Chelsea Saber
PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 01/03/24 09:12
SUBMITTED: 12/26/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9533906 **Lab ID:** 3122607-02 **Sampled:** 12/18/23 23:59
Matrix: Air **Sample Volume:** 2035.188 m³ **Received:** 12/26/23 12:07
Filter ID: **Analysis Date:** 12/27/23 22:27
Comments: MFK-AM02-121823-HM

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	**7429-90-5**	**219**		**25.7**
Antimony	**7440-36-0**	**0.0642**	SL	**0.0353**
Arsenic	**7440-38-2**	**0.216**		**0.00763**
Barium	**7440-39-3**	**3.78**		**0.758**
Beryllium	**7440-41-7**	**0.00747**		**0.00265**
Cadmium	7440-43-9	0.00904	U	0.0871
Calcium	**7440-70-2**	**426**	LJ, QB-01	**233**
Chromium	**7440-47-3**	**1.81**		**1.62**
Cobalt	**7440-48-4**	**0.116**	QB-01	**0.0125**
Copper	**7440-50-8**	**16.2**		**2.40**
Iron	**7439-89-6**	**239**		**19.3**
Lead	7439-92-1	0.201	U	0.221
Magnesium	**7439-95-4**	**109**		**77.1**
Manganese	**7439-96-5**	**5.88**		**0.951**
Molybdenum	**7439-98-7**	**0.991**	QB-01	**0.170**
Nickel	7440-02-0	0.597	U	0.640
Phosphorus	7723-14-0	291	GC-BS, U	999
Potassium	**7440-09-7**	**104**		**30.4**
Rubidium	**7440-17-7**	**0.190**		**0.0146**
Selenium	**7782-49-2**	**0.0741**		**0.00879**
Sodium	7440-23-5	1090	U	1600
Strontium	**7440-24-6**	**2.08**	QB-01	**0.521**
Thallium	**7440-28-0**	**0.00111**		**4.02E-4**
Thorium	**7440-29-01**	**0.00702**		**0.00240**
Uranium	7440-61-1	0.00590	U	0.0136
Vanadium	**7440-62-2**	**0.558**		**0.0393**
Zinc	7440-66-6	23.4	U	78.1

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FILE #: 0000.00
REPORTED: 01/03/24 09:12
SUBMITTED: 12/26/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9533904
Matrix: Air
Lab ID: 3122607-03
Sample Volume: 1629.96€ m³
Filter ID:
Sampled: 12/18/23 23:59
Received: 12/26/23 12:07
Analysis Date: 12/27/23 22:45
Comments: MFK-AM03-121823-HM

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	**7429-90-5**	**160**		**32.0**
Antimony	**7440-36-0**	**0.0650**	SL	**0.0440**
Arsenic	**7440-38-2**	**0.171**		**0.00953**
Barium	**7440-39-3**	**3.62**		**0.946**
Beryllium	**7440-41-7**	**0.00772**		**0.00331**
Cadmium	7440-43-9	0.00650	U	0.109
Calcium	**7440-70-2**	**488**	LJ, QB-01	**291**
Chromium	**7440-47-3**	**2.35**		**2.03**
Cobalt	**7440-48-4**	**0.149**	QB-01	**0.0156**
Copper	**7440-50-8**	**24.4**		**2.99**
Iron	**7439-89-6**	**200**		**24.2**
Lead	7439-92-1	0.250	U	0.275
Magnesium	**7439-95-4**	**118**		**96.2**
Manganese	**7439-96-5**	**5.46**		**1.19**
Molybdenum	**7439-98-7**	**1.29**	QB-01	**0.213**
Nickel	7440-02-0	0.702	U	0.800
Phosphorus	7723-14-0	355	GC-BS, U	1250
Potassium	**7440-09-7**	**69.2**		**37.9**
Rubidium	**7440-17-7**	**0.110**		**0.0183**
Selenium	**7782-49-2**	**0.0622**		**0.0110**
Sodium	7440-23-5	1260	U	2000
Strontium	**7440-24-6**	**2.00**	QB-01	**0.651**
Thallium	**7440-28-0**	**8.96E-4**		**5.02E-4**
Thorium	**7440-29-01**	**0.00650**		**0.00299**
Uranium	7440-61-1	0.00532	U	0.0170
Vanadium	**7440-62-2**	**0.441**		**0.0491**
Zinc	7440-66-6	33.2	U	97.5

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FILE #: 0000.00
REPORTED: 01/03/24 09:12
SUBMITTED: 12/26/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9533903 FB **Lab ID:** 3122607-04 **Sampled:** 12/18/23 00:00
Matrix: Air **Sample Volume:** 2014.265 m³ **Received:** 12/26/23 12:07
Filter ID: **Analysis Date:** 12/27/23 23:01
Comments: MFK-FB01-121823-HM Field Blank

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	7429-90-5	10.4	U	25.9
Antimony	7440-36-0	0.00680	SL, U	0.0356
Arsenic	7440-38-2	0.00249	U	0.00771
Barium	7440-39-3	0.589	U	0.766
Beryllium	7440-41-7	0.00104	U	0.00268
Cadmium	7440-43-9	0.00271	U	0.0880
Calcium	**7440-70-2**	**364**	FB-01, LJ, QB-01	**236**
Chromium	7440-47-3	1.50	U	1.64
Cobalt	**7440-48-4**	**0.0228**	FB-01, QB-01	**0.0126**
Copper	7440-50-8	0.487	U	2.42
Iron	7439-89-6	11.7	U	19.5
Lead	7439-92-1	0.0511	U	0.223
Magnesium	7439-95-4	38.7	U	77.9
Manganese	7439-96-5	0.162	U	0.961
Molybdenum	**7439-98-7**	**0.240**	FB-01, QB-01	**0.172**
Nickel	7440-02-0	0.279	U	0.647
Phosphorus	7723-14-0	283	GC-BS, U	1010
Potassium	**7440-09-7**	**36.5**	FB-01	**30.7**
Rubidium	7440-17-7	0.0143	U	0.0148
Selenium	7782-49-2	0.00562	U	0.00889
Sodium	7440-23-5	665	U	1620
Strontium	**7440-24-6**	**0.554**	FB-01, QB-01	**0.527**
Thallium	7440-28-0	1.78E-4	U	4.06E-4
Thorium	7440-29-01	0.00197	U	0.00242
Uranium	7440-61-1	0.00171	U	0.0137
Vanadium	7440-62-2	0.0121	U	0.0397
Zinc	7440-66-6	22.0	U	78.9

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FILE #: 0000.00
REPORTED: 01/03/24 09:12
SUBMITTED: 12/26/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9533902 **Lab ID:** 3122607-05 **Sampled:** 12/19/23 23:59
Matrix: Air **Sample Volume:** 1946.945 m³ **Received:** 12/26/23 12:07
Filter ID: **Analysis Date:** 12/27/23 19:12
Comments: MFK-AM01-121923-HM

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	**7429-90-5**	**477**	QM-4X	**26.8**
Antimony	**7440-36-0**	**0.0598**	SL	**0.0369**
Arsenic	**7440-38-2**	**0.208**		**0.00798**
Barium	**7440-39-3**	**5.22**		**0.792**
Beryllium	**7440-41-7**	**0.0156**		**0.00277**
Cadmium	7440-43-9	0.00878	U	0.0911
Calcium	**7440-70-2**	**551**	A-01, LJ, QB-01, QM-4X	**244**
Chromium	**7440-47-3**	**1.95**		**1.70**
Cobalt	**7440-48-4**	**0.249**	QB-01	**0.0130**
Copper	**7440-50-8**	**20.0**	QM-07	**2.51**
Iron	**7439-89-6**	**516**	QM-4X	**20.2**
Lead	**7439-92-1**	**0.312**		**0.231**
Magnesium	**7439-95-4**	**267**	QM-4X	**80.6**
Manganese	**7439-96-5**	**13.5**		**0.994**
Molybdenum	**7439-98-7**	**1.11**	QB-01	**0.178**
Nickel	7440-02-0	0.597	U	0.669
Phosphorus	7723-14-0	317	A-01, GC-BS, QM-4X, U	1040
Potassium	**7440-09-7**	**118**	QM-07	**31.8**
Rubidium	**7440-17-7**	**0.168**		**0.0153**
Selenium	**7782-49-2**	**0.137**		**0.00919**
Sodium	**7440-23-5**	**2190**	A-01, E, QM-4X	**1670**
Strontium	**7440-24-6**	**3.96**	QB-01	**0.545**
Thallium	**7440-28-0**	**0.00111**		**4.20E-4**
Thorium	**7440-29-01**	**0.0117**	QM-07	**0.00251**
Uranium	7440-61-1	0.0108	U	0.0142
Vanadium	**7440-62-2**	**1.26**		**0.0411**
Zinc	7440-66-6	32.8	U	81.6

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PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 01/03/24 09:12
SUBMITTED: 12/26/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9533901 **Lab ID:** 3122607-06 **Sampled:** 12/19/23 23:59
Matrix: Air **Sample Volume:** 2090.356 m³ **Received:** 12/26/23 12:07
Filter ID: **Analysis Date:** 12/27/23 23:15
Comments: MFK-AM02-121923-HM

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	**7429-90-5**	**418**		**25.0**
Antimony	**7440-36-0**	**0.0613**	SL	**0.0343**
Arsenic	**7440-38-2**	**0.167**		**0.00743**
Barium	**7440-39-3**	**5.28**		**0.738**
Beryllium	**7440-41-7**	**0.0156**		**0.00258**
Cadmium	7440-43-9	0.0103	U	0.0848
Calcium	**7440-70-2**	**502**	LJ, QB-01	**227**
Chromium	**7440-47-3**	**1.82**		**1.58**
Cobalt	**7440-48-4**	**0.216**	QB-01	**0.0121**
Copper	**7440-50-8**	**24.2**		**2.34**
Iron	**7439-89-6**	**440**		**18.8**
Lead	**7439-92-1**	**0.360**		**0.215**
Magnesium	**7439-95-4**	**262**		**75.0**
Manganese	**7439-96-5**	**11.5**		**0.926**
Molybdenum	**7439-98-7**	**1.23**	QB-01	**0.166**
Nickel	7440-02-0	0.594	U	0.623
Phosphorus	7723-14-0	311	GC-BS, U	973
Potassium	**7440-09-7**	**133**		**29.6**
Rubidium	**7440-17-7**	**0.199**		**0.0142**
Selenium	**7782-49-2**	**0.134**		**0.00856**
Sodium	**7440-23-5**	**2170**	E	**1560**
Strontium	**7440-24-6**	**3.93**	QB-01	**0.507**
Thallium	**7440-28-0**	**9.53E-4**		**3.92E-4**
Thorium	**7440-29-01**	**0.0121**		**0.00234**
Uranium	7440-61-1	0.0103	U	0.0132
Vanadium	**7440-62-2**	**1.11**		**0.0383**
Zinc	7440-66-6	23.3	U	76.0

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Tetra Tech, Inc.
1777 Sentry Pkwy, Bldg 12
Blue Bell, PA 19422
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PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 01/03/24 09:12
SUBMITTED: 12/26/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9533899
Matrix: Air
Lab ID: 3122607-07
Sample Volume: 1814.848 m³
Filter ID:
Sampled: 12/19/23 23:59
Received: 12/26/23 12:07
Analysis Date: 12/27/23 23:30
Comments: MFK-AM03-121923-HM

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	**7429-90-5**	**319**		**28.8**
Antimony	**7440-36-0**	**0.0801**	SL	**0.0395**
Arsenic	**7440-38-2**	**0.151**		**0.00856**
Barium	**7440-39-3**	**5.68**		**0.850**
Beryllium	**7440-41-7**	**0.0145**		**0.00298**
Cadmium	7440-43-9	0.00900	U	0.0977
Calcium	**7440-70-2**	**538**	LJ, QB-01	**262**
Chromium	**7440-47-3**	**1.97**		**1.82**
Cobalt	**7440-48-4**	**0.201**	QB-01	**0.0140**
Copper	**7440-50-8**	**35.9**		**2.69**
Iron	**7439-89-6**	**380**		**21.7**
Lead	**7439-92-1**	**0.623**		**0.247**
Magnesium	**7439-95-4**	**278**		**86.4**
Manganese	**7439-96-5**	**11.2**		**1.07**
Molybdenum	**7439-98-7**	**1.26**	QB-01	**0.191**
Nickel	**7440-02-0**	**0.771**		**0.718**
Phosphorus	7723-14-0	344	GC-BS, U	1120
Potassium	**7440-09-7**	**128**		**34.1**
Rubidium	**7440-17-7**	**0.164**		**0.0164**
Selenium	**7782-49-2**	**0.139**		**0.00986**
Sodium	**7440-23-5**	**2340**	E	**1790**
Strontium	**7440-24-6**	**3.87**	QB-01	**0.585**
Thallium	**7440-28-0**	**9.10E-4**		**4.51E-4**
Thorium	**7440-29-01**	**0.0112**		**0.00269**
Uranium	7440-61-1	0.00899	U	0.0152
Vanadium	**7440-62-2**	**0.937**		**0.0441**
Zinc	7440-66-6	31.3	U	87.6

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Tetra Tech, Inc.
1777 Sentry Pkwy, Bldg 12
Blue Bell, PA 19422
ATTN: Ms. Chelsea Saber
PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 01/03/24 09:12
SUBMITTED: 12/26/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9533897 FB
Matrix: Air
Lab ID: 3122607-08
Sample Volume: 1946.945 m³
Filter ID:
Sampled: 12/19/23 00:00
Received: 12/26/23 12:07
Analysis Date: 12/27/23 23:46
Comments: MFK-FB01-121923-HM Field Blank

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	7429-90-5	9.58	U	26.8
Antimony	7440-36-0	0.00728	SL, U	0.0369
Arsenic	7440-38-2	0.00254	U	0.00798
Barium	**7440-39-3**	**0.898**	FB-01	**0.792**
Beryllium	7440-41-7	9.11E-4	U	0.00277
Cadmium	7440-43-9	0.00279	U	0.0911
Calcium	**7440-70-2**	**310**	FB-01, LJ, QB-01	**244**
Chromium	7440-47-3	1.48	U	1.70
Cobalt	**7440-48-4**	**0.0259**	FB-01, QB-01	**0.0130**
Copper	7440-50-8	0.435	U	2.51
Iron	7439-89-6	10.7	U	20.2
Lead	7439-92-1	0.0554	U	0.231
Magnesium	7439-95-4	39.6	U	80.6
Manganese	7439-96-5	0.150	U	0.994
Molybdenum	**7439-98-7**	**0.237**	FB-01, QB-01	**0.178**
Nickel	7440-02-0	0.258	U	0.669
Phosphorus	7723-14-0	288	GC-BS, U	1040
Potassium	7440-09-7	27.8	U	31.8
Rubidium	7440-17-7	0.0135	U	0.0153
Selenium	7782-49-2	0.00264	U	0.00919
Sodium	7440-23-5	672	U	1670
Strontium	**7440-24-6**	**0.561**	FB-01, QB-01	**0.545**
Thallium	7440-28-0	1.23E-4	U	4.20E-4
Thorium	7440-29-01	0.00204	U	0.00251
Uranium	7440-61-1	0.00157	U	0.0142
Vanadium	7440-62-2	0.0203	U	0.0411
Zinc	7440-66-6	19.2	U	81.6

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PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 01/03/24 09:12
SUBMITTED: 12/26/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9524476
Matrix: Air
Comments: MFK-AM01-122023-HM

Lab ID: 3122607-09
Sample Volume: 1858.198 m³
Filter ID:

Sampled: 12/20/23 23:59
Received: 12/26/23 12:07
Analysis Date: 12/28/23 00:00

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	**7429-90-5**	**533**		**28.1**
Antimony	**7440-36-0**	**0.104**	SL	**0.0386**
Arsenic	**7440-38-2**	**0.303**		**0.00836**
Barium	**7440-39-3**	**6.05**		**0.830**
Beryllium	**7440-41-7**	**0.0189**		**0.00291**
Cadmium	7440-43-9	0.00886	U	0.0954
Calcium	**7440-70-2**	**488**	LJ, QB-01	**256**
Chromium	7440-47-3	1.26	U	1.78
Cobalt	**7440-48-4**	**0.300**	QB-01	**0.0137**
Copper	**7440-50-8**	**25.0**		**2.63**
Iron	**7439-89-6**	**599**		**21.2**
Lead	**7439-92-1**	**0.423**		**0.242**
Magnesium	**7439-95-4**	**301**		**84.4**
Manganese	**7439-96-5**	**16.7**		**1.04**
Molybdenum	**7439-98-7**	**0.771**	QB-01	**0.186**
Nickel	7440-02-0	0.600	U	0.701
Phosphorus	7723-14-0	230	GC-BS, U	1090
Potassium	**7440-09-7**	**114**		**33.3**
Rubidium	**7440-17-7**	**0.195**		**0.0160**
Selenium	**7782-49-2**	**0.173**		**0.00963**
Sodium	**7440-23-5**	**2360**	E	**1750**
Strontium	**7440-24-6**	**4.47**	QB-01	**0.571**
Thallium	**7440-28-0**	**0.00128**		**4.40E-4**
Thorium	**7440-29-01**	**0.0163**		**0.00263**
Uranium	7440-61-1	0.0112	U	0.0149
Vanadium	**7440-62-2**	**1.53**		**0.0431**
Zinc	7440-66-6	28.5	U	85.5

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CERTIFICATE OF ANALYSIS

Tetra Tech, Inc.
1777 Sentry Pkwy, Bldg 12
Blue Bell, PA 19422
ATTN: Ms. Chelsea Saber
PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 01/03/24 09:12
SUBMITTED: 12/26/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9551127
Lab ID: 3122607-10
Sampled: 12/20/23 23:59
Matrix: Air
Sample Volume: 1997.516 m³
Received: 12/26/23 12:07
Filter ID:
Analysis Date: 12/28/23 00:14
Comments: MFK-AM02-122023-HM

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	**7429-90-5**	**473**		**26.1**
Antimony	**7440-36-0**	**0.0535**	SL	**0.0359**
Arsenic	**7440-38-2**	**0.139**		**0.00778**
Barium	**7440-39-3**	**5.40**		**0.772**
Beryllium	**7440-41-7**	**0.0184**		**0.00270**
Cadmium	7440-43-9	0.00646	U	0.0888
Calcium	**7440-70-2**	**706**	LJ, QB-01	**238**
Chromium	**7440-47-3**	**1.77**		**1.65**
Cobalt	**7440-48-4**	**0.275**	QB-01	**0.0127**
Copper	**7440-50-8**	**15.5**		**2.44**
Iron	**7439-89-6**	**525**		**19.7**
Lead	**7439-92-1**	**0.347**		**0.225**
Magnesium	**7439-95-4**	**307**		**78.5**
Manganese	**7439-96-5**	**14.6**		**0.969**
Molybdenum	**7439-98-7**	**0.974**	QB-01	**0.173**
Nickel	**7440-02-0**	**0.670**		**0.652**
Phosphorus	7723-14-0	476	GC-BS, U	1020
Potassium	**7440-09-7**	**111**		**31.0**
Rubidium	**7440-17-7**	**0.189**		**0.0149**
Selenium	**7782-49-2**	**0.183**		**0.00896**
Sodium	**7440-23-5**	**2480**	E	**1630**
Strontium	**7440-24-6**	**4.57**	QB-01	**0.531**
Thallium	**7440-28-0**	**0.00104**		**4.10E-4**
Thorium	**7440-29-01**	**0.0150**		**0.00244**
Uranium	7440-61-1	0.0111	U	0.0138
Vanadium	**7440-62-2**	**1.40**		**0.0401**
Zinc	7440-66-6	19.6	U	79.6

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Blue Bell, PA 19422
ATTN: Ms. Chelsea Saber
PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 01/03/24 09:12
SUBMITTED: 12/26/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9524475 **Lab ID:** 3122607-11 **Sampled:** 12/20/23 23:59
Matrix: Air **Sample Volume:** 2229.577 m³ **Received:** 12/26/23 12:07
Filter ID: **Analysis Date:** 12/28/23 01:38
Comments: MFK-AM03-122023-HM

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	**7429-90-5**	**388**		**23.4**
Antimony	**7440-36-0**	**0.130**	SL	**0.0322**
Arsenic	**7440-38-2**	**0.111**		**0.00697**
Barium	**7440-39-3**	**6.50**		**0.692**
Beryllium	**7440-41-7**	**0.0178**		**0.00242**
Cadmium	7440-43-9	0.00679	U	0.0795
Calcium	**7440-70-2**	**405**	LJ, QB-01	**213**
Chromium	7440-47-3	0.988	U	1.48
Cobalt	**7440-48-4**	**0.249**	QB-01	**0.0114**
Copper	**7440-50-8**	**17.9**		**2.19**
Iron	**7439-89-6**	**480**		**17.7**
Lead	**7439-92-1**	**0.212**		**0.201**
Magnesium	**7439-95-4**	**278**		**70.3**
Manganese	**7439-96-5**	**14.1**		**0.868**
Molybdenum	**7439-98-7**	**0.702**	QB-01	**0.155**
Nickel	7440-02-0	0.528	U	0.585
Phosphorus	7723-14-0	183	GC-BS, U	912
Potassium	**7440-09-7**	**110**		**27.7**
Rubidium	**7440-17-7**	**0.172**		**0.0134**
Selenium	**7782-49-2**	**0.171**		**0.00803**
Sodium	**7440-23-5**	**2140**	E	**1460**
Strontium	**7440-24-6**	**4.12**	QB-01	**0.476**
Thallium	**7440-28-0**	**0.00104**		**3.67E-4**
Thorium	**7440-29-01**	**0.0142**		**0.00219**
Uranium	7440-61-1	0.00948	U	0.0124
Vanadium	**7440-62-2**	**1.34**		**0.0359**
Zinc	7440-66-6	19.3	U	71.3

Eastern Research Group

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Tetra Tech, Inc.
1777 Sentry Pkwy, Bldg 12
Blue Bell, PA 19422
ATTN: Ms. Chelsea Saber
PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 01/03/24 09:12
SUBMITTED: 12/26/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9524488 FB **Lab ID:** 3122607-12 **Sampled:** 12/20/23 00:00
Matrix: Air **Sample Volume:** 1858.198 m³ **Received:** 12/26/23 12:07
Filter ID: **Analysis Date:** 12/28/23 01:56
Comments: MFK-FB01-122023-HM - Field Blank

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	7429-90-5	9.27	U	28.1
Antimony	7440-36-0	0.0147	SL, U	0.0386
Arsenic	7440-38-2	0.00233	U	0.00836
Barium	7440-39-3	0.678	U	0.830
Beryllium	7440-41-7	5.23E-4	U	0.00291
Cadmium	7440-43-9	4.59E-4	U	0.0954
Calcium	7440-70-2	112	LJ, QB-01, U	256
Chromium	7440-47-3	0.634	U	1.78
Cobalt	7440-48-4	0.00449	QB-01, U	0.0137
Copper	7440-50-8	0.203	U	2.63
Iron	7439-89-6	6.22	U	21.2
Lead	7439-92-1	0.0286	U	0.242
Magnesium	7439-95-4	22.9	U	84.4
Manganese	7439-96-5	0.104	U	1.04
Molybdenum	7439-98-7	0.0847	QB-01, U	0.186
Nickel	7440-02-0	0.180	U	0.701
Phosphorus	7723-14-0	171	GC-BS, U	1090
Potassium	7440-09-7	13.1	U	33.3
Rubidium	7440-17-7	0.00758	U	0.0160
Selenium	7782-49-2	3.99E-4	U	0.00963
Sodium	7440-23-5	567	U	1750
Strontium	7440-24-6	0.231	QB-01, U	0.571
Thallium	7440-28-0	1.64E-4	U	4.40E-4
Thorium	7440-29-01	0.00222	U	0.00263
Uranium	7440-61-1	7.30E-4	U	0.0149
Vanadium	7440-62-2	0.0102	U	0.0431
Zinc	7440-66-6	15.5	U	85.5

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Tetra Tech, Inc.
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Blue Bell, PA 19422
ATTN: Ms. Chelsea Saber
PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 01/03/24 09:12
SUBMITTED: 12/26/23
AQS SITE CODE:
SITE CODE: Maui fires

Inorganics by Compendium Method IO-3.5 - Quality Control

Batch 2312074 - B3K2705

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Calibration Blank (2312074-CCB1)				Prepared & Analyzed: 12/27/23						
Aluminum	-4.37		ng/l							U
Antimony	1.09		ng/l							
Arsenic	3.89		ng/l							
Barium	1.50		ng/l							
Beryllium	0.0904		ng/l							
Cadmium	0.319		ng/l							
Calcium	530		ng/l							
Chromium	4.99		ng/l							
Cobalt	0.249		ng/l							
Copper	24.0		ng/l							
Iron	-8.19		ng/l							U
Lead	6.35		ng/l							
Magnesium	25.9		ng/l							
Manganese	3.81		ng/l							
Molybdenum	13.4		ng/l							
Nickel	0.213		ng/l							
Phosphorus	-199		ng/l							U
Potassium	805		ng/l							
Rubidium	-0.0276		ng/l							U
Selenium	0.319		ng/l							
Sodium	109		ng/l							
Strontium	1.30		ng/l							
Thallium	0.518		ng/l							
Thorium	0.0273		ng/l							
Uranium	0.0171		ng/l							
Vanadium	-16.4		ng/l							U
Zinc	-65.5		ng/l							U
Calibration Blank (2312074-CCB2)				Prepared & Analyzed: 12/27/23						
Aluminum	-25.1		ng/l							U
Antimony	0.303		ng/l							
Arsenic	1.90		ng/l							
Barium	0.735		ng/l							
Beryllium	0.114		ng/l							
Cadmium	0.123		ng/l							
Calcium	31.4		ng/l							
Chromium	3.94		ng/l							
Cobalt	0.140		ng/l							
Copper	10.1		ng/l							

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FILE #: 0000.00
REPORTED: 01/03/24 09:12
SUBMITTED: 12/26/23
AQS SITE CODE:
SITE CODE: Maui fires

Inorganics by Compendium Method IO-3.5 - Quality Control

Batch 2312074 - B3K2705

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Calibration Blank (2312074-CCB2) Contin				Prepared & Analyzed: 12/27/23						
Iron	59.5		ng/l							
Lead	3.86		ng/l							
Magnesium	2.32		ng/l							
Manganese	1.07		ng/l							
Molybdenum	3.22		ng/l							
Nickel	-0.833		ng/l							U
Phosphorus	210		ng/l							
Potassium	105		ng/l							
Rubidium	-9.30E-4		ng/l							U
Selenium	3.37		ng/l							
Sodium	-6.40		ng/l							U
Strontium	0.672		ng/l							
Thallium	0.523		ng/l							
Thorium	0.518		ng/l							
Uranium	0.0101		ng/l							
Vanadium	-20.6		ng/l							U
Zinc	-89.6		ng/l							U
Calibration Blank (2312074-CCB3)				Prepared: 12/27/23 Analyzed: 12/28/23						
Aluminum	42.4		ng/l							
Antimony	0.286		ng/l							
Arsenic	-0.929		ng/l							U
Barium	1.99		ng/l							
Beryllium	0.135		ng/l							
Cadmium	-0.0538		ng/l							U
Calcium	205		ng/l							
Chromium	2.35		ng/l							
Cobalt	0.0790		ng/l							
Copper	7.30		ng/l							
Iron	41.9		ng/l							
Lead	2.55		ng/l							
Magnesium	23.0		ng/l							
Manganese	2.05		ng/l							
Molybdenum	2.92		ng/l							
Nickel	-0.270		ng/l							U
Phosphorus	-148		ng/l							U
Potassium	-145		ng/l							U
Rubidium	-0.575		ng/l							U
Selenium	-1.33		ng/l							U

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FILE #: 0000.00
REPORTED: 01/03/24 09:12
SUBMITTED: 12/26/23
AQS SITE CODE:
SITE CODE: Maui fires

Inorganics by Compendium Method IO-3.5 - Quality Control

Batch 2312074 - B3K2705

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Calibration Blank (2312074-CCB3) Contin				Prepared: 12/27/23 Analyzed: 12/28/23						
Sodium	78.7		ng/l							
Strontium	0.729		ng/l							
Thallium	0.608		ng/l							
Thorium	0.329		ng/l							
Uranium	0.00407		ng/l							
Vanadium	-24.9		ng/l							U
Zinc	-87.9		ng/l							U
Calibration Blank (2312074-CCB4)				Prepared: 12/27/23 Analyzed: 12/28/23						
Aluminum	-47.6		ng/l							U
Antimony	0.275		ng/l							
Arsenic	-1.11		ng/l							U
Barium	1.47		ng/l							
Beryllium	0.0825		ng/l							
Cadmium	0.0851		ng/l							
Calcium	149		ng/l							
Chromium	2.52		ng/l							
Cobalt	0.0894		ng/l							
Copper	8.42		ng/l							
Iron	191		ng/l							
Lead	2.80		ng/l							
Magnesium	-0.551		ng/l							U
Manganese	1.26		ng/l							
Molybdenum	2.95		ng/l							
Nickel	-0.314		ng/l							U
Phosphorus	534		ng/l							
Potassium	408		ng/l							
Rubidium	0.276		ng/l							
Selenium	4.67		ng/l							
Sodium	-2.48		ng/l							U
Strontium	0.260		ng/l							
Thallium	0.484		ng/l							
Thorium	0.346		ng/l							
Uranium	-0.00811		ng/l							U
Vanadium	-29.1		ng/l							U
Zinc	-93.5		ng/l							U
Calibration Check (2312074-CCV1)				Prepared & Analyzed: 12/27/23						
Aluminum	1.55E6		ng/l	1.5000E6		103	90-110			
Antimony	19800		ng/l	20000		99.0	90-110			

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FILE #: 0000.00
REPORTED: 01/03/24 09:12
SUBMITTED: 12/26/23
AQS SITE CODE:
SITE CODE: Maui fires

Inorganics by Compendium Method IO-3.5 - Quality Control

Batch 2312074 - B3K2705

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Calibration Check (2312074-CCV1) Contin				Prepared & Analyzed: 12/27/23						
Arsenic	19900		ng/l	20000		99.4	90-110			
Barium	199000		ng/l	200000		99.3	90-110			
Beryllium	5100		ng/l	5000.0		102	90-110			
Cadmium	19900		ng/l	20000		99.3	90-110			
Calcium	2.52E7		ng/l	2.5000E7		101	90-110			
Chromium	235000		ng/l	240000		97.7	90-110			
Cobalt	51000		ng/l	50000		102	90-110			
Copper	2.04E6		ng/l	2.0000E6		102	90-110			
Iron	2.54E6		ng/l	2.5000E6		102	90-110			
Lead	196000		ng/l	200000		98.2	90-110			
Magnesium	1.04E6		ng/l	1.0000E6		104	90-110			
Manganese	506000		ng/l	500000		101	90-110			
Molybdenum	50100		ng/l	50000		100	90-110			
Nickel	123000		ng/l	120000		102	90-110			
Phosphorus	202000		ng/l	200000		101	90-110			
Potassium	2.55E6		ng/l	2.5000E6		102	90-110			
Rubidium	10000		ng/l	10000		100	90-110			
Selenium	19800		ng/l	20000		99.1	90-110			
Sodium	2.63E6		ng/l	2.5000E6		105	90-110			
Strontium	49500		ng/l	50000		99.1	90-110			
Thallium	485		ng/l	500.00		97.1	90-110			
Thorium	488		ng/l	500.00		97.6	90-110			
Uranium	486		ng/l	500.00		97.2	90-110			
Vanadium	19700		ng/l	20000		98.3	90-110			
Zinc	512000		ng/l	500000		102	90-110			
Calibration Check (2312074-CCV2)				Prepared & Analyzed: 12/27/23						
Aluminum	1.55E6		ng/l	1.5000E6		103	90-110			
Antimony	20500		ng/l	20000		102	90-110			
Arsenic	20400		ng/l	20000		102	90-110			
Barium	205000		ng/l	200000		102	90-110			
Beryllium	5400		ng/l	5000.0		108	90-110			
Cadmium	20500		ng/l	20000		102	90-110			
Calcium	2.59E7		ng/l	2.5000E7		103	90-110			
Chromium	249000		ng/l	240000		104	90-110			
Cobalt	51700		ng/l	50000		103	90-110			
Copper	2.09E6		ng/l	2.0000E6		105	90-110			
Iron	2.58E6		ng/l	2.5000E6		103	90-110			
Lead	203000		ng/l	200000		101	90-110			

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Blue Bell, PA 19422
ATTN: Ms. Chelsea Saber
PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 01/03/24 09:12
SUBMITTED: 12/26/23
AQS SITE CODE:
SITE CODE: Maui fires

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes

Inorganics by Compendium Method IO-3.5 - Quality Control

Batch 2312074 - B3K2705

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Calibration Check (2312074-CCV2) Contin				Prepared & Analyzed: 12/27/23						
Magnesium	1.05E6		ng/l	1.0000E6		105	90-110			
Manganese	513000		ng/l	500000		103	90-110			
Molybdenum	51200		ng/l	50000		102	90-110			
Nickel	125000		ng/l	120000		104	90-110			
Phosphorus	203000		ng/l	200000		102	90-110			
Potassium	2.56E6		ng/l	2.5000E6		102	90-110			
Rubidium	10200		ng/l	10000		102	90-110			
Selenium	20500		ng/l	20000		102	90-110			
Sodium	2.63E6		ng/l	2.5000E6		105	90-110			
Strontium	51200		ng/l	50000		102	90-110			
Thallium	491		ng/l	500.00		98.2	90-110			
Thorium	500		ng/l	500.00		99.9	90-110			
Uranium	501		ng/l	500.00		100	90-110			
Vanadium	20600		ng/l	20000		103	90-110			
Zinc	525000		ng/l	500000		105	90-110			
Calibration Check (2312074-CCV3)				Prepared: 12/27/23 Analyzed: 12/28/23						
Aluminum	1.53E6		ng/l	1.5000E6		102	90-110			
Antimony	20100		ng/l	20000		101	90-110			
Arsenic	20000		ng/l	20000		100	90-110			
Barium	201000		ng/l	200000		101	90-110			
Beryllium	5120		ng/l	5000.0		102	90-110			
Cadmium	20300		ng/l	20000		101	90-110			
Calcium	2.54E7		ng/l	2.5000E7		102	90-110			
Chromium	245000		ng/l	240000		102	90-110			
Cobalt	50800		ng/l	50000		102	90-110			
Copper	2.07E6		ng/l	2.0000E6		103	90-110			
Iron	2.53E6		ng/l	2.5000E6		101	90-110			
Lead	201000		ng/l	200000		101	90-110			
Magnesium	1.03E6		ng/l	1.0000E6		103	90-110			
Manganese	508000		ng/l	500000		102	90-110			
Molybdenum	50400		ng/l	50000		101	90-110			
Nickel	123000		ng/l	120000		102	90-110			
Phosphorus	199000		ng/l	200000		99.6	90-110			
Potassium	2.52E6		ng/l	2.5000E6		101	90-110			
Rubidium	10100		ng/l	10000		101	90-110			
Selenium	20200		ng/l	20000		101	90-110			
Sodium	2.61E6		ng/l	2.5000E6		104	90-110			
Strontium	50200		ng/l	50000		100	90-110			

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CERTIFICATE OF ANALYSIS

Tetra Tech, Inc.
1777 Sentry Pkwy, Bldg 12
Blue Bell, PA 19422
ATTN: Ms. Chelsea Saber
PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 01/03/24 09:12
SUBMITTED: 12/26/23
AQS SITE CODE:
SITE CODE: Maui fires

Inorganics by Compendium Method IO-3.5 - Quality Control

Batch 2312074 - B3K2705

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Calibration Check (2312074-CCV3) Contin				Prepared: 12/27/23 Analyzed: 12/28/23						
Thallium	486		ng/l	500.00		97.2	90-110			
Thorium	491		ng/l	500.00		98.2	90-110			
Uranium	498		ng/l	500.00		99.6	90-110			
Vanadium	20200		ng/l	20000		101	90-110			
Zinc	518000		ng/l	500000		104	90-110			
Calibration Check (2312074-CCV4)				Prepared: 12/27/23 Analyzed: 12/28/23						
Aluminum	1.55E6		ng/l	1.5000E6		103	90-110			
Antimony	20400		ng/l	20000		102	90-110			
Arsenic	20200		ng/l	20000		101	90-110			
Barium	204000		ng/l	200000		102	90-110			
Beryllium	5260		ng/l	5000.0		105	90-110			
Cadmium	20400		ng/l	20000		102	90-110			
Calcium	2.54E7		ng/l	2.5000E7		102	90-110			
Chromium	246000		ng/l	240000		103	90-110			
Cobalt	51100		ng/l	50000		102	90-110			
Copper	2.07E6		ng/l	2.0000E6		103	90-110			
Iron	2.55E6		ng/l	2.5000E6		102	90-110			
Lead	203000		ng/l	200000		101	90-110			
Magnesium	1.04E6		ng/l	1.0000E6		104	90-110			
Manganese	510000		ng/l	500000		102	90-110			
Molybdenum	50600		ng/l	50000		101	90-110			
Nickel	124000		ng/l	120000		103	90-110			
Phosphorus	199000		ng/l	200000		99.7	90-110			
Potassium	2.54E6		ng/l	2.5000E6		102	90-110			
Rubidium	10000		ng/l	10000		100	90-110			
Selenium	20300		ng/l	20000		101	90-110			
Sodium	2.62E6		ng/l	2.5000E6		105	90-110			
Strontium	50500		ng/l	50000		101	90-110			
Thallium	494		ng/l	500.00		98.9	90-110			
Thorium	498		ng/l	500.00		99.6	90-110			
Uranium	499		ng/l	500.00		99.8	90-110			
Vanadium	20300		ng/l	20000		102	90-110			
Zinc	520000		ng/l	500000		104	90-110			
High Cal Check (2312074-HCV1)				Prepared & Analyzed: 12/27/23						
Aluminum	3.05E6		ng/l	3.0000E6		102	95-105			
Antimony	40600		ng/l	40000		102	95-105			
Arsenic	40300		ng/l	40000		101	95-105			
Barium	409000		ng/l	400000		102	95-105			

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Inorganics by Compendium Method IO-3.5 - Quality Control

Batch 2312074 - B3K2705

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
High Cal Check (2312074-HCV1) Continue				Prepared & Analyzed: 12/27/23						
Beryllium	9780		ng/l	10000		97.8	95-105			
Cadmium	40000		ng/l	40000		100	95-105			
Calcium	5.08E7		ng/l	5.0000E7		102	95-105			
Chromium	474000		ng/l	480000		98.8	95-105			
Cobalt	101000		ng/l	100000		101	95-105			
Copper	3.97E6		ng/l	4.0000E6		99.2	95-105			
Iron	5.05E6		ng/l	5.0000E6		101	95-105			
Lead	400000		ng/l	400000		100	95-105			
Magnesium	2.03E6		ng/l	2.0000E6		102	95-105			
Manganese	997000		ng/l	1.0000E6		99.7	95-105			
Molybdenum	102000		ng/l	100000		102	95-105			
Nickel	241000		ng/l	240000		100	95-105			
Phosphorus	397000		ng/l	400000		99.2	95-105			
Potassium	5.03E6		ng/l	5.0000E6		101	95-105			
Rubidium	20200		ng/l	20000		101	95-105			
Selenium	40600		ng/l	40000		101	95-105			
Sodium	4.98E6		ng/l	5.0000E6		99.7	95-105			
Strontium	101000		ng/l	100000		101	95-105			
Thallium	1010		ng/l	1000.0		101	95-105			
Thorium	1020		ng/l	1000.0		102	95-105			
Uranium	1010		ng/l	1000.0		101	95-105			
Vanadium	40400		ng/l	40000		101	95-105			
Zinc	1.02E6		ng/l	1.0000E6		102	95-105			
Initial Cal Blank (2312074-ICB1)				Prepared & Analyzed: 12/27/23						
Aluminum	-47.0		ng/l							U
Antimony	1.39		ng/l							
Arsenic	-0.839		ng/l							U
Barium	3.81		ng/l							
Beryllium	0.356		ng/l							
Cadmium	0.458		ng/l							
Calcium	22.6		ng/l							
Chromium	9.66		ng/l							
Cobalt	0.835		ng/l							
Copper	61.5		ng/l							
Iron	92.2		ng/l							
Lead	13.7		ng/l							
Magnesium	26.7		ng/l							
Manganese	11.1		ng/l							

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Inorganics by Compendium Method IO-3.5 - Quality Control

Batch 2312074 - B3K2705

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Initial Cal Blank (2312074-ICB1) Continu				Prepared & Analyzed: 12/27/23						
Molybdenum	15.1		ng/l							
Nickel	1.37		ng/l							
Phosphorus	-403		ng/l							U
Potassium	35.2		ng/l							
Rubidium	0.602		ng/l							
Selenium	-0.0289		ng/l							U
Sodium	-68.5		ng/l							U
Strontium	1.77		ng/l							
Thallium	0.459		ng/l							
Thorium	0.687		ng/l							
Uranium	0.0112		ng/l							
Vanadium	-25.5		ng/l							U
Zinc	-41.9		ng/l							U
Initial Cal Check (2312074-ICV1)				Prepared & Analyzed: 12/27/23						
Aluminum	1.46E6		ng/l	1.5000E6		97.5	90-110			
Antimony	19400		ng/l	20000		97.2	90-110			
Arsenic	19800		ng/l	20000		99.1	90-110			
Barium	197000		ng/l	200000		98.7	90-110			
Beryllium	5370		ng/l	5000.0		107	90-110			
Cadmium	20300		ng/l	20000		101	90-110			
Calcium	2.44E7		ng/l	2.5000E7		97.7	90-110			
Chromium	234000		ng/l	240000		97.4	90-110			
Cobalt	49600		ng/l	50000		99.1	90-110			
Copper	2.01E6		ng/l	2.0000E6		100	90-110			
Iron	2.50E6		ng/l	2.5000E6		99.9	90-110			
Lead	195000		ng/l	200000		97.7	90-110			
Magnesium	986000		ng/l	1.0000E6		98.6	90-110			
Manganese	491000		ng/l	500000		98.2	90-110			
Molybdenum	49400		ng/l	50000		98.8	90-110			
Nickel	118000		ng/l	120000		98.7	90-110			
Phosphorus	189000		ng/l	200000		94.7	90-110			
Potassium	2.51E6		ng/l	2.5000E6		100	90-110			
Rubidium	9610		ng/l	10000		96.1	90-110			
Selenium	20500		ng/l	20000		102	90-110			
Sodium	2.50E6		ng/l	2.5000E6		100	90-110			
Strontium	49400		ng/l	50000		98.8	90-110			
Thallium	483		ng/l	500.00		96.6	90-110			
Thorium	474		ng/l	500.00		94.7	90-110			

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Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes

Inorganics by Compendium Method IO-3.5 - Quality Control

Batch 2312074 - B3K2705

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Initial Cal Check (2312074-ICV1) Continu				Prepared & Analyzed: 12/27/23						
Uranium	484		ng/l	500.00		96.8	90-110			
Vanadium	19900		ng/l	20000		99.7	90-110			
Zinc	511000		ng/l	500000		102	90-110			
Interference Check A (2312074-IFA1)				Prepared & Analyzed: 12/27/23						
Aluminum	1.45E7		ng/l	1.5000E7		96.5	80-120			
Antimony	0.00		ng/l				80-120			U
Arsenic	0.00		ng/l				80-120			U
Barium	0.00		ng/l				80-120			U
Beryllium	0.00		ng/l				80-120			U
Cadmium	0.00		ng/l				80-120			U
Calcium	9.91E7		ng/l	1.0040E8		98.7	80-120			
Chromium	0.00		ng/l				80-120			U
Cobalt	0.00		ng/l				80-120			U
Copper	0.00		ng/l				80-120			U
Iron	1.43E7		ng/l	1.5000E7		95.4	80-120			
Lead	0.00		ng/l				80-120			U
Magnesium	1.50E7		ng/l	1.5000E7		100	80-120			
Manganese	0.00		ng/l				80-120			U
Molybdenum	291000		ng/l	300000		97.1	80-120			
Nickel	0.00		ng/l				80-120			U
Phosphorus	1.57E7		ng/l	1.5000E7		104	80-120			
Potassium	1.44E7		ng/l	1.5000E7		96.2	80-120			
Rubidium	0.00		ng/l				80-120			U
Selenium	0.00		ng/l				80-120			U
Sodium	1.51E7		ng/l	1.5000E7		101	80-120			
Strontium	0.00		ng/l				80-120			U
Thallium	0.00		ng/l				80-120			U
Thorium	0.00		ng/l				80-120			U
Uranium	0.00		ng/l				80-120			U
Vanadium	0.00		ng/l				80-120			U
Zinc	0.00		ng/l				80-120			U
Interference Check B (2312074-IFB1)				Prepared & Analyzed: 12/27/23						
Aluminum	1.60E7		ng/l	1.6500E7		97.1	80-120			
Antimony	19700		ng/l	20000		98.4	80-120			
Arsenic	19800		ng/l	20000		99.2	80-120			
Barium	197000		ng/l	200000		98.6	80-120			
Beryllium	5600		ng/l	5000.0		112	80-120			
Cadmium	18900		ng/l	20000		94.4	80-120			

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Inorganics by Compendium Method IO-3.5 - Quality Control

Batch 2312074 - B3K2705

Interference Check B (2312074-IFB1) Co — Prepared & Analyzed: 12/27/23

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Calcium	1.15E8		ng/l	1.2540E8		91.7	80-120			
Chromium	223000		ng/l	240000		92.8	80-120			
Cobalt	48400		ng/l	50000		96.7	80-120			
Copper	1.85E6		ng/l	2.0000E6		92.6	80-120			
Iron	1.68E7		ng/l	1.7500E7		95.9	80-120			
Lead	199000		ng/l	200000		99.5	80-120			
Magnesium	1.61E7		ng/l	1.6000E7		101	80-120			
Manganese	510000		ng/l	500000		102	80-120			
Molybdenum	334000		ng/l	350000		95.6	80-120			
Nickel	114000		ng/l	120000		94.6	80-120			
Phosphorus	1.59E7		ng/l	1.5200E7		105	80-120			
Potassium	1.70E7		ng/l	1.7500E7		97.3	80-120			
Rubidium	9900		ng/l	10000		99.0	80-120			
Selenium	19000		ng/l	20000		94.8	80-120			
Sodium	1.81E7		ng/l	1.7500E7		103	80-120			
Strontium	48900		ng/l	50000		97.8	80-120			
Thallium	506		ng/l	500.00		101	80-120			
Thorium	520		ng/l	500.00		104	80-120			
Uranium	522		ng/l	500.00		104	80-120			
Vanadium	18600		ng/l	20000		93.1	80-120			
Zinc	460000		ng/l	500000		92.0	80-120			

Batch B3L2703 - ICP-MS Extraction

Blank (B3L2703-BLK1) — Prepared & Analyzed: 12/27/23

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Aluminum	ND	32.1	ng/m³ Air							U
Antimony	ND	0.0441	ng/m³ Air							SL, U
Arsenic	ND	0.00955	ng/m³ Air							U
Barium	ND	0.948	ng/m³ Air							U
Beryllium	ND	0.00332	ng/m³ Air							U
Cadmium	ND	0.109	ng/m³ Air							U
Calcium	ND	292	ng/m³ Air							LJ, QB-01, U
Chromium	ND	2.03	ng/m³ Air							U
Cobalt	ND	0.0156	ng/m³ Air							QB-01, U
Copper	ND	3.00	ng/m³ Air							U
Iron	ND	24.2	ng/m³ Air							U
Lead	ND	0.276	ng/m³ Air							U
Magnesium	ND	96.4	ng/m³ Air							U
Manganese	ND	1.19	ng/m³ Air							U
Molybdenum	ND	0.213	ng/m³ Air							QB-01, U

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PHONE: (703) 885-5495 **FAX:**	**SITE CODE:** Maui fires

Inorganics by Compendium Method IO-3.5 - Quality Control

Batch B3L2703 - ICP-MS Extraction

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (B3L2703-BLK1) Continued				Prepared & Analyzed: 12/27/23						
Nickel	ND	0.801	ng/m³ Air							U
Phosphorus	ND	1250	ng/m³ Air							GC-BS, U
Potassium	ND	38.0	ng/m³ Air							U
Rubidium	ND	0.0183	ng/m³ Air							U
Selenium	ND	0.0110	ng/m³ Air							U
Sodium	ND	2000	ng/m³ Air							U
Strontium	ND	0.652	ng/m³ Air							QB-01, U
Thallium	ND	5.03E-4	ng/m³ Air							U
Thorium	ND	0.00300	ng/m³ Air							U
Uranium	ND	0.0170	ng/m³ Air							U
Vanadium	ND	0.0492	ng/m³ Air							U
Zinc	ND	97.7	ng/m³ Air							U
LCS (B3L2703-BS1)				Prepared & Analyzed: 12/27/23						
Aluminum	93.7	32.1	ng/m³ Air	82.975		113	80-120			
Antimony	0.519	0.0441	ng/m³ Air	1.3829		37.5	80-120			SL
Arsenic	2.71	0.00955	ng/m³ Air	2.7658		98.0	80-120			
Barium	28.0	0.948	ng/m³ Air	27.658		101	80-120			
Beryllium	1.44	0.00332	ng/m³ Air	1.3829		104	80-120			
Cadmium	1.38	0.109	ng/m³ Air	1.3829		100	80-120			
Calcium	647	292	ng/m³ Air	69.146		935	80-120			LJ, QB-01
Chromium	15.9	2.03	ng/m³ Air	13.829		115	80-120			
Cobalt	1.41	0.0156	ng/m³ Air	1.3829		102	80-120			QB-01
Copper	31.2	3.00	ng/m³ Air	27.658		113	80-120			
Iron	40.7	24.2	ng/m³ Air	27.658		147	80-120			
Lead	13.5	0.276	ng/m³ Air	13.829		97.6	80-120			
Magnesium	ND	96.4	ng/m³ Air	27.658			80-120			U
Manganese	8.82	1.19	ng/m³ Air	8.2975		106	80-120			
Molybdenum	1.63	0.213	ng/m³ Air	1.3829		118	80-120			QB-01
Nickel	3.01	0.801	ng/m³ Air	2.7658		109	80-120			
Phosphorus	ND	1250	ng/m³ Air	13.829			80-120			GC-BS, U
Potassium	68.0	38.0	ng/m³ Air	55.317		123	80-120			
Rubidium	1.34	0.0183	ng/m³ Air	1.3829		96.7	80-120			
Selenium	2.71	0.0110	ng/m³ Air	2.7658		98.0	80-120			
Sodium	ND	2000	ng/m³ Air	55.317			80-120			U
Strontium	2.28	0.652	ng/m³ Air	1.3829		165	80-120			QB-01
Thallium	0.133	5.03E-4	ng/m³ Air	0.13829		96.1	80-120			
Thorium	0.130	0.00300	ng/m³ Air	0.13829		94.0	80-120			
Uranium	0.129	0.0170	ng/m³ Air	0.13829		93.3	80-120			

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Inorganics by Compendium Method IO-3.5 - Quality Control

Batch B3L2703 - ICP-MS Extraction

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
LCS (B3L2703-BS1) Continued				Prepared & Analyzed: 12/27/23						
Vanadium	2.75	0.0492	ng/m³ Air	2.7658		99.4	80-120			
Zinc	124	97.7	ng/m³ Air	82.975		150	80-120			
Duplicate (B3L2703-DUP1)	**Source: 3122607-05**			Prepared & Analyzed: 12/27/23						
Aluminum	466	26.8	ng/m³ Air		477			2.35	10	
Antimony	0.0556	0.0369	ng/m³ Air		0.0598			7.22	10	SL
Arsenic	0.179	0.00798	ng/m³ Air		0.208			15.2	10	
Barium	5.00	0.792	ng/m³ Air		5.22			4.39	10	
Beryllium	0.0160	0.00277	ng/m³ Air		0.0156			2.14	10	
Cadmium	ND	0.0911	ng/m³ Air		ND				10	U
Calcium	519	244	ng/m³ Air		551			5.86	10	LJ, QB-01
Chromium	1.89	1.70	ng/m³ Air		1.95			3.03	10	
Cobalt	0.233	0.0130	ng/m³ Air		0.249			6.68	10	QB-01
Copper	21.1	2.51	ng/m³ Air		20.0			5.31	10	
Iron	500	20.2	ng/m³ Air		516			2.98	10	
Lead	0.365	0.231	ng/m³ Air		0.312			15.7	10	
Magnesium	264	80.6	ng/m³ Air		267			1.14	10	
Manganese	13.1	0.994	ng/m³ Air		13.5			2.62	10	
Molybdenum	1.18	0.178	ng/m³ Air		1.11			6.07	10	QB-01
Nickel	ND	0.669	ng/m³ Air		ND				10	U
Phosphorus	ND	1040	ng/m³ Air		ND				10	GC-BS, U
Potassium	104	31.8	ng/m³ Air		118			11.9	10	
Rubidium	0.162	0.0153	ng/m³ Air		0.168			3.77	10	
Selenium	0.130	0.00919	ng/m³ Air		0.137			5.56	10	
Sodium	2190	1670	ng/m³ Air		2190			0.0622	10	E
Strontium	3.90	0.545	ng/m³ Air		3.96			1.49	10	QB-01
Thallium	0.00103	4.20E-4	ng/m³ Air		0.00111			7.62	10	
Thorium	0.0109	0.00251	ng/m³ Air		0.0117			6.63	10	
Uranium	ND	0.0142	ng/m³ Air		ND				10	U
Vanadium	1.23	0.0411	ng/m³ Air		1.26			2.42	10	
Zinc	ND	81.6	ng/m³ Air		ND				10	U
Duplicate (B3L2703-DUP2)	**Source: 3122607-10**			Prepared: 12/27/23 Analyzed: 12/28/23						
Aluminum	466	26.1	ng/m³ Air		473			1.53	10	
Antimony	0.0533	0.0359	ng/m³ Air		0.0535			0.378	10	SL
Arsenic	0.143	0.00778	ng/m³ Air		0.139			3.22	10	
Barium	5.39	0.772	ng/m³ Air		5.40			0.144	10	
Beryllium	0.0174	0.00270	ng/m³ Air		0.0184			5.55	10	
Cadmium	ND	0.0888	ng/m³ Air		ND				10	U
Calcium	703	238	ng/m³ Air		706			0.453	10	LJ, QB-01

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Blue Bell, PA 19422
ATTN: Ms. Chelsea Saber
PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 01/03/24 09:12
SUBMITTED: 12/26/23
AQS SITE CODE:
SITE CODE: Maui fires

Inorganics by Compendium Method IO-3.5 - Quality Control

Batch B3L2703 - ICP-MS Extraction

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Duplicate (B3L2703-DUP2) Continued		**Source: 3122607-10**		Prepared: 12/27/23 Analyzed: 12/28/23						
Chromium	1.76	1.65	ng/m³ Air		1.77			0.594	10	
Cobalt	0.274	0.0127	ng/m³ Air		0.275			0.157	10	QB-01
Copper	15.4	2.44	ng/m³ Air		15.5			0.936	10	
Iron	524	19.7	ng/m³ Air		525			0.0519	10	
Lead	0.346	0.225	ng/m³ Air		0.347			0.286	10	
Magnesium	307	78.5	ng/m³ Air		307			0.0793	10	
Manganese	14.6	0.969	ng/m³ Air		14.6			0.0235	10	
Molybdenum	0.979	0.173	ng/m³ Air		0.974			0.482	10	QB-01
Nickel	0.666	0.652	ng/m³ Air		0.670			0.643	10	
Phosphorus	ND	1020	ng/m³ Air		ND				10	GC-BS, U
Potassium	110	31.0	ng/m³ Air		111			1.45	10	
Rubidium	0.192	0.0149	ng/m³ Air		0.189			1.93	10	
Selenium	0.169	0.00896	ng/m³ Air		0.183			7.76	10	
Sodium	2490	1630	ng/m³ Air		2480			0.288	10	E
Strontium	4.52	0.531	ng/m³ Air		4.57			1.07	10	QB-01
Thallium	9.71E-4	4.10E-4	ng/m³ Air		0.00104			7.17	10	
Thorium	0.0149	0.00244	ng/m³ Air		0.0150			0.753	10	
Uranium	ND	0.0138	ng/m³ Air		ND				10	U
Vanadium	1.38	0.0401	ng/m³ Air		1.40			1.16	10	
Zinc	ND	79.6	ng/m³ Air		ND				10	U
Matrix Spike (B3L2703-MS1)		**Source: 3122607-05**		Prepared & Analyzed: 12/27/23						
Aluminum	544	26.8	ng/m³ Air	69.339	477	97.0	80-120			
Antimony	0.569	0.0369	ng/m³ Air	1.1557	0.0598	44.1	80-120			SL
Arsenic	2.47	0.00798	ng/m³ Air	2.3113	0.208	98.0	80-120			
Barium	28.7	0.792	ng/m³ Air	23.113	5.22	102	80-120			
Beryllium	1.19	0.00277	ng/m³ Air	1.1557	0.0156	101	80-120			
Cadmium	1.17	0.0911	ng/m³ Air	1.1557	ND	102	80-120			
Calcium	603	244	ng/m³ Air	57.783	551	89.9	80-120			LJ, QB-01
Chromium	14.0	1.70	ng/m³ Air	11.557	1.95	104	80-120			
Cobalt	1.39	0.0130	ng/m³ Air	1.1557	0.249	98.3	80-120			QB-01
Copper	48.3	2.51	ng/m³ Air	23.113	20.0	122	80-120			QM-07
Iron	529	20.2	ng/m³ Air	23.113	516	56.3	80-120			QM-4X
Lead	12.0	0.231	ng/m³ Air	11.557	0.312	101	80-120			
Magnesium	297	80.6	ng/m³ Air	23.113	267	127	80-120			QM-4X
Manganese	20.8	0.994	ng/m³ Air	6.9339	13.5	105	80-120			
Molybdenum	2.23	0.178	ng/m³ Air	1.1557	1.11	97.3	80-120			QB-01
Nickel	2.85	0.669	ng/m³ Air	2.3113	ND	123	80-120			

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AQS SITE CODE:
SITE CODE: Maui fires

Inorganics by Compendium Method IO-3.5 - Quality Control

Batch B3L2703 - ICP-MS Extraction

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Matrix Spike (B3L2703-MS1) Continued	**Source: 3122607-05**		Prepared & Analyzed: 12/27/23							
Phosphorus	ND	1040	ng/m³ Air	11.557	ND		80-120			GC-BS, QM-4X, U
Potassium	152	31.8	ng/m³ Air	46.226	118	75.2	80-120			QM-07
Rubidium	1.25	0.0153	ng/m³ Air	1.1557	0.168	93.7	80-120			
Selenium	2.40	0.00919	ng/m³ Air	2.3113	0.137	98.0	80-120			
Sodium	2310	1670	ng/m³ Air	46.226	2190	261	80-120			E, QM-4X
Strontium	5.06	0.545	ng/m³ Air	1.1557	3.96	95.4	80-120			QB-01
Thallium	0.115	4.20E-4	ng/m³ Air	0.11557	0.00111	98.2	80-120			
Thorium	0.0479	0.00251	ng/m³ Air	0.11557	0.0117	31.4	80-120			QM-07
Uranium	0.121	0.0142	ng/m³ Air	0.11557	ND	104	80-120			
Vanadium	3.55	0.0411	ng/m³ Air	2.3113	1.26	98.9	80-120			
Zinc	98.9	81.6	ng/m³ Air	69.339	ND	143	80-120			
Matrix Spike Dup (B3L2703-MSD1)	**Source: 3122607-05**		Prepared & Analyzed: 12/27/23							
Aluminum	514	26.8	ng/m³ Air	69.339	477	53.8	80-120	5.66	20	QM-4X
Antimony	0.586	0.0369	ng/m³ Air	1.1557	0.0598	45.5	80-120	2.89	20	SL
Arsenic	2.44	0.00798	ng/m³ Air	2.3113	0.208	96.7	80-120	1.20	20	
Barium	28.1	0.792	ng/m³ Air	23.113	5.22	99.0	80-120	2.14	20	
Beryllium	1.28	0.00277	ng/m³ Air	1.1557	0.0156	109	80-120	7.43	20	
Cadmium	1.15	0.0911	ng/m³ Air	1.1557	ND	99.7	80-120	1.87	20	
Calcium	591	244	ng/m³ Air	57.783	551	69.3	80-120	2.00	20	LJ, QB-01, QM-4X
Chromium	13.9	1.70	ng/m³ Air	11.557	1.95	103	80-120	0.686	20	
Cobalt	1.37	0.0130	ng/m³ Air	1.1557	0.249	97.1	80-120	1.02	20	QB-01
Copper	49.8	2.51	ng/m³ Air	23.113	20.0	129	80-120	3.17	20	QM-07
Iron	504	20.2	ng/m³ Air	23.113	516	NR	80-120	4.76	20	QM-4X
Lead	11.8	0.231	ng/m³ Air	11.557	0.312	99.7	80-120	1.41	20	
Magnesium	281	80.6	ng/m³ Air	23.113	267	60.9	80-120	5.32	20	QM-4X
Manganese	19.8	0.994	ng/m³ Air	6.9339	13.5	91.6	80-120	4.59	20	
Molybdenum	2.24	0.178	ng/m³ Air	1.1557	1.11	97.6	80-120	0.186	20	QB-01
Nickel	2.99	0.669	ng/m³ Air	2.3113	ND	129	80-120	4.71	20	
Phosphorus	ND	1040	ng/m³ Air	11.557	ND		80-120		20	GC-BS, QM-4X, U
Potassium	148	31.8	ng/m³ Air	46.226	118	65.0	80-120	3.15	20	QM-07
Rubidium	1.24	0.0153	ng/m³ Air	1.1557	0.168	93.1	80-120	0.596	20	
Selenium	2.41	0.00919	ng/m³ Air	2.3113	0.137	98.4	80-120	0.437	20	
Sodium	2210	1670	ng/m³ Air	46.226	2190	30.5	80-120	4.70	20	QM-4X
Strontium	4.91	0.545	ng/m³ Air	1.1557	3.96	82.2	80-120	3.08	20	QB-01
Thallium	0.113	4.20E-4	ng/m³ Air	0.11557	0.00111	97.0	80-120	1.17	20	
Thorium	0.0537	0.00251	ng/m³ Air	0.11557	0.0117	36.3	80-120	11.3	20	QM-07

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Inorganics by Compendium Method IO-3.5 - Quality Control

Batch B3L2703 - ICP-MS Extraction

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Matrix Spike Dup (B3L2703-MSD1) ContirSource: 3122607-05				Prepared & Analyzed: 12/27/23						
Uranium	0.119	0.0142	ng/m³ Air	0.11557	ND	103	80-120	1.71	20	
Vanadium	3.45	0.0411	ng/m³ Air	2.3113	1.26	94.6	80-120	2.85	20	
Zinc	103	81.6	ng/m³ Air	69.339	ND	148	80-120	3.72	20	
Post Spike (B3L2703-PS1)	**Source: 3122607-05**			Prepared & Analyzed: 12/27/23						
Aluminum	504	26.8	ng/m³ Air	23.113	477	118	75-125			
Antimony	0.286	0.0369	ng/m³ Air	0.23113	0.0598	97.8	75-125			SL
Arsenic	1.31	0.00798	ng/m³ Air	1.1557	0.208	95.7	75-125			
Barium	7.53	0.792	ng/m³ Air	2.3113	5.22	99.8	75-125			
Beryllium	0.250	0.00277	ng/m³ Air	0.23113	0.0156	101	75-125			
Cadmium	0.122	0.0911	ng/m³ Air	0.11557	ND	105	75-125			
Calcium	587	244	ng/m³ Air		551		75-125			A-01, LJ, QB-01
Chromium	3.09	1.70	ng/m³ Air	1.1557	1.95	98.2	75-125			
Cobalt	0.481	0.0130	ng/m³ Air	0.23113	0.249	100	75-125			QB-01
Copper	32.3	2.51	ng/m³ Air	11.557	20.0	107	75-125			
Iron	544	20.2	ng/m³ Air	23.113	516	121	75-125			
Lead	23.2	0.231	ng/m³ Air	23.113	0.312	98.8	75-125			
Magnesium	292	80.6	ng/m³ Air	23.113	267	108	75-125			
Manganese	16.0	0.994	ng/m³ Air	2.3113	13.5	109	75-125			
Molybdenum	2.20	0.178	ng/m³ Air	1.1557	1.11	94.4	75-125			QB-01
Nickel	2.87	0.669	ng/m³ Air	2.3113	ND	124	75-125			
Phosphorus	ND	1040	ng/m³ Air	4.6226	ND		75-125			A-01, GC-BS, U
Potassium	141	31.8	ng/m³ Air	23.113	118	101	75-125			
Rubidium	0.278	0.0153	ng/m³ Air	0.11557	0.168	95.6	75-125			
Selenium	1.23	0.00919	ng/m³ Air	1.1557	0.137	94.7	75-125			
Sodium	2260	1670	ng/m³ Air	23.113	2190	263	75-125			A-01
Strontium	5.04	0.545	ng/m³ Air	1.1557	3.96	93.3	75-125			QB-01
Thallium	0.0561	4.20E-4	ng/m³ Air	5.7783E-2	0.00111	95.2	75-125			
Thorium	0.0637	0.00251	ng/m³ Air	5.7783E-2	0.0117	89.9	75-125			
Uranium	0.0647	0.0142	ng/m³ Air	5.7783E-2	ND	112	75-125			
Vanadium	2.39	0.0411	ng/m³ Air	1.1557	1.26	97.9	75-125			
Zinc	ND	81.6	ng/m³ Air	23.113	ND		75-125			U
Dilution Check (B3L2703-SRL1)	**Source: 3122607-05**			Prepared & Analyzed: 12/27/23						
Aluminum	467	134	ng/m³ Air		477			2.04	10	
Antimony	ND	0.184	ng/m³ Air		ND				10	SL, U
Arsenic	0.207	0.0399	ng/m³ Air		0.208			0.569	10	
Barium	5.37	3.96	ng/m³ Air		5.22			2.80	10	

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Inorganics by Compendium Method IO-3.5 - Quality Control

Batch B3L2703 - ICP-MS Extraction

Dilution Check (B3L2703-SRL1) Continued **Source: 3122607-05** Prepared & Analyzed: 12/27/23

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Beryllium	0.0152	0.0139	ng/m³ Air		0.0156			2.41	10	
Cadmium	ND	0.455	ng/m³ Air		ND				10	U
Calcium	ND	1220	ng/m³ Air		ND				10	LJ, QB-01, U
Chromium	ND	8.48	ng/m³ Air		ND				10	U
Cobalt	0.249	0.0652	ng/m³ Air		0.249			0.123	10	QB-01
Copper	20.1	12.5	ng/m³ Air		20.0			0.675	10	
Iron	514	101	ng/m³ Air		516			0.328	10	
Lead	ND	1.15	ng/m³ Air		ND				10	U
Magnesium	ND	403	ng/m³ Air		ND				10	U
Manganese	13.5	4.97	ng/m³ Air		13.5			0.127	10	
Molybdenum	1.11	0.890	ng/m³ Air		1.11			0.287	10	QB-01
Nickel	ND	3.35	ng/m³ Air		ND				10	U
Phosphorus	ND	5220	ng/m³ Air		ND				10	GC-BS, U
Potassium	ND	159	ng/m³ Air		ND				10	U
Rubidium	0.161	0.0765	ng/m³ Air		0.168			4.42	10	
Selenium	0.152	0.0460	ng/m³ Air		0.137			10.1	10	
Sodium	ND	8360	ng/m³ Air		ND				10	U
Strontium	4.02	2.72	ng/m³ Air		3.96			1.67	10	QB-01
Thallium	ND	0.00210	ng/m³ Air		ND				10	U
Thorium	ND	0.0125	ng/m³ Air		ND				10	U
Uranium	ND	0.0710	ng/m³ Air		ND				10	U
Vanadium	1.29	0.206	ng/m³ Air		1.26			2.12	10	
Zinc	ND	408	ng/m³ Air		ND				10	U

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Notes and Definitions

U	Under Detection Limit
SL	The spike recovery was outside acceptance limits. Reported value may be biased low.
QM-4X	The MS/MSD recovery exceeds criteria because the parent sample concentration is greater than 4x the spike concentration. Sample results for the QC batch were accepted based on acceptable BS/BSD recoveries.
QM-07	The spike recovery was outside acceptance limits for the MS and/or MSD. The batch was accepted based on acceptable LCS recovery.
QB-01	Analyte exceeds method blank criteria
LJ	Identification of analyte is acceptable; reported value is an estimate.
GC-BS	Compound exceeds Blank Spike Criteria
FB-01	Analyte exceeds Field Blank criteria.
E	The concentration indicated for this analyte is an estimated value above the calibration range of the instrument. This value is considered an estimate (CLP E-flag).
A-01	Parent sample >4x spike amount
ND	Analyte NOT DETECTED
NR	Not Reported
MDL	Method Detection Limit
RPD	Relative Percent Difference

Note: This test is accredited under the 2016 TNI Standard.

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Stage 1 Data Verification Checklist - Metals

HDOH CAB – Ambient Community Air Sampling – Kula

Task Order No. 23141

Reviewed by:
Trinh Vu 01/03/2024 & Shanna Vasser 1/3/2024
Laboratory: Eastern Research Group – Morrisville, NC
Analysis Date: 12/27/2023 and 12/28/2023
Report No: 3122607

√	1.	Chain of custody (CoC) documentation is present.
X	2.	Sample receipt condition information is present and acceptable.
√	3.	Laboratory conducting the analysis is identified.
√	4.	All samples submitted to the laboratory are accounted for.
√	5.	Requested analytical methods were performed.
√	6.	Analysis dates are provided.
√	7.	Analyte results are provided.
√	8.	Result qualifiers and definitions are provided.
√	9.	Result units are reported.
NA	10.	Requested reporting limits are present.
√	11.	Method detection limits are present.
√	12.	Sample collection date and time are present.

Discrepancies: None

Notes:

10. No reporting limits were included in the data package.

Eastern Research Group
601 Keystone Park Drive
Suite 700
Morrisville, NC 27560

December 28, 2023

Ms. Chelsea Saber
Tetra Tech, Inc.
1777 Sentry Pkwy, Bldg 12
Blue Bell, PA 19422
Project Name: Maui fires

Dear Ms. Chelsea Saber,

This report contains the analytical results for the sample(s) received under chain(s) of custody by Eastern Research Group on 12/20/23 13:27.

Values below the MDL for QC results in this report are recorded as ND, however the actual values are reported in the accompanying Excel report with a "U" flag (Under the detection limit). The actual values are reported in AQS.

This test is accredited under the 2016 TNI Standard for Environmental Laboratories (FL DOH Certification # E87673). All analyses were performed as described in the US EPA-approved QAPP, under the contract for National Hazardous Air Pollutant Support (US EPA Contract No. 68HERH22D0002). This cover page is an integral part of this report, and any exceptions or comments are noted on the last page.

Release of the data contained in this data package and in the data submitted in the electronic data deliverable, has been authorized by the Program Manager, or the Program Manager's designee as verified by the following signature.

The issuance of the final Certificate of Analysis takes precedence over any previous Report. If you have any questions, please contact me at 919-468-7924.

Sincerely,

Julie Swift
Program Manager
julie.swift@erg.com

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FILE #: 0000.00
REPORTED: 12/28/23 10:10
SUBMITTED: 12/20/23
AQS SITE CODE:
SITE CODE: Maui fires

ANALYTICAL REPORT FOR SAMPLES

SampleName	LabNumber	Matrix	Sampled	Received
TetraTech Q9533938	3122052-01	Air	12/14/23 23:59	12/20/23 13:27
TetraTech Q9533937	3122052-02	Air	12/14/23 23:59	12/20/23 13:27
TetraTech Q9533935	3122052-03	Air	12/14/23 23:59	12/20/23 13:27
TetraTech Q9533934 FB	3122052-04	Air	12/14/23 00:00	12/20/23 13:27
TetraTech Q9543029	3122052-05	Air	12/15/23 23:59	12/20/23 13:27
TetraTech Q9533895	3122052-06	Air	12/15/23 23:59	12/20/23 13:27
TetraTech Q9533893	3122052-07	Air	12/15/23 23:59	12/20/23 13:27
TetraTech Q9533890 FB	3122052-08	Air	12/15/23 00:00	12/20/23 13:27
TetraTech Q9533892	3122052-09	Air	12/16/23 23:59	12/20/23 13:27
TetraTech Q9533888	3122052-10	Air	12/16/23 23:59	12/20/23 13:27
TetraTech Q9533885	3122052-11	Air	12/16/23 23:59	12/20/23 13:27
TetraTech Q9533884 FB	3122052-12	Air	12/16/23 00:00	12/20/23 13:27
TetraTech Q9533883	3122052-13	Air	12/17/23 23:59	12/20/23 13:27
TetraTech Q9533881	3122052-14	Air	12/17/23 23:59	12/20/23 13:27
TetraTech Q9533910	3122052-15	Air	12/17/23 23:59	12/20/23 13:27
TetraTech Q9533908 FB	3122052-16	Air	12/17/23 00:00	12/20/23 13:27

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FILE #: 0000.00
REPORTED: 12/28/23 10:10
SUBMITTED: 12/20/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9533938 **Lab ID:** 3122052-01 **Sampled:** 12/14/23 23:59
Matrix: Air **Sample Volume:** 2222.149 m³ **Received:** 12/20/23 13:27
Filter ID: **Analysis Date:** 12/21/23 19:16
Comments: MFK-AM01-121423-HM

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	**7429-90-5**	**567**		**23.5**
Antimony	7440-36-0	0.0243	SL, U	0.0323
Arsenic	**7440-38-2**	**0.158**		**0.00699**
Barium	**7440-39-3**	**4.17**		**0.694**
Beryllium	**7440-41-7**	**0.0164**		**0.00243**
Cadmium	7440-43-9	0.0132	U	0.0798
Calcium	**7440-70-2**	**474**	LJ, QB-01	**214**
Chromium	**7440-47-3**	**1.81**		**1.49**
Cobalt	**7440-48-4**	**0.216**	QB-01	**0.0114**
Copper	**7440-50-8**	**14.1**		**2.20**
Iron	**7439-89-6**	**532**		**17.7**
Lead	**7439-92-1**	**0.769**		**0.202**
Magnesium	**7439-95-4**	**134**		**70.6**
Manganese	**7439-96-5**	**14.0**		**0.871**
Molybdenum	**7439-98-7**	**0.630**	QB-01	**0.156**
Nickel	7440-02-0	0.548	U	0.586
Phosphorus	7723-14-0	302	GC-BS, U	915
Potassium	**7440-09-7**	**118**		**27.8**
Rubidium	**7440-17-7**	**0.163**		**0.0134**
Selenium	**7782-49-2**	**0.109**		**0.00805**
Sodium	7440-23-5	1130	GC-BS, U	1460
Strontium	**7440-24-6**	**3.67**	QB-01	**0.477**
Thallium	**7440-28-0**	**0.00188**		**3.68E-4**
Thorium	**7440-29-01**	**0.0135**		**0.00220**
Uranium	**7440-61-1**	**0.0128**		**0.0124**
Vanadium	**7440-62-2**	**1.26**		**0.0360**
Zinc	7440-66-6	24.5	U	71.5

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FILE #: 0000.00
REPORTED: 12/28/23 10:10
SUBMITTED: 12/20/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9533937 **Lab ID:** 3122052-02 **Sampled:** 12/14/23 23:59
Matrix: Air **Sample Volume:** 2205.002 m³ **Received:** 12/20/23 13:27
Filter ID: **Analysis Date:** 12/21/23 19:34
Comments: MFK-AM02-121423-HM

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	**7429-90-5**	**318**		**23.7**
Antimony	7440-36-0	0.0257	SL, U	0.0325
Arsenic	**7440-38-2**	**0.0912**		**0.00705**
Barium	**7440-39-3**	**3.48**		**0.699**
Beryllium	**7440-41-7**	**0.0111**		**0.00245**
Cadmium	7440-43-9	0.0226	U	0.0804
Calcium	**7440-70-2**	**389**	LJ, QB-01	**215**
Chromium	**7440-47-3**	**1.62**		**1.50**
Cobalt	**7440-48-4**	**0.140**	QB-01	**0.0115**
Copper	**7440-50-8**	**10.9**		**2.21**
Iron	**7439-89-6**	**322**		**17.9**
Lead	**7439-92-1**	**0.435**		**0.204**
Magnesium	**7439-95-4**	**150**		**71.1**
Manganese	**7439-96-5**	**7.95**		**0.878**
Molybdenum	**7439-98-7**	**0.560**	QB-01	**0.157**
Nickel	**7440-02-0**	**0.623**		**0.591**
Phosphorus	7723-14-0	285	GC-BS, U	922
Potassium	**7440-09-7**	**82.6**		**28.0**
Rubidium	**7440-17-7**	**0.121**		**0.0135**
Selenium	**7782-49-2**	**0.0965**		**0.00812**
Sodium	7440-23-5	1300	GC-BS, U	1480
Strontium	**7440-24-6**	**2.48**	QB-01	**0.481**
Thallium	**7440-28-0**	**0.00191**		**3.71E-4**
Thorium	**7440-29-01**	**0.00974**		**0.00221**
Uranium	7440-61-1	0.00798	U	0.0125
Vanadium	**7440-62-2**	**0.756**		**0.0363**
Zinc	7440-66-6	19.8	U	72.1

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FILE #: 0000.00
REPORTED: 12/28/23 10:10
SUBMITTED: 12/20/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9533935 **Lab ID:** 3122052-03 **Sampled:** 12/14/23 23:59
Matrix: Air **Sample Volume:** 1852.809 m³ **Received:** 12/20/23 13:27
Filter ID: **Analysis Date:** 12/21/23 19:49
Comments: MFK-AM03-121423-HM

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	**7429-90-5**	**381**		**28.2**
Antimony	**7440-36-0**	**0.0462**	SL	**0.0387**
Arsenic	**7440-38-2**	**0.142**		**0.00839**
Barium	**7440-39-3**	**5.48**		**0.832**
Beryllium	**7440-41-7**	**0.0171**		**0.00292**
Cadmium	7440-43-9	0.0129	U	0.0957
Calcium	**7440-70-2**	**488**	LJ, QB-01	**256**
Chromium	**7440-47-3**	**2.14**		**1.78**
Cobalt	**7440-48-4**	**0.203**	QB-01	**0.0137**
Copper	**7440-50-8**	**17.6**		**2.63**
Iron	**7439-89-6**	**438**		**21.3**
Lead	**7439-92-1**	**0.488**		**0.242**
Magnesium	**7439-95-4**	**207**		**84.7**
Manganese	**7439-96-5**	**14.2**		**1.04**
Molybdenum	**7439-98-7**	**0.565**	QB-01	**0.187**
Nickel	**7440-02-0**	**0.761**		**0.703**
Phosphorus	7723-14-0	342	GC-BS, U	1100
Potassium	**7440-09-7**	**106**		**33.4**
Rubidium	**7440-17-7**	**0.177**		**0.0161**
Selenium	**7782-49-2**	**0.130**		**0.00966**
Sodium	7440-23-5	1680	GC-BS, U	1760
Strontium	**7440-24-6**	**3.89**	QB-01	**0.573**
Thallium	**7440-28-0**	**0.00265**		**4.42E-4**
Thorium	**7440-29-01**	**0.0134**		**0.00263**
Uranium	7440-61-1	0.0107	U	0.0149
Vanadium	**7440-62-2**	**0.942**		**0.0432**
Zinc	7440-66-6	22.7	U	85.8

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FILE #: 0000.00
REPORTED: 12/28/23 10:10
SUBMITTED: 12/20/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9533934 FB **Lab ID:** 3122052-04 **Sampled:** 12/14/23 00:00
Matrix: Air **Sample Volume:** 2222.149 m³ **Received:** 12/20/23 13:27
Filter ID: **Analysis Date:** 12/21/23 20:04
Comments: MFK-FB01-121423-HM Field Blank

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	7429-90-5	10.5	U	23.5
Antimony	7440-36-0	0.00714	SL, U	0.0323
Arsenic	7440-38-2	0.00231	U	0.00699
Barium	7440-39-3	0.608	U	0.694
Beryllium	7440-41-7	9.04E-4	U	0.00243
Cadmium	7440-43-9	0.00346	U	0.0798
Calcium	**7440-70-2**	**294**	FB-01, LJ, QB-01	**214**
Chromium	7440-47-3	1.38	U	1.49
Cobalt	**7440-48-4**	**0.0240**	FB-01, QB-01	**0.0114**
Copper	7440-50-8	0.833	U	2.20
Iron	7439-89-6	14.5	U	17.7
Lead	7439-92-1	0.0590	U	0.202
Magnesium	7439-95-4	34.9	U	70.6
Manganese	7439-96-5	0.195	U	0.871
Molybdenum	**7439-98-7**	**0.213**	FB-01, QB-01	**0.156**
Nickel	7440-02-0	0.231	U	0.586
Phosphorus	7723-14-0	256	GC-BS, U	915
Potassium	**7440-09-7**	**35.3**	FB-01	**27.8**
Rubidium	7440-17-7	0.0131	U	0.0134
Selenium	7782-49-2	0.00599	U	0.00805
Sodium	7440-23-5	568	GC-BS, U	1460
Strontium	**7440-24-6**	**0.542**	FB-01, QB-01	**0.477**
Thallium	7440-28-0	1.34E-4	U	3.68E-4
Thorium	7440-29-01	0.00200	U	0.00220
Uranium	7440-61-1	0.00146	U	0.0124
Vanadium	7440-62-2	0.0180	U	0.0360
Zinc	7440-66-6	19.4	U	71.5

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FILE #: 0000.00
REPORTED: 12/28/23 10:10
SUBMITTED: 12/20/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9543029 **Lab ID:** 3122052-05 **Sampled:** 12/15/23 23:59
Matrix: Air **Sample Volume:** 1884.781 m^3 **Received:** 12/20/23 13:27
Filter ID: **Analysis Date:** 12/21/23 20:18
Comments: MFK-AM01-121523-HM

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	**7429-90-5**	**197**		**27.7**
Antimony	7440-36-0	0.0313	SL, U	0.0381
Arsenic	**7440-38-2**	**0.0956**		**0.00824**
Barium	**7440-39-3**	**2.82**		**0.818**
Beryllium	**7440-41-7**	**0.00639**		**0.00287**
Cadmium	7440-43-9	0.00835	U	0.0941
Calcium	**7440-70-2**	**617**	LJ, QB-01	**252**
Chromium	**7440-47-3**	**1.80**		**1.75**
Cobalt	**7440-48-4**	**0.121**	QB-01	**0.0135**
Copper	**7440-50-8**	**16.5**		**2.59**
Iron	**7439-89-6**	**217**		**20.9**
Lead	**7439-92-1**	**0.460**		**0.238**
Magnesium	**7439-95-4**	**351**		**83.2**
Manganese	**7439-96-5**	**5.48**		**1.03**
Molybdenum	**7439-98-7**	**0.880**	QB-01	**0.184**
Nickel	7440-02-0	0.611	U	0.691
Phosphorus	7723-14-0	408	GC-BS, U	1080
Potassium	**7440-09-7**	**129**		**32.8**
Rubidium	**7440-17-7**	**0.118**		**0.0158**
Selenium	**7782-49-2**	**0.117**		**0.00950**
Sodium	**7440-23-5**	**3180**	E, GC-BS	**1730**
Strontium	**7440-24-6**	**3.49**	QB-01	**0.563**
Thallium	**7440-28-0**	**0.00157**		**4.34E-4**
Thorium	**7440-29-01**	**0.00641**		**0.00259**
Uranium	7440-61-1	0.00671	U	0.0147
Vanadium	**7440-62-2**	**0.492**		**0.0425**
Zinc	7440-66-6	22.8	U	84.3

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FILE #: 0000.00
REPORTED: 12/28/23 10:10
SUBMITTED: 12/20/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9533895 **Lab ID:** 3122052-06 **Sampled:** 12/15/23 23:59
Matrix: Air **Sample Volume:** 1899.853 m³ **Received:** 12/20/23 13:27
Filter ID: **Analysis Date:** 12/21/23 20:49
Comments: MFK-AM02-121523-HM

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	**7429-90-5**	**212**		**27.5**
Antimony	7440-36-0	0.0370	SL, U	0.0378
Arsenic	**7440-38-2**	**0.100**		**0.00818**
Barium	**7440-39-3**	**3.08**		**0.812**
Beryllium	**7440-41-7**	**0.00691**		**0.00284**
Cadmium	7440-43-9	0.0254	U	0.0933
Calcium	**7440-70-2**	**486**	LJ, QB-01	**250**
Chromium	**7440-47-3**	**1.85**		**1.74**
Cobalt	**7440-48-4**	**0.117**	QB-01	**0.0134**
Copper	**7440-50-8**	**10.0**		**2.57**
Iron	**7439-89-6**	**228**		**20.7**
Lead	**7439-92-1**	**0.296**		**0.236**
Magnesium	**7439-95-4**	**362**		**82.6**
Manganese	**7439-96-5**	**5.37**		**1.02**
Molybdenum	**7439-98-7**	**0.698**	QB-01	**0.182**
Nickel	7440-02-0	0.560	U	0.686
Phosphorus	7723-14-0	319	GC-BS, U	1070
Potassium	**7440-09-7**	**135**		**32.5**
Rubidium	**7440-17-7**	**0.126**		**0.0157**
Selenium	**7782-49-2**	**0.127**		**0.00942**
Sodium	**7440-23-5**	**3210**	E, GC-BS	**1710**
Strontium	**7440-24-6**	**3.39**	QB-01	**0.558**
Thallium	**7440-28-0**	**0.00162**		**4.31E-4**
Thorium	**7440-29-01**	**0.00856**		**0.00257**
Uranium	7440-61-1	0.00650	U	0.0146
Vanadium	**7440-62-2**	**0.522**		**0.0421**
Zinc	7440-66-6	17.2	U	83.7

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FILE #: 0000.00
REPORTED: 12/28/23 10:10
SUBMITTED: 12/20/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9533893 **Lab ID:** 3122052-07 **Sampled:** 12/15/23 23:59
Matrix: Air **Sample Volume:** 1569.877 m³ **Received:** 12/20/23 13:27
Filter ID: **Analysis Date:** 12/21/23 21:03
Comments: MFK-AM03-121523-HM

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	**7429-90-5**	**259**		**33.3**
Antimony	**7440-36-0**	**0.0633**	SL	**0.0457**
Arsenic	**7440-38-2**	**0.105**		**0.00990**
Barium	**7440-39-3**	**4.78**		**0.982**
Beryllium	**7440-41-7**	**0.0119**		**0.00344**
Cadmium	7440-43-9	0.0104	U	0.113
Calcium	**7440-70-2**	**578**	LJ, QB-01	**303**
Chromium	**7440-47-3**	**2.14**		**2.10**
Cobalt	**7440-48-4**	**0.177**	QB-01	**0.0162**
Copper	**7440-50-8**	**27.2**		**3.11**
Iron	**7439-89-6**	**316**		**25.1**
Lead	**7439-92-1**	**0.435**		**0.286**
Magnesium	**7439-95-4**	**418**		**99.9**
Manganese	**7439-96-5**	**9.78**		**1.23**
Molybdenum	**7439-98-7**	**0.798**	QB-01	**0.221**
Nickel	**7440-02-0**	**0.940**		**0.830**
Phosphorus	7723-14-0	394	GC-BS, U	1300
Potassium	**7440-09-7**	**194**		**39.4**
Rubidium	**7440-17-7**	**0.157**		**0.0190**
Selenium	**7782-49-2**	**0.127**		**0.0114**
Sodium	**7440-23-5**	**3630**	E, GC-BS	**2070**
Strontium	**7440-24-6**	**4.52**	QB-01	**0.676**
Thallium	**7440-28-0**	**0.00190**		**5.21E-4**
Thorium	**7440-29-01**	**0.0107**		**0.00311**
Uranium	7440-61-1	0.00854	U	0.0176
Vanadium	**7440-62-2**	**0.683**		**0.0510**
Zinc	7440-66-6	21.6	U	101

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FILE #: 0000.00
REPORTED: 12/28/23 10:10
SUBMITTED: 12/20/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9533890 FB **Lab ID:** 3122052-08 **Sampled:** 12/15/23 00:00
Matrix: Air **Sample Volume:** 1884.781 m³ **Received:** 12/20/23 13:27
Filter ID: **Analysis Date:** 12/21/23 21:18
Comments: MFK-FB01-121523-HM Field Blank

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	7429-90-5	12.3	U	27.7
Antimony	7440-36-0	0.00847	SL, U	0.0381
Arsenic	7440-38-2	0.00475	U	0.00824
Barium	7440-39-3	0.676	U	0.818
Beryllium	7440-41-7	0.00108	U	0.00287
Cadmium	7440-43-9	0.00276	U	0.0941
Calcium	**7440-70-2**	**311**	FB-01, LJ, QB-01	**252**
Chromium	7440-47-3	1.68	U	1.75
Cobalt	**7440-48-4**	**0.0276**	FB-01, QB-01	**0.0135**
Copper	7440-50-8	0.826	U	2.59
Iron	7439-89-6	15.6	U	20.9
Lead	7439-92-1	0.0631	U	0.238
Magnesium	7439-95-4	40.3	U	83.2
Manganese	7439-96-5	0.245	U	1.03
Molybdenum	**7439-98-7**	**0.282**	FB-01, QB-01	**0.184**
Nickel	7440-02-0	0.360	U	0.691
Phosphorus	7723-14-0	309	GC-BS, U	1080
Potassium	**7440-09-7**	**40.1**	FB-01	**32.8**
Rubidium	**7440-17-7**	**0.0166**	FB-01	**0.0158**
Selenium	7782-49-2	0.00488	U	0.00950
Sodium	7440-23-5	707	GC-BS, U	1730
Strontium	**7440-24-6**	**0.609**	FB-01, QB-01	**0.563**
Thallium	7440-28-0	1.03E-4	U	4.34E-4
Thorium	7440-29-01	0.00232	U	0.00259
Uranium	7440-61-1	0.00177	U	0.0147
Vanadium	7440-62-2	0.0282	U	0.0425
Zinc	7440-66-6	16.7	U	84.3

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Tetra Tech, Inc.
1777 Sentry Pkwy, Bldg 12
Blue Bell, PA 19422
ATTN: Ms. Chelsea Saber
PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 12/28/23 10:10
SUBMITTED: 12/20/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9533892 **Lab ID:** 3122052-09 **Sampled:** 12/16/23 23:59
Matrix: Air **Sample Volume:** 2060.35 m^3 **Received:** 12/20/23 13:27
Filter ID: **Analysis Date:** 12/21/23 21:32
Comments: MFK-AM01-121623-HM

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	**7429-90-5**	**254**		**25.3**
Antimony	**7440-36-0**	**0.0604**	SL	**0.0348**
Arsenic	**7440-38-2**	**0.0980**		**0.00754**
Barium	**7440-39-3**	**4.03**		**0.749**
Beryllium	**7440-41-7**	**0.00826**		**0.00262**
Cadmium	7440-43-9	0.0229	U	0.0861
Calcium	**7440-70-2**	**476**	LJ, QB-01	**231**
Chromium	**7440-47-3**	**1.65**		**1.60**
Cobalt	**7440-48-4**	**0.158**	QB-01	**0.0123**
Copper	**7440-50-8**	**16.6**		**2.37**
Iron	**7439-89-6**	**308**		**19.1**
Lead	**7439-92-1**	**0.305**		**0.218**
Magnesium	**7439-95-4**	**282**		**76.1**
Manganese	**7439-96-5**	**8.03**		**0.940**
Molybdenum	**7439-98-7**	**1.05**	QB-01	**0.168**
Nickel	**7440-02-0**	**0.713**		**0.633**
Phosphorus	7723-14-0	307	GC-BS, U	987
Potassium	**7440-09-7**	**130**		**30.0**
Rubidium	**7440-17-7**	**0.149**		**0.0145**
Selenium	**7782-49-2**	**0.105**		**0.00869**
Sodium	**7440-23-5**	**2500**	E, GC-BS	**1580**
Strontium	**7440-24-6**	**3.36**	QB-01	**0.515**
Thallium	**7440-28-0**	**0.00121**		**3.97E-4**
Thorium	**7440-29-01**	**0.00841**		**0.00237**
Uranium	7440-61-1	0.00716	U	0.0134
Vanadium	**7440-62-2**	**0.712**		**0.0389**
Zinc	7440-66-6	18.9	U	77.2

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ATTN: Ms. Chelsea Saber
PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 12/28/23 10:10
SUBMITTED: 12/20/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9533888 **Lab ID:** 3122052-10 **Sampled:** 12/16/23 23:59
Matrix: Air **Sample Volume:** 2057.6 m³ **Received:** 12/20/23 13:27
Filter ID: **Analysis Date:** 12/21/23 22:26
Comments: MFK-AM02-121623-HM

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	**7429-90-5**	**246**		**25.4**
Antimony	**7440-36-0**	**0.0588**	SL	**0.0349**
Arsenic	**7440-38-2**	**0.0969**		**0.00755**
Barium	**7440-39-3**	**3.93**		**0.750**
Beryllium	**7440-41-7**	**0.00857**		**0.00263**
Cadmium	7440-43-9	0.0181	U	0.0862
Calcium	**7440-70-2**	**443**	LJ, QB-01	**231**
Chromium	**7440-47-3**	**1.67**		**1.61**
Cobalt	**7440-48-4**	**0.169**	QB-01	**0.0123**
Copper	**7440-50-8**	**13.7**		**2.37**
Iron	**7439-89-6**	**287**		**19.1**
Lead	**7439-92-1**	**0.290**		**0.218**
Magnesium	**7439-95-4**	**250**		**76.2**
Manganese	**7439-96-5**	**7.42**		**0.941**
Molybdenum	**7439-98-7**	**0.855**	QB-01	**0.168**
Nickel	7440-02-0	0.631	U	0.633
Phosphorus	7723-14-0	294	GC-BS, U	988
Potassium	**7440-09-7**	**126**		**30.0**
Rubidium	**7440-17-7**	**0.166**		**0.0145**
Selenium	**7782-49-2**	**0.0989**		**0.00870**
Sodium	**7440-23-5**	**2230**	E, GC-BS	**1580**
Strontium	**7440-24-6**	**3.27**	QB-01	**0.516**
Thallium	**7440-28-0**	**0.00132**		**3.98E-4**
Thorium	**7440-29-01**	**0.00831**		**0.00237**
Uranium	7440-61-1	0.00701	U	0.0134
Vanadium	**7440-62-2**	**0.665**		**0.0389**
Zinc	7440-66-6	15.5	U	77.3

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FILE #: 0000.00
REPORTED: 12/28/23 10:10
SUBMITTED: 12/20/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9533885
Matrix: Air
Lab ID: 3122052-11
Sample Volume: 1753.525 m^3
Filter ID:
Sampled: 12/16/23 23:59
Received: 12/20/23 13:27
Analysis Date: 12/21/23 22:42
Comments: MFK-AM03-121623-HM

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m^3 Air	Flag	MDL ng/m^3 Air
Aluminum	**7429-90-5**	**224**		**29.8**
Antimony	**7440-36-0**	**0.0535**	SL	**0.0409**
Arsenic	**7440-38-2**	**0.0708**		**0.00886**
Barium	**7440-39-3**	**4.34**		**0.880**
Beryllium	**7440-41-7**	**0.00989**		**0.00308**
Cadmium	7440-43-9	0.00832	U	0.101
Calcium	**7440-70-2**	**485**	LJ, QB-01	**271**
Chromium	**7440-47-3**	**1.97**		**1.88**
Cobalt	**7440-48-4**	**0.142**	QB-01	**0.0145**
Copper	**7440-50-8**	**36.6**		**2.78**
Iron	**7439-89-6**	**279**		**22.5**
Lead	**7439-92-1**	**0.403**		**0.256**
Magnesium	**7439-95-4**	**239**		**89.4**
Manganese	**7439-96-5**	**8.25**		**1.10**
Molybdenum	**7439-98-7**	**0.935**	QB-01	**0.198**
Nickel	7440-02-0	0.530	U	0.743
Phosphorus	7723-14-0	364	GC-BS, U	1160
Potassium	**7440-09-7**	**132**		**35.3**
Rubidium	**7440-17-7**	**0.138**		**0.0170**
Selenium	**7782-49-2**	**0.0987**		**0.0102**
Sodium	**7440-23-5**	**2170**	E, GC-BS	**1860**
Strontium	**7440-24-6**	**3.21**	QB-01	**0.605**
Thallium	**7440-28-0**	**0.00154**		**4.67E-4**
Thorium	**7440-29-01**	**0.00832**		**0.00278**
Uranium	7440-61-1	0.00757	U	0.0158
Vanadium	**7440-62-2**	**0.604**		**0.0456**
Zinc	7440-66-6	23.1	U	90.7

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PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 12/28/23 10:10
SUBMITTED: 12/20/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9533884 FB **Lab ID:** 3122052-12 **Sampled:** 12/16/23 00:00
Matrix: Air **Sample Volume:** 2060.35 m³ **Received:** 12/20/23 13:27
Filter ID: **Analysis Date:** 12/21/23 22:56
Comments: MFK-FB01-121623-HM Field Blank

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	7429-90-5	7.84	U	25.3
Antimony	7440-36-0	0.00608	SL, U	0.0348
Arsenic	7440-38-2	0.00157	U	0.00754
Barium	7440-39-3	0.564	U	0.749
Beryllium	7440-41-7	6.98E-4	U	0.00262
Cadmium	7440-43-9	0.00253	U	0.0861
Calcium	**7440-70-2**	**279**	FB-01, LJ, QB-01	**231**
Chromium	7440-47-3	1.44	U	1.60
Cobalt	**7440-48-4**	**0.0316**	FB-01, QB-01	**0.0123**
Copper	7440-50-8	0.245	U	2.37
Iron	7439-89-6	11.1	U	19.1
Lead	7439-92-1	0.0512	U	0.218
Magnesium	7439-95-4	34.3	U	76.1
Manganese	7439-96-5	0.139	U	0.940
Molybdenum	**7439-98-7**	**0.246**	FB-01, QB-01	**0.168**
Nickel	7440-02-0	0.258	U	0.633
Phosphorus	7723-14-0	274	GC-BS, U	987
Potassium	**7440-09-7**	**32.4**	FB-01	**30.0**
Rubidium	7440-17-7	0.0114	U	0.0145
Selenium	7782-49-2	0.00294	U	0.00869
Sodium	7440-23-5	612	GC-BS, U	1580
Strontium	**7440-24-6**	**0.540**	FB-01, QB-01	**0.515**
Thallium	7440-28-0	8.30E-5	U	3.97E-4
Thorium	7440-29-01	0.00183	U	0.00237
Uranium	7440-61-1	0.00146	U	0.0134
Vanadium	7440-62-2	0.00830	U	0.0389
Zinc	7440-66-6	14.3	U	77.2

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PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 12/28/23 10:10
SUBMITTED: 12/20/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9533883 **Lab ID:** 3122052-13 **Sampled:** 12/17/23 23:59
Matrix: Air **Sample Volume:** 2065.514 m³ **Received:** 12/20/23 13:27
Filter ID: **Analysis Date:** 12/21/23 23:10
Comments: MFK-AM01-121723-HM

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	**7429-90-5**	**266**		**25.3**
Antimony	**7440-36-0**	**0.0496**	SL	**0.0347**
Arsenic	**7440-38-2**	**0.0803**		**0.00752**
Barium	**7440-39-3**	**3.97**		**0.747**
Beryllium	**7440-41-7**	**0.00861**		**0.00262**
Cadmium	7440-43-9	0.00920	U	0.0859
Calcium	**7440-70-2**	**420**	LJ, QB-01	**230**
Chromium	**7440-47-3**	**1.64**		**1.60**
Cobalt	**7440-48-4**	**0.140**	QB-01	**0.0123**
Copper	**7440-50-8**	**19.9**		**2.36**
Iron	**7439-89-6**	**299**		**19.1**
Lead	**7439-92-1**	**0.442**		**0.217**
Magnesium	**7439-95-4**	**195**		**75.9**
Manganese	**7439-96-5**	**7.42**		**0.937**
Molybdenum	**7439-98-7**	**0.976**	QB-01	**0.168**
Nickel	7440-02-0	0.437	U	0.631
Phosphorus	7723-14-0	311	GC-BS, U	985
Potassium	**7440-09-7**	**81.7**		**29.9**
Rubidium	**7440-17-7**	**0.128**		**0.0144**
Selenium	**7782-49-2**	**0.107**		**0.00866**
Sodium	**7440-23-5**	**1780**	E, GC-BS	**1580**
Strontium	**7440-24-6**	**2.63**	QB-01	**0.514**
Thallium	**7440-28-0**	**0.00419**		**3.96E-4**
Thorium	**7440-29-01**	**0.00770**		**0.00236**
Uranium	7440-61-1	0.00765	U	0.0134
Vanadium	**7440-62-2**	**0.714**		**0.0388**
Zinc	7440-66-6	15.7	U	77.0

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Blue Bell, PA 19422
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PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 12/28/23 10:10
SUBMITTED: 12/20/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9533881 **Lab ID:** 3122052-14 **Sampled:** 12/17/23 23:59
Matrix: Air **Sample Volume:** 2070.53 m³ **Received:** 12/20/23 13:27
Filter ID: **Analysis Date:** 12/21/23 23:25
Comments: MFK-AM02-121723-HM

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	**7429-90-5**	**268**		**25.2**
Antimony	**7440-36-0**	**0.0631**	SL	**0.0347**
Arsenic	**7440-38-2**	**0.0900**		**0.00750**
Barium	**7440-39-3**	**3.77**		**0.745**
Beryllium	**7440-41-7**	**0.00921**		**0.00261**
Cadmium	7440-43-9	0.0412	U	0.0857
Calcium	**7440-70-2**	**466**	LJ, QB-01	**229**
Chromium	**7440-47-3**	**1.67**		**1.60**
Cobalt	**7440-48-4**	**0.141**	QB-01	**0.0123**
Copper	**7440-50-8**	**16.8**		**2.36**
Iron	**7439-89-6**	**282**		**19.0**
Lead	**7439-92-1**	**0.289**		**0.217**
Magnesium	**7439-95-4**	**181**		**75.8**
Manganese	**7439-96-5**	**7.14**		**0.935**
Molybdenum	**7439-98-7**	**0.893**	QB-01	**0.167**
Nickel	7440-02-0	0.452	U	0.629
Phosphorus	7723-14-0	303	GC-BS, U	982
Potassium	**7440-09-7**	**162**		**29.9**
Rubidium	**7440-17-7**	**0.271**		**0.0144**
Selenium	**7782-49-2**	**0.103**		**0.00864**
Sodium	**7440-23-5**	**1640**	E, GC-BS	**1570**
Strontium	**7440-24-6**	**2.63**	QB-01	**0.512**
Thallium	**7440-28-0**	**0.00462**		**3.95E-4**
Thorium	**7440-29-01**	**0.00777**		**0.00236**
Uranium	7440-61-1	0.00722	U	0.0134
Vanadium	**7440-62-2**	**0.655**		**0.0387**
Zinc	7440-66-6	14.8	U	76.8

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PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 12/28/23 10:10
SUBMITTED: 12/20/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9533910
Lab ID: 3122052-15
Sampled: 12/17/23 23:59
Matrix: Air
Sample Volume: 1578.644 m³
Received: 12/20/23 13:27
Filter ID:
Analysis Date: 12/21/23 16:50
Comments: MFK-AM03-121723-HM/MS/MSD

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	**7429-90-5**	**223**	QM-07	**33.1**
Antimony	7440-36-0	0.0451	SL, U	0.0455
Arsenic	**7440-38-2**	**0.0661**		**0.00984**
Barium	**7440-39-3**	**3.62**		**0.977**
Beryllium	**7440-41-7**	**0.00964**		**0.00342**
Cadmium	7440-43-9	0.00845	U	0.112
Calcium	**7440-70-2**	**492**	LJ, QB-01	**301**
Chromium	7440-47-3	2.07	U	2.09
Cobalt	**7440-48-4**	**0.142**	QB-01	**0.0161**
Copper	**7440-50-8**	**21.8**		**3.09**
Iron	**7439-89-6**	**259**	QM-4X	**24.9**
Lead	**7439-92-1**	**0.350**		**0.284**
Magnesium	**7439-95-4**	**163**	QM-4X	**99.4**
Manganese	**7439-96-5**	**7.96**		**1.23**
Molybdenum	**7439-98-7**	**0.802**	QB-01	**0.220**
Nickel	7440-02-0	0.479	U	0.826
Phosphorus	7723-14-0	378	A-01, GC-BS, QM-4X, U	1290
Potassium	**7440-09-7**	**81.5**		**39.2**
Rubidium	**7440-17-7**	**0.127**		**0.0189**
Selenium	**7782-49-2**	**0.0804**		**0.0113**
Sodium	7440-23-5	1580	A-01, GC-BS, QM-4X, U	2060
Strontium	**7440-24-6**	**2.75**	QB-01	**0.672**
Thallium	**7440-28-0**	**0.00377**		**5.18E-4**
Thorium	**7440-29-01**	**0.00878**	QM-07	**0.00309**
Uranium	7440-61-1	0.00688	U	0.0175
Vanadium	**7440-62-2**	**0.545**		**0.0507**
Zinc	7440-66-6	26.5	U	101

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FILE #: 0000.00
REPORTED: 12/28/23 10:10
SUBMITTED: 12/20/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9533908 FB **Lab ID:** 3122052-16 **Sampled:** 12/17/23 00:00
Matrix: Air **Sample Volume:** 2065.514 m³ **Received:** 12/20/23 13:27
Filter ID: **Analysis Date:** 12/21/23 23:39
Comments: MFK-FB01-121723-HM Field Blank

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	7429-90-5	10.2	U	25.3
Antimony	7440-36-0	0.00651	SL, U	0.0347
Arsenic	7440-38-2	0.00254	U	0.00752
Barium	**7440-39-3**	**0.761**	FB-01	**0.747**
Beryllium	7440-41-7	7.84E-4	U	0.00262
Cadmium	7440-43-9	0.00231	U	0.0859
Calcium	**7440-70-2**	**268**	FB-01, LJ, QB-01	**230**
Chromium	7440-47-3	1.46	U	1.60
Cobalt	**7440-48-4**	**0.0986**	FB-01, QB-01	**0.0123**
Copper	7440-50-8	0.511	U	2.36
Iron	7439-89-6	12.9	U	19.1
Lead	7439-92-1	0.0569	U	0.217
Magnesium	7439-95-4	37.0	U	75.9
Manganese	7439-96-5	0.173	U	0.937
Molybdenum	**7439-98-7**	**0.229**	FB-01, QB-01	**0.168**
Nickel	7440-02-0	0.281	U	0.631
Phosphorus	7723-14-0	276	GC-BS, U	985
Potassium	**7440-09-7**	**34.0**	FB-01	**29.9**
Rubidium	7440-17-7	0.0127	U	0.0144
Selenium	7782-49-2	0.00276	U	0.00866
Sodium	7440-23-5	637	GC-BS, U	1580
Strontium	**7440-24-6**	**0.543**	FB-01, QB-01	**0.514**
Thallium	7440-28-0	8.47E-5	U	3.96E-4
Thorium	7440-29-01	0.00215	U	0.00236
Uranium	7440-61-1	0.00153	U	0.0134
Vanadium	7440-62-2	0.0207	U	0.0388
Zinc	7440-66-6	13.0	U	77.0

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1777 Sentry Pkwy, Bldg 12
Blue Bell, PA 19422
ATTN: Ms. Chelsea Saber
PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 12/28/23 10:10
SUBMITTED: 12/20/23
AQS SITE CODE:
SITE CODE: Maui fires

Inorganics by Compendium Method IO-3.5 - Quality Control

Batch 2312067 - B3L2101

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Calibration Blank (2312067-CCB1)				Prepared & Analyzed: 12/21/23						
Aluminum	-63.3		ng/l							U
Antimony	1.23		ng/l							
Arsenic	0.586		ng/l							
Barium	1.05		ng/l							
Beryllium	0.227		ng/l							
Cadmium	0.562		ng/l							
Calcium	723		ng/l							
Chromium	9.03		ng/l							
Cobalt	1.14		ng/l							
Copper	61.5		ng/l							
Iron	51.2		ng/l							
Lead	9.43		ng/l							
Magnesium	44.6		ng/l							
Manganese	11.2		ng/l							
Molybdenum	25.6		ng/l							
Nickel	2.94		ng/l							
Phosphorus	380		ng/l							
Potassium	17.1		ng/l							
Rubidium	-0.627		ng/l							U
Selenium	13.9		ng/l							
Sodium	-348		ng/l							U
Strontium	1.64		ng/l							
Thallium	0.561		ng/l							
Thorium	0.549		ng/l							
Uranium	0.0219		ng/l							
Vanadium	-35.3		ng/l							U
Zinc	-32.9		ng/l							U
Calibration Blank (2312067-CCB2)				Prepared & Analyzed: 12/21/23						
Aluminum	-35.7		ng/l							U
Antimony	0.966		ng/l							
Arsenic	0.728		ng/l							
Barium	1.78		ng/l							
Beryllium	0.204		ng/l							
Cadmium	0.562		ng/l							
Calcium	702		ng/l							
Chromium	3.79		ng/l							
Cobalt	1.18		ng/l							
Copper	57.1		ng/l							

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Batch 2312067 - B3L2101

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Calibration Blank (2312067-CCB2) Contin				Prepared & Analyzed: 12/21/23						
Iron	94.6		ng/l							
Lead	11.4		ng/l							
Magnesium	8.41		ng/l							
Manganese	10.1		ng/l							
Molybdenum	10.2		ng/l							
Nickel	1.39		ng/l							
Phosphorus	500		ng/l							
Potassium	-429		ng/l							U
Rubidium	-0.707		ng/l							U
Selenium	3.96		ng/l							
Sodium	-486		ng/l							U
Strontium	2.19		ng/l							
Thallium	0.509		ng/l							
Thorium	0.906		ng/l							
Uranium	0.0222		ng/l							
Vanadium	-40.7		ng/l							U
Zinc	-13.4		ng/l							U
Calibration Blank (2312067-CCB3)				Prepared & Analyzed: 12/21/23						
Aluminum	-29.3		ng/l							U
Antimony	1.55		ng/l							
Arsenic	-0.712		ng/l							U
Barium	-0.769		ng/l							U
Beryllium	0.127		ng/l							
Cadmium	0.432		ng/l							
Calcium	-249		ng/l							U
Chromium	0.776		ng/l							
Cobalt	0.447		ng/l							
Copper	26.8		ng/l							
Iron	110		ng/l							
Lead	7.00		ng/l							
Magnesium	4.29		ng/l							
Manganese	3.75		ng/l							
Molybdenum	7.72		ng/l							
Nickel	-0.135		ng/l							U
Phosphorus	-504		ng/l							U
Potassium	-1080		ng/l							U
Rubidium	-1.08		ng/l							U
Selenium	14.4		ng/l							

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Batch 2312067 - B3L2101

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Calibration Blank (2312067-CCB3) Contin				Prepared & Analyzed: 12/21/23						
Sodium	-288		ng/l							U
Strontium	0.752		ng/l							
Thallium	0.407		ng/l							
Thorium	0.391		ng/l							
Uranium	0.0162		ng/l							
Vanadium	-43.0		ng/l							U
Zinc	-33.5		ng/l							U
Calibration Blank (2312067-CCB4)				Prepared: 12/21/23 Analyzed: 12/22/23						
Aluminum	-86.4		ng/l							U
Antimony	1.63		ng/l							
Arsenic	0.473		ng/l							
Barium	-0.969		ng/l							U
Beryllium	0.165		ng/l							
Cadmium	0.624		ng/l							
Calcium	926		ng/l							
Chromium	1.34		ng/l							
Cobalt	0.500		ng/l							
Copper	28.3		ng/l							
Iron	81.5		ng/l							
Lead	7.97		ng/l							
Magnesium	39.7		ng/l							
Manganese	3.53		ng/l							
Molybdenum	8.48		ng/l							
Nickel	-0.729		ng/l							U
Phosphorus	-435		ng/l							U
Potassium	-772		ng/l							U
Rubidium	0.184		ng/l							
Selenium	-0.0424		ng/l							U
Sodium	-251		ng/l							U
Strontium	0.0686		ng/l							
Thallium	0.429		ng/l							
Thorium	0.820		ng/l							
Uranium	0.0267		ng/l							
Vanadium	-43.6		ng/l							U
Zinc	-30.6		ng/l							U
Calibration Check (2312067-CCV1)				Prepared & Analyzed: 12/21/23						
Aluminum	1.53E6		ng/l	1.5000E6		102	90-110			
Antimony	19900		ng/l	20000		99.4	90-110			

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Batch 2312067 - B3L2101

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Calibration Check (2312067-CCV1) Contin				Prepared & Analyzed: 12/21/23						
Arsenic	19800		ng/l	20000		98.9	90-110			
Barium	199000		ng/l	200000		99.6	90-110			
Beryllium	5030		ng/l	5000.0		101	90-110			
Cadmium	19700		ng/l	20000		98.7	90-110			
Calcium	2.51E7		ng/l	2.5000E7		101	90-110			
Chromium	234000		ng/l	240000		97.6	90-110			
Cobalt	50400		ng/l	50000		101	90-110			
Copper	2.03E6		ng/l	2.0000E6		102	90-110			
Iron	2.52E6		ng/l	2.5000E6		101	90-110			
Lead	197000		ng/l	200000		98.6	90-110			
Magnesium	1.02E6		ng/l	1.0000E6		102	90-110			
Manganese	505000		ng/l	500000		101	90-110			
Molybdenum	49000		ng/l	50000		98.0	90-110			
Nickel	122000		ng/l	120000		101	90-110			
Phosphorus	203000		ng/l	200000		101	90-110			
Potassium	2.52E6		ng/l	2.5000E6		101	90-110			
Rubidium	9930		ng/l	10000		99.3	90-110			
Selenium	20000		ng/l	20000		99.9	90-110			
Sodium	2.52E6		ng/l	2.5000E6		101	90-110			
Strontium	49500		ng/l	50000		99.0	90-110			
Thallium	496		ng/l	500.00		99.2	90-110			
Thorium	488		ng/l	500.00		97.6	90-110			
Uranium	497		ng/l	500.00		99.4	90-110			
Vanadium	19700		ng/l	20000		98.6	90-110			
Zinc	523000		ng/l	500000		105	90-110			
Calibration Check (2312067-CCV2)				Prepared & Analyzed: 12/21/23						
Aluminum	1.49E6		ng/l	1.5000E6		99.6	90-110			
Antimony	20100		ng/l	20000		100	90-110			
Arsenic	20200		ng/l	20000		101	90-110			
Barium	206000		ng/l	200000		103	90-110			
Beryllium	5040		ng/l	5000.0		101	90-110			
Cadmium	20200		ng/l	20000		101	90-110			
Calcium	2.50E7		ng/l	2.5000E7		100	90-110			
Chromium	238000		ng/l	240000		99.1	90-110			
Cobalt	50100		ng/l	50000		100	90-110			
Copper	2.04E6		ng/l	2.0000E6		102	90-110			
Iron	2.50E6		ng/l	2.5000E6		100	90-110			
Lead	200000		ng/l	200000		100	90-110			

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Batch 2312067 - B3L2101

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Calibration Check (2312067-CCV2) Contin				Prepared & Analyzed: 12/21/23						
Magnesium	1.01E6		ng/l	1.0000E6		101	90-110			
Manganese	501000		ng/l	500000		100	90-110			
Molybdenum	50600		ng/l	50000		101	90-110			
Nickel	122000		ng/l	120000		101	90-110			
Phosphorus	199000		ng/l	200000		99.7	90-110			
Potassium	2.48E6		ng/l	2.5000E6		99.0	90-110			
Rubidium	10000		ng/l	10000		100	90-110			
Selenium	20300		ng/l	20000		102	90-110			
Sodium	2.49E6		ng/l	2.5000E6		99.7	90-110			
Strontium	50100		ng/l	50000		100	90-110			
Thallium	503		ng/l	500.00		101	90-110			
Thorium	492		ng/l	500.00		98.4	90-110			
Uranium	493		ng/l	500.00		98.5	90-110			
Vanadium	19900		ng/l	20000		99.3	90-110			
Zinc	529000		ng/l	500000		106	90-110			
Calibration Check (2312067-CCV3)				Prepared & Analyzed: 12/21/23						
Aluminum	1.53E6		ng/l	1.5000E6		102	90-110			
Antimony	20800		ng/l	20000		104	90-110			
Arsenic	20700		ng/l	20000		103	90-110			
Barium	213000		ng/l	200000		107	90-110			
Beryllium	4820		ng/l	5000.0		96.4	90-110			
Cadmium	20800		ng/l	20000		104	90-110			
Calcium	2.57E7		ng/l	2.5000E7		103	90-110			
Chromium	248000		ng/l	240000		103	90-110			
Cobalt	51500		ng/l	50000		103	90-110			
Copper	2.11E6		ng/l	2.0000E6		105	90-110			
Iron	2.58E6		ng/l	2.5000E6		103	90-110			
Lead	205000		ng/l	200000		103	90-110			
Magnesium	1.04E6		ng/l	1.0000E6		104	90-110			
Manganese	515000		ng/l	500000		103	90-110			
Molybdenum	52400		ng/l	50000		105	90-110			
Nickel	125000		ng/l	120000		104	90-110			
Phosphorus	201000		ng/l	200000		101	90-110			
Potassium	2.53E6		ng/l	2.5000E6		101	90-110			
Rubidium	10100		ng/l	10000		101	90-110			
Selenium	20900		ng/l	20000		104	90-110			
Sodium	2.58E6		ng/l	2.5000E6		103	90-110			
Strontium	51100		ng/l	50000		102	90-110			

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Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Calibration Check (2312067-CCV3) Contin				Prepared & Analyzed: 12/21/23						
Thallium	510		ng/l	500.00		102	90-110			
Thorium	506		ng/l	500.00		101	90-110			
Uranium	506		ng/l	500.00		101	90-110			
Vanadium	20600		ng/l	20000		103	90-110			
Zinc	546000		ng/l	500000		109	90-110			
Calibration Check (2312067-CCV4)				Prepared & Analyzed: 12/21/23						
Aluminum	1.52E6		ng/l	1.5000E6		101	90-110			
Antimony	20500		ng/l	20000		103	90-110			
Arsenic	20500		ng/l	20000		102	90-110			
Barium	212000		ng/l	200000		106	90-110			
Beryllium	4740		ng/l	5000.0		94.9	90-110			
Cadmium	20700		ng/l	20000		104	90-110			
Calcium	2.54E7		ng/l	2.5000E7		102	90-110			
Chromium	246000		ng/l	240000		102	90-110			
Cobalt	51100		ng/l	50000		102	90-110			
Copper	2.10E6		ng/l	2.0000E6		105	90-110			
Iron	2.55E6		ng/l	2.5000E6		102	90-110			
Lead	204000		ng/l	200000		102	90-110			
Magnesium	1.03E6		ng/l	1.0000E6		103	90-110			
Manganese	512000		ng/l	500000		102	90-110			
Molybdenum	52100		ng/l	50000		104	90-110			
Nickel	125000		ng/l	120000		104	90-110			
Phosphorus	204000		ng/l	200000		102	90-110			
Potassium	2.51E6		ng/l	2.5000E6		101	90-110			
Rubidium	10200		ng/l	10000		102	90-110			
Selenium	20600		ng/l	20000		103	90-110			
Sodium	2.56E6		ng/l	2.5000E6		103	90-110			
Strontium	50700		ng/l	50000		101	90-110			
Thallium	512		ng/l	500.00		102	90-110			
Thorium	504		ng/l	500.00		101	90-110			
Uranium	510		ng/l	500.00		102	90-110			
Vanadium	20500		ng/l	20000		102	90-110			
Zinc	541000		ng/l	500000		108	90-110			
High Cal Check (2312067-HCV1)				Prepared & Analyzed: 12/21/23						
Aluminum	2.95E6		ng/l	3.0000E6		98.3	95-105			
Antimony	40100		ng/l	40000		100	95-105			
Arsenic	40100		ng/l	40000		100	95-105			
Barium	405000		ng/l	400000		101	95-105			

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Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
High Cal Check (2312067-HCV1) Continue				Prepared & Analyzed: 12/21/23						
Beryllium	9970		ng/l	10000		99.7	95-105			
Cadmium	39600		ng/l	40000		98.9	95-105			
Calcium	4.98E7		ng/l	5.0000E7		99.5	95-105			
Chromium	471000		ng/l	480000		98.0	95-105			
Cobalt	98500		ng/l	100000		98.5	95-105			
Copper	3.95E6		ng/l	4.0000E6		98.7	95-105			
Iron	4.93E6		ng/l	5.0000E6		98.6	95-105			
Lead	396000		ng/l	400000		99.0	95-105			
Magnesium	1.96E6		ng/l	2.0000E6		97.9	95-105			
Manganese	989000		ng/l	1.0000E6		98.9	95-105			
Molybdenum	99500		ng/l	100000		99.5	95-105			
Nickel	237000		ng/l	240000		98.6	95-105			
Phosphorus	395000		ng/l	400000		98.8	95-105			
Potassium	4.94E6		ng/l	5.0000E6		98.7	95-105			
Rubidium	20000		ng/l	20000		100	95-105			
Selenium	40000		ng/l	40000		99.9	95-105			
Sodium	4.87E6		ng/l	5.0000E6		97.4	95-105			
Strontium	100000		ng/l	100000		100	95-105			
Thallium	994		ng/l	1000.0		99.4	95-105			
Thorium	1010		ng/l	1000.0		101	95-105			
Uranium	999		ng/l	1000.0		99.9	95-105			
Vanadium	39600		ng/l	40000		98.9	95-105			
Zinc	981000		ng/l	1.0000E6		98.1	95-105			
Initial Cal Blank (2312067-ICB1)				Prepared & Analyzed: 12/21/23						
Aluminum	-116		ng/l							U
Antimony	1.65		ng/l							
Arsenic	-0.499		ng/l							U
Barium	-2.96		ng/l							U
Beryllium	0.0160		ng/l							
Cadmium	0.0948		ng/l							
Calcium	-251		ng/l							U
Chromium	4.68		ng/l							
Cobalt	0.234		ng/l							
Copper	27.7		ng/l							
Iron	38.5		ng/l							
Lead	11.2		ng/l							
Magnesium	-27.2		ng/l							U
Manganese	5.81		ng/l							

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Batch 2312067 - B3L2101

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Initial Cal Blank (2312067-ICB1) Continu				Prepared & Analyzed: 12/21/23						
Molybdenum	14.1		ng/l							
Nickel	-0.342		ng/l							U
Phosphorus	-367		ng/l							U
Potassium	-168		ng/l							U
Rubidium	-0.297		ng/l							U
Selenium	12.8		ng/l							
Sodium	-470		ng/l							U
Strontium	0.815		ng/l							
Thallium	0.425		ng/l							
Thorium	0.580		ng/l							
Uranium	0.00926		ng/l							
Vanadium	-37.4		ng/l							U
Zinc	-14.0		ng/l							U
Initial Cal Check (2312067-ICV1)				Prepared & Analyzed: 12/21/23						
Aluminum	1.45E6		ng/l	1.5000E6		96.8	90-110			
Antimony	19500		ng/l	20000		97.7	90-110			
Arsenic	19700		ng/l	20000		98.6	90-110			
Barium	200000		ng/l	200000		99.9	90-110			
Beryllium	4980		ng/l	5000.0		99.6	90-110			
Cadmium	20200		ng/l	20000		101	90-110			
Calcium	2.43E7		ng/l	2.5000E7		97.3	90-110			
Chromium	231000		ng/l	240000		96.2	90-110			
Cobalt	49100		ng/l	50000		98.1	90-110			
Copper	2.00E6		ng/l	2.0000E6		99.9	90-110			
Iron	2.47E6		ng/l	2.5000E6		98.7	90-110			
Lead	196000		ng/l	200000		97.8	90-110			
Magnesium	971000		ng/l	1.0000E6		97.1	90-110			
Manganese	489000		ng/l	500000		97.7	90-110			
Molybdenum	48700		ng/l	50000		97.4	90-110			
Nickel	118000		ng/l	120000		97.9	90-110			
Phosphorus	193000		ng/l	200000		96.5	90-110			
Potassium	2.48E6		ng/l	2.5000E6		99.2	90-110			
Rubidium	9650		ng/l	10000		96.5	90-110			
Selenium	20400		ng/l	20000		102	90-110			
Sodium	2.43E6		ng/l	2.5000E6		97.4	90-110			
Strontium	49700		ng/l	50000		99.4	90-110			
Thallium	484		ng/l	500.00		96.8	90-110			
Thorium	481		ng/l	500.00		96.3	90-110			

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CERTIFICATE OF ANALYSIS

Tetra Tech, Inc.
1777 Sentry Pkwy, Bldg 12
Blue Bell, PA 19422
ATTN: Ms. Chelsea Saber
PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 12/28/23 10:10
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AQS SITE CODE:
SITE CODE: Maui fires

Inorganics by Compendium Method IO-3.5 - Quality Control

Batch 2312067 - B3L2101

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Initial Cal Check (2312067-ICV1) Continu				Prepared & Analyzed: 12/21/23						
Uranium	492		ng/l	500.00		98.4	90-110			
Vanadium	19900		ng/l	20000		99.4	90-110			
Zinc	522000		ng/l	500000		104	90-110			
Interference Check A (2312067-IFA1)				Prepared & Analyzed: 12/21/23						
Aluminum	1.45E7		ng/l	1.5000E7		96.8	80-120			
Antimony	0.00		ng/l				80-120			U
Arsenic	0.00		ng/l				80-120			U
Barium	0.00		ng/l				80-120			U
Beryllium	0.00		ng/l				80-120			U
Cadmium	0.00		ng/l				80-120			U
Calcium	9.26E7		ng/l	1.0040E8		92.2	80-120			
Chromium	0.00		ng/l				80-120			U
Cobalt	0.00		ng/l				80-120			U
Copper	0.00		ng/l				80-120			U
Iron	1.44E7		ng/l	1.5000E7		95.9	80-120			
Lead	0.00		ng/l				80-120			U
Magnesium	1.49E7		ng/l	1.5000E7		99.4	80-120			
Manganese	0.00		ng/l				80-120			U
Molybdenum	291000		ng/l	300000		97.0	80-120			
Nickel	0.00		ng/l				80-120			U
Phosphorus	1.60E7		ng/l	1.5000E7		106	80-120			
Potassium	1.45E7		ng/l	1.5000E7		96.7	80-120			
Rubidium	0.00		ng/l				80-120			U
Selenium	0.00		ng/l				80-120			U
Sodium	1.52E7		ng/l	1.5000E7		101	80-120			
Strontium	0.00		ng/l				80-120			U
Thallium	0.00		ng/l				80-120			U
Thorium	0.00		ng/l				80-120			U
Uranium	0.00		ng/l				80-120			U
Vanadium	0.00		ng/l				80-120			U
Zinc	0.00		ng/l				80-120			U
Interference Check B (2312067-IFB1)				Prepared & Analyzed: 12/21/23						
Aluminum	1.72E7		ng/l	1.6500E7		104	80-120			
Antimony	20800		ng/l	20000		104	80-120			
Arsenic	20700		ng/l	20000		103	80-120			
Barium	208000		ng/l	200000		104	80-120			
Beryllium	4660		ng/l	5000.0		93.3	80-120			
Cadmium	19700		ng/l	20000		98.3	80-120			

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Inorganics by Compendium Method IO-3.5 - Quality Control

Batch 2312067 - B3L2101

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Interference Check B (2312067-IFB1) Co				Prepared & Analyzed: 12/21/23						
Calcium	1.23E8		ng/l	1.2540E8		97.8	80-120			
Chromium	234000		ng/l	240000		97.4	80-120			
Cobalt	50100		ng/l	50000		100	80-120			
Copper	1.93E6		ng/l	2.0000E6		96.3	80-120			
Iron	1.77E7		ng/l	1.7500E7		101	80-120			
Lead	207000		ng/l	200000		103	80-120			
Magnesium	1.69E7		ng/l	1.6000E7		106	80-120			
Manganese	530000		ng/l	500000		106	80-120			
Molybdenum	349000		ng/l	350000		99.8	80-120			
Nickel	118000		ng/l	120000		98.2	80-120			
Phosphorus	1.74E7		ng/l	1.5200E7		114	80-120			
Potassium	1.80E7		ng/l	1.7500E7		103	80-120			
Rubidium	10200		ng/l	10000		102	80-120			
Selenium	19700		ng/l	20000		98.6	80-120			
Sodium	1.91E7		ng/l	1.7500E7		109	80-120			
Strontium	51100		ng/l	50000		102	80-120			
Thallium	523		ng/l	500.00		105	80-120			
Thorium	553		ng/l	500.00		111	80-120			
Uranium	550		ng/l	500.00		110	80-120			
Vanadium	19500		ng/l	20000		97.6	80-120			
Zinc	492000		ng/l	500000		98.5	80-120			
Serial Dilution (2312067-SRD1)		**Source: 3122052-15**		Prepared & Analyzed: 12/21/23						
Aluminum	222	165	ng/m³ Air		223			0.415	10	
Antimony	ND	0.227	ng/m³ Air		ND				10	SL, U
Arsenic	0.0602	0.0492	ng/m³ Air		0.0661			9.31	10	
Barium	ND	4.89	ng/m³ Air		ND				10	U
Beryllium	ND	0.0171	ng/m³ Air		ND				10	U
Cadmium	ND	0.562	ng/m³ Air		ND				10	U
Calcium	ND	1500	ng/m³ Air		ND				10	LJ, QB-01, U
Chromium	ND	10.5	ng/m³ Air		ND				10	U
Cobalt	0.146	0.0804	ng/m³ Air		0.142			2.48	10	QB-01
Copper	22.1	15.5	ng/m³ Air		21.8			1.68	10	
Iron	260	125	ng/m³ Air		259			0.456	10	
Lead	ND	1.42	ng/m³ Air		ND				10	U
Magnesium	ND	497	ng/m³ Air		ND				10	U
Manganese	8.05	6.13	ng/m³ Air		7.96			1.07	10	
Molybdenum	ND	1.10	ng/m³ Air		ND				10	QB-01, U
Nickel	ND	4.13	ng/m³ Air		ND				10	U

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Inorganics by Compendium Method IO-3.5 - Quality Control

Batch 2312067 - B3L2101

Serial Dilution (2312067-SRD1) Continued Source: 3122052-15 Prepared & Analyzed: 12/21/23

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Phosphorus	ND	6440	ng/m³ Air		ND				10	GC-BS, U
Potassium	ND	196	ng/m³ Air		ND				10	U
Rubidium	0.120	0.0943	ng/m³ Air		0.127			5.57	10	
Selenium	0.0877	0.0567	ng/m³ Air		0.0804			8.61	10	
Sodium	ND	10300	ng/m³ Air		ND				10	GC-BS, U
Strontium	ND	3.36	ng/m³ Air		ND				10	QB-01, U
Thallium	0.00383	0.00259	ng/m³ Air		0.00377			1.54	10	
Thorium	ND	0.0155	ng/m³ Air		ND				10	U
Uranium	ND	0.0876	ng/m³ Air		ND				10	U
Vanadium	0.567	0.254	ng/m³ Air		0.545			4.01	10	
Zinc	ND	503	ng/m³ Air		ND				10	U

Batch B3L2101 - ICP-MS Extraction

Blank (B3L2101-BLK1) Prepared & Analyzed: 12/21/23

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Aluminum	ND	32.1	ng/m³ Air							U
Antimony	ND	0.0441	ng/m³ Air							SL, U
Arsenic	ND	0.00955	ng/m³ Air							U
Barium	ND	0.948	ng/m³ Air							U
Beryllium	ND	0.00332	ng/m³ Air							U
Cadmium	ND	0.109	ng/m³ Air							U
Calcium	ND	292	ng/m³ Air							LJ, QB-01, U
Chromium	ND	2.03	ng/m³ Air							U
Cobalt	ND	0.0156	ng/m³ Air							QB-01, U
Copper	ND	3.00	ng/m³ Air							U
Iron	ND	24.2	ng/m³ Air							U
Lead	ND	0.276	ng/m³ Air							U
Magnesium	ND	96.4	ng/m³ Air							U
Manganese	ND	1.19	ng/m³ Air							U
Molybdenum	ND	0.213	ng/m³ Air							QB-01, U
Nickel	ND	0.801	ng/m³ Air							U
Phosphorus	ND	1250	ng/m³ Air							GC-BS, U
Potassium	ND	38.0	ng/m³ Air							U
Rubidium	ND	0.0183	ng/m³ Air							U
Selenium	ND	0.0110	ng/m³ Air							U
Sodium	ND	2000	ng/m³ Air							GC-BS, U
Strontium	ND	0.652	ng/m³ Air							QB-01, U
Thallium	ND	5.03E-4	ng/m³ Air							U
Thorium	ND	0.00300	ng/m³ Air							U
Uranium	ND	0.0170	ng/m³ Air							U

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Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes

Inorganics by Compendium Method IO-3.5 - Quality Control

Batch B3L2101 - ICP-MS Extraction

Blank (B3L2101-BLK1) Continued Prepared & Analyzed: 12/21/23

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Vanadium	ND	0.0492	ng/m³ Air							U
Zinc	ND	97.7	ng/m³ Air							U

LCS (B3L2101-BS1) Prepared & Analyzed: 12/21/23

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Aluminum	94.5	32.1	ng/m³ Air	82.975		114	80-120			
Antimony	0.533	0.0441	ng/m³ Air	1.3829		38.5	80-120			SL
Arsenic	2.75	0.00955	ng/m³ Air	2.7658		99.4	80-120			
Barium	28.4	0.948	ng/m³ Air	27.658		103	80-120			
Beryllium	1.31	0.00332	ng/m³ Air	1.3829		94.7	80-120			
Cadmium	1.38	0.109	ng/m³ Air	1.3829		100	80-120			
Calcium	607	292	ng/m³ Air	69.146		878	80-120			LJ, QB-01
Chromium	16.2	2.03	ng/m³ Air	13.829		117	80-120			
Cobalt	1.41	0.0156	ng/m³ Air	1.3829		102	80-120			QB-01
Copper	31.6	3.00	ng/m³ Air	27.658		114	80-120			
Iron	41.8	24.2	ng/m³ Air	27.658		151	80-120			
Lead	13.7	0.276	ng/m³ Air	13.829		99.2	80-120			
Magnesium	ND	96.4	ng/m³ Air	27.658			80-120			U
Manganese	8.82	1.19	ng/m³ Air	8.2975		106	80-120			
Molybdenum	1.67	0.213	ng/m³ Air	1.3829		121	80-120			QB-01
Nickel	3.17	0.801	ng/m³ Air	2.7658		115	80-120			
Phosphorus	ND	1250	ng/m³ Air	13.829			80-120			GC-BS, U
Potassium	66.2	38.0	ng/m³ Air	55.317		120	80-120			
Rubidium	1.36	0.0183	ng/m³ Air	1.3829		98.3	80-120			
Selenium	2.81	0.0110	ng/m³ Air	2.7658		102	80-120			
Sodium	ND	2000	ng/m³ Air	55.317			80-120			GC-BS, U
Strontium	2.30	0.652	ng/m³ Air	1.3829		166	80-120			QB-01
Thallium	0.136	5.03E-4	ng/m³ Air	0.13829		98.5	80-120			
Thorium	0.134	0.00300	ng/m³ Air	0.13829		96.7	80-120			
Uranium	0.133	0.0170	ng/m³ Air	0.13829		96.2	80-120			
Vanadium	2.79	0.0492	ng/m³ Air	2.7658		101	80-120			
Zinc	116	97.7	ng/m³ Air	82.975		139	80-120			

Duplicate (B3L2101-DUP1) **Source: 3122052-15** Prepared & Analyzed: 12/21/23

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Aluminum	224	33.1	ng/m³ Air		223			0.408	10	
Antimony	ND	0.0455	ng/m³ Air		ND				10	SL, U
Arsenic	0.0722	0.00984	ng/m³ Air		0.0661			8.90	10	
Barium	3.61	0.977	ng/m³ Air		3.62			0.208	10	
Beryllium	0.00979	0.00342	ng/m³ Air		0.00964			1.56	10	
Cadmium	ND	0.112	ng/m³ Air		ND				10	U
Calcium	496	301	ng/m³ Air		492			0.697	10	LJ, QB-01

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Inorganics by Compendium Method IO-3.5 - Quality Control

Batch B3L2101 - ICP-MS Extraction

Duplicate (B3L2101-DUP1) Continued **Source: 3122052-15** Prepared & Analyzed: 12/21/23

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Chromium	ND	2.09	ng/m³ Air		ND				10	U
Cobalt	0.135	0.0161	ng/m³ Air		0.142			5.60	10	QB-01
Copper	20.4	3.09	ng/m³ Air		21.8			6.31	10	
Iron	257	24.9	ng/m³ Air		259			0.795	10	
Lead	ND	0.284	ng/m³ Air		0.350				10	U
Magnesium	164	99.4	ng/m³ Air		163			0.972	10	
Manganese	7.93	1.23	ng/m³ Air		7.96			0.426	10	
Molybdenum	0.786	0.220	ng/m³ Air		0.802			1.99	10	QB-01
Nickel	ND	0.826	ng/m³ Air		ND				10	U
Phosphorus	ND	1290	ng/m³ Air		ND				10	GC-BS, U
Potassium	77.3	39.2	ng/m³ Air		81.5			5.32	10	
Rubidium	0.127	0.0189	ng/m³ Air		0.127			0.533	10	
Selenium	0.0894	0.0113	ng/m³ Air		0.0804			10.5	10	
Sodium	ND	2060	ng/m³ Air		ND				10	GC-BS, U
Strontium	2.78	0.672	ng/m³ Air		2.75			1.37	10	QB-01
Thallium	0.00355	5.18E-4	ng/m³ Air		0.00377			5.85	10	
Thorium	0.00868	0.00309	ng/m³ Air		0.00878			1.14	10	
Uranium	ND	0.0175	ng/m³ Air		ND				10	U
Vanadium	0.550	0.0507	ng/m³ Air		0.545			0.970	10	
Zinc	ND	101	ng/m³ Air		ND				10	U

Duplicate (B3L2101-DUP2) **Source: 3122052-05** Prepared & Analyzed: 12/21/23

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Aluminum	195	27.7	ng/m³ Air		197			0.675	10	
Antimony	ND	0.0381	ng/m³ Air		ND				10	SL, U
Arsenic	0.0955	0.00824	ng/m³ Air		0.0956			0.166	10	
Barium	2.82	0.818	ng/m³ Air		2.82			0.298	10	
Beryllium	0.00640	0.00287	ng/m³ Air		0.00639			0.0497	10	
Cadmium	ND	0.0941	ng/m³ Air		ND				10	U
Calcium	610	252	ng/m³ Air		617			1.10	10	LJ, QB-01
Chromium	1.78	1.75	ng/m³ Air		1.80			1.08	10	
Cobalt	0.121	0.0135	ng/m³ Air		0.121			0.265	10	QB-01
Copper	16.5	2.59	ng/m³ Air		16.5			0.135	10	
Iron	216	20.9	ng/m³ Air		217			0.450	10	
Lead	0.459	0.238	ng/m³ Air		0.460			0.270	10	
Magnesium	350	83.2	ng/m³ Air		351			0.408	10	
Manganese	5.45	1.03	ng/m³ Air		5.48			0.618	10	
Molybdenum	0.878	0.184	ng/m³ Air		0.880			0.312	10	QB-01
Nickel	ND	0.691	ng/m³ Air		ND				10	U
Phosphorus	ND	1080	ng/m³ Air		ND				10	GC-BS, U

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Batch B3L2101 - ICP-MS Extraction

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Duplicate (B3L2101-DUP2) Continued	**Source: 3122052-05**		Prepared & Analyzed: 12/21/23							
Potassium	127	32.8	ng/m³ Air		129			1.12	10	
Rubidium	0.117	0.0158	ng/m³ Air		0.118			0.751	10	
Selenium	0.108	0.00950	ng/m³ Air		0.117			7.59	10	
Sodium	3170	1730	ng/m³ Air		3180			0.314	10	E, GC-BS
Strontium	3.47	0.563	ng/m³ Air		3.49			0.466	10	QB-01
Thallium	0.00154	4.34E-4	ng/m³ Air		0.00157			1.91	10	
Thorium	0.00662	0.00259	ng/m³ Air		0.00641			3.24	10	
Uranium	ND	0.0147	ng/m³ Air		ND				10	U
Vanadium	0.485	0.0425	ng/m³ Air		0.492			1.40	10	
Zinc	ND	84.3	ng/m³ Air		ND				10	U
Matrix Spike (B3L2101-MS1)	**Source: 3122052-15**		Prepared & Analyzed: 12/21/23							
Aluminum	299	33.1	ng/m³ Air	85.516	223	88.7	80-120			
Antimony	0.641	0.0455	ng/m³ Air	1.4253	ND	45.0	80-120			SL
Arsenic	2.86	0.00984	ng/m³ Air	2.8505	0.0661	97.9	80-120			
Barium	31.7	0.977	ng/m³ Air	28.505	3.62	98.6	80-120			
Beryllium	1.44	0.00342	ng/m³ Air	1.4253	0.00964	100	80-120			
Cadmium	1.42	0.112	ng/m³ Air	1.4253	ND	99.6	80-120			
Calcium	555	301	ng/m³ Air	71.264	492	88.2	80-120			LJ, QB-01
Chromium	16.5	2.09	ng/m³ Air	14.253	ND	116	80-120			
Cobalt	1.50	0.0161	ng/m³ Air	1.4253	0.142	95.3	80-120			QB-01
Copper	51.8	3.09	ng/m³ Air	28.505	21.8	105	80-120			
Iron	276	24.9	ng/m³ Air	28.505	259	61.3	80-120			QM-4X
Lead	14.1	0.284	ng/m³ Air	14.253	0.350	96.7	80-120			
Magnesium	190	99.4	ng/m³ Air	28.505	163	96.7	80-120			
Manganese	16.4	1.23	ng/m³ Air	8.5516	7.96	98.6	80-120			
Molybdenum	2.14	0.220	ng/m³ Air	1.4253	0.802	93.6	80-120			QB-01
Nickel	3.26	0.826	ng/m³ Air	2.8505	ND	115	80-120			
Phosphorus	ND	1290	ng/m³ Air	14.253	ND		80-120			GC-BS, U
Potassium	130	39.2	ng/m³ Air	57.011	81.5	85.6	80-120			
Rubidium	1.46	0.0189	ng/m³ Air	1.4253	0.127	93.8	80-120			
Selenium	2.93	0.0113	ng/m³ Air	2.8505	0.0804	99.9	80-120			
Sodium	ND	2060	ng/m³ Air	57.011	ND		80-120			GC-BS, U
Strontium	4.07	0.672	ng/m³ Air	1.4253	2.75	93.0	80-120			QB-01
Thallium	0.142	5.18E-4	ng/m³ Air	0.14253	0.00377	96.8	80-120			
Thorium	0.0747	0.00309	ng/m³ Air	0.14253	0.00878	46.2	80-120			QM-07
Uranium	0.140	0.0175	ng/m³ Air	0.14253	ND	98.3	80-120			
Vanadium	3.33	0.0507	ng/m³ Air	2.8505	0.545	97.6	80-120			
Zinc	112	101	ng/m³ Air	85.516	ND	131	80-120			

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Tetra Tech, Inc.
1777 Sentry Pkwy, Bldg 12
Blue Bell, PA 19422
ATTN: Ms. Chelsea Saber
PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 12/28/23 10:10
SUBMITTED: 12/20/23
AQS SITE CODE:
SITE CODE: Maui fires

Inorganics by Compendium Method IO-3.5 - Quality Control

Batch B3L2101 - ICP-MS Extraction

Matrix Spike Dup (B3L2101-MSD1) **Source: 3122052-15** Prepared & Analyzed: 12/21/23

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Aluminum	330	33.1	ng/m³ Air	85.516	223	125	80-120	9.82	20	QM-07
Antimony	0.634	0.0455	ng/m³ Air	1.4253	ND	44.5	80-120	1.13	20	SL
Arsenic	2.83	0.00984	ng/m³ Air	2.8505	0.0661	97.0	80-120	0.838	20	
Barium	32.3	0.977	ng/m³ Air	28.505	3.62	100	80-120	1.63	20	
Beryllium	1.38	0.00342	ng/m³ Air	1.4253	0.00964	96.4	80-120	3.88	20	
Cadmium	1.41	0.112	ng/m³ Air	1.4253	ND	98.7	80-120	0.886	20	
Calcium	574	301	ng/m³ Air	71.264	492	114	80-120	3.26	20	LJ, QB-01
Chromium	16.4	2.09	ng/m³ Air	14.253	ND	115	80-120	0.297	20	
Cobalt	1.50	0.0161	ng/m³ Air	1.4253	0.142	95.6	80-120	0.234	20	QB-01
Copper	54.1	3.09	ng/m³ Air	28.505	21.8	113	80-120	4.33	20	
Iron	297	24.9	ng/m³ Air	28.505	259	133	80-120	7.14	20	QM-4X
Lead	14.1	0.284	ng/m³ Air	14.253	0.350	96.4	80-120	0.333	20	
Magnesium	198	99.4	ng/m³ Air	28.505	163	124	80-120	4.08	20	QM-4X
Manganese	17.4	1.23	ng/m³ Air	8.5516	7.96	110	80-120	5.86	20	
Molybdenum	2.17	0.220	ng/m³ Air	1.4253	0.802	96.2	80-120	1.69	20	QB-01
Nickel	3.46	0.826	ng/m³ Air	2.8505	ND	121	80-120	5.79	20	
Phosphorus	ND	1290	ng/m³ Air	14.253	ND		80-120		20	GC-BS, QM-4X, U
Potassium	136	39.2	ng/m³ Air	57.011	81.5	95.0	80-120	4.00	20	
Rubidium	1.44	0.0189	ng/m³ Air	1.4253	0.127	92.1	80-120	1.68	20	
Selenium	2.89	0.0113	ng/m³ Air	2.8505	0.0804	98.7	80-120	1.26	20	
Sodium	ND	2060	ng/m³ Air	57.011	ND		80-120		20	GC-BS, QM-4X, U
Strontium	4.20	0.672	ng/m³ Air	1.4253	2.75	102	80-120	3.23	20	QB-01
Thallium	0.141	5.18E-4	ng/m³ Air	0.14253	0.00377	96.5	80-120	0.335	20	
Thorium	0.0746	0.00309	ng/m³ Air	0.14253	0.00878	46.2	80-120	0.0972	20	QM-07
Uranium	0.140	0.0175	ng/m³ Air	0.14253	ND	98.3	80-120	0.0457	20	
Vanadium	3.38	0.0507	ng/m³ Air	2.8505	0.545	99.3	80-120	1.48	20	
Zinc	112	101	ng/m³ Air	85.516	ND	131	80-120	0.540	20	

Post Spike (B3L2101-PS1) **Source: 3122052-15** Prepared & Analyzed: 12/21/23

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Aluminum	247	33.1	ng/m³ Air	28.505	223	83.5	75-125			
Antimony	0.321	0.0455	ng/m³ Air	0.28505	ND	112	75-125			SL
Arsenic	1.42	0.00984	ng/m³ Air	1.4253	0.0661	94.9	75-125			
Barium	6.54	0.977	ng/m³ Air	2.8505	3.62	102	75-125			
Beryllium	0.293	0.00342	ng/m³ Air	0.28505	0.00964	99.3	75-125			
Cadmium	0.147	0.112	ng/m³ Air	0.14253	ND	103	75-125			
Calcium	525	301	ng/m³ Air	28.505	492	114	75-125			LJ, QB-01
Chromium	3.44	2.09	ng/m³ Air	1.4253	ND	241	75-125			
Cobalt	0.418	0.0161	ng/m³ Air	0.28505	0.142	96.7	75-125			QB-01

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AQS SITE CODE:
SITE CODE: Maui fires

Inorganics by Compendium Method IO-3.5 - Quality Control

Batch B3L2101 - ICP-MS Extraction

Post Spike (B3L2101-PS1) Continued **Source: 3122052-15** Prepared & Analyzed: 12/21/23

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Copper	36.7	3.09	ng/m³ Air	14.253	21.8	105	75-125			
Iron	283	24.9	ng/m³ Air	28.505	259	84.1	75-125			
Lead	28.0	0.284	ng/m³ Air	28.505	0.350	96.9	75-125			
Magnesium	189	99.4	ng/m³ Air	28.505	163	91.0	75-125			
Manganese	10.8	1.23	ng/m³ Air	2.8505	7.96	99.5	75-125			
Molybdenum	2.16	0.220	ng/m³ Air	1.4253	0.802	95.3	75-125			QB-01
Nickel	3.22	0.826	ng/m³ Air	2.8505	ND	113	75-125			
Phosphorus	ND	1290	ng/m³ Air	5.7011	ND		75-125			A-01, GC-BS, U
Potassium	108	39.2	ng/m³ Air	28.505	81.5	93.1	75-125			
Rubidium	0.258	0.0189	ng/m³ Air	0.14253	0.127	91.4	75-125			
Selenium	1.46	0.0113	ng/m³ Air	1.4253	0.0804	96.6	75-125			
Sodium	ND	2060	ng/m³ Air	28.505	ND		75-125			A-01, GC-BS, U
Strontium	4.03	0.672	ng/m³ Air	1.4253	2.75	89.9	75-125			QB-01
Thallium	0.0712	5.18E-4	ng/m³ Air	7.1264E-2	0.00377	94.6	75-125			
Thorium	0.0716	0.00309	ng/m³ Air	7.1264E-2	0.00878	88.1	75-125			
Uranium	0.0731	0.0175	ng/m³ Air	7.1264E-2	ND	103	75-125			
Vanadium	1.93	0.0507	ng/m³ Air	1.4253	0.545	97.3	75-125			
Zinc	ND	101	ng/m³ Air	28.505	ND		75-125			U

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AQS SITE CODE:
SITE CODE: Maui fires

Notes and Definitions

U	Under Detection Limit
SL	The spike recovery was outside acceptance limits. Reported value may be biased low.
QM-4X	The MS/MSD recovery exceeds criteria because the parent sample concentration is greater than 4x the spike concentration. Sample results for the QC batch were accepted based on acceptable BS/BSD recoveries.
QM-07	The spike recovery was outside acceptance limits for the MS and/or MSD. The batch was accepted based on acceptable LCS recovery.
QB-01	Analyte exceeds method blank criteria
LJ	Identification of analyte is acceptable; reported value is an estimate.
GC-BS	Compound exceeds Blank Spike Criteria
FB-01	Analyte exceeds Field Blank criteria.
E	The concentration indicated for this analyte is an estimated value above the calibration range of the instrument. This value is considered an estimate (CLP E-flag).
A-01	Parent sample >4x spike
ND	Analyte NOT DETECTED
NR	Not Reported
MDL	Method Detection Limit
RPD	Relative Percent Difference

Note: This test is accredited under the 2016 TNI Standard.

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Stage 1 Data Verification Checklist - Metals

HDOH CAB – Ambient Community Air Sampling – Kula

Task Order No. 23141

Reviewed by:
Trinh Vu 12/28/2023 & Shanna Vasser 12/28/2023
Laboratory: Eastern Research Group – Morrisville, NC
Analysis Date: 12/21/2023
Report No: 3122052

√ 1. Chain of custody (CoC) documentation is present.

X 2. Sample receipt condition information is present and acceptable.

√ 3. Laboratory conducting the analysis is identified.

√ 4. All samples submitted to the laboratory are accounted for.

√ 5. Requested analytical methods were performed.

√ 6. Analysis dates are provided.

√ 7. Analyte results are provided.

√ 8. Result qualifiers and definitions are provided.

√ 9. Result units are reported.

NA 10. Requested reporting limits are present.

√ 11. Method detection limits are present.

√ 12. Sample collection date and time are present.

Discrepancies: None

Notes:

10. No reporting limits were included in the data package.

Ambient Community Air Monitoring Weekly Report
For the Hawaii Department of Health – Clean Air Branch

Kula, Maui

12/21/2023-12/29/2023
[Report Updated: 4/12/2024]

Due to ongoing debris removal operations in response to the Maui Wildfires, a community air monitoring and sampling plan (CAMSP, 2023) has been developed and sampling is being performed at three community locations across Kula.

This approach includes ambient community air monitoring and sampling to monitor conditions and ensure debris removal activities, taking place under the U.S. Army Corps of Engineers (USACE), does not significantly impact air quality in the area of Kula. Data collected is made available to HDOH via online shared site and this weekly report. This approach to air monitoring and sampling will continue until debris removal activities are complete or until HDOH CAB advises otherwise.

Air quality monitoring for particulate matter was collected at all three community locations over a 24-hour period each day in accordance with the CAMSP. Additionally, daily air samples were collected at all community locations for asbestos and heavy metals. Summary analytical data is presented in **Tables 1 and 2**. **Figure 1** depicts the community air monitoring and sampling locations. **Appendix 1** provides detailed analytical results for all community locations where air sampling was performed. Analytical results were compared to site-specific screening levels for particulate matter, asbestos, and heavy metals as published in the CAMSP (Tetra Tech 2023; see Table 2).

Results for Community Locations:
Ambient particulate air monitoring was performed to assess for the presence and concentrations of airborne particulates with a particle size aerodynamic diameter of 2.5 micrometers (µm) and less ($PM_{2.5}$), as well as 10 micrometers (µm) and less (PM_{10}). This particle size diameter is recognized for health evaluations and is identified as "$PM_{2.5}$" and "PM_{10}". The particle size diameters of 2.5 micrometers (µm) and 10 micrometers (µm) are small enough to be inhaled into a person's lungs. Monitoring for $PM_{2.5}$ and PM_{10} was conducted 7 days a week at each of the following locations: Top Property (AM-01) (December 21 – 29), Middle Property (AM-02) (December 21 – 29), Lower Property (AM-03) (December 21 – 29).

The results of PM10 monitoring found that screening levels were not exceeded during this reporting period.

The results of $PM_{2.5}$ monitoring found that screening levels were exceeded at the Top Property air monitoring station on December 23, 24, 25, 26, 28, and 29. On December 23 and 26, USACE crews were conducting activities approximately 300 meters (about 984.25 ft) west of the sampling site. These activities may have contributed to the exceedance during the time block of 08:00-10:00, all other elevated readings took place during the early morning or late evening hours, outside USACE crew operations. Dec 24 and 25 were approved observed holidays. No USACE crew activities took place during these days to contribute to exceedance, and no field observations were made. The exceedances on December 28 and 29 were not related to USACE debris removal activities as no USACE crews were conducting work at the site on these days. The property owners adjacent to the site were observed doing yard work, applying mulch, manicuring, and racking. Visible dust resulted from the property owner's activities.

The results of $PM_{2.5}$ monitoring found that screening levels were exceeded at the Middle Property air monitoring station on December 23, 25, 28, and 29. The exceedance on December 23 was not related to USACE debris ops activities because no USACE crews were conducting work at the site on this day. The elevated readings took place during the early morning or late evening hours, outside field crew operations. Dec 25 was approved observed holiday for Christmas and no USACE crew activities were taking place during these days, nor were field observations collected. The exceedances on December 28 and 29 were not related to USACE debris ops activities as no USACE crews were conducting work at the site on these days. The property owners adjacent to the site were observed using heavy machinery for yard work and tree trimming. Visible dust resulted from the property owner's activities.

There were twenty-one samples collected for asbestos fibers at community monitoring locations throughout this time frame. No asbestos sample returned a value above the laboratory's detection limit, indicating fibers were not present in the air sampled. All asbestos results were below the public health screening level of 0.0034 fibers/cc (as well as the laboratory's detection limits).

Some extremely low levels of heavy metals were detected in ambient air samples at community locations. Although detected, all concentrations were below the public health screening levels for heavy metals. Details for particulates, heavy metal and asbestos sampling data for community locations are found in Attachment 1.

Attachments:

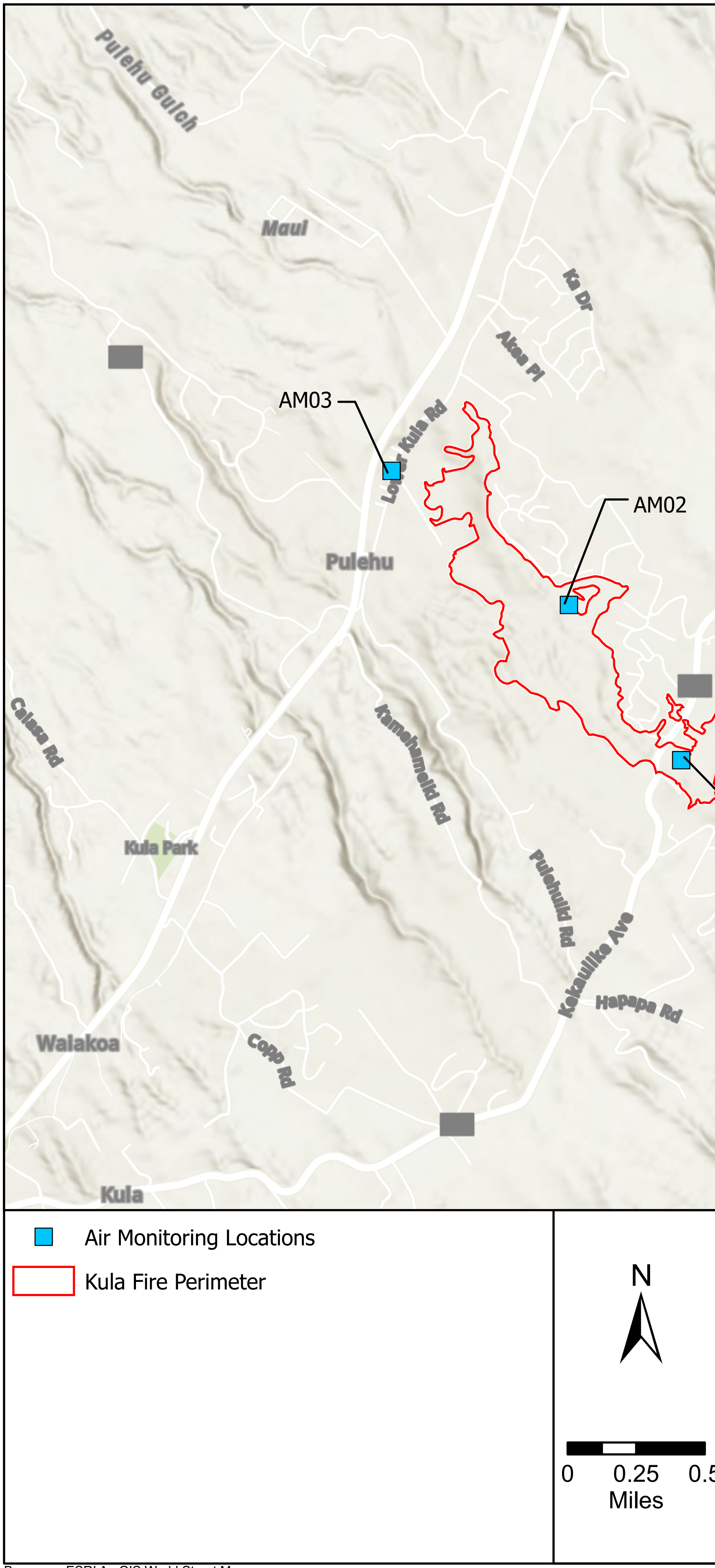
Analytical Sampling Results and Particulate Monitoring Results

Air Monitoring and Sampling Locations

Appendix:

Analytical Reports

Attachments



TETRA TECH

Figure 1
Ambient Community
Air Monitoring Locations

Hawaii DOH
2023 Kula Wildfire

Basemap: ESRI ArcGIS World Street Map

Table 1: HDOH CAB Ambient Community Monitoring and Sampling
Analytical Sampling Results
Maui Wildfire, Kula
12/21/2023-12/29/2023
[Report Updated: 4/12/2024]

Analyte		Asbestos		Antimony	Arsenic	Barium	Beryllium	Cadmium	Chromium	Cobalt	Copper	Lead	Manganese	Molybdenum	Nickel	Selenium	Thallium	Vanadium
Units		f/cc	Y/N	µg/m³	µg/m³	µg/m³	µg/m³	µg/m³	µg/m³	µg/m³	µg/m³	µg/m³	µg/m³	µg/m³	µg/m³	µg/m³	µg/m³	µg/m³
Screening Level	Location / ID	0.0034 [1]	Confirmed Asbestos [2]	1.4	0.18	2.4	0.1	0.048	24	0.029	480	1.5	0.24	9.6	0.048	96	48	0.48
12/21/2023	Top Property (AM-01)	<0.00039	N	0.0000962	0.000155	0.00516	0.0000151	ND	0.00184	0.000242	0.0188	0.000287	0.0138	0.000795	0.000721	0.000151	0.0000017	0.00153
	Middle Property (AM-02)	<0.00074	N	0.000103	0.000158	0.00545	0.0000139	ND	ND	0.000219	0.0137	ND	0.0128	0.000927	ND	0.000159	0.00000162	0.00141
	Lower Property (AM-03)	<0.00075	N	0.000149	0.000155	0.00635	0.0000144	ND	ND	0.000218	0.0169	0.000243	0.0126	0.000738	ND	0.000159	0.00000151	0.00127
12/22/2023	Top Property (AM-01)	<0.00037	N	0.000101	0.000168	0.00671	0.0000172	ND	ND	0.000277	0.0283	0.000512	0.0158	0.000803	ND	0.000186	0.00000167	0.00151
	Middle Property (AM-02)	<0.00048	N	0.0000718	0.000159	0.00664	0.0000165	ND	ND	0.000251	0.0115	0.000282	0.0157	0.000801	ND	0.000168	0.00000164	0.0014
	Lower Property (AM-03)	<0.00049	N	0.000122	0.000134	0.00698	0.0000164	ND	ND	0.000252	0.0153	0.000276	0.0154	0.000707	ND	0.000166	0.00000156	0.00133
12/23/2003	Top Property (AM-01)	<0.00037	N	0.0000834	0.000149	0.00499	0.0000128	ND	ND	0.000254	0.0196	0.000301	0.0136	0.000602	ND	0.000135	0.00000102	0.00138
	Middle Property (AM-02)	<0.00044	N	0.000097	0.000225	0.00519	0.0000138	ND	ND	0.000261	0.012	ND	0.0142	0.000806	ND	0.000135	0.00000102	0.0014
	Lower Property (AM-03)	<0.00046	N	0.000112	0.000119	0.00524	0.0000143	ND	ND	0.00025	0.0157	0.000215	0.0138	0.000724	ND	0.000126	0.000000926	0.00127
12/24/2023	Top Property (AM-01)	<0.00039	N	0.000117	0.000144	0.00554	0.0000136	ND	ND	0.000268	0.0181	0.000258	0.0141	0.000594	ND	0.000153	0.00000126	0.00141
	Middle Property (AM-02)	<0.00105	N	0.000112	0.000209	0.00729	0.0000177	ND	ND	0.000313	0.00925	0.000299	0.0183	0.000609	0.000687	0.000176	0.00000146	0.00186
	Lower Property (AM-03)	<0.00097	N	0.000129	0.000135	0.00577	0.0000136	ND	ND	0.000241	0.0124	0.000296	0.0137	0.000652	0.000618	0.000163	0.00000128	0.00146
12/25/2023	Top Property (AM-01)																	
	Middle Property (AM-02)																	
	Lower Property (AM-03)																	
12/26/2023	Top Property (AM-01)																	
	Middle Property (AM-02)																	
	Lower Property (AM-03)																	
12/27/2023	Top Property (AM-01)	<0.00042	N	0.0000662	0.0000606	0.00312	0.00000616	ND	ND	0.0000886	0.0184	ND	0.00559	0.000614	ND	0.0000336	0.000000598	0.000477
	Middle Property (AM-02)	<0.00037	N	0.000126	0.000198	0.00572	0.0000134	ND	ND	0.000177	0.025	ND	0.0111	0.00144	ND	0.0000744	0.00000115	0.00101
	Lower Property (AM-03)	<0.00030	N	0.000168	0.000139	0.00764	0.0000182	ND	ND	0.000205	0.041	ND	0.014	0.00246	ND	0.0000963	0.00000129	0.00112
12/28/2023	Top Property (AM-01)	<0.00045	N	0.0000587	0.0000749	0.00269	0.00000613	ND	ND	0.000086	0.0175	ND	0.00525	0.000584	ND	0.0000917	0.000000694	0.000637
	Middle Property (AM-02)	<0.00065	N	0.0000586	0.000082	0.00347	0.00000848	ND	ND	0.000102	0.01	ND	0.00663	0.000626	ND	0.000113	0.000000809	0.000771
	Lower Property (AM-03)	<0.00038	N	0.0000902	0.000109	0.00611	0.0000177	ND	ND	0.000187	0.0194	0.000574	0.0147	0.000705	ND	0.000143	0.0000014	0.00108
12/29/2023	Top Property (AM-01)	<0.00119	N	0.0000919	0.0000788	0.00522	0.0000128	ND	ND	0.000192	0.0211	0.000343	0.0111	0.000678	ND	0.000112	0.000000929	0.000939
	Middle Property (AM-02)	<0.00045	N	0.0000744	0.000107	0.00477	0.000011	ND	ND	0.000154	0.0141	0.000286	0.0102	0.000696	ND	0.000105	0.0000079	0.000863
	Lower Property (AM-03)	<0.00267	N	0.0000939	0.0000616	0.00496	0.0000129	ND	ND	0.000147	0.0124	ND	0.0105	0.000728	ND	0.0000899	0.000000804	0.000748
95% Upper Confidence Limit[3]		0.00078		0.00011	0.00016	0.00612	0.000022	NA	NA	0.00036	0.02771	0.00034	0.015	0.00093	0.00078	0.00023	0.0000014	0.00136

Notes:
Asbestos and Metals sampling was not deployed on the 24, and 25 due to the Christmas Holiday. Resulting in no asbestos or Metals samples for the 25, or 26.
NA = Not Available
f/cc = fibers per cubic centimeter
µg/m3= micrograms per cubic meter
ND = Not detected at or above the laboratory reporting limit or method detection limit
1 Fiber count sample result via Phase Contrast Microscopy
2 Confirmed asbestos sample result via Transmission Electron Microscopy
3 95% UCL determined through 'best fit' lognormal or normal parametric statistics via W test
Asbestos Sample from AM-03 on 12/21 was corrected due to a error by the lab.

Table 1: HDOH CAB Ambient Community Monitoring and Sampling
Analytical Sampling Results
Maui Wildfire, Kula
12/21/2023-12/29/2023
[Report Updated: 4/12/2024]

Zinc
μg/m^3
2400
ND
ND
ND
ND
ND
ND
ND
ND
ND
ND
ND
ND
ND
ND
ND
ND
ND
ND
ND
ND
ND
NA

Table 2: HDOH CAB Ambient Community Monitoring and Sampling
Particulate Monitoring Results
Maui Wildfire, Kula
12/21/2023-12/29/2023
[Report Updated: 4/12/2024]

Particulate Size		PM 2.5	PM 10
Screening Level	**Location / ID**	**35 µg/m^3**	**150 µg/m^3**
12/21/2023	Top Property (AM-01)	24	21
	Middle Property (AM-02)	33	5.6
	Lower Property (AM-03)	5.8	9.4
12/22/2023	Top Property (AM-01)	34	37
	Middle Property (AM-02)	22	5.0
	Lower Property (AM-03)	5.3	9.3
12/23/2003	Top Property (AM-01)	47	40
	Middle Property (AM-02)	39	7.2
	Lower Property (AM-03)	6.0	9.3
12/24/2023	Top Property (AM-01)	45	34
	Middle Property (AM-02)	31	6.0
	Lower Property (AM-03)	5.3	8.9
12/25/2023	Top Property (AM-01)	43	33
	Middle Property (AM-02)	40	5.7
	Lower Property (AM-03)	6.0	6.1
12/26/2023	Top Property (AM-01)	64	93
	Middle Property (AM-02)	13	4.0
	Lower Property (AM-03)	6.2	4.4
12/27/2023	Top Property (AM-01)	30	137
	Middle Property (AM-02)	35*	5.5
	Lower Property (AM-03)	6.4	7.6
12/28/2023	Top Property (AM-01)	53	41
	Middle Property (AM-02)	60	8.4
	Lower Property (AM-03)	8.7	12
12/29/2023	Top Property (AM-01)	40	29
	Middle Property (AM-02)	43	6.8
	Lower Property (AM-03)	6.7	5.8

Notes:
The exceedances at the Top and Middle Property on 12/24, and 12/25 were not related to USACE crew activities. Date range was under approved time off for the Christmas holiday. No observations were made.
The exceedances at the Top Property on 12/23 and 12/26 may have contributed to by USACE operations during the time block of 08:00-10:00.Other exceedances took place during non operation time periods (early am/late evening).
The exceedances on 12/23 at the Middle Property were not related to USACE crew activities. Exceedances took place in early moring and late evening hours.
The exceedances on 12/28 and 12/29 at the Top Property and Middle Property were not related to USACE crew activities. No USACE crew present.
* = The middle Property PM2.5 24hr TWA on 12/27 is rounded up from 34.51 and not considered a true exceedance.
Results are based on 24 hour TWA calculation
24 hour TWA calculation is presented in two significant figures
µg/m^3 = micrograms per cubic meter
ND = Not detected at or above the laboratory reporting limit
NA = Not Available
Data for the Top Property (AM-01) on 12/21 has been revised from the prerviously submitted report
Data for the Middle Property (AM-02) on 12/22, 12/23, and12/26 has been revised from the prerviously submitted report

Appendix 1

Eastern Research Group
601 Keystone Park Drive
Suite 700
Morrisville, NC 27560

January 05, 2024

Ms. Chelsea Saber
Tetra Tech, Inc.
1777 Sentry Pkwy, Bldg 12
Blue Bell, PA 19422
Project Name: Maui fires

Dear Ms. Chelsea Saber,

This report contains the analytical results for the sample(s) received under chain(s) of custody by Eastern Research Group on 12/28/23 13:04.

Values below the MDL for QC results in this report are recorded as ND, however the actual values are reported in the accompanying Excel report with a "U" flag (Under the detection limit). The actual values are reported in AQS.

This test is accredited under the 2016 TNI Standard for Environmental Laboratories (FL DOH Certification # E87673). All analyses were performed as described in the US EPA-approved QAPP, under the contract for National Hazardous Air Pollutant Support (US EPA Contract No. 68HERH22D0002). This cover page is an integral part of this report, and any exceptions or comments are noted on the last page.

Release of the data contained in this data package and in the data submitted in the electronic data deliverable, has been authorized by the Program Manager, or the Program Manager's designee as verified by the following signature.

The issuance of the final Certificate of Analysis takes precedence over any previous Report. If you have any questions, please contact me at 919-468-7924.

Sincerely,

Julie Swift
Program Manager
julie.swift@erg.com

The information contained in this report and its attachment(s) are intended only for the use of the individual to whom it is addressed and may contain information that is privileged, confidential, or exempt from disclosure. If the reader of this message is not the intended recipient, you are hereby notified that any dissemination, distribution, or copying of this report is strictly prohibited. If you have received this report in error, please notify julie.swift@erg.com and delete the report without retaining any copies.

CERTIFICATE OF ANALYSIS

Tetra Tech, Inc.
1777 Sentry Pkwy, Bldg 12
Blue Bell, PA 19422
ATTN: Ms. Chelsea Saber
PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 01/05/24 14:13
SUBMITTED: 12/28/23
AQS SITE CODE:
SITE CODE: Maui fires

ANALYTICAL REPORT FOR SAMPLES

SampleName	LabNumber	Matrix	Sampled	Received
TetraTech Q9551158	3122828-01	Air	12/21/23 23:59	12/28/23 13:04
TetraTech Q9524491	3122828-02	Air	12/21/23 23:59	12/28/23 13:04
TetraTech Q9524490	3122828-03	Air	12/21/23 23:59	12/28/23 13:04
TetraTech Q9524486 FB	3122828-04	Air	12/21/23 00:00	12/28/23 13:04
TetraTech Q9524487	3122828-05	Air	12/22/23 23:59	12/28/23 13:04
TetraTech Q9524477	3122828-06	Air	12/22/23 23:59	12/28/23 13:04
TetraTech Q9524489	3122828-07	Air	12/22/23 23:59	12/28/23 13:04
TetraTech Q9524485 FB	3122828-08	Air	12/22/23 00:00	12/28/23 13:04
TetraTech Q9524482	3122828-09	Air	12/24/23 23:59	12/28/23 13:04
TetraTech Q9524479	3122828-10	Air	12/24/23 23:59	12/28/23 13:04
TetraTech Q9524469	3122828-11	Air	12/24/23 23:59	12/28/23 13:04
TetraTech Q9524481 FB	3122828-12	Air	12/24/23 00:00	12/28/23 13:04
TetraTech Q9524478	3122828-13	Air	12/23/23 23:59	12/28/23 13:04
TetraTech Q9524484	3122828-14	Air	12/23/23 23:59	12/28/23 13:04
TetraTech Q9524483	3122828-15	Air	12/23/23 23:59	12/28/23 13:04
TetraTech Q9524480 FB	3122828-16	Air	12/23/23 00:00	12/28/23 13:04

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Tetra Tech, Inc.
1777 Sentry Pkwy, Bldg 12
Blue Bell, PA 19422
ATTN: Ms. Chelsea Saber
PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 01/05/24 14:13
SUBMITTED: 12/28/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9551158 **Lab ID:** 3122828-01 **Sampled:** 12/21/23 23:59
Matrix: Air **Sample Volume:** 1917.117 m³ **Received:** 12/28/23 13:04
Filter ID: **Analysis Date:** 01/02/24 20:12
Comments: MFK-AM01-122123-HM

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	**7429-90-5**	**477**		**27.2**
Antimony	**7440-36-0**	**0.0962**	SL	**0.0374**
Arsenic	**7440-38-2**	**0.155**		**0.00810**
Barium	**7440-39-3**	**5.16**		**0.805**
Beryllium	**7440-41-7**	**0.0151**		**0.00282**
Cadmium	7440-43-9	0.00818	U	0.0925
Calcium	**7440-70-2**	**436**	LJ, QB-01	**248**
Chromium	**7440-47-3**	**1.84**		**1.72**
Cobalt	**7440-48-4**	**0.242**	QB-01	**0.0132**
Copper	**7440-50-8**	**18.8**		**2.55**
Iron	**7439-89-6**	**548**		**20.5**
Lead	**7439-92-1**	**0.287**		**0.234**
Magnesium	**7439-95-4**	**219**		**81.8**
Manganese	**7439-96-5**	**13.8**		**1.01**
Molybdenum	**7439-98-7**	**0.795**	QB-01	**0.181**
Nickel	**7440-02-0**	**0.721**		**0.680**
Phosphorus	7723-14-0	385	GC-BS, U	1060
Potassium	**7440-09-7**	**94.8**		**32.2**
Rubidium	**7440-17-7**	**0.175**		**0.0155**
Selenium	**7782-49-2**	**0.151**		**0.00934**
Sodium	**7440-23-5**	**1930**	E, GC-BS	**1700**
Strontium	**7440-24-6**	**3.50**	QB-01	**0.553**
Thallium	**7440-28-0**	**0.00170**		**4.27E-4**
Thorium	**7440-29-01**	**0.0110**		**0.00255**
Uranium	7440-61-1	0.0111	U	0.0144
Vanadium	**7440-62-2**	**1.53**		**0.0418**
Zinc	7440-66-6	31.2	U	82.9

CERTIFICATE OF ANALYSIS

Tetra Tech, Inc.
1777 Sentry Pkwy, Bldg 12
Blue Bell, PA 19422
ATTN: Ms. Chelsea Saber
PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 01/05/24 14:13
SUBMITTED: 12/28/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9524491 **Lab ID:** 3122828-02 **Sampled:** 12/21/23 23:59
Matrix: Air **Sample Volume:** 2016.319 m³ **Received:** 12/28/23 13:04
Filter ID: **Analysis Date:** 01/02/24 20:26
Comments: MFK-AM02-122123-HM

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	**7429-90-5**	**402**		**25.9**
Antimony	**7440-36-0**	**0.103**	SL	**0.0356**
Arsenic	**7440-38-2**	**0.158**		**0.00771**
Barium	**7440-39-3**	**5.45**		**0.765**
Beryllium	**7440-41-7**	**0.0139**		**0.00268**
Cadmium	7440-43-9	0.00641	U	0.0880
Calcium	**7440-70-2**	**377**	LJ, QB-01	**236**
Chromium	7440-47-3	1.03	U	1.64
Cobalt	**7440-48-4**	**0.219**	QB-01	**0.0126**
Copper	**7440-50-8**	**13.7**		**2.42**
Iron	**7439-89-6**	**472**		**19.5**
Lead	7439-92-1	0.221	U	0.223
Magnesium	**7439-95-4**	**220**		**77.8**
Manganese	**7439-96-5**	**12.8**		**0.960**
Molybdenum	**7439-98-7**	**0.927**	QB-01	**0.172**
Nickel	7440-02-0	0.503	U	0.646
Phosphorus	7723-14-0	193	GC-BS, U	1010
Potassium	**7440-09-7**	**103**		**30.7**
Rubidium	**7440-17-7**	**0.166**		**0.0148**
Selenium	**7782-49-2**	**0.159**		**0.00888**
Sodium	**7440-23-5**	**1820**	E, GC-BS	**1610**
Strontium	**7440-24-6**	**3.45**	QB-01	**0.526**
Thallium	**7440-28-0**	**0.00162**		**4.06E-4**
Thorium	**7440-29-01**	**0.0134**		**0.00242**
Uranium	7440-61-1	0.00967	U	0.0137
Vanadium	**7440-62-2**	**1.41**		**0.0397**
Zinc	7440-66-6	21.8	U	78.8

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CERTIFICATE OF ANALYSIS

Tetra Tech, Inc.
1777 Sentry Pkwy, Bldg 12
Blue Bell, PA 19422
ATTN: Ms. Chelsea Saber
PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 01/05/24 14:13
SUBMITTED: 12/28/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9524490 **Lab ID:** 3122828-03 **Sampled:** 12/21/23 23:59
Matrix: Air **Sample Volume:** 2287.288 m³ **Received:** 12/28/23 13:04
Filter ID: **Analysis Date:** 01/02/24 20:40
Comments: MFK-AM03-122123-HM

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	**7429-90-5**	**318**		**22.8**
Antimony	**7440-36-0**	**0.149**	SL	**0.0314**
Arsenic	**7440-38-2**	**0.155**		**0.00679**
Barium	**7440-39-3**	**6.35**		**0.674**
Beryllium	**7440-41-7**	**0.0144**		**0.00236**
Cadmium	7440-43-9	0.0186	U	0.0775
Calcium	**7440-70-2**	**382**	LJ, QB-01	**208**
Chromium	7440-47-3	0.949	U	1.44
Cobalt	**7440-48-4**	**0.218**	QB-01	**0.0111**
Copper	**7440-50-8**	**16.9**		**2.13**
Iron	**7439-89-6**	**423**		**17.2**
Lead	**7439-92-1**	**0.243**		**0.196**
Magnesium	**7439-95-4**	**228**		**68.6**
Manganese	**7439-96-5**	**12.6**		**0.846**
Molybdenum	**7439-98-7**	**0.738**	QB-01	**0.152**
Nickel	7440-02-0	0.510	U	0.570
Phosphorus	7723-14-0	164	GC-BS, U	889
Potassium	**7440-09-7**	**105**		**27.0**
Rubidium	**7440-17-7**	**0.156**		**0.0130**
Selenium	**7782-49-2**	**0.159**		**0.00782**
Sodium	**7440-23-5**	**1850**	E, GC-BS	**1420**
Strontium	**7440-24-6**	**3.35**	QB-01	**0.464**
Thallium	**7440-28-0**	**0.00151**		**3.58E-4**
Thorium	**7440-29-01**	**0.0140**		**0.00213**
Uranium	7440-61-1	0.00836	U	0.0121
Vanadium	**7440-62-2**	**1.27**		**0.0350**
Zinc	7440-66-6	25.2	U	69.5

CERTIFICATE OF ANALYSIS

Tetra Tech, Inc.
1777 Sentry Pkwy, Bldg 12
Blue Bell, PA 19422
ATTN: Ms. Chelsea Saber
PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 01/05/24 14:13
SUBMITTED: 12/28/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9524486 FB **Lab ID:** 3122828-04 **Sampled:** 12/21/23 00:00
Matrix: Air **Sample Volume:** 1917.117 m³ **Received:** 12/28/23 13:04
Filter ID: **Analysis Date:** 01/02/24 20:54
Comments: MFK-FB01-122123-HM Field Blank

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	7429-90-5	9.89	U	27.2
Antimony	7440-36-0	0.0170	SL, U	0.0374
Arsenic	7440-38-2	0.00343	U	0.00810
Barium	7440-39-3	0.681	U	0.805
Beryllium	7440-41-7	5.16E-4	U	0.00282
Cadmium	7440-43-9	0.00779	U	0.0925
Calcium	7440-70-2	144	LJ, QB-01, U	248
Chromium	7440-47-3	0.643	U	1.72
Cobalt	7440-48-4	0.00555	QB-01, U	0.0132
Copper	7440-50-8	0.253	U	2.55
Iron	7439-89-6	11.7	U	20.5
Lead	7439-92-1	0.0297	U	0.234
Magnesium	7439-95-4	22.6	U	81.8
Manganese	7439-96-5	0.147	U	1.01
Molybdenum	7439-98-7	0.0974	QB-01, U	0.181
Nickel	7440-02-0	0.188	U	0.680
Phosphorus	7723-14-0	172	GC-BS, U	1060
Potassium	7440-09-7	11.2	U	32.2
Rubidium	7440-17-7	0.00657	U	0.0155
Selenium	7782-49-2	0.00162	U	0.00934
Sodium	7440-23-5	547	GC-BS, U	1700
Strontium	7440-24-6	0.280	QB-01, U	0.553
Thallium	7440-28-0	1.94E-4	U	4.27E-4
Thorium	7440-29-01	0.00206	U	0.00255
Uranium	7440-61-1	7.49E-4	U	0.0144
Vanadium	7440-62-2	0.0164	U	0.0418
Zinc	7440-66-6	22.2	U	82.9

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CERTIFICATE OF ANALYSIS

Tetra Tech, Inc.
1777 Sentry Pkwy, Bldg 12
Blue Bell, PA 19422
ATTN: Ms. Chelsea Saber
PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 01/05/24 14:13
SUBMITTED: 12/28/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9524487
Matrix: Air
Comments: MFK-AM01-122223-HM

Lab ID: 3122828-05
Sample Volume: 1891.231 m^3
Filter ID:

Sampled: 12/22/23 23:59
Received: 12/28/23 13:04
Analysis Date: 01/02/24 21:08

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m^3 Air	Flag	MDL ng/m^3 Air
Aluminum	**7429-90-5**	**531**		**27.6**
Antimony	**7440-36-0**	**0.101**	SL	**0.0379**
Arsenic	**7440-38-2**	**0.168**		**0.00822**
Barium	**7440-39-3**	**6.71**		**0.816**
Beryllium	**7440-41-7**	**0.0172**		**0.00286**
Cadmium	7440-43-9	0.0120	U	0.0938
Calcium	**7440-70-2**	**442**	LJ, QB-01	**251**
Chromium	7440-47-3	1.23	U	1.75
Cobalt	**7440-48-4**	**0.277**	QB-01	**0.0134**
Copper	**7440-50-8**	**28.3**		**2.58**
Iron	**7439-89-6**	**604**		**20.8**
Lead	**7439-92-1**	**0.512**		**0.237**
Magnesium	**7439-95-4**	**282**		**82.9**
Manganese	**7439-96-5**	**15.8**		**1.02**
Molybdenum	**7439-98-7**	**0.803**	QB-01	**0.183**
Nickel	7440-02-0	0.564	U	0.689
Phosphorus	7723-14-0	202	GC-BS, U	1080
Potassium	**7440-09-7**	**115**		**32.7**
Rubidium	**7440-17-7**	**0.208**		**0.0157**
Selenium	**7782-49-2**	**0.186**		**0.00946**
Sodium	**7440-23-5**	**2280**	E, GC-BS	**1720**
Strontium	**7440-24-6**	**4.21**	QB-01	**0.561**
Thallium	**7440-28-0**	**0.00167**		**4.33E-4**
Thorium	**7440-29-01**	**0.0173**		**0.00258**
Uranium	7440-61-1	0.0123	U	0.0146
Vanadium	**7440-62-2**	**1.51**		**0.0423**
Zinc	7440-66-6	25.7	U	84.0

CERTIFICATE OF ANALYSIS

Tetra Tech, Inc.
1777 Sentry Pkwy, Bldg 12
Blue Bell, PA 19422
ATTN: Ms. Chelsea Saber
PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 01/05/24 14:13
SUBMITTED: 12/28/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9524477 **Lab ID:** 3122828-06 **Sampled:** 12/22/23 23:59
Matrix: Air **Sample Volume:** 2157.187 m³ **Received:** 12/28/23 13:04
Filter ID: **Analysis Date:** 01/02/24 21:22
Comments: MFK-AM02-122223-HM

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	**7429-90-5**	**480**		**24.2**
Antimony	**7440-36-0**	**0.0718**	SL	**0.0333**
Arsenic	**7440-38-2**	**0.159**		**0.00720**
Barium	**7440-39-3**	**6.64**		**0.715**
Beryllium	**7440-41-7**	**0.0165**		**0.00250**
Cadmium	7440-43-9	0.0110	U	0.0822
Calcium	**7440-70-2**	**390**	LJ, QB-01	**220**
Chromium	7440-47-3	1.06	U	1.53
Cobalt	**7440-48-4**	**0.251**	QB-01	**0.0118**
Copper	**7440-50-8**	**11.5**		**2.26**
Iron	**7439-89-6**	**546**		**18.3**
Lead	**7439-92-1**	**0.282**		**0.208**
Magnesium	**7439-95-4**	**252**		**72.7**
Manganese	**7439-96-5**	**15.7**		**0.898**
Molybdenum	**7439-98-7**	**0.801**	QB-01	**0.161**
Nickel	7440-02-0	0.498	U	0.604
Phosphorus	7723-14-0	195	GC-BS, U	943
Potassium	**7440-09-7**	**131**		**28.7**
Rubidium	**7440-17-7**	**0.239**		**0.0138**
Selenium	**7782-49-2**	**0.168**		**0.00830**
Sodium	**7440-23-5**	**2040**	E, GC-BS	**1510**
Strontium	**7440-24-6**	**3.99**	QB-01	**0.492**
Thallium	**7440-28-0**	**0.00164**		**3.79E-4**
Thorium	**7440-29-01**	**0.0169**		**0.00226**
Uranium	7440-61-1	0.0112	U	0.0128
Vanadium	**7440-62-2**	**1.40**		**0.0371**
Zinc	7440-66-6	20.5	U	73.7

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CERTIFICATE OF ANALYSIS

Tetra Tech, Inc.
1777 Sentry Pkwy, Bldg 12
Blue Bell, PA 19422
ATTN: Ms. Chelsea Saber
PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 01/05/24 14:13
SUBMITTED: 12/28/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9524489 **Lab ID:** 3122828-07 **Sampled:** 12/22/23 23:59
Matrix: Air **Sample Volume:** 2305.563 m³ **Received:** 12/28/23 13:04
Filter ID: **Analysis Date:** 01/02/24 21:36
Comments: MFK-AM03-122223-HM

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	**7429-90-5**	**399**		**22.7**
Antimony	**7440-36-0**	**0.122**	SL	**0.0311**
Arsenic	**7440-38-2**	**0.134**		**0.00674**
Barium	**7440-39-3**	**6.98**		**0.669**
Beryllium	**7440-41-7**	**0.0164**		**0.00234**
Cadmium	7440-43-9	0.00927	U	0.0769
Calcium	**7440-70-2**	**395**	LJ, QB-01	**206**
Chromium	7440-47-3	1.01	U	1.43
Cobalt	**7440-48-4**	**0.252**	QB-01	**0.0110**
Copper	**7440-50-8**	**15.3**		**2.12**
Iron	**7439-89-6**	**514**		**17.1**
Lead	**7439-92-1**	**0.276**		**0.195**
Magnesium	**7439-95-4**	**269**		**68.0**
Manganese	**7439-96-5**	**15.4**		**0.840**
Molybdenum	**7439-98-7**	**0.707**	QB-01	**0.150**
Nickel	7440-02-0	0.474	U	0.565
Phosphorus	7723-14-0	181	GC-BS, U	882
Potassium	**7440-09-7**	**121**		**26.8**
Rubidium	**7440-17-7**	**0.205**		**0.0129**
Selenium	**7782-49-2**	**0.166**		**0.00776**
Sodium	**7440-23-5**	**2140**	E, GC-BS	**1410**
Strontium	**7440-24-6**	**4.41**	QB-01	**0.460**
Thallium	**7440-28-0**	**0.00156**		**3.55E-4**
Thorium	**7440-29-01**	**0.0168**		**0.00212**
Uranium	7440-61-1	0.0103	U	0.0120
Vanadium	**7440-62-2**	**1.33**		**0.0347**
Zinc	7440-66-6	18.9	U	68.9

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CERTIFICATE OF ANALYSIS

Tetra Tech, Inc.
1777 Sentry Pkwy, Bldg 12
Blue Bell, PA 19422
ATTN: Ms. Chelsea Saber
PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 01/05/24 14:13
SUBMITTED: 12/28/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9524485 FB
Matrix: Air
Lab ID: 3122828-08
Sample Volume: 1891.231 m³
Filter ID:
Sampled: 12/22/23 00:00
Received: 12/28/23 13:04
Analysis Date: 01/02/24 21:50
Comments: MFK-FB01-122223-HM Field Blank

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	7429-90-5	9.60	U	27.6
Antimony	7440-36-0	0.0147	SL, U	0.0379
Arsenic	7440-38-2	0.00377	U	0.00822
Barium	7440-39-3	0.719	U	0.816
Beryllium	7440-41-7	5.38E-4	U	0.00286
Cadmium	7440-43-9	0.00264	U	0.0938
Calcium	7440-70-2	139	LJ, QB-01, U	251
Chromium	7440-47-3	0.639	U	1.75
Cobalt	7440-48-4	0.00641	QB-01, U	0.0134
Copper	7440-50-8	0.195	U	2.58
Iron	7439-89-6	9.72	U	20.8
Lead	7439-92-1	0.0278	U	0.237
Magnesium	7439-95-4	23.3	U	82.9
Manganese	7439-96-5	0.149	U	1.02
Molybdenum	7439-98-7	0.0864	QB-01, U	0.183
Nickel	7440-02-0	0.182	U	0.689
Phosphorus	7723-14-0	167	GC-BS, U	1080
Potassium	7440-09-7	17.3	U	32.7
Rubidium	7440-17-7	0.00651	U	0.0157
Selenium	7782-49-2	0.00274	U	0.00946
Sodium	7440-23-5	557	GC-BS, U	1720
Strontium	7440-24-6	0.249	QB-01, U	0.561
Thallium	7440-28-0	1.54E-4	U	4.33E-4
Thorium	7440-29-01	0.00215	U	0.00258
Uranium	7440-61-1	6.87E-4	U	0.0146
Vanadium	7440-62-2	0.0177	U	0.0423
Zinc	7440-66-6	18.7	U	84.0

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Tetra Tech, Inc.
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Blue Bell, PA 19422
ATTN: Ms. Chelsea Saber
PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 01/05/24 14:13
SUBMITTED: 12/28/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9524482
Lab ID: 3122828-09
Sampled: 12/24/23 23:59
Matrix: Air
Sample Volume: 1958.81 m³
Received: 12/28/23 13:04
Filter ID:
Analysis Date: 01/02/24 17:50
Comments: MFK-AM01-122423-HM

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	**7429-90-5**	**343**	QM-4X	**26.7**
Antimony	**7440-36-0**	**0.117**	SL	**0.0366**
Arsenic	**7440-38-2**	**0.144**		**0.00793**
Barium	**7440-39-3**	**5.54**		**0.787**
Beryllium	**7440-41-7**	**0.0136**		**0.00276**
Cadmium	7440-43-9	0.00716	U	0.0905
Calcium	**7440-70-2**	**516**	A-01, LJ, QB-01, QM-4X	**243**
Chromium	7440-47-3	1.10	U	1.69
Cobalt	**7440-48-4**	**0.268**	QB-01	**0.0130**
Copper	**7440-50-8**	**18.1**	QM-07	**2.49**
Iron	**7439-89-6**	**467**	A-01, QM-4X	**20.1**
Lead	**7439-92-1**	**0.258**		**0.229**
Magnesium	**7439-95-4**	**243**	QM-4X	**80.1**
Manganese	**7439-96-5**	**14.1**		**0.988**
Molybdenum	**7439-98-7**	**0.594**	QB-01	**0.177**
Nickel	7440-02-0	0.605	U	0.665
Phosphorus	7723-14-0	179	A-01, GC-BS, U	1040
Potassium	**7440-09-7**	**111**	QM-07	**31.6**
Rubidium	**7440-17-7**	**0.167**		**0.0152**
Selenium	**7782-49-2**	**0.153**		**0.00914**
Sodium	**7440-23-5**	**1880**	QM-4X, A-01, E, GC-BS	**1660**
Strontium	**7440-24-6**	**3.65**	QB-01	**0.542**
Thallium	**7440-28-0**	**0.00126**		**4.18E-4**
Thorium	**7440-29-01**	**0.0121**	QM-07	**0.00249**
Uranium	7440-61-1	0.00962	U	0.0141
Vanadium	**7440-62-2**	**1.41**		**0.0409**
Zinc	7440-66-6	39.1	U	81.2

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Tetra Tech, Inc.
1777 Sentry Pkwy, Bldg 12
Blue Bell, PA 19422
ATTN: Ms. Chelsea Saber
PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 01/05/24 14:13
SUBMITTED: 12/28/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9524479 **Lab ID:** 3122828-10 **Sampled:** 12/24/23 23:59
Matrix: Air **Sample Volume:** 2041.741 m^3 **Received:** 12/28/23 13:04
Filter ID: **Analysis Date:** 01/02/24 22:04
Comments: MFK-AM02-122423-HM

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	**7429-90-5**	**529**		**25.6**
Antimony	**7440-36-0**	**0.112**	SL	**0.0351**
Arsenic	**7440-38-2**	**0.209**		**0.00761**
Barium	**7440-39-3**	**7.29**		**0.755**
Beryllium	**7440-41-7**	**0.0177**		**0.00265**
Cadmium	7440-43-9	0.0120	U	0.0869
Calcium	**7440-70-2**	**521**	LJ, QB-01	**233**
Chromium	7440-47-3	1.24	U	1.62
Cobalt	**7440-48-4**	**0.313**	QB-01	**0.0124**
Copper	**7440-50-8**	**9.25**		**2.39**
Iron	**7439-89-6**	**635**		**19.3**
Lead	**7439-92-1**	**0.299**		**0.220**
Magnesium	**7439-95-4**	**260**		**76.8**
Manganese	**7439-96-5**	**18.3**		**0.948**
Molybdenum	**7439-98-7**	**0.609**	QB-01	**0.170**
Nickel	**7440-02-0**	**0.687**		**0.638**
Phosphorus	7723-14-0	203	GC-BS, U	996
Potassium	**7440-09-7**	**132**		**30.3**
Rubidium	**7440-17-7**	**0.245**		**0.0146**
Selenium	**7782-49-2**	**0.176**		**0.00877**
Sodium	**7440-23-5**	**1960**	E, GC-BS	**1590**
Strontium	**7440-24-6**	**4.45**	QB-01	**0.520**
Thallium	**7440-28-0**	**0.00146**		**4.01E-4**
Thorium	**7440-29-01**	**0.0194**		**0.00239**
Uranium	**7440-61-1**	**0.0136**		**0.0135**
Vanadium	**7440-62-2**	**1.86**		**0.0392**
Zinc	7440-66-6	30.7	U	77.9

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Tetra Tech, Inc.
1777 Sentry Pkwy, Bldg 12
Blue Bell, PA 19422
ATTN: Ms. Chelsea Saber
PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 01/05/24 14:13
SUBMITTED: 12/28/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9524469 **Lab ID:** 3122828-11 **Sampled:** 12/24/23 23:59
Matrix: Air **Sample Volume:** 2131.191 m^3 **Received:** 12/28/23 13:04
Filter ID: **Analysis Date:** 01/02/24 23:06
Comments: MFK-AM03-122423-HM

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	**7429-90-5**	**319**		**24.5**
Antimony	**7440-36-0**	**0.129**	SL	**0.0337**
Arsenic	**7440-38-2**	**0.135**		**0.00729**
Barium	**7440-39-3**	**5.77**		**0.724**
Beryllium	**7440-41-7**	**0.0136**		**0.00253**
Cadmium	7440-43-9	0.00775	U	0.0832
Calcium	**7440-70-2**	**466**	LJ, QB-01	**223**
Chromium	7440-47-3	1.05	U	1.55
Cobalt	**7440-48-4**	**0.241**	QB-01	**0.0119**
Copper	**7440-50-8**	**12.4**		**2.29**
Iron	**7439-89-6**	**449**		**18.5**
Lead	**7439-92-1**	**0.296**		**0.211**
Magnesium	**7439-95-4**	**276**		**73.6**
Manganese	**7439-96-5**	**13.7**		**0.908**
Molybdenum	**7439-98-7**	**0.652**	QB-01	**0.163**
Nickel	**7440-02-0**	**0.618**		**0.612**
Phosphorus	7723-14-0	174	GC-BS, U	954
Potassium	**7440-09-7**	**109**		**29.0**
Rubidium	**7440-17-7**	**0.173**		**0.0140**
Selenium	**7782-49-2**	**0.163**		**0.00840**
Sodium	**7440-23-5**	**2040**	E, GC-BS	**1530**
Strontium	**7440-24-6**	**3.84**	QB-01	**0.498**
Thallium	**7440-28-0**	**0.00128**		**3.84E-4**
Thorium	**7440-29-01**	**0.0139**		**0.00229**
Uranium	7440-61-1	0.0102	U	0.0130
Vanadium	**7440-62-2**	**1.46**		**0.0376**
Zinc	7440-66-6	19.7	U	74.6

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Tetra Tech, Inc.
1777 Sentry Pkwy, Bldg 12
Blue Bell, PA 19422
ATTN: Ms. Chelsea Saber
PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 01/05/24 14:13
SUBMITTED: 12/28/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9524481 FB **Lab ID:** 3122828-12 **Sampled:** 12/24/23 00:00
Matrix: Air **Sample Volume:** 1958.81 m³ **Received:** 12/28/23 13:04
Filter ID: **Analysis Date:** 01/02/24 23:21
Comments: MFK-FB01-122423-HM Field Blank

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	7429-90-5	9.47	U	26.7
Antimony	7440-36-0	0.0153	SL, U	0.0366
Arsenic	7440-38-2	0.00299	U	0.00793
Barium	**7440-39-3**	**0.890**	FB-01	**0.787**
Beryllium	7440-41-7	5.95E-4	U	0.00276
Cadmium	7440-43-9	0.00128	U	0.0905
Calcium	7440-70-2	126	LJ, QB-01, U	243
Chromium	7440-47-3	0.633	U	1.69
Cobalt	7440-48-4	0.00573	QB-01, U	0.0130
Copper	7440-50-8	0.285	U	2.49
Iron	7439-89-6	9.22	U	20.1
Lead	7439-92-1	0.0333	U	0.229
Magnesium	7439-95-4	22.6	U	80.1
Manganese	7439-96-5	0.147	U	0.988
Molybdenum	7439-98-7	0.0840	QB-01, U	0.177
Nickel	7440-02-0	0.190	U	0.665
Phosphorus	7723-14-0	158	GC-BS, U	1040
Potassium	7440-09-7	13.5	U	31.6
Rubidium	7440-17-7	0.00684	U	0.0152
Selenium	7782-49-2	9.35E-4	U	0.00914
Sodium	7440-23-5	519	GC-BS, U	1660
Strontium	7440-24-6	0.246	QB-01, U	0.542
Thallium	7440-28-0	1.77E-4	U	4.18E-4
Thorium	7440-29-01	0.00208	U	0.00249
Uranium	7440-61-1	6.67E-4	U	0.0141
Vanadium	7440-62-2	0.0144	U	0.0409
Zinc	7440-66-6	19.8	U	81.2

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Tetra Tech, Inc.
1777 Sentry Pkwy, Bldg 12
Blue Bell, PA 19422
ATTN: Ms. Chelsea Saber
PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 01/05/24 14:13
SUBMITTED: 12/28/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9524478
Matrix: Air
Lab ID: 3122828-13
Sample Volume: 2054.738 m^3
Filter ID:
Sampled: 12/23/23 23:59
Received: 12/28/23 13:04
Analysis Date: 01/02/24 23:35
Comments: MFK-AM01-122323-HM

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	**7429-90-5**	**380**		**25.4**
Antimony	**7440-36-0**	**0.0834**	SL	**0.0349**
Arsenic	**7440-38-2**	**0.149**		**0.00756**
Barium	**7440-39-3**	**4.99**		**0.751**
Beryllium	**7440-41-7**	**0.0128**		**0.00263**
Cadmium	7440-43-9	0.00761	U	0.0863
Calcium	**7440-70-2**	**397**	LJ, QB-01	**231**
Chromium	7440-47-3	1.13	U	1.61
Cobalt	**7440-48-4**	**0.254**	QB-01	**0.0124**
Copper	**7440-50-8**	**19.6**		**2.38**
Iron	**7439-89-6**	**481**		**19.2**
Lead	**7439-92-1**	**0.301**		**0.219**
Magnesium	**7439-95-4**	**197**		**76.3**
Manganese	**7439-96-5**	**13.6**		**0.942**
Molybdenum	**7439-98-7**	**0.602**	QB-01	**0.169**
Nickel	7440-02-0	0.571	U	0.634
Phosphorus	7723-14-0	200	GC-BS, U	990
Potassium	**7440-09-7**	**95.7**		**30.1**
Rubidium	**7440-17-7**	**0.171**		**0.0145**
Selenium	**7782-49-2**	**0.135**		**0.00871**
Sodium	**7440-23-5**	**1590**	E, GC-BS	**1580**
Strontium	**7440-24-6**	**3.27**	QB-01	**0.516**
Thallium	**7440-28-0**	**0.00102**		**3.98E-4**
Thorium	**7440-29-01**	**0.0135**		**0.00238**
Uranium	7440-61-1	0.00921	U	0.0135
Vanadium	**7440-62-2**	**1.38**		**0.0390**
Zinc	7440-66-6	19.0	U	77.4

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Tetra Tech, Inc.
1777 Sentry Pkwy, Bldg 12
Blue Bell, PA 19422
ATTN: Ms. Chelsea Saber
PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 01/05/24 14:13
SUBMITTED: 12/28/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9524484 **Lab ID:** 3122828-14 **Sampled:** 12/23/23 23:59
Matrix: Air **Sample Volume:** 2126.294 m^3 **Received:** 12/28/23 13:04
Filter ID: **Analysis Date:** 01/02/24 23:49
Comments: MFK-AM02-122323-HM

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	**7429-90-5**	**381**		**24.6**
Antimony	**7440-36-0**	**0.0970**	SL	**0.0337**
Arsenic	**7440-38-2**	**0.225**		**0.00731**
Barium	**7440-39-3**	**5.19**		**0.725**
Beryllium	**7440-41-7**	**0.0138**		**0.00254**
Cadmium	7440-43-9	0.00968	U	0.0834
Calcium	**7440-70-2**	**423**	LJ, QB-01	**223**
Chromium	7440-47-3	1.16	U	1.55
Cobalt	**7440-48-4**	**0.261**	QB-01	**0.0119**
Copper	**7440-50-8**	**12.0**		**2.30**
Iron	**7439-89-6**	**495**		**18.5**
Lead	7439-92-1	0.207	U	0.211
Magnesium	**7439-95-4**	**211**		**73.8**
Manganese	**7439-96-5**	**14.2**		**0.911**
Molybdenum	**7439-98-7**	**0.806**	QB-01	**0.163**
Nickel	7440-02-0	0.582	U	0.613
Phosphorus	7723-14-0	180	GC-BS, U	956
Potassium	**7440-09-7**	**102**		**29.1**
Rubidium	**7440-17-7**	**0.168**		**0.0140**
Selenium	**7782-49-2**	**0.135**		**0.00842**
Sodium	**7440-23-5**	**1640**	E, GC-BS	**1530**
Strontium	**7440-24-6**	**3.72**	QB-01	**0.499**
Thallium	**7440-28-0**	**0.00102**		**3.85E-4**
Thorium	**7440-29-01**	**0.0163**		**0.00230**
Uranium	7440-61-1	0.00963	U	0.0130
Vanadium	**7440-62-2**	**1.40**		**0.0376**
Zinc	7440-66-6	21.5	U	74.8

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Tetra Tech, Inc.
1777 Sentry Pkwy, Bldg 12
Blue Bell, PA 19422
ATTN: Ms. Chelsea Saber
PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 01/05/24 14:13
SUBMITTED: 12/28/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9524483
Matrix: Air
Lab ID: 3122828-15
Sample Volume: 2333.452 m³
Filter ID:
Sampled: 12/23/23 23:59
Received: 12/28/23 13:04
Analysis Date: 01/03/24 00:03
Comments: MFK-AM03-122323-HM

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	**7429-90-5**	**326**		**22.4**
Antimony	**7440-36-0**	**0.112**	SL	**0.0307**
Arsenic	**7440-38-2**	**0.119**		**0.00666**
Barium	**7440-39-3**	**5.24**		**0.661**
Beryllium	**7440-41-7**	**0.0143**		**0.00231**
Cadmium	7440-43-9	0.00656	U	0.0760
Calcium	**7440-70-2**	**399**	LJ, QB-01	**204**
Chromium	7440-47-3	1.01	U	1.42
Cobalt	**7440-48-4**	**0.250**	QB-01	**0.0109**
Copper	**7440-50-8**	**15.7**		**2.09**
Iron	**7439-89-6**	**461**		**16.9**
Lead	**7439-92-1**	**0.215**		**0.192**
Magnesium	**7439-95-4**	**222**		**67.2**
Manganese	**7439-96-5**	**13.8**		**0.830**
Molybdenum	**7439-98-7**	**0.724**	QB-01	**0.149**
Nickel	7440-02-0	0.517	U	0.558
Phosphorus	7723-14-0	170	GC-BS, U	872
Potassium	**7440-09-7**	**100**		**26.5**
Rubidium	**7440-17-7**	**0.159**		**0.0128**
Selenium	**7782-49-2**	**0.126**		**0.00767**
Sodium	**7440-23-5**	**1720**	E, GC-BS	**1390**
Strontium	**7440-24-6**	**3.42**	QB-01	**0.455**
Thallium	**7440-28-0**	**9.26E-4**		**3.51E-4**
Thorium	**7440-29-01**	**0.0155**		**0.00209**
Uranium	7440-61-1	0.00884	U	0.0119
Vanadium	**7440-62-2**	**1.27**		**0.0343**
Zinc	7440-66-6	20.3	U	68.1

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CERTIFICATE OF ANALYSIS

Tetra Tech, Inc.
1777 Sentry Pkwy, Bldg 12
Blue Bell, PA 19422
ATTN: Ms. Chelsea Saber
PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 01/05/24 14:13
SUBMITTED: 12/28/23
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9524480 FB **Lab ID:** 3122828-16 **Sampled:** 12/23/23 00:00
Matrix: Air **Sample Volume:** 2054.738 m³ **Received:** 12/28/23 13:04
Filter ID: **Analysis Date:** 01/03/24 00:17
Comments: MFK-FB01-122323-HM Field Blank

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	7429-90-5	8.36	U	25.4
Antimony	7440-36-0	0.0146	SL, U	0.0349
Arsenic	7440-38-2	0.00359	U	0.00756
Barium	**7440-39-3**	**0.919**	FB-01	**0.751**
Beryllium	7440-41-7	5.38E-4	U	0.00263
Cadmium	7440-43-9	0.00103	U	0.0863
Calcium	7440-70-2	105	LJ, QB-01, U	231
Chromium	7440-47-3	0.623	U	1.61
Cobalt	7440-48-4	0.00816	QB-01, U	0.0124
Copper	7440-50-8	0.244	U	2.38
Iron	7439-89-6	8.35	U	19.2
Lead	7439-92-1	0.0342	U	0.219
Magnesium	7439-95-4	21.7	U	76.3
Manganese	7439-96-5	0.128	U	0.942
Molybdenum	**7439-98-7**	**0.216**	FB-01, QB-01	**0.169**
Nickel	7440-02-0	0.204	U	0.634
Phosphorus	7723-14-0	157	GC-BS, U	990
Potassium	7440-09-7	29.5	U	30.1
Rubidium	7440-17-7	0.00696	U	0.0145
Selenium	7782-49-2	8.42E-4	U	0.00871
Sodium	7440-23-5	536	GC-BS, U	1580
Strontium	7440-24-6	0.228	QB-01, U	0.516
Thallium	7440-28-0	9.95E-5	U	3.98E-4
Thorium	7440-29-01	0.00205	U	0.00238
Uranium	7440-61-1	6.65E-4	U	0.0135
Vanadium	7440-62-2	0.0137	U	0.0390
Zinc	7440-66-6	13.5	U	77.4

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Inorganics by Compendium Method IO-3.5 - Quality Control

Batch 2401002 - B4A0205

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Calibration Blank (2401002-CCB1)				Prepared & Analyzed: 01/02/24						
Aluminum	29.2		ng/l							
Antimony	0.334		ng/l							
Arsenic	4.98		ng/l							
Barium	-0.516		ng/l							U
Beryllium	0.0560		ng/l							
Cadmium	0.173		ng/l							
Calcium	101		ng/l							
Chromium	5.99		ng/l							
Cobalt	3.62E-4		ng/l							
Copper	12.9		ng/l							
Iron	-181		ng/l							U
Lead	2.85		ng/l							
Magnesium	-27.7		ng/l							U
Manganese	2.73		ng/l							
Molybdenum	13.4		ng/l							
Nickel	0.270		ng/l							
Phosphorus	-28.0		ng/l							U
Potassium	413		ng/l							
Rubidium	-0.352		ng/l							U
Selenium	-4.83		ng/l							U
Sodium	-431		ng/l							U
Strontium	-0.257		ng/l							U
Thallium	0.698		ng/l							
Thorium	0.505		ng/l							
Uranium	0.00426		ng/l							
Vanadium	24.2		ng/l							
Zinc	-48.1		ng/l							U
Calibration Blank (2401002-CCB2)				Prepared & Analyzed: 01/02/24						
Aluminum	60.1		ng/l							
Antimony	1.03		ng/l							
Arsenic	-1.10		ng/l							U
Barium	3.25		ng/l							
Beryllium	0.412		ng/l							
Cadmium	0.576		ng/l							
Calcium	160		ng/l							
Chromium	8.48		ng/l							
Cobalt	0.947		ng/l							
Copper	53.8		ng/l							

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Inorganics by Compendium Method IO-3.5 - Quality Control

Batch 2401002 - B4A0205

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Calibration Blank (2401002-CCB2) Contin				Prepared & Analyzed: 01/02/24						
Iron	9.74		ng/l							
Lead	10.1		ng/l							
Magnesium	-32.5		ng/l							U
Manganese	10.7		ng/l							
Molybdenum	10.5		ng/l							
Nickel	2.89		ng/l							
Phosphorus	22.9		ng/l							
Potassium	-284		ng/l							U
Rubidium	0.182		ng/l							
Selenium	-0.317		ng/l							U
Sodium	-270		ng/l							U
Strontium	0.380		ng/l							
Thallium	1.19		ng/l							
Thorium	0.765		ng/l							
Uranium	0.0172		ng/l							
Vanadium	-4.91		ng/l							U
Zinc	-49.3		ng/l							U
Calibration Blank (2401002-CCB3)				Prepared & Analyzed: 01/02/24						
Aluminum	29.1		ng/l							
Antimony	0.949		ng/l							
Arsenic	1.33		ng/l							
Barium	2.83		ng/l							
Beryllium	0.206		ng/l							
Cadmium	0.661		ng/l							
Calcium	-378		ng/l							U
Chromium	6.51		ng/l							
Cobalt	1.11		ng/l							
Copper	55.8		ng/l							
Iron	77.2		ng/l							
Lead	9.47		ng/l							
Magnesium	9.66		ng/l							
Manganese	11.7		ng/l							
Molybdenum	9.87		ng/l							
Nickel	2.65		ng/l							
Phosphorus	-652		ng/l							U
Potassium	392		ng/l							
Rubidium	0.482		ng/l							
Selenium	-1.76		ng/l							U

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Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes

Inorganics by Compendium Method IO-3.5 - Quality Control

Batch 2401002 - B4A0205

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Calibration Blank (2401002-CCB3) Contin				Prepared & Analyzed: 01/02/24						
Sodium	-5.82		ng/l							U
Strontium	0.427		ng/l							
Thallium	1.06		ng/l							
Thorium	0.812		ng/l							
Uranium	0.00232		ng/l							
Vanadium	-4.80		ng/l							U
Zinc	-50.0		ng/l							U
Calibration Blank (2401002-CCB4)				Prepared: 01/02/24 Analyzed: 01/03/24						
Aluminum	17.1		ng/l							
Antimony	0.744		ng/l							
Arsenic	6.62		ng/l							
Barium	14.6		ng/l							
Beryllium	0.464		ng/l							
Cadmium	0.660		ng/l							
Calcium	158		ng/l							
Chromium	7.05		ng/l							
Cobalt	1.07		ng/l							
Copper	58.2		ng/l							
Iron	-31.3		ng/l							U
Lead	9.09		ng/l							
Magnesium	2.39		ng/l							
Manganese	10.5		ng/l							
Molybdenum	11.5		ng/l							
Nickel	2.12		ng/l							
Phosphorus	-837		ng/l							U
Potassium	149		ng/l							
Rubidium	0.216		ng/l							
Selenium	-10.1		ng/l							U
Sodium	-217		ng/l							U
Strontium	1.75		ng/l							
Thallium	1.07		ng/l							
Thorium	0.802		ng/l							
Uranium	0.0146		ng/l							
Vanadium	-15.5		ng/l							U
Zinc	-44.8		ng/l							U
Calibration Check (2401002-CCV1)				Prepared & Analyzed: 01/02/24						
Aluminum	1.53E6		ng/l	1.5000E6		102	90-110			
Antimony	20100		ng/l	20000		100	90-110			

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Inorganics by Compendium Method IO-3.5 - Quality Control

Batch 2401002 - B4A0205

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Calibration Check (2401002-CCV1) Contir				Prepared & Analyzed: 01/02/24						
Arsenic	20100		ng/l	20000		101	90-110			
Barium	204000		ng/l	200000		102	90-110			
Beryllium	5190		ng/l	5000.0		104	90-110			
Cadmium	20200		ng/l	20000		101	90-110			
Calcium	2.52E7		ng/l	2.5000E7		101	90-110			
Chromium	239000		ng/l	240000		99.5	90-110			
Cobalt	51300		ng/l	50000		103	90-110			
Copper	2.07E6		ng/l	2.0000E6		103	90-110			
Iron	2.54E6		ng/l	2.5000E6		102	90-110			
Lead	200000		ng/l	200000		100	90-110			
Magnesium	1.03E6		ng/l	1.0000E6		103	90-110			
Manganese	507000		ng/l	500000		101	90-110			
Molybdenum	50100		ng/l	50000		100	90-110			
Nickel	123000		ng/l	120000		103	90-110			
Phosphorus	202000		ng/l	200000		101	90-110			
Potassium	2.51E6		ng/l	2.5000E6		100	90-110			
Rubidium	10100		ng/l	10000		101	90-110			
Selenium	20400		ng/l	20000		102	90-110			
Sodium	2.61E6		ng/l	2.5000E6		105	90-110			
Strontium	50400		ng/l	50000		101	90-110			
Thallium	489		ng/l	500.00		97.7	90-110			
Thorium	493		ng/l	500.00		98.6	90-110			
Uranium	495		ng/l	500.00		99.0	90-110			
Vanadium	20000		ng/l	20000		99.9	90-110			
Zinc	532000		ng/l	500000		106	90-110			
Calibration Check (2401002-CCV2)				Prepared & Analyzed: 01/02/24						
Aluminum	1.49E6		ng/l	1.5000E6		99.0	90-110			
Antimony	20200		ng/l	20000		101	90-110			
Arsenic	20100		ng/l	20000		101	90-110			
Barium	203000		ng/l	200000		102	90-110			
Beryllium	4840		ng/l	5000.0		96.8	90-110			
Cadmium	20300		ng/l	20000		102	90-110			
Calcium	2.49E7		ng/l	2.5000E7		99.5	90-110			
Chromium	254000		ng/l	240000		106	90-110			
Cobalt	50300		ng/l	50000		101	90-110			
Copper	2.05E6		ng/l	2.0000E6		102	90-110			
Iron	2.49E6		ng/l	2.5000E6		99.7	90-110			
Lead	200000		ng/l	200000		100	90-110			

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Inorganics by Compendium Method IO-3.5 - Quality Control

Batch 2401002 - B4A0205

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Calibration Check (2401002-CCV2) Contin				Prepared & Analyzed: 01/02/24						
Magnesium	998000		ng/l	1.0000E6		99.8	90-110			
Manganese	496000		ng/l	500000		99.3	90-110			
Molybdenum	50600		ng/l	50000		101	90-110			
Nickel	122000		ng/l	120000		101	90-110			
Phosphorus	196000		ng/l	200000		98.0	90-110			
Potassium	2.45E6		ng/l	2.5000E6		97.9	90-110			
Rubidium	10000		ng/l	10000		100	90-110			
Selenium	20200		ng/l	20000		101	90-110			
Sodium	2.57E6		ng/l	2.5000E6		103	90-110			
Strontium	50400		ng/l	50000		101	90-110			
Thallium	490		ng/l	500.00		98.0	90-110			
Thorium	497		ng/l	500.00		99.4	90-110			
Uranium	497		ng/l	500.00		99.3	90-110			
Vanadium	20300		ng/l	20000		101	90-110			
Zinc	533000		ng/l	500000		107	90-110			
Calibration Check (2401002-CCV3)				Prepared & Analyzed: 01/02/24						
Aluminum	1.48E6		ng/l	1.5000E6		98.4	90-110			
Antimony	20000		ng/l	20000		100	90-110			
Arsenic	20000		ng/l	20000		99.8	90-110			
Barium	202000		ng/l	200000		101	90-110			
Beryllium	5000		ng/l	5000.0		100	90-110			
Cadmium	20200		ng/l	20000		101	90-110			
Calcium	2.48E7		ng/l	2.5000E7		99.3	90-110			
Chromium	247000		ng/l	240000		103	90-110			
Cobalt	50100		ng/l	50000		100	90-110			
Copper	2.05E6		ng/l	2.0000E6		103	90-110			
Iron	2.50E6		ng/l	2.5000E6		99.9	90-110			
Lead	201000		ng/l	200000		101	90-110			
Magnesium	998000		ng/l	1.0000E6		99.8	90-110			
Manganese	497000		ng/l	500000		99.4	90-110			
Molybdenum	50500		ng/l	50000		101	90-110			
Nickel	122000		ng/l	120000		101	90-110			
Phosphorus	192000		ng/l	200000		96.1	90-110			
Potassium	2.44E6		ng/l	2.5000E6		97.5	90-110			
Rubidium	10000		ng/l	10000		100	90-110			
Selenium	19900		ng/l	20000		99.4	90-110			
Sodium	2.56E6		ng/l	2.5000E6		103	90-110			
Strontium	50000		ng/l	50000		100	90-110			

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Batch 2401002 - B4A0205

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Calibration Check (2401002-CCV3) Contir			Prepared & Analyzed: 01/02/24							
Thallium	488		ng/l	500.00		97.7	90-110			
Thorium	494		ng/l	500.00		98.7	90-110			
Uranium	495		ng/l	500.00		99.0	90-110			
Vanadium	20200		ng/l	20000		101	90-110			
Zinc	530000		ng/l	500000		106	90-110			
Calibration Check (2401002-CCV4)			Prepared: 01/02/24 Analyzed: 01/03/24							
Aluminum	1.52E6		ng/l	1.5000E6		101	90-110			
Antimony	20400		ng/l	20000		102	90-110			
Arsenic	20300		ng/l	20000		102	90-110			
Barium	204000		ng/l	200000		102	90-110			
Beryllium	4780		ng/l	5000.0		95.6	90-110			
Cadmium	20600		ng/l	20000		103	90-110			
Calcium	2.53E7		ng/l	2.5000E7		101	90-110			
Chromium	260000		ng/l	240000		108	90-110			
Cobalt	51400		ng/l	50000		103	90-110			
Copper	2.10E6		ng/l	2.0000E6		105	90-110			
Iron	2.55E6		ng/l	2.5000E6		102	90-110			
Lead	203000		ng/l	200000		101	90-110			
Magnesium	1.03E6		ng/l	1.0000E6		103	90-110			
Manganese	509000		ng/l	500000		102	90-110			
Molybdenum	51300		ng/l	50000		103	90-110			
Nickel	124000		ng/l	120000		104	90-110			
Phosphorus	201000		ng/l	200000		101	90-110			
Potassium	2.47E6		ng/l	2.5000E6		98.9	90-110			
Rubidium	10100		ng/l	10000		101	90-110			
Selenium	20100		ng/l	20000		101	90-110			
Sodium	2.64E6		ng/l	2.5000E6		105	90-110			
Strontium	50900		ng/l	50000		102	90-110			
Thallium	487		ng/l	500.00		97.4	90-110			
Thorium	498		ng/l	500.00		99.6	90-110			
Uranium	502		ng/l	500.00		100	90-110			
Vanadium	20800		ng/l	20000		104	90-110			
Zinc	541000		ng/l	500000		108	90-110			
High Cal Check (2401002-HCV1)			Prepared & Analyzed: 01/02/24							
Aluminum	2.95E6		ng/l	3.0000E6		98.3	95-105			
Antimony	40000		ng/l	40000		99.9	95-105			
Arsenic	39900		ng/l	40000		99.8	95-105			
Barium	403000		ng/l	400000		101	95-105			

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Batch 2401002 - B4A0205

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
High Cal Check (2401002-HCV1) Continue				Prepared & Analyzed: 01/02/24						
Beryllium	10400		ng/l	10000		104	95-105			
Cadmium	39600		ng/l	40000		99.1	95-105			
Calcium	4.97E7		ng/l	5.0000E7		99.4	95-105			
Chromium	477000		ng/l	480000		99.3	95-105			
Cobalt	99000		ng/l	100000		99.0	95-105			
Copper	3.95E6		ng/l	4.0000E6		98.8	95-105			
Iron	4.93E6		ng/l	5.0000E6		98.5	95-105			
Lead	400000		ng/l	400000		100	95-105			
Magnesium	1.96E6		ng/l	2.0000E6		98.2	95-105			
Manganese	986000		ng/l	1.0000E6		98.6	95-105			
Molybdenum	99600		ng/l	100000		99.6	95-105			
Nickel	236000		ng/l	240000		98.4	95-105			
Phosphorus	393000		ng/l	400000		98.3	95-105			
Potassium	4.99E6		ng/l	5.0000E6		99.7	95-105			
Rubidium	19800		ng/l	20000		99.2	95-105			
Selenium	39600		ng/l	40000		99.0	95-105			
Sodium	4.90E6		ng/l	5.0000E6		98.0	95-105			
Strontium	99300		ng/l	100000		99.3	95-105			
Thallium	987		ng/l	1000.0		98.7	95-105			
Thorium	996		ng/l	1000.0		99.6	95-105			
Uranium	1000		ng/l	1000.0		100	95-105			
Vanadium	40000		ng/l	40000		100	95-105			
Zinc	1.04E6		ng/l	1.0000E6		104	95-105			
Initial Cal Blank (2401002-ICB1)				Prepared & Analyzed: 01/02/24						
Aluminum	46.2		ng/l							
Antimony	1.67		ng/l							
Arsenic	4.49		ng/l							
Barium	2.17		ng/l							
Beryllium	0.253		ng/l							
Cadmium	0.503		ng/l							
Calcium	524		ng/l							
Chromium	16.1		ng/l							
Cobalt	1.01		ng/l							
Copper	55.6		ng/l							
Iron	31.2		ng/l							
Lead	12.7		ng/l							
Magnesium	-4.87		ng/l							U
Manganese	15.5		ng/l							

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CERTIFICATE OF ANALYSIS

Tetra Tech, Inc.
1777 Sentry Pkwy, Bldg 12
Blue Bell, PA 19422
ATTN: Ms. Chelsea Saber
PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 01/05/24 14:13
SUBMITTED: 12/28/23
AQS SITE CODE:
SITE CODE: Maui fires

Inorganics by Compendium Method IO-3.5 - Quality Control

Batch 2401002 - B4A0205

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Initial Cal Blank (2401002-ICB1) Continu				Prepared & Analyzed: 01/02/24						
Molybdenum	17.2		ng/l							
Nickel	2.94		ng/l							
Phosphorus	-698		ng/l							U
Potassium	461		ng/l							
Rubidium	-0.262		ng/l							U
Selenium	-9.56		ng/l							U
Sodium	-311		ng/l							U
Strontium	-0.423		ng/l							U
Thallium	0.519		ng/l							
Thorium	0.436		ng/l							
Uranium	0.0182		ng/l							
Vanadium	16.8		ng/l							
Zinc	-29.2		ng/l							U
Initial Cal Check (2401002-ICV1)				Prepared & Analyzed: 01/02/24						
Aluminum	1.47E6		ng/l	1.5000E6		97.8	90-110			
Antimony	19900		ng/l	20000		99.3	90-110			
Arsenic	19900		ng/l	20000		99.5	90-110			
Barium	201000		ng/l	200000		101	90-110			
Beryllium	5460		ng/l	5000.0		109	90-110			
Cadmium	20600		ng/l	20000		103	90-110			
Calcium	2.46E7		ng/l	2.5000E7		98.5	90-110			
Chromium	237000		ng/l	240000		98.7	90-110			
Cobalt	50100		ng/l	50000		100	90-110			
Copper	2.02E6		ng/l	2.0000E6		101	90-110			
Iron	2.51E6		ng/l	2.5000E6		100	90-110			
Lead	199000		ng/l	200000		99.3	90-110			
Magnesium	991000		ng/l	1.0000E6		99.1	90-110			
Manganese	497000		ng/l	500000		99.5	90-110			
Molybdenum	49600		ng/l	50000		99.3	90-110			
Nickel	119000		ng/l	120000		99.4	90-110			
Phosphorus	199000		ng/l	200000		99.5	90-110			
Potassium	2.52E6		ng/l	2.5000E6		101	90-110			
Rubidium	9760		ng/l	10000		97.6	90-110			
Selenium	20700		ng/l	20000		104	90-110			
Sodium	2.54E6		ng/l	2.5000E6		102	90-110			
Strontium	50400		ng/l	50000		101	90-110			
Thallium	489		ng/l	500.00		97.9	90-110			
Thorium	484		ng/l	500.00		96.7	90-110			

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Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes

Inorganics by Compendium Method IO-3.5 - Quality Control

Batch 2401002 - B4A0205

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Initial Cal Check (2401002-ICV1) Continu				Prepared & Analyzed: 01/02/24						
Uranium	498		ng/l	500.00		99.6	90-110			
Vanadium	20200		ng/l	20000		101	90-110			
Zinc	532000		ng/l	500000		106	90-110			
Interference Check A (2401002-IFA1)				Prepared & Analyzed: 01/02/24						
Aluminum	1.45E7		ng/l	1.5000E7		96.6	80-120			
Antimony	0.00		ng/l				80-120			U
Arsenic	0.00		ng/l				80-120			U
Barium	0.00		ng/l				80-120			U
Beryllium	0.00		ng/l				80-120			U
Cadmium	0.00		ng/l				80-120			U
Calcium	9.49E7		ng/l	1.0040E8		94.5	80-120			
Chromium	0.00		ng/l				80-120			U
Cobalt	0.00		ng/l				80-120			U
Copper	0.00		ng/l				80-120			U
Iron	1.44E7		ng/l	1.5000E7		95.9	80-120			
Lead	0.00		ng/l				80-120			U
Magnesium	1.53E7		ng/l	1.5000E7		102	80-120			
Manganese	0.00		ng/l				80-120			U
Molybdenum	297000		ng/l	300000		98.9	80-120			
Nickel	0.00		ng/l				80-120			U
Phosphorus	1.60E7		ng/l	1.5000E7		106	80-120			
Potassium	1.44E7		ng/l	1.5000E7		95.7	80-120			
Rubidium	0.00		ng/l				80-120			U
Selenium	0.00		ng/l				80-120			U
Sodium	1.55E7		ng/l	1.5000E7		103	80-120			
Strontium	0.00		ng/l				80-120			U
Thallium	0.00		ng/l				80-120			U
Thorium	0.00		ng/l				80-120			U
Uranium	0.00		ng/l				80-120			U
Vanadium	0.00		ng/l				80-120			U
Zinc	0.00		ng/l				80-120			U
Interference Check B (2401002-IFB1)				Prepared & Analyzed: 01/02/24						
Aluminum	1.65E7		ng/l	1.6500E7		100	80-120			
Antimony	20700		ng/l	20000		103	80-120			
Arsenic	20600		ng/l	20000		103	80-120			
Barium	209000		ng/l	200000		104	80-120			
Beryllium	4590		ng/l	5000.0		91.8	80-120			
Cadmium	20100		ng/l	20000		100	80-120			

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Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes

Inorganics by Compendium Method IO-3.5 - Quality Control

Batch 2401002 - B4A0205

Interference Check B (2401002-IFB1) Co — Prepared & Analyzed: 01/02/24

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Calcium	1.19E8		ng/l	1.2540E8		95.2	80-120			
Chromium	237000		ng/l	240000		98.8	80-120			
Cobalt	50600		ng/l	50000		101	80-120			
Copper	1.94E6		ng/l	2.0000E6		96.9	80-120			
Iron	1.72E7		ng/l	1.7500E7		98.0	80-120			
Lead	209000		ng/l	200000		105	80-120			
Magnesium	1.67E7		ng/l	1.6000E7		104	80-120			
Manganese	527000		ng/l	500000		105	80-120			
Molybdenum	347000		ng/l	350000		99.0	80-120			
Nickel	118000		ng/l	120000		98.6	80-120			
Phosphorus	1.67E7		ng/l	1.5200E7		110	80-120			
Potassium	1.74E7		ng/l	1.7500E7		99.4	80-120			
Rubidium	10400		ng/l	10000		104	80-120			
Selenium	19600		ng/l	20000		97.8	80-120			
Sodium	1.90E7		ng/l	1.7500E7		108	80-120			
Strontium	51900		ng/l	50000		104	80-120			
Thallium	523		ng/l	500.00		105	80-120			
Thorium	551		ng/l	500.00		110	80-120			
Uranium	552		ng/l	500.00		110	80-120			
Vanadium	19600		ng/l	20000		98.2	80-120			
Zinc	494000		ng/l	500000		98.8	80-120			

Batch B4A0205 - ICP-MS Extraction

Blank (B4A0205-BLK1) — Prepared & Analyzed: 01/02/24

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Aluminum	ND	32.1	ng/m³ Air							U
Antimony	ND	0.0441	ng/m³ Air							SL, U
Arsenic	ND	0.00955	ng/m³ Air							U
Barium	ND	0.948	ng/m³ Air							U
Beryllium	ND	0.00332	ng/m³ Air							U
Cadmium	ND	0.109	ng/m³ Air							U
Calcium	ND	292	ng/m³ Air							LJ, QB-01, U
Chromium	ND	2.03	ng/m³ Air							U
Cobalt	ND	0.0156	ng/m³ Air							QB-01, U
Copper	ND	3.00	ng/m³ Air							U
Iron	ND	24.2	ng/m³ Air							U
Lead	ND	0.276	ng/m³ Air							U
Magnesium	ND	96.4	ng/m³ Air							U
Manganese	ND	1.19	ng/m³ Air							U
Molybdenum	ND	0.213	ng/m³ Air							QB-01, U

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Inorganics by Compendium Method IO-3.5 - Quality Control

Batch B4A0205 - ICP-MS Extraction

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (B4A0205-BLK1) Continued				Prepared & Analyzed: 01/02/24						
Nickel	ND	0.801	ng/m³ Air							U
Phosphorus	ND	1250	ng/m³ Air							GC-BS, U
Potassium	ND	38.0	ng/m³ Air							U
Rubidium	ND	0.0183	ng/m³ Air							U
Selenium	ND	0.0110	ng/m³ Air							U
Sodium	ND	2000	ng/m³ Air							GC-BS, U
Strontium	ND	0.652	ng/m³ Air							QB-01, U
Thallium	ND	5.03E-4	ng/m³ Air							U
Thorium	ND	0.00300	ng/m³ Air							U
Uranium	ND	0.0170	ng/m³ Air							U
Vanadium	ND	0.0492	ng/m³ Air							U
Zinc	ND	97.7	ng/m³ Air							U
LCS (B4A0205-BS1)				Prepared & Analyzed: 01/02/24						
Aluminum	93.4	32.1	ng/m³ Air	82.975		113	80-120			
Antimony	0.515	0.0441	ng/m³ Air	1.3829		37.3	80-120			SL
Arsenic	2.72	0.00955	ng/m³ Air	2.7658		98.5	80-120			
Barium	28.4	0.948	ng/m³ Air	27.658		103	80-120			
Beryllium	1.29	0.00332	ng/m³ Air	1.3829		93.2	80-120			
Cadmium	1.38	0.109	ng/m³ Air	1.3829		100	80-120			
Calcium	642	292	ng/m³ Air	69.146		929	80-120			LJ, QB-01
Chromium	16.5	2.03	ng/m³ Air	13.829		119	80-120			
Cobalt	1.38	0.0156	ng/m³ Air	1.3829		99.7	80-120			QB-01
Copper	32.0	3.00	ng/m³ Air	27.658		116	80-120			
Iron	42.6	24.2	ng/m³ Air	27.658		154	80-120			
Lead	13.7	0.276	ng/m³ Air	13.829		99.3	80-120			
Magnesium	ND	96.4	ng/m³ Air	27.658			80-120			U
Manganese	8.94	1.19	ng/m³ Air	8.2975		108	80-120			
Molybdenum	1.65	0.213	ng/m³ Air	1.3829		120	80-120			QB-01
Nickel	3.11	0.801	ng/m³ Air	2.7658		113	80-120			
Phosphorus	ND	1250	ng/m³ Air	13.829			80-120			GC-BS, U
Potassium	68.3	38.0	ng/m³ Air	55.317		124	80-120			
Rubidium	1.35	0.0183	ng/m³ Air	1.3829		97.3	80-120			
Selenium	2.76	0.0110	ng/m³ Air	2.7658		99.7	80-120			
Sodium	ND	2000	ng/m³ Air	55.317			80-120			GC-BS, U
Strontium	2.28	0.652	ng/m³ Air	1.3829		165	80-120			QB-01
Thallium	0.135	5.03E-4	ng/m³ Air	0.13829		97.3	80-120			
Thorium	0.132	0.00300	ng/m³ Air	0.13829		95.6	80-120			
Uranium	0.133	0.0170	ng/m³ Air	0.13829		96.0	80-120			

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Inorganics by Compendium Method IO-3.5 - Quality Control

Batch B4A0205 - ICP-MS Extraction

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
LCS (B4A0205-BS1) Continued				Prepared & Analyzed: 01/02/24						
Vanadium	2.81	0.0492	ng/m³ Air	2.7658		102	80-120			
Zinc	126	97.7	ng/m³ Air	82.975		152	80-120			
Duplicate (B4A0205-DUP1)		**Source: 3122828-09**		Prepared & Analyzed: 01/02/24						
Aluminum	357	26.7	ng/m³ Air		343			4.07	10	
Antimony	0.119	0.0366	ng/m³ Air		0.117			1.44	10	SL
Arsenic	0.159	0.00793	ng/m³ Air		0.144			9.53	10	
Barium	5.62	0.787	ng/m³ Air		5.54			1.34	10	
Beryllium	0.0144	0.00276	ng/m³ Air		0.0136			5.82	10	
Cadmium	ND	0.0905	ng/m³ Air		ND				10	U
Calcium	525	243	ng/m³ Air		516			1.74	10	LJ, QB-01
Chromium	ND	1.69	ng/m³ Air		ND				10	U
Cobalt	0.274	0.0130	ng/m³ Air		0.268			2.27	10	QB-01
Copper	20.2	2.49	ng/m³ Air		18.1			11.2	10	
Iron	492	20.1	ng/m³ Air		467			5.19	10	
Lead	0.285	0.229	ng/m³ Air		0.258			9.69	10	
Magnesium	250	80.1	ng/m³ Air		243			2.89	10	
Manganese	14.4	0.988	ng/m³ Air		14.1			2.32	10	
Molybdenum	0.612	0.177	ng/m³ Air		0.594			2.96	10	QB-01
Nickel	ND	0.665	ng/m³ Air		ND				10	U
Phosphorus	ND	1040	ng/m³ Air		ND				10	GC-BS, U
Potassium	106	31.6	ng/m³ Air		111			4.71	10	
Rubidium	0.172	0.0152	ng/m³ Air		0.167			2.88	10	
Selenium	0.164	0.00914	ng/m³ Air		0.153			6.93	10	
Sodium	1920	1660	ng/m³ Air		1880			2.20	10	E, GC-BS
Strontium	3.77	0.542	ng/m³ Air		3.65			3.17	10	QB-01
Thallium	0.00129	4.18E-4	ng/m³ Air		0.00126			2.31	10	
Thorium	0.0139	0.00249	ng/m³ Air		0.0121			13.3	10	
Uranium	ND	0.0141	ng/m³ Air		ND				10	U
Vanadium	1.47	0.0409	ng/m³ Air		1.41			4.18	10	
Zinc	ND	81.2	ng/m³ Air		ND				10	U
Duplicate (B4A0205-DUP2)		**Source: 3122828-10**		Prepared & Analyzed: 01/02/24						
Aluminum	529	25.6	ng/m³ Air		529			0.00114	10	
Antimony	0.113	0.0351	ng/m³ Air		0.112			0.395	10	SL
Arsenic	0.209	0.00761	ng/m³ Air		0.209			0.311	10	
Barium	7.28	0.755	ng/m³ Air		7.29			0.206	10	
Beryllium	0.0175	0.00265	ng/m³ Air		0.0177			1.21	10	
Cadmium	ND	0.0869	ng/m³ Air		ND				10	U
Calcium	525	233	ng/m³ Air		521			0.750	10	LJ, QB-01

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Inorganics by Compendium Method IO-3.5 - Quality Control

Batch B4A0205 - ICP-MS Extraction

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Duplicate (B4A0205-DUP2) Continued		**Source: 3122828-10**		Prepared & Analyzed: 01/02/24						
Chromium	ND	1.62	ng/m³ Air		ND				10	U
Cobalt	0.311	0.0124	ng/m³ Air		0.313			0.667	10	QB-01
Copper	9.31	2.39	ng/m³ Air		9.25			0.646	10	
Iron	632	19.3	ng/m³ Air		635			0.546	10	
Lead	0.296	0.220	ng/m³ Air		0.299			1.02	10	
Magnesium	261	76.8	ng/m³ Air		260			0.667	10	
Manganese	18.3	0.948	ng/m³ Air		18.3			0.0661	10	
Molybdenum	0.608	0.170	ng/m³ Air		0.609			0.0869	10	QB-01
Nickel	0.689	0.638	ng/m³ Air		0.687			0.249	10	
Phosphorus	ND	996	ng/m³ Air		ND				10	GC-BS, U
Potassium	133	30.3	ng/m³ Air		132			0.936	10	
Rubidium	0.248	0.0146	ng/m³ Air		0.245			1.11	10	
Selenium	0.181	0.00877	ng/m³ Air		0.176			2.41	10	
Sodium	1950	1590	ng/m³ Air		1960			0.630	10	E, GC-BS
Strontium	4.41	0.520	ng/m³ Air		4.45			0.722	10	QB-01
Thallium	0.00140	4.01E-4	ng/m³ Air		0.00146			4.19	10	
Thorium	0.0194	0.00239	ng/m³ Air		0.0194			0.266	10	
Uranium	ND	0.0135	ng/m³ Air		0.0136				10	U
Vanadium	1.86	0.0392	ng/m³ Air		1.86			0.114	10	
Zinc	ND	77.9	ng/m³ Air		ND				10	U
Matrix Spike (B4A0205-MS1)		**Source: 3122828-09**		Prepared & Analyzed: 01/02/24						
Aluminum	426	26.7	ng/m³ Air	68.919	343	121	80-120			QM-4X
Antimony	0.850	0.0366	ng/m³ Air	1.1487	0.117	63.8	80-120			SL
Arsenic	2.40	0.00793	ng/m³ Air	2.2973	0.144	98.2	80-120			
Barium	28.9	0.787	ng/m³ Air	22.973	5.54	102	80-120			
Beryllium	1.07	0.00276	ng/m³ Air	1.1487	0.0136	92.1	80-120			
Cadmium	1.17	0.0905	ng/m³ Air	1.1487	ND	102	80-120			
Calcium	592	243	ng/m³ Air	57.433	516	132	80-120			LJ, QB-01, QM-4X
Chromium	13.3	1.69	ng/m³ Air	11.487	ND	116	80-120			
Cobalt	1.40	0.0130	ng/m³ Air	1.1487	0.268	98.9	80-120			QB-01
Copper	46.4	2.49	ng/m³ Air	22.973	18.1	123	80-120			QM-07
Iron	517	20.1	ng/m³ Air	22.973	467	217	80-120			QM-4X
Lead	11.8	0.229	ng/m³ Air	11.487	0.258	101	80-120			
Magnesium	274	80.1	ng/m³ Air	22.973	243	135	80-120			QM-4X
Manganese	21.7	0.988	ng/m³ Air	6.8919	14.1	111	80-120			
Molybdenum	1.71	0.177	ng/m³ Air	1.1487	0.594	97.2	80-120			QB-01
Nickel	2.94	0.665	ng/m³ Air	2.2973	ND	128	80-120			

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1777 Sentry Pkwy, Bldg 12
Blue Bell, PA 19422
ATTN: Ms. Chelsea Saber
PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 01/05/24 14:13
SUBMITTED: 12/28/23
AQS SITE CODE:
SITE CODE: Maui fires

Inorganics by Compendium Method IO-3.5 - Quality Control

Batch B4A0205 - ICP-MS Extraction

Matrix Spike (B4A0205-MS1) Continued **Source: 3122828-09** Prepared & Analyzed: 01/02/24

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Phosphorus	ND	1040	ng/m³ Air	11.487	ND		80-120			GC-BS, U
Potassium	151	31.6	ng/m³ Air	45.946	111	88.2	80-120			
Rubidium	1.25	0.0152	ng/m³ Air	1.1487	0.167	94.1	80-120			
Selenium	2.40	0.00914	ng/m³ Air	2.2973	0.153	97.8	80-120			
Sodium	1980	1660	ng/m³ Air	45.946	1880	215	80-120			E, GC-BS, QM-4X
Strontium	4.89	0.542	ng/m³ Air	1.1487	3.65	108	80-120			QB-01
Thallium	0.115	4.18E-4	ng/m³ Air	0.11487	0.00126	98.7	80-120			
Thorium	0.0649	0.00249	ng/m³ Air	0.11487	0.0121	45.9	80-120			QM-07
Uranium	0.121	0.0141	ng/m³ Air	0.11487	ND	106	80-120			
Vanadium	3.76	0.0409	ng/m³ Air	2.2973	1.41	102	80-120			
Zinc	107	81.2	ng/m³ Air	68.919	ND	156	80-120			

Matrix Spike Dup (B4A0205-MSD1) **Source: 3122828-09** Prepared & Analyzed: 01/02/24

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Aluminum	430	26.7	ng/m³ Air	68.919	343	127	80-120	0.963	20	QM-4X
Antimony	0.830	0.0366	ng/m³ Air	1.1487	0.117	62.0	80-120	2.46	20	SL
Arsenic	2.37	0.00793	ng/m³ Air	2.2973	0.144	97.0	80-120	1.18	20	
Barium	28.8	0.787	ng/m³ Air	22.973	5.54	101	80-120	0.412	20	
Beryllium	1.09	0.00276	ng/m³ Air	1.1487	0.0136	94.1	80-120	2.12	20	
Cadmium	1.15	0.0905	ng/m³ Air	1.1487	ND	99.8	80-120	2.31	20	
Calcium	593	243	ng/m³ Air	57.433	516	134	80-120	0.245	20	LJ, QB-01, QM-4X
Chromium	13.1	1.69	ng/m³ Air	11.487	ND	114	80-120	1.68	20	
Cobalt	1.40	0.0130	ng/m³ Air	1.1487	0.268	98.1	80-120	0.658	20	QB-01
Copper	45.9	2.49	ng/m³ Air	22.973	18.1	121	80-120	0.946	20	QM-07
Iron	511	20.1	ng/m³ Air	22.973	467	189	80-120	1.26	20	QM-4X
Lead	11.7	0.229	ng/m³ Air	11.487	0.258	99.9	80-120	0.852	20	
Magnesium	277	80.1	ng/m³ Air	22.973	243	146	80-120	0.962	20	QM-4X
Manganese	21.9	0.988	ng/m³ Air	6.8919	14.1	113	80-120	0.609	20	
Molybdenum	1.67	0.177	ng/m³ Air	1.1487	0.594	93.6	80-120	2.46	20	QB-01
Nickel	2.92	0.665	ng/m³ Air	2.2973	ND	127	80-120	0.884	20	
Phosphorus	ND	1040	ng/m³ Air	11.487	ND		80-120		20	GC-BS, U
Potassium	144	31.6	ng/m³ Air	45.946	111	73.2	80-120	4.64	20	QM-07
Rubidium	1.24	0.0152	ng/m³ Air	1.1487	0.167	93.0	80-120	0.996	20	
Selenium	2.43	0.00914	ng/m³ Air	2.2973	0.153	99.1	80-120	1.24	20	
Sodium	2000	1660	ng/m³ Air	45.946	1880	265	80-120	1.17	20	E, GC-BS, QM-4X
Strontium	4.93	0.542	ng/m³ Air	1.1487	3.65	111	80-120	0.728	20	QB-01
Thallium	0.113	4.18E-4	ng/m³ Air	0.11487	0.00126	97.4	80-120	1.33	20	
Thorium	0.0625	0.00249	ng/m³ Air	0.11487	0.0121	43.8	80-120	3.78	20	QM-07

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Blue Bell, PA 19422
ATTN: Ms. Chelsea Saber
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FILE #: 0000.00
REPORTED: 01/05/24 14:13
SUBMITTED: 12/28/23
AQS SITE CODE:
SITE CODE: Maui fires

Inorganics by Compendium Method IO-3.5 - Quality Control

Batch B4A0205 - ICP-MS Extraction

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Matrix Spike Dup (B4A0205-MSD1) Conti Source: 3122828-09				Prepared & Analyzed: 01/02/24						
Uranium	0.120	0.0141	ng/m³ Air	0.11487	ND	104	80-120	1.42	20	
Vanadium	3.75	0.0409	ng/m³ Air	2.2973	1.41	102	80-120	0.226	20	
Zinc	106	81.2	ng/m³ Air	68.919	ND	154	80-120	0.996	20	
Post Spike (B4A0205-PS1) Source: 3122828-09				Prepared & Analyzed: 01/02/24						
Aluminum	371	26.7	ng/m³ Air	22.973	343	123	75-125			
Antimony	0.346	0.0366	ng/m³ Air	0.22973	0.117	99.3	75-125			SL
Arsenic	1.26	0.00793	ng/m³ Air	1.1487	0.144	96.7	75-125			
Barium	7.90	0.787	ng/m³ Air	2.2973	5.54	102	75-125			
Beryllium	0.229	0.00276	ng/m³ Air	0.22973	0.0136	93.9	75-125			
Cadmium	0.123	0.0905	ng/m³ Air	0.11487	ND	107	75-125			
Calcium	558	243	ng/m³ Air	22.973	516	182	75-125			A-01, LJ, QB-01
Chromium	2.28	1.69	ng/m³ Air	1.1487	ND	198	75-125			
Cobalt	0.501	0.0130	ng/m³ Air	0.22973	0.268	101	75-125			QB-01
Copper	30.7	2.49	ng/m³ Air	11.487	18.1	110	75-125			
Iron	496	20.1	ng/m³ Air	22.973	467	126	75-125			A-01
Lead	23.1	0.229	ng/m³ Air	22.973	0.258	99.3	75-125			
Magnesium	269	80.1	ng/m³ Air	22.973	243	112	75-125			
Manganese	16.6	0.988	ng/m³ Air	2.2973	14.1	109	75-125			
Molybdenum	1.68	0.177	ng/m³ Air	1.1487	0.594	94.7	75-125			QB-01
Nickel	2.88	0.665	ng/m³ Air	2.2973	ND	125	75-125			
Phosphorus	ND	1040	ng/m³ Air	4.5946	ND		75-125			A-01, GC-BS, U
Potassium	134	31.6	ng/m³ Air	22.973	111	100	75-125			
Rubidium	0.270	0.0152	ng/m³ Air	0.11487	0.167	90.0	75-125			
Selenium	1.27	0.00914	ng/m³ Air	1.1487	0.153	97.3	75-125			
Sodium	1920	1660	ng/m³ Air	22.973	1880	185	75-125			A-01, E, GC-BS
Strontium	4.78	0.542	ng/m³ Air	1.1487	3.65	98.5	75-125			QB-01
Thallium	0.0559	4.18E-4	ng/m³ Air	5.7433E-2	0.00126	95.1	75-125			
Thorium	0.0663	0.00249	ng/m³ Air	5.7433E-2	0.0121	94.3	75-125			
Uranium	0.0649	0.0141	ng/m³ Air	5.7433E-2	ND	113	75-125			
Vanadium	2.55	0.0409	ng/m³ Air	1.1487	1.41	99.9	75-125			
Zinc	ND	81.2	ng/m³ Air	22.973	ND		75-125			U
Dilution Check (B4A0205-SRL1) Source: 3122828-09				Prepared & Analyzed: 01/02/24						
Aluminum	329	133	ng/m³ Air		343			4.01	10	
Antimony	ND	0.183	ng/m³ Air		ND				10	SL, U
Arsenic	0.145	0.0397	ng/m³ Air		0.144			0.426	10	
Barium	5.38	3.94	ng/m³ Air		5.54			2.98	10	

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Tetra Tech, Inc.
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Blue Bell, PA 19422
ATTN: Ms. Chelsea Saber
PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 01/05/24 14:13
SUBMITTED: 12/28/23
AQS SITE CODE:
SITE CODE: Maui fires

Inorganics by Compendium Method IO-3.5 - Quality Control

Batch B4A0205 - ICP-MS Extraction

Dilution Check (B4A0205-SRL1) Continue Source: 3122828-09 Prepared & Analyzed: 01/02/24

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Beryllium	0.0150	0.0138	ng/m³ Air		ND			9.86	10	
Cadmium	ND	0.453	ng/m³ Air		ND				10	U
Calcium	ND	1210	ng/m³ Air		ND				10	LJ, QB-01, U
Chromium	ND	8.43	ng/m³ Air		ND				10	U
Cobalt	0.263	0.0648	ng/m³ Air		0.268			2.05	10	QB-01
Copper	17.8	12.5	ng/m³ Air		18.1			1.62	10	
Iron	455	101	ng/m³ Air		467			2.65	10	
Lead	ND	1.15	ng/m³ Air		ND				10	U
Magnesium	ND	400	ng/m³ Air		ND				10	U
Manganese	13.7	4.94	ng/m³ Air		14.1			2.95	10	
Molybdenum	ND	0.885	ng/m³ Air		ND				10	QB-01, U
Nickel	ND	3.33	ng/m³ Air		ND				10	U
Phosphorus	ND	5190	ng/m³ Air		ND				10	GC-BS, U
Potassium	ND	158	ng/m³ Air		ND				10	U
Rubidium	0.163	0.0760	ng/m³ Air		0.167			2.21	10	
Selenium	0.167	0.0457	ng/m³ Air		0.153			8.95	10	
Sodium	ND	8310	ng/m³ Air		ND				10	GC-BS, U
Strontium	3.57	2.71	ng/m³ Air		3.65			2.08	10	QB-01
Thallium	ND	0.00209	ng/m³ Air		ND				10	U
Thorium	ND	0.0125	ng/m³ Air		ND				10	U
Uranium	ND	0.0706	ng/m³ Air		ND				10	U
Vanadium	1.38	0.204	ng/m³ Air		1.41			1.78	10	
Zinc	ND	406	ng/m³ Air		ND				10	U

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FILE #: 0000.00
REPORTED: 01/05/24 14:13
SUBMITTED: 12/28/23
AQS SITE CODE:
SITE CODE: Maui fires

Notes and Definitions

U	Under Detection Limit
SL	The spike recovery was outside acceptance limits. Reported value may be biased low.
QM-4X	The MS/MSD recovery exceeds criteria because the parent sample concentration is greater than 4x the spike concentration. Sample results for the QC batch were accepted based on acceptable BS/BSD recoveries.
QM-07	The spike recovery was outside acceptance limits for the MS and/or MSD. The batch was accepted based on acceptable LCS recovery.
QB-01	Analyte exceeds method blank criteria
LJ	Identification of analyte is acceptable; reported value is an estimate.
GC-BS	Compound exceeds Blank Spike Criteria
FB-01	Analyte exceeds Field Blank criteria.
E	The concentration indicated for this analyte is an estimated value above the calibration range of the instrument. This value is considered an estimate (CLP E-flag).
A-01	Parent sample >4x spike
ND	Analyte NOT DETECTED
NR	Not Reported
MDL	Method Detection Limit
RPD	Relative Percent Difference

Note: This test is accredited under the 2016 TNI Standard.

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Stage 1 Data Verification Checklist - Metals

HDOH CAB – Ambient Community Air Sampling – Kula

Task Order No. 23141

Reviewed by:
Trinh Vu 01/08/2024 & Shanna Vasser 1/9/2024
Laboratory: Eastern Research Group – Morrisville, NC
Analysis Date: 01/02/2024 and 01/03/2024
Report No: 3122828

√ 1. Chain of custody (CoC) documentation is present.

X 2. Sample receipt condition information is present and acceptable.

√ 3. Laboratory conducting the analysis is identified.

√ 4. All samples submitted to the laboratory are accounted for.

√ 5. Requested analytical methods were performed.

√ 6. Analysis dates are provided.

√ 7. Analyte results are provided.

√ 8. Result qualifiers and definitions are provided.

√ 9. Result units are reported.

NA 10. Requested reporting limits are present.

√ 11. Method detection limits are present.

√ 12. Sample collection date and time are present.

Discrepancies:

1. Samples MFK-AM01-122323-HM and MFK-AM03-122323-HM were swapped on the CoC. The laboratory logged the samples in as they were received and matched them with the correct physical filters and labels.

Notes:

10. No reporting limits were included in the data package.

Stage 1 Data Verification Checklist - Metals

HDOH CAB – Ambient Community Air Sampling – Kula

Task Order No. 23141

Reviewed by:

Trinh Vu 01/09/2024 & Shanna Vasser 1/10/2024

Laboratory: Eastern Research Group – Morrisville, NC

Analysis Date: 01/04/2024

Report No: 4010214

√	1.	Chain of custody (CoC) documentation is present.
X	2.	Sample receipt condition information is present and acceptable.
√	3.	Laboratory conducting the analysis is identified.
√	4.	All samples submitted to the laboratory are accounted for.
√	5.	Requested analytical methods were performed.
√	6.	Analysis dates are provided.
√	7.	Analyte results are provided.
√	8.	Result qualifiers and definitions are provided.
√	9.	Result units are reported.
NA	10.	Requested reporting limits are present.
√	11.	Method detection limits are present.
√	12.	Sample collection date and time are present.

Discrepancies: None

Notes:

10. No reporting limits were included in the data package.

Eastern Research Group
601 Keystone Park Drive
Suite 700
Morrisville, NC 27560

January 09, 2024

Ms. Chelsea Saber
Tetra Tech, Inc.
1777 Sentry Pkwy, Bldg 12
Blue Bell, PA 19422
Project Name: Maui fires

Dear Ms. Chelsea Saber,

This report contains the analytical results for the sample(s) received under chain(s) of custody by Eastern Research Group on 01/02/24 11:20 through 01/03/24 12:50.

Values below the MDL for QC results in this report are recorded as ND, however the actual values are reported in the accompanying Excel report with a "U" flag (Under the detection limit). The actual values are reported in AQS.

This test is accredited under the 2016 TNI Standard for Environmental Laboratories (FL DOH Certification # E87673). All analyses were performed as described in the US EPA-approved QAPP, under the contract for National Hazardous Air Pollutant Support (US EPA Contract No. 68HERH22D0002). This cover page is an integral part of this report, and any exceptions or comments are noted on the last page.

Release of the data contained in this data package and in the data submitted in the electronic data deliverable, has been authorized by the Program Manager, or the Program Manager's designee as verified by the following signature.

The issuance of the final Certificate of Analysis takes precedence over any previous Report. If you have any questions, please contact me at 919-468-7924.

Sincerely,

Julie Swift
Program Manager
julie.swift@erg.com

The information contained in this report and its attachment(s) are intended only for the use of the individual to whom it is addressed and may contain information that is privileged, confidential, or exempt from disclosure. If the reader of this message is not the intended recipient, you are hereby notified that any dissemination, distribution, or copying of this report is strictly prohibited. If you have received this report in error, please notify julie.swift@erg.com and delete the report without retaining any copies.

CERTIFICATE OF ANALYSIS

Tetra Tech, Inc.
1777 Sentry Pkwy, Bldg 12
Blue Bell, PA 19422
ATTN: Ms. Chelsea Saber
PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 01/09/24 12:34
SUBMITTED: 01/02/24 to 01/03/24
AQS SITE CODE:
SITE CODE: Maui fires

ANALYTICAL REPORT FOR SAMPLES

SampleName	LabNumber	Matrix	Sampled	Received
TetraTech Q9524471	4010214-01	Air	12/27/23 23:59	01/02/24 11:20
TetraTech Q9524470	4010214-02	Air	12/27/23 23:59	01/02/24 11:20
TetraTech Q9524472	4010214-03	Air	12/27/23 23:59	01/02/24 11:20
TetraTech Q9524467 FB	4010214-04	Air	12/27/23 00:00	01/02/24 11:20
TetraTech Q9524473	4010353-01	Air	12/28/23 23:59	01/03/24 12:50
TetraTech Q9524468	4010353-02	Air	12/28/23 23:59	01/03/24 12:50
TetraTech Q9524465	4010353-03	Air	12/28/23 23:59	01/03/24 12:50
TetraTech Q9524466	4010353-04	Air	12/29/23 23:59	01/03/24 12:50
TetraTech Q9524474	4010353-05	Air	12/29/23 23:59	01/03/24 12:50
TetraTech Q9524464	4010353-06	Air	12/29/23 23:59	01/03/24 12:50

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FILE #: 0000.00
REPORTED: 01/09/24 12:34
SUBMITTED: 01/02/24 to 01/03/24
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9524471
Matrix: Air
Lab ID: 4010214-01
Sample Volume: 2034.182 m³
Filter ID:
Sampled: 12/27/23 23:59
Received: 01/02/24 11:20
Analysis Date: 01/04/24 19:48
Comments: MFK-AM01-122723-HM

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	**7429-90-5**	**189**		**25.7**
Antimony	**7440-36-0**	**0.0662**	SL	**0.0353**
Arsenic	**7440-38-2**	**0.0606**		**0.00764**
Barium	**7440-39-3**	**3.12**		**0.758**
Beryllium	**7440-41-7**	**0.00616**		**0.00266**
Cadmium	7440-43-9	0.00521	U	0.0872
Calcium	7440-70-2	214	GC-BS, LJ, QB-01, U	234
Chromium	7440-47-3	0.798	U	1.62
Cobalt	**7440-48-4**	**0.0886**	QB-01	**0.0125**
Copper	**7440-50-8**	**18.4**		**2.40**
Iron	**7439-89-6**	**203**		**19.4**
Lead	7439-92-1	0.205	U	0.221
Magnesium	7439-95-4	44.9	U	77.1
Manganese	**7439-96-5**	**5.59**		**0.952**
Molybdenum	**7439-98-7**	**0.614**	QB-01	**0.170**
Nickel	7440-02-0	0.589	U	0.641
Phosphorus	7723-14-0	186	GC-BS, U	1000
Potassium	**7440-09-7**	**48.7**		**30.4**
Rubidium	**7440-17-7**	**0.0902**		**0.0146**
Selenium	**7782-49-2**	**0.0336**		**0.00880**
Sodium	7440-23-5	567	GC-BS, U	1600
Strontium	**7440-24-6**	**1.17**	QB-01	**0.521**
Thallium	**7440-28-0**	**5.98E-4**		**4.02E-4**
Thorium	**7440-29-01**	**0.00491**		**0.00240**
Uranium	7440-61-1	0.00441	U	0.0136
Vanadium	**7440-62-2**	**0.477**		**0.0394**
Zinc	7440-66-6	27.9	U	78.1

Eastern Research Group

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Blue Bell, PA 19422
ATTN: Ms. Chelsea Saber
PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 01/09/24 12:34
SUBMITTED: 01/02/24 to 01/03/24
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9524470 **Lab ID:** 4010214-02 **Sampled:** 12/27/23 23:59
Matrix: Air **Sample Volume:** 1005.15 m³ **Received:** 01/02/24 11:20
Filter ID: **Analysis Date:** 01/04/24 17:16
Comments: MFK-AM02-122723-HM-MS-MSD

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	**7429-90-5**	**380**		**52.0**
Antimony	**7440-36-0**	**0.126**	SL	**0.0714**
Arsenic	**7440-38-2**	**0.198**		**0.0155**
Barium	**7440-39-3**	**5.72**		**1.53**
Beryllium	**7440-41-7**	**0.0134**		**0.00537**
Cadmium	7440-43-9	0.0441	U	0.176
Calcium	7440-70-2	459	A-01, GC-BS, LJ, QB-01, QM-4X, U	473
Chromium	7440-47-3	1.54	U	3.29
Cobalt	**7440-48-4**	**0.177**	QB-01	**0.0253**
Copper	**7440-50-8**	**25.0**	QM-07	**4.86**
Iron	**7439-89-6**	**406**		**39.2**
Lead	7439-92-1	0.274	U	0.447
Magnesium	7439-95-4	96.2	U	156
Manganese	**7439-96-5**	**11.1**		**1.93**
Molybdenum	**7439-98-7**	**1.44**	QB-01	**0.345**
Nickel	7440-02-0	0.569	U	1.30
Phosphorus	7723-14-0	369	GC-BS, QM-4X, U	2020
Potassium	**7440-09-7**	**119**	QM-07	**61.5**
Rubidium	**7440-17-7**	**0.193**		**0.0296**
Selenium	**7782-49-2**	**0.0744**		**0.0178**
Sodium	7440-23-5	1140	GC-BS, QM-4X, U	3240
Strontium	**7440-24-6**	**2.74**	QB-01	**1.06**
Thallium	**7440-28-0**	**0.00115**		**8.14E-4**
Thorium	**7440-29-01**	**0.0123**	QM-07	**0.00486**
Uranium	7440-61-1	0.00913	U	0.0275
Vanadium	**7440-62-2**	**1.01**		**0.0796**
Zinc	7440-66-6	52.3	U	158

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FILE #: 0000.00
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SUBMITTED: 01/02/24 to 01/03/24
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9524472 **Lab ID:** 4010214-03 **Sampled:** 12/27/23 23:59
Matrix: Air **Sample Volume:** 1028.79 m³ **Received:** 01/02/24 11:20
Filter ID: **Analysis Date:** 01/04/24 20:07
Comments: MFK-AM03-122723-HM

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	**7429-90-5**	**390**		**50.8**
Antimony	**7440-36-0**	**0.168**	SL	**0.0697**
Arsenic	**7440-38-2**	**0.139**		**0.0151**
Barium	**7440-39-3**	**7.64**		**1.50**
Beryllium	**7440-41-7**	**0.0182**		**0.00525**
Cadmium	7440-43-9	0.00857	U	0.172
Calcium	7440-70-2	457	GC-BS, LJ, QB-01, U	462
Chromium	7440-47-3	1.56	U	3.21
Cobalt	**7440-48-4**	**0.205**	QB-01	**0.0247**
Copper	**7440-50-8**	**41.0**		**4.74**
Iron	**7439-89-6**	**460**		**38.3**
Lead	7439-92-1	0.271	U	0.436
Magnesium	7439-95-4	132	U	152
Manganese	**7439-96-5**	**14.0**		**1.88**
Molybdenum	**7439-98-7**	**2.46**	QB-01	**0.337**
Nickel	7440-02-0	0.665	U	1.27
Phosphorus	7723-14-0	370	GC-BS, U	1980
Potassium	**7440-09-7**	**191**		**60.1**
Rubidium	**7440-17-7**	**0.254**		**0.0289**
Selenium	**7782-49-2**	**0.0963**		**0.0174**
Sodium	7440-23-5	1260	GC-BS, U	3160
Strontium	**7440-24-6**	**3.46**	QB-01	**1.03**
Thallium	**7440-28-0**	**0.00129**		**7.95E-4**
Thorium	**7440-29-01**	**0.0142**		**0.00474**
Uranium	7440-61-1	0.00993	U	0.0269
Vanadium	**7440-62-2**	**1.12**		**0.0778**
Zinc	7440-66-6	50.5	U	155

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AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9524467 FB **Lab ID:** 4010214-04 **Sampled:** 12/27/23 00:00
Matrix: Air **Sample Volume:** 2034.182 m³ **Received:** 01/02/24 11:20
Filter ID: **Analysis Date:** 01/04/24 20:21
Comments: MFK-FB01-122723-HM Field Blank

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	7429-90-5	9.36	U	25.7
Antimony	7440-36-0	0.0145	SL, U	0.0353
Arsenic	7440-38-2	0.00300	U	0.00764
Barium	**7440-39-3**	**0.955**	FB-01	**0.758**
Beryllium	7440-41-7	5.60E-4	U	0.00266
Cadmium	7440-43-9	0.00214	U	0.0872
Calcium	7440-70-2	138	GC-BS, LJ, QB-01, U	234
Chromium	7440-47-3	0.638	U	1.62
Cobalt	7440-48-4	0.00787	QB-01, U	0.0125
Copper	7440-50-8	0.206	U	2.40
Iron	7439-89-6	11.3	U	19.4
Lead	7439-92-1	0.0345	U	0.221
Magnesium	7439-95-4	22.0	U	77.1
Manganese	7439-96-5	0.151	U	0.952
Molybdenum	7439-98-7	0.0872	QB-01, U	0.170
Nickel	7440-02-0	0.238	U	0.641
Phosphorus	7723-14-0	155	GC-BS, U	1000
Potassium	7440-09-7	10.9	U	30.4
Rubidium	7440-17-7	0.00669	U	0.0146
Selenium	7782-49-2	ND	U	0.00880
Sodium	7440-23-5	502	GC-BS, U	1600
Strontium	7440-24-6	0.337	QB-01, U	0.521
Thallium	7440-28-0	1.97E-4	U	4.02E-4
Thorium	7440-29-01	0.00199	U	0.00240
Uranium	7440-61-1	6.31E-4	U	0.0136
Vanadium	7440-62-2	0.0113	U	0.0394
Zinc	7440-66-6	18.9	U	78.1

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AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9524473 **Lab ID:** 4010353-01 **Sampled:** 12/28/23 23:59
Matrix: Air **Sample Volume:** 2057.307 m³ **Received:** 01/03/24 12:50
Filter ID: **Analysis Date:** 01/04/24 20:36
Comments: MFK-AM01-122823-HM

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	**7429-90-5**	**182**		**25.4**
Antimony	**7440-36-0**	**0.0587**	SL	**0.0349**
Arsenic	**7440-38-2**	**0.0749**		**0.00755**
Barium	**7440-39-3**	**2.69**		**0.750**
Beryllium	**7440-41-7**	**0.00613**		**0.00263**
Cadmium	7440-43-9	0.00639	U	0.0862
Calcium	**7440-70-2**	**296**	GC-BS, LJ, QB-01	**231**
Chromium	7440-47-3	0.791	U	1.61
Cobalt	**7440-48-4**	**0.0860**	QB-01	**0.0123**
Copper	**7440-50-8**	**17.5**		**2.37**
Iron	**7439-89-6**	**203**		**19.1**
Lead	7439-92-1	0.207	U	0.218
Magnesium	**7439-95-4**	**169**		**76.2**
Manganese	**7439-96-5**	**5.25**		**0.941**
Molybdenum	**7439-98-7**	**0.584**	QB-01	**0.168**
Nickel	7440-02-0	0.352	U	0.633
Phosphorus	7723-14-0	181	GC-BS, U	989
Potassium	**7440-09-7**	**81.8**		**30.1**
Rubidium	**7440-17-7**	**0.102**		**0.0145**
Selenium	**7782-49-2**	**0.0917**		**0.00870**
Sodium	7440-23-5	1550	GC-BS, U	1580
Strontium	**7440-24-6**	**1.95**	QB-01	**0.516**
Thallium	**7440-28-0**	**6.94E-4**		**3.98E-4**
Thorium	**7440-29-01**	**0.00575**		**0.00237**
Uranium	7440-61-1	0.00511	U	0.0134
Vanadium	**7440-62-2**	**0.637**		**0.0389**
Zinc	7440-66-6	22.8	U	77.3

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AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9524468 **Lab ID:** 4010353-02 **Sampled:** 12/28/23 23:59
Matrix: Air **Sample Volume:** 2153.885 m³ **Received:** 01/03/24 12:50
Filter ID: **Analysis Date:** 01/04/24 20:51
Comments: MFK-AM02-122823-HM

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	**7429-90-5**	**258**		**24.2**
Antimony	**7440-36-0**	**0.0586**	SL	**0.0333**
Arsenic	**7440-38-2**	**0.0820**		**0.00721**
Barium	**7440-39-3**	**3.47**		**0.716**
Beryllium	**7440-41-7**	**0.00848**		**0.00251**
Cadmium	7440-43-9	0.00535	U	0.0823
Calcium	**7440-70-2**	**277**	GC-BS, LJ, QB-01	**221**
Chromium	7440-47-3	0.787	U	1.53
Cobalt	**7440-48-4**	**0.102**	QB-01	**0.0118**
Copper	**7440-50-8**	**10.0**		**2.27**
Iron	**7439-89-6**	**268**		**18.3**
Lead	7439-92-1	0.195	U	0.208
Magnesium	**7439-95-4**	**191**		**72.8**
Manganese	**7439-96-5**	**6.63**		**0.899**
Molybdenum	**7439-98-7**	**0.626**	QB-01	**0.161**
Nickel	7440-02-0	0.376	U	0.605
Phosphorus	7723-14-0	176	GC-BS, U	944
Potassium	**7440-09-7**	**91.2**		**28.7**
Rubidium	**7440-17-7**	**0.114**		**0.0138**
Selenium	**7782-49-2**	**0.113**		**0.00831**
Sodium	**7440-23-5**	**1710**	E, GC-BS	**1510**
Strontium	**7440-24-6**	**2.27**	QB-01	**0.493**
Thallium	**7440-28-0**	**8.09E-4**		**3.80E-4**
Thorium	**7440-29-01**	**0.00754**		**0.00227**
Uranium	7440-61-1	0.00661	U	0.0128
Vanadium	**7440-62-2**	**0.771**		**0.0372**
Zinc	7440-66-6	19.9	U	73.8

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AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9524465 **Lab ID:** 4010353-03 **Sampled:** 12/28/23 23:59
Matrix: Air **Sample Volume:** 2322.877 m³ **Received:** 01/03/24 12:50
Filter ID: **Analysis Date:** 01/04/24 21:05
Comments: MFK-AM03-122823-HM

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	**7429-90-5**	**385**		**22.5**
Antimony	**7440-36-0**	**0.0902**	SL	**0.0309**
Arsenic	**7440-38-2**	**0.109**		**0.00669**
Barium	**7440-39-3**	**6.11**		**0.664**
Beryllium	**7440-41-7**	**0.0177**		**0.00233**
Cadmium	7440-43-9	0.00942	U	0.0763
Calcium	**7440-70-2**	**308**	GC-BS, LJ, QB-01	**205**
Chromium	7440-47-3	0.907	U	1.42
Cobalt	**7440-48-4**	**0.187**	QB-01	**0.0109**
Copper	**7440-50-8**	**19.4**		**2.10**
Iron	**7439-89-6**	**463**		**17.0**
Lead	**7439-92-1**	**0.574**		**0.193**
Magnesium	**7439-95-4**	**223**		**67.5**
Manganese	**7439-96-5**	**14.7**		**0.834**
Molybdenum	**7439-98-7**	**0.705**	QB-01	**0.149**
Nickel	7440-02-0	0.436	U	0.561
Phosphorus	7723-14-0	193	GC-BS, U	876
Potassium	**7440-09-7**	**113**		**26.6**
Rubidium	**7440-17-7**	**0.171**		**0.0128**
Selenium	**7782-49-2**	**0.143**		**0.00770**
Sodium	**7440-23-5**	**1780**	E, GC-BS	**1400**
Strontium	**7440-24-6**	**3.59**	QB-01	**0.457**
Thallium	**7440-28-0**	**0.00140**		**3.52E-4**
Thorium	**7440-29-01**	**0.0120**		**0.00210**
Uranium	**7440-61-1**	**0.0124**		**0.0119**
Vanadium	**7440-62-2**	**1.08**		**0.0345**
Zinc	7440-66-6	23.7	U	68.4

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FILE #: 0000.00
REPORTED: 01/09/24 12:34
SUBMITTED: 01/02/24 to 01/03/24
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9524466 **Lab ID:** 4010353-04 **Sampled:** 12/29/23 23:59
Matrix: Air **Sample Volume:** 1666.744 m³ **Received:** 01/03/24 12:50
Filter ID: **Analysis Date:** 01/04/24 21:21
Comments: MFK-AM01-122923-HM

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	**7429-90-5**	**360**		**31.3**
Antimony	**7440-36-0**	**0.0919**	SL	**0.0430**
Arsenic	**7440-38-2**	**0.0788**		**0.00932**
Barium	**7440-39-3**	**5.22**		**0.925**
Beryllium	**7440-41-7**	**0.0128**		**0.00324**
Cadmium	7440-43-9	0.0242	U	0.106
Calcium	**7440-70-2**	**300**	GC-BS, LJ, QB-01	**285**
Chromium	7440-47-3	1.34	U	1.98
Cobalt	**7440-48-4**	**0.192**	QB-01	**0.0152**
Copper	**7440-50-8**	**21.1**		**2.93**
Iron	**7439-89-6**	**402**		**23.6**
Lead	**7439-92-1**	**0.343**		**0.269**
Magnesium	**7439-95-4**	**151**		**94.1**
Manganese	**7439-96-5**	**11.1**		**1.16**
Molybdenum	**7439-98-7**	**0.678**	QB-01	**0.208**
Nickel	7440-02-0	0.546	U	0.782
Phosphorus	7723-14-0	230	GC-BS, U	1220
Potassium	**7440-09-7**	**70.4**		**37.1**
Rubidium	**7440-17-7**	**0.147**		**0.0179**
Selenium	**7782-49-2**	**0.112**		**0.0107**
Sodium	7440-23-5	1390	GC-BS, U	1950
Strontium	**7440-24-6**	**2.59**	QB-01	**0.636**
Thallium	**7440-28-0**	**9.29E-4**		**4.91E-4**
Thorium	**7440-29-01**	**0.00998**		**0.00293**
Uranium	7440-61-1	0.00847	U	0.0166
Vanadium	**7440-62-2**	**0.939**		**0.0480**
Zinc	7440-66-6	26.3	U	95.4

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REPORTED: 01/09/24 12:34
SUBMITTED: 01/02/24 to 01/03/24
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9524474 **Lab ID:** 4010353-05 **Sampled:** 12/29/23 23:59
Matrix: Air **Sample Volume:** 1804.992 m³ **Received:** 01/03/24 12:50
Filter ID: **Analysis Date:** 01/04/24 21:36
Comments: MFK-AM02-122923-HM

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	**7429-90-5**	**342**		**28.9**
Antimony	**7440-36-0**	**0.0744**	SL	**0.0398**
Arsenic	**7440-38-2**	**0.107**		**0.00861**
Barium	**7440-39-3**	**4.77**		**0.855**
Beryllium	**7440-41-7**	**0.0110**		**0.00299**
Cadmium	7440-43-9	0.00588	U	0.0983
Calcium	**7440-70-2**	**284**	GC-BS, LJ, QB-01	**263**
Chromium	7440-47-3	0.984	U	1.83
Cobalt	**7440-48-4**	**0.154**	QB-01	**0.0141**
Copper	**7440-50-8**	**14.1**		**2.70**
Iron	**7439-89-6**	**374**		**21.8**
Lead	**7439-92-1**	**0.286**		**0.249**
Magnesium	**7439-95-4**	**137**		**86.9**
Manganese	**7439-96-5**	**10.2**		**1.07**
Molybdenum	**7439-98-7**	**0.696**	QB-01	**0.192**
Nickel	7440-02-0	0.371	U	0.722
Phosphorus	7723-14-0	212	GC-BS, U	1130
Potassium	**7440-09-7**	**71.4**		**34.3**
Rubidium	**7440-17-7**	**0.148**		**0.0165**
Selenium	**7782-49-2**	**0.105**		**0.00992**
Sodium	7440-23-5	1290	GC-BS, U	1800
Strontium	**7440-24-6**	**2.51**	QB-01	**0.588**
Thallium	**7440-28-0**	**7.90E-4**		**4.53E-4**
Thorium	**7440-29-01**	**0.0107**		**0.00270**
Uranium	7440-61-1	0.00786	U	0.0153
Vanadium	**7440-62-2**	**0.863**		**0.0443**
Zinc	7440-66-6	22.1	U	88.1

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FILE #: 0000.00
REPORTED: 01/09/24 12:34
SUBMITTED: 01/02/24 to 01/03/24
AQS SITE CODE:
SITE CODE: Maui fires

Description: TetraTech Q9524464 **Lab ID:** 4010353-06 **Sampled:** 12/29/23 23:59
Matrix: Air **Sample Volume:** 1934.288 m³ **Received:** 01/03/24 12:50
Filter ID: **Analysis Date:** 01/04/24 21:51
Comments: MFK-AM03-122923-HM

Inorganics by Compendium Method IO-3.5

Analyte	CAS Number	Results ng/m³ Air	Flag	MDL ng/m³ Air
Aluminum	**7429-90-5**	**298**		**27.0**
Antimony	**7440-36-0**	**0.0939**	SL	**0.0371**
Arsenic	**7440-38-2**	**0.0616**		**0.00803**
Barium	**7440-39-3**	**4.96**		**0.797**
Beryllium	**7440-41-7**	**0.0129**		**0.00279**
Cadmium	7440-43-9	0.00639	U	0.0917
Calcium	**7440-70-2**	**255**	GC-BS, LJ, QB-01	**246**
Chromium	7440-47-3	0.952	U	1.71
Cobalt	**7440-48-4**	**0.147**	QB-01	**0.0131**
Copper	**7440-50-8**	**12.4**		**2.52**
Iron	**7439-89-6**	**339**		**20.4**
Lead	7439-92-1	0.219	U	0.232
Magnesium	**7439-95-4**	**123**		**81.1**
Manganese	**7439-96-5**	**10.5**		**1.00**
Molybdenum	**7439-98-7**	**0.728**	QB-01	**0.179**
Nickel	7440-02-0	0.333	U	0.674
Phosphorus	7723-14-0	206	GC-BS, U	1050
Potassium	**7440-09-7**	**66.1**		**32.0**
Rubidium	**7440-17-7**	**0.131**		**0.0154**
Selenium	**7782-49-2**	**0.0899**		**0.00925**
Sodium	7440-23-5	1140	GC-BS, U	1680
Strontium	**7440-24-6**	**2.45**	QB-01	**0.548**
Thallium	**7440-28-0**	**8.04E-4**		**4.23E-4**
Thorium	**7440-29-01**	**0.0103**		**0.00252**
Uranium	7440-61-1	0.00748	U	0.0143
Vanadium	**7440-62-2**	**0.748**		**0.0414**
Zinc	7440-66-6	22.4	U	82.2

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FILE #: 0000.00
REPORTED: 01/09/24 12:34
SUBMITTED: 01/02/24 to 01/03/24
AQS SITE CODE:
SITE CODE: Maui fires

Inorganics by Compendium Method IO-3.5 - Quality Control

Batch 2401011 - B4A0401

Calibration Blank (2401011-CCB1) Prepared & Analyzed: 01/04/24

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Aluminum	-79.4		ng/l							U
Antimony	0.720		ng/l							
Arsenic	1.07		ng/l							
Barium	0.862		ng/l							
Beryllium	0.151		ng/l							
Cadmium	0.116		ng/l							
Calcium	519		ng/l							
Chromium	3.39		ng/l							
Cobalt	0.164		ng/l							
Copper	10.6		ng/l							
Iron	24.2		ng/l							
Lead	3.74		ng/l							
Magnesium	19.9		ng/l							
Manganese	4.26		ng/l							
Molybdenum	11.6		ng/l							
Nickel	0.362		ng/l							
Phosphorus	-266		ng/l							U
Potassium	-727		ng/l							U
Rubidium	-0.296		ng/l							U
Selenium	-14.3		ng/l							U
Sodium	-187		ng/l							U
Strontium	-0.112		ng/l							U
Thallium	0.609		ng/l							
Thorium	0.298		ng/l							
Uranium	-0.00246		ng/l							U
Vanadium	-28.1		ng/l							U
Zinc	-42.8		ng/l							U

Calibration Blank (2401011-CCB2) Prepared & Analyzed: 01/04/24

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Aluminum	-91.1		ng/l							U
Antimony	1.09		ng/l							
Arsenic	7.75		ng/l							
Barium	4.87		ng/l							
Beryllium	0.507		ng/l							
Cadmium	0.566		ng/l							
Calcium	643		ng/l							
Chromium	6.13		ng/l							
Cobalt	1.24		ng/l							
Copper	59.3		ng/l							

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Inorganics by Compendium Method IO-3.5 - Quality Control

Batch 2401011 - B4A0401

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Calibration Blank (2401011-CCB2) Contin				Prepared & Analyzed: 01/04/24						
Iron	-42.4		ng/l							U
Lead	12.4		ng/l							
Magnesium	17.5		ng/l							
Manganese	14.0		ng/l							
Molybdenum	11.1		ng/l							
Nickel	2.85		ng/l							
Phosphorus	118		ng/l							
Potassium	-662		ng/l							U
Rubidium	0.235		ng/l							
Selenium	-7.96		ng/l							U
Sodium	-161		ng/l							U
Strontium	2.34		ng/l							
Thallium	1.20		ng/l							
Thorium	0.569		ng/l							
Uranium	0.00481		ng/l							
Vanadium	-36.0		ng/l							U
Zinc	-45.0		ng/l							U
Calibration Blank (2401011-CCB3)				Prepared & Analyzed: 01/04/24						
Aluminum	-64.4		ng/l							U
Antimony	0.991		ng/l							
Arsenic	6.08		ng/l							
Barium	0.616		ng/l							
Beryllium	0.686		ng/l							
Cadmium	0.192		ng/l							
Calcium	154		ng/l							
Chromium	2.05		ng/l							
Cobalt	0.384		ng/l							
Copper	20.0		ng/l							
Iron	143		ng/l							
Lead	6.33		ng/l							
Magnesium	-14.9		ng/l							U
Manganese	2.92		ng/l							
Molybdenum	9.85		ng/l							
Nickel	1.02		ng/l							
Phosphorus	-187		ng/l							U
Potassium	-114		ng/l							U
Rubidium	-0.0106		ng/l							U
Selenium	9.65		ng/l							

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Inorganics by Compendium Method IO-3.5 - Quality Control

Batch 2401011 - B4A0401

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Calibration Blank (2401011-CCB3) Contin				Prepared & Analyzed: 01/04/24						
Sodium	-53.6		ng/l						U	
Strontium	0.510		ng/l							
Thallium	1.19		ng/l							
Thorium	0.578		ng/l							
Uranium	0.0107		ng/l							
Vanadium	-38.9		ng/l						U	
Zinc	102		ng/l							
Calibration Check (2401011-CCV1)				Prepared & Analyzed: 01/04/24						
Aluminum	1.49E6		ng/l	1.5000E6		99.2	90-110			
Antimony	19200		ng/l	20000		96.0	90-110			
Arsenic	19500		ng/l	20000		97.6	90-110			
Barium	195000		ng/l	200000		97.3	90-110			
Beryllium	4960		ng/l	5000.0		99.2	90-110			
Cadmium	19400		ng/l	20000		97.1	90-110			
Calcium	2.44E7		ng/l	2.5000E7		97.5	90-110			
Chromium	230000		ng/l	240000		95.8	90-110			
Cobalt	49600		ng/l	50000		99.2	90-110			
Copper	1.99E6		ng/l	2.0000E6		99.7	90-110			
Iron	2.46E6		ng/l	2.5000E6		98.5	90-110			
Lead	193000		ng/l	200000		96.5	90-110			
Magnesium	990000		ng/l	1.0000E6		99.0	90-110			
Manganese	493000		ng/l	500000		98.7	90-110			
Molybdenum	48500		ng/l	50000		97.0	90-110			
Nickel	119000		ng/l	120000		99.0	90-110			
Phosphorus	196000		ng/l	200000		98.0	90-110			
Potassium	2.45E6		ng/l	2.5000E6		97.9	90-110			
Rubidium	9780		ng/l	10000		97.8	90-110			
Selenium	19800		ng/l	20000		98.9	90-110			
Sodium	2.51E6		ng/l	2.5000E6		101	90-110			
Strontium	48500		ng/l	50000		97.0	90-110			
Thallium	474		ng/l	500.00		94.8	90-110			
Thorium	471		ng/l	500.00		94.2	90-110			
Uranium	472		ng/l	500.00		94.5	90-110			
Vanadium	19200		ng/l	20000		96.2	90-110			
Zinc	511000		ng/l	500000		102	90-110			
Calibration Check (2401011-CCV2)				Prepared & Analyzed: 01/04/24						
Aluminum	1.49E6		ng/l	1.5000E6		99.0	90-110			
Antimony	20000		ng/l	20000		100	90-110			

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Inorganics by Compendium Method IO-3.5 - Quality Control

Batch 2401011 - B4A0401

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Calibration Check (2401011-CCV2) Contin				Prepared & Analyzed: 01/04/24						
Arsenic	20000		ng/l	20000		100	90-110			
Barium	201000		ng/l	200000		100	90-110			
Beryllium	5230		ng/l	5000.0		105	90-110			
Cadmium	20100		ng/l	20000		100	90-110			
Calcium	2.50E7		ng/l	2.5000E7		100	90-110			
Chromium	249000		ng/l	240000		104	90-110			
Cobalt	49800		ng/l	50000		99.6	90-110			
Copper	2.05E6		ng/l	2.0000E6		102	90-110			
Iron	2.48E6		ng/l	2.5000E6		99.4	90-110			
Lead	200000		ng/l	200000		100	90-110			
Magnesium	998000		ng/l	1.0000E6		99.8	90-110			
Manganese	496000		ng/l	500000		99.3	90-110			
Molybdenum	49900		ng/l	50000		99.9	90-110			
Nickel	120000		ng/l	120000		100	90-110			
Phosphorus	193000		ng/l	200000		96.6	90-110			
Potassium	2.45E6		ng/l	2.5000E6		97.9	90-110			
Rubidium	9980		ng/l	10000		99.8	90-110			
Selenium	20100		ng/l	20000		100	90-110			
Sodium	2.55E6		ng/l	2.5000E6		102	90-110			
Strontium	49900		ng/l	50000		99.7	90-110			
Thallium	484		ng/l	500.00		96.8	90-110			
Thorium	490		ng/l	500.00		97.9	90-110			
Uranium	488		ng/l	500.00		97.6	90-110			
Vanadium	19900		ng/l	20000		99.5	90-110			
Zinc	523000		ng/l	500000		105	90-110			
Calibration Check (2401011-CCV3)				Prepared & Analyzed: 01/04/24						
Aluminum	1.50E6		ng/l	1.5000E6		100	90-110			
Antimony	20000		ng/l	20000		100	90-110			
Arsenic	20000		ng/l	20000		99.9	90-110			
Barium	200000		ng/l	200000		99.9	90-110			
Beryllium	5240		ng/l	5000.0		105	90-110			
Cadmium	20100		ng/l	20000		101	90-110			
Calcium	2.50E7		ng/l	2.5000E7		99.9	90-110			
Chromium	255000		ng/l	240000		106	90-110			
Cobalt	49900		ng/l	50000		99.8	90-110			
Copper	2.05E6		ng/l	2.0000E6		103	90-110			
Iron	2.49E6		ng/l	2.5000E6		99.7	90-110			
Lead	198000		ng/l	200000		99.2	90-110			

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Inorganics by Compendium Method IO-3.5 - Quality Control

Batch 2401011 - B4A0401

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Calibration Check (2401011-CCV3) Contir				Prepared & Analyzed: 01/04/24						
Magnesium	1.01E6		ng/l	1.0000E6		101	90-110			
Manganese	501000		ng/l	500000		100	90-110			
Molybdenum	50000		ng/l	50000		99.9	90-110			
Nickel	121000		ng/l	120000		101	90-110			
Phosphorus	201000		ng/l	200000		100	90-110			
Potassium	2.46E6		ng/l	2.5000E6		98.5	90-110			
Rubidium	9980		ng/l	10000		99.8	90-110			
Selenium	20100		ng/l	20000		100	90-110			
Sodium	2.56E6		ng/l	2.5000E6		102	90-110			
Strontium	49900		ng/l	50000		99.8	90-110			
Thallium	475		ng/l	500.00		94.9	90-110			
Thorium	483		ng/l	500.00		96.7	90-110			
Uranium	486		ng/l	500.00		97.2	90-110			
Vanadium	20100		ng/l	20000		100	90-110			
Zinc	525000		ng/l	500000		105	90-110			
High Cal Check (2401011-HCV1)				Prepared & Analyzed: 01/04/24						
Aluminum	2.96E6		ng/l	3.0000E6		98.6	95-105			
Antimony	39700		ng/l	40000		99.3	95-105			
Arsenic	39700		ng/l	40000		99.2	95-105			
Barium	399000		ng/l	400000		99.8	95-105			
Beryllium	10200		ng/l	10000		102	95-105			
Cadmium	39200		ng/l	40000		98.1	95-105			
Calcium	4.97E7		ng/l	5.0000E7		99.4	95-105			
Chromium	476000		ng/l	480000		99.1	95-105			
Cobalt	98600		ng/l	100000		98.6	95-105			
Copper	3.95E6		ng/l	4.0000E6		98.7	95-105			
Iron	4.96E6		ng/l	5.0000E6		99.2	95-105			
Lead	396000		ng/l	400000		99.1	95-105			
Magnesium	1.96E6		ng/l	2.0000E6		98.0	95-105			
Manganese	996000		ng/l	1.0000E6		99.6	95-105			
Molybdenum	99500		ng/l	100000		99.5	95-105			
Nickel	236000		ng/l	240000		98.3	95-105			
Phosphorus	405000		ng/l	400000		101	95-105			
Potassium	4.94E6		ng/l	5.0000E6		98.8	95-105			
Rubidium	20000		ng/l	20000		100	95-105			
Selenium	40100		ng/l	40000		100	95-105			
Sodium	4.92E6		ng/l	5.0000E6		98.3	95-105			
Strontium	99800		ng/l	100000		99.8	95-105			

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Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes

Inorganics by Compendium Method IO-3.5 - Quality Control

Batch 2401011 - B4A0401

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
High Cal Check (2401011-HCV1) Continue				Prepared & Analyzed: 01/04/24						
Thallium	986		ng/l	1000.0		98.6	95-105			
Thorium	990		ng/l	1000.0		99.0	95-105			
Uranium	989		ng/l	1000.0		98.9	95-105			
Vanadium	39800		ng/l	40000		99.5	95-105			
Zinc	1.03E6		ng/l	1.0000E6		103	95-105			
Initial Cal Blank (2401011-ICB1)				Prepared & Analyzed: 01/04/24						
Aluminum	-108		ng/l							U
Antimony	1.04		ng/l							
Arsenic	2.89		ng/l							
Barium	0.485		ng/l							
Beryllium	0.249		ng/l							
Cadmium	0.325		ng/l							
Calcium	-524		ng/l							U
Chromium	5.47		ng/l							
Cobalt	0.189		ng/l							
Copper	18.4		ng/l							
Iron	29.6		ng/l							
Lead	12.7		ng/l							
Magnesium	-13.2		ng/l							U
Manganese	6.41		ng/l							
Molybdenum	15.5		ng/l							
Nickel	1.13		ng/l							
Phosphorus	122		ng/l							
Potassium	-1030		ng/l							U
Rubidium	0.297		ng/l							
Selenium	-12.0		ng/l							U
Sodium	-350		ng/l							U
Strontium	0.414		ng/l							
Thallium	0.690		ng/l							
Thorium	0.601		ng/l							
Uranium	0.00365		ng/l							
Vanadium	-32.9		ng/l							U
Zinc	-7.45		ng/l							U
Initial Cal Check (2401011-ICV1)				Prepared & Analyzed: 01/04/24						
Aluminum	1.47E6		ng/l	1.5000E6		98.0	90-110			
Antimony	19700		ng/l	20000		98.3	90-110			
Arsenic	19900		ng/l	20000		99.4	90-110			
Barium	200000		ng/l	200000		99.8	90-110			

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Batch 2401011 - B4A0401

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Initial Cal Check (2401011-ICV1) Continu				Prepared & Analyzed: 01/04/24						
Beryllium	5130		ng/l	5000.0		103	90-110			
Cadmium	20400		ng/l	20000		102	90-110			
Calcium	2.46E7		ng/l	2.5000E7		98.3	90-110			
Chromium	242000		ng/l	240000		101	90-110			
Cobalt	49800		ng/l	50000		99.5	90-110			
Copper	2.03E6		ng/l	2.0000E6		101	90-110			
Iron	2.51E6		ng/l	2.5000E6		100	90-110			
Lead	197000		ng/l	200000		98.5	90-110			
Magnesium	992000		ng/l	1.0000E6		99.2	90-110			
Manganese	495000		ng/l	500000		99.1	90-110			
Molybdenum	49500		ng/l	50000		98.9	90-110			
Nickel	119000		ng/l	120000		98.9	90-110			
Phosphorus	192000		ng/l	200000		96.2	90-110			
Potassium	2.50E6		ng/l	2.5000E6		99.9	90-110			
Rubidium	9750		ng/l	10000		97.5	90-110			
Selenium	20500		ng/l	20000		102	90-110			
Sodium	2.56E6		ng/l	2.5000E6		102	90-110			
Strontium	50400		ng/l	50000		101	90-110			
Thallium	488		ng/l	500.00		97.5	90-110			
Thorium	482		ng/l	500.00		96.3	90-110			
Uranium	490		ng/l	500.00		98.0	90-110			
Vanadium	20200		ng/l	20000		101	90-110			
Zinc	527000		ng/l	500000		105	90-110			
Interference Check A (2401011-IFA1)				Prepared & Analyzed: 01/04/24						
Aluminum	1.42E7		ng/l	1.5000E7		94.4	80-120			
Antimony	0.00		ng/l				80-120			U
Arsenic	0.00		ng/l				80-120			U
Barium	0.00		ng/l				80-120			U
Beryllium	0.00		ng/l				80-120			U
Cadmium	0.00		ng/l				80-120			U
Calcium	9.78E7		ng/l	1.0040E8		97.4	80-120			
Chromium	0.00		ng/l				80-120			U
Cobalt	0.00		ng/l				80-120			U
Copper	0.00		ng/l				80-120			U
Iron	1.41E7		ng/l	1.5000E7		94.3	80-120			
Lead	0.00		ng/l				80-120			U
Magnesium	1.49E7		ng/l	1.5000E7		99.6	80-120			
Manganese	0.00		ng/l				80-120			U

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Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Interference Check A (2401011-IFA1) Co				Prepared & Analyzed: 01/04/24						
Molybdenum	291000		ng/l	300000		96.8	80-120			
Nickel	0.00		ng/l				80-120			U
Phosphorus	1.55E7		ng/l	1.5000E7		103	80-120			
Potassium	1.41E7		ng/l	1.5000E7		94.0	80-120			
Rubidium	0.00		ng/l				80-120			U
Selenium	0.00		ng/l				80-120			U
Sodium	1.51E7		ng/l	1.5000E7		101	80-120			
Strontium	0.00		ng/l				80-120			U
Thallium	0.00		ng/l				80-120			U
Thorium	0.00		ng/l				80-120			U
Uranium	0.00		ng/l				80-120			U
Vanadium	0.00		ng/l				80-120			U
Zinc	0.00		ng/l				80-120			U
Interference Check B (2401011-IFB1)				Prepared & Analyzed: 01/04/24						
Aluminum	1.60E7		ng/l	1.6500E7		97.0	80-120			
Antimony	19900		ng/l	20000		99.4	80-120			
Arsenic	20000		ng/l	20000		99.8	80-120			
Barium	201000		ng/l	200000		100	80-120			
Beryllium	5040		ng/l	5000.0		101	80-120			
Cadmium	19200		ng/l	20000		95.9	80-120			
Calcium	1.16E8		ng/l	1.2540E8		92.2	80-120			
Chromium	228000		ng/l	240000		95.2	80-120			
Cobalt	48600		ng/l	50000		97.2	80-120			
Copper	1.87E6		ng/l	2.0000E6		93.3	80-120			
Iron	1.68E7		ng/l	1.7500E7		95.8	80-120			
Lead	201000		ng/l	200000		101	80-120			
Magnesium	1.61E7		ng/l	1.6000E7		100	80-120			
Manganese	509000		ng/l	500000		102	80-120			
Molybdenum	337000		ng/l	350000		96.2	80-120			
Nickel	113000		ng/l	120000		94.2	80-120			
Phosphorus	1.62E7		ng/l	1.5200E7		107	80-120			
Potassium	1.70E7		ng/l	1.7500E7		97.0	80-120			
Rubidium	9990		ng/l	10000		99.9	80-120			
Selenium	19000		ng/l	20000		95.1	80-120			
Sodium	1.81E7		ng/l	1.7500E7		103	80-120			
Strontium	49900		ng/l	50000		99.8	80-120			
Thallium	503		ng/l	500.00		101	80-120			
Thorium	522		ng/l	500.00		104	80-120			

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Inorganics by Compendium Method IO-3.5 - Quality Control

Batch 2401011 - B4A0401

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Interference Check B (2401011-IFB1) Co				Prepared & Analyzed: 01/04/24						
Uranium	531		ng/l	500.00		106	80-120			
Vanadium	18900		ng/l	20000		94.6	80-120			
Zinc	472000		ng/l	500000		94.5	80-120			

Batch B4A0401 - ICP-MS Extraction

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (B4A0401-BLK1)				Prepared & Analyzed: 01/04/24						
Aluminum	ND	32.1	ng/m³ Air							U
Antimony	ND	0.0441	ng/m³ Air							SL, U
Arsenic	ND	0.00955	ng/m³ Air							U
Barium	ND	0.948	ng/m³ Air							U
Beryllium	ND	0.00332	ng/m³ Air							U
Cadmium	ND	0.109	ng/m³ Air							U
Calcium	ND	292	ng/m³ Air							GC-BS, LJ, QB-01, U
Chromium	ND	2.03	ng/m³ Air							U
Cobalt	ND	0.0156	ng/m³ Air							QB-01, U
Copper	ND	3.00	ng/m³ Air							U
Iron	ND	24.2	ng/m³ Air							U
Lead	ND	0.276	ng/m³ Air							U
Magnesium	ND	96.4	ng/m³ Air							U
Manganese	ND	1.19	ng/m³ Air							U
Molybdenum	ND	0.213	ng/m³ Air							QB-01, U
Nickel	ND	0.801	ng/m³ Air							U
Phosphorus	ND	1250	ng/m³ Air							GC-BS, U
Potassium	ND	38.0	ng/m³ Air							U
Rubidium	ND	0.0183	ng/m³ Air							U
Selenium	ND	0.0110	ng/m³ Air							U
Sodium	ND	2000	ng/m³ Air							GC-BS, U
Strontium	ND	0.652	ng/m³ Air							QB-01, U
Thallium	ND	5.03E-4	ng/m³ Air							U
Thorium	ND	0.00300	ng/m³ Air							U
Uranium	ND	0.0170	ng/m³ Air							U
Vanadium	ND	0.0492	ng/m³ Air							U
Zinc	ND	97.7	ng/m³ Air							U
LCS (B4A0401-BS1)				Prepared & Analyzed: 01/04/24						
Aluminum	89.9	32.1	ng/m³ Air	82.975		108	80-120			
Antimony	0.493	0.0441	ng/m³ Air	1.3829		35.6	80-120			SL
Arsenic	2.68	0.00955	ng/m³ Air	2.7658		96.8	80-120			
Barium	27.5	0.948	ng/m³ Air	27.658		99.4	80-120			

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Inorganics by Compendium Method IO-3.5 - Quality Control

Batch B4A0401 - ICP-MS Extraction

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
LCS (B4A0401-BS1) Continued				Prepared & Analyzed: 01/04/24						
Beryllium	1.39	0.00332	ng/m³ Air	1.3829		100	80-120			
Cadmium	1.35	0.109	ng/m³ Air	1.3829		97.4	80-120			
Calcium	629	292	ng/m³ Air	69.146		909	80-120			GC-BS, LJ, QB-01
Chromium	15.9	2.03	ng/m³ Air	13.829		115	80-120			
Cobalt	1.34	0.0156	ng/m³ Air	1.3829		97.3	80-120			QB-01
Copper	31.1	3.00	ng/m³ Air	27.658		112	80-120			
Iron	41.1	24.2	ng/m³ Air	27.658		149	80-120			
Lead	13.3	0.276	ng/m³ Air	13.829		96.3	80-120			
Magnesium	ND	96.4	ng/m³ Air	27.658			80-120			U
Manganese	8.71	1.19	ng/m³ Air	8.2975		105	80-120			
Molybdenum	1.58	0.213	ng/m³ Air	1.3829		115	80-120			QB-01
Nickel	3.02	0.801	ng/m³ Air	2.7658		109	80-120			
Phosphorus	ND	1250	ng/m³ Air	13.829			80-120			GC-BS, U
Potassium	67.9	38.0	ng/m³ Air	55.317		123	80-120			
Rubidium	1.33	0.0183	ng/m³ Air	1.3829		96.1	80-120			
Selenium	2.71	0.0110	ng/m³ Air	2.7658		98.0	80-120			
Sodium	ND	2000	ng/m³ Air	55.317			80-120			GC-BS, U
Strontium	2.20	0.652	ng/m³ Air	1.3829		159	80-120			QB-01
Thallium	0.132	5.03E-4	ng/m³ Air	0.13829		95.2	80-120			
Thorium	0.127	0.00300	ng/m³ Air	0.13829		91.7	80-120			
Uranium	0.128	0.0170	ng/m³ Air	0.13829		92.4	80-120			
Vanadium	2.73	0.0492	ng/m³ Air	2.7658		98.8	80-120			
Zinc	126	97.7	ng/m³ Air	82.975		152	80-120			
Duplicate (B4A0401-DUP1)		**Source: 4010214-02**		Prepared & Analyzed: 01/04/24						
Aluminum	391	52.0	ng/m³ Air		380			2.89	10	
Antimony	0.120	0.0714	ng/m³ Air		0.126			4.58	10	SL
Arsenic	0.175	0.0155	ng/m³ Air		0.198			11.9	10	
Barium	5.88	1.53	ng/m³ Air		5.72			2.79	10	
Beryllium	0.0131	0.00537	ng/m³ Air		0.0134			2.39	10	
Cadmium	ND	0.176	ng/m³ Air		ND				10	U
Calcium	ND	473	ng/m³ Air		ND				10	GC-BS, LJ, QB-01, U
Chromium	ND	3.29	ng/m³ Air		ND				10	U
Cobalt	0.181	0.0253	ng/m³ Air		0.177			2.51	10	QB-01
Copper	25.7	4.86	ng/m³ Air		25.0			2.69	10	
Iron	423	39.2	ng/m³ Air		406			4.07	10	
Lead	ND	0.447	ng/m³ Air		ND				10	U
Magnesium	ND	156	ng/m³ Air		ND				10	U

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Inorganics by Compendium Method IO-3.5 - Quality Control

Batch B4A0401 - ICP-MS Extraction

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Duplicate (B4A0401-DUP1) Continued	**Source: 4010214-02**		Prepared & Analyzed: 01/04/24							
Manganese	11.4	1.93	ng/m³ Air		11.1			2.43	10	
Molybdenum	1.46	0.345	ng/m³ Air		1.44			1.55	10	QB-01
Nickel	ND	1.30	ng/m³ Air		ND				10	U
Phosphorus	ND	2020	ng/m³ Air		ND				10	GC-BS, U
Potassium	108	61.5	ng/m³ Air		119			9.76	10	
Rubidium	0.193	0.0296	ng/m³ Air		0.193			0.00967	10	
Selenium	0.0891	0.0178	ng/m³ Air		0.0744			18.0	10	
Sodium	ND	3240	ng/m³ Air		ND				10	GC-BS, U
Strontium	2.75	1.06	ng/m³ Air		2.74			0.452	10	QB-01
Thallium	0.00111	8.14E-4	ng/m³ Air		0.00115			3.88	10	
Thorium	0.0123	0.00486	ng/m³ Air		0.0123			0.351	10	
Uranium	ND	0.0275	ng/m³ Air		ND				10	U
Vanadium	1.03	0.0796	ng/m³ Air		1.01			2.58	10	
Zinc	ND	158	ng/m³ Air		ND				10	U
Matrix Spike (B4A0401-MS1)	**Source: 4010214-02**		Prepared & Analyzed: 01/04/24							
Aluminum	506	52.0	ng/m³ Air	134.31	380	94.0	80-120			
Antimony	1.54	0.0714	ng/m³ Air	2.2385	0.126	63.2	80-120			SL
Arsenic	4.46	0.0155	ng/m³ Air	4.4769	0.198	95.1	80-120			
Barium	49.5	1.53	ng/m³ Air	44.769	5.72	97.8	80-120			
Beryllium	2.27	0.00537	ng/m³ Air	2.2385	0.0134	101	80-120			
Cadmium	2.19	0.176	ng/m³ Air	2.2385	ND	97.8	80-120			
Calcium	607	473	ng/m³ Air	111.92	ND	543	80-120			GC-BS, LJ, QB-01, QM-4X
Chromium	24.4	3.29	ng/m³ Air	22.385	ND	109	80-120			
Cobalt	2.30	0.0253	ng/m³ Air	2.2385	0.177	94.9	80-120			QB-01
Copper	76.4	4.86	ng/m³ Air	44.769	25.0	115	80-120			
Iron	450	39.2	ng/m³ Air	44.769	406	97.2	80-120			
Lead	21.9	0.447	ng/m³ Air	22.385	ND	97.7	80-120			
Magnesium	ND	156	ng/m³ Air	44.769	ND		80-120			U
Manganese	25.0	1.93	ng/m³ Air	13.431	11.1	104	80-120			
Molybdenum	3.70	0.345	ng/m³ Air	2.2385	1.44	101	80-120			QB-01
Nickel	4.88	1.30	ng/m³ Air	4.4769	ND	109	80-120			
Phosphorus	ND	2020	ng/m³ Air	22.385	ND		80-120			GC-BS, U
Potassium	190	61.5	ng/m³ Air	89.539	119	80.0	80-120			
Rubidium	2.29	0.0296	ng/m³ Air	2.2385	0.193	93.7	80-120			
Selenium	4.47	0.0178	ng/m³ Air	4.4769	0.0744	98.2	80-120			
Sodium	ND	3240	ng/m³ Air	89.539	ND		80-120			GC-BS, QM-4X, U
Strontium	4.86	1.06	ng/m³ Air	2.2385	2.74	94.9	80-120			QB-01

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Inorganics by Compendium Method IO-3.5 - Quality Control

Batch B4A0401 - ICP-MS Extraction

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Matrix Spike (B4A0401-MS1) Continued	**Source: 4010214-02**		Prepared & Analyzed: 01/04/24							
Thallium	0.212	8.14E-4	ng/m³ Air	0.22385	0.00115	94.1	80-120			
Thorium	0.112	0.00486	ng/m³ Air	0.22385	0.0123	44.5	80-120			QM-07
Uranium	0.212	0.0275	ng/m³ Air	0.22385	ND	94.9	80-120			
Vanadium	5.35	0.0796	ng/m³ Air	4.4769	1.01	96.9	80-120			
Zinc	204	158	ng/m³ Air	134.31	ND	152	80-120			
Matrix Spike Dup (B4A0401-MSD1)	**Source: 4010214-02**		Prepared & Analyzed: 01/04/24							
Aluminum	503	52.0	ng/m³ Air	134.31	380	91.9	80-120	0.544	20	
Antimony	1.54	0.0714	ng/m³ Air	2.2385	0.126	63.4	80-120	0.252	20	SL
Arsenic	4.49	0.0155	ng/m³ Air	4.4769	0.198	95.8	80-120	0.683	20	
Barium	50.0	1.53	ng/m³ Air	44.769	5.72	98.9	80-120	0.992	20	
Beryllium	2.34	0.00537	ng/m³ Air	2.2385	0.0134	104	80-120	2.83	20	
Cadmium	2.22	0.176	ng/m³ Air	2.2385	ND	99.3	80-120	1.51	20	
Calcium	618	473	ng/m³ Air	111.92	ND	552	80-120	1.68	20	GC-BS, LJ, QB-01, QM-4X
Chromium	24.7	3.29	ng/m³ Air	22.385	ND	110	80-120	1.25	20	
Cobalt	2.33	0.0253	ng/m³ Air	2.2385	0.177	96.3	80-120	1.35	20	QB-01
Copper	81.2	4.86	ng/m³ Air	44.769	25.0	126	80-120	6.18	20	QM-07
Iron	444	39.2	ng/m³ Air	44.769	406	84.9	80-120	1.23	20	
Lead	22.1	0.447	ng/m³ Air	22.385	ND	98.9	80-120	1.22	20	
Magnesium	ND	156	ng/m³ Air	44.769	ND		80-120		20	U
Manganese	25.2	1.93	ng/m³ Air	13.431	11.1	105	80-120	0.521	20	
Molybdenum	3.81	0.345	ng/m³ Air	2.2385	1.44	106	80-120	3.06	20	QB-01
Nickel	4.99	1.30	ng/m³ Air	4.4769	ND	111	80-120	2.28	20	
Phosphorus	ND	2020	ng/m³ Air	22.385	ND		80-120		20	GC-BS, QM-4X, U
Potassium	190	61.5	ng/m³ Air	89.539	119	79.6	80-120	0.185	20	QM-07
Rubidium	2.29	0.0296	ng/m³ Air	2.2385	0.193	93.8	80-120	0.0627	20	
Selenium	4.42	0.0178	ng/m³ Air	4.4769	0.0744	97.0	80-120	1.12	20	
Sodium	ND	3240	ng/m³ Air	89.539	ND		80-120		20	GC-BS, QM-4X, U
Strontium	4.91	1.06	ng/m³ Air	2.2385	2.74	96.9	80-120	0.897	20	QB-01
Thallium	0.215	8.14E-4	ng/m³ Air	0.22385	0.00115	95.5	80-120	1.46	20	
Thorium	0.0947	0.00486	ng/m³ Air	0.22385	0.0123	36.8	80-120	16.7	20	QM-07
Uranium	0.212	0.0275	ng/m³ Air	0.22385	ND	94.6	80-120	0.293	20	
Vanadium	5.39	0.0796	ng/m³ Air	4.4769	1.01	97.8	80-120	0.785	20	
Zinc	207	158	ng/m³ Air	134.31	ND	154	80-120	1.70	20	
Post Spike (B4A0401-PS1)	**Source: 4010214-02**		Prepared & Analyzed: 01/04/24							
Aluminum	423	52.0	ng/m³ Air	44.769	380	95.7	75-125			
Antimony	0.554	0.0714	ng/m³ Air	0.44769	0.126	95.5	75-125			SL

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Inorganics by Compendium Method IO-3.5 - Quality Control

Batch B4A0401 - ICP-MS Extraction

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Post Spike (B4A0401-PS1) Continued		**Source: 4010214-02**		Prepared & Analyzed: 01/04/24						
Arsenic	2.31	0.0155	ng/m³ Air	2.2385	0.198	94.5	75-125			
Barium	10.1	1.53	ng/m³ Air	4.4769	5.72	97.2	75-125			
Beryllium	0.460	0.00537	ng/m³ Air	0.44769	0.0134	99.9	75-125			
Cadmium	0.258	0.176	ng/m³ Air	0.22385	ND	115	75-125			
Calcium	525	473	ng/m³ Air	44.769	ND	NR	75-125			A-01, GC-BS, LJ, QB-01
Chromium	3.75	3.29	ng/m³ Air	2.2385	ND	168	75-125			
Cobalt	0.605	0.0253	ng/m³ Air	0.44769	0.177	95.6	75-125			QB-01
Copper	48.8	4.86	ng/m³ Air	22.385	25.0	106	75-125			
Iron	455	39.2	ng/m³ Air	44.769	406	109	75-125			
Lead	43.0	0.447	ng/m³ Air	44.769	ND	96.0	75-125			
Magnesium	ND	156	ng/m³ Air	44.769	ND		75-125			U
Manganese	15.7	1.93	ng/m³ Air	4.4769	11.1	102	75-125			
Molybdenum	3.49	0.345	ng/m³ Air	2.2385	1.44	91.7	75-125			QB-01
Nickel	4.86	1.30	ng/m³ Air	4.4769	ND	109	75-125			
Phosphorus	ND	2020	ng/m³ Air	8.9539	ND		75-125			GC-BS, U
Potassium	161	61.5	ng/m³ Air	44.769	119	95.3	75-125			
Rubidium	0.398	0.0296	ng/m³ Air	0.22385	0.193	91.7	75-125			
Selenium	2.22	0.0178	ng/m³ Air	2.2385	0.0744	96.0	75-125			
Sodium	ND	3240	ng/m³ Air	44.769	ND		75-125			GC-BS, U
Strontium	4.82	1.06	ng/m³ Air	2.2385	2.74	93.1	75-125			QB-01
Thallium	0.105	8.14E-4	ng/m³ Air	0.11192	0.00115	92.4	75-125			
Thorium	0.108	0.00486	ng/m³ Air	0.11192	0.0123	85.5	75-125			
Uranium	0.108	0.0275	ng/m³ Air	0.11192	ND	96.7	75-125			
Vanadium	3.13	0.0796	ng/m³ Air	2.2385	1.01	95.0	75-125			
Zinc	ND	158	ng/m³ Air	44.769	ND		75-125			U
Dilution Check (B4A0401-SRL1)		**Source: 4010214-02**		Prepared & Analyzed: 01/04/24						
Aluminum	376	260	ng/m³ Air		380			0.933	10	
Antimony	ND	0.357	ng/m³ Air		ND				10	SL, U
Arsenic	0.195	0.0773	ng/m³ Air		0.198			1.47	10	
Barium	ND	7.67	ng/m³ Air		ND				10	U
Beryllium	ND	0.0269	ng/m³ Air		ND				10	U
Cadmium	ND	0.882	ng/m³ Air		ND				10	U
Calcium	ND	2360	ng/m³ Air		ND				10	GC-BS, LJ, QB-01, U
Chromium	ND	16.4	ng/m³ Air		ND				10	U
Cobalt	0.174	0.126	ng/m³ Air		0.177			1.80	10	QB-01
Copper	25.0	24.3	ng/m³ Air		25.0			0.0484	10	
Iron	406	196	ng/m³ Air		406			0.0535	10	

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Inorganics by Compendium Method IO-3.5 - Quality Control

Batch B4A0401 - ICP-MS Extraction

Dilution Check (B4A0401-SRL1) ContinueSource: 4010214-02 Prepared & Analyzed: 01/04/24

Analyte	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Lead	ND	2.23	ng/m³ Air		ND				10	U
Magnesium	ND	780	ng/m³ Air		ND				10	U
Manganese	11.0	9.63	ng/m³ Air		11.1			0.761	10	
Molybdenum	ND	1.72	ng/m³ Air		ND				10	QB-01, U
Nickel	ND	6.48	ng/m³ Air		ND				10	U
Phosphorus	ND	10100	ng/m³ Air		ND				10	GC-BS, U
Potassium	ND	308	ng/m³ Air		ND				10	U
Rubidium	0.187	0.148	ng/m³ Air		0.193			3.43	10	
Selenium	ND	0.0890	ng/m³ Air		ND				10	U
Sodium	ND	16200	ng/m³ Air		ND				10	GC-BS, U
Strontium	ND	5.28	ng/m³ Air		ND				10	QB-01, U
Thallium	ND	0.00407	ng/m³ Air		ND				10	U
Thorium	ND	0.0243	ng/m³ Air		ND				10	U
Uranium	ND	0.138	ng/m³ Air		ND				10	U
Vanadium	1.02	0.398	ng/m³ Air		1.01			1.06	10	
Zinc	ND	791	ng/m³ Air		ND				10	U

The results in this report apply only to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

CERTIFICATE OF ANALYSIS

Tetra Tech, Inc.
1777 Sentry Pkwy, Bldg 12
Blue Bell, PA 19422
ATTN: Ms. Chelsea Saber
PHONE: (703) 885-5495 **FAX:**

FILE #: 0000.00
REPORTED: 01/09/24 12:34
SUBMITTED: 01/02/24 to 01/03/24
AQS SITE CODE:
SITE CODE: Maui fires

Notes and Definitions

U	Under Detection Limit
SL	The spike recovery was outside acceptance limits. Reported value may be biased low.
QM-4X	The MS/MSD recovery exceeds criteria because the parent sample concentration is greater than 4x the spike concentration. Sample results for the QC batch were accepted based on acceptable BS/BSD recoveries.
QM-07	The spike recovery was outside acceptance limits for the MS and/or MSD. The batch was accepted based on acceptable LCS recovery.
QB-01	Analyte exceeds method blank criteria
LJ	Identification of analyte is acceptable; reported value is an estimate.
GC-BS	Compound exceeds Blank Spike Criteria
FB-01	Analyte exceeds Field Blank criteria.
E	The concentration indicated for this analyte is an estimated value above the calibration range of the instrument. This value is considered an estimate (CLP E-flag).
A-01	Parent sample >4x spike amount
ND	Analyte NOT DETECTED
NR	Not Reported
MDL	Method Detection Limit
RPD	Relative Percent Difference

Note: This test is accredited under the 2016 TNI Standard.

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Airborne Asbestos Fiber Analysis by Transmission Electron Microscopy (TEM) ISO 10312 - Ambient Air - Determination of Asbestos Fibers Direct-Transfer Transmission Electron Microscopy Method

Maura McAleese
Tetra Tech-Maui Fire
1999 Harrison St. Ste. 500
Oakland, CA 94612

EJ3 Order #: 3493379
Project #: 103S864023141
Receipt Date: 28-Dec-2023
Analysis Date: 3-Jan-2024
Report Date: 3-Jan-2024

HDOH Kula Community Air

Sample Number **MFK-AM01-122123-AB**

Air Volume:	7533.188
Effective Filter Area:	385.0 mm^2
Level of Analysis (Chrysotile):	CDQ
Level of Analysis (Amphibole):	ADQ
Magnification Used for Fiber Counting:	20,000
Aspect Ratio for Fiber Definition:	5:1
Mean Dimension of Grid Openings (GOs):	0.0132 mm^2
Initials of Analyst:	TS
Number of GO's Examined:	10
Analytical Sensitivity: f/Liter:	0.38718
Analytical Sensitivity: f/cm3:	0.00039
Number of primary asbestos structures:	0
Number of asbestos structures counted:	0
Number of asbestos structures > 5 um :	0
Number of asbestos fibers and bundles > 5 um:	0
Number of PCM equivalent asbestos structures:	0
Number of PCM equivalent asbestos fibers:	0
Concentration of Asbestos (Chrysotile) f/cm3:	<0.00039
Concentration of Asbestos (Amphibole) f/cm3:	<0.00039
Concentration of PCME Asbestos (Chrysotile) f/cm3:	<0.00039
Concentration of Asbestos (Chrysotile), Str/L:	0
Concentration of Asbestos (Amphibole), Str/L:	0
Lower 95% Confidence Limit (Chrysotile), Str/L:	0
Upper 95% Confidence Limit (Chrysotile), Str/L:	1.4
Lower 95% Confidence Limit (Amphibole), Str/L:	0
Upper 95% Confidence Limit (Amphibole), Str/L:	1.4

Analyst: Taylor Smylie

Scott M. Ward, Ph.D. **Lab Director**

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Receipt Date: 28-Dec-2023
Analysis Date: 3-Jan-2024
Report Date: 3-Jan-2024

HDOH Kula Community Air

Sample Number **MFK-AM02-122123-AB**

Air Volume:	3921.046
Effective Filter Area:	385.0 mm^2
Level of Analysis (Chrysotile):	CDQ
Level of Analysis (Amphibole):	ADQ
Magnification Used for Fiber Counting:	20,000
Aspect Ratio for Fiber Definition:	5:1
Mean Dimension of Grid Openings (GOs):	0.0132 mm^2
Initials of Analyst:	TS
Number of GO's Examined:	10
Analytical Sensitivity: f/Liter:	0.74385
Analytical Sensitivity: f/cm3:	0.00074
Number of primary asbestos structures:	0
Number of asbestos structures counted:	0
Number of asbestos structures > 5 um :	0
Number of asbestos fibers and bundles > 5 um:	0
Number of PCM equivalent asbestos structures:	0
Number of PCM equivalent asbestos fibers:	0
Concentration of Asbestos (Chrysotile) f/cm3:	<0.00074
Concentration of Asbestos (Amphibole) f/cm3:	<0.00074
Concentration of PCME Asbestos (Chrysotile) f/cm3:	<0.00074
Concentration of Asbestos (Chrysotile), Str/L:	0
Concentration of Asbestos (Amphibole), Str/L:	0
Lower 95% Confidence Limit (Chrysotile), Str/L:	0
Upper 95% Confidence Limit (Chrysotile), Str/L:	2.7
Lower 95% Confidence Limit (Amphibole), Str/L:	0
Upper 95% Confidence Limit (Amphibole), Str/L:	2.7

Analyst: Taylor Smylie

Scott M. Ward, Ph.D. **Lab Director**

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Report Date: 3-Jan-2024

HDOH Kula Community Air

Sample Number **MFK-AM03-122123-AB**

Air Volume:	3884.217
Effective Filter Area:	385.0 mm^2
Level of Analysis (Chrysotile):	CDQ
Level of Analysis (Amphibole):	ADQ
Magnification Used for Fiber Counting:	20,000
Aspect Ratio for Fiber Definition:	5:1
Mean Dimension of Grid Openings (GOs):	0.0132 mm^2
Initials of Analyst:	TS
Number of GO’s Examined:	10
Analytical Sensitivity: f/Liter:	0.75090
Analytical Sensitivity: f/cm3:	0.00075
Number of primary asbestos structures:	0
Number of asbestos structures counted:	0
Number of asbestos structures > 5 um :	0
Number of asbestos fibers and bundles > 5 um:	0
Number of PCM equivalent asbestos structures:	0
Number of PCM equivalent asbestos fibers:	0
Concentration of Asbestos (Chrysotile) f/cm3:	<0.00075
Concentration of Asbestos (Amphibole) f/cm3:	<0.00075
Concentration of PCME Asbestos (Chrysotile) f/cm3:	<0.00075
Concentration of Asbestos (Chrysotile), Str/L:	0
Concentration of Asbestos (Amphibole), Str/L:	0
Lower 95% Confidence Limit (Chrysotile), Str/L:	0
Upper 95% Confidence Limit (Chrysotile), Str/L:	2.8
Lower 95% Confidence Limit (Amphibole), Str/L:	0
Upper 95% Confidence Limit (Amphibole), Str/L:	2.8

Analyst: Taylor Smylie

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Receipt Date: 28-Dec-2023
Analysis Date: 3-Jan-2024
Report Date: 3-Jan-2024

HDOH Kula Community Air

Sample Number **MFK-FB01-122123-AB**

Air Volume:	0
Effective Filter Area:	385.0 mm^2
Level of Analysis (Chrysotile):	CDQ
Level of Analysis (Amphibole):	ADQ
Magnification Used for Fiber Counting:	20,000
Aspect Ratio for Fiber Definition:	5:1
Mean Dimension of Grid Openings (GOs):	0.0132 mm^2
Initials of Analyst:	TS
Number of GO's Examined:	10
Analytical Sensitivity: f/Liter:	N/A
Analytical Sensitivity: f/cm3:	N/A
Number of primary asbestos structures:	0
Number of asbestos structures counted:	0
Number of asbestos structures > 5 um :	0
Number of asbestos fibers and bundles > 5 um:	0
Number of PCM equivalent asbestos structures:	0
Number of PCM equivalent asbestos fibers:	0
Concentration of Asbestos (Chrysotile) f/cm3:	N/A
Concentration of Asbestos (Amphibole) f/cm3:	N/A
Concentration of PCME Asbestos (Chrysotile) f/cm3:	N/A
Concentration of Asbestos (Chrysotile), Str/L:	N/A
Concentration of Asbestos (Amphibole), Str/L:	N/A
Lower 95% Confidence Limit (Chrysotile), Str/L:	N/A
Upper 95% Confidence Limit (Chrysotile), Str/L:	N/A
Lower 95% Confidence Limit (Amphibole), Str/L:	N/A
Upper 95% Confidence Limit (Amphibole), Str/L:	N/A

Analyst: Taylor Smylie

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Report Date: 3-Jan-2024

HDOH Kula Community Air

Sample Number **MFK-AM01-122223-AB**

Air Volume:	7931.31
Effective Filter Area:	385.0 mm^2
Level of Analysis (Chrysotile):	CDQ
Level of Analysis (Amphibole):	ADQ
Magnification Used for Fiber Counting:	20,000
Aspect Ratio for Fiber Definition:	5:1
Mean Dimension of Grid Openings (GOs):	0.0132 mm^2
Initials of Analyst:	TS
Number of GO's Examined:	10
Analytical Sensitivity: f/Liter:	0.36774
Analytical Sensitivity: f/cm3:	0.00037
Number of primary asbestos structures:	0
Number of asbestos structures counted:	0
Number of asbestos structures > 5 um :	0
Number of asbestos fibers and bundles > 5 um:	0
Number of PCM equivalent asbestos structures:	0
Number of PCM equivalent asbestos fibers:	0
Concentration of Asbestos (Chrysotile) f/cm3:	<0.00037
Concentration of Asbestos (Amphibole) f/cm3:	<0.00037
Concentration of PCME Asbestos (Chrysotile) f/cm3:	<0.00037
Concentration of Asbestos (Chrysotile), Str/L:	0
Concentration of Asbestos (Amphibole), Str/L:	0
Lower 95% Confidence Limit (Chrysotile), Str/L:	0
Upper 95% Confidence Limit (Chrysotile), Str/L:	1.4
Lower 95% Confidence Limit (Amphibole), Str/L:	0
Upper 95% Confidence Limit (Amphibole), Str/L:	1.4

Analyst: Taylor Smylie

Scott M. Ward, Ph.D. **Lab Director**

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Project #: 103S864023141
Receipt Date: 28-Dec-2023
Analysis Date: 3-Jan-2024
Report Date: 3-Jan-2024

HDOH Kula Community Air

Sample Number **MFK-AM02-122223-AB**

Air Volume:	6086.993
Effective Filter Area:	385.0 mm^2
Level of Analysis (Chrysotile):	CDQ
Level of Analysis (Amphibole):	ADQ
Magnification Used for Fiber Counting:	20,000
Aspect Ratio for Fiber Definition:	5:1
Mean Dimension of Grid Openings (GOs):	0.0132 mm^2
Initials of Analyst:	TS
Number of GO's Examined:	10
Analytical Sensitivity: f/Liter:	0.47916
Analytical Sensitivity: f/cm3:	0.00048
Number of primary asbestos structures:	0
Number of asbestos structures counted:	0
Number of asbestos structures > 5 um :	0
Number of asbestos fibers and bundles > 5 um:	0
Number of PCM equivalent asbestos structures:	0
Number of PCM equivalent asbestos fibers:	0
Concentration of Asbestos (Chrysotile) f/cm3:	<0.00048
Concentration of Asbestos (Amphibole) f/cm3:	<0.00048
Concentration of PCME Asbestos (Chrysotile) f/cm3:	<0.00048
Concentration of Asbestos (Chrysotile), Str/L:	0
Concentration of Asbestos (Amphibole), Str/L:	0
Lower 95% Confidence Limit (Chrysotile), Str/L:	0
Upper 95% Confidence Limit (Chrysotile), Str/L:	1.8
Lower 95% Confidence Limit (Amphibole), Str/L:	0
Upper 95% Confidence Limit (Amphibole), Str/L:	1.8

Analyst: Taylor Smylie

Scott M. Ward, Ph.D. **Lab Director**

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HDOH Kula Community Air

Sample Number **MFK-AM03-122223-AB**

Air Volume:	5918.076
Effective Filter Area:	385.0 mm^2
Level of Analysis (Chrysotile):	CDQ
Level of Analysis (Amphibole):	ADQ
Magnification Used for Fiber Counting:	20,000
Aspect Ratio for Fiber Definition:	5:1
Mean Dimension of Grid Openings (GOs):	0.0132 mm^2
Initials of Analyst:	TS
Number of GO's Examined:	10
Analytical Sensitivity: f/Liter:	0.49284
Analytical Sensitivity: f/cm3:	0.00049
Number of primary asbestos structures:	0
Number of asbestos structures counted:	0
Number of asbestos structures > 5 um :	0
Number of asbestos fibers and bundles > 5 um:	0
Number of PCM equivalent asbestos structures:	0
Number of PCM equivalent asbestos fibers:	0
Concentration of Asbestos (Chrysotile) f/cm3:	<0.00049
Concentration of Asbestos (Amphibole) f/cm3:	<0.00049
Concentration of PCME Asbestos (Chrysotile) f/cm3:	<0.00049
Concentration of Asbestos (Chrysotile), Str/L:	0
Concentration of Asbestos (Amphibole), Str/L:	0
Lower 95% Confidence Limit (Chrysotile), Str/L:	0
Upper 95% Confidence Limit (Chrysotile), Str/L:	1.8
Lower 95% Confidence Limit (Amphibole), Str/L:	0
Upper 95% Confidence Limit (Amphibole), Str/L:	1.8

Analyst: Taylor Smylie

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HDOH Kula Community Air

Sample Number **MFK-FB01-122223-AB**

Air Volume:	0
Effective Filter Area:	385.0 mm^2
Level of Analysis (Chrysotile):	CDQ
Level of Analysis (Amphibole):	ADQ
Magnification Used for Fiber Counting:	20,000
Aspect Ratio for Fiber Definition:	5:1
Mean Dimension of Grid Openings (GOs):	0.0132 mm^2
Initials of Analyst:	TS
Number of GO's Examined:	10
Analytical Sensitivity: f/Liter:	N/A
Analytical Sensitivity: f/cm3:	N/A
Number of primary asbestos structures:	0
Number of asbestos structures counted:	0
Number of asbestos structures > 5 um :	0
Number of asbestos fibers and bundles > 5 um:	0
Number of PCM equivalent asbestos structures:	0
Number of PCM equivalent asbestos fibers:	0
Concentration of Asbestos (Chrysotile) f/cm3:	N/A
Concentration of Asbestos (Amphibole) f/cm3:	N/A
Concentration of PCME Asbestos (Chrysotile) f/cm3:	N/A
Concentration of Asbestos (Chrysotile), Str/L:	N/A
Concentration of Asbestos (Amphibole), Str/L:	N/A
Lower 95% Confidence Limit (Chrysotile), Str/L:	N/A
Upper 95% Confidence Limit (Chrysotile), Str/L:	N/A
Lower 95% Confidence Limit (Amphibole), Str/L:	N/A
Upper 95% Confidence Limit (Amphibole), Str/L:	N/A

Analyst: Taylor Smylie

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Report Date: 3-Jan-2024

HDOH Kula Community Air

Sample Number **MFK-AM01-122323-AB**

Air Volume:	7980.742
Effective Filter Area:	385.0 mm^2
Level of Analysis (Chrysotile):	CDQ
Level of Analysis (Amphibole):	ADQ
Magnification Used for Fiber Counting:	20,000
Aspect Ratio for Fiber Definition:	5:1
Mean Dimension of Grid Openings (GOs):	0.0132 mm^2
Initials of Analyst:	TS
Number of GO's Examined:	10
Analytical Sensitivity: f/Liter:	0.36546
Analytical Sensitivity: f/cm3:	0.00037
Number of primary asbestos structures:	0
Number of asbestos structures counted:	0
Number of asbestos structures > 5 um :	0
Number of asbestos fibers and bundles > 5 um:	0
Number of PCM equivalent asbestos structures:	0
Number of PCM equivalent asbestos fibers:	0
Concentration of Asbestos (Chrysotile) f/cm3:	<0.00037
Concentration of Asbestos (Amphibole) f/cm3:	<0.00037
Concentration of PCME Asbestos (Chrysotile) f/cm3:	<0.00037
Concentration of Asbestos (Chrysotile), Str/L:	0
Concentration of Asbestos (Amphibole), Str/L:	0
Lower 95% Confidence Limit (Chrysotile), Str/L:	0
Upper 95% Confidence Limit (Chrysotile), Str/L:	1.3
Lower 95% Confidence Limit (Amphibole), Str/L:	0
Upper 95% Confidence Limit (Amphibole), Str/L:	1.3

Analyst: Taylor Smylie

Scott M. Ward, Ph.D. **Lab Director**

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Phone: (713) 290-0221 Fax: (713) 290-0248
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Airborne Asbestos Fiber Analysis by Transmission Electron Microscopy (TEM) ISO 10312 - Ambient Air - Determination of Asbestos Fibers Direct-Transfer Transmission Electron Microscopy Method

Maura McAleese
Tetra Tech-Maui Fire
1999 Harrison St. Ste. 500
Oakland, CA 94612

EJ3 Order #: 3493379
Project #: 103S864023141
Receipt Date: 28-Dec-2023
Analysis Date: 3-Jan-2024
Report Date: 3-Jan-2024

HDOH Kula Community Air

Sample Number **MFK-AM02-122323-AB**

Air Volume:	6675.376
Effective Filter Area:	385.0 mm^2
Level of Analysis (Chrysotile):	CDQ
Level of Analysis (Amphibole):	ADQ
Magnification Used for Fiber Counting:	20,000
Aspect Ratio for Fiber Definition:	5:1
Mean Dimension of Grid Openings (GOs):	0.0132 mm^2
Initials of Analyst:	TS
Number of GO's Examined:	10
Analytical Sensitivity: f/Liter:	0.43693
Analytical Sensitivity: f/cm3:	0.00044
Number of primary asbestos structures:	0
Number of asbestos structures counted:	0
Number of asbestos structures > 5 um :	0
Number of asbestos fibers and bundles > 5 um:	0
Number of PCM equivalent asbestos structures:	0
Number of PCM equivalent asbestos fibers:	0
Concentration of Asbestos (Chrysotile) f/cm3:	<0.00044
Concentration of Asbestos (Amphibole) f/cm3:	<0.00044
Concentration of PCME Asbestos (Chrysotile) f/cm3:	<0.00044
Concentration of Asbestos (Chrysotile), Str/L:	0
Concentration of Asbestos (Amphibole), Str/L:	0
Lower 95% Confidence Limit (Chrysotile), Str/L:	0
Upper 95% Confidence Limit (Chrysotile), Str/L:	1.6
Lower 95% Confidence Limit (Amphibole), Str/L:	0
Upper 95% Confidence Limit (Amphibole), Str/L:	1.6

Analyst: Taylor Smylie

Scott M. Ward, Ph.D. **Lab Director**

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NVLAP Lab Code: 200525-0; TDSHS License: 30-0273

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Receipt Date: 28-Dec-2023
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Report Date: 3-Jan-2024

HDOH Kula Community Air

Sample Number **MFK-AM03-122323-AB**

Air Volume:	6335.225
Effective Filter Area:	385.0 mm^2
Level of Analysis (Chrysotile):	CDQ
Level of Analysis (Amphibole):	ADQ
Magnification Used for Fiber Counting:	20,000
Aspect Ratio for Fiber Definition:	5:1
Mean Dimension of Grid Openings (GOs):	0.0132 mm^2
Initials of Analyst:	TS
Number of GO's Examined:	10
Analytical Sensitivity: f/Liter:	0.46039
Analytical Sensitivity: f/cm3:	0.00046
Number of primary asbestos structures:	0
Number of asbestos structures counted:	0
Number of asbestos structures > 5 um :	0
Number of asbestos fibers and bundles > 5 um:	0
Number of PCM equivalent asbestos structures:	0
Number of PCM equivalent asbestos fibers:	0
Concentration of Asbestos (Chrysotile) f/cm3:	<0.00046
Concentration of Asbestos (Amphibole) f/cm3:	<0.00046
Concentration of PCME Asbestos (Chrysotile) f/cm3:	<0.00046
Concentration of Asbestos (Chrysotile), Str/L:	0
Concentration of Asbestos (Amphibole), Str/L:	0
Lower 95% Confidence Limit (Chrysotile), Str/L:	0
Upper 95% Confidence Limit (Chrysotile), Str/L:	1.7
Lower 95% Confidence Limit (Amphibole), Str/L:	0
Upper 95% Confidence Limit (Amphibole), Str/L:	1.7

Analyst: Taylor Smylie

Scott M. Ward, Ph.D. **Lab Director**

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EJ3 Order #: 3493379
Project #: 103S864023141
Receipt Date: 28-Dec-2023
Analysis Date: 3-Jan-2024
Report Date: 3-Jan-2024

HDOH Kula Community Air

Sample Number **MFK-FB01-122323-AB**

Air Volume:	0
Effective Filter Area:	385.0 mm^2
Level of Analysis (Chrysotile):	CDQ
Level of Analysis (Amphibole):	ADQ
Magnification Used for Fiber Counting:	20,000
Aspect Ratio for Fiber Definition:	5:1
Mean Dimension of Grid Openings (GOs):	0.0132 mm^2
Initials of Analyst:	TS
Number of GO's Examined:	10
Analytical Sensitivity: f/Liter:	N/A
Analytical Sensitivity: f/cm3:	N/A
Number of primary asbestos structures:	0
Number of asbestos structures counted:	0
Number of asbestos structures > 5 um :	0
Number of asbestos fibers and bundles > 5 um:	0
Number of PCM equivalent asbestos structures:	0
Number of PCM equivalent asbestos fibers:	0
Concentration of Asbestos (Chrysotile) f/cm3:	N/A
Concentration of Asbestos (Amphibole) f/cm3:	N/A
Concentration of PCME Asbestos (Chrysotile) f/cm3:	N/A
Concentration of Asbestos (Chrysotile), Str/L:	N/A
Concentration of Asbestos (Amphibole), Str/L:	N/A
Lower 95% Confidence Limit (Chrysotile), Str/L:	N/A
Upper 95% Confidence Limit (Chrysotile), Str/L:	N/A
Lower 95% Confidence Limit (Amphibole), Str/L:	N/A
Upper 95% Confidence Limit (Amphibole), Str/L:	N/A

Analyst: Taylor Smylie

Scott M. Ward, Ph.D. **Lab Director**

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EJ3 Order #: 3493379
Project #: 103S864023141
Receipt Date: 28-Dec-2023
Analysis Date: 3-Jan-2024
Report Date: 3-Jan-2024

HDOH Kula Community Air

Sample Number **MFK-AM01-122423-AB**

Air Volume:	7501.983
Effective Filter Area:	385.0 mm^2
Level of Analysis (Chrysotile):	CDQ
Level of Analysis (Amphibole):	ADQ
Magnification Used for Fiber Counting:	20,000
Aspect Ratio for Fiber Definition:	5:1
Mean Dimension of Grid Openings (GOs):	0.0132 mm^2
Initials of Analyst:	TS
Number of GO's Examined:	10
Analytical Sensitivity: f/Liter:	0.38879
Analytical Sensitivity: f/cm3:	0.00039
Number of primary asbestos structures:	0
Number of asbestos structures counted:	0
Number of asbestos structures > 5 um :	0
Number of asbestos fibers and bundles > 5 um:	0
Number of PCM equivalent asbestos structures:	0
Number of PCM equivalent asbestos fibers:	0
Concentration of Asbestos (Chrysotile) f/cm3:	<0.00039
Concentration of Asbestos (Amphibole) f/cm3:	<0.00039
Concentration of PCME Asbestos (Chrysotile) f/cm3:	<0.00039
Concentration of Asbestos (Chrysotile), Str/L:	0
Concentration of Asbestos (Amphibole), Str/L:	0
Lower 95% Confidence Limit (Chrysotile), Str/L:	0
Upper 95% Confidence Limit (Chrysotile), Str/L:	1.4
Lower 95% Confidence Limit (Amphibole), Str/L:	0
Upper 95% Confidence Limit (Amphibole), Str/L:	1.4

Analyst: Taylor Smylie

Scott M. Ward, Ph.D. **Lab Director**

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EJ3 Order #: 3493379
Project #: 103S864023141
Receipt Date: 28-Dec-2023
Analysis Date: 3-Jan-2024
Report Date: 3-Jan-2024

HDOH Kula Community Air

Sample Number **MFK-AM02-122423-AB**

Air Volume:	2776.689
Effective Filter Area:	385.0 mm^2
Level of Analysis (Chrysotile):	CDQ
Level of Analysis (Amphibole):	ADQ
Magnification Used for Fiber Counting:	20,000
Aspect Ratio for Fiber Definition:	5:1
Mean Dimension of Grid Openings (GOs):	0.0132 mm^2
Initials of Analyst:	TS
Number of GO’s Examined:	10
Analytical Sensitivity: f/Liter:	1.05041
Analytical Sensitivity: f/cm3:	0.00105
Number of primary asbestos structures:	0
Number of asbestos structures counted:	0
Number of asbestos structures > 5 um :	0
Number of asbestos fibers and bundles > 5 um:	0
Number of PCM equivalent asbestos structures:	0
Number of PCM equivalent asbestos fibers:	0
Concentration of Asbestos (Chrysotile) f/cm3:	<0.00105
Concentration of Asbestos (Amphibole) f/cm3:	<0.00105
Concentration of PCME Asbestos (Chrysotile) f/cm3:	<0.00105
Concentration of Asbestos (Chrysotile), Str/L:	0
Concentration of Asbestos (Amphibole), Str/L:	0
Lower 95% Confidence Limit (Chrysotile), Str/L:	0
Upper 95% Confidence Limit (Chrysotile), Str/L:	3.9
Lower 95% Confidence Limit (Amphibole), Str/L:	0
Upper 95% Confidence Limit (Amphibole), Str/L:	3.9

Analyst: Taylor Smylie

Scott M. Ward, Ph.D. **Lab Director**

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EJ3 Order #: 3493379
Project #: 103S864023141
Receipt Date: 28-Dec-2023
Analysis Date: 3-Jan-2024
Report Date: 3-Jan-2024

HDOH Kula Community Air

Sample Number **MFK-AM03-122423-AB**

Air Volume:	2997.767
Effective Filter Area:	385.0 mm^2
Level of Analysis (Chrysotile):	CDQ
Level of Analysis (Amphibole):	ADQ
Magnification Used for Fiber Counting:	20,000
Aspect Ratio for Fiber Definition:	5:1
Mean Dimension of Grid Openings (GOs):	0.0132 mm^2
Initials of Analyst:	TS
Number of GO's Examined:	10
Analytical Sensitivity: f/Liter:	0.97295
Analytical Sensitivity: f/cm3:	0.00097
Number of primary asbestos structures:	0
Number of asbestos structures counted:	0
Number of asbestos structures > 5 um :	0
Number of asbestos fibers and bundles > 5 um:	0
Number of PCM equivalent asbestos structures:	0
Number of PCM equivalent asbestos fibers:	0
Concentration of Asbestos (Chrysotile) f/cm3:	<0.00097
Concentration of Asbestos (Amphibole) f/cm3:	<0.00097
Concentration of PCME Asbestos (Chrysotile) f/cm3:	<0.00097
Concentration of Asbestos (Chrysotile), Str/L:	0
Concentration of Asbestos (Amphibole), Str/L:	0
Lower 95% Confidence Limit (Chrysotile), Str/L:	0
Upper 95% Confidence Limit (Chrysotile), Str/L:	3.6
Lower 95% Confidence Limit (Amphibole), Str/L:	0
Upper 95% Confidence Limit (Amphibole), Str/L:	3.6

Analyst: Taylor Smylie

Scott M. Ward, Ph.D. **Lab Director**

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Project #: 103S864023141
Receipt Date: 28-Dec-2023
Analysis Date: 3-Jan-2024
Report Date: 3-Jan-2024

HDOH Kula Community Air

Sample Number **MFK-FB01-122423-AB**

Air Volume:	0
Effective Filter Area:	385.0 mm^2
Level of Analysis (Chrysotile):	CDQ
Level of Analysis (Amphibole):	ADQ
Magnification Used for Fiber Counting:	20,000
Aspect Ratio for Fiber Definition:	5:1
Mean Dimension of Grid Openings (GOs):	0.0132 mm^2
Initials of Analyst:	TS
Number of GO's Examined:	10
Analytical Sensitivity: f/Liter:	N/A
Analytical Sensitivity: f/cm3:	N/A
Number of primary asbestos structures:	0
Number of asbestos structures counted:	0
Number of asbestos structures > 5 um :	0
Number of asbestos fibers and bundles > 5 um:	0
Number of PCM equivalent asbestos structures:	0
Number of PCM equivalent asbestos fibers:	0
Concentration of Asbestos (Chrysotile) f/cm3:	N/A
Concentration of Asbestos (Amphibole) f/cm3:	N/A
Concentration of PCME Asbestos (Chrysotile) f/cm3:	N/A
Concentration of Asbestos (Chrysotile), Str/L:	N/A
Concentration of Asbestos (Amphibole), Str/L:	N/A
Lower 95% Confidence Limit (Chrysotile), Str/L:	N/A
Upper 95% Confidence Limit (Chrysotile), Str/L:	N/A
Lower 95% Confidence Limit (Amphibole), Str/L:	N/A
Upper 95% Confidence Limit (Amphibole), Str/L:	N/A

Analyst: Taylor Smylie

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Stage 1 Data Verification Checklist – Asbestos

HDOH CAB – Ambient Community Air Sampling – Kula

Task Order No. 23141

Reviewed by:

Trinh Vu 01/03/2024 & Shanna Vasser 1/4/2024

Laboratory: Eurofins Built Environment Testing – Houston, TX

Analysis date: 01/03/2024

Report No: 3493379

√ 1. Chain of custody (CoC) documentation is present.

√ 2. Sample receipt condition information is present and acceptable.

√ 3. Laboratory conducting the analysis is identified.

√ 4. All samples submitted to the laboratory are accounted for.

√ 5. Requested analytical methods were performed.

√ 6. Analysis dates are provided.

√ 7. Analyte results are provided.

NA 8. Result qualifiers and definitions are provided.

√ 9. Result units are reported.

√ 10. Requested reporting limits are present.

NA 11. Method detection limits are present.

√ 12. Sample collection date and time are present.

Discrepancies:

Total volumes and the analytical method requested for samples MFK-AM01-122423-AB, MFK-AM02-122423-AB, and MFK-AM03-122423-AB are not noted on the CoC. These samples were analyzed for method ISO 10312. No action is required.

Notes: None

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EJ3 Order #: 3495358
Project #: 103S864023141
Receipt Date: 2-Jan-2024
Analysis Date: 4-Jan-2024
Report Date: 4-Jan-2024

HDOH Kula Community Air

Sample Number **MFK-AM01-122723-AB**

Air Volume:	6989.499
Effective Filter Area:	385.0 mm^2
Level of Analysis (Chrysotile):	CDQ
Level of Analysis (Amphibole):	ADQ
Magnification Used for Fiber Counting:	20,000
Aspect Ratio for Fiber Definition:	5:1
Mean Dimension of Grid Openings (GOs):	0.0132 mm^2
Initials of Analyst:	AF
Number of GO's Examined:	10
Analytical Sensitivity: f/Liter:	0.41729
Analytical Sensitivity: f/cm3:	0.00042
Number of primary asbestos structures:	0
Number of asbestos structures counted:	0
Number of asbestos structures > 5 um :	0
Number of asbestos fibers and bundles > 5 um:	0
Number of PCM equivalent asbestos structures:	0
Number of PCM equivalent asbestos fibers:	0
Concentration of Asbestos (Chrysotile) f/cm3:	<0.00042
Concentration of Asbestos (Amphibole) f/cm3:	<0.00042
Concentration of PCME Asbestos (Chrysotile) f/cm3:	<0.00042
Concentration of Asbestos (Chrysotile), Str/L:	0
Concentration of Asbestos (Amphibole), Str/L:	0
Lower 95% Confidence Limit (Chrysotile), Str/L:	0
Upper 95% Confidence Limit (Chrysotile), Str/L:	1.5
Lower 95% Confidence Limit (Amphibole), Str/L:	0
Upper 95% Confidence Limit (Amphibole), Str/L:	1.5

Analyst: Arnold Flores

Scott M. Ward, Ph.D. **Lab Director**

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Receipt Date: 2-Jan-2024
Analysis Date: 4-Jan-2024
Report Date: 4-Jan-2024

HDOH Kula Community Air

Sample Number **MFK-AM02-122723-AB**

Air Volume:	7907.303
Effective Filter Area:	385.0 mm^2
Level of Analysis (Chrysotile):	CDQ
Level of Analysis (Amphibole):	ADQ
Magnification Used for Fiber Counting:	20,000
Aspect Ratio for Fiber Definition:	5:1
Mean Dimension of Grid Openings (GOs):	0.0132 mm^2
Initials of Analyst:	AF
Number of GO's Examined:	10
Analytical Sensitivity: f/Liter:	0.36886
Analytical Sensitivity: f/cm3:	0.00037
Number of primary asbestos structures:	0
Number of asbestos structures counted:	0
Number of asbestos structures > 5 um :	0
Number of asbestos fibers and bundles > 5 um:	0
Number of PCM equivalent asbestos structures:	0
Number of PCM equivalent asbestos fibers:	0
Concentration of Asbestos (Chrysotile) f/cm3:	<0.00037
Concentration of Asbestos (Amphibole) f/cm3:	<0.00037
Concentration of PCME Asbestos (Chrysotile) f/cm3:	<0.00037
Concentration of Asbestos (Chrysotile), Str/L:	0
Concentration of Asbestos (Amphibole), Str/L:	0
Lower 95% Confidence Limit (Chrysotile), Str/L:	0
Upper 95% Confidence Limit (Chrysotile), Str/L:	1.4
Lower 95% Confidence Limit (Amphibole), Str/L:	0
Upper 95% Confidence Limit (Amphibole), Str/L:	1.4

Analyst: Arnold Flores

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EJ3 Order #: 3495358
Project #: 103S864023141
Receipt Date: 2-Jan-2024
Analysis Date: 4-Jan-2024
Report Date: 4-Jan-2024

HDOH Kula Community Air

Sample Number **MFK-AM03-122723-AB**

Air Volume:	9694.414
Effective Filter Area:	385.0 mm^2
Level of Analysis (Chrysotile):	CDQ
Level of Analysis (Amphibole):	ADQ
Magnification Used for Fiber Counting:	20,000
Aspect Ratio for Fiber Definition:	5:1
Mean Dimension of Grid Openings (GOs):	0.0132 mm^2
Initials of Analyst:	AF
Number of GO’s Examined:	10
Analytical Sensitivity: f/Liter:	0.30086
Analytical Sensitivity: f/cm3:	0.00030
Number of primary asbestos structures:	0
Number of asbestos structures counted:	0
Number of asbestos structures > 5 um :	0
Number of asbestos fibers and bundles > 5 um:	0
Number of PCM equivalent asbestos structures:	0
Number of PCM equivalent asbestos fibers:	0
Concentration of Asbestos (Chrysotile) f/cm3:	<0.00030
Concentration of Asbestos (Amphibole) f/cm3:	<0.00030
Concentration of PCME Asbestos (Chrysotile) f/cm3:	<0.00030
Concentration of Asbestos (Chrysotile), Str/L:	0
Concentration of Asbestos (Amphibole), Str/L:	0
Lower 95% Confidence Limit (Chrysotile), Str/L:	0
Upper 95% Confidence Limit (Chrysotile), Str/L:	1.1
Lower 95% Confidence Limit (Amphibole), Str/L:	0
Upper 95% Confidence Limit (Amphibole), Str/L:	1.1

Analyst: Arnold Flores

Scott M. Ward, Ph.D. **Lab Director**

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Airborne Asbestos Fiber Analysis by Transmission Electron Microscopy (TEM) ISO 10312 - Ambient Air - Determination of Asbestos Fibers Direct-Transfer Transmission Electron Microscopy Method

Maura McAleese
Tetra Tech - Maui Fire
1999 Harrison St. Ste 500
Oakland, CA 94612

EJ3 Order #: 3495358
Project #: 103S864023141
Receipt Date: 2-Jan-2024
Analysis Date: 4-Jan-2024
Report Date: 4-Jan-2024

HDOH Kula Community Air

Sample Number **MFK-FB01-122723-AB**

Air Volume:	0
Effective Filter Area:	385.0 mm^2
Level of Analysis (Chrysotile):	CDQ
Level of Analysis (Amphibole):	ADQ
Magnification Used for Fiber Counting:	20,000
Aspect Ratio for Fiber Definition:	5:1
Mean Dimension of Grid Openings (GOs):	0.0132 mm^2
Initials of Analyst:	AF
Number of GO's Examined:	10
Analytical Sensitivity: f/Liter:	N/A
Analytical Sensitivity: f/cm3:	N/A
Number of primary asbestos structures:	0
Number of asbestos structures counted:	0
Number of asbestos structures > 5 um :	0
Number of asbestos fibers and bundles > 5 um:	0
Number of PCM equivalent asbestos structures:	0
Number of PCM equivalent asbestos fibers:	0
Concentration of Asbestos (Chrysotile) f/cm3:	N/A
Concentration of Asbestos (Amphibole) f/cm3:	N/A
Concentration of PCME Asbestos (Chrysotile) f/cm3:	N/A
Concentration of Asbestos (Chrysotile), Str/L:	N/A
Concentration of Asbestos (Amphibole), Str/L:	N/A
Lower 95% Confidence Limit (Chrysotile), Str/L:	N/A
Upper 95% Confidence Limit (Chrysotile), Str/L:	N/A
Lower 95% Confidence Limit (Amphibole), Str/L:	N/A
Upper 95% Confidence Limit (Amphibole), Str/L:	N/A

Analyst: Arnold Flores

Scott M. Ward, Ph.D. **Lab Director**

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Oakland, CA 94612

EJ3 Order #: 3495358
Project #: 103S864023141
Receipt Date: 2-Jan-2024
Analysis Date: 4-Jan-2024
Report Date: 4-Jan-2024

HDOH Kula Community Air

Sample Number **MFK-LB01-122723-AB**

Air Volume:	0
Effective Filter Area:	385.0 mm^2
Level of Analysis (Chrysotile):	CDQ
Level of Analysis (Amphibole):	ADQ
Magnification Used for Fiber Counting:	20,000
Aspect Ratio for Fiber Definition:	5:1
Mean Dimension of Grid Openings (GOs):	0.0132 mm^2
Initials of Analyst:	AF
Number of GO's Examined:	10
Analytical Sensitivity: f/Liter:	N/A
Analytical Sensitivity: f/cm3:	N/A
Number of primary asbestos structures:	0
Number of asbestos structures counted:	0
Number of asbestos structures > 5 um :	0
Number of asbestos fibers and bundles > 5 um:	0
Number of PCM equivalent asbestos structures:	0
Number of PCM equivalent asbestos fibers:	0
Concentration of Asbestos (Chrysotile) f/cm3:	N/A
Concentration of Asbestos (Amphibole) f/cm3:	N/A
Concentration of PCME Asbestos (Chrysotile) f/cm3:	N/A
Concentration of Asbestos (Chrysotile), Str/L:	N/A
Concentration of Asbestos (Amphibole), Str/L:	N/A
Lower 95% Confidence Limit (Chrysotile), Str/L:	N/A
Upper 95% Confidence Limit (Chrysotile), Str/L:	N/A
Lower 95% Confidence Limit (Amphibole), Str/L:	N/A
Upper 95% Confidence Limit (Amphibole), Str/L:	N/A

Analyst: Arnold Flores

Scott M. Ward, Ph.D. **Lab Director**

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Stage 1 Data Verification Checklist – Asbestos

HDOH CAB – Ambient Community Air Sampling – Kula

Task Order No. 23141

Reviewed by:
Trinh Vu 01/08/2024 & Shanna Vasser 1/9/2024
Laboratory: Eurofins Built Environment Testing – Houston, TX
Analysis date: 01/04/2024
Report No: 3495358

√ 1. Chain of custody (CoC) documentation is present.

√ 2. Sample receipt condition information is present and acceptable.

√ 3. Laboratory conducting the analysis is identified.

√ 4. All samples submitted to the laboratory are accounted for.

√ 5. Requested analytical methods were performed.

√ 6. Analysis dates are provided.

√ 7. Analyte results are provided.

NA 8. Result qualifiers and definitions are provided.

√ 9. Result units are reported.

√ 10. Requested reporting limits are present.

NA 11. Method detection limits are present.

√ 12. Sample collection date and time are present.

Discrepancies: None

Notes: None

Built Environment Testing

Report for:

Maura McAleese
Tetra Tech- Maui Fire
1999 Harrison St. Ste. 500
Oakland, CA 94612

Regarding: Eurofins J3 Resources, Inc.
Project: 103S864023141; HDOH Kula Community Air
EML ID: 3495311

Approved by:

Lab Director
Scott Ward

Dates of Analysis:
Asbestos TEM ISO 10312 / ASTM6281-06: 01-05-2024

All samples were received in acceptable condition unless noted in the Report Comments portion in the body of the report. Due to the nature of the analyses performed, field blank correction of results is not applied. The results relate only to the samples as received and tested.

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EJ3 Order #: 3495311
Project #: 103S864023141
Receipt Date: 2-Jan-2024
Analysis Date: 4-Jan-2024
Report Date: 4-Jan-2024

HDOH Kula Community Air

Sample Number **MFK-AM01-122823-AB**

Air Volume:	6446.938
Effective Filter Area:	385.0 mm^2
Level of Analysis (Chrysotile):	CDQ
Level of Analysis (Amphibole):	ADQ
Magnification Used for Fiber Counting:	20,000
Aspect Ratio for Fiber Definition:	5:1
Mean Dimension of Grid Openings (GOs):	0.0132 mm^2
Initials of Analyst:	AF
Number of GO's Examined:	10
Analytical Sensitivity: f/Liter:	0.45241
Analytical Sensitivity: f/cm3:	0.00045
Number of primary asbestos structures:	0
Number of asbestos structures counted:	0
Number of asbestos structures > 5 um :	0
Number of asbestos fibers and bundles > 5 um:	0
Number of PCM equivalent asbestos structures:	0
Number of PCM equivalent asbestos fibers:	0
Concentration of Asbestos (Chrysotile) f/cm3:	<0.00045
Concentration of Asbestos (Amphibole) f/cm3:	<0.00045
Concentration of PCME Asbestos (Chrysotile) f/cm3:	<0.00045
Concentration of Asbestos (Chrysotile), Str/L:	0
Concentration of Asbestos (Amphibole), Str/L:	0
Lower 95% Confidence Limit (Chrysotile), Str/L:	0
Upper 95% Confidence Limit (Chrysotile), Str/L:	1.7
Lower 95% Confidence Limit (Amphibole), Str/L:	0
Upper 95% Confidence Limit (Amphibole), Str/L:	1.7

Analyst: Arnold Flores

Scott M. Ward, Ph.D. **Lab Director**

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EJ3 Order #: 3495311
Project #: 103S864023141
Receipt Date: 2-Jan-2024
Analysis Date: 4-Jan-2024
Report Date: 4-Jan-2024

HDOH Kula Community Air

Sample Number **MFK-AM02-122823-AB**

Air Volume:	4502.584
Effective Filter Area:	385.0 mm^2
Level of Analysis (Chrysotile):	CDQ
Level of Analysis (Amphibole):	ADQ
Magnification Used for Fiber Counting:	20,000
Aspect Ratio for Fiber Definition:	5:1
Mean Dimension of Grid Openings (GOs):	0.0132 mm^2
Initials of Analyst:	AF
Number of GO's Examined:	10
Analytical Sensitivity: f/Liter:	0.64778
Analytical Sensitivity: f/cm3:	0.00065
Number of primary asbestos structures:	0
Number of asbestos structures counted:	0
Number of asbestos structures > 5 um :	0
Number of asbestos fibers and bundles > 5 um:	0
Number of PCM equivalent asbestos structures:	0
Number of PCM equivalent asbestos fibers:	0
Concentration of Asbestos (Chrysotile) f/cm3:	<0.00065
Concentration of Asbestos (Amphibole) f/cm3:	<0.00065
Concentration of PCME Asbestos (Chrysotile) f/cm3:	<0.00065
Concentration of Asbestos (Chrysotile), Str/L:	0
Concentration of Asbestos (Amphibole), Str/L:	0
Lower 95% Confidence Limit (Chrysotile), Str/L:	0
Upper 95% Confidence Limit (Chrysotile), Str/L:	2.4
Lower 95% Confidence Limit (Amphibole), Str/L:	0
Upper 95% Confidence Limit (Amphibole), Str/L:	2.4

Analyst: Arnold Flores

Scott M. Ward, Ph.D. **Lab Director**

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EJ3 Order #: 3495311
Project #: 103S864023141
Receipt Date: 2-Jan-2024
Analysis Date: 4-Jan-2024
Report Date: 4-Jan-2024

HDOH Kula Community Air

Sample Number **MFK-AM03-122823-AB**

Air Volume:	7776.869
Effective Filter Area:	385.0 mm^2
Level of Analysis (Chrysotile):	CDQ
Level of Analysis (Amphibole):	ADQ
Magnification Used for Fiber Counting:	20,000
Aspect Ratio for Fiber Definition:	5:1
Mean Dimension of Grid Openings (GOs):	0.0132 mm^2
Initials of Analyst:	AF
Number of GO's Examined:	10
Analytical Sensitivity: f/Liter:	0.37504
Analytical Sensitivity: f/cm3:	0.00038
Number of primary asbestos structures:	0
Number of asbestos structures counted:	0
Number of asbestos structures > 5 um :	0
Number of asbestos fibers and bundles > 5 um:	0
Number of PCM equivalent asbestos structures:	0
Number of PCM equivalent asbestos fibers:	0
Concentration of Asbestos (Chrysotile) f/cm3:	<0.00038
Concentration of Asbestos (Amphibole) f/cm3:	<0.00038
Concentration of PCME Asbestos (Chrysotile) f/cm3:	<0.00038
Concentration of Asbestos (Chrysotile), Str/L:	0
Concentration of Asbestos (Amphibole), Str/L:	0
Lower 95% Confidence Limit (Chrysotile), Str/L:	0
Upper 95% Confidence Limit (Chrysotile), Str/L:	1.4
Lower 95% Confidence Limit (Amphibole), Str/L:	0
Upper 95% Confidence Limit (Amphibole), Str/L:	1.4

Analyst: Arnold Flores

Scott M. Ward, Ph.D. **Lab Director**

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EJ3 Order #: 3495311
Project #: 103S864023141
Receipt Date: 2-Jan-2024
Analysis Date: 5-Jan-2024
Report Date: 5-Jan-2024

HDOH Kula Community Air

Sample Number **MFK-FB01-122823-AB**

Air Volume:	0
Effective Filter Area:	385.0 mm^2
Level of Analysis (Chrysotile):	CDQ
Level of Analysis (Amphibole):	ADQ
Magnification Used for Fiber Counting:	20,000
Aspect Ratio for Fiber Definition:	5:1
Mean Dimension of Grid Openings (GOs):	0.0132 mm^2
Initials of Analyst:	AF
Number of GO's Examined:	10
Analytical Sensitivity: f/Liter:	N/A
Analytical Sensitivity: f/cm3:	N/A
Number of primary asbestos structures:	0
Number of asbestos structures counted:	0
Number of asbestos structures > 5 um :	0
Number of asbestos fibers and bundles > 5 um:	0
Number of PCM equivalent asbestos structures:	0
Number of PCM equivalent asbestos fibers:	0
Concentration of Asbestos (Chrysotile) f/cm3:	N/A
Concentration of Asbestos (Amphibole) f/cm3:	N/A
Concentration of PCME Asbestos (Chrysotile) f/cm3:	N/A
Concentration of Asbestos (Chrysotile), Str/L:	N/A
Concentration of Asbestos (Amphibole), Str/L:	N/A
Lower 95% Confidence Limit (Chrysotile), Str/L:	N/A
Upper 95% Confidence Limit (Chrysotile), Str/L:	N/A
Lower 95% Confidence Limit (Amphibole), Str/L:	N/A
Upper 95% Confidence Limit (Amphibole), Str/L:	N/A

Analyst: Arnold Flores

Scott M. Ward, Ph.D. **Lab Director**

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EJ3 Order #: 3495311
Project #: 103S864023141
Receipt Date: 2-Jan-2024
Analysis Date: 5-Jan-2024
Report Date: 5-Jan-2024

HDOH Kula Community Air

Sample Number **MFK-AM01-122923-AB**

Air Volume:	2448.073
Effective Filter Area:	385.0 mm^2
Level of Analysis (Chrysotile):	CDQ
Level of Analysis (Amphibole):	ADQ
Magnification Used for Fiber Counting:	20,000
Aspect Ratio for Fiber Definition:	5:1
Mean Dimension of Grid Openings (GOs):	0.0132 mm^2
Initials of Analyst:	AF
Number of GO's Examined:	10
Analytical Sensitivity: f/Liter:	1.19141
Analytical Sensitivity: f/cm3:	0.00119
Number of primary asbestos structures:	0
Number of asbestos structures counted:	0
Number of asbestos structures > 5 um :	0
Number of asbestos fibers and bundles > 5 um:	0
Number of PCM equivalent asbestos structures:	0
Number of PCM equivalent asbestos fibers:	0
Concentration of Asbestos (Chrysotile) f/cm3:	<0.00119
Concentration of Asbestos (Amphibole) f/cm3:	<0.00119
Concentration of PCME Asbestos (Chrysotile) f/cm3:	<0.00119
Concentration of Asbestos (Chrysotile), Str/L:	0
Concentration of Asbestos (Amphibole), Str/L:	0
Lower 95% Confidence Limit (Chrysotile), Str/L:	0
Upper 95% Confidence Limit (Chrysotile), Str/L:	4.4
Lower 95% Confidence Limit (Amphibole), Str/L:	0
Upper 95% Confidence Limit (Amphibole), Str/L:	4.4

Analyst: Arnold Flores

Scott M. Ward, Ph.D. **Lab Director**

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EJ3 Order #: 3495311
Project #: 103S864023141
Receipt Date: 2-Jan-2024
Analysis Date: 5-Jan-2024
Report Date: 5-Jan-2024

HDOH Kula Community Air

Sample Number **MFK-AM02-122923-AB**

Air Volume:	6461.735
Effective Filter Area:	385.0 mm^2
Level of Analysis (Chrysotile):	CDQ
Level of Analysis (Amphibole):	ADQ
Magnification Used for Fiber Counting:	20,000
Aspect Ratio for Fiber Definition:	5:1
Mean Dimension of Grid Openings (GOs):	0.0132 mm^2
Initials of Analyst:	AF
Number of GO's Examined:	10
Analytical Sensitivity: f/Liter:	0.45138
Analytical Sensitivity: f/cm3:	0.00045
Number of primary asbestos structures:	0
Number of asbestos structures counted:	0
Number of asbestos structures > 5 um :	0
Number of asbestos fibers and bundles > 5 um:	0
Number of PCM equivalent asbestos structures:	0
Number of PCM equivalent asbestos fibers:	0
Concentration of Asbestos (Chrysotile) f/cm3:	<0.00045
Concentration of Asbestos (Amphibole) f/cm3:	<0.00045
Concentration of PCME Asbestos (Chrysotile) f/cm3:	<0.00045
Concentration of Asbestos (Chrysotile), Str/L:	0
Concentration of Asbestos (Amphibole), Str/L:	0
Lower 95% Confidence Limit (Chrysotile), Str/L:	0
Upper 95% Confidence Limit (Chrysotile), Str/L:	1.7
Lower 95% Confidence Limit (Amphibole), Str/L:	0
Upper 95% Confidence Limit (Amphibole), Str/L:	1.7

Analyst: Arnold Flores

Scott M. Ward, Ph.D. **Lab Director**

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Oakland, CA 94612

EJ3 Order #: 3495311
Project #: 103S864023141
Receipt Date: 2-Jan-2024
Analysis Date: 5-Jan-2024
Report Date: 5-Jan-2024

HDOH Kula Community Air

Sample Number **MFK-AM03-122923-AB**

Air Volume:	1094.381
Effective Filter Area:	385.0 mm^2
Level of Analysis (Chrysotile):	CDQ
Level of Analysis (Amphibole):	ADQ
Magnification Used for Fiber Counting:	20,000
Aspect Ratio for Fiber Definition:	5:1
Mean Dimension of Grid Openings (GOs):	0.0132 mm^2
Initials of Analyst:	AF
Number of GO's Examined:	10
Analytical Sensitivity: f/Liter:	2.66513
Analytical Sensitivity: f/cm3:	0.00267
Number of primary asbestos structures:	0
Number of asbestos structures counted:	0
Number of asbestos structures > 5 um :	0
Number of asbestos fibers and bundles > 5 um:	0
Number of PCM equivalent asbestos structures:	0
Number of PCM equivalent asbestos fibers:	0
Concentration of Asbestos (Chrysotile) f/cm3:	<0.00267
Concentration of Asbestos (Amphibole) f/cm3:	<0.00267
Concentration of PCME Asbestos (Chrysotile) f/cm3:	<0.00267
Concentration of Asbestos (Chrysotile), Str/L:	0
Concentration of Asbestos (Amphibole), Str/L:	0
Lower 95% Confidence Limit (Chrysotile), Str/L:	0
Upper 95% Confidence Limit (Chrysotile), Str/L:	9.8
Lower 95% Confidence Limit (Amphibole), Str/L:	0
Upper 95% Confidence Limit (Amphibole), Str/L:	9.8

Analyst: Arnold Flores

Scott M. Ward, Ph.D. **Lab Director**

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EJ3 Order #: 3495311
Project #: 103S864023141
Receipt Date: 2-Jan-2024
Analysis Date: 5-Jan-2024
Report Date: 5-Jan-2024

HDOH Kula Community Air

Sample Number **MFK-FB01-122923-AB**

Air Volume:	0
Effective Filter Area:	385.0 mm^2
Level of Analysis (Chrysotile):	CDQ
Level of Analysis (Amphibole):	ADQ
Magnification Used for Fiber Counting:	20,000
Aspect Ratio for Fiber Definition:	5:1
Mean Dimension of Grid Openings (GOs):	0.0132 mm^2
Initials of Analyst:	AF
Number of GO's Examined:	10
Analytical Sensitivity: f/Liter:	N/A
Analytical Sensitivity: f/cm3:	N/A
Number of primary asbestos structures:	0
Number of asbestos structures counted:	0
Number of asbestos structures > 5 um :	0
Number of asbestos fibers and bundles > 5 um:	0
Number of PCM equivalent asbestos structures:	0
Number of PCM equivalent asbestos fibers:	0
Concentration of Asbestos (Chrysotile) f/cm3:	N/A
Concentration of Asbestos (Amphibole) f/cm3:	N/A
Concentration of PCME Asbestos (Chrysotile) f/cm3:	N/A
Concentration of Asbestos (Chrysotile), Str/L:	N/A
Concentration of Asbestos (Amphibole), Str/L:	N/A
Lower 95% Confidence Limit (Chrysotile), Str/L:	N/A
Upper 95% Confidence Limit (Chrysotile), Str/L:	N/A
Lower 95% Confidence Limit (Amphibole), Str/L:	N/A
Upper 95% Confidence Limit (Amphibole), Str/L:	N/A

Analyst: Arnold Flores

Scott M. Ward, Ph.D. **Lab Director**

These results apply to the sample(s) as received. Eurofins J3 Resources, Inc. (EJ3) is not responsible for results reported in fibers or asbestos structures per cubic centimeter, which is dependent on volumes provided by non-laboratory personnel. This report is for the exclusive use of the addressed client and shall not be reproduced except in full, without written approval by EJ3. All samples received in good condition unless otherwise noted. This report shall not be used to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the federal government.

NVLAP Lab Code: 200525-0; TDSHS License: 30-0273

Stage 1 Data Verification Checklist – Asbestos

HDOH CAB – Ambient Community Air Sampling – Kula

Task Order No. 23141

Reviewed by:
Trinh Vu 01/11/2024 & Shanna Vasser 1/12/2024
Laboratory: Eurofins Built Environment Testing – Houston, TX
Analysis date: 01/04/2024 and 01/05/2024
Report No: 3495311

√ 1. Chain of custody (CoC) documentation is present.

√ 2. Sample receipt condition information is present and acceptable.

√ 3. Laboratory conducting the analysis is identified.

√ 4. All samples submitted to the laboratory are accounted for.

√ 5. Requested analytical methods were performed.

√ 6. Analysis dates are provided.

√ 7. Analyte results are provided.

NA 8. Result qualifiers and definitions are provided.

√ 9. Result units are reported.

√ 10. Requested reporting limits are present.

NA 11. Method detection limits are present.

√ 12. Sample collection date and time are present.

Discrepancies: None

Notes: None