



DEPARTMENT OF THE NAVY

COMMANDER
NAVY REGION HAWAII
NAVY CLOSURE TASK FORCE - RED HILL
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JBPHH, HAWAII 96860-5101

5090
Ser N0/032
April 12, 2024

Joanna Seto
State of Hawaii, Department of Health
Administrator Environmental Management Division
P.O. Box 3378
Honolulu, HI 96801-3378

Dear Ms. Seto:

**SUBJECT: NAVY CLOSURE TASK FORCE-RED HILL TANK CLEANING
VENTILATION AIR QUALITY MONITORING PLAN**

Thank you for meeting with the Navy Closure Task Force-Red Hill (NCTF-RH) on April 9, 2024, to discuss the forced ventilation of the Red Hill Bulk Fuel Storage Facility (RHBFSF) tanks to allow for cleaning. NCTF-RH acknowledges your re-confirmation that an air permit is not required for ventilation during the meeting, confirmed in your guidance email dated April 10, 2024, and stated in official correspondence from the State of Hawaii Department of Health (DOH) dated October 4, 2023. As discussed, NCTF-RH understands the concerns of citizens and DOH regarding the health and safety of workers at the facility and residents in the community who may have a higher risk for respiratory issues.

NCTF-RH has developed an Air Quality Monitoring (AQM) Plan as requested, detailed below. To proceed with AQM and venting operations, NCTF-RH requires confirmation and acceptance of applying Acute Exposure Level Guidelines (AELGs) or the DOE-, EPA-, and NOAA-developed Protective Action Criteria (PAC), as appropriate, as Action Levels. Specifically, the 10-minute AELG-1 for JP-5 and JP-8 is 290 mg/m^3 or 38.33 parts per million per volume (ppmv) when using the JP-5 molecular weight of 185 at 25°C . No AELG currently exists for diesel, and so as an alternate standard, NCTF-RH proposes to use the PAC-1 standard of 300 mg/m^3 or 36.67 ppmv using the diesel molecular weight of 200 at 25°C . For field implementation, NCTF-RH seeks approval to measure total Volatile Organic Compounds (VOCs) as a surrogate for monitoring fuel in the air at the Facility.

Because JP-5 and diesel fuel encompass a large suite of VOCs, for sampling efforts, the NCTF-RH and DOH should agree to the constituents for laboratory analysis of summa canister samples. NCTF-RH also proposes the following approach in response to an AQM exceedance/trigger.

- If an AQM station exceeds 35 ppmv for a one-hour time-weighted average:
 - Summa canister will be automatically triggered to collect an air sample for certified laboratory analysis;

- AQM will be inspected by the contractor to determine potential equipment malfunction;
- The AQM station will continue to be monitored closely to determine if high readings are continuous or anomalous.
- If AQM station exceeds 38 ppmv for a one-hour time-weighted average:
 - Summa canister will be automatically triggered to collect an air sample for certified laboratory analysis;
 - AQM will be inspected by the contractor to determine potential equipment malfunction;
 - The AQM station will continue to be monitored closely to determine if high readings are continuous or anomalous;
 - NCTF-RH will use existing notification procedures developed for the previous AQM effort to inform NCTF-RH, DOH and EPA;
 - Public Notification will be issued by the NCTF-RH;
 - Forced ventilation operations will cease until corrective action is taken to resolve the issue.

In addition to NCTF-RH monitoring, a contractor will directly monitor ventilation stack emissions at Adit 4 and adjusting air flow to meet the NIOSH 10-hour time-weighted average for worker protection of 15 ppmv for VOCs (indoor settings).

Accordingly, to implement the Plan at the Facility for the duration of tank cleaning efforts, NCTF-RH proposes to use the AQM systems described in detail below. NCTF-RH agrees with DOH's request to implement an AQM system for tank cleaning and site closure. The AQM effort will focus directly on the Facility during an estimated three-year period while forced ventilation is occurring. Using the AQM systems from the effort that just concluded in March 2024, six of those AQM systems have been installed within the perimeter of the Facility on April 3, and are currently collecting VOC and meteorological data until the new systems and services are under contract.

The new AQM systems will be upgraded with a more suitable sensor rated for extended outdoor use, housed in weatherproof enclosures on a stand or rack, and each station will run exclusively on solar and battery power. All systems will be checked daily and tested along with the manufacturer's recommended maintenance schedule. Additional air monitoring units will be placed on standby in the event of a field failure.

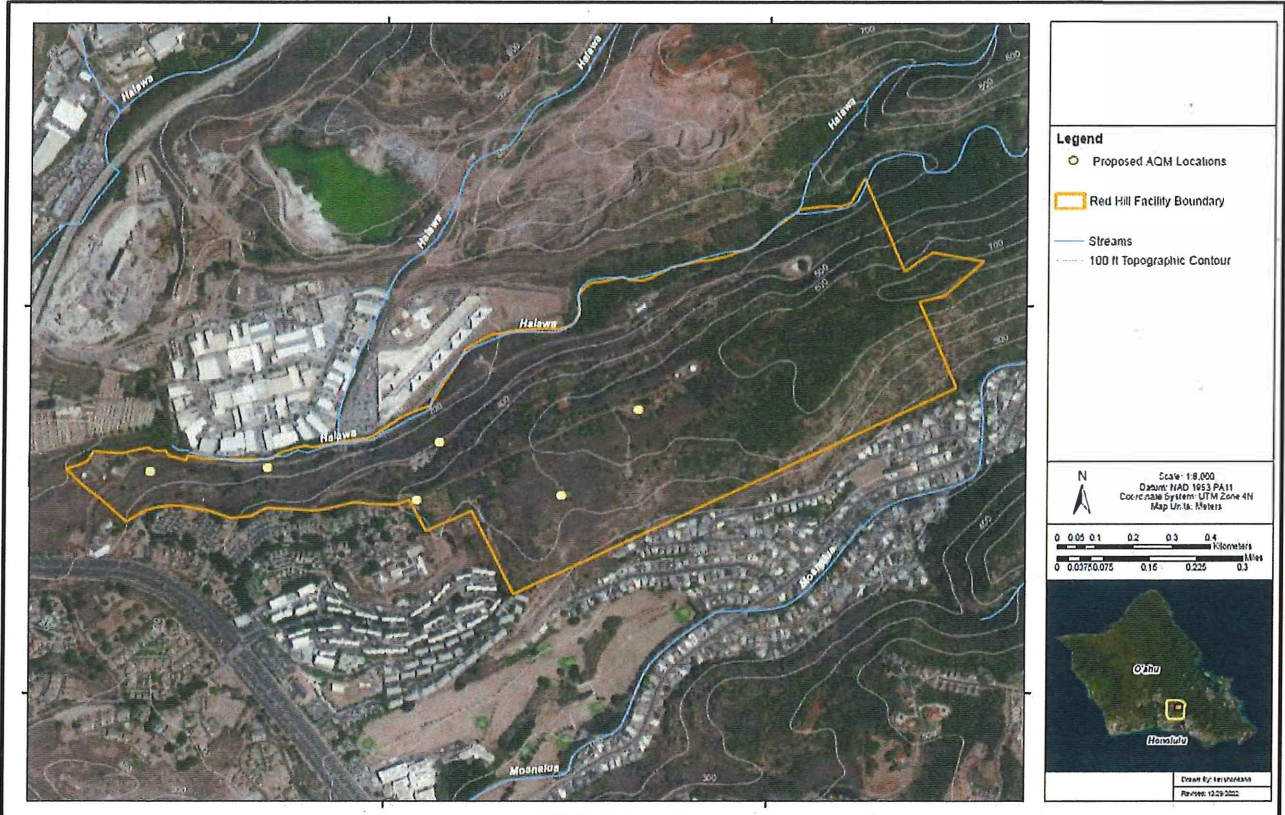
The AQM systems are intended for monitoring, detection, and environmental surveillance of total VOCs, automatic summa canister sampling at set trigger levels, along with the potential to add additional pollutants. NCTF-RH proposes the following details to document the logistics, operating procedures, and methodologies to accomplish the AQM effort.

AQM Site Locations

AQM locations have been set up within the Facility boundary based primarily on meteorological data. Current AQM weather data that has been collected since October 2023,

show a prevailing wind direction at the Facility, generally running northeast to southwest following the ridge line. Figure 1 shows the current AQM locations (which are subject to change) with a baseline AQM at the top of the ridge near the water tanks. The remaining AQM locations are situated downwind, with some proximal to Adit entrances, the Adit 4 stack, and adjacent communities to establish an effective monitoring grid.

Figure 1: AQM Locations



AQM System Design Capabilities

The current AQM consists of a weather station and a MiniRAE 3000+ PID equipped with a 10.6 eV lamp, capable of measuring approximately 200 VOCs.

The new AQM system will also include an automatic summa canister air sample collection system at each station using. The summa canister will have the ability to collect an air sample at a set alarm point currently proposed at 35 ppmv for total VOCs. Collected summa canister air samples will be sent to a Navy-approved laboratory for analysis after consultation with DOH on the analytical constituents.

The system will also include a meteorological station that will collect, at a minimum:

- Temperature
- Barometric pressure
- Relative humidity

- Wind direction
- Wind speed

AQM Work Requirements

The contractor will perform the following:

- Provide all equipment, materials, and labor necessary to complete the project.
- Collect air samples via summa canister at a set trigger threshold at 35 ppmv.
- AQM will continue with an on-site alarm and alert system in the event of a trigger, and will follow the previously agreed upon AQM notification chart.
- Monitor and continuously record data at each AQM location.
- Meet the reporting requirements that are specified in this document.
- Total monitoring duration will be dependent on NCTF-RH work schedules for tank cleaning.

Data Evaluation, Validation, and Reporting

The contractor will collect and evaluate air monitoring data for the duration defined in the contract which is expected to be approximately a three-year period of performance. The equipment will be calibrated in accordance with manufacturer recommendations, and calibration will be performed at least monthly with the likelihood of daily bump testing. The accuracy of each AQM will be checked daily with a bump-test, and will be recalibrated when results are outside established limits.

The contractor will include a strategy to establish a baseline of air quality conditions based on equipment, as well as alert NCTF-RH of any indications of potential exceedances/releases due to readings that are typically outside of established normal ranges. As stated previously, NCTF-RH has identified VOCs and other potential air pollutants depending on equipment. This is subject to change and may include additional nuisance monitoring parameters as directed.

- Air monitoring equipment and/or database will provide a running 1-hour time-weighted average and 8-hour time-weighted average concentration.
- The contractor will utilize a networked system when practical, depending on the limitations of the location. Any direct reading instruments used shall have an audible alarm to indicate an immediate exceedance over a set trigger level (TBD).
- Fuel odor may be used to determine presence/release, but it will not be used exclusively to evaluate potential concentrations or issues.
- AQM system is expected to provide continuous monitoring during ventilation, which is expected to run during the tank cleaning.
- Per DOH's request in its March 8, 2024, official correspondence to the Navy, at a minimum, the following data is requested to be reported **for each hour of degassing:**
 - Total VOC concentrations in ppmv, averaged on an hourly basis.
 - That data shall be made available to the public by posting on a Navy-hosted website (e.g., Safe Waters).

- In response to this DOH request, NCTF-RH is evaluating and determining the feasibility for posting “near real-time data.” Current Navy protocol dictates that data posted for public and regulatory dissemination must meet our established validation requirements in order to provide accuracy. This will cause a delay in posting “near real-time data” depending on the volume of data points per station. It is estimated that best available scenario for validated data posting may be 24 to 48 hours after data collection.
- Data retrieval frequency at all stations will be collected five days a week during the period of planned ventilation and will be reviewed daily at external stations, which will be capable of cellular uploads to a cloud-based data base, with password-keyed security, and user specified permissions for data use. Data from both in-tunnel stations and external broad area stations will be stored in a single cloud-based data system that will be customized for this project, based on project requirements.
- Data will be made available to NCTF-RH within 24 hours if the database is not readily accessible by Government personnel. In the event that a reading elicits concern, NCTF-RH will require immediate notification to enact proper response measures. At a minimum, any detected exceedance that triggers a response/sampling action will need to address:
 - Notification of designated personnel/response contacts provided by NCTF-RH, along with the contractor’s Site-Specific Health and Safety Plan.
- Upon completion of monitoring requirements, the contractor will remove all equipment and return the site locations to their original condition.

The contractor shall include support to review data from each AQM system on a daily basis. Data will be validated according to procedures described in the project Quality Assurance Protection Plan (QAPP). Data that needs to be invalidated due to various reasons (such as bump test failure, weather issues/humidity, etc.) will be flagged by the data validator with input from the field operation team and oversight from a quality control manager. Data will be validated routinely.

The contractor shall include support to save all data from the project into a secure database. Activities covered in this task include creating and maintaining the database. This should also cover daily or weekly maintenance (as needed) and uploading raw and validated data from the data validator. A secure, permanent copy of the data set may be used for current reporting and any future data needs. AECOM has also included support in this task to produce data sets of the time averaging intervals required for Navy reporting requirements.

For data collected outside the degassing events, the contractor will prepare a baseline report presenting data collected during the first month, a completion report, summarizing all activities and results, weekly data reports, and exceedance reports as described below:

- Immediate reporting of any exceedances beyond an established Action Level
- One baseline report after an agreed upon date.
- Monthly documentation reports including tables showing instrument results along with any relevant statistical analyses, including summaries of parameters and meteorological data.

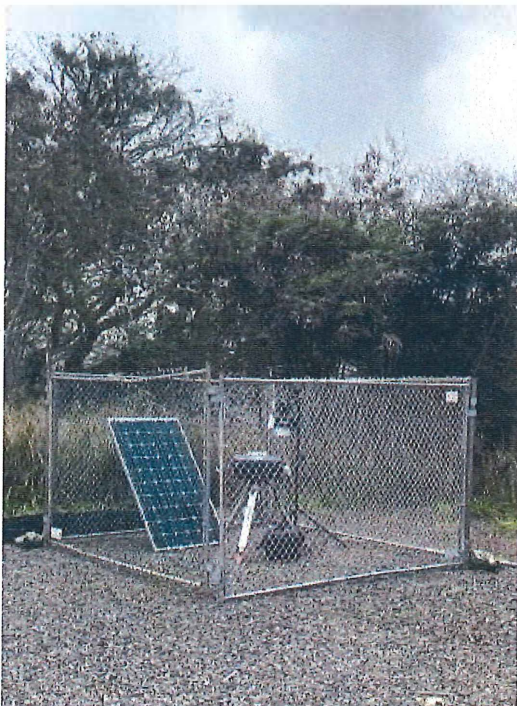
- Reports shall include a summary of 1-hour running average air monitoring results for each monitoring station and instrument, and the 1-hour block average meteorological data.
- One completion report summarizing activities and results.
- Raw electronic data files and reports will be uploaded to EDMS and/or the Safe Waters website per Navy direction and approval.

Due dates for these reports are not specified and assumes they will be determined in the project kick-off meeting.

Setup and Installation

The contractor shall procure all necessary equipment to satisfy requirements of this work plan. Upon contract issue, Navy assumes that installation should be relatively routine and fairly quick because of the simplicity of the set up. The anticipated start date will be April 2024 prior to commencement of degassing/ventilation. Figure 2 represents the current setup with the MiniRAE 3000+, stand, weather station, marine batteries, and solar panels. The AQM stations will have a similar, but slightly larger footprint compared to the setup shown in Figure 2 which represents the current setup with the MiniRAE 3000+, stand, weather station, marine batteries, and solar panels located on Red Hill.

Figure 2: The “baseline” AQM setup at Red Hill on the upper ridge (4/5/2024)



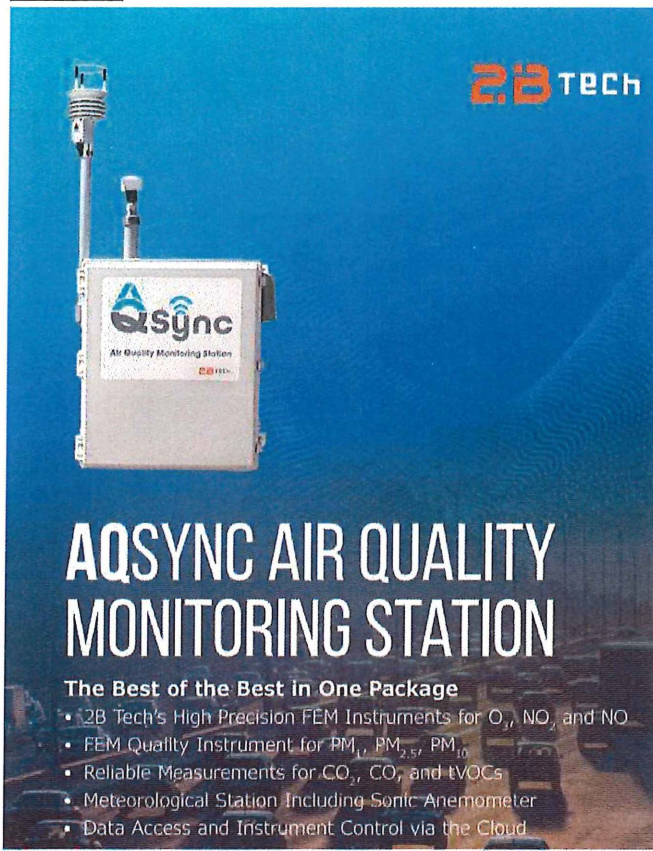
The contractor shall ensure all AQM systems are in good working condition prior to use, and upon confirmation of working condition, installation for six locations should not exceed one week.

The Navy will continue with an extension of the current AQM program using existing equipment at the six proposed locations. Upon completion and acceptance of a new contract, the current systems will be replaced accordingly and as needed with any new equipment identified in the new contract.

Potential Equipment

There are improved air monitoring systems that are superior to the current setup of using an array of field PIDs. The Navy has been researching several units including the AQSync system manufactured by 2B Tech. The AQSync displayed below, or similar equipment, will be used to achieve the monitoring goals previously stated.

AQSync



AQSync Air Quality Monitoring Station: Detailed Specifications

Instrument/Sensor Specifications <small>(per manufacturer)</small>	
<p>Ozone (O₃)</p> <p>Measurement Method: UV Absorbance at 254 nm Instrument: 2B Technologies Model 108-L (FEM) Linear Range: 0-100,000 ppb Precision: 1.5 ppb or 2% of reading for 10-s avg Accuracy: 1.5 ppb or 2% of reading Response Time: 4 s for 2-5 avg, 20 s for 10-s avg</p>	<p>Nitrogen Dioxide (NO₂)</p> <p>Measurement Method: Direct Absorbance at 405 nm Instrument: Based on 2B Tech Model 405 nm NO₂/NO/NO_x Monitor (FEM approval pending) Linear Range: 0-10,000 ppb Precision: 0.5 ppb Accuracy: 2 ppb or 2% of reading Response Time: 20 s</p>
<p>Nitric Oxide (NO)</p> <p>Measurement Method: Oxidation to NO₂ with O₃ followed by Absorbance of NO₂ at 405 nm Instrument: 2B Tech Model 405 nm NO₂/NO/NO_x Monitor Linear Range: 0-2,000 ppb Precision: 0.5 ppb Accuracy: 2 ppb or 2% of reading Response Time: 20 s</p>	<p>Particulate Matter (PM₁, PM_{2.5}, PM₁₀)</p> <p>Measurement Method: Optical Particle Counter, right angle light scatter detection with sheath flow and heated inlet Instrument: Met One Instruments Model 83214 Range: 0-320,000 particles per liter Minimum Particle Size: 0.3 μm Accuracy: 10% Response Time: minimum 1 s</p>
<p>Carbon Dioxide (CO₂)</p> <p>Measurement Method: Non Dispersive Infrared (NDIR) Absorbance with Auto-Zeroing Instrument: PP Systems CO₂ Gas Analyzer, Model SBA-5 Linear Range: 0-1,000 ppm Precision: 1 ppm Accuracy: 5 ppm Response Time: 10 s</p>	<p>Carbon Monoxide (CO)</p> <p>Measurement Method: Amperometry Linear Range: 0-50 ppm Sensor: Alphasense CO-A4 Precision: 0.02 ppm Accuracy: 0.1 ppm Response Time: 20 s</p>
<p>Total VOCs</p> <p>Measurement Method: Photoionization Detector Sensor: ION Science Mini-PID2 HS Measurement Range: 0 to 3 ppm Sensitivity: > 600 mV per ppm Minimum Detection Limit: 0.5 ppb Response Time: < 12 s</p>	

*Option for SO₂ sensor; contact 2B Tech for information.

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Weather Station Specifications (per manufacturer)		
EM Young ResponseONE 92000	Range	Accuracy
Temperature	-40 to +60 °C	±0.3 °C (-20 to +50 °C) ±0.7 °C (other)
Pressure	500 – 1100 hPa	±0.3 hPa (0 to 60 °C) ± 1 hPa (-40 to 0 °C)
Relative Humidity	0 – 100% RH	±2 %RH (5 to 95 %RH)
Wind Speed (2-D Sonic Anemometry)	0-70 m/s (156 MPH)	±2% (0-30 m/s) ±3% (>30 m/s)
Wind Direction (2-D Sonic Anemometry)	0-360 degrees azimuth	±2 degrees

System Specifications	
Weight	54.5 lb, 24.8 kg (varies with modules chosen)
Size	25.5 H x 25.5 W x 10.3 D in (65 x 65 x 26.2 cm); height with weather station is 49 in (124.5 cm)
Power	35 watt (53 watt max during warmup) (varies with modules chosen)
Data Transmission	Cellular or WiFi to the Cloud; Ethernet option
Sample Flow Rate	~4 L/min (varies with modules chosen)

References

NRC (National Research Council). 2001. *Acute Exposure Guideline Levels for Selected Airborne Chemicals*. Washington D.C.: National Academy Press

Protective Action Criteria for Chemicals – Including AEGLs, ERPGs, & TEELs. Emergency Preparedness. The Emergency Management Issues Special Interest Group (EMI SIG). Archived from the original on 12 March 2012.

State of Hawaii Department of Health. 2024. *Official Correspondence to Department of the Navy; Rear Admiral Stephen Barnett*. SUBJECT: Red Hill Bulk Fuel Storage Facility Degassing Activity. March 08.

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State of Hawaii Department of Health. 2023. *Official Correspondence to Department of the Navy contractor APTIM Federal Services, LLC; Richard Lewis.* SUBJECT: Underground Storage Tanks Degassing Project, Seven (7) Jet Fuel (JP-5), Five (5) Jet Fuel (F-24), Two (2) Diesel Fuel (F-76) Storage Tanks, and Four (4) Diesel/Jet Fuel Surge Tanks Located at: Red Hill Bulk Fuel Storage Facility (RHBFSF) and Joint Base Pearl Harbor-Hickam (JBPHH), Aiea, Island of Oahu. DOH File 23-406E CAB. October 04.

We are optimistic that by partnering together we can reach a consensus on Air Quality Monitoring that will reassure the public of the safety of the process. We look forward to your participation, continued partnership, and experience throughout this process. If there are any questions regarding this matter, please contact Milton Johnston, NCTF-RH Environmental Director by email at milton.l.johnston3.civ@us.navy.mil or by phone at (808)583-4928.

Sincerely,



M. F. WILLIAMS
Rear Admiral, U.S. Navy
Deputy Commander
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