



**Naval Facilities Engineering Systems Command Hawaii
JBPHH HI**

Quarterly Release Response Report Red Hill Bulk Fuel Storage Facility JBPHH, O'AHU, HAWAI'I

**DOH Facility ID No. 9-102271
DOH UST Release ID Nos. 990051, 010011, 140010, 210012
DOH HEER Release Incident Case Nos. 20210507-0852,
20211120-2330**

June 13, 2024

This page intentionally left blank



**Naval Facilities Engineering Systems Command Hawaii
JBPHH HI**

Quarterly Release Response Report Red Hill Bulk Fuel Storage Facility JBPHH, O'AHU, HAWAI'I

**DOH Facility ID No. 9-102271
DOH UST Release ID Nos. 990051, 010011, 140010, 210012
DOH HEER Release Incident Case Nos. 20210507-0852,
20211120-2330**

June 13, 2024

Prepared for NAVFAC Hawaii by
**AECOM Technical Services Inc
1001 Bishop Street Suite 1600
Honolulu HI 96813-3698**

**N62742-23-D-1802
CTO N6274223F0142**

This page intentionally left blank

Executive Summary

This Quarterly Release Response Report covering the reporting period January 12 to April 10, 2024, was prepared for Naval Facilities Engineering Systems Command, Hawaii by AECOM Technical Services, Inc. for the Red Hill Bulk Fuel Storage Facility (Facility) in accordance with the State of Hawai'i Department of Health (DOH) Technical Guidance Manual for the Implementation of the Hawaii State Contingency Plan (DOH 2023). It presents results of soil vapor and groundwater monitoring conducted in accordance with the Red Hill Consolidated Groundwater Sampling Program (DON 2023g). The groundwater data reporting also includes laboratory data for samples collected prior to this period that were finalized (validated) during this period.

This Quarterly Release Response Report continues to present release response activities conducted pursuant to Hawai'i Administrative Rules Section 11-280.1 and DOH Notices of Interest for fuel releases from the Facility in January 2014, May 2021 and November 2021. This report also discusses activities and data previously presented in quarterly groundwater Long-Term Monitoring Reports that were prepared pursuant to the Red Hill Groundwater Protection Plan (DON 2014b). In addition to documenting monitoring results, this report presents a plan for future release response actions to be taken.

Site characterization, removal, and remedial efforts conducted during this reporting period include:

- Continued soil vapor monitoring in the Facility tank farm and in the Adit 3 and Pearl Harbor Tunnels.
- Continued monitoring well free product gauging, groundwater monitoring well headspace measurements, and analysis of groundwater samples for chemicals of potential concern (COPCs), natural attenuation, and general chemistry parameters.
- Continued groundwater sampling and analysis and expansion of the groundwater monitoring network.
- Continued operation of the granular activated carbon (GAC) pump and treat system at Red Hill Shaft.
- Site characterization planning activities for the Collection, Holding, and Transfer (CHT) Tank.
- Remediation pilot test planning and installation activities.

Results from this reporting period indicate the following:

- Soil vapor impacts associated with the January 2014, May 2021, and November 2021 Releases are decreasing over time, consistent with natural attenuation of light nonaqueous-phase liquid (LNAPL) in the environment.
- Groundwater concentrations for all contaminants appear to be declining or stable over time. All data collected to date demonstrate that groundwater impacts are undergoing natural attenuation, including biodegradation. Groundwater analytical detections and exceedances are summarized in Table ES-1.

Table ES-1: Summary of Analytical Detections and Exceedances in Groundwater, Current Reporting Period

Monitoring Location	COPC, Fuel Additive, or Lead Scavenger Detection Below Screening Criterion	Analyte Concentration Exceeding Screening Criterion
RHMW2254-01	None	None
RHMW01R	DRO (ND after SGC)	None
RHMW02	GRO ORO (ND after SGC) 1-Methylnaphthalene 2-Methylnaphthalene Naphthalene	DRO: 1,210; 1,460, 981, 1,030; 1,270 and 1,380 µg/L (screening criterion: 400 µg/L) (below SSRBL: 4,500 µg/L)
RHMW03	ORO (ND after SGC)	None
RHMW04	None	None
RHMW05	None	None
RHMW06	None	None
RHMW08	None	None
RHMW09	GRO	None
RHMW10	None	None
RHMW11-05	GRO	None
RHMW12A	None	None
RHMW13-04	None	None
RHMW14-03	None	None
RHMW15-05	None	None
RHMW16	Benzo(b)fluoranthene Benzo(k)fluoranthene Chrysene	Benzo(a)anthracene: 0.043 J µg/L (screening criterion: 0.029 µg/L)
RHMW17	None	None
RHMW18	DRO (ND after SGC) ORO (ND after SGC)	None
RHMW19	DRO (ND after SGC) ORO (ND after SGC)	None
RHMW20	None	None
HDMW2253-01	None	None
RHP01	None	None
RHP02	None	None
RHP03	None	None
RHP04A	None	None
RHP04B	None	DRO: 1,170 µg/L (screening criterion: 400 µg/L) ORO: 777 µg/L (screening criterion: 500 µg/L)
RHP04C	DRO (ND after SGC) ORO (ND after SGC)	None

Monitoring Location	COPC, Fuel Additive, or Lead Scavenger Detection Below Screening Criterion	Analyte Concentration Exceeding Screening Criterion
RHP05	None	None
RHP06	None	None
RHP07	None	None
RHP08	ORO (detected after SGC)	None
NMW24	GRO	None
NMW25	None	None
NMW26	DRO (ND after SGC) ORO (lower after SGC)	None
NMW30	None	None
NMW32	None	None
NMW33	None	None

µg/L micrograms per liter
 COPC chemical of potential concern
 DRO diesel range organics
 ND non-detect
 ORO residual oil range organics
 SGC silica gel cleanup
 SSRBL Site-Specific Risk-Based Level

In addition to the site characterization activities described in this report, the Navy has conducted fuel recovery efforts since December 2021, including use of absorbent materials, skimmers, direct recovery from piping, soil excavation, and operation of the GAC treatment system.

Planned future actions include:

- Continued soil vapor monitoring at sampling locations within the Facility tank farm, and in the Adit 3 and Pearl Harbor Tunnels near Red Hill Shaft
- Continued groundwater sampling from the Red Hill monitoring well network in accordance with the Consolidated Groundwater Sampling Program
- Installation of new groundwater monitoring wells
- Continued operation of the GAC pump and treat system at Red Hill Shaft
- Continued site characterization activities at the CHT Tank and in the Adit 3 and Pearl Harbor Tunnels near Red Hill Shaft
- Conducting a remediation pilot test in the Adit 3 and Pearl Harbor Tunnels near Red Hill Shaft
- Additional removal or remedial actions, as appropriate

The Navy continues to expand the groundwater monitoring well network, including additional offsite sentinel wells to provide early warning of offsite contaminant migration, and additional plume delineation wells within the Facility boundaries. New sentinel well locations are being installed to monitor groundwater quality between Red Hill and offsite water supply wells. Activities and sampling of the JBPHH Water Distribution System (regulated by the DOH Safe Drinking Water Branch) and the November 29, 2022, aqueous film-forming foam release outside Adit 6 (being investigated separately) are not addressed in this Quarterly Release Response Report.

This page intentionally left blank

Table of Contents

Executive Summary	iii
Table of Contents	vii
Acronyms and Abbreviations	xi
1.0 Introduction and Purpose	1
1.1 Statement of Purpose	5
1.2 Previous Reports	5
2.0 Background	5
2.1 Site Description	7
2.1.1 Climate	7
2.1.2 Soils and Geology	7
2.1.3 Surface Water	8
2.1.4 Groundwater	8
2.2 Historical Land Use	9
2.3 Current Land Use	9
2.4 Conceptual Site Model	9
2.4.1 Facility Construction and Operations	9
2.4.2 Subsurface Conditions	10
2.4.3 Exposure Model	10
2.5 Previous Facility Investigations	11
3.0 Summary of Investigation History	13
3.1 Release Response Actions	13
3.2 Adit 3 Site Characterization	18
3.3 Holding Tank and Leach Tank Site Characterization	18
3.4 CHT Tank Site Characterization	21
3.5 Inspection of Water Development Tunnel	21
3.6 Single-Event Groundwater Sampling at DH-43 and BWS2253J1 Well	22
3.7 Remediation Pilot Test at Adit 3	22
4.0 Site Investigation Objectives	22
4.1 Soil Vapor	22
4.2 Free-Product Gauging and Monitoring Well Headspace Measurements	23
4.3 Groundwater	23
4.4 Data Usability	23
5.0 Field Activities	25
5.1 Soil Vapor Monitoring	25
5.1.1 Below-Tank SVMPs	25
5.1.2 Adit 3 and Pearl Harbor Tunnel SVMPs	26
5.1.3 SVE/NSZD Pilot Project at Adit 3	26
5.2 Free Product Gauging and Monitoring Well Headspace Measurements	26
5.3 Groundwater Sampling	29
5.3.1 Single-Screen Monitoring Well Sampling	29
5.3.2 Multilevel Monitoring Well Sampling	30
5.4 Decontamination	30
5.5 Investigation-Derived Waste Management	31
6.0 Sample Control Procedures	31
6.1 Sample Containers and Preservation	31
6.2 Sample Handling and Chain of Custody	33
6.3 Laboratory Analyses	34
6.3.1 Soil Vapor Analyses	34
6.3.2 Groundwater Analyses	34
7.0 Field Observations During Sampling	36

7.1	Soil Vapor Monitoring Observations.....	36
7.2	Free Product Gauging and Monitoring Well Headspace Observations	36
7.3	Groundwater Level Measurements	37
7.4	Groundwater Sampling Observations	37
8.0	Data Quality	38
8.1	Laboratory Quality Control	38
8.1.1	Soil Vapor Samples	38
8.1.2	Groundwater Samples.....	38
8.2	Field Quality Control.....	38
8.2.1	Soil Vapor Samples	38
8.2.2	Groundwater Samples.....	38
8.2.3	Sample Control Procedures	39
8.3	Data Quality Assessment	40
8.3.1	Precision	40
8.3.2	Accuracy	42
8.3.3	Representativeness.....	43
8.3.4	Completeness	44
8.3.5	Comparability	45
8.3.6	Sensitivity	45
8.4	Data Quality Assessment Conclusions	45
9.0	Analytical Results.....	45
9.1	Soil Vapor Analytical Results.....	45
9.1.1	Below-Tank Sampling Locations	45
9.1.2	Adit 3 Tunnel Sampling Locations.....	46
9.2	Free Product Gauging and Monitoring Well Headspace Measurements	46
9.3	Groundwater Analytical Results	46
9.3.1	TPH Range Organics	57
9.3.2	Lead Scavengers	61
9.3.3	BTEX.....	61
9.3.4	SVOCs	61
9.3.5	PAHs.....	61
9.3.6	Natural Attenuation Parameters.....	61
10.0	Summary of Results and Extent and Magnitude of Contamination.....	65
10.1	Soil Vapor Impacts	65
10.2	Groundwater Impacts.....	67
10.2.1	Red Hill Network Wells	69
10.2.2	Delineation Wells	69
10.2.3	Sentinel Wells	70
11.0	Conclusions and Recommendations	70
11.1	Conclusions.....	70
11.2	Recommendations and Planned Future Actions	70
12.0	References.....	71

APPENDIXES

A	Soil Vapor Monitoring Results, Current Reporting Period	
A.1	Soil Vapor PID Concentrations	
A.2	Soil Vapor Chromatograms	
B	Groundwater Monitoring Results, Current Reporting Period	
B.1	Analytical Program for Groundwater Samples Collected During Current Reporting Period	
B.2	Monitoring Well Measurements	

	B.2.1	Free Product Gauging, Monitoring Well Headspace Measurements, and General Chemistry Parameters
	B.2.2	Monitoring Well Water Level Measurements
B.3		Summary of Groundwater Analytical Results
	B.3.1	Groundwater Analytical Results
	B.3.2	Groundwater TPH and PAH Analytical Charts
B.4		Chromatograms for Groundwater Detections and Exceedances
B.5		Natural Attenuation Parameters
C		Index of Soil Vapor Analytical Data
D		Index of Groundwater Analytical Data
E		EDMS Navigation

FIGURES

1	Location of Releases and Groundwater Monitoring Wells.....	3
2	Adit 3 and Pearl Harbor Tunnel Layout Map	7
3	Soil Vapor Monitoring Network Below the Red Hill Fuel Storage Tanks	14
4	Holding Tank and Leach Tank Sampling Location Map.....	19
5A	Soil Vapor Monitoring Point Results, January 12, 2024 – April 9, 2024, Adit 3 Tunnel and Pearl Harbor Tunnel.....	27
5B	Adit 3 Boring and Temporary Well Locations	28
6	DRO Groundwater Analytical Results Summary	51
7	ORO Groundwater Analytical Results Summary	52
8	Naphthalene Groundwater Analytical Results Summary	53
9	1-Methylnaphthalene Groundwater Analytical Results Summary	54
10	2-Methylnaphthalene Groundwater Analytical Results Summary	55
11	SVM PID Readings for Tanks 17, 18, and 20	66

TABLES

2-1	Summary of Previous Red Hill Environmental Investigations.....	11
3-1	Current Red Hill Monitoring Well Network, Consolidated Groundwater Sampling Program.....	16
3-2	Description of Multilevel Monitoring Zones	17
4-1	Target Analytes for Middle-Distillate Contaminated Media	24
4-2	DOH Environmental Action Levels.....	25
6-1	Sample Containers, Preservatives, and Holding Times	31
6-2	Consolidated Groundwater Sampling Program – Monthly.....	35
8-1	Measurement Performance Criteria – Field QC Samples	38
8-2	Field Duplicate Analyte RPDs.....	41
9-1	Summary of Groundwater Analytical Results, Current Reporting Period.....	47
9-2	Statistical Summary of Groundwater Analytical Results Received During the Current Reporting Period (1/12/2024 to 4/11/2024).....	49
9-3	Comparison of TPH Concentrations Without and With Silica Gel Cleanup	60
10-1	Summary of Current Groundwater Result Exceedances.....	68

This page intentionally left blank

Acronyms and Abbreviations

%	percent
%D	percent difference
%R	percent recovery
%RSD	percent relative standard deviation
°C	degree Celsius
µg/L	micrograms per liter
µg/m ³	micrograms per cubic meter
1MN	1-methylnaphthalene
2-2-MEE	2-(2-methoxyethoxy)-ethanol
2MN	2-methylnaphthalene
AOC	Administrative Order on Consent
AS	air sparging
bgs	below ground surface
BTEX	benzene, toluene, ethylbenzene, and xylenes
BWS	Board of Water Supply, City and County of Honolulu
CAS	Chemical Abstracts Service
CCV	continuing calibration verification
CF&T	contaminant fate and transport
CHT	collection, holding, and transfer
COPC	chemical of potential concern
CSM	conceptual site model
DEET	n,n-diethyl-3-methylbenzamide
DLA	Defense Logistics Agency
DO	dissolved oxygen
DOC	dissolved organic carbon
DoD	Department of Defense
DOH	Department of Health, State of Hawai'i
DQI	data quality indicator
DRO	diesel range organics
EAL	Environmental Action Level
EB	equipment blank
EDMS	Environmental Data Management System
Energy	Energy Laboratories, Inc.
EPA	Environmental Protection Agency, United States
Facility	Red Hill Bulk Fuel Storage Facility
FB	field blank
FD	field duplicate
ft	foot/feet
GAC	granular activated carbon
GRO	gasoline range organics
GW LTM	groundwater long-term monitoring
GWPP	Groundwater Protection Plan
H ₂ SO ₄	sulfuric acid
HCl	hydrochloric acid
HDPE	high-density polyethylene
HEER	Hazard Evaluation and Emergency Response
HNO ₃	nitric acid
ICV	initial calibration verification
ID	identification

JBPHH	Joint Base Pearl Harbor-Hickam
JP	Jet Fuel Propellant
L	liter
LCS	laboratory control sample
LCSD	laboratory control sample duplicate
LNAPL	light nonaqueous-phase liquid
LOD	limit of detection
LOQ	limit of quantitation
mg/kg	milligrams per kilogram
mg/L	milligrams per liter
mL	milliliter
MS	matrix spike
MSD	matrix spike duplicate
msl	mean sea level
N	naphthalene
N/A	not applicable
NAP	natural attenuation parameter
NAVFAC	Naval Facilities Engineering Systems Command
Navy	Department of the Navy, United States
ND	not detected
no.	number
NOI	Notice of Interest
NSZD	natural source-zone depletion
NVDOC	non-volatile dissolved organic carbon
ORO	residual oil range organics
OU	Operable Unit
oz.	ounce
PAH	polynuclear aromatic hydrocarbon
PFAS	per- and polyfluoroalkyl substances
PID	photoionization detector
ppbv	parts per billion by volume
ppm	parts per million
ppmv	parts per million by volume
PVC	polyvinyl chloride
QC	quality control
RI	remedial investigation
ROV	remotely operated vehicle
RPD	relative percent difference
RRF	relative response factor
RRR	release response report
SDG	sample delivery group
SGC	silica gel cleanup
SIM	selected ion monitoring
SOP	standard operating procedure
SSRBL	Site-Specific Risk-Based Level
SVE	soil vapor extraction
SVMP	soil vapor monitoring point
SVOC	semivolatile organic compound
TGM	Technical Guidance Manual for the Implementation of the Hawaii State Contingency Plan

THM	trihalomethane
TMB	trimethylbenzene
TOC	total organic carbon
TPH	total petroleum hydrocarbons
U.S.	United States
UST	underground storage tank
VOA	volatile organic analysis
VOC	volatile organic compound
WP	work plan

This page intentionally left blank

1.0 Introduction and Purpose

This Quarterly Release Response Report (RRR) presents soil vapor results collected and groundwater results validated during the current reporting period of January 12 to April 10, 2024, for monitoring locations at the Red Hill Bulk Fuel Storage Facility (“Facility”), Joint Base Pearl Harbor-Hickam, O‘ahu, Hawai‘i. In concert with the Consolidated Groundwater Sampling Program (DON 2023g), this report series now includes monitoring results previously reported in separate quarterly long-term groundwater monitoring reports that were prepared pursuant to the Red Hill *Groundwater Protection Plan* [GWPP] (DON 2014b); that report series is now discontinued.

Release response efforts documented herein were conducted for the following petroleum releases to the environment at the Facility (release locations are shown on Figure 1):

- **January 2014 Release:** On January 23, 2014, the Navy reported to the State of Hawai‘i Department of Health (DOH) a release of an estimated 27,000 gallons of Jet Fuel Propellant (JP)-8 from one of the Facility’s underground fuel storage tanks (Tank 5). The release occurred when placing the tank back in service following a 3-year inspection and refurbishment process completed in December 2013.
- **May 2021 Release:** On May 6, 2021, a JP-5 pipeline near Facility Tanks 18 and 20 was damaged during a fuel transfer procedure. Fuel was released to the lower access tunnel floor, and fuel was recovered shortly after the event. It was later determined that some of the fuel entered soil vapor monitoring boreholes, which are in contact with the surrounding basalt, and some of the fuel was pumped from the fire suppression retention system into the fire suppression recovery drain line. The fuel remained contained in the fire suppression recovery drain line until it was damaged on November 20, 2021.
- **November 2021 Release:** On November 20, 2021, fuel in the fire suppression recovery drain line was released into the Adit 3 Tunnel, traveled on the concrete tunnel floor toward the adit portal, and collected in a sump (Adit 3 Sump) and a sanitary sewer sump near the Adit 3 entranceway. Fuel that entered the Adit 3 Sump was either recovered, released to the subsurface adjacent to the sump, or pumped from the sump to an underground Holding Tank and Leach Tank system outside the Adit 3 portal, where it was released to the subsurface. Fuel that entered the sanitary sewer sump was pumped to an aboveground Collection, Holding, and Transfer (CHT) Tank system outside the Adit 3 portal, which overflowed during heavy rains to the surrounding asphalt-covered work area in January 2022. The remainder of the fuel entered the subsurface (soil or volcanic bedrock) near United States (U.S.) Department of the Navy (Navy) Well 2254-01 (Red Hill Shaft). Some of the fuel entered the Joint Base Pearl Harbor-Hickam (JBPHH) Water Distribution System. Red Hill Shaft ceased pumping on November 28, 2021, and was isolated from the JBPHH Water Distribution System. Release response activities have been conducted at the Facility since the May 2021 Release and are ongoing.

The reporting includes laboratory data that were finalized (validated) during this period, not necessarily from samples collected during this period, due to the lag between sample collection and validation. Specifically, as required by Hawai‘i Administrative Rules Section 11-280.1-65.2, this report describes:

- All response actions (investigation, removal, and remediation activities) taken during the current quarterly reporting period
- A plan for future release response actions to be taken

This report summarizes the following activities conducted during this reporting period:

- Continued soil vapor monitoring in the Facility tank farm, and in the Adit 3 and Pearl Harbor Tunnels
- Continued monitoring well free product gauging, groundwater monitoring well headspace, and purge water natural chemistry parameters
- Continued groundwater sampling and analysis and expansion of the groundwater monitoring network
- Continued operation of the granular activated carbon (GAC) pump and treat system at Red Hill Shaft
- Continued Adit 3 and Pearl Harbor Tunnel site characterization activities
- Continued CHT Tank site characterization investigation planning activities
- Continued remediation and treatability study pilot test planning activities

This report presents field observations and final analytical results available through this reporting period, including:

- Results from soil vapor field measurements using photoionization detectors (PIDs)
- Results from a fixed-based laboratory for soil vapor passivated canister samples
- Results from monitoring well free product gauging and measurements of headspace, water levels, and groundwater parameters
- Laboratory results for groundwater samples

Separate reporting has been provided to the Regulatory Agencies (DOH and the U.S. Environmental Protection Agency [EPA]) for investigations conducted at the Adit 3 and Pearl Harbor Tunnel area, the Holding Tank and Leach Tank area, and the CHT Tank area, as summarized in Section 3.0.

In addition to the activities described in this report, the Navy has conducted fuel recovery efforts since December 2021 and is continuing operation of the GAC pump and treat system at Red Hill Shaft, which began in January 2022. Fuel recovery efforts include the use of sorbent materials, skimmers, direct recovery from piping, and soil excavation. In addition, the GAC pump and treat system for Red Hill Shaft groundwater will continue to remove any dissolved constituents that are captured by pumping in the vicinity of Red Hill Shaft, as described in the Red Hill Shaft Recovery and Monitoring Plan (IDWST 2022).

Activities and sampling of the JBPHH Water Distribution System (regulated by the DOH Safe Drinking Water Branch) and the November 29, 2022, aqueous film-forming foam release outside Adit 6 (being investigated separately) are not addressed in this report.

Figure 1
Location of Releases and
Groundwater Monitoring Wells
Consolidated Quarterly Monitoring Report
Red Hill Bulk Fuel Storage Facility
JBPHH, O'ahu, Hawai'i

This page intentionally left blank

1.1 Statement of Purpose

Quarterly groundwater monitoring was conducted pursuant to the Red Hill *Groundwater Protection Plan* [GWPP] (DON 2014b) and in response to the Notices of Interest (NOIs) issued by DOH for the January 2014, May 2021, and November 2021 Releases. Groundwater sampling was conducted in accordance with the May 2023 memorandum *Consolidation and Optimization of the Groundwater Sampling Programs, Red Hill Bulk Fuel Storage Facility* memorandum (DON 2023g), which unified multiple groundwater monitoring efforts at Red Hill under a single Consolidated Groundwater Sampling Program beginning in June 2023.

The purpose of the groundwater monitoring is to evaluate the condition of groundwater beneath the Facility and to ensure that the United States Department of the Navy remains in compliance with DOH Underground Storage Tank release response requirements as described in Hawai'i Administrative Rules Chapter 11-280.1, Subchapter 6, Release Response Action.

The Facility has a network of soil vapor monitoring points (SVMPs) that are monitored in accordance with the Red Hill GWPP (DON 2014b) and Long-Term Monitoring Work Plan/Sampling and Analysis Plan (DON 2015b) using the existing boreholes beneath 18 of 20 tanks in the Facility to support leak detection. In response to the NOIs issued by DOH for the May 2021, and November 2021 Releases, additional subsurface SVMPs were installed into petroleum-impacted segments of the Adit 3 and Pearl Harbor Tunnels.

This report provides activities and results from groundwater and soil vapor sampling from the vadose zone to monitor and evaluate potential risks to human health and the environment.

DOH Identification (ID) and case numbers (nos.) for the Facility fuel releases are as follows:

- DOH Facility ID No. is 9-102271.
- DOH Release ID Nos. are 990051, 010011, 020028, 140010, and 210012.
- DOH Hazard Evaluation and Emergency Response (HEER) Release Incident Case Nos. are 20210507-0852 (May 10, 2021) (DOH 2021a) and 20211120-2330 (November 24, 2021) (DOH 2021b).

1.2 Previous Reports

Documentation of previous Red Hill environmental investigations is presented in Section 2.5, and release response-related reports are listed in prior Quarterly RRRs.

2.0 Background

Groundwater Protection Plan (GWPP). The Red Hill GWPP (DON 2008b, 2014b) presents an integrated strategy to manage risks associated with potential inadvertent fuel releases from the tanks by implementing detection and mitigation measures. The Navy first developed the GWPP in 2008 at DOH's request after previous environmental investigations (DON 1999, 2002, 2007) showed impact to the environment by petroleum hydrocarbons. Its provisions include conducting soil vapor monitoring under the fuel storage tanks and groundwater long-term monitoring (GW LTM). Soil vapor concentrations have been measured monthly since 2008, and groundwater samples have been collected and analyzed at least quarterly since 2005; results have been reported to DOH on a quarterly basis.

Generally, the GWPP is slated for updating every 5 years. An update specific to tank defueling activities was published in September 2023 (DON 2023m).

January 2014 Release. During Tank 5 refilling operations in January 2014 following a routine 3-year tank inspection and refurbishment process, a release of approximately 27,000 gallons of JP-8 fuel was confirmed and reported to DOH on January 23, 2014 (Figure 1). During that month, a fuel hydrocarbon seep was observed on a tunnel wall below Tank 5, and SVMPs installed beneath Tank 5 exhibited a sharp increase in hydrocarbon vapor concentrations. Subsequent analyses indicated that the causes of the release were defective workmanship in welding by the tank refurbishment contractor, poor inspection, and ineffective quality control (QC). The release resulted in EPA, DOH, the Navy, and Defense Logistics Agency (DLA) agreeing to the Red Hill AOC in September 2015 (EPA Region 9 and DOH 2015). The AOC provides for the performance by the Navy of a release assessment, response(s) to release(s), and actions to minimize the threat of future releases in connection with the field-constructed bulk fuel underground fuel storage tanks, surge tanks, pumps, and associated piping, and on any property that may be affected now or in the future by petroleum or other substances released from the Facility.

May 2021 Release. On May 6, 2021, Navy personnel responded to a reported release of fuel from a distribution pipeline inside the Facility in the vicinity of Tanks 18 and 20 (Figure 1). The Navy notified DOH of the release within 24 hours and provided DOH preliminary findings of the ongoing investigation on October 1, 2021, indicating that JP-5 fuel was released during a fuel transfer and that there were no leaks from any fuel tanks. The Navy recovered JP-5 fuel from the tunnel drain system and then performed a complete wash down of the area with fresh water on May 7, 2021 (DON 2021d). It was later determined that some SVMP vaults on the tunnel floor near the May 2021 Release and a fire suppression drain line were impacted by fuel, and the below-tank SVMPs exhibited elevated organic vapor concentrations on field instruments (PIDs).

November 2021 Release. On November 20, 2021, a release of JP-5 fuel occurred in the Adit 3 Tunnel of the Facility (Figure 1). JP-5 fuel was released from an overhead 14-inch polyvinyl chloride (PVC) fire suppression recovery drain line at a location approximately (b)(3) of the Red Hill Shaft water supply pumping station and approximately (b)(3) of the junction with the Pearl Harbor Tunnel. The release point is in proximity to the supply well's underlying water development tunnel that extends greater than (b)(3) of the pumping station at an elevation of approximately 0–20 ft above mean sea level (msl).

Released fuel flowed westward along the Adit 3 Tunnel floor past the junction with the Pearl Harbor Tunnel and Red Hill Shaft. Fuel accumulated in two sumps (Adit 3 Sump and a sanitary sewer sump) approximately (b)(3) of the November 2021 Release point (Figure 2). JP-5 fuel was recovered from the Adit 3 Sump, connected piping, the fire suppression recovery drain line, and the Holding Tank/Leach Tank area including subsurface soil. JP-5 fuel was also recovered from the sanitary sewer sump and the CHT Tank, which was fed by a pump in the sanitary sewer sump.

The November 2021 incident released fuel to the environment via natural and manmade penetrations through the concrete tunnel floor, and from fuel that accumulated in the Adit 3 Sump and fuel that was inadvertently pumped from the Adit 3 Sump and sanitary sewer sump to the Holding Tank and Leach Tank and the CHT Tank. Fuel was subsequently observed in the water development tunnel of Red Hill Shaft. Upon confirmation that a fuel-like odor was present in drinking water in homes served by Red Hill Shaft, the supply well was shut off and isolated from the JBPHH Water Distribution System on November 28, 2021.



Figure 2: Adit 3 and Pearl Harbor Tunnel Layout Map

2.1 Site Description

The 144-acre underground fuel storage Facility is located in south-central O‘ahu approximately 2–3 miles east of Pearl Harbor, within the Red Hill ridge that divides South Hālawā Valley from Moanalua Valley on the southwest flank of O‘ahu’s Ko‘olau mountain range (Figure 1). The Facility’s (b)(3) fuel storage tanks were used to store and supply fuel for military operations in Hawai‘i and throughout the Pacific. The tank bottoms and fuel lines/tunnels are situated approximately 100–130 ft above an underlying basal aquifer that is a major municipal and military drinking water source.

2.1.1 Climate

Climatological conditions in the vicinity of the Facility consist of warm to moderate temperatures and low to moderate rainfall. The average annual precipitation is approximately 40 inches, which occurs mainly between November and April (Giambelluca, Nullet, and Schroeder 1986). Average temperatures range from the low 60s to high 80s (degrees Fahrenheit) (Juvik and Juvik 1998).

2.1.2 Soils and Geology

The Facility is located within the Ko‘olau Volcanic series. The Ko‘olau formation at Red Hill consists of basaltic lava flows that erupted from a fissure line approaching 30 miles in length and trending in a northwest rift zone (Wentworth and Macdonald 1953). Pāhoehoe and a‘ā lava flows are present in the Ko‘olau formation. The valleys on either side of the Red Hill ridge were formed as a result of fluvial erosion and are filled with sedimentary deposits (alluvium and colluvium), also known as valley fill, underlain by weathered basalt, also known as saprolite. Saprolite zones in Hawai‘i are typically around 75 ft thick but can be 300 ft thick or greater beneath the valley floors or in areas of high precipitation (Hunt Jr. 1996;

Macdonald, Abbott, and Peterson 1983) The results of a recently conducted seismic survey in North and South Hālawā Valleys, Red Hill, and Moanalua Valley (DON 2018d) found that valley fill and saprolite extend much deeper in the valleys surrounding Red Hill, particularly in the center of the valleys and below the streambeds.

Soils in the vicinity of the Facility are mapped as Helemano-Wahiawā association consisting of well drained, moderately fine-textured and fine-textured soils (USDA SCS 1972). The surfaces of the basaltic flows have been weathered to form reddish-brown clayey silt, which is the basis for the local name “Red Hill.” These soils typically range from nearly level to moderately sloping and occur in broad areas dissected by very steep gulches. They formed in material weathered from basalt to a depth of approximately 10 ft below ground surface (bgs). Along the slopes, the basaltic bedrock is covered with approximately 10–30 ft of Ko‘olau residuum. These soils were derived from weathering of the underlying basalt bedrock or were deposited as alluvium/colluvium. The younger alluvium/colluvium deposits were derived from fractured basalts and tuff. Beneath the surficial soils, alternating layers of clay and basalts are encountered at depth. The northwestern slope of Red Hill is generally barren of soil and consists of outcropping basalt lava flows to the valley floor.

2.1.3 Surface Water

Surface water features in the general vicinity of the Facility include South Hālawā Stream (an ephemeral stream approximately (b)(3) of the tanks), North Hālawā Stream (approximately (b)(3) of the tanks), and Moanalua Stream (approximately (b)(3) of the tanks). Potential recharge (run-on and operational water use) from the Hālawā Quarry north of the Facility may also impact groundwater flow in this area. Groundwater that flows beneath the Facility does not intercept surface water inland of the ocean shoreline (DON 2007). Both South Hālawā Stream and Moanalua Stream (to the north and south of the Red Hill ridge, respectively) are located approximately 170 ft or more above the basal water table in the vicinity of the tanks. The bottoms of the Facility’s fuel storage tanks are located at least 50 ft below the bottom of these streams. In the vicinity of Adit 3 and the November 2021 Release, South Hālawā Stream may be fed by the perched water system during the rainy season, although this has not been confirmed.

2.1.4 Groundwater

In the vicinity of Red Hill, the basal aquifer water table lies between 15 and 20 ft above msl. Regionally, groundwater flows toward Pearl Harbor (mauka to makai) (Hunt Jr. 1996; Izuka and Rotzoll 2023), although potential exists for variability in localized flow directions depending on geologic formations and other factors. In Hālawā Valley, streamflow may contribute water to perched groundwater within alluvial material (valley fill), but South Hālawā Stream is likely a losing stream to the underlying basal aquifer. Most precipitation percolates to the basal aquifer and does not maintain base flows in the streams (Izuka 1992)

The Facility is located at the administrative boundary between the Waimalu Aquifer System of the Pearl Harbor Aquifer Sector and the Moanalua Aquifer System of the Honolulu Aquifer Sector. The underlying aquifer is classified as a basal, unconfined, flank-type aquifer and is currently used as a drinking water source.

The Facility is located upgradient of the Hawaii State Underground Injection Control Line, which separates potable groundwater from non-potable groundwater. The drinking water supply well closest to the Red Hill tank farm is Navy Well 2254-01 (Red Hill Shaft), located (b)(3) approximately (b)(3) of the nearest fuel storage tank. Red Hill Shaft and Navy Well 2255-32 (Navy ‘Aiea Hālawā Shaft, located approximately (b)(3) of the near fuel storage tank) formerly provided

potable water to the JBPHH Water Distribution System, which serves approximately 65,200 military customers; the potable water is now supplied by Waiawa Shaft, located approximately (b)(3) of the Facility. Naval Facilities Engineering Systems Command (NAVFAC), Hawaii, Utilities Management Division operates the drinking water system. The nearest Honolulu Board of Water Supply (BWS) public drinking water supply well (BWS Hālawa Shaft Well 2354-01; currently inactive) is located hydraulically cross-gradient of the Facility approximately 4,400 ft northwest of the fuel storage tanks, within the basal aquifer.

2.2 Historical Land Use

Prior to construction of the tank farm, the surface of Red Hill supported sugar cane and pineapple agriculture. Navy archive images show that the Red Hill ground surface was exposed and modified during construction of the tank farm beginning in 1940. A 1952 aerial photograph shows unmaintained land on the Red Hill ridge and agriculture on the lower reaches of Red Hill north of the Moanalua Golf Course (DON 2019b).

2.3 Current Land Use

The Facility is located on land zoned by the City and County of Honolulu as a mix of F-1 Federal and Military and P-1 Restricted Preservation districts. All major structures at the Facility are located underground. Populated areas closest to the Facility are ‘Aiea to the west and Honolulu to the south and east. Honolulu is heavily urbanized and densely populated.

Preservation land is located east and northeast of the Facility boundary. To the southeast are residential single-family homes in Moanalua Valley; a high cliff face with a 100–200 ft elevation difference exists between the Facility and this residential area. Southwest of the tank farm area on the lower southwest flank of Red Hill are the public Red Hill Elementary School and residential apartments, and further west is U.S. Army Housing on F-1 Military land. North of the western segment of the Facility boundary in South Hālawa Valley is the State Animal Quarantine Station, private businesses in Hālawa Industrial Park, and the State-operated Hālawa Correctional Facility. To the north of the Correctional Facility at the lower reaches of an inter-valley ridge that forms the north wall of South Hālawa Valley is the open-pit Hālawa Quarry operated by the Hawaiian Cement Company.

As shown on Figure 1, the H-201 Moanalua Freeway transits approximately 350–700 ft beyond the Facility’s southwest boundary and intersects with the H-1 and H-3 Freeways at the Hālawa Interchange, approximately 1,800 ft west of the Facility. The H-3 Freeway transits northeast from the interchange through North Hālawa Valley and on to O‘ahu’s windward side.

2.4 Conceptual Site Model

2.4.1 Facility Construction and Operations

The Facility’s (b)(3) bulk fuel storage tanks were field-constructed of steel-lined concrete in the early 1940s. They were connected to a fuel pumping station at Pearl Harbor via a tunnel system. The Facility was operated by Naval Supply Systems Command Fleet Logistics Center Pearl Harbor (formerly Fleet and Industrial Supply Center). Each fuel tank has a total capacity of approximately (b)(3) gallons. The 14 most recently active bulk fuel storage tanks stored either JP-5, North Atlantic Treaty Organization-grade F-24 jet fuel, or F-76 marine diesel fuel. All tanks have been defueled as of March 2024; remaining sludge and piping will be removed during Facility closure operations under command of the Navy Closure Task Force – Red Hill.¹

¹ <https://www.navyclosuretaskforce.navy.mil/>

2.4.2 Subsurface Conditions

The Facility's bulk fuel storage tanks are surrounded by rock in the vadose (i.e., unsaturated) zone, which consists primarily of basalt flows in complex, alternating layers. These heterogeneous layers vary from extremely high to extremely low permeability, with a corresponding ability to transmit and hold liquid petroleum hydrocarbon fuels (light nonaqueous-phase liquid [LNAPL]; i.e., free product) depending on the layer's rock type and micro-pore structure (i.e., high transmissivity in highly permeable a'ā, thin pāhoehoe flows, and a'ā clinker zones; low transmissivity in massive a'ā and massive pāhoehoe flows). Geologic and water saturation characteristics in the rock surrounding the tanks could cause LNAPL to spread as it moves through the rock. As LNAPL moves through the larger pore spaces, some of it could be trapped in poorly connected fractures and blocked by nearby low-permeability regions or by surface tension and capillary forces of moisture, including water held in the smaller pores. The potential presence of intact lava tubes might serve as preferential pathways and conduits for LNAPL migration.

Hawaiian volcanic rocks vary in porosity and permeability depending on the emplacement process, lava type, genesis, flow thickness, flow rate, extent, cooling rate, and weathering. Permeability is typically highest in the relatively thick, unweathered, rubbly a'ā clinker zones and intensely fractured zones or lava tubes of pāhoehoe flows. Permeability is much lower in the interior portions of massive flows, weathered interflows, intrusive rocks (dikes and sills), ash beds, and weathered rocks (saprolite) and soil horizons, which can impede both vertical and horizontal flows across valleys. Generally, the bulk vertical permeability of the basalt is orders of magnitude lower than the bulk horizontal permeability. Horizontal permeability is generally higher in the direction that the lava flowed than in the transverse direction.

Groundwater flow and solute transport are controlled by both the hydraulic conditions (e.g., gradients) and the physical properties of the hydrogeologic units, including hydraulic conductivity, effective porosity, specific yield, specific storage, anisotropy, and dispersivity, all of which can vary significantly under the highly heterogeneous conditions present at the site.

Fresh groundwater inflow originates as deep infiltration of precipitation and seepage from surface water features. According to the U.S. Geological Survey, estimates of recharge for O'ahu for recent conditions (2010 land cover and 1978–2007 rainfall) differ from predevelopment recharge values by only a few percent (Izuka et al. 2018). Spatial distribution of recharge mimics the orographic rainfall pattern; recharge is highest on windward slopes and mountain peaks below the top of the tradewind inversion.

Groundwater outflow includes withdrawals from wells and natural groundwater discharge to springs, streams, wetlands, and submarine seeps. Data collected by the U.S. Geological Survey for groundwater levels, saltwater/freshwater interface, spring flow, and stream base-flow indicate an overall reduction in aquifer storage for most areas where groundwater has been extracted; this has caused groundwater levels to decline (Izuka et al. 2018).

Regional groundwater levels decrease from areas of recharge in the higher elevation rainforest (mauka) to areas of discharge along the coast (makai) (Hunt Jr. 1996). Locally, water level gradients are extremely low and are influenced by geologic conditions, as well as by variability in local pumping stresses from water development shafts and wells.

2.4.3 Exposure Model

Potentially contaminated media are indoor air within the Facility tunnels; surface and near-surface materials associated with the CHT Tank and Holding Tank/Leach Tank; unconsolidated materials, volcanic rock, and soil/rock vapor surrounding the tanks and tunnel; groundwater beneath the Facility, which has the potential to migrate off site; and offsite surface water where groundwater may discharge. Human receptors that may

potentially contact onsite or offsite Facility-impacted media are Facility occupational workers, construction workers, visitors, and offsite residents. Among the potentially complete exposure pathways identified, the primary pathway of concern for offsite human receptors is exposure to impacted tap water via direct ingestion and dermal contact, and inhalation while showering and bathing. Animals and vegetation may also be exposed to tap water as pets or from irrigation. Exposure by ecological receptors is considered incomplete or insignificant (DON 2019b). However, at the CHT Tank area of concern, where fuel may have been released to the ground surface, animals and vegetation may be exposed via direct contact. A CHT Tank Investigation is currently in the planning stages (Section 3.4).

2.5 Previous Facility Investigations

Previous environmental investigations at the Facility are summarized in Table 2-1.

Table 2-1: Summary of Previous Red Hill Environmental Investigations

Investigation Report	Summary
<i>Remedial Investigation Phase I and II, Red Hill Oily Waste Disposal Facility</i> (DON 1996, 2000)	A two-phase RI was initiated in the early 1990s at the Red Hill Oily Waste Disposal Facility. No contaminants were detected in the basal aquifer beneath the site, and DOH issued a concurrence letter for a No Further Action determination in 2005 (DOH 2005).
<i>Facility Site Characterization and Investigation</i> (DON 1999, 2002)	A two-phase investigation initiated in 1998 evaluated the presence of petroleum constituents at the Facility. DOH requested the Navy to conduct quarterly groundwater monitoring, conduct a Tier 3 risk assessment, and develop a contingency plan.
<i>Quarterly Groundwater Monitoring Reports</i> (DON 2005 to present)	Sampling and analysis of Red Hill network groundwater monitoring wells were initiated in 2005 and incorporated into the Red Hill GWPP (DON 2008b, 2014b); results are reported to DOH.
<i>Technical Report</i> (DON 2007)	An environmental investigation and risk assessment initiated in 2004 included installation of SVMPs in angle borings under the active fuel storage tanks, three additional groundwater monitoring wells in the lower access tunnel, a three-dimensional groundwater model, and a Tier 3 human health risk assessment.
<i>Tank 17 Removal Action Report</i> (DON 2008c)	Documented results of a limited removal action and site characterization investigation conducted in June 2008 in response to a 4-gallon release of JP-5 fuel from tunnel piping; the report's Environmental Hazard Analysis determined that the release posed no further significant environmental hazards.
<i>Type 1 Letter Report</i> (DON 2010)	A 2010 investigation re-evaluated the DON (2007) groundwater model assumptions and results, as well as the Tier 3 risk assessment results.
<i>Monthly Soil Vapor Monitoring Reports</i> (DON 2008a)	Soil vapor PID measurements are collected monthly under the Facility's fuel storage tanks with SVMPs in accordance with the Red Hill GWPP (DON 2008a; 2014b); results are reported to DOH.

Investigation Report	Summary
<i>Tank 5 Initial and Quarterly Release Response Reports</i> (DON 2014a to December 2022)	Documented the results of release response efforts for the Tank 5 January 2014 Release.
<i>Seismic Profiling to Map Hydrostratigraphy in the Red Hill Area</i> (DON 2018d)	Presented results and evaluation of nine seismic profiling transects conducted at Red Hill and in North and South Hālawā Valleys and Moanalua Valley to improve understanding of subsurface conditions that affect groundwater flow and CF&T.
<i>Groundwater Protection and Evaluation Considerations for the Red Hill Bulk Fuel Storage Facility</i> (DON 2018g)	Presented an interim analysis of environmental data and potential environmental risks; interim results of the groundwater flow model; and an evaluation of hypothetical release scenarios.
<i>Conceptual Site Model</i> (DON 2018f, 2019b)	Established a basis for evaluating contaminant transport pathways and potential for exposure of human receptors to potentially impacted drinking water.
<i>Groundwater Flow Model Report</i> (DON 2020a)	Refined the previous groundwater flow model to improve understanding of the direction and rate of groundwater flow within the aquifers around the Facility.
<i>Investigation and Remediation of Releases Report</i> (DON 2020b)	Documented the response to the January 2014 Tank 5 release and evaluated potential remedial alternatives for that release and any potential future release.
<i>Evaluation of Chromatograms for Understanding TPH Detections in Monitoring Wells</i> (DON 2020c)	Provided an evaluation of TPH detections in monitoring wells to determine whether those detections are indicative of potential fuel impacts from the Facility.
<i>Initial and Quarterly Release Response Reports, Pipeline Breach in Tunnel and Fire Suppression Drain Line</i> (DON 2021b, c, e, 2022c, d, f, h)	Documented the quarterly results of release response efforts for the May 6, 2021, Tunnel Pipeline Breach and the November 20, 2021, Fire Suppression Recovery Drain Line releases.
<i>Phase 1 and Phase 2 Technical Memoranda, Holding Tank and Leach Tank Characterization, November 2021 Pipeline Release</i> (DON 2022b, 2023j)	Presented preliminary results of a two-phase site characterization effort at the Holding Tank and Leach Tank area outside Adit 3.
<i>Quarterly Release Response Reports, Red Hill Bulk Fuel Storage Facility</i> (DON 2022j, 2023e, i, k, o, 2024c)	Documented the combined quarterly results of release response efforts for the January 2014, May 2021, and November 2021 releases.
<i>Final Closure Report Concrete Tank Removal</i> (DON 2023h)	Documented the field activities associated with removal of the Holding Tank, Leach Tank, and contaminated soil outside Adit 3 in 2022.

Investigation Report	Summary
<i>Technical Memorandum: In-Progress Data Report, Adit 3 Site Characterization</i> (DON 2023d)	Presented in-progress results of the Adit 3 site characterization effort.
<i>Draft Site Characterization Report, November 2021 JP-5 Release in Adit 3, Operable Unit 1</i> (DON 2023f)	Presented draft results of the Adit 3 site characterization effort for the shallow vadose zone (Operable Unit 1 [OU-1]).
<i>Final Report of Findings, Red Hill Shaft Flow Optimization Study</i> (DON 2023l)	Presented results of a study to determine optimized pumping rates of Red Hill Shaft groundwater through the GAC system installed outside Adit 3.
<i>Groundwater Protection Plan Defueling Summary Report</i> (DON 2024d)	Presented results of groundwater protection measures implemented at the Facility during tank defueling operations in 2023–2024.

CF&T contaminant fate and transport
 RI remedial investigation
 TPH total petroleum hydrocarbons

3.0 Summary of Investigation History

Investigation activities associated with the January 2014 Release began in 2014 and have continued under the AOC since it was signed in 2015.

Investigation activities in response to the May 2021 Release began on May 10, 2021, and included soil vapor, groundwater, and drinking water monitoring and free product gauging and headspace measurements. Following the November 2021 Release, site characterization and investigation efforts were expanded to include investigations of the Adit 3 and Pearl Harbor Tunnels, the Holding Tank and Leach Tank area and the CHT Tank area outside Adit 3, video inspection of the Red Hill Shaft water development tunnel, single-event groundwater sampling at two non-network monitoring wells on the Moanalua Valley side of Red Hill, and pilot tests currently being planned to evaluate potential technologies for remediating the November 2021 Release, as described below.

3.1 Release Response Actions

Investigation activities in response to the May 2021 Release began on May 10, 2021, with a site assessment that included soil vapor PID field measurements. Continuing release response activities for the January 2014 Release at Tank 5 and the May 2021 Release include soil vapor and groundwater sampling, analysis, evaluation, and reporting; free product gauging and headspace measurements in groundwater monitoring wells; installation of additional groundwater monitoring wells; geologic mapping; forensic analyses; and groundwater modeling.

Soil Vapor Monitoring. Soil vapor monitoring currently includes weekly collection of soil vapor PID readings from probes at Tanks 2 through 18 and Tank 20 (Figure 3). Passivated canister samples for laboratory analysis are collected at least monthly at SVMPs SV15S, SV15D, SV17S, SV17D, SV18S, SV18D, SV20M, and SV20D.

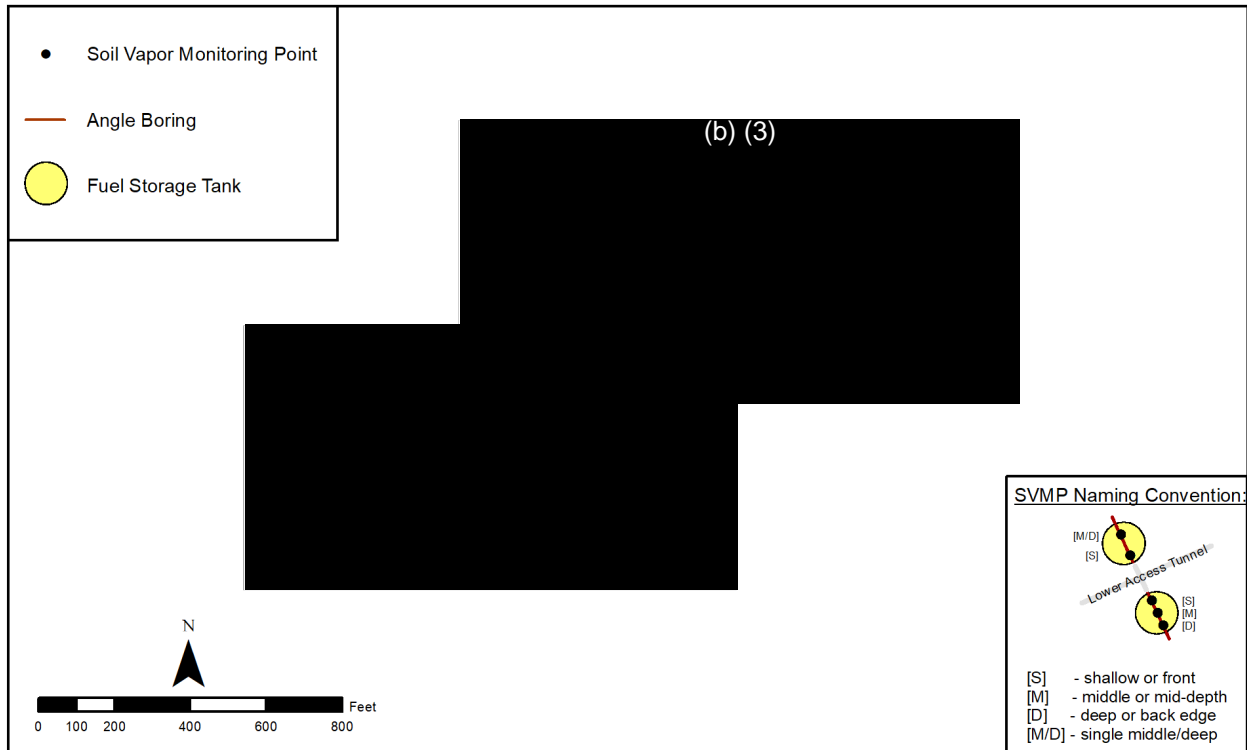


Figure 3: Soil Vapor Monitoring Network Below the Red Hill Fuel Storage Tanks

Soil vapor monitoring in the Adit 3 Tunnel has been conducted periodically since December 17, 2021. Fifty-four SVMPs were installed through the Adit 3 Tunnel floor in response to the November 20, 2021, JP-5 release; they are currently monitored with handheld PIDs monthly and twice within 10 days when a rain event exceeds 1-inch per 24 hours at an adjacent National Oceanic and Atmospheric Administration weather station (Section 3.2).

Free Product Gauging and Headspace Measurements. Free product gauging and headspace measurements were collected as part of the prior NOI and current Consolidated Groundwater Sampling Program (DON 2023g). Free product has never been detected in any monitoring well other than Red Hill Shaft and temporary wells screened in the shallow perched water zone beneath the Adit 3 Tunnel floor adjacent to the shaft.

Groundwater Monitoring. Groundwater samples were initially collected at RHMW01R, RHMW02, and RHMW03 beginning in May 2021 (Figure 1). The collection of drinking water samples at the pre-chlorination spigot/Red Hill Shaft Pump sampling point in conjunction with groundwater sampling began in June 2021. The number of groundwater sampling locations was increased to include RHMW05 and RHMW2254-01 in September 2021 following the detection of diesel range organics (DRO) and residual oil range organics (ORO) in the Red Hill Shaft pre-chlorination samples, including detections of ORO above the DOH Environmental Action Level (EAL) that occurred in August and September 2021.

Following the November 2021 Release, the December 2021 NOI *Groundwater Sampling Plan* was prepared (IDWST 2022, Exhibit C), and the number of groundwater sampling locations was further expanded in December 2021 and January 2022 to include weekly sampling at additional existing groundwater monitoring wells identified in the plan, along with sump water sampling from the Adit 3 Sump.

Installations of RHMW17, RHMW18, and RHMW20 were completed in June 2022, December 2023, and June 2023, respectively. In addition, RHMW21 has commenced drilling on May 2024.

Delineation Wells. Ten “RHP” delineation wells were installed during 2022–2023 at locations shown on Figure 1 to evaluate groundwater conditions in the vicinity of Red Hill Shaft and delineate the extent of contamination extending from the November 2021 Release in the Adit 3 Tunnel. In addition, these wells are used to evaluate groundwater flow and the effect of pumping Red Hill Shaft on the local hydraulic gradient and evaluate whether contamination is migrating from the site toward potential offsite receptors. The delineation wells are screened across the basal aquifer water table except for RHP04B and RHP04C, which have deeper screens (approximately -140 ft msl and -340 ft msl, respectively) designed to monitor chloride concentrations associated with the saltwater/freshwater interface. New delineation wells RHP08B and RPHP08C with screens below the water table are pending installation in 2024.

Sentinel Wells. Installation of “NMW” sentinel wells continues as part of expanding the groundwater monitoring network following the November 2021 Release, with completion and sampling of NMW24 in 2022; NMW25, NMW26, NMW30, NMW32, and NMW33 in 2023; and NMW34 in 2024 (Figure 1). NMW27 is currently being drilled.

The Navy provided a *Draft Monitoring Well Installation Work Plan* to the Regulatory Agencies for review on January 31, 2024, that documented the current proposed approach for installing new groundwater monitoring wells within and in the vicinity of the Facility (DON 2024a).

Details on well installation and construction and water quality data are uploaded to the JBPHH Red Hill Bulk Fuel Storage Facility Environmental Data Management System (EDMS) (Appendix E – Groundwater Monitoring Well Installation Data) and are reported as they are acquired.

Drinking Water Sampling. Drinking water sampling was conducted at Red Hill Shaft as part of the Release Response effort for the November 2021 Release until December 2021, when Red Hill Shaft was disconnected from the JBPHH Water Distribution System. Ongoing drinking water sampling and analysis continue under a separate program and are therefore not described in this Quarterly Release Response Report.

Changes to Groundwater Sampling Program. The Navy initially described modifications to the Red Hill groundwater sampling and analysis program to the Regulatory Agencies in a May 18, 2023, memorandum titled *Consolidation and Optimization of the Groundwater Sampling Programs, Red Hill Bulk Fuel Storage Facility* (DON 2023g). This memorandum integrated all Red Hill groundwater sampling programs into a single program, revised the analyte list, optimized the sampling frequency, specified free product gauging and PID headspace measurements, and standardized sample collection methodology to low-flow purging. Monthly sampling under the Consolidated Groundwater Sampling Program began in June 2023 (DON 2023g).

Groundwater monitoring locations in the current Consolidated Well Network are listed in Table 3-1, and monitoring zones for each of the four multilevel wells are described in Table 3-2.

Table 3-1: Current Red Hill Monitoring Well Network, Consolidated Groundwater Sampling Program

Location ID	Type	Location	Year Installed	Approximate Closest Distance to South Hālawā Stream (meters)
RHMW2254-01 ^a	Sampling Point	Inside Facility boundary	2005	(b)(3)
RHMW01R	Single Screen	Inside Facility boundary	2021	(b)(3)
RHMW02	Single Screen	Inside Facility boundary	2005	(b)(3)
RHMW03	Single Screen	Inside Facility boundary	2005	(b)(3)
RHMW04	Single Screen	Inside Facility boundary	2005	(b)(3)
RHMW05	Single Screen	Inside Facility boundary	2009	(b)(3)
RHMW06	Single Screen	Inside Facility boundary	2014	(b)(3)
RHMW08	Single Screen	Inside Facility boundary	2016	(b)(3)
RHMW09	Single Screen	Inside Facility boundary	2016	(b)(3)
RHMW10	Single Screen	Inside Facility boundary	2017	(b)(3)
RHMW11	Multilevel	Hālawā Correctional Facility	2017	(b)(3) ^c
RHMW12A	Single Screen	Hālawā Correctional Facility	2021	(b)(3)
RHMW13	Multilevel	Inside Facility boundary	2019	(b)(3)
RHMW14	Multilevel	Hālawā Correctional Facility	2019	(b)(3) ^c
RHMW15	Multilevel	Inside Facility boundary	2019	(b)(3)
RHMW16	Single Screen	Inside Facility boundary	2020	(b)(3)
RHMW17	Single Screen	Inside Facility boundary	2022	(b)(3)
RHMW18	Single Screen	Inside Facility boundary	2023	(b)(3)
RHMW19	Single Screen	Inside Facility boundary	2020	(b)(3)
RHMW20	Single Screen	Inside Facility boundary	2023	(b)(3)
HDMW2253-03 ^b	Deep Monitoring Well	Hālawā Correctional Facility	2000	(b)(3)
RHP01	Single Screen	Inside Facility boundary	2022	(b)(3)
RHP02	Single Screen	Inside Facility boundary	2022	(b)(3)
RHP03	Single Screen	Inside Facility boundary	2022	(b)(3)
RHP04A	Single Screen	Inside Facility boundary	2022	(b)(3)
RHP04B	Deep Monitoring Well	Inside Facility boundary	2022	(b)(3)
RHP04C	Deep Monitoring Well	Inside Facility boundary	2023	(b)(3)
RHP05	Single Screen	South of Facility boundary	2022	(b)(3)
RHP06	Single Screen	South of Facility boundary	2023	(b)(3)
RHP07	Single Screen	Inside Facility boundary	2023	(b)(3)

Location ID	Type	Location	Year Installed	Approximate Closest Distance to South Hālawā Stream (meters)
RHP08	Single Screen	South of Facility boundary	2023	(b)(3)
NMW24	Single Screen	Northwest of Facility boundary	2022	(b)(3)
NMW25	Single Screen	South of Facility boundary	2023	(b)(3)
NMW26	Single Screen	North of Facility boundary	2024	(b)(3)
NMW30	Single Screen	South of Facility boundary	2023	(b)(3)
NMW32	Single Screen	West of Facility boundary	2023	(b)(3)
NMW33	Single Screen	Southwest of Facility boundary	2023	(b)(3)
NMW34	Single Screen	Northwest of Facility boundary	2024	(b)(3)

Notes:

Single screen: Conventional monitoring well with single screen typically installed across or near the water table.

Multilevel: Well that is screened near the piezometric surface of the regional basal aquifer and at lower depths (zone identifiers decrease with depth).

^a Sampling point located inside the shaft of Navy Supply Well 2254-01.

^b Installed by State of Hawai‘i Department of Land and Natural Resources with a solid casing to approximately 50 ft below the water table.

^c RHMW11 and RHMW14 are located adjacent to the concrete-lined portion of South Hālawā Stream.

Table 3-2: Description of Multilevel Monitoring Zones

Well	Number of Zones	Description	Zone(s) Currently Monitored	Zones Not Currently Monitored
RHMW11	8	<ul style="list-style-type: none"> Zone 8 is completed at an elevation near the regional basal aquifer potentiometric surface, with the zone’s sampling port located in saprolite. Zones 6 and 7 are completed at elevations below the regional basal aquifer potentiometric surface, with sampling ports located in saprolite. Zones 1 through 5 are completed deeper, with sampling ports within the basalt in the basal aquifer. 	Zone 5	Zones 1 to 4 ^a Zones 6 to 8 ^b
RHMW13	5	All zones are located within high-hydraulic-conductivity portions of unweathered basalt: <ul style="list-style-type: none"> Zone 5 is completed at an elevation near the regional basal aquifer potentiometric surface. Zones 1 through 4 are completed deeper. 	Zone 5	Zones 1 to 4 ^a

Well	Number of Zones	Description	Zone(s) Currently Monitored	Zones Not Currently Monitored
RHMW14	8	<ul style="list-style-type: none"> Zone 8 is completed above the elevation of the piezometric surface of the regional basal aquifer with the zone's sampling port located in saprolite. Zone 7 is completed across the regional basal aquifer potentiometric surface, with the sampling port in basalt with lower hydraulic conductivity. Zones 4 to 6 are below the elevation of the piezometric surface of the regional basal aquifer, with sampling ports within basalt with relatively lower hydraulic conductivity. Zones 1 to 3 are located deeper, with sampling ports within the relatively higher-hydraulic-conductivity portions of the unweathered basalt in the basal aquifer. 	Zone 3	Zones 1 to 2 ^a Zones 4 to 8 ^b
RHMW15	5	<p>All zones are located within high-hydraulic-conductivity portions of unweathered basalt:</p> <ul style="list-style-type: none"> Zone 5 is completed at an elevation near the regional basal aquifer potentiometric surface. Zones 1 through 4 are completed deeper. 	Zone 5	Zones 1 to 4 ^a

^a Not monitored due to lack of detections of COPCs in previous GW LTM events.

^b Not monitored due to low hydraulic conductivity.

3.2 Adit 3 Site Characterization

Investigation and sampling activities in response to the November 2021 Release began on November 29, 2021. Characterization results for the shallow vadose zone are presented in a *Draft Site Characterization Report, November 2021 JP-5 Release in Adit 3, Operable Unit 1*, submitted to the Regulatory Agencies for review on May 19, 2023 (DON 2023f).

Site characterization activities of the perched water zone continue at Adit 3, and an Operable Unit (OU) 2 report that will evaluate the deep vadose zone is forthcoming. Site characterization sampling locations included six deep nested SVMPs installed in the Adit 3 and Pearl Harbor Tunnels. Two additional deep nested SVMPs are planned for installation in the latter part of calendar year 2024. Characterization data are uploaded to EDMS (Appendix E – Characterization and Remediation Data, Characterization and Remediation Analytical Laboratory Reports, and Environmental Data Report Tables). AECOM conducted gauging of water levels, product levels (where applicable), and headspace VOC readings in boreholes and temporary wells. During the reporting period, continuous pressure transducer data was collected at temporary wells. In addition, soil vapor VOCs, oxygen, carbon dioxide, and methane gases were monitored from subslab and deep nested SVMPs during this reporting period, as reported in Section 5.1.2.

3.3 Holding Tank and Leach Tank Site Characterization

A multi-phase subsurface site characterization and removal action of contaminated soil at the Holding Tank and Leach Tank area outside Adit 3 (Figure 2) was initiated in January 2022. Phase 1 and 2 sampling locations are shown on Figure 4.

Figure 4
Holding Tank and Leach Tank
Sampling Location Map
Quarterly Release Response Report
Red Hill Bulk Fuel Storage Facility
JBPHH, O'ahu, Hawai'i

This page intentionally left blank

Under Phase 1, 21 soil borings were drilled and sampled in January 2022 using a direct-push rig. The investigation was unable to delineate the extent of contamination in the perched aquifer due to encountering shallow refusal, as documented in a *Technical Memorandum Holding Tank and Leach Tank Characterization, February 2022* (DON 2022b).

Following consultation with the Regulatory Agencies, the Navy conducted Phase 2 field work during March 9–17, 2022, to complete vertical delineation of the petroleum in subsurface soil and to characterize petroleum impacts in the shallow perched water body located at approximately 30 ft bgs in the study area. Subsurface soil samples and organic vapor headspace readings were collected at eight soil borings from data gap locations, and groundwater grab samples were collected at three temporary monitoring wells within the perched groundwater zone. The chemical constituents evaluated were GRO, DRO, and ORO; benzene, toluene, ethylbenzene, and total xylenes (BTEX); and naphthalene, 1-methylnaphthalene, and 2-methylnaphthalene (N, 1MN, and 2MN).

The Phase 2 findings led to excavation and removal of both tanks and approximately 97 tons of soil in May 2022. Waste characterization soil samples were collected and analyzed for GRO, DRO, and ORO prior to the excavation event, and the excavated soil was properly disposed of at a permitted landfill. Removal activities continued with a second soil removal action in September–October 2022 that removed approximately 1,000 cubic yards (1,712 tons) of additional petroleum-contaminated soil. Soil samples were collected using multi-increment sampling methods. After sampling, all excavated soil was properly disposed of at a permitted landfill.

Details and results were presented to the Regulatory Agencies in a *Final Technical Memorandum, Phase 2 Holding Tank and Leach Tank Characterization, November 2021 Pipeline Release* (DON 2023j) on July 13, 2023. In addition, a *Final Closure Report, Concrete Tank Removal* was provided to the Regulatory Agencies in June 2023 (DON 2023h). Once the removal action confirmation sampling results have been evaluated, the Navy will develop site-specific risk-based action levels following the DOH HEER Environmental Hazard Evaluation process and, if necessary, develop and implement an Environmental Hazard Management Plan in accordance with HEER guidelines.

3.4 CHT Tank Site Characterization

Site characterization activities are being planned as part of a Phase 1 assessment to characterize the nature and lateral extent of petroleum hydrocarbon impacts in near-surface soil around the CHT Tank located outside Adit 3 (Figure 2). Additional activities will include characterizing and quantifying the amount of recovered material (i.e., LNAPL, petroleum-contaminated water, and petroleum-impacted sludge) stored in four fractionation (frac) tanks near Adit 1 at Pearl Harbor to quantify the amount of petroleum recovered. Site characterization plans were presented to the Regulatory Agencies for comment in a revised *Site Characterization Plan Addendum – Collection, Hold, and Transfer Tank Overflow Site Characterization, November 2021 Release* in March 2024 (DON 2024b), and the Regulatory Agencies conditionally approved the plan on April 12, 2024.

3.5 Inspection of Water Development Tunnel

Inspections of the Red Hill Shaft water development tunnel were conducted using a submersible remotely operated vehicle (ROV) to better understand the extent of impact in the tunnel and to potentially identify areas of fluid infiltration. Cameras on the cable-controlled ROV recorded downward, forward, and upward video of the first 515 ft of the tunnel, which investigators then reviewed and evaluated. An initial inspection conducted on January 13, 2022, was followed by a second June 14–15, 2022, inspection; the results are reported in a *Findings from ROV Inspection #2 Video Review of Red Hill Water Development Tunnel* technical memorandum (DON 2022g).

3.6 *Single-Event Groundwater Sampling at DH-43 and BWS2253J1 Well*

In a single sampling event in October 2022, the Navy collected split samples with BWS at monitoring wells DH-43 (State Well ID No. 3-2253-02), located adjacent to Red Hill in Moanalua Valley, and BWS2253J1 Well (State Well ID No. 3-2253-006), located beside an aboveground BWS water tank southwest of the Red Hill fuel storage tanks adjacent to the Facility boundary and RHMW09. The split sampling was conducted to obtain data to further evaluate potential impacts to groundwater southeast and south of the Facility. The Navy's samples were analyzed for the parameters identified in Section 6.3.2. Details and analytical results were reported in the December 21, 2022, Quarterly RRR (DON 2022j).

3.7 *Remediation Pilot Test at Adit 3*

The Navy has completed a bench-scale test, and a shallow zone pilot test commenced in April 2024 to evaluate potential technologies for remediating fuel released to the environment by the November 2021 Release. The objectives are to assess the technologies' effectiveness in heterogeneous volcanic lithologies, assess the constructability of the technologies, and identify design parameters prior to full-scale implementation.

The ongoing field pilot testing consists of short-duration soil vapor extraction (SVE) and potential air sparging (AS) pilot tests (pending regulatory approval), a 4-month Shallow SVE pilot test, and a 24-month natural source-zone depletion (NSZD) study. A laboratory JP-5 weathering treatability study was completed, and a report is being prepared. Following the shallow pilot testing period, operation of the Shallow and Deep SVE systems is planned.

The Navy provided to the Regulatory Agencies for comment a *Draft Shallow SVE/AS Work Plan (WP)* on January 9, 2023 (DON 2023a); a *Draft NSZD WP* on February 23, 2023 (DON 2023c); and a *Draft Deep SVE WP* on February 27, 2023 (DON 2023b).

In April 2023, the Navy authorized installation of components of the Shallow SVE/AS and the Deep SVE study. Components consisted of AS points, shallow and deep SVMPs, a shallow SVE well, and a Hume line SVE point. Deep SVE wells are also planned for installation following completion of monitoring well RHMW21 in June 2024.

4.0 *Site Investigation Objectives*

Sampling activities in response to the three fuel releases include routine sampling and other investigation activities associated with soil vapor and groundwater monitoring and site characterization, as described below.

4.1 *Soil Vapor*

Soil Vapor Sampling at the Tank Farm. The Navy installed SVMPs below each of the active Red Hill fuel storage tanks in the mid-2000s to collect data that provide additional layers of protection to screen for potential releases (Figure 3) (DON 2007). These SVMPs have been monitored monthly since 2008 for total volatile organic compound (VOC) vapors as a release detection screening tool that operates in conjunction with other leak detection systems used at the Facility. More frequent (e.g., weekly) monitoring of some or all of the below-tank SVMPs has been conducted since the May 2021 Release to further characterize the specific VOCs associated with the May 2021 Release and to evaluate the extent of weathering that has occurred. The data are available in EDMS (Appendix E – Soil Vapor Data – Below-Tank Sampling Locations).

Adit 3 Soil Vapor Monitoring. Routine monitoring of the SVMPs installed in the tunnel floor near Adit 3 and in the Pearl Harbor Tunnel using handheld PIDs has been conducted to further characterize the nature and extent and fate of impacts from the November 2021 Release near Adit 3. Results have been used to identify initial hotspots and to direct additional subsurface soil, LNAPL, and groundwater studies to develop a complete conceptual site model (CSM) for development of the current remedial pilot studies and future feasibility studies and remedial designs. The SVMPs are monitored monthly and following rain events that exceed 1 inch per 24 hours. The data are available in EDMS (Appendix E – Characterization and Remediation Data, Characterization and Remediation Analytical Laboratory Reports, and Environmental Data Report Tables).

The six deep nested SVMPs installed in the Adit 3 and Pearl Harbor Tunnels will be used to provide estimates of radius of influence for the SVE pilot study (Section 3.7) as well as site characterization data during the installation phase. Two additional deep nested SVMPs are planned for installation in the latter part of calendar year 2024 (DoD 2022).

4.2 Free-Product Gauging and Monitoring Well Headspace Measurements

Oil/Water Interface Measurements. The Navy continues to collect monthly oil/water interface measurements to evaluate whether free product has reached groundwater for monitoring well locations with screens that bracket the water table and wells installed in unconfined conditions, in response to the January 2014 Release.

Gauging, Headspace, and Water Level Measurements. The objectives of the free product gauging and groundwater monitoring well headspace measurements are to evaluate whether free product has reached groundwater for monitoring well locations with screens that bracket the water table and wells installed in unconfined conditions, and to monitor for the presence of free product in Red Hill Shaft. In-well pressure transducers have been collecting water level data from seven temporary wells located in the Adit 3 Tunnel, west of the train track wye, where shallow perched water has been observed. These results are expected to inform on the fate and transport of LNAPL from the November 2021 Release within this section of the tunnel.

4.3 Groundwater

The objective of groundwater sample collection and analysis from monitoring wells underneath the tank farm and in the vicinity of Red Hill Shaft is to evaluate the nature and extent of impacts of the 2014 and 2021 Releases to the basal groundwater aquifer. Free product gauging and headspace measurements are also conducted during groundwater sampling activities, as described in Section 5.2.

Groundwater sample collection from June 5, 2023, onward has been consolidated to include NOI, GW LTM, delineation, and sentinel groundwater sampling programs into one comprehensive, optimized groundwater sampling program (DON 2023g). This program optimizes the sampling programs for targeted sampling for faster laboratory turnaround times and more efficient data analyses. Sections 5.3 and 6.3 provide details of the Consolidated Groundwater Sampling Program.

4.4 Data Usability

The usability of data collected depends on its quality, which in turn depends on a variety of factors. Adhering to proper sample collection techniques, observing and documenting chain of custody procedures, and using Department of Defense (DoD)-accredited laboratories and approved analytical methods ensure that the quality of data generated meets site characterization objectives.

The DOH document *Evaluation of Environmental Hazards at Sites with Contaminated Soil and Groundwater* (DOH 2017, Volume 2, Section 6) provides guidance on characterizing petroleum-impacted soil and groundwater (“Soil, Soil Vapor and Groundwater Action Levels for TPH”) and is summarized as follows:

- Petroleum is a complex mixture that degrades into potentially toxic metabolites.
- Non-specific aliphatic and aromatic compounds and related degradation compounds compose the majority of the mass collectively referred to as TPH.
- Risk to human health and the environment posed by petroleum releases is evaluated in terms of both TPH and individual “indicator” compounds such as BTEX as well as N, 1MN, and 2MN and other targeted polynuclear aromatic hydrocarbons (PAHs). The latter compose only a small percentage of the total mass in fuels and in vapors but can pose a significant risk due to their higher toxicity and can be important for evaluating risk.
- For risk evaluation, samples are evaluated for additives known or suspected to have been pre-blended into the fuel. Such additives can potentially include antioxidants, biocides, and fuel system ice inhibitors.

The following bullets identify soil borings as part of the LNAPL characterization process, including the following delineation methods for soil:

- If the depth of the source of a release is known, then the approximate upper extent of that release can be inferred.
- Headspace measurements for volatile organics will typically show an increase in concentration within the LNAPL zones. Plotting these on a simple chart of depth against concentration will typically show the inferred bulk LNAPL zone (mobile or residual).
- Visual and olfactory observations are typically logged as well, giving another indication of the presence of LNAPL.
- Soil samples are often collected and analyzed chemically, which will give another set of clear LNAPL indications. In general, TPH analytical results (for the appropriate fuel carbon range) greater than 250 milligrams per kilogram (mg/kg) are indicative of residual LNAPL (because site soil has a limited sorptive capacity).

Petroleum-related target analytes identified in the above guidance are listed in Table 4-1, and relevant DOH EALs are listed in Table 4-2.

Table 4-1: Target Analytes for Middle-Distillate Contaminated Media

Petroleum Product	Media	Recommended Target Analytes
Middle Distillates (e.g., diesel, kerosene, Stoddard solvents, heating fuels, jet fuels)	Soil Vapor	TPH, BTEX, N, and methane
	Groundwater	TPH, BTEX, N, 1MN, and 2MN

Source: DOH (2017, Volume 2, Table 6-1).

Table 4-2: DOH Environmental Action Levels

Analytical Method	Analyte	EALs	
		Soil Vapor ($\mu\text{g}/\text{m}^3$) ^a	Groundwater ($\mu\text{g}/\text{L}$) ^b
SW-8260	GRO	4.9×10^6	500/ 300
	Benzene	6,300	170/ 5
	Toluene	1.8×10^7	40 /1,000
	Ethylbenzene	2×10^5	30 /700
	Xylenes	3.5×10^5	20 /10,000
SW-8270	N	1.1×10^4	21/ 17
	1MN	9.8×10^5	10 /27
	2MN	5.6×10^4	10 /24
SW-8015	DRO	2.2×10^6	500/ 400
	ORO	N/A	500 /2,400

Note: **Bold value** indicates Tier 1 EAL used for groundwater data screening.

Source: State of Hawai‘i Department of Health Environmental Action Level Surfer (Fall 2017) (DOH 2017).

- $\mu\text{g}/\text{L}$ micrograms per liter
- $\mu\text{g}/\text{m}^3$ micrograms per cubic meter
- N/A not applicable
- N naphthalene
- 1MN 1-methylnaphthalene
- 2MN 2-methylnaphthalene
- GRO gasoline range organics
- DRO diesel range organics
- ORO oil range organics

^a Soil Vapor EALs = (Commercial/Industrial Shallow Soil Vapor Action Levels) (Table C).

^b Groundwater EALs = (Odor Taste Threshold)/(Drinking Water Toxicity).

5.0 Field Activities

Field activities performed during this reporting period to characterize soil vapor and groundwater are described below. Summaries of site characterization activities associated with the Adit 3 and Pearl Harbor Tunnel and the Holding Tank and Leach Tank area are included below. As noted in Section 3.0, the data for these two investigations are documented in separate reports (DON 2023f, 2022i).

Analytical methods for the samples collected are identified in Section 6.3, and analytical results are presented in Section 9.0.

5.1 Soil Vapor Monitoring

5.1.1 Below-Tank SVMs

Total VOC concentrations at below-tank SVMs were measured weekly in the field using hand-held PIDs at all SVMs below Tanks 2 through 18 and 20. SVM locations are shown on Figure 3.

5.1.2 Adit 3 and Pearl Harbor Tunnel SVMs

Six SVM monitoring events were conducted during this reporting period, as part of implementing the *Preliminary Site Characterization Plan* (DON 2022a) and *LNAPL Site Characterization Plan* (DON 2022e) (Section 3.2) including both planned monthly SVM monitoring events and out-of-frequency events conducted in response to rainfall events. Figure 5A shows the organic vapor concentrations measured during the reporting period, and Figure 5B shows boring and temporary well locations. No laboratory soil vapor testing was conducted at SVMs within the Adit 3 or Pearl Harbor tunnels during the current reporting period.

5.1.3 SVE/NSZD Pilot Project at Adit 3

Field work conducted for the Shallow SVE and NSZD pilot project at Adit 3 (Section 3.7) during this reporting period includes:

- Completed baseline sampling, including collection of groundwater and soil vapor samples.
- Finished installation of the shallow SVE system, including GAC loading, sump L-pipe installation, piping connections in the tunnel and system, installation of a vapor liquid separator transfer pump, and bolting the system building to its concrete slab.
- Commenced startup of shallow SVE system in April 2024.

5.2 Free Product Gauging and Monitoring Well Headspace Measurements

Free product gauging and PID headspace measurements were conducted monthly as part of the Consolidated Groundwater Sampling Program (DON 2023g) (Section 3.1):

- Free product gauging was conducted at the groundwater monitoring wells listed in Section 5.3 using a clear bailer in addition to an oil/water interface probe. An ultraviolet light was also used at Red Hill Shaft (RHMW2254-01) to check for the presence of free product.
- Headspace PID measurements were collected from inside the well casing immediately after well cap removal.

RHMW12A and RHMW16 have submerged well screens. HDMW2253-03 is a deep monitoring well installed by the State of Hawai'i Department of Land and Natural Resources with a solid casing to approximately 50 ft below the water table. Multilevel wells RHMW11, RHMW13, RHMW14, and RHMW15 are closed systems with sampling ports below the water level surface, and as a result LNAPL would likely not be able to enter these wells.

Adit 3 Gauging and Measurements. During the reporting period, free product gauging, organic vapor headspace, and water level measurements were collected weekly at 15 boreholes and seven temporary wells located within Adit 3. In addition, continuous water level measurements were collected at the temporary wells using in-well pressure transducers.

Event No	Date	A3+300	A3+250	A3+200	A3+150	A3+100	A3+050	A3a+000	A3b+000	A3-025	A3a-050	A3b-050	A3-075	A3-100	A3-125	A3a-150	A3b-150	A3-175	A3a-200	A3b-200	A3-225	A3-250	A3-275	A3a-300	A3b-300	A3-325	A3a-350	A3b-350	A3-375	A3-375-05.0	A3-400	A3-425	A3-450
71	1/12/2024*	1	0	0	0	0	1	1	1	1	1	1	Tight	2	24	1	2	1	2	4	Tight	32	62	1	2	22	20	40	9	17	0	1	0
72	1/19/2024*	3	1	1	1	1	2	1	1	2	2	2	Tight	2	2	1	2	1	4	2	Tight	14	6	2	3	8	5	28	1	1	1	1	
73	2/23/2024	6	1	1	0	0	0	0	0	0	0	0	Tight	1	1	1	1	1	2	4	4	59	81	2	3	28	11	32	7	6	1	2	3
74	3/5/2024*	3	1	1	1	0	1	1	1	1	2	2	Tight	4	4	Tight	3	2	4	6	Tight	37	53	3	2	29	11	29	6	4	0	0	0
75	3/12/2024*	1	0	0	0	0	0	0	0	0	0	0	Tight	1	0	0	0	0	1	1	Tight	13	11	0	1	6	3	3	1	1	0	0	0
76	4/9/2024*	2	0	0	0	0	0	0	1	0	0	0	Tight	1	1	1	1	1	1	2	Tight	16	18	1	1	7	4	6	2	2	0	0	0

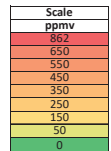
(b) (3)

Event No.	Date	A3+500	A3+475	A3+450	A3+425	A3+400	A3a+375	A3b+375
71	1/12/2024*	0	0	0	0	0	0	0
72	1/19/2024*	2	1	1	1	1	1	1
73	2/23/2024	1	1	1	1	1	1	1
74	3/5/2024*	1	1	1	1	0	1	1
75	3/12/2024*	1	0	0	0	0	0	0
76	4/9/2024*	0	0	0	0	0	0	0

Date	25+300	25+275	25+250	25+225	25+200	25+175	25+150	25+125	25+100	15+038	15+068	25+075	25+075-05.0	25+050	25+025
1/12/2024*	0	0	0	0	0	0	0	0	70	0	0	54	8	0	0
1/19/2024*	2	1	1	2	1	2	2	3	28	1	1	12	3	2	3
2/23/2024	1	1	0	1	1	2	1	2	87	1	1	35	12	2	3
3/5/2024*	1	2	2	2	Tight	3	2	4	54	2	2	27	10	3	3
3/12/2024*	0	0	0	0	0	0	0	0	20	0	0	12	2	0	0
4/9/2024*	1	1	1	1	1	1	1	2	20	1	1	3	15	2	1

Figure 5A. Soil Vapor Monitoring Point Results
January 12, 2024 - April 9, 2024
Adit 3 Tunnel and Pearl Harbor Tunnel

Notes
* denotes out-of-frequency sampling events that were conducted in response to a significant rain event that exceeded 1 inch in 24 hours. An additional follow-up sampling event is conducted 7 days after the initial event.



(b) (3)

Figure 5B
Adit 3 Boring and Temporary Well Locations
Quarterly Release Response Report
Red Hill Bulk Fuel Storage Facility
JBPHH, O'ahu, Hawai'i

5.3 Groundwater Sampling

Groundwater sampling was conducted monthly in accordance with the Consolidated Groundwater Sampling Program (DON 2023g). The following locations were monitored during this reporting period (Figure 1):

- Groundwater sampling point RHMW2254-01 at Red Hill Shaft; in-tunnel monitoring wells RHMW01R, RHMW02, RHMW03, and RHMW05; and the following wells external to the lower access tunnel:
 - RHMW04, RHMW06, RHMW08, RHMW13-05, RHMW15-05, RHMW16, RHMW17, RHMW18, and RHMW20, located within the Facility boundary along its northern border
 - RHMW09, RHMW10, and RHMW19, located within the Facility boundary along its southern border
 - RHMW11-05, RHMW12A, RHMW14-03, and HDMW2253-03, located north of the Facility boundary on the grounds of the Hālawā Correctional Facility
- Delineation wells RHP01, RHP02, RHP03, RHP04A/04B/04C, and RHP07, located within the Facility boundary in a cluster surrounding Red Hill Shaft, and RHP05, RHP06, and RHP08, located just outside the Facility boundary south of Red Hill Shaft
- Sentinel wells at locations north (NMW26), northwest (NMW24 and NMW34), south (NMW25 and NMW30), and southwest (NMW32 and NMW33) of the Facility boundary

All samples were collected using low-flow sample collection methodology in accordance with the Consolidated Groundwater Sampling Program (DON 2023g).

5.3.1 Single-Screen Monitoring Well Sampling

Prior to collecting groundwater samples, the single-screen monitoring wells were purged of standing water in the well casings. These monitoring locations each contain a dedicated bladder pump, which was used to purge the well and collect samples. The groundwater wells were purged using low-flow sampling methodology at flow rates of approximately 0.10–0.30 liter per minute or less to minimize VOC loss and drawdown.

To operate the pump, a portable air compressor with an in-line filter was connected to a QED Environmental Systems MicroPurge MP10 Controller, which was then connected to the pump. The compressor was turned on to power the pump, and the controller was adjusted to achieve a flow rate of approximately 0.10–0.30 liter per minute or less. Compressed nitrogen gas was used to purge and sample these single-screen monitoring wells.

Water quality parameters were monitored on a periodic basis during well purging using an In-Situ Inc. smarTROLL multiparameter handheld water quality meter to automate data entry of the parameters into a digitized format. Parameters measured included total dissolved solids, pH, temperature, specific conductivity, dissolved oxygen (DO), turbidity, oxidation-reduction potential (ORP), and salinity. The water quality parameters were used to evaluate whether the natural characteristics of the aquifer formation water were present within the monitoring wells before the samples were collected. A minimum of six readings were collected at each well during the purging process. When feasible depending on the well's inside diameter allowing space for both the bladder pump tubing and calibrated tape, water level measurements were collected and recorded during purging to detect indications of drawdown; if drawdown approaching 0.2 ft was detected, the rate of low-flow purging was reduced. Purging was considered complete when at least three consecutive water quality measurements stabilized within the specified range

for each parameter noted in groundwater sampling logs and in accordance with NAVFAC Pacific Environmental Restoration Program Project Procedure I-C-3, *Monitoring Well Sampling* (DON 2015a). The readings were recorded in the groundwater sampling logs. Sampling logs can be furnished upon request.

Once water quality parameters stabilized, groundwater samples were immediately collected from the wells using the bladder pumps. Groundwater samples for all single-screen monitoring wells were collected no more than 2.5 hours after purging was completed. Groundwater samples were collected in sample containers that were pre-preserved (as necessary) and provided by the analytical laboratory. Samples collected for ferrous iron and non-volatile dissolved organic carbon (NVDOC) analyses were filtered in the field using new 0.45-micron and 0.20-micron filters, respectively, attached at the end of the pump/probe discharge tubing.

5.3.2 Multilevel Monitoring Well Sampling

Due to the multilevel design of monitoring wells RHMW11, RHMW13, RHMW14, and RHMW15, purging was not required immediately prior to collecting groundwater from the sampled monitoring zone, because the sampling ports extend into the surrounding formation and there is no filter pack. Groundwater was collected using sampling probes from the following multilevel monitoring zones: RHMW11 Zone 5, RHMW13 Zone 5, RHMW14 Zone 3, and RHMW15 Zone 5.

A string of four sealed 250-mL sample containers was connected to the sampling probe, which was lowered to each monitoring zone, and the containers filled with groundwater from the formation through a sampling port in the central casing of the well. Once sample containers were filled, the sampling port was closed, and the probe and container string were brought to the surface. The groundwater was then transferred to the appropriate laboratory-supplied containers. For collection of groundwater quality parameters, the sample containers were flushed with nitrogen to remove air from within the containers prior to collection of groundwater. The nitrogen flush was performed to minimize DO enrichment due to high water pressure in the formation, which would otherwise have forced air in the sample containers to mix into the groundwater collected. Groundwater quality parameters were collected at least three times during the sampling of each multilevel monitoring well zone and recorded in the groundwater sampling logs. Sampling logs can be furnished upon request.

Groundwater samples were collected in sample containers that were pre-preserved (as necessary) and provided by the analytical laboratory. Samples collected for ferrous iron and NVDOC were filtered in the field using new, single-use 0.45-micron and 0.20-micron filters, respectively, attached at the end of the pump/probe discharge tubing.

Groundwater sampling at multilevel monitoring well zones requires a few hours for each zone due to the limited volume (1 liter) collected from each deployment of the sample container string. During the Second Quarter 2019 GW LTM event, a one-time evaluation was conducted to determine whether the groundwater geochemistry changes during sampling. Three additional aliquots of groundwater (from run #2, run #7, and run #13) were collected at RHMW11-05 and analyzed for anions and alkalinity. The results indicated that the groundwater geochemistry is consistent during the 4-hour sampling duration at RHMW11-05. Data related to these samples were presented in the *Second Quarter 2019 Groundwater Monitoring Report* (DON 2019c).

5.4 Decontamination

Decontamination activities were performed in accordance with NAVFAC Pacific Environmental Restoration Program Project Procedure I-F, *Equipment Decontamination* (DON 2015a). A staging and

decontamination area was established near each well location. Non-disposable sampling equipment (e.g., water level meter, oil/water interface probe, and multilevel monitoring well sample container string) was decontaminated at the beginning of each day and after purging and sampling each well. The decontamination process included washing and scrubbing the equipment with stiff-bristled nylon brushes and a non-phosphate detergent (e.g., Alconox) solution, followed by rinsing once with isopropyl alcohol and twice with distilled water. Liquid wastes generated during decontamination activities were captured and containerized in properly labeled, U.S. Department of Transportation-approved 55-gallon drums or other suitable temporary containers and managed as investigation-derived waste (IDW).

5.5 Investigation-Derived Waste Management

IDW generated during the monitoring events consisted of purged groundwater from the monitoring wells and decontamination water. The IDW was handled, accumulated, and labeled in accordance with NAVFAC Pacific Environmental Restoration Program Project Procedure I-A-6, *Investigation-Derived Waste Management* (DON 2015a). Fluid from wells with PFAS exceeding the RSLs was containerized separately from the other well locations. All IDW was containerized in clearly labeled, 55-gallon-capacity drums, covered with a tarp, and accumulated onsite in an area designated by the Navy pending disposal. Disposable personal protective equipment and sampling equipment and supplies were collected in plastic trash bags and disposed of as municipal waste.

6.0 Sample Control Procedures

Prior to sampling, the field team inspected all supplies and consumables to ensure that they were acceptable for use. Sampling and sample handling procedures were designed to ensure that samples were consistently collected, labeled, preserved, and transported in a manner that maintained their integrity for their intended purposes.

6.1 Sample Containers and Preservation

Sample container, preservative, and holding time requirements for soil vapor and groundwater are listed in Table 6-1. The samples were preserved as indicated and analyzed within the required holding times. The containers, preservatives, and holding times are specified in the respective EPA or SW-846 methods.

Table 6-1: Sample Containers, Preservatives, and Holding Times

Parameter	Number/Type of Containers per Sample	Preservative	Holding Time
Soil Vapor			
Total VOCs, GRO, BTEX, N, 1MN, and 2MN; oxygen, carbon dioxide, methane, and helium	1 × passivated canister	N/A	30 days

Parameter	Number/Type of Containers per Sample	Preservative	Holding Time
Groundwater			
<i>VOCs</i>			
BTEX	2 × 40-mL vials, Teflon-lined septum caps	No headspace, cool to ≤6°C and adjust to pH <2 with HCl	Maximum holding time is 7 days if pH >2 or 14 days if pH <2
<i>TPH</i>			
GRO	2 × 40-mL vials, Teflon-lined septum caps	No headspace, cool to ≤6°C and adjust to pH <2 with HCl	Maximum holding time is 7 days if pH >2 or 14 days if pH <2
DRO, ORO (without and with SGC)	2 × 1-L amber glass (Energy Laboratories), Teflon-lined lid or 2 × 250-mL amber glass (SGS-Orlando), Teflon-lined lid	Cool to ≤6°C and adjust to pH <2 with H ₂ SO ₄ or cool to ≤6°C if unpreserved	Maximum holding time is 7 days if pH >2 or 14 days if pH <2/40 days ^a
<i>SVOCs, PAHs</i>			
SVOCs (phenol)	2 × 1-L amber glass, Teflon-lined lid	Cool to ≤6°C	7 days/40 days ^a
Full suite PAHs including N, 1MN, and 2MN	2 × 250-mL glass amber glass, Teflon-lined lid	Cool to ≤6°C	7 days/40 days ^a
SVOCs (2-(2-methoxyethoxy)-ethanol)	2 × 250-mL glass amber glass, Teflon-lined lid	Cool to ≤6°C	7 days/40 days ^a
<i>Lead Scavengers</i>			
1,2-Dibromoethane	2 × 40-mL vials, Teflon-lined septum caps	No headspace, cool to ≤6°C, and adjust to pH <2 with HCl	Maximum holding time is 7 days if pH >2 or 14 days if pH <2
1,2-Dichloroethane	2 × 40-mL vials, Teflon-lined septum caps	No headspace, cool to ≤6°C, and adjust to pH <2 with HCl	Maximum holding time is 7 days if pH >2 or 14 days if pH <2
<i>Natural Attenuation Parameters</i>			
Methane	2 × 40-mL vials, Teflon-lined septum caps	No headspace, cool to ≤6°C, and adjust to pH <2 with HCl	Maximum holding time is 7 days if pH >2 or 14 days if pH <2
Ferrous Iron	1 × 250-mL brown plastic	Cool to ≤6°C, and adjust to pH <2 with HCl	7 days
Nitrate	1 × 250 mL plastic	Cool to ≤6°C	48 hours
Alkalinity (total, bicarbonate, carbonate)	1 × 250 mL plastic	Cool to ≤6°C	14 days

Parameter	Number/Type of Containers per Sample	Preservative	Holding Time
Nitrate-nitrite	1 × 250 mL plastic	Cool to ≤6°C and adjust to pH <2 with H ₂ SO ₄	28 days
<i>Non-Volatile Dissolved and Total Organic Carbon</i>			
NVDOC, TOC	2 × 40-mL amber VOA vials, Teflon-lined lid	Cool to ≤6°C and adjust to pH <2 with HCl	28 days
DOC	2 × 40-mL amber VOA vials, Teflon-lined lid	Cool to ≤6°C and adjust to pH <2 with HCl	28 days
<i>Groundwater Chemistry</i>			
Total Silica, Bromide, chloride, fluoride, sulfate	1 × 250 mL plastic	Cool to ≤6°C	28 days
Dissolved Silica	1 × 250 mL plastic	Field filtered, cool to ≤6°C	28 days
Total calcium, total magnesium, total manganese, total potassium, total sodium	1 × 250 mL plastic	Cool to ≤6°C and adjust to pH <2 with HNO ₃	6 months

- °C degree Celsius
- 1-MN 1-methylnaphthalene
- 2-MN 2-methylnaphthalene
- DOC dissolved organic carbon
- H₂SO₄ sulfuric acid
- HCl hydrochloric acid
- HDPE high-density polyethylene
- HNO₃ nitric acid
- L liter
- mL milliliter
- N naphthalene
- N/A not applicable (holding times not provided)
- NVDOC non-volatile dissolved organic carbon
- SGC silica gel cleanup
- SVOC semivolatile organic compound
- TOC total organic carbon
- VOA volatile organic analysis

^a x days/y days = x days from sample collection to extraction/y days for analysis of extracts following extraction.

6.2 Sample Handling and Chain of Custody

The samples were labeled and logged in accordance with NAVFAC Pacific Environmental Restoration Program Project Procedure III-E, *Record Keeping, Sample Labeling, and Chain-of-Custody Procedures* (DON 2015a). Immediately after collection, all samples were labeled, logged in the field logbooks, custody-sealed, sealed with tape, and placed in a resealable plastic bag. To meet the recommended holding time for nitrate analysis, efforts were made to ship samples to the laboratory on the day of collection. Samples not shipped on the day of collection were stored in secure and controlled cold storage overnight and shipped the following day.

Prior to shipping, the samples were logged in a chain-of-custody form and loaded into a cooler with double-bagged wet ice. Packed coolers were sent by field personnel via express-courier overnight shipping in custody-sealed coolers to the following subcontractor laboratories: Eurofins (located in Seattle, Washington and Denver, Colorado), SGS Orlando (Orlando, Florida), SGS Anchorage (Anchorage, Alaska), Agriculture & Priority Pollutants Laboratories, Inc. (Clovis, California), and Energy Laboratories, Inc. (Billings, Montana).

Chain-of-custody documentation was maintained for samples during all phases of sample collection, transport, and receipt and internal transfer within the laboratory. Sample transport and custody details are provided in the chain-of-custody records in the laboratory reports indexed in Appendix C (soil vapor) and Appendix D (groundwater).

6.3 Laboratory Analyses

The analytical methods, analytes, and applicable screening criteria for the soil vapor and groundwater samples are identified below.

6.3.1 Soil Vapor Analyses

Passivated canister samples collected from SVMPs in borings below the tanks in the Red Hill tank farm were analyzed for VOCs by Method TO-15; total VOCs (C5–C12) by Method TO-3; and oxygen, carbon dioxide, and methane by ASTM D1946.

6.3.2 Groundwater Analyses

First implemented in June 2023, the Consolidated Groundwater Sampling Program (DON 2023g) is an integration of the various groundwater monitoring programs (NOI, GW LTM, delineation well, and sentinel well sampling) into one overall program based on the substantial amount of laboratory results, DOH guidance, and the composition of the fuels stored at the Facility.

The following ten primary COPCs were established in February 2016 (EPA Region 9 and DOH 2016) for the GW LTM program and remain the same for the Consolidated Groundwater Sampling Program:

- GRO, DRO, and ORO
- N, 1MN, and 2MN
- BTEX

Additional PAHs analyzed for sampling also continue as part of the Consolidated Groundwater Sampling Program, since some PAHs are potentially associated with jet fuels at low concentrations. NVDOC has also been added to the natural attenuation parameter (NAP) list for monthly sampling.

Table 6-2 summarizes the analytical list for the Consolidated Groundwater Sampling Program, which includes monthly analytes, analytical methods, and screening criteria.

Table 6-2: Consolidated Groundwater Sampling Program – Monthly

Parameter	Analytical Method	Analyte	Groundwater Screening Criterion (DOH EAL) (µg/L)
TPH	EPA 8015	GRO	300
	EPA 8015	DRO	400
		ORO	500
Total TPH	—	Reported as a non-overlapping sum of GRO/DRO/ORO with BTEX,1MN, 2MN, N subtracted	—
TPH with SGC	EPA 8015/DEP FL PRO	DRO	—
		ORO	—
VOCs	EPA 8260	Benzene	5
		Ethyl Benzene	30
		Toluene	40
		Total Xylenes	20
GW LTM PAHs	EPA 8270 SIM	1-MN	10
		2-MN	10
		Naphthalene	17
Additional PAHs	EPA 8270 SIM	Acenaphthene	20
		Acenaphthylene	240
		Anthracene	0.18
		Benzo(a)anthracene	0.029
		Benzo(a)pyrene	0.2
		Benzo(b)fluoranthene	0.22
		Benzo(g,h,i)perylene	0.13
		Benzo(k)fluoranthene	0.4
		Chrysene	1
		Dibenzo(a,h)anthracene	0.022
		Fluoranthene	13
		Fluorene	240
		Indeno(1,2,3-cd)pyrene	0.095
		Phenanthrene	210
Pyrene	68		

Parameter	Analytical Method	Analyte	Groundwater Screening Criterion (DOH EAL) (µg/L)
Fuel Additives	EPA 8270	Phenol	300
Lead Scavengers ^a	EPA 8011	1,2-Dibromoethane	0.04
	EPA 8260	1,2-Dichloroethane	5
NAPs	RSK 175M	Methane	—
	EPA 9060A	TOC	—
	EPA 9060A	NVDOC	—

Source: DON (2023g).

— not applicable

^a Discontinued if 1 year of sampling at newly constructed wells shows levels are below DOH EALs.

Split-Sample Testing. Split sampling and performance testing results documented in detail in the *Third Quarter 2018 Groundwater Monitoring Report* (DON 2018a) showed that although both laboratories’ processes and protocols were in accordance with EPA Method 8015, the EPA Region 9 laboratory had higher DRO and PAH recoveries than the Navy-contracted laboratory for analytes present in groundwater samples at high concentrations (EPA Region 9 and DOH 2017a, 2018; DON 2018b). The differences in recoveries were due to the EPA Region 9 laboratory protocols being more effective at recovering higher DRO and PAH concentrations, especially for samples with higher concentrations of polar hydrocarbons and metabolites. Changes made to the Navy-contracted laboratory’s protocols included: using calibration standards identical to those used by the EPA Region 9 laboratory; sample acidification to pH less than 5 prior to extraction; switching extraction methodologies from EPA Method 3510C (separatory funnel liquid-liquid extraction) to EPA Method 3520C (continuous liquid-liquid extraction); using a rotary evaporator for extract condensation; and reducing the field-collected sample volume for optimal extraction within the liquid-liquid extractor vessel. After the method optimizations, there were no significant differences in the TPH and PAH concentration trends between EPA Region 9 laboratory and Navy-contracted laboratory results.

7.0 Field Observations During Sampling

Field observations recorded during the soil vapor and groundwater sampling activities this reporting period are described below.

7.1 Soil Vapor Monitoring Observations

During this reporting period, soil vapor monitoring was conducted weekly at the below-tank SVMPs. Soil vapor monitoring was also conducted monthly (plus additional out-of-frequency monitoring) at the subslab and shallow SVMPs installed in the tunnel system by Adit 3 near Red Hill Shaft. Historical soil vapor monitoring observations are presented in the December 11, 2023, Quarterly RRR (DON 2023o).

Two Adit 3 subslab SVMPs (A3-075 and A3-225) have been consistently poor vapor producers, with sampling results designated as “tight” to indicate vacuum is pulled when sampling and readings could not be obtained potentially due to low-permeability soil directly underneath the tunnel floor.

7.2 Free Product Gauging and Monitoring Well Headspace Observations

A summary of free product gauging and groundwater monitoring well headspace measurements collected during the Consolidated Groundwater Sampling Program sampling events is provided in Appendix B.2.1. Historical free product gauging and groundwater well headspace measurements are presented in the

December 11, 2023, Quarterly RRR (DON 2023o). Except for free product observed in temporary monitoring wells screened in the shallow perched water located beneath the Adit 3 tunnel floor, no free product was observed during the reporting period in any groundwater monitoring well during any sampling event, regardless of the detection method used (either oil/water interface probe or bailer), including in samples collected at the multilevel wells RHMW11, RHMW13, RHMW14, and RHMW15 equipped with closed sampling ports.

Groundwater monitoring well headspace concentrations were generally low. Readings were 0.3 part per million by volume (ppmv) or less and with the exception of RHP08 occurred only occasionally throughout this reporting period. RHP08 had a reading of 7.5 ppmv on February 7, but TPH results were non-detect. All other headspace readings at RHP08 were 0.0 ppmv.

At Adit 3, all borehole and temporary well locations had LNAPL thicknesses ranging from not observed to 0.05 ft (at A3+015-TW and A3-010-TW) during this reporting period.

7.3 Groundwater Level Measurements

Depths to groundwater were gauged from the notched and surveyed top of casing using calibrated water level measuring tapes at single-screen monitoring well locations prior to sampling. The measuring tape correction factors were updated as described in a December 14, 2022, letter from the U.S. Geological Survey and are included in Appendix B.2.2. Additionally, a Heron or Solinst oil/water interface probe was used to detect LNAPL, which was measured if present.

The oil/water interface probe and water level measuring tapes were decontaminated between well measurements by washing with a non-phosphate detergent solution and rinsing with isopropyl alcohol and distilled water to prevent cross-contamination. Measuring points for all single-screen monitoring wells are detailed in three well elevation survey reports. The measuring point elevations have been updated to reflect the well elevation survey report revised on January 7, 2022, (DON 2018c, e, 2019a) and to include recent elevations surveyed from July 2022 to present, all presented in Appendix B.2.2. Historical groundwater level measurements can be found in the December 11, 2023, Quarterly RRR (DON 2023o) and the Third Quarter 2023 GW LTM Report (DON 2023n).

During the reporting period, groundwater elevations beneath and near the site ranged from 12.97 to 18.71 ft above msl, as presented in Appendix B.2.2. Basal groundwater elevations ranged from 15.48 to 18.71 ft above msl except for NMW33. Minor fluctuations in groundwater elevations from single-screen wells have generally been observed since the Fourth Quarter 2023.

Additionally, due to the design of the multilevel monitoring wells, depths to groundwater cannot be measured in the monitoring zones of RHMW11, RHMW13, RHMW14, and RHMW15. Instead, transducers are used in these wells to measure potentiometric elevations. Cumulative results of water pressure, temperature, and elevation for multilevel monitoring wells were last presented in Appendix D of the *Fourth Quarter 2020 Groundwater Monitoring Report* (DON 2021a).

7.4 Groundwater Sampling Observations

The following observations were noted during groundwater sampling field activities this reporting period:

- A decaying or metallic odor was observed during most sampling events at RHMW11.
- Particulates were observed in the water collected at HDMW2253-03 during one sampling event.
- Organic or sulfurous odors were observed intermittently at RHMW02.

8.0 Data Quality

Field and laboratory QC measures implemented during this reporting period are described below. When applicable, corrective actions were implemented when control limits for field or laboratory QC measurements were not met. Results are reported in the associated laboratory and data validation reports (indexed in Appendix C and Appendix D).

8.1 Laboratory Quality Control

The following laboratory QC samples were collected and analyzed.

8.1.1 Soil Vapor Samples

Laboratory QC samples included method blank, laboratory control sample (LCS), and laboratory control sample duplicate (LCSD) analyses.

8.1.2 Groundwater Samples

Laboratory QC samples included method blanks, LCSs/LCSDs, matrix spikes/matrix spike duplicates (MSs/MSDs), and duplicates, as described in the DoD *Quality Systems Manual Version 5.4* (DoD and DOE 2021) and the AOC *Red Hill Sampling and Analysis Plan Addendum 01* (DON 2017d).

8.2 Field Quality Control

8.2.1 Soil Vapor Samples

Analytical soil vapor samples from the SVMPs beneath the Red Hill tanks were collected by Element Environmental, LLC. Field QC samples were not collected.

Soil vapor samples collected monthly and out-of-frequency from the subslab SVMPs in the Adit 3 and Pearl Harbor Tunnel floors were collected with field PIDs that were calibrated before the sampling event with 100 ppmv isobutylene gas and zero span gas for a two-point calibration, then bump-tested with the 100 ppmv isobutylene between 6 and 12 times per sampling event, to ensure that instruments remained calibrated. If bump test results did not meet QC criteria, the equipment was recalibrated or returned to the shop for maintenance if the recalibration failed to meet the criteria.

8.2.2 Groundwater Samples

Field QC samples for groundwater including trip blanks and equipment rinsates were collected according to procedures described in NAVFAC Pacific Environmental Restoration Program Project Procedure III-B, *Field QC Samples* (Water, Soil) (DON 2015a). Field QC samples are listed in Table 8-1.

Table 8-1: Measurement Performance Criteria – Field QC Samples

QC Sample	Analytical Group ^a	Frequency	DQI	Measurement Performance Criterion
Field duplicate	VOCs, GRO, DRO, ORO, PAHs, SVOCs	10% of primary samples collected per matrix per analytical method	Field sampling precision	RPD \leq 50% water ^b

QC Sample	Analytical Group ^a	Frequency	DQI	Measurement Performance Criterion
Field blank	VOCs, GRO, DRO, ORO, PAHs, SVOCs	Once per source of decontamination water per sampling event	Adequacy of the decontamination water quality or potential for contamination due to field conditions	≤1/2 of LOQ
Equipment blank	VOCs, GRO, DRO, ORO, PAHs, SVOCs	5% of primary samples collected per matrix per analytical method	Adequacy of the decontamination process	≤1/2 of LOQ
Trip blank	VOCs, GRO, methane, lead scavengers	At minimum, one per cooler per analytical method containing VOCs, GRO, methane, or lead scavenger samples	Contamination during sample transport	≤1/2 of LOQ

% percent
 DQI data quality indicator
 LOQ limit of quantitation
 RPD relative percent difference

^a See Table 6-1 for the list of analytes within analytical groups.

^b Per Project Procedures Manual Section II, *Data Validation Procedures* (DON 2015a).

In addition, because unexpected detections of phthalate and PAH compounds had previously been observed in the data set, collection of extra field blanks and equipment blanks was added for PAHs and SVOCs beginning the week of March 7, 2022. Field blanks were collected by pouring decontamination water directly into the sample bottles, and equipment blanks were collected by pouring decontamination water over the water level indicator and collecting the rinsate into sample bottles.

8.2.3 Sample Control Procedures

Field instruments were calibrated each morning prior to starting field activities. The PID was calibrated with 100 parts per million (ppm) isobutylene calibration gas. The multi-gas monitor was calibrated with 100 ppm isobutylene calibration gas and a multi-gas monitor calibration gas composed of 50 ppm carbon monoxide, 25 ppm dihydrogen sulfide, 19 percent oxygen, and 50 percent of the lower explosive limit of methane. The water quality meter was calibrated with an auto-calibration solution prior to recording measurements.

To assess the effectiveness of the equipment decontamination process, one equipment blank sample was collected from the reusable sample container used during the multilevel monitoring well zone sampling. The equipment blank sample was collected onsite by pouring distilled water onto the decontaminated multilevel monitoring well sample container string and then into the sample containers. A field blank sample was also collected to assess the quality of the locally sourced Menchune Water Company distilled water used to collect the equipment blank. The field blank was collected by pouring distilled water directly into sample containers. The field blank and equipment blank samples were analyzed for the same COPCs as the groundwater samples.

Because all single-screen monitoring locations have dedicated bladder pumps installed, no field or equipment blanks were collected at single-screen monitoring locations.

To help assess the precision of the data collection activity, including sampling and analysis, field duplicates were collected at the same approximate time as their respective primary samples. During the current sampling period, one field duplicate was collected at NMW32, RHMW08, RHMW10, RHMW16, and RHP06.

One trip blank was used for each sampling location for VOCs (GRO, BTEX, methane, and lead scavengers) to evaluate the condition of the samples in each shipment. The hermetically sealed trip blank samples were prepared by the field team using laboratory-provided VOC-free water immediately prior to the sampling event and kept chilled until the sampling day. Trip blanks remained with the associated groundwater samples in the cooler during the field event and during sample shipment to the laboratory.

8.3 Data Quality Assessment

The objective of data validation is to provide data of known quality for project decisions. Data quality is judged in terms of precision, accuracy, representativeness, comparability, completeness, and sensitivity. The analytical laboratory data for the groundwater sampling events were submitted to a third-party data validator, ESI (Environmental Standards, Inc.) or EDS (Environmental Data Services, Ltd.), for data validation and assessment. The following summary includes results provided during this reporting period that completed full data validation. Samples not meeting the acceptance criteria were qualified with a flag indicating a deficiency in the data. Groundwater data with validation qualifiers and reason codes are available in the Red Hill EDMS (Appendix E – Data Validation Qualifier Tables).

8.3.1 Precision

Precision is defined as the reproducibility of replicate measurements. Precision is evaluated by the RPD of field duplicates (FDs), laboratory control sample/laboratory control sample duplicate (LCS/LCSD), matrix spike/matrix spike duplicate (MS/MSD), and laboratory duplicate results. Field duplicate and MS/MSD samples were collected at a rate of approximately 10 percent of primary samples. Field duplicates were sent to the laboratory along with the primary samples.

An RPD outside the numerical QC limit in MS/MSD samples, LCS/LCSDs, or FDs indicates poor precision. Thus, the actual analyte concentration has a larger potential variance from the measured value than recommended in the Project Quality Assurance Project Plan. Possible causes of poor precision include sample matrix interference, improper sample collection or handling, inconsistent sample preparation, and poor instrument stability.

The following exceptions to the groundwater RPD performance criterion of $\leq 20\%$ for QC samples and field duplicates were reported during data validation:

- Two PAH samples were qualified as estimated due to field duplicate imprecision.

Primary and field duplicate RPDs are presented in Table 8-2 for duplicate pairs in which the COPC was detected in one or both samples. When COPCs are not detected in the primary and field duplicate samples, the RPD is within control limits. RPDs could not be calculated when a primary or duplicate sample is not detected.

Table 8-2: Field Duplicate Analyte RPDs

Analyte	Screening Criterion (µg/L)	Sample ID	Concentration (µg/L)	RPD ^{a,b}
RHMW01R				
DRO	400	RHMW01R-WGN01LF-2402	182 J	14%
		RHMW01R-WGFD01LF-2402	158 J	
		RHMW01R-WGN01LF-2402	100 U	—
		RHMW01R-WGFD01LF-2402	89 J	
		RHMW01R-WGN01LF-2403	113 J	6%
		RHMW01R-WGFD01LF-2403	106 J	
RHMW02				
GRO	300	RHMW02-WGN01LF-2403	50 U	—
		RHMW02-WGFD01LF-2403	46.3 J	
DRO	400	RHMW02-WGN01LF-2402	1210	19%
		RHMW02-WGFD01LF-2402	1460	
		RHMW02-WGN01LF-2402	981	5%
		RHMW02-WGFD01LF-2402	1030	
		RHMW02-WGN01LF-2403	1270	8%
		RHMW02-WGFD01LF-2403	1380	
DRO SGC	—	RHMW02-WGN01LF-2402	124 J	10%
		RHMW02-WGFD01LF-2402	137 J	
		RHMW02-WGN01LF-2402	766	2%
		RHMW02-WGFD01LF-2402	751	
		RHMW02-WGN01LF-2403	1110	8%
		RHMW02-WGFD01LF-2403	1200	
ORO	500	RHMW02-WGN01LF-2402	298 J	5%
		RHMW02-WGFD01LF-2402	313	
		RHMW02-WGN01LF-2403	170 U	—
		RHMW02-WGFD01LF-2403	88.4 J	
1MN	10	RHMW02-WGN01LF-2402	1.2	34%
		RHMW02-WGFD01LF-2402	1.7	
		RHMW02-WGN01LF-2403	0.93	20%
		RHMW02-WGFD01LF-2403	0.76 J	
2MN	10	RHMW02-WGN01LF-2402	0.59 J	37%
		RHMW02-WGFD01LF-2402	0.86	
		RHMW02-WGN01LF-2403	0.34 J	—
		RHMW02-WGFD01LF-2403	0.42 U	

Analyte	Screening Criterion (µg/L)	Sample ID	Concentration (µg/L)	RPD ^{a,b}
N	17	RHMW02-WGN01LF-2402	2.7 J	29%
		RHMW02-WGFD01LF-2402	3.6 J	
		RHMW02-WGN01LF-2403	1.7	6%
		RHMW02-WGFD01LF-2403	1.8	

— not calculable
 % percent
 J estimated value
 J- estimated low
 N/A not applicable
 U non-detect value
 UJ non-detect estimate value

^a Field duplicate RPD measurement performance criterion for groundwater is 50 percent in accordance with the criteria presented in Table 5-1 of the SAP (DON 2017b, 2018c) and Table 3-2 of the SAP addenda (DON 2017d, 2018g).

^b $RPD = \frac{|(x2 - x1)|}{((x2+x1)/2)}$

No other precision concerns were identified for data validated during the reporting period.

8.3.2 Accuracy

Accuracy is defined as the degree of conformity of a measurement to a standard or true value. Accuracy is evaluated through measurement of the percent recovery (%R) of an analyte in a reference standard or spiked sample. Accuracy also encompasses the percent difference (%D) between the initial calibration verification (ICV) and the continuing calibration verification (CCV). Accuracy limits for internal standards, surrogates, LCS, MS, and MSD samples are either prescribed by the DoD or established by the individual laboratory.

Initial and continuing calibration results provide a means of evaluating accuracy within a particular sample delivery group (SDG). Relative response factor (RRF), percent relative standard deviation (%RSD), and percent difference (%D) are the three major parameters used to measure the effectiveness of instrument calibration. RRF is a measure of the relative spectral response of an analyte compared to its internal standard. %RSD is an expression of the linearity of instrument response. %D is a comparison of a continuing calibration instrumental response with its initial response. %RSD and %D exceedances suggest routine instrumental anomalies, which typically impact all sample results for the affected compounds.

The acceptance criteria for accuracy are dependent on the analytical method and based on historical laboratory or DoD data.

The following groundwater data validated during the reporting period deviated from the established QC criteria and have been qualified as estimated (J), estimated biased low (J-), estimated biased high (J+), or not-detected estimated (UJ). Not-detected results are at the limit of detection (LOD):

- PAHs were not detected in 34 primary and 3 field duplicate samples and were qualified as UJ due to high %RSDs (%RSD > 15%).
- 2-2-MEE was not detected in eight primary and two field duplicate samples; they were qualified as UJ because of QC sample recoveries outside the acceptance limit.

- DRO was not detected in one primary sample and was qualified as UJ because of QC sample recoveries outside the acceptance limit.
- Dissolved silica was detected in one primary sample and was qualified as J because sample concentrations were out of the linear calibration range.
- Sulfate was detected in one primary sample and was qualified as J- because of QC sample recovery outside the acceptance limit.

Rejected data occurred due to significant deficiencies in meeting the published method and project QC criteria, as described in Section 8.3.4.

8.3.3 Representativeness

Representativeness is the degree to which data accurately and precisely represent a characteristic of a population, parameter variations at a sampling point, or an environmental condition. Representativeness can be supported by using regulator-approved, industry-standard sampling and analysis protocols that were developed to address a specific data quality objective of the sampled medium.

During the sampling rounds for this reporting period:

- Groundwater samples for the Consolidated Groundwater Sampling Program were collected in accordance with procedures described in the DOH-approved AOC Statement of Work Sections 6 and 7, Work Plan/Scope of Work (DON 2017a) and the associated project Sampling and Analysis Plan and addenda (DON 2017b, c, d), including standardized sample collection methods identified in NAVFAC Pacific Environmental Restoration Program Project Procedure I-C-3, Monitoring Well Sampling (DON 2015a):
 - This procedure outlines collection of groundwater samples from a specific depth directly beneath the water table using a low-flow pumping strategy. Samples consist generally of dissolved constituents within the aquifer; the samples will not collect LNAPL or compounds in the LNAPL/groundwater interface (if one existed).
 - Results from these samples represent groundwater from one depth, below the water table.
- Prior to the Consolidated Groundwater Sampling Program (DON 2023g), groundwater samples from wells that are screened across the water table were collected with a bailer, based on DOH's request:²
 - Sampling with a bailer was requested to collect water at the groundwater/air interface along with any potential LNAPL that may be present. Sampling with a bailer may introduce air and turbulence to the sample, which may volatilize VOCs in the groundwater matrix. The bailer technique is also less repeatable and therefore adds a degree of variability into the results, which may be less representative of actual conditions at the water table.
 - In addition, DOH requested no purging be associated with this method; therefore, the methodology is likely to be affected by any localized equilibrium within the well and filter pack, and the results may not represent water flowing through the aquifer.
 - This methodology is contrary to the DOH Technical Guidance Manual for the Implementation of the Hawaii State Contingency Plan (TGM) (DOH 2023), which "recommends that low-flow purging and sampling approaches be utilized whenever feasible in order to improve the representativeness of the sample data."

² Email from L. Galvez, DOH-HEER, to S. Eng, Navy Region Hawaii; May 28, 2021.

Representativeness is evaluated through compliance with the method-specific recommended sample holding time, method-specific sample preservation and through the analysis of blank samples, including method blank, equipment blank, field blank, and trip blank samples (DoD 2021). All sample holding times, sample preservation, and any impacts of associated blank contamination have been evaluated in accordance with EPA SW-846 method recommendations and DoD *Quality Systems Manual Version 5.4* (DoD and DOE 2021) during validation.

The following detected sampling results for the groundwater data were reported below the LOD and were qualified as not detected (U) at the LOD due to field, equipment, laboratory, instrument, or trip blank contamination:

- One DRO, three GRO, 13 nitrate-nitrite as nitrogen (N), 14 NVDOC, and 28 TOC sample results that were detected in the laboratory were qualified not detected (U) due to contamination in field, equipment, laboratory, instrument, or trip blanks.

The following results reported above the LOD and less than or equal to five times the blank contamination were flagged due to field, equipment, instrument, laboratory, or trip blank contamination:

- One ORO result was flagged as J+ due to contamination in the equipment blank.
- Two nitrate-nitrite as nitrogen (N) results were flagged as J+ due to contamination in the instrument blank.
- Seventeen NVDOC results were flagged as J+ due to contamination in the laboratory or instrument blank.
- Eight TOC results were flagged as J+ due to contamination in the laboratory or instrument blank.

Pending validation, detections in the field blanks and equipment blanks are summarized to aid in discussion of the analytical results. Field blank and equipment blank detections with final results are available in the data validation table available through the Red Hill EDMS (Appendix E – Data Validation Qualifier Tables).

No groundwater results were flagged for the specified methods due to samples being extracted or analyzed beyond the method-recommended holding times.

No other representativeness concerns were identified during validation of the sample results.

8.3.4 Completeness

Completeness is defined as the overall percentage of valid analytical results (including estimated results) compared to the total number of analytical results reported by the analytical laboratory.

Rejected data (R) occurred due to significant deficiencies in meeting the published method and project QC criteria. The presence or absence of the compound cannot be supported by the data provided and is excluded for data usability and assessment.

Validated data results that were impacted include the following:

- Three nitrate-nitrate as N primary samples were qualified as R due to QC samples having recoveries significantly outside the acceptance limit.

Based on the frequency of sampling and the quantity of data collected, the loss of these data points does not constitute a significant data gap for the sampling events. The completeness of the data (99.9 percent) met the 90 percent completeness goal.

8.3.5 Comparability

Comparability expresses the confidence with which one data set can be compared to another. Comparability can be related to accuracy and precision because these quantities are measures of data reliability. Data with acceptable precision and accuracy are considered comparable if collection techniques, analytical procedures, methods, and reporting are equivalent.

The laboratories used standard analytical methods for all analyses. In all cases, the detection limits and LODs attained were below the specified LOQs. Target analytes detected below the LOQs flagged (J) by the laboratory are considered estimated. The data presented can be compared to and evaluated against regulatory standards as required for this report.

8.3.6 Sensitivity

The LOQs are established by the laboratory based on the LODs or instrument detection limits and limits established for the various methods. The LOQs and LODs for samples may require adjustment by the laboratory due to matrix interference or when high levels of target analytes necessitate dilution before analysis. Matrix interference and sample dilutions decrease sensitivity and increase the LOQs/LODs. No results in this data set had increased LOQs or LODs that impacted sensitivity and data usability.

8.4 Data Quality Assessment Conclusions

The precision, accuracy, representativeness, comparability, completeness, and sensitivity criteria were evaluated by Environmental Standards, Inc. in Valley Forge, Pennsylvania, and Environmental Data Services, Ltd. in Pittsburgh, Pennsylvania, the project third-party data validators for groundwater samples. Complete validation reports received to date are listed in Appendix D.

Groundwater sample analysis and third-party data validation are ongoing and pending completion for a number of samples collected during this reporting period. These pending sample results will be included in the next Quarterly Release Response Report. Laboratory and field data quality will be fully assessed pending availability of additional laboratory and third-party data validation reports.

The third-party data assessment for the provided data concluded that 99.8 percent of the data generated during the sampling events reported herein are usable for the intended purpose with the limitations described above.

9.0 Analytical Results

Analytical results for soil vapor and groundwater samples collected during this reporting period are presented below, along with the results of free product gauging and headspace measurements performed as part of the Consolidated Groundwater Sampling Program (DON 2023g). No soil samples associated with monitoring well installation were collected during this reporting period.

9.1 Soil Vapor Analytical Results

9.1.1 Below-Tank Sampling Locations

Soil vapor measurements of total VOCs collected below the fuel storage tanks since January 2014 are provided in EDMS (Appendix E – Soil Vapor Measurements Below Tanks) and the DOH Red Hill

Technical Documents web pages.³ Soil vapor PID measurements of total VOCs for Tanks 2 through 18 and 20 are presented in Appendix A.1; and chromatograms for passivated canister samples collected below Tanks 15, 17, 18, and 20 for laboratory reports validated during this reporting period are presented in Appendix A.2. Soil vapor analytical data reports for passivated canister samples collected below the fuel storage tanks are indexed in Appendix C and available in EDMS (Appendix E – Soil Vapor Analytical Laboratory Reports).

Laboratory results for below-tank SVMPs during this reporting period are consistent with recent monitoring periods. The cumulative results are consistent with natural attenuation and weathering of LNAPL in the environment, indicating that the vapor impacts from the May 2021 Release have attenuated.

9.1.2 Adit 3 Tunnel Sampling Locations

During this reporting period, SVMPs in the Adit 3 Tunnel were monitored monthly, as well as additional out-of-frequency monitoring events. Figure 5A shows the results of soil vapor monitoring from subslab and shallow SVMPs installed in the floor of the Adit 3 and Pearl Harbor Tunnels during the reporting period. As shown on the figure, the results showed fluctuations over time. An overall decrease in concentrations has been observed since the commencement of monitoring in December 2021, which has continued during the current reporting period.

On January 12, 2024:

- Fifty-two of 54 points were sampled, with a maximum concentration of 70 ppmv.
- Eleven of 52 samples had concentrations greater than 5 ppmv, with an average concentration of 32 ppmv.

On April 9, 2024:

- Fifty-two of 54 points were sampled with a maximum concentration of 20 ppmv.
- Six of 52 samples had concentrations greater than 5 ppmv, with an average concentration of 14 ppmv.

Historical soil vapor monitoring observations are presented in the December 11, 2023, Quarterly RRR (DON 2023o).

9.2 Free Product Gauging and Monitoring Well Headspace Measurements

Free product gauging results and headspace measurements collected during the reporting period are presented in Section 5.2 and Appendix B.2.1. Free product was not detected at any monitoring location outside the Adit 3 Tunnel, as discussed in Section 7.2.

9.3 Groundwater Analytical Results

Groundwater samples were analyzed for the parameters and methods described in Section 6.0.

Appendix B.1 summarizes samples collected, laboratory analytical methods, and status of SDG reports. The sampling events covered in this report include data that have been validated within this reporting period. Monitoring well results for NMW34 have not been validated during this reporting period and will be provided in the next quarterly report. Appendix B.3.1 provides groundwater monitoring well results

³ <https://health.hawaii.gov/ust/ust-home-test/ust-red-hill-project-main/#technical-docs>

compared to the EALs for each analyte group. TPH and PAH groundwater results collected during this reporting period are graphically displayed over time in Appendix B.3.2. Appendix B.4 provides chromatograms of detections and exceedances observed during the current period. Appendix B.5 presents NAP analytical results. Final Level II and IV analytical reports and data validation reports are indexed in Appendix D. Historical analytical results are presented in the December 11, 2023, Quarterly RRR (DON 2023o) and the Third Quarter 2023 GW LTM Report (DON 2023n).

Analytical results for the current reporting period are summarized in Table 9-1. Summary statistics for all sample results validated during this reporting period are presented in Table 9-2. TPH and PAH groundwater analytical results are depicted on Figure 6 through Figure 10.

Table 9-1: Summary of Groundwater Analytical Results, Current Reporting Period

Monitoring Location	COPC, Fuel Additive, or Lead Scavenger Detection Below Screening Criterion	Analyte Concentration Exceeding Screening Criterion
RHMW2254-01	None	None
RHMW01R	DRO (ND after SGC)	None
RHMW02	GRO ORO (ND after SGC) 1-Methylnaphthalene 2-Methylnaphthalene Naphthalene	DRO: 1,210; 1,460, 981, 1,030; 1,270, and 1,380 µg/L (screening criterion: 400 µg/L) (below SSRBL: 4,500 µg/L)
RHMW03	ORO (ND after SGC)	None
RHMW04	None	None
RHMW05	None	None
RHMW06	None	None
RHMW08	None	None
RHMW09	GRO	None
RHMW10	None	None
RHMW11-05	GRO	None
RHMW12A	None	None
RHMW13-04	None	None
RHMW14-03	None	None
RHMW15-05	None	None
RHMW16	Benzo(b)fluoranthene Benzo(k)fluoranthene Chrysene	Benzo(a)anthracene: 0.043 J µg/L (screening criterion: 0.029 µg/L)
RHMW17	None	None
RHMW18	DRO (ND after SGC) ORO (ND after SGC)	None
RHMW19	DRO (ND after SGC) ORO (ND after SGC)	None
RHMW20	None	None

Monitoring Location	COPC, Fuel Additive, or Lead Scavenger Detection Below Screening Criterion	Analyte Concentration Exceeding Screening Criterion
HDMW2253-01	None	None
RHP01	None	None
RHP02	None	None
RHP03	None	None
RHP04A	None	None
RHP04B	None	DRO: 1,170 µg/L (screening criterion: 400 µg/L) ORO: 777 µg/L (screening criterion: 500 µg/L)
RHP04C	DRO (ND after SGC) ORO (ND after SGC)	None
RHP05	None	None
RHP06	None	None
RHP07	None	None
RHP08	ORO (detected after SGC)	None
NMW24	GRO	None
NMW25	None	None
NMW26	DRO (ND after SGC) ORO (lower after SGC)	None
NMW30	None	None
NMW32	None	None
NMW33	None	None

µg/L micrograms per liter
 COPC chemical of potential concern
 ND non-detect
 SGC silica gel cleanup
 SSRBL Site-Specific Risk-Based Level
 DRO diesel range organics
 ORO residual oil range organics

Table 9-2. Statistical Summary of Groundwater Analytical Results Received During the Current Reporting Period (1/12/2024 to 4/11/2024)

Chemical of Concern	CAS	Method	Units	Number of Samples ^{a, b, c}	Number of Non-Detects	Number of Detects	Detection Frequency	Minimum Detected Value		Maximum Detected Value		Location of Minimum Detect	Location of Maximum Detect	Project Screening Criteria		
								Value ¹	Qualifier	Value ¹	Qualifier			Criteria	Number of Exceedances	Exceedance Frequency
TPH and Fuel Related Compounds																
TPH-g	PHCC6C10	8015	µg/L	73	69	4	5.5%	41.7	J	51.9	J	RHMW09	RHMW11-05	300	0	0.0%
TPH-d	PHCC10C24	8015	µg/L	114	98	16	14.0%	51.4	J	1460		RHP04C	RHMW02	400	7	6.1%
TPH-d with Silica Gel Cleanup	PHCC10C24SGC	8015	µg/L	22	16	6	27.3%	124	J	1200		RHMW02	RHMW02	—	0	0.0%
TPH-o	PHCC24C40	8015	µg/L	114	103	11	9.6%	88.4	J	777		RHMW02	RHP04B	500	1	0.9%
TPH-o with Silica Gel Cleanup	PHCC24C40SGC	8015	µg/L	22	20	2	9.1%	ND		111	J	—	NMW26	—	0	0.0%
BTEX, Full Suite VOCs, and Lead																
Benzene	71-43-2	8260	µg/L	73	73	0	0.0%	ND		ND		—	—	5	0	0.0%
Ethylbenzene	100-41-4	8260	µg/L	73	73	0	0.0%	ND		ND		—	—	30	0	0.0%
Toluene	108-88-3	8260	µg/L	73	73	0	0.0%	ND		ND		—	—	40	0	0.0%
Xylenes	1330-20-7	8260	µg/L	73	73	0	0.0%	ND		ND		—	—	20	0	0.0%
Lead Scavengers																
1,2-Dibromoethane	106-93-4	8011	µg/L	32	32	0	0.0%	ND		ND		—	—	0.04	0	0.0%
1,2-Dichloroethane	107-06-2	8260	µg/L	28	28	0	0.0%	ND		ND		—	—	5	0	0.0%
Fuel Additives																
Phenol	108-95-2	SW8270	µg/L	73	73	0	0.0%	ND		ND		—	—	58	0	0.0%
2-(2- Methoxyethoxy)-ethanol	111-77-3	8270	µg/L	42	42	0	0.0%	ND		ND		—	—	800	0	0.0%
AOC / Groundwater LTM PAHs																
1-Methylnaphthalene	90-12-0	8270 SIM	µg/L	73	69	4	5.5%	0.76	J	1.7		RHMW02	RHMW02	10	0	0.0%
2-Methylnaphthalene	91-57-6	8270 SIM	µg/L	73	70	3	4.1%	0.34	J	0.86		RHMW02	RHMW02	10	0	0.0%
Naphthalene	91-20-3	8270 SIM	µg/L	73	69	4	5.5%	1.7		3.6	J	RHMW02	RHMW02	17	0	0.0%
PAHs																
Acenaphthene (SIM)	83-32-9	8270SIM	µg/L	72	72	0	0.0%	ND		ND		—	—	15	0	0.0%
Acenaphthylene (SIM)	208-96-8	8270SIM	µg/L	73	73	0	0.0%	ND		ND		—	—	13	0	0.0%
Anthracene (SIM)	120-12-7	8270SIM	µg/L	73	73	0	0.0%	ND		ND		—	—	0.02	0	0.0%
Benzo(a)anthracene (SIM)	56-55-3	8270SIM	µg/L	73	72	1	1.4%	0.043	J	0.043	J	RHMW16	RHMW16	0.027	1	1.4%
Benzo(a)pyrene (SIM)	50-32-8	8270SIM	µg/L	73	73	0	0.0%	ND		ND		—	—	0.06	0	0.0%
Benzo(b)fluoranthene (SIM)	205-99-2	8270SIM	µg/L	73	72	1	1.4%	0.042	J	0.042	J	RHMW16	RHMW16	0.22	0	0.0%
Benzo(g,h,i)perylene (SIM)	191-24-2	8270SIM	µg/L	73	73	0	0.0%	ND		ND		—	—	0.13	0	0.0%
Benzo(k)fluoranthene (SIM)	207-08-9	8270SIM	µg/L	73	72	1	1.4%	0.036	J	0.036	J	RHMW16	RHMW16	0.4	0	0.0%
Chrysene (SIM)	218-01-9	8270SIM	µg/L	73	72	1	1.4%	0.036	J	0.036	J	RHMW16	RHMW16	1	0	0.0%
Dibenzo(a,h)anthracene (SIM)	53-70-3	8270SIM	µg/L	73	73	0	0.0%	ND		ND		—	—	0.022	0	0.0%
Fluoranthene (SIM)	206-44-0	8270SIM	µg/L	73	73	0	0.0%	ND		ND		—	—	0.8	0	0.0%
Fluorene (SIM)	86-73-7	8270SIM	µg/L	73	73	0	0.0%	ND		ND		—	—	3.9	0	0.0%
Indeno(1,2,3-cd)pyrene (SIM)	193-39-5	8270SIM	µg/L	73	73	0	0.0%	ND		ND		—	—	0.095	0	0.0%
Phenanthrene (SIM)	85-01-8	8270SIM	µg/L	73	73	0	0.0%	ND		ND		—	—	2.3	0	0.0%
Pyrene (SIM)	129-00-0	8270SIM	µg/L	73	73	0	0.0%	ND		ND		—	—	4.6	0	0.0%
Natural Attenuation Parameters																
Total Organic Carbon	TOC	9060	µg/L	76	27	49	64.5%	263	J	4540		HDMW2253-03	RHMW02	—	0	0.0%
NV Dissolved Organic Carbon	DOC	9060	µg/L	76	14	62	81.6%	323	J	3930		RHMW12A	RHMW02	—	0	0.0%
Methane	74-82-8	SW8015	µg/L	66	42	24	36.4%	0.16	J	2770		RHMW19	RHMW02	—	0	0.0%

Note¹: The minimum and maximum detected values are given for each analyte. If the analyte was not detected in any sample, "ND" is shown for minimum or maximum detected values.

Note²: If the minimum or maximum result value occurs at more than one location only the location of the first occurrence is given.

^a Includes normal and field duplicate samples.

^b Does not include sample results rejected by validation.

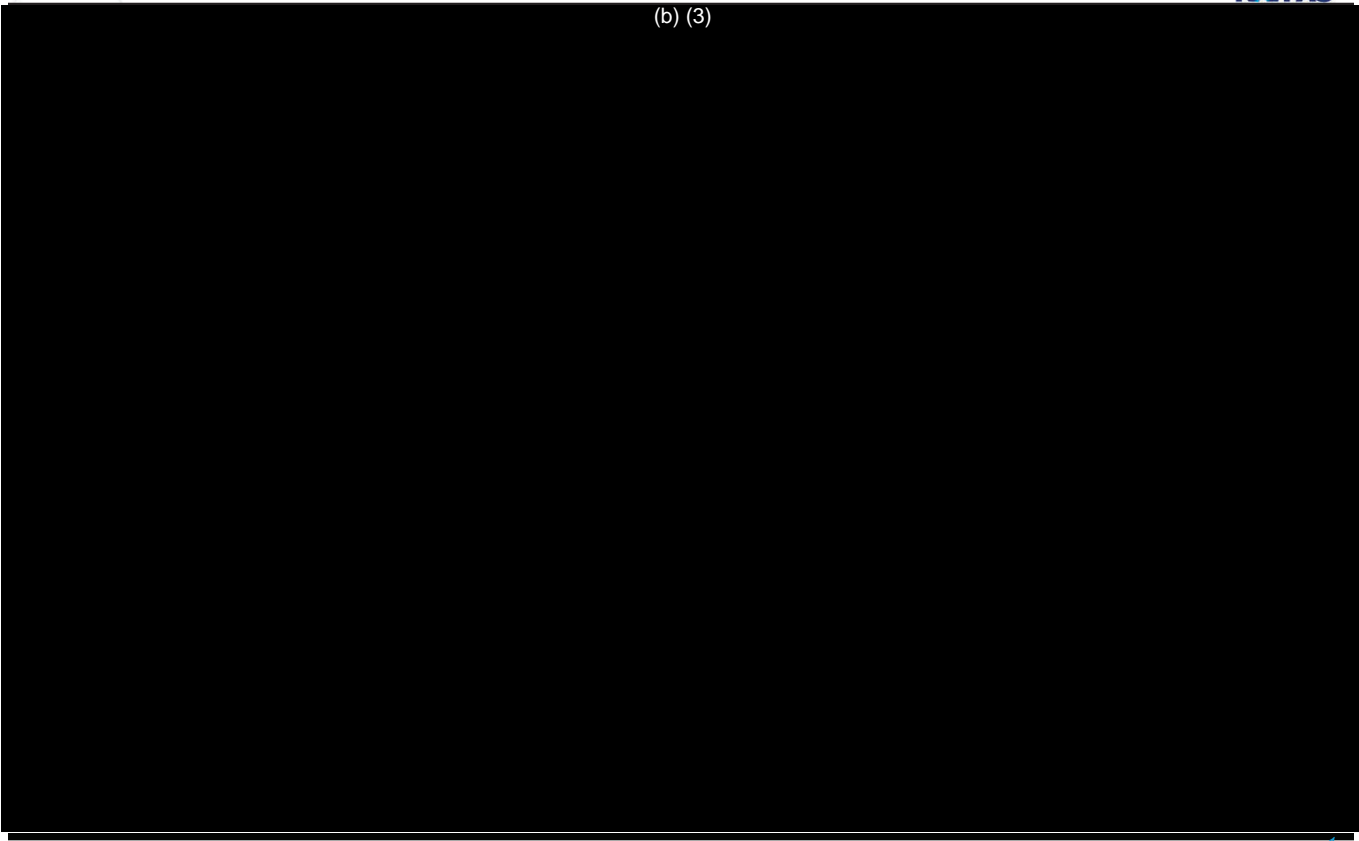
^c Wells sampled during this reporting period include the following: HDMW2253-03, NMW24, NMW25, NMW26, NMW30, NMW32, NMW33, RHMW01R, RHMW02, RHMW03, RHMW04, RHMW05, RHMW06, RHMW08, RHMW09, RHMW10, RHMW11-05, RHMW12A, RHMW13-04, RHMW13-05, RHMW14-03, RHMW15-05, RHMW16, RHMW17, RHMW19, RHMW20, RHMW2254-01, RHP01, RHP02, RHP03, RHP04A, RHP04B, RHP04C, RHP05, RHP06, RHP07, and RHP08.

This page intentionally left blank

DRO Sample Results – Red Hill Monitoring Wells



(b) (3)



DRO Sample Results – Plume Delineation Wells



(b) (3)



DRO Sample Results – Sentinel Wells



(b) (3)

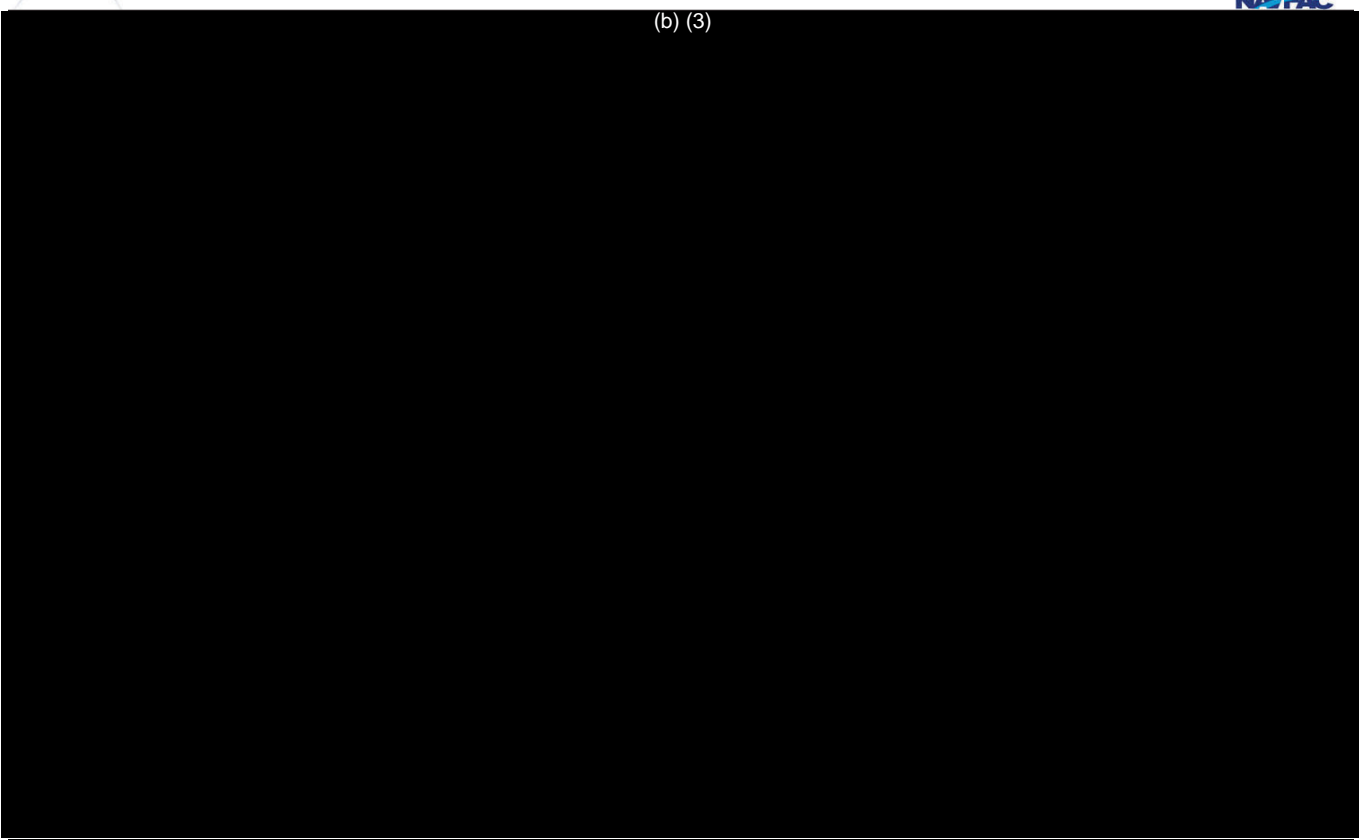


Figure 6: DRO Groundwater Analytical Results Summary

ORO Sample Results – Red Hill Monitoring Wells



(b) (3)



ORO Sample Results – Plume Delineation Wells



(b) (3)



ORO Sample Results – Sentinel Wells



(b) (3)



Figure 7: ORO Groundwater Analytical Results Summary

Naphthalene Sample Results – Red Hill Monitoring Wells



(b) (3)

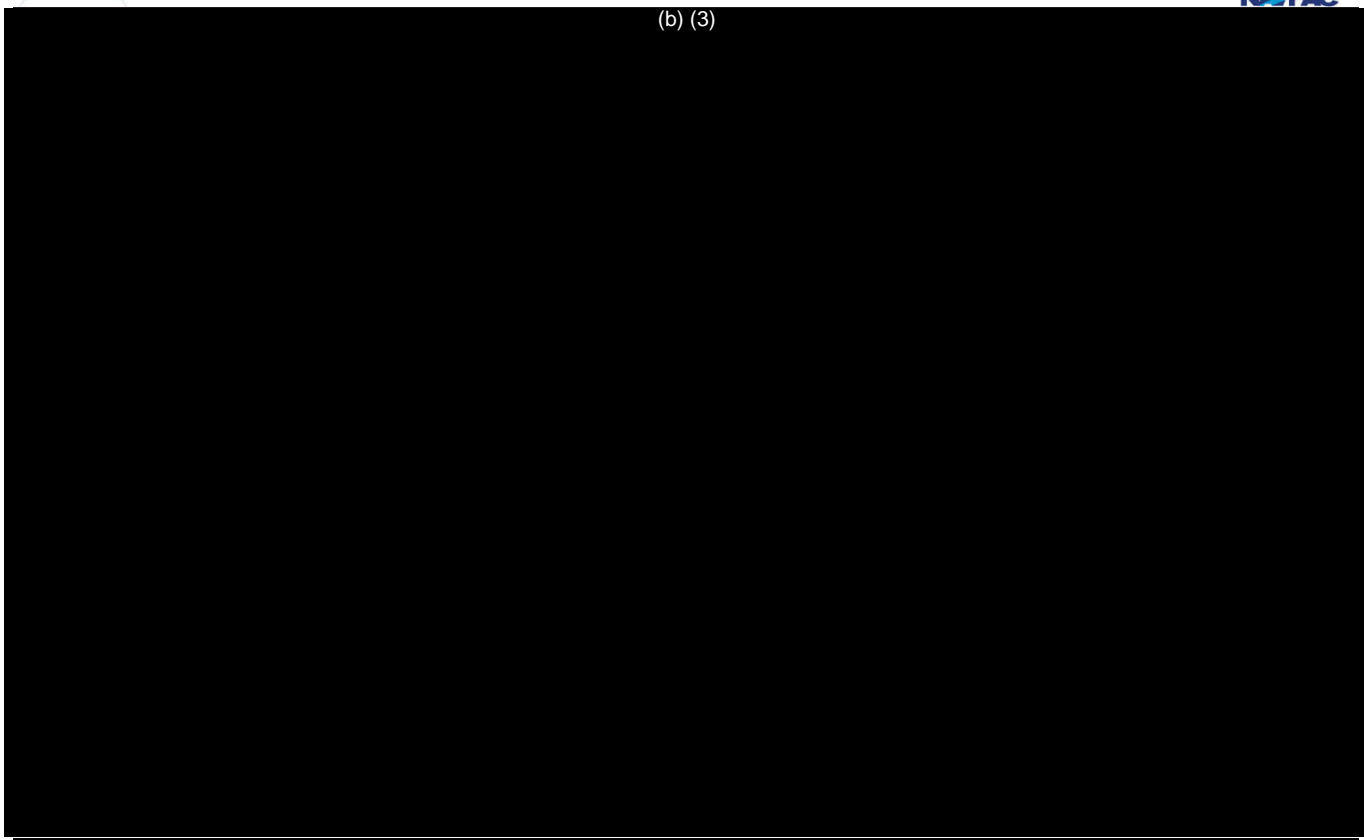


73

Naphthalene Sample Results – Plume Delineation Wells



(b) (3)



74

Naphthalene Sample Results – Sentinel Wells



(b) (3)



75

Figure 8: Naphthalene Groundwater Analytical Results Summary

1-Methylnaphthalene Sample Results – Red Hill Monitoring Wells



(b) (3)



1-Methylnaphthalene Sample Results – Plume Delineation Wells



(b) (3)



1-Methylnaphthalene Sample Results – Sentinel Wells



(b) (3)



Figure 9: 1-Methylnaphthalene Groundwater Analytical Results Summary

2-Methylnaphthalene Sample Results – Red Hill Monitoring Wells



(b) (3)



10

2-Methylnaphthalene Sample Results – Plume Delineation Wells



(b) (3)



11

2-Methylnaphthalene Sample Results – Sentinel Wells



(b) (3)



12

Figure 10: 2-Methylnaphthalene Groundwater Analytical Results Summary

This page intentionally left blank

Detected sample concentrations for data validated during the current reporting period are described by analyte below. The extent and magnitude of groundwater contamination are further evaluated in Section 10.1.

9.3.1 *TPH Range Organics*

Total petroleum hydrocarbon (TPH) range organics were measured using analytical methods that do not discriminate between petroleum hydrocarbons and many other organic compounds that may be detected within the specific carbon ranges of the methods. The numerical results provided in the text below, and in the referenced figures and tables can measure a larger set of organic compounds including petroleum hydrocarbons, naturally occurring hydrocarbons, or other organic compounds that may be introduced to the sample after it was removed from the groundwater. Determining the potential source of the organics measured in the sample requires additional qualitative review by a trained chemist and possible additional analysis. The results presented below include:

- Gasoline range organics (GRO): Organic compounds that fall in the gasoline range (C6–C10)
- Diesel range organics (DRO): Organic compounds that fall in the middle distillate range, including diesel and jet fuel (C10–C24)
- Oil range organics (ORO): Organic compounds that fall in the residual oil range, including motor oil (C24–C40)

9.3.1.1 *GRO*

GRO was detected once at low concentrations in samples collected at RHMW02, RHMW09, RHMW11-05, and NMW24. No measured concentrations exceeded the EAL of 300 µg/L. Many of the low-level detections have been attributed to laboratory contamination or are close to the detection limit in the range of instrument noise. Concentrations remained stable and consistent within historical ranges for all wells.

9.3.1.2 *DRO*

All non-silica gel cleanup (non-SGC) sample results from in-tunnel well RHMW02 exceeded the 400 µg/L EAL during the reporting period (which is consistent with historical results), and one sample at delineation well RHP04B exceeded the 400 µg/L EAL during the February 14, 2024, sampling event. The maximum DRO concentration at the in-tunnel wells was 1,460 µg/L in a sample collected at RHMW02.

As depicted in Appendix B.4, the sample exceedances from RHMW02 exhibited chromatographic profiles with peaks spanning the carbon range (C10–C24) characteristic of some dissolved components of jet fuel and a “hump” in the DRO range consistent with metabolites from JP-5/JP-8 and degraded jet fuels in general. The corresponding SGC chromatograms for samples from RHMW02 have been typical of dissolved aromatic hydrocarbons expected from jet fuel.

The DRO exceedance in a sample collected at RHP04B is the first exceedance in samples collected at this location. The chromatogram is not characteristic of fuel, water-soluble components of fuel, or fuel metabolites and has several large discrete peaks along a messy baseline that extends into the C40 range. In addition, there were no detects in the SGC extract. The sample result for the subsequent quarterly sampling event was lower in concentration, which will be included in the next quarterly report. Other fuel-related COPCs (PAHs and BTEX) were not detected. The RHP04B sample exceedance was extracted using EPA Method 3520C, which results in typically higher detections than EPA Method 3510C. DRO was not detected in the split sample that was extracted by EPA Method 3510C. This inconsistency indicates that the exceedance is due not to petroleum but to other organic compounds that are detected in the DRO range.

No other exceedances were reported for the other sampling locations.

As shown on Figure 6, detections were present for samples collected at in-tunnel well RHMW01R, outlying wells RHMW18 and RHMW19, delineation well RHP04C, and sentinel well NMW26. Inconsistent detections below the EAL for samples collected at the offsite wells support that there is no evidence of an expanding plume. There were no detections at any of the delineation wells or sentinel wells for samples analyzed by SGS; detections were reported for samples analyzed by Energy. Outlying well RHMW18 and sentinel well NMW26 are newly constructed wells, and the detected concentrations are most likely attributable to a lubricant or grease introduced during drilling, as evidenced by concentrations continuing to decline over time.

Detected sample concentrations from monitored wells for data validated during the current reporting period are summarized as follows:

- Detections for samples collected at in-tunnel wells appear to be stable or decreasing, with RHMW02 exhibiting consistent EAL exceedances attributed to some dissolved components of jet fuel. The chromatographic fingerprints for samples collected at RHMW01R are consistent with being impacted by potential metabolites from JP-5/JP-8 and degraded jet fuels in general that are mostly removed by SGC. Because RHMW01R is situated in proximity to RHMW02, it may be impacted by natural attenuation processes occurring at RHMW02. No detections were reported in the data validated during this reporting period in samples collected at in-tunnel wells RHMW03, RHMW05, and RHP07.
- Low-level detections for samples collected at outlying, delineation, and sentinel wells appear to be sporadic for samples analyzed by Energy, with no detections reported in the corresponding split samples analyzed by SGS. Inconsistent detections indicate that the exceedance is not due to petroleum but other organic compounds that are detected in the DRO range.
- Concentrations for samples collected at outlying well RHMW19 and delineation well RHP04C have been stable or decreasing since the inception of monitoring. Outlying well RHMW18 and sentinel well NMW26 are newly constructed wells, and the detections are most likely attributable to a lubricant or grease introduced during drilling, as evidenced by detections continuing to decline over time.
- The sample chromatograms for all outlying, delineation, and sentinel wells are not characteristic of fuel, water-soluble components of fuel, or fuel metabolites. Chromatograms either exhibited a few relatively large discrete peaks in the C10–C24 range or short, broad peaks along the baseline from the ~C22 to C40 range and beyond. SGC resulted in partial and selective removal of the peaks.
- Detections for samples collected at RHMW2254-01 (Red Hill Shaft) consistently exceeded the EAL immediately following the November 2021 Release, but have not exceeded the EAL since March 2022, with no detections reported for data validated during this reporting period.

9.3.1.3 ORO

The only reported ORO exceedance during this period was a sample from RHP04B collected on February 14, 2024, and analyzed by Energy Labs, which exceeded the ORO EAL (500 µg/L). As depicted in Appendix B.4, the chromatographic pattern for the ORO exceedance for the sample collected at RHMW04B shows a continuum of bumps along the baseline from the ~C22 to C40 ORO range and beyond. The chromatographic profile is not typical or consistent with fuels, dissolved fuel components, or fuel metabolites. In addition, ORO were not detected following SGC, suggesting the detection is from polar constituents. No ORO exceedances were reported for the other sampling locations.

As shown on Figure 7, ORO was below the EAL for samples collected at in-tunnel wells RHMW02 and RHMW03, outlying wells RHMW18 and RHMW19, delineation wells RHP04C and RHP08, and sentinel well NMW26.

Samples with detected concentrations of ORO that were validated during the current reporting period are summarized as follows:

- RHMW02 had detections in 50 percent of the sampling events using results from Energy but only one detection from SGS. Concentrations were not detected at most locations in the majority of the sampling events, with one or two sporadic detections. The chromatographic profiles for samples collected at these wells except for RHMW02 were not characteristic of dissolved fuel components. The detections for samples collected at RHMW02 are attributed to some dissolved components of the jet fuel “hump” from the C10–C24 range.
- The chromatograms for samples collected at the outlying, delineation, and sentinel wells for detections in the ORO range are not characteristic of fuel, water-soluble components of fuel, or fuel metabolites. In addition, ORO was removed by SGC for the majority of samples collected at the delineation and sentinel wells and for all in-tunnel and outlying wells, which indicates that the bulk of the detections are from polar compounds. Although polar compounds can be a byproduct from petroleum degradation, without the presence of LNAPL and with the chromatographic profile inconsistent to fuel, water-soluble components of fuel, or fuel metabolites, the polar material may also be composed of naturally occurring organic compounds that are polar.
- The chromatographic profile for the sample collected at NMW26 is consistent with lubricant used at NMW26 along with laboratory contaminants, as seen in the chromatographic profile for the method blank. The laboratory has traced the contaminant observed in other samples mostly to sodium sulfate, filter paper, and glass wool. These family of alkane peaks will not be removed by SGC since they are hydrocarbons.
- Samples that were collected at RHMW2254-01 (Red Hill Shaft) had consistent detections with sporadic exceedances immediately following the November 2021 Release, have not had exceedances since November 2022, and had only two detections throughout 2023. No detections have been reported for data validated during this reporting period.

Table 9-3 presents a comparison of DRO and ORO concentrations with and without SGC for wells validated during the reporting period.

Table 9-3. Comparison of TPH Concentrations Without and With Silica Gel Cleanup

Location	Lab ^a	SDG	Sample ID	Sampling Date	Type	TPH-d Result (µg/L)		TPH-d with SGC Result (µg/L)		Percent of Polar Compounds (SGC Result) in Non-SGC TPH-d Result	TPH-o Result (µg/L)		TPH-o with SGC Result (µg/L)		Percent of Polar Compounds (SGC Result) in Non-SGC TPH-o Result
NMW26	SGS Orlando	FC13080	NMW26-WGN02LF-2401	2/2/2024	Primary	<100	U	<100	U	—	121	J	111	J	9%
RHMW03	Energy	B24020463	RHMW03-WGN01LF-2402	2/6/2024	Primary	<141	U	<141	U	—	184	J+	<141	U	100%
RHMW19	Energy	B24020580	RHMW19-WGN01LF-2402	2/7/2024	Primary	89.2	J	<141	U	100%	186	J	<189	U	100%
NMW26	Energy	B24020801	NMW26-WGN01LF-2402	2/12/2024	Primary	104	J	<141	U	100%	117	J	<141	U	100%
RHMW02	Energy	B24020912	RHMW02-WGN01LF-2402	2/13/2024	Primary	1210		124	J	90%	298	J	<143	U	100%
RHMW02	Energy	B24020912	RHMW02-WGFD01LF-2402	2/13/2024	Field Duplicate	1460		137	J	91%	313		<141	U	100%
RHMW02	SGS Orlando	FC13371	RHMW02-WGN01LF-2402	2/13/2024	Primary	981		766		22%	<160	U	<160	U	—
RHMW02	SGS Orlando	FC13371	RHMW02-WGFD01LF-2402	2/13/2024	Field Duplicate	1030		751		27%	<170	U	<170	U	—
RHP04C	Energy	B24020997	RHP04C-WGN01LF-2402	2/14/2024	Primary	51.4	J	<146	U	100%	90.6	J	<146	U	100%
RHP04B	Energy	B24020997	RHP04B-WGN01LF-2402	2/14/2024	Primary	1170		<141	U	100%	777		<141	U	100%
RHMW18	Energy	B24021083	RHMW18-WGN01LF-2402	2/15/2024	Primary	98	J	<141	U	100%	145	J	<189	U	100%
RHMW01R	Energy	B24021107	RHMW01R-WGN01LF-2402	2/16/2024	Primary	182	J	<141	U	100%	<189	U	<189	U	—
RHMW01R	Energy	B24021107	RHMW01R-WGFD01LF-2402	2/16/2024	Field Duplicate	158	J	<141	U	100%	<189	U	<189	U	—
RHMW01R	SGS Orlando	FC13462	RHMW01R-WGFD01LF-2402	2/16/2024	Field Duplicate	89	J	<100	U	100%	<160	U	<160	U	—
RHMW01R	SGS Orlando	FC14092	RHMW01R-WGN01LF-2403	3/13/2024	Primary	113	J	<100	U	100%	<170	U	<170	U	—
RHMW01R	SGS Orlando	FC14092	RHMW01R-WGFD01LF-2403	3/13/2024	Field Duplicate	106	J	<100	U	100%	<170	U	<170	U	—
RHMW02	SGS Orlando	FC14139	RHMW02-WGN01LF-2403	3/15/2024	Primary	1270		1110		13%	<170	U	<170	U	—
RHMW02	SGS Orlando	FC14139	RHMW02-WGFD01LF-2403	3/15/2024	Field Duplicate	1380		1200		13%	88.4	J	<170	U	100%
RHP08	SGS Orlando	FC14185	RHP08-WGN01LF-2403	3/18/2024	Primary	<100	U	<100	U	—	91.5	J	111	J	— ^b

Notes:

Non-bold text indicates non-detected value

Bold text indicates detected value, but below the Environmental Action Level (EAL).

Bold and orange shaded text indicates exceeds the Department of Health Tier 1 EAL.

Specific EPA method revision used for analyses vary by lab and compound. The lab report associated with a sample specifies the exact method revision used.

— = not analyzed or not applicable

µg/L = microgram per liter (same as parts per billion)

^a = SGS uses 3510 extraction method for Consolidated-Monthly. Energy uses 3520 extraction method for Consolidated-Quarterly.

^b = Percent polars not calculable, SGC results higher than non-SGC results.

J = estimated value

J- = estimated value, low bias

J+ = estimated value, high bias

U = nondetect value

SGC = Silica Gel Cleanup

TPH-d = total petroleum hydrocarbons-diesel range organics

TPH-o = total petroleum hydrocarbons-residual range

9.3.2 Lead Scavengers

1,2-Dibromoethane and 1,2-dichloroethane were not detected at any sampling location for data validated during this reporting period.

9.3.3 BTEX

BTEX were also not detected at any sampling location for data validated during this reporting period.

9.3.4 SVOCs

Phenol and 2-2-methoxyethoxyethanol (2-2-MEE) were monitored in accordance with the Consolidated Groundwater Sampling Program. Phenol and 2-2-MEE were not detected at any in-tunnel, outlying, delineation, or sentinel wells.

9.3.5 PAHs

Non-pyrogenic PAHs are commonly found in petroleum, including middle distillates such as JP-5. Non-pyrogenic PAHs that are present in kerosene or jet fuels include 1MN, 2MN, N, and, to lesser extents, acenaphthene, acenaphthylene, and fluorene.

Consistent with historical data, N, 1MN, and 2MN were detected in samples at in-tunnel well RHMW02, as shown on Figure 8, Figure 9, and Figure 10, respectively. PAH COPCs were previously detected in samples from RHMW01R; however, they were not detected for data validated during this reporting period.

Pyrogenic PAHs benzo(b)fluoranthene, benzo(k)fluoranthene, and chrysene were detected once in a sample collected at RHMW16, below the LOD (J flagged). DRO and ORO were not detected in this sample, and PAHs were not detected in other samples from this well, which suggests that these PAHs did not represent the groundwater from the well and may have been from baseline noise. Other pyrogenic PAHs were not detected in groundwater sampled from wells validated during this reporting period.

Pyrogenic PAHs, or heavy PAHs, are not found in fuels, but are commonly associated with combustion products and associated atmospheric deposition and urban run-off.

Benzo(a)anthracene was reported above the EAL of 0.029 µg/L once in a sample collected at outlying well RHMW16 during the March 11, 2024, sampling event and may have been from baseline noise. Prior and subsequent sampling events were not detected.

9.3.6 Natural Attenuation Parameters

As described in the Red Hill CSM report (DON 2019b, Section 7.3), the natural attenuation evaluation uses the following lines of evidence:

- Use of current and historical groundwater primary indicators (COPC data) to demonstrate contaminant concentration over time.
- Use of secondary lines of evidence (general groundwater chemistry parameters and NAPs) to evaluate whether natural attenuation processes are active at the site and the rate at which such processes can reduce contaminant concentrations to below screening levels.
- Comparison of DRO and ORO with and without SGC to evaluate the degree of weathering of dissolved fuel hydrocarbons based on the fraction of polar-weathered hydrocarbons and total recoverable hydrocarbons.

Natural attenuation parameter measurements collected during groundwater monitoring field activities this reporting period are representative of electron donors used in microbial respiration, including DO, nitrate, and sulfate; direct microbial byproducts including soluble ferrous iron, soluble manganese and methane; and geochemical indicators of microbial processes, including ORP and alkalinity.

9.3.6.1 *DISSOLVED OXYGEN AND OXIDATION-REDUCTION POTENTIAL*

DO is beneficially consumed by microorganisms first while aerobically metabolizing the hydrocarbon plume. Oxygen provides the greatest amount of energy to the petroleum-degrading microorganisms. Groundwater flow with a continuous source of DO maintains the aerobic biodegradation process. DO concentrations greater than 1 milligram per liter (mg/L) are considered aerobic, while DO concentrations less than 1 mg/L are considered anaerobic. Oxygen depleted water travels faster than the plume and may be used to confirm groundwater flow direction. However, naturally occurring groundwater is expected to be saturated at approximately 8 mg/L in a normal steady state equilibrium without biodegradation occurring.

ORP is the measure of the tendency of a chemical species to acquire electrons (reduction) or lose electrons (oxidation) in a solution. ORP trends downward as oxygen is consumed (e.g., ORP values will be lower in a hydrocarbon plume undergoing aerobic biodegradation). Negative ORP values are characteristic of a strongly reducing environment favorable for anaerobic biodegradation.

DO concentrations and ORP values for the current quarterly events were consistent with previous measurements. Measurement and distribution of DO from the current monitoring event confirms that the aquifer is naturally aerobic, with concentrations at 29 wells ranging from 1.35 mg/L to 8.78 mg/L. Typical oxygen-saturated groundwater has oxygen levels ranging between 8 and 9 mg/L.

During the current monitoring event, anaerobic conditions ($DO < 1$ mg/L) were detected at nine locations, including wells with current detections of dissolved TPH (RHMW01, RHMW02, RHP04B, and RHP04C). Recently installed offsite wells NMW26 and NMW30 and newly installed upgradient well RHMW18 also exhibited $DO < 1$ mg/L, with NMW26 and RHMW18 and both exhibiting low-level detections of TPH during the current period. Additional monitoring is required to confirm geochemical conditions (and TPH detections) at newly installed upgradient and offsite wells, as they are generally affected by drilling fluids that contain organic compounds similar to petroleum hydrocarbons, and are not distinguishable with the current testing procedures.

Highly reducing conditions (negative ORP) favorable for lower-energy anaerobic biodegradation via methanogenesis, sulfate reduction, and iron reduction were measured at three onsite wells (RHMW01R, RHMW02, and RHP04B), all of which either consistently or intermittently exhibited the presence of dissolved TPH. Newly installed offsite wells NMW26 and NMW30 also exhibited negative ORP readings; however, additional monitoring is required to confirm the geochemistry at these locations. In addition, RHMW11-05, located spatially between the tank farm release locations and Red Hill Shaft and with historical detections of TPH, exhibited negative ORP readings, thereby potentially confirming ground water flow from the tank release locations to Red Hill Shaft.

9.3.6.2 *TEMPERATURE*

Temperature is known to influence metabolic rates for microorganisms, with temperatures between 5°C and 45°C (optimally >15 °C) being favored for enhanced biodegradation of petroleum products. Further, increases in temperature may indicate active biologic zones.

Review of data collected during the current period indicates groundwater temperature ranges from 21.73°C to 27.3°C, residing in the optimal range for enhanced biodegradation. However, a correlation of increased temperature at locations with other biodegradation indicators did not indicate overt trends of increased temperature over background.

9.3.6.3 NITRATE

Following oxygen depletion, denitrification (conversion of nitrate to nitrogen) or nitrate reduction (conversion of nitrate to nitrite to ammonia) is the preferred path for anaerobic biodegradation, with denitrification preferred over nitrate reduction.

Similar to oxygen, nitrate was observed at depressed levels (<0.13 mg/L) in wells with current detections of dissolved TPH (RHMW01, RHMW02, RHP04B, and RHP04C). Depressed nitrate concentrations were also observed at onsite well RHMW11-05, located between release locations and Red Hill Shaft, newly installed upgradient well RHMW18 and newly installed offsite well NMW26 (each exhibiting low-level detections of TPH this monitoring period). Additional monitoring is required to confirm geochemical conditions at newly installed upgradient and offsite wells RHMW18 and NMW26.

Remaining wells had nitrate concentrations similar to or greater than historical background nitrate levels for the site, with the highest concentrations being detected at offsite wells NMW25, NMW32, and NMW33.

9.3.6.4 MANGANESE

Following depletion of nitrate, insoluble manganese (Mn+4) is reduced to soluble manganese (Mn+2) in support of anaerobic biodegradation of petroleum compounds, resulting in a higher soluble manganese concentration within the plume. During the current reporting period, soluble manganese was sampled at only one well, NMW26, where it was detected at a concentration of 92 µg/L. NMW26 is a newly installed well that has exhibited intermittent concentrations of dissolved hydrocarbons.

9.3.6.5 FERROUS IRON

Ferrous iron is a metabolic byproduct of biodegradation of hydrocarbons, resulting from reduction of insoluble ferric iron by anaerobic microorganisms to dissolved ferrous iron. During anaerobic degradation, the concentrations of ferrous iron will increase within the plume to concentrations above background.

Ferrous iron was detected in wells RHMW01R, RHMW02, and RHP04B, all of which exhibit consistent or intermittent detections of dissolved hydrocarbons, DO concentrations less than 1 mg/L, and negative ORP results indicating likely anaerobic biodegradation supported by iron reduction at these wells. Ferrous iron oxidizes back to ferric iron in the presence of oxygen. Ferrous iron was also detected at HDMW2253-03 in the presence of low DO but positive ORP. Concentrations ranged from 0.62 J mg/L (HDMW2253-03) to 1.4 mg/L (RHMW02). All other locations were below detection limits, coincident with DO levels greater than 1 mg/L.

9.3.6.6 SULFATE

At a lower energy level, sulfate reduction follows ferric iron reduction in the petroleum biodegradation process. As sulfate is consumed by anaerobic microbial activity within a hydrocarbon plume, a corresponding increase of sulfide is expected.

The lowest sulfate concentrations observed were at RHMW02 and RHMW01R at 5.1 and 5.6 mg/L, respectively (both wells consistently exhibit elevated dissolved hydrocarbons). The highest detected concentration was 95 mg/L at offsite well NMW25. Reduced sulfate concentrations in RHMW01R and RHMW02 suggest that sulfate-reducing biodegradation of hydrocarbons is occurring at those locations.

9.3.6.7 METHANE

Methanogenesis (reduction of carbon dioxide and generation of methane as a metabolic byproduct) follows sulfate reduction. During anaerobic biodegradation, the concentration of methane will increase to levels

above background within and downgradient of the plume. Increases of methane in groundwater may be indicative of anaerobic degradation at the corresponding location or upgradient. Methane was detected in the samples from HDMW2253-03, RHMW01R, RHMW02, RHP04C, and NMW30 at concentrations greater than 1 µg/L.

The methane concentration at RHMW02 was significantly elevated over the other wells, with detected concentrations ranging from 2,350 to 2,770 µg/L. Elevated methane concentrations at the referenced wells, especially RHMW02 suggest that methanogenic biodegradation is occurring in proximity to these wells. NMW30 is a newly installed offsite well, and additional monitoring is required to confirm geochemical conditions at this well.

9.3.6.8 *ALKALINITY*

Alkalinity is the measure of the aquifers ability to buffer changes in pH, including changes resulting from biologically generated acids. Additionally, increased alkalinity may be an indication of microbial activity, which results in an increase in carbon dioxide. However, carbon dioxide is also consumed by methanogenic processes.

The greatest levels of alkalinity are measured at recently installed offsite wells NMW25, NMW32, and NMW33 and at source area wells RHMW02 and RHMW03. Elevated alkalinity at RHMW02 and RHMW03 may be attributable to the presence of carbon dioxide produced by biodegradation processes occurring at these locations, which is underscored by historical detections of TPH. Elevated alkalinity at the other monitoring locations may be attributable to aquifer geochemistry.

9.3.6.9 *NAP CONCENTRATIONS*

Graphs of groundwater NAP results are presented in Appendix B.5. Evaluation of NAP data from the Fourth Quarter 2016 GW LTM event (DON 2016) onward indicates that there is no evidence that seasonal variations (i.e., wet- and dry-season effects) influence NAP concentrations, and thus influence biodegradation in groundwater at the Red Hill monitoring well network. Multiple NAP parameter observations, including a decrease in electron acceptors and an increase in metabolic by products compared to background concentrations, indicate that active biodegradation is occurring at Red Hill.

At wells RHMW01R and RHMW02, which exhibit consistent detections of dissolved hydrocarbons, and wells RHMW03 and RHP04B, DO levels are < 1 mg/L, indicating that aerobic respiration of oxygen as a primary source of energy for petroleum degrading microorganisms is occurring. In conjunction, ORP levels are negative in three of these wells. With continued groundwater pumping at Red Hill Shaft, an influx of groundwater with higher concentrations of DO should continue to provide oxygen for continued aerobic biodegradation of the hydrocarbon plume.

In conjunction with reducing conditions at the wells noted above, evidence of subsequent anaerobic biodegradation facilitated by nitrate, iron, sulfate, and carbon dioxide reduction is provided by lower concentrations of terminal electron acceptors (nitrate and sulfate) and increased concentrations of metabolic byproducts (dissolved ferrous iron and methane).

Additionally, Table 9-3 illustrates weathering of non-polar petroleum fractions to weathered polar fractions, again supporting natural attenuation processes.

While variability exists in the comprehensive data sets, sufficient evidence is realized to conclude that natural attenuation via biodegradation and other natural attenuation processes is occurring in proximity to documented release points and will continue to occur given the geochemical conditions evident in the aquifer.

Additional evaluation of natural source-zone depletion and natural attenuation at the Facility is discussed in the AOC Statement of Work Sections 6 and 7 CSM report (DON 2019b) and Investigation and Remediation of Releases Report (DON 2020b).

10.0 Summary of Results and Extent and Magnitude of Contamination

The reporting period's analytical results presented in Section 9.0 are summarized below, and historical context is provided for evaluating the impacts of prior releases.

10.1 Soil Vapor Impacts

PID results for SVMs at Tanks 17, 18, and 20 since the May 2021 Release are charted on Figure 11.

As indicated on the figure, PID readings under those tanks have declined significantly since the May 2021 Release:

- At Tank 17, the highest PID reading (181,733 parts per billion by volume [ppbv]) was recorded on June 6, 2021, at SV17S.
- At Tank 18, the highest PID reading (146,667 ppbv) was recorded on May 19, 2021, at SV18S.
- At Tank 20, the highest PID reading (232,667 ppbv) was recorded on May 13, 2021, at SV20M.

The following observations are consistent with continued long-term biodegradation and weathering of the May 2021 Release:

- For this reporting period, all PID readings were within the range observed prior to the May 2021 Release.
- As documented in prior Quarterly RRRs, passivated canister samples collected in 2021 and early 2022 and analyzed for total VOCs by Method TO-15 and Method TO-3 served to further document weathering of the May 2021 Release over time.

Laboratory results of passivated canister samples collected during the current reporting period were similar to prior recent results and are indicative of low to non-detect concentrations of petroleum vapors from highly weathered residual fuel.

Following the November 20, 2021, release of JP-5 in the Adit 3 tunnel, 54 SVMs were installed through the Adit 3 and Pearl Harbor Tunnel floors to monitor organic vapors in the subfloor. Concentrations have decreased significantly from their original maximum of 525 ppmv collected on December 20, 2021, to the recent maximum of 20 ppmv from samples collected on April 9, 2024.

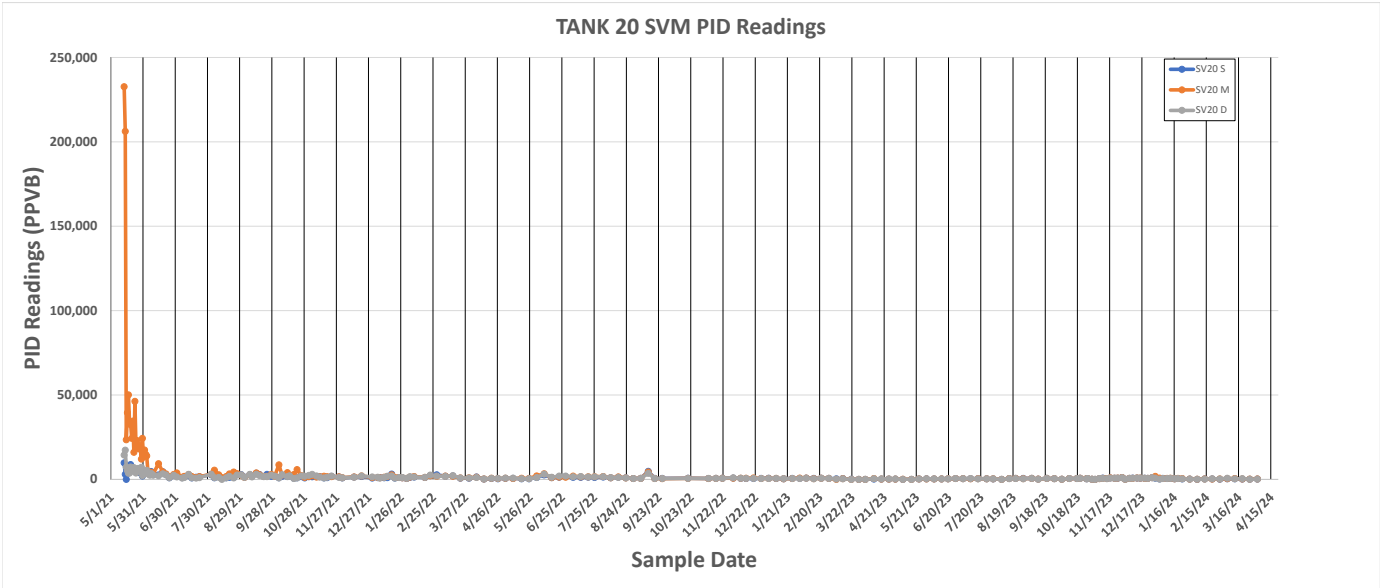
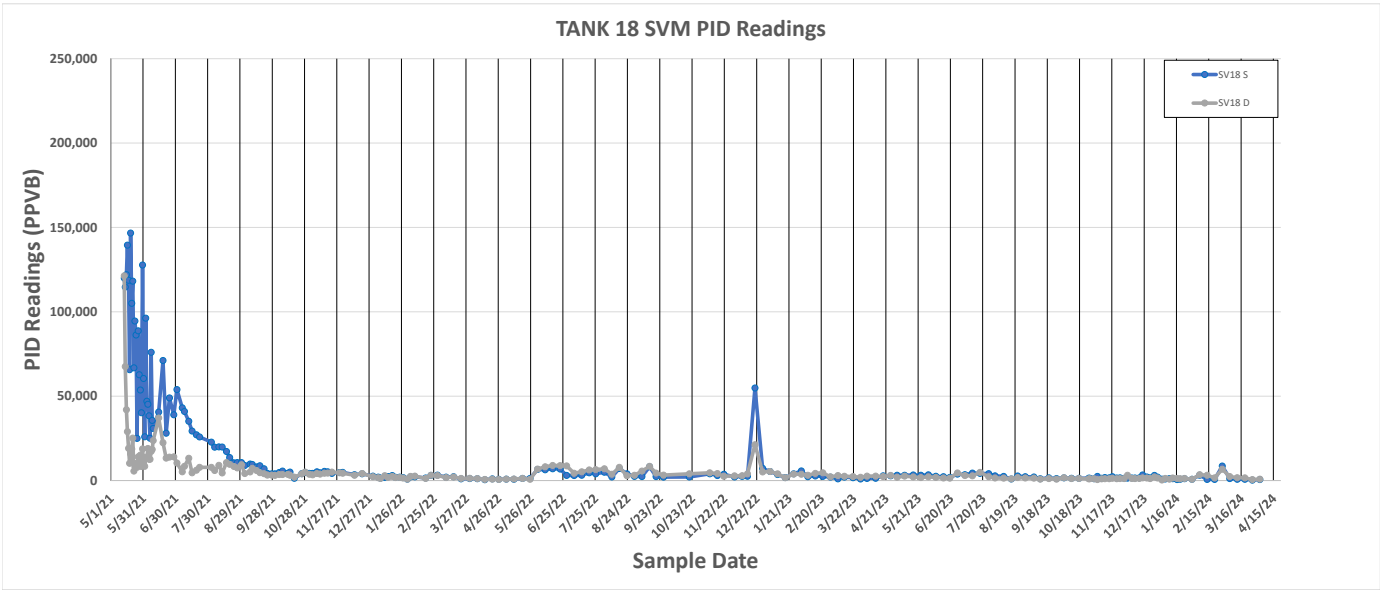
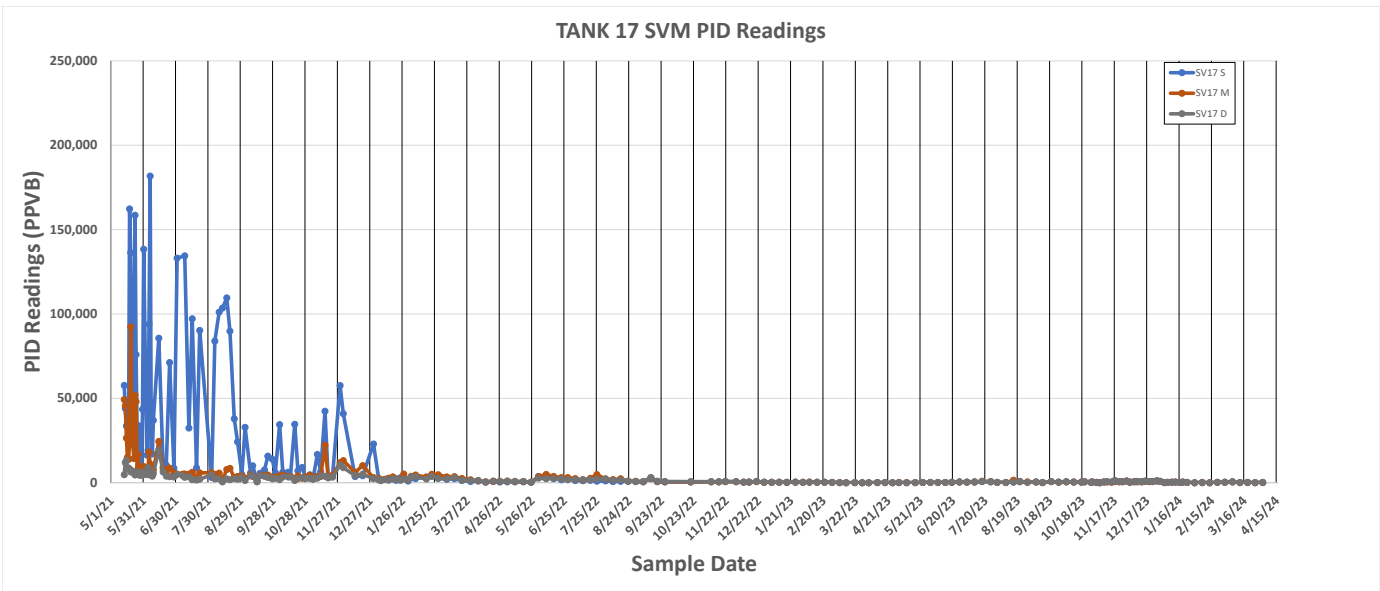


Figure 11: SVM PID Readings for Tanks 17, 18, and 20

10.2 Groundwater Impacts

Summary statistics include all groundwater samples completing validation during this reporting period regardless of sample collection date.

Table 9-2 presents summary statistics of groundwater results for all groundwater sampling results presented in Section 9.3. Table 10-1 presents the summary of groundwater concentrations detected above the DOH EALs as distilled from the summary statistics.

In general, contaminant concentrations are either declining or stable near the tank farm with no sustained evidence of contamination elsewhere. Groundwater impacts primarily include elevated concentrations of DRO and low-level ORO at in-tunnel sampling location RHMW02 and to a much lesser extent at in-tunnel well RHMW01R.

The following compounds were not detected in any samples included in this reporting period:

- Benzene, toluene, ethylbenzene and xylenes
- Lead scavengers: 1,2-dibromomethane and 1,2-dichloroethane
- Fuel Additives: phenol and 2-2-MEE
- PAHs (except for COPCs N, 1MN and 2MN in samples from RHMW02 and benzo(a)anthracene, benzo(k) fluoranthene and chrysene in a sample from RHMW16)

DRO and ORO were most often detected at in-tunnel sampling locations and appear to be stable. Naphthalenes were only detected at in-tunnel well RHMW02.

All non-SGC samples from RHMW02 exceeded the DRO EAL of 400 µg/L during this reporting period, which is consistent with historical values and indicates the presence of soluble fuel components and fuel metabolites. In addition, one sample exceeded the DRO EAL and ORO EAL at RHP04B during the reporting period, but evaluation of the chromatogram showed no evidence of fuel components or fuel metabolites.

One exceedance of benzo(a)anthracene was reported in a sample collected at outlying well RHMW16. No other exceedances for any other target compound were reported in any groundwater samples this reporting period.

For samples collected at groundwater monitoring wells other in-tunnel wells RHMW02 and RHMW01R, chromatographic profiles for DRO and ORO during this reporting period are distinctly different from what is expected from fuels, dissolved fuel components, or metabolites.

Additional details are summarized below for Red Hill network wells, delineation wells, and sentinel wells.

Table 10–1: Summary of Current Groundwater Result Exceedances

						TPH-d	TPH-o	Benzo(a)anthracene (SIM)	
Analyte									
CAS No.						PHCC10C24	PHCC24C40	56-55-3	
Method						8015	8015	8270SIM	
DOH Tier 1 EAL						400	500	0.027	
Units						µg/L	µg/L	µg/L	
Location	Sampling Method	Lab	Sample ID¹	Sampling Date	Type	Result		Result	
RHMW02	Low-Flow	Energy	RHMW02-WGFD01LF-2402	2/13/2024	Field Duplicate	1460	—	—	—
RHMW02	Low-Flow	Energy	RHMW02-WGN01LF-2402	2/13/2024	Primary	1210	—	—	—
RHP04B	Low-Flow	Energy	RHP04B-WGN01LF-2402	2/14/2024	Primary	1170	777	—	—
RHMW02	Low-Flow	SGS Orlando	RHMW02-WGFD01LF-2402	2/13/2024	Field Duplicate	1030	—	—	—
RHMW02	Low-Flow	SGS Orlando	RHMW02-WGN01LF-2402	2/13/2024	Primary	981	—	—	—
RHMW16	Low-Flow	SGS Orlando	RHMW16-WGN01LF-2403	3/11/2024	Primary	—	—	0.043	J
RHMW02	Low-Flow	SGS Orlando	RHMW02-WGFD01LF-2403	3/15/2024	Field Duplicate	1380	—	—	—
RHMW02	Low-Flow	SGS Orlando	RHMW02-WGN01LF-2403	3/15/2024	Primary	1270	—	—	—

Acronyms and Footnotes:

CAS-Chemical Abstracts Service

J-estimated: the analyte was positively identified; the quantitation is an estimation

ND-not detected

V-results have been validated

µg/L-microgram per Liter

%-percent

Bold and orange shaded text indicates exceeds the Department of Health Tier 1 EAL.

Green text indicates results have completed third-party validation.

10.2.1 Red Hill Network Wells

Sample concentrations collected at the in-tunnel and outlying wells appear to be stable over time for DRO and to a lesser extent, ORO, most often detected in samples collected at in-tunnel sampling locations.

GRO was detected at low concentrations once at in-tunnel well RHMW02 and at outlying wells RHMW09 and RHMW11-05. These low-level detections (<52 J µg/L) are attributed to laboratory contamination or were close to the detection limit and in the range of instrument noise.

DRO exceeded the EAL for all sampling events from RHMW02. Detections for samples from this well are due to soluble fuel components and fuel metabolites. Exceedances of DRO for samples from RHMW02 are consistent with historical results. No DRO exceedances were reported for any other sampling locations for these types of wells.

Low-level detections of DRO below the EAL were reported in most samples collected at in-tunnel well RHMW01R. These low-level detections for samples from RHMW01R (all removed by SGC) are consistent with historical results and because RHMW01R is situated in proximity to RHMW02, it may be impacted by natural attenuation processes occurring at RHMW02. Very low-level detections (removed by SGC) were reported in single samples collected at outlying wells RHMW18 and RHMW19. These detections were reported by one laboratory and not the other laboratory of the two laboratories that analyzed split samples from these wells.

No exceedances for ORO were reported in samples collected at in-tunnel or outlying wells during this reporting period. ORO was detected at low levels below the EAL in samples collected at in-tunnel wells RHMW02 and RHMW03 and outlying wells RHMW18 and RHMW19. Samples with detections by Energy from all well locations had no detections in the split samples analyzed by SGS; all detections were removed by SGC.

PAH COPCs (N, 1MN, and 2MN) were consistently detected only for the sample collected at in-tunnel well RHMW02 (as expected from historical data for this well). Three PAHs—benzo(a)anthracene (exceeding EAL), benzo(b)fluoranthene, benzo(k)fluoranthene and chrysene—were detected in one sample collected at outlying well RHMW16 and may be attributed to baseline noise due to the absence of DRO and ORO, and that prior and subsequent results were not detected.

No other compounds were detected in any of these samples during this reporting period.

In summary, samples from in-tunnel wells RHMW01R and RHMW02 are stable, with consistent detections of DRO, N, 1MN, 2MN and, with less frequency, ORO. The chromatograms are consistent with dissolved fuel compounds and fuel metabolites. Samples collected at the outlying wells are also stable, with infrequent low-level detections of DRO and ORO inconsistent with fuel sources.

10.2.2 Delineation Wells

Sample concentrations collected at the delineation wells had a very low-level detection of DRO in one well and two very low-level detections of ORO in two wells, with one exception where DRO and ORO exceeded EALs in a sample collected at RHP04B. However, there were no detections in any on these samples that were also analyzed at SGS. The chromatogram is not characteristic of fuel, water-soluble components of fuel, or fuel metabolites and has several large discrete peaks along an inconsistent baseline that extends into the C40 range. It is likely that the one exceedance for the sample from RHP04B is not representative of the groundwater at this location and potentially due to random sample contamination.

10.2.3 Sentinel Wells

Samples from the sentinel wells had only a low-level detection of GRO at one well and two very low-level detections of ORO at another well by two laboratories but for different sampling events, thus there is no consistency to these detections near the detection limit for these analyses and in the range of instrument noise.

11.0 Conclusions and Recommendations

11.1 Conclusions

Soil Vapor Impacts. The magnitude of soil vapor impacts associated with the fuel releases continues to decrease over time, consistent with natural attenuation and weathering of LNAPL in the environment.

Groundwater Impacts. In general, contaminant concentrations appear to be either declining or stable near the tank farm over time with no sustained evidence of contamination elsewhere. Groundwater impacts primarily include elevated concentrations of DRO and low-level ORO for samples collected at in-tunnel wells RHMW02 and, to a much lesser extent, RHMW01R. Sample concentrations of all formerly elevated COPCs near Red Hill Shaft have decreased considerably since operation of skimmers, sorbents, and the Red Hill Shaft GAC treatment system, with most results below the detection limit.

Chromatographic profiles for the DRO and ORO detections for samples validated during this reporting period for the Red Hill network wells, delineation wells, and sentinel wells are distinctly different from what is expected from fuels, dissolved fuel components, or metabolites except for samples from RHMW02 and RHMW01R (consistent with historical results for these two wells).

11.2 Recommendations and Planned Future Actions

The Navy recommends continuing the following activities in coordination with DOH:

- Soil vapor and groundwater sampling
- Site characterization at Adit 3, including installation of additional deep SVMPs and SVE points for the remedial pilot study
- Initial site characterization activities at the CHT Tank area outside Adit 3
- Data gathering and associated analyses

The Navy is also expanding the groundwater monitoring well network (including sentinel wells) as part of plume delineation efforts and to monitor groundwater quality between Red Hill and offsite water supply wells.

Extensive sampling and monitoring activities in response to the fuel releases are ongoing. Associated data evaluation will continue to be performed to support evaluation of:

- Impact and extent of the releases to the environment
- Effectiveness of the Red Hill Shaft GAC pump and treat system in containing impacted groundwater and preventing additional migration of contaminants
- Potential future migration of contaminants and potential impacts to offsite receptors including existing and newly installed Navy wells and additional wells identified while working in coordination with the Honolulu BWS

- Remedial alternatives and future remediation strategies
- Pilot testing for remediation effectiveness and optimization

Upon finalization of all laboratory analyses/reports for the Adit 3 OU-2 saturated zone investigation, the comprehensive set of data will be provided in a format similar to and complementary to the OU-1 vadose zone report that was provided to the Regulatory Agencies in a draft report on May 19, 2023 (DON 2023f).

The Navy will finalize the following reports once comments are received from the Regulatory Agencies:

- *Draft Site Characterization Report, November 2021 JP-5 Release in Adit 3, Operable Unit 1* (May 19, 2023)

The Navy will continue site characterization efforts and implement pilot projects once the Regulatory Agencies review and approve the following WPs:

- *Draft Natural Source-Zone Depletion Work Plan* (February 23, 2023)
- *Draft Deep Soil Vapor Extraction Work Plan* (February 27, 2023)
- *Site Characterization Plan Addendum, Additional Nested Deep Soil Vapor Monitoring Points in Adit 3 Tunnel* (March 8, 2023)
- *Draft Monitoring Well Installation Work Plan* (January 2024)

12.0 References

Department of Defense and Department of Energy, United States (DoD and DOE). 2021. *Department of Defense (DoD) and Department of Energy (DOE) Consolidated Quality Systems Manual (QSM) for Environmental Laboratories*. DoD/DOE QSM Ver. 5.4. Prepared by DoD Environmental Data Quality Workgroup and DOE Consolidated Audit Program Operations Team.

Department of Defense, United States (DoD). 2021. *Data Validation Guidelines Module 4: Data Validation Procedure for Organic Analysis by GC*. SW-846 8000 Series. Environmental Data Quality Workgroup. March.

———. 2022. *Defueling Plan, Red Hill Bulk Fuel Storage Facility, Oahu, Hawaii*. Prepared by Secretary of the Navy (SECNAV), in Coordination with Director, Defense Logistics Agency (DLA), on Behalf of DoD. June 30, 2022.

Department of Health, State of Hawaii (DOH). 2005. *Subject: Request for No Further Action Determination for the Red Hill Oily Waste Disposal Facility*. Letter from: M. K. Miyasaka, Hawaii DOH Hazard Evaluation and Emergency Response Office, to: D. Ige, Naval Facilities Engineering Command, Pacific. April 11.

———. 2017. *Evaluation of Environmental Hazards at Sites with Contaminated Soil and Groundwater, Hawai'i Edition*. Hazard Evaluation and Emergency Response. Revised 2017. Fall.

———. 2021a. *Notice of Interest in a Release or Threatened Release of Hazardous Substances: Red Hill Bulk Fuel Storage Facility, Pearl Harbor, HI. Case No.: 20210507-0852 JP-5 Spill That Occurred on 6 May 2021*. Letter from: Keith Kawaoka, Hawaii DOH Deputy Director for Environmental Health; to: Admiral R. B. Chadwick II, Navy Region Hawaii. May 10.

- . 2021b. *Notice of Interest in a Release or Threatened Release of Hazardous Substances: Red Hill Bulk Fuel Storage Facility, Pearl Harbor, HI. HEER Incident Release Case No.: 20211120-2330*. Letter from: K. Ho, Hawaii DOH Deputy Director for Environmental Health; to: Rear Admiral T. Kott, Navy Region Hawaii. November 24.
- . 2023. *Technical Guidance Manual for the Implementation of the Hawaii State Contingency Plan*. Interim Final. Honolulu, HI: Hazard Evaluation and Emergency Response Office. Latest Update: July 2023.
- Department of the Navy (DON). 1996. *Phase I Remedial Investigation Report, Red Hill Oily Waste Disposal Facility, Fleet and Industrial Supply Center, Pearl Harbor, Oahu, Hawaii, Volume I, Technical Report*. Prepared by Ogden Environmental and Energy Services Co., Inc., Honolulu, HI. Pearl Harbor, HI: Naval Facilities Engineering Command, Pacific. January.
- . 1999. *Initial Phase II Site Characterization Report, Fleet Industrial Supply Center Bulk Fuel Storage Facility at Red Hill*. Prepared by Ogden Environmental and Energy Services Co., Inc., Honolulu, HI. Pearl Harbor, HI: Naval Facilities Engineering Command, Pacific. March.
- . 2000. *Remedial Investigation Phase II, Red Hill Oily Waste Disposal Facility, Halawa, Oahu, Hawaii*. Prepared by Earth Tech, Inc., Honolulu, HI. Volume I, Technical Report. Pearl Harbor, HI: Naval Facilities Engineering Command, Pacific. September.
- . 2002. *Red Hill Bulk Fuel Storage Facility Investigation Report (Final) for Fleet Industrial Supply Center (FISC), Oahu, Hawaii*. Prepared by AMEC Earth & Environmental, Inc., Huntsville, AL. Pearl Harbor, HI: Naval Facilities Engineering Command, Pacific. August.
- . 2005. *Quarterly Groundwater Monitoring Reports, Red Hill Bulk Fuel Storage Facility, Joint Base Pearl Harbor-Hickam, Oahu, Hawaii*. 2005–Present. Prepared by Dawson Group, Inc.; TEC, Inc.; Environet, Inc.; Environmental Science International, Inc.; Element Environmental, LLC; and AECOM Technical Services, Inc. Prepared for Naval Facilities Engineering Command, Hawaii, JBPHH HI.
- . 2007. *Red Hill Bulk Fuel Storage Facility Final Technical Report, Pearl Harbor, Hawaii*. Prepared by TEC, Inc. Pearl Harbor, HI: Naval Facilities Engineering Command, Pacific. August.
- . 2008a. *Monthly Soil Vapor Monitoring Reports, Red Hill Bulk Fuel Storage Facility*. 2008–Present. Prepared for Naval Facilities Engineering Command, Hawaii, JBPHH HI.
- . 2008b. *Red Hill Bulk Fuel Storage Facility Final Groundwater Protection Plan, Pearl Harbor, Hawaii*. Prepared by TEC Inc. Includes December 2009 Revisions to the Red Hill Groundwater Protection Plan. Pearl Harbor, HI: Naval Facilities Engineering Command, Pacific. January.
- . 2008c. *Tank 17 Removal Action Report, Red Hill Fuel Storage Facility, Pearl Harbor, Oahu, Hawaii*. Prepared by TEC Inc., Honolulu, HI. Pearl Harbor, HI: Commander, Navy Region Hawaii, Environmental Department, Code N45. September.
- . 2010. *Type 1 Letter Report – Re-Evaluation of the Tier 3 Risk Assessment/Groundwater Model & Proposed Course of Action Red Hill Bulk Fuels Storage Facility, Pearl Harbor, HI*. Prepared by TEC Inc. Prepared for Naval Fleet Engineering Service Center and Pearl Harbor Naval Base Fleet Industrial Supply Center. May 4.

- . 2014a. *Tank 5 Initial and Quarterly Release Response Reports, Red Hill Bulk Fuel Storage Facility, JBPHH, Oahu, Hawaii*. April 2014–December 2022. Prepared by Commander Navy Region Hawaii Environmental Department, Code N45, JBPHH HI.
- . 2014b. *Interim Update, Red Hill Bulk Fuel Storage Facility Final Groundwater Protection Plan, Pearl Harbor, Hawaii. (January 2008)*. Pearl Harbor, HI: Naval Facilities Engineering Command, Pacific. August.
- . 2015a. *Final Project Procedures Manual, U.S. Navy Environmental Restoration Program, NAVFAC Pacific*. JBPHH HI: Naval Facilities Engineering Command, Pacific. May.
- . 2015b. *Work Plan/Sampling and Analysis Plan, Long-Term Groundwater and Soil Vapor Monitoring, Red Hill Bulk Fuel Storage Facility, Joint Base Pearl Harbor-Hickam, Oahu, Hawaii*. Prepared by Element Environmental, LLC, Aiea, HI. JBPHH HI: Naval Facilities Engineering Command, Hawaii. September.
- . 2016. *Final Fourth Quarter 2016 - Quarterly Groundwater Monitoring Report, Red Hill Bulk Fuel Storage Facility, Joint Base Pearl Harbor-Hickam, Oahu, Hawaii*. December. Prepared by AECOM Technical Services, Inc., Honolulu, HI. JBPHH HI: Naval Facilities Engineering Command, Hawaii.
- . 2017a. *Work Plan/Scope of Work, Investigation and Remediation of Releases and Groundwater Protection and Evaluation, Red Hill Bulk Fuel Storage Facility, Joint Base Pearl Harbor-Hickam, O'ahu, Hawai'i; January 4, 2017, Revision 02*. Prepared by AECOM Technical Services, Inc., Honolulu, HI. Prepared for Defense Logistics Agency Energy, Fort Belvoir, VA, under Naval Facilities Engineering Command, Hawaii, JBPHH HI.
- . 2017b. *Sampling and Analysis Plan, Investigation and Remediation of Releases and Groundwater Protection and Evaluation, Red Hill Bulk Fuel Storage Facility, Joint Base Pearl Harbor-Hickam, O'ahu, Hawai'i; January 19, 2017, Revision 00*. Prepared by AECOM Technical Services, Inc., Honolulu, HI. Prepared for Defense Logistics Agency Energy, Fort Belvoir, VA, under Naval Facilities Engineering Command, Hawaii, JBPHH HI.
- . 2017c. *Sampling and Analysis Plan, Investigation and Remediation of Releases and Groundwater Protection and Evaluation, Red Hill Bulk Fuel Storage Facility, Joint Base Pearl Harbor-Hickam, O'ahu, Hawai'i; April 20, 2017, Revision 01*. Prepared by AECOM Technical Services, Inc., Honolulu, HI. Prepared for Defense Logistics Agency Energy, Fort Belvoir, VA, under Naval Facilities Engineering Command, Hawaii, JBPHH HI.
- . 2017d. *Sampling and Analysis Plan Addendum 01, Investigation and Remediation of Releases and Groundwater Protection and Evaluation, Red Hill Bulk Fuel Storage Facility, Joint Base Pearl Harbor-Hickam, O'ahu, Hawai'i; September 1, 2017, Revision 00*. Prepared by AECOM Technical Services, Inc., Honolulu, HI. Prepared for Defense Logistics Agency Energy, Fort Belvoir, VA, under Naval Facilities Engineering Command, Hawaii, JBPHH HI.
- . 2018a. *Final Third Quarter 2018 - Quarterly Groundwater Monitoring Report, Red Hill Bulk Fuel Storage Facility, Joint Base Pearl Harbor-Hickam, O'ahu, Hawai'i*. Prepared by AECOM Technical Services, Inc. JBPHH HI: Naval Facilities Engineering Command, Hawaii. November.
- . 2018b. *Final Fourth Quarter 2017 - Quarterly Groundwater Monitoring Report, Red Hill Bulk Fuel Storage Facility, Joint Base Pearl Harbor-Hickam, O'ahu, Hawai'i*. Prepared by AECOM Technical Services, Inc. JBPHH HI: Naval Facilities Engineering Command, Hawaii. January.

- . 2018c. *Well Elevation Survey Report, Red Hill Bulk Fuel Storage Facility, Joint Base Pearl Harbor-Hickam, O'ahu, Hawai'i; Revision 00*. Prepared by AECOM Technical Services, Inc., Honolulu, HI. Prepared for Defense Logistics Agency Energy, Fort Belvoir, VA, under Naval Facilities Engineering Command, Hawaii, JBPHH HI. January.
- . 2018d. *Seismic Profiling to Map Hydrostratigraphy in the Red Hill Area, Red Hill Bulk Fuel Storage Facility, Joint Base Pearl Harbor-Hickam, O'ahu, Hawai'i; March 30, 2018, Revision 00*. Prepared by Lee Liberty and James St. Claire, Boise State University, Boise, ID, for AECOM Technical Services, Inc., Honolulu, HI. Boise State University Technical Report BSU CGISS 18-01. Prepared for Defense Logistics Agency Energy, Fort Belvoir, VA, under Naval Facilities Engineering Command, Hawaii, JBPHH HI.
- . 2018e. *Well Elevation Surveys for Red Hill Monitoring Well RHMW11 and Navy 'Aiea Halawa Shaft 2255-032, Honolulu, O'ahu, Hawai'i*. Prepared by AECOM Technical Services, Inc., Honolulu, HI. Letter Report. Prepared for Naval Facilities Engineering Command, Hawaii, JBPHH HI. May 11.
- . 2018f. *Conceptual Site Model, Red Hill Bulk Fuel Storage Facility, Joint Base Pearl Harbor-Hickam, O'ahu, Hawai'i; July 27, 2018, Revision 00*. Prepared by AECOM Technical Services, Inc., Honolulu, HI. Prepared for Defense Logistics Agency Energy, Fort Belvoir, VA, under Naval Facilities Engineering Command, Hawaii, JBPHH HI.
- . 2018g. *Groundwater Protection and Evaluation Considerations for the Red Hill Bulk Fuel Storage Facility, Joint Base Pearl Harbor-Hickam, O'ahu, Hawai'i; July 27, 2018, Revision 00*. Prepared by AECOM Technical Services, Inc., Honolulu, HI. Prepared for Defense Logistics Agency Energy, Fort Belvoir, VA, under Naval Facilities Engineering Command, Hawaii, JBPHH HI.
- . 2019a. *Well Elevation Surveys for Red Hill Monitoring Well RHMW14 and Test Boring RHTB01, Honolulu, O'ahu, Hawai'i*. Prepared for: Defense Logistics Agency Energy, Fort Belvoir, VA. Prepared by: AECOM Technical Services, Inc., Honolulu, HI. Letter Report. Naval Facilities Engineering Command, Hawaii, JBPHH HI. June 7.
- . 2019b. *Conceptual Site Model, Investigation and Remediation of Releases and Groundwater Protection and Evaluation, Red Hill Bulk Fuel Storage Facility, Joint Base Pearl Harbor-Hickam, O'ahu, Hawai'i; June 30, 2019, Revision 01*. Prepared by AECOM Technical Services, Inc., Honolulu, HI. Prepared for Defense Logistics Agency Energy, Fort Belvoir, VA, under Naval Facilities Engineering Command, Hawaii, JBPHH HI.
- . 2019c. *Final Second Quarter 2019 - Quarterly Groundwater Monitoring Report, Red Hill Bulk Fuel Storage Facility, Joint Base Pearl Harbor-Hickam, O'ahu, Hawai'i*. Prepared by AECOM Technical Services, Inc. JBPHH HI: Naval Facilities Engineering Command, Hawaii. August.
- . 2020a. *Groundwater Flow Model Report, Red Hill Bulk Fuel Storage Facility, Joint Base Pearl Harbor-Hickam, O'ahu, Hawai'i; March 25, 2020, Revision 00*. Prepared by AECOM Technical Services, Inc., Honolulu, HI. Prepared for Defense Logistics Agency Energy, Fort Belvoir, VA, under Naval Facilities Engineering Command, Hawaii, JBPHH HI.
- . 2020b. *Investigation and Remediation of Releases Report, Red Hill Bulk Fuel Storage Facility, Joint Base Pearl Harbor-Hickam, O'ahu, Hawai'i; March 25, 2020, Revision 00*. Prepared by AECOM Technical Services, Inc., Honolulu, HI. Prepared for Defense Logistics Agency Energy, Fort Belvoir, VA, under Naval Facilities Engineering Command, Hawaii, JBPHH HI.

- . 2020c. *Evaluation of Chromatograms for Understanding TPH Detections in Monitoring Wells, Red Hill Bulk Fuel Storage Facility, Joint Base Pearl Harbor-Hickam, O‘ahu, Hawai‘i*. Prepared by AECOM Technical Services, Inc. JBPHH HI: Naval Facilities Engineering Command, Hawaii. Final, September.
- . 2021a. *Final Fourth Quarter 2020 - Quarterly Groundwater Monitoring Report Red Hill Bulk Fuel Storage Facility Joint Base Pearl Harbor-Hickam, O‘ahu, Hawai‘i*. Naval Facilities Engineering Systems Command, Hawaii. February.
- . 2021b. *Initial Site Characterization Report, Red Hill Bulk Fuel Storage Facility, JBPHH O‘ahu Hawai‘i*. JBPHH HI: Commander, Navy Region Hawaii. August.
- . 2021c. *Initial Release Response Report, Pipeline Breach in Tunnel Red Hill Bulk Fuel Storage Facility JBPHH O‘ahu Hawai‘i*. Prepared by AECOM Technical Services, Inc. JBPHH HI: Naval Facilities Engineering Systems Command, Hawaii. September.
- . 2021d. *Subject: Red Hill Bulk Fuel Storage Facility Request for Information – Addendum, DOH Facility ID No. 9-102271, DOH Release ID No. 210012*. Letter from: J. G. Meyer, Navy Region Hawaii; to: Roxanne Kwan, Hawaii DOH Solid and Hazardous Waste Branch. 5090, SerN45/053. October 1.
- . 2021e. *Quarterly Release Response Report, Pipeline Breach in Tunnel Red Hill Bulk Fuel Storage Facility JBPHH, O‘ahu, Hawai‘i*. Prepared by AECOM Technical Services, Inc. JBPHH HI: Naval Facilities Engineering Systems Command, Hawaii. December.
- . 2022a. *Preliminary Site Characterization Plan, November 2021 Release, U.S. Navy Well 2254-01, JBPHH, O‘ahu, Hawai‘i*. Prepared by AECOM Technical Services, Inc. JBPHH HI: Naval Facilities Engineering Systems Command, Hawaii. January.
- . 2022b. *Technical Memorandum, Holding Tank and Leach Tank Characterization, November 2021 Pipeline Release, Red Hill Bulk Fuel Storage Facility JBPHH, O‘ahu, Hawai‘i February 2022*. Prepared for NAVFAC Hawaii by AECOM Technical Services, Inc. DOH Facility ID No. 9-102271; DOH Release ID No 20211120_2330. JBPHH HI: Naval Facilities Engineering Systems Command, Hawaii. February.
- . 2022c. *Initial Release Response Report, Fire Suppression Drain Line, Red Hill Bulk Fuel Storage Facility JBPHH, O‘ahu, Hawai‘i*. Prepared for NAVFAC Hawaii by AECOM Technical Services, Inc. DOH Facility ID No. 9-102271; DOH HEER Incident Release Case No. 20211120-2330. JBPHH HI: Naval Facilities Engineering Systems Command, Hawaii. Revised March 7.
- . 2022d. *Quarterly Release Response Report, May 6 and November 20, 2021 Releases, Red Hill Bulk Fuel Storage Facility, JBPHH, O‘ahu, Hawai‘i*. Prepared for NAVFAC Hawaii by AECOM Technical Services, Inc. DOH Facility ID No. 9-102271; DOH UST Release ID No. 210012; DOH HEER Release Incident Case Nos. 20210507-0852, 20211120-2330. JBPHH HI: Naval Facilities Engineering Systems Command, Hawaii. April 6.
- . 2022e. *Site Characterization Plan Adit 3 LNAPL Step-Out Addendum November 2021 Release, U.S. Navy Well 2254-01 Red Hill Bulk Fuel Storage Facility Joint Base Pearl Harbor-Hickam Oahu HI*. Prepared by AECOM Technical Services, Inc. JBPHH HI: Naval Facilities Engineering Systems Command, Hawaii. July.

- . 2022f. *Quarterly Release Response Report, May 6 and November 20, 2021 Releases, Red Hill Bulk Fuel Storage Facility, JBPHH, O‘ahu, Hawai‘i*. Prepared for NAVFAC Hawaii by AECOM Technical Services, Inc. DOH Facility ID No. 9-102271; DOH UST Release ID No. 210012; DOH HEER Release Incident Case Nos. 20210507-0852, 20211120-2330. JBPHH HI: Naval Facilities Engineering Systems Command, Hawaii. July 7.
- . 2022g. *Findings from ROV Inspection #2 Video Review of Red Hill Water Development Tunnel, Red Hill Bulk Fuel Storage Facility, Joint Base Pearl Harbor-Hickam, O‘ahu, Hawai‘i*. JBPHH HI: Naval Facilities Engineering Command, Hawaii. August.
- . 2022h. *Quarterly Release Response Report, May 6 and November 20, 2021 Releases, Red Hill Bulk Fuel Storage Facility, JBPHH, O‘ahu, Hawai‘i*. Prepared for NAVFAC Hawaii by AECOM Technical Services, Inc. DOH Facility ID No. 9-102271; DOH UST Release ID No. 210012; DOH HEER Release Incident Case Nos. 20210507-0852, 20211120-2330. JBPHH HI: Naval Facilities Engineering Systems Command, Hawaii. October 3.
- . 2022i. *Draft Final Technical Memorandum, Phase 2 Holding Tank and Leach Tank Characterization, November 2021 Pipeline Release, Red Hill Bulk Fuel Storage Facility JBPHH, O‘ahu, Hawai‘i*. Prepared for NAVFAC Hawaii by AECOM Technical Services, Inc. DOH Facility ID No. 9-102271; DOH Release ID No 20211120_2330. JBPHH HI: Naval Facilities Engineering Systems Command, Hawaii. November 22.
- . 2022j. *Quarterly Release Response Report, Red Hill Bulk Fuel Storage Facility, JBPHH, O‘ahu, Hawai‘i*. Prepared for NAVFAC Hawaii by AECOM Technical Services, Inc. DOH Facility ID No. 9-102271; DOH UST Release ID Nos. 140010, 210012; DOH HEER Release Incident Case Nos. 20210507-0852, 20211120-2330. JBPHH HI: Naval Facilities Engineering Systems Command, Hawaii. December 21.
- . 2023a. *Draft Shallow Soil Vapor Extraction and Air Sparging Work Plan Red Hill Drinking Water Shaft Joint Base Pearl Harbor-Hickam Oahu HI*. Prepared by AECOM Technical Services, Inc. JBPHH HI: Naval Facilities Engineering Systems Command, Pacific. January.
- . 2023b. *Draft Deep Soil Vapor Extraction Pilot Study Work Plan Red Hill Bulk Fuel Storage Facility Joint Base Pearl Harbor-Hickam O‘ahu HI*. Prepared by AECOM Technical Services, Inc. JBPHH HI: Naval Facilities Engineering Systems Command, Pacific. February.
- . 2023c. *Draft Natural Source-Zone Depletion Work Plan Red Hill Bulk Fuel Storage Facility Joint Base Pearl Harbor-Hickam O‘ahu HI*. Prepared by AECOM Technical Services, Inc. JBPHH HI: Naval Facilities Engineering Systems Command, Pacific. February.
- . 2023d. *Technical Memorandum: In-Progress Data Report, Adit 3 Site Characterization, Red Hill Bulk Fuel Storage Facility, Joint Base Pearl Harbor-Hickam, Oahu, Hawaii. February 23, 2023*. JBPHH HI: Navy Facilities and Engineering Command, Hawaii.
- . 2023e. *Quarterly Release Response Report, Red Hill Bulk Fuel Storage Facility, JBPHH, O‘ahu, Hawai‘i*. Prepared for NAVFAC Hawaii by AECOM Technical Services, Inc. DOH Facility ID No. 9-102271; DOH UST Release ID Nos. 140010, 210012; DOH HEER Release Incident Case Nos. 20210507-0852, 20211120-2330. JBPHH HI: Naval Facilities Engineering Systems Command, Hawaii. March 22.

- . 2023f. *Site Characterization Report, November 2021 JP-5 Release in Adit 3, Operable Unit 1, Red Hill Bulk Fuel Storage Facility, JBPHH, O’ahu, Hawai’i*. Working Draft. JBPHH HI: Naval Facilities Engineering Systems Command, Hawaii. March.
- . 2023g. *Consolidation and Optimization of the Groundwater Sampling Programs, Red Hill Bulk Fuel Storage Facility, Joint Base Pearl Harbor-Hickam, O’ahu, Hawai’i*. Enclosure 1 to May 18 Letter 5090, Ser N4/143 from: C. J. Geertsema, by Direction of Commander, Navy Region Hawaii; to Red Hill Project Coordinators G. Scavello, U.S. Environmental Protection Agency, Region 9. and K. A. Lee, State of Hawai’i Department of Health. JBPHH HI: Naval Facilities Engineering Systems Command, Hawaii, May.
- . 2023h. *Final Closure Report, Concrete Tank Removal, Red Hill Bulk Fuel Storage Facility, Joint Base Pearl Harbor-Hickam, Oahu, Hawaii*. Prepared for Naval Facilities Engineering Systems Command Pacific by: Cape Environmental Management Inc, Honolulu, Hawaii. June.
- . 2023i. *Quarterly Release Response Report, Red Hill Bulk Fuel Storage Facility, JBPHH, O’ahu, Hawai’i*. Prepared for NAVFAC Hawaii by AECOM Technical Services, Inc. DOH Facility ID No. 9-102271; DOH UST Release ID Nos. 140010, 210012; DOH HEER Release Incident Case Nos. 20210507-0852, 20211120-2330. JBPHH HI: Naval Facilities Engineering Systems Command, Hawaii. June 20.
- . 2023j. *Final Technical Memorandum, Phase 2 Holding Tank and Leach Tank Characterization, November 2021 Pipeline Release, Red Hill Bulk Fuel Storage Facility JBPHH, O’ahu, Hawai’i*. Prepared for NAVFAC Hawaii by AECOM Technical Services, Inc. DOH Facility ID No. 9-102271; DOH Release ID No 20211120_2330. JBPHH HI: Naval Facilities Engineering Systems Command, Hawaii. July 13.
- . 2023k. *Quarterly Release Response Report, Red Hill Bulk Fuel Storage Facility, JBPHH, O’ahu, Hawai’i*. Prepared for NAVFAC Hawaii by AECOM Technical Services, Inc. DOH Facility ID No. 9-102271; DOH UST Release ID Nos. 140010, 210012; DOH HEER Release Incident Case Nos. 20210507-0852, 20211120-2330. JBPHH HI: Naval Facilities Engineering Systems Command, Hawaii. September 18.
- . 2023l. *Final Report of Findings, Red Hill Shaft Flow Optimization Study, September 19, 2023*. Prepared for NAVFAC Hawaii by AECOM Technical Services Inc. Naval Facilities Engineering Systems Command Hawaii.
- . 2023m. *Groundwater Protection Plan Update – Defueling Revision, Red Hill Bulk Fuel Storage Facility, Joint Base Pearl Harbor-Hickam, O’ahu, HI*. Pearl Harbor, HI: Naval Facilities Engineering Command, Pacific. September 20.
- . 2023n. *Final Third Quarter 2023 - Quarterly Groundwater Monitoring Report, Red Hill Bulk Fuel Storage Facility, Joint Base Pearl Harbor-Hickam, O’ahu, HI*. Prepared by AECOM Technical Services, Inc. JBPHH HI: Naval Facilities Engineering Systems Command, Hawaii. December 11.
- . 2023o. *Quarterly Release Response Report, Red Hill Bulk Fuel Storage Facility, JBPHH, O’ahu, Hawai’i*. Prepared for NAVFAC Hawaii by AECOM Technical Services, Inc. DOH Facility ID No. 9-102271; DOH UST Release ID Nos. 140010, 210012; DOH HEER Release Incident Case Nos. 20210507-0852, 20211120-2330. JBPHH HI: Naval Facilities Engineering Systems Command, Hawaii. December 11.

- . 2024a. *Monitoring Well Installation Work Plan, Red Hill Bulk Fuel Storage Facility, Joint Base Pearl Harbor-Hickam, O‘ahu, Hawai‘i. January 31.*
- . 2024b. *Site Characterization Plan Addendum, Collection, Holding, and Transfer Tank Overflow Site Characterization, November 2021 Release, Red Hill Bulk Fuel Storage Facility Joint Base Pearl Harbor-Hickam, O‘ahu, Hawai‘i.* Naval Facilities Engineering Systems Command Hawaii. March.
- . 2024c. *Quarterly Release Response Report, Red Hill Bulk Fuel Storage Facility, JBPHH, O‘ahu, Hawai‘i.* Prepared for NAVFAC Hawaii by AECOM Technical Services, Inc. JBPHH HI: Naval Facilities Engineering Systems Command, Hawaii. March 15.
- . 2024d. *Groundwater Protection Plan Defueling Summary Report, Red Hill Bulk Fuel Storage Facility, Joint Base Pearl Harbor-Hickam O‘ahu Hawai‘i.* Naval Facilities Engineering Command, Hawaii. April 17.
- Environmental Protection Agency, United States, Region 9; and Department of Health, State of Hawaii (EPA Region 9 and DOH). 2015. *Administrative Order on Consent In the Matter of Red Hill Bulk Fuel Storage Facility, EPA Docket No: RCRA 7003-R9-2015-01; DOH Docket No: 15-UST-EA-01.* September.
- . 2016. *Final Scoping for AOC SOW Sections 6 and 7, and Navy’s Proposed Chemical of Potential Concern (COPC) Recommendations.* Letter from: Bob Pallarino, EPA Red Hill Project Coordinator, and Steven Chang, Hawaii DOH Red Hill Project Coordinator, to: James A. K. Miyamoto, Naval Facilities Engineering Command, Hawaii, Joint Base Pearl Harbor-Hickam. February 4.
- . 2017a. *Split Sampling Results from First Quarter 2017.* Letter from: Bob Pallarino, EPA Region 9 Project Coordinator, and Steven Chang, Hawaii DOH Project Coordinator, to: Mark Manfredi, Red Hill Project Coordinator, Naval Facilities Hawaii. September 12.
- . 2017b. “Split Sampling Results from Fourth Quarter 2017.” Red Hill Technical Documents 2017. October 2017.
- Giambelluca, T. W., M. A. Nullet, and T. A. Schroeder. 1986. *Rainfall Atlas of Hawaii.* Report R76. Honolulu, HI: Department of Land and Natural Resources, Division of Water and Land Development. June.
- Hunt Jr., C. D. 1996. *Geohydrology of the Island of Oahu, Hawaii.* Professional Paper 1412-B. Regional Aquifer-System Analysis—Oahu, Hawaii. U.S. Geological Survey.
- Interagency Drinking Water System Team (IDWST). 2022. *Red Hill Shaft Recovery and Monitoring Plan (RHSRMP), JBPHH, O‘ahu, Hawai‘i.* Navy, Army, State of Hawaii Department of Health, and United States Environmental Protection Agency. January.
- Izuka, S. K. 1992. *Geology and Stream Infiltration of North Halawa Valley, Oahu, Hawaii.* Prepared in cooperation with the State of Hawaii Department of Transportation. Honolulu, HI. Water-Resources Investigations Report 91-4197. U.S. Geological Survey.
- Izuka, S. K., J. A. Engott, K. Rotzoll, M. Bassiouni, A. G. Johnson, L. D. Miller, and A. Mair. 2018. *Volcanic Aquifers of Hawai‘i—Hydrogeology, Water Budgets, and Conceptual Models.* Ver. 2.0, March 2018. Scientific Investigations Report 2015–5164. Water Availability and Use Science Program. U.S. Geological Survey.

- Izuka, S. K., and K. Rotzoll. 2023. *Volcanic Aquifers of Hawai‘i—Contributions to Assessing Groundwater Availability on Kaua‘i, O‘ahu, and Maui*. Professional Paper 1876. U.S. Geological Survey. <https://doi.org/10.3133/pp1876>.
- Juvik, S. P., and J. O. Juvik, eds. 1998. *Atlas of Hawaii*. Honolulu, HI: University of Hawaii Press.
- Macdonald, G. A., A. T. Abbott, and F. L. Peterson. 1983. *Volcanoes in the Sea: The Geology of Hawaii*. 2nd ed. Honolulu, HI: University of Hawaii Press.
- United States Department of Agriculture, Soil Conservation Service (USDA SCS). 1972. *Soil Survey of Islands of Kauai, Oahu, Maui, Molokai, and Lanai, State of Hawaii*. In cooperation with the University of Hawaii Agricultural Experiment Station. Washington, DC. August. <https://www.nrcs.usda.gov/wps/portal/nrcs/surveylist/soils/survey/state/?stateId=HI>.
- Wentworth, C. K., and G. A. Macdonald. 1953. *Structures and Forms of Basaltic Rocks in Hawaii*. Geological Survey Bulletin 994. U.S. Geological Survey.

This page intentionally left blank

Appendix A – Soil Vapor Monitoring Results, Current Reporting Period

Appendix A.1 – Soil Vapor PID Concentrations

Appendix A.2 – Soil Vapor Chromatograms

Appendix A.1 – Soil Vapor PID Concentrations

RHS Tank Soil Vapor Monitoring
 Notice of Interest 20210507-0852 (6 May 2021 Event)
 Notice of Interest 20211120-2330 (20 Nov 2021 Event)
 Monthly Tank Soil Vapor Monitoring
 Weekly Tank Soil Vapor Monitoring

Appendix A.1: Average Soil Vapor PID Concentration Readings at Tanks 2-18 and 20 (ppbv)

Date	SV02 S	SV02 M	SV02 D	SV03 S	SV03 M	SV03 D	SV04 S	SV04 M	SV04 D	SV05 S	SV05 M	SV05 D	SV06 S	SV06 M	SV07 S	SV07 M	SV07 D	SV08 S	SV08 M	SV08 D	SV09 S	SV09 M	SV09 D	SV10 S	SV10 M/D	SV11 S	SV11 M/D	SV12 S	SV12 M	SV12 D	SV13 S	SV13 M	SV13 D	SV14 S	SV14 M	SV14 D	SV15 S	SV15 M	SV15 D	SV16 S	SV16 M	SV16 D	SV17 S	SV17 M	SV17 D	SV18 S	SV18 D	SV20 S	SV20 M	SV20 D
1/9/2024	275	209	188	229	217	261	220	190	174	464	709	1861	439	4729	463	350	343	377	321	293	307	280	272	306	287	275	249	289	277	251	420	350	372	377	352	341	346	NC2	409	350	380	390	393	346	350	1151	871	493	547	469
1/12/2024	38	33	20	194	251	170	172	293	328	2102	1096	650	3485	1233	410	418	539	350	378	390	336	346	358	341	354	355	391	453	430	426	397	385	540	529	551	557	411	NC2	400	407	399	444	408	414	452	1115	1566	621	638	614
1/16/2024	0	0	0	0	0	5	0	0	10	2071	625	174	4567	809	174	151	248	180	286	378	175	223	576	200	176	216	183	232	191	191	257	236	296	250	254	235	240	NC2	242	977	521	369	201	239	236	598	1240	314	334	401
1/19/2024	0	19	16	142	144	148	108	129	131	2638	488	443	5738	1083	396	273	524	190	178	233	161	205	190	279	302	NC1	NC1	NC1	NC1	239	407	460	432	511	479	541	NC2	516	495	423	433	351	411	418	777	1108	481	573	511	
1/23/2024	9	0	0	115	155	122	82	54	80	1947	3217	1071	4255	1204	301	362	251	168	199	261	284	415	296	236	269	204	177	231	233	254	151	171	181	202	214	231	152	NC2	159	NC	178	183	153	173	209	1065	1248	259	492	364
1/30/2024	0	0	0	0	0	0	0	0	0	1243	648	272	5011	185	65	94	101	118	95	124	0	0	31	0	0	23	5	314	86	10	39	35	55	110	63	59	7	NC2	15	NC	24	0	8	12	0	715	796	152	176	197
2/6/2024	2	1	0	28	2	0	528	139	8	1262	823	385	4750	235	4	1	0	1	0	1	0	0	6	1	0	0	1	0	1	0	2	0	2	1	2	NC2	0	NC	0	0	285	112	23	3111	3508	9	70	82		
2/13/2024	0	0	0	0	0	1	0	0	0	872	862	275	4847	434	94	119	197	15	89	148	0	0	0	0	0	0	0	0	62	123	0	28	63	NC1	NC1	NC1	28	NC2	53	NC	82	94	27	0	26	637	3115	202	240	186
2/20/2024	36	32	45	139	144	67	63	106	108	1327	2403	1163	6141	1332	200	268	326	283	261	279	154	160	153	235	220	236	215	216	158	130	331	281	326	222	236	281	345	NC2	334	NC	317	340	256	231	217	654	1606	252	193	309
2/27/2024	0	0	0	0	0	0	0	0	0	706	1119	179	4582	822	0	0	100	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	12	NC2	0	NC	33	0	449	268	182	8637	6737	115	218	216
3/5/2024	37	3	0	0	0	0	0	0	0	593	745	368	812	838	109	147	231	80	251	292	215	183	164	81	145	223	254	208	181	196	203	220	236	138	256	196	232	NC2	224	NC	222	136	488	532	610	1178	2391	352	405	638
3/12/2024	0	0	0	0	0	0	0	0	0	388	418	316	4303	334	2192	129	383	0	0	57	0	0	0	0	0	20	0	22	0	11	0	0	72	24	13	28	0	NC2	0	NC	0	0	100	144	97	734	1679	350	536	362
3/19/2024	0	0	3	1	0	0	0	0	0	651	551	299	2011	574	7	97	158	0	9	6	50	0	0	0	0	27	0	25	39	39	0	0	1	48	54	0	0	NC2	0	NC	38	19	152	116	246	745	1576	187	208	379
3/26/2024	0	0	0	0	0	0	0	23	30	513	1182	140	2849	191	23	177	164	17	22	111	7	11	5	0	0	0	18	40	31	36	31	104	48	39	91	0	NC2	21	NC	71	0	0	81	66	286	566	63	143	109	
4/2/2024	0	0	0	0	0	0	0	0	0	793	681	7	2581	644	148	177	261	122	151	204	88	74	73	0	137	0	10	6	10	0	11	22	50	14	0	0	15	NC2	15	NC	0	7	207	160	111	569	840	126	243	182

Notes:
 Soil vapor concentration readings are reported in parts per billion by volume (ppbv).
 * - SVMP-10M/D, SVMP-11M/D - "M/D" monitoring points were constructed to screen both middle & deep depth intervals along the respective underground storage tank.

Legend:
 NC - Not collected
 NC1 - Not collected due to tank maintenance
 NC2 - Not collected due to obstruction in vapor line
 ppbv - parts per billion by volume
 SVMP - soil vapor monitoring point

RHS Tank Soil Vapor Monitoring
 Notice of Interest 20210507-0852 (6 May 2021 Event)
 Notice of Interest 20211120-2330 (20 Nov 2021 Event)
 Monthly Tank Soil Vapor Monitoring
 Weekly Tank Soil Vapor Monitoring

Appendix A.1: Background Tunnel Air Soil Vapor PID Concentration Readings (ppbv)

Date	Tank 2	Tank 3	Tank 4	Tank 5	Tank 6	Tank 7	Tank 8	Tank 9	Tank 10	Tank 11	Tank 12	Tank 13	Tank 14	Tank 15	Tank 16	Tank 17	Tank 18	Tank 20
1/9/2024	238	277	251	259	325	414	380	352	363	303	348	404	381	402	450	479	873	616
1/12/2024	283	448	470	458	564	577	540	503	448	497	488	416	551	482	375	650	765	845
1/16/2024	103	105	182	459	440	598	569	649	720	683	649	637	420	612	1487	508	643	565
1/19/2024	100	216	227	288	280	319	272	310	293	NC1	NC1	468	507	618	405	516	710	604
1/23/2024	1733	2204	2787	2281	2165	1633	1695	2568	1908	401	394	224	262	252	273	350	464	415
1/30/2024	938	760	1081	715	713	631	1343	412	538	190	210	228	207	210	198	255	409	384
2/6/2024	52	160	553	101	74	16	31	23	18	0	6	13	68	31	10	1052	1449	501
2/13/2024	0	18	0	261	0	173	165	137	140	81	68	102	NC1	145	118	233	237	328
2/20/2024	238	242	172	652	230	372	436	340	312	342	306	443	402	475	439	771	684	645
2/27/2024	0	0	0	196	0	61	43	5	21	25	10	62	37	79	111	1048	1835	464
3/5/2024	237	78	69	328	86	213	210	320	208	434	422	479	358	564	417	1641	788	1676
3/12/2024	0	0	0	0	0	110	65	12	35	125	111	141	107	85	84	315	326	583
3/19/2024	9	50	108	95	111	201	144	60	70	118	154	101	163	145	131	501	3017	503
3/26/2024	12	15	65	192	121	145	134	21	33	72	110	122	145	128	192	235	301	276
4/2/2024	81	63	76	135	32	16	0	259	57	104	107	170	81	109	120	406	541	372

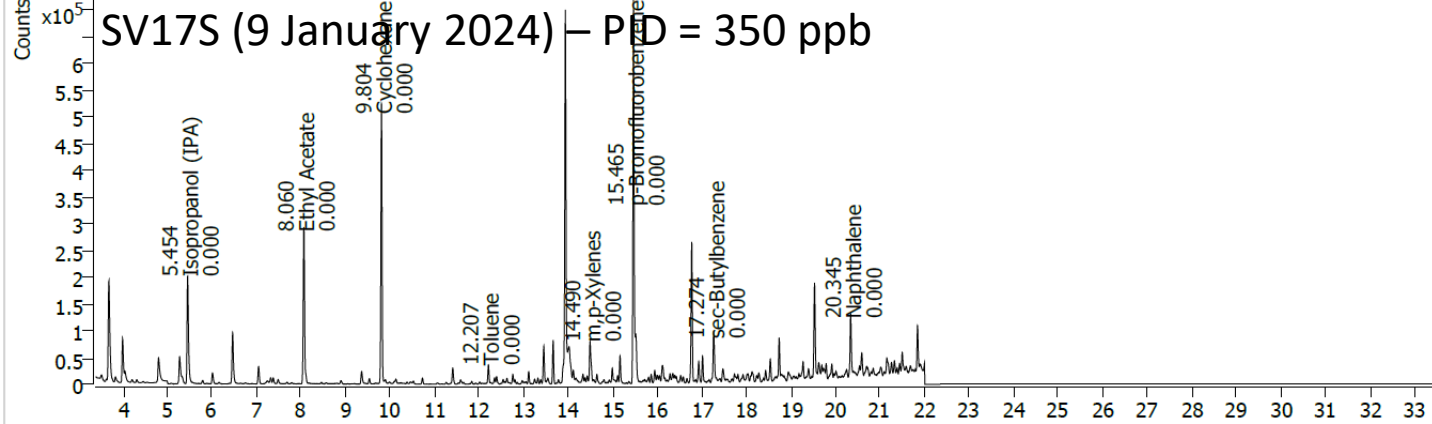
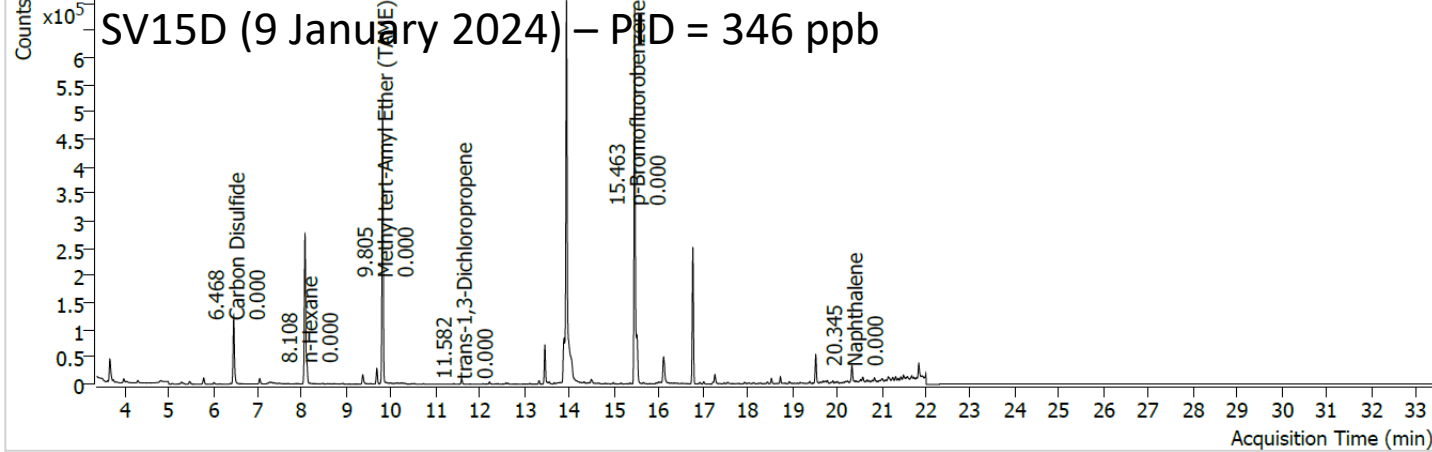
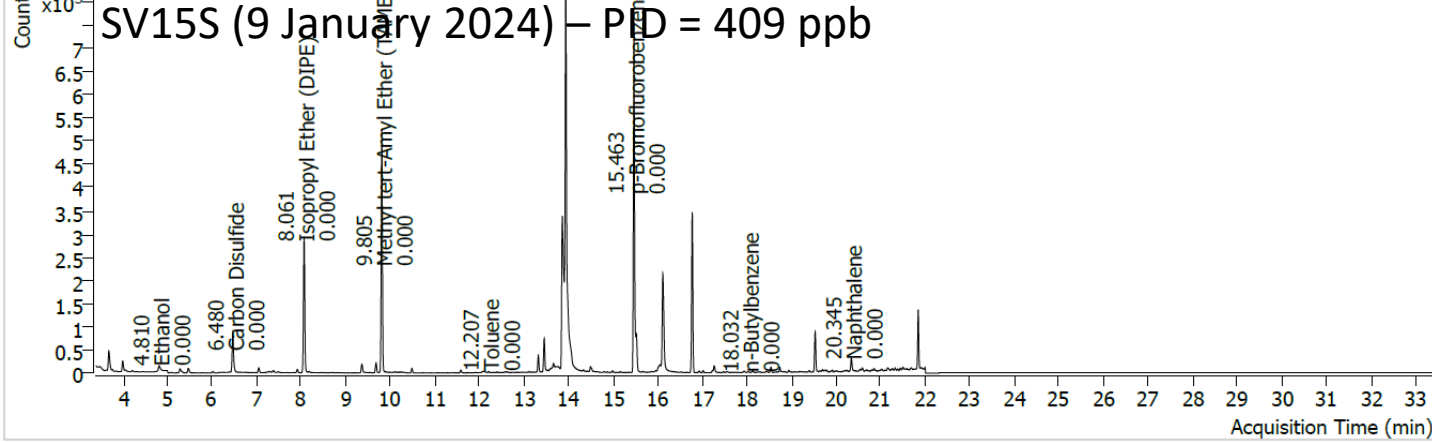
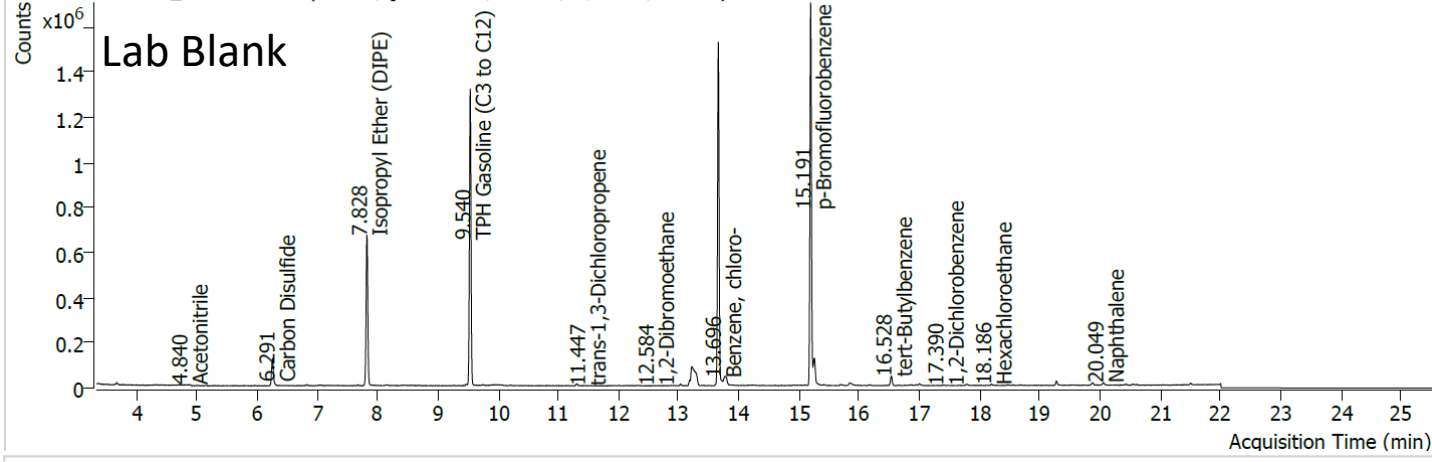
Notes:
 Soil vapor concentration readings are reported in parts per billion by volume (ppbv).
 Tank readings are background ambient air conditions.

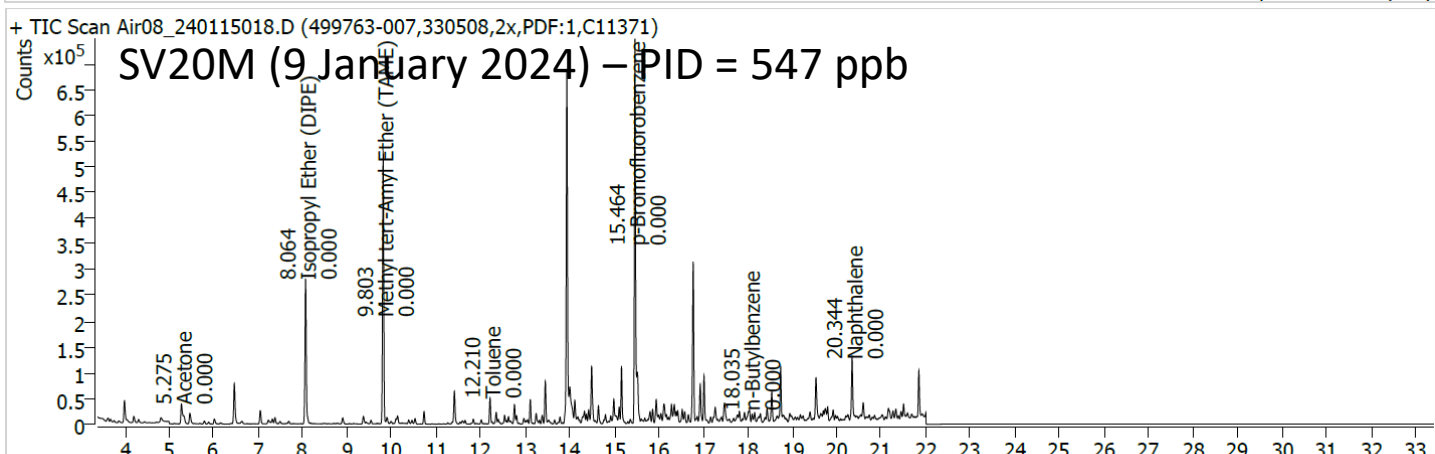
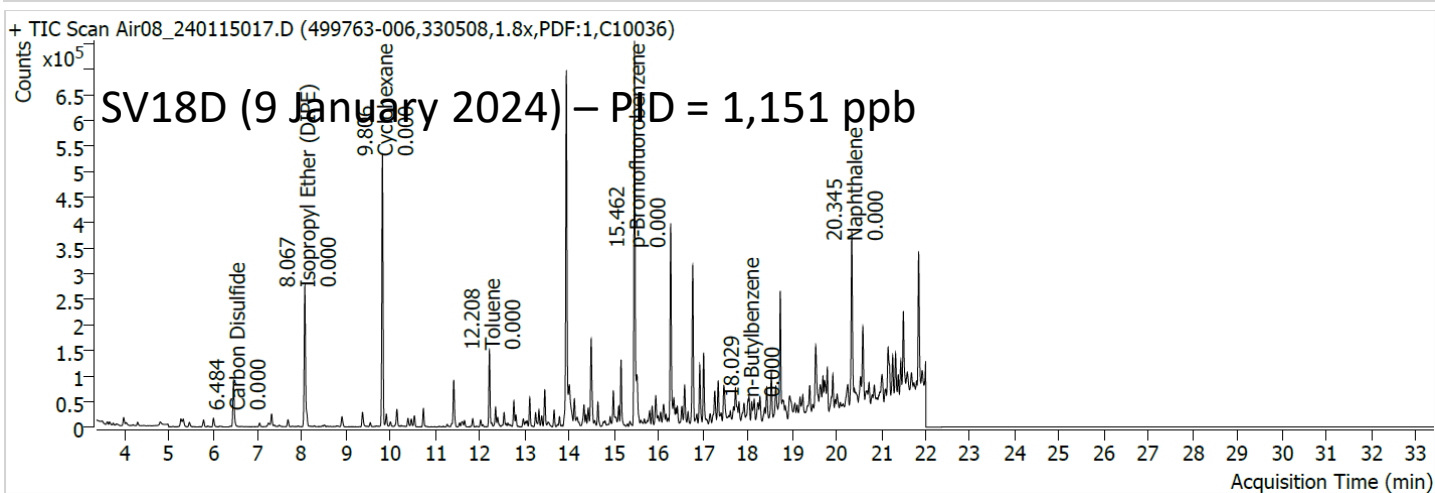
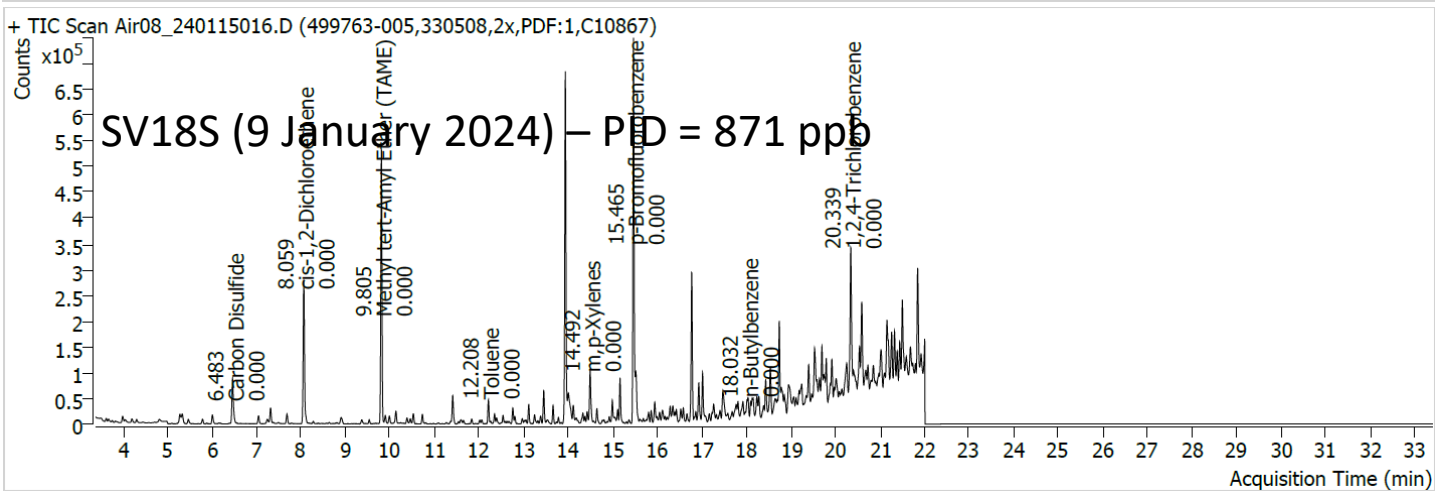
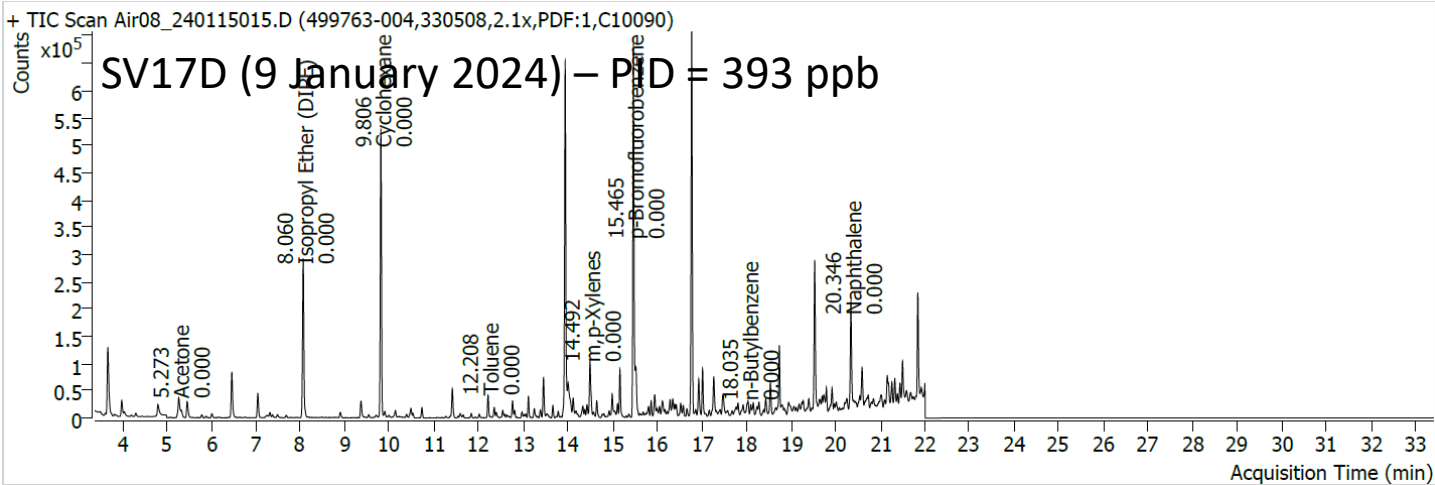
Legend:
 NC - Not collected
 ppbv - parts per billion by volume

Appendix A.2 – Soil Vapor Chromatograms

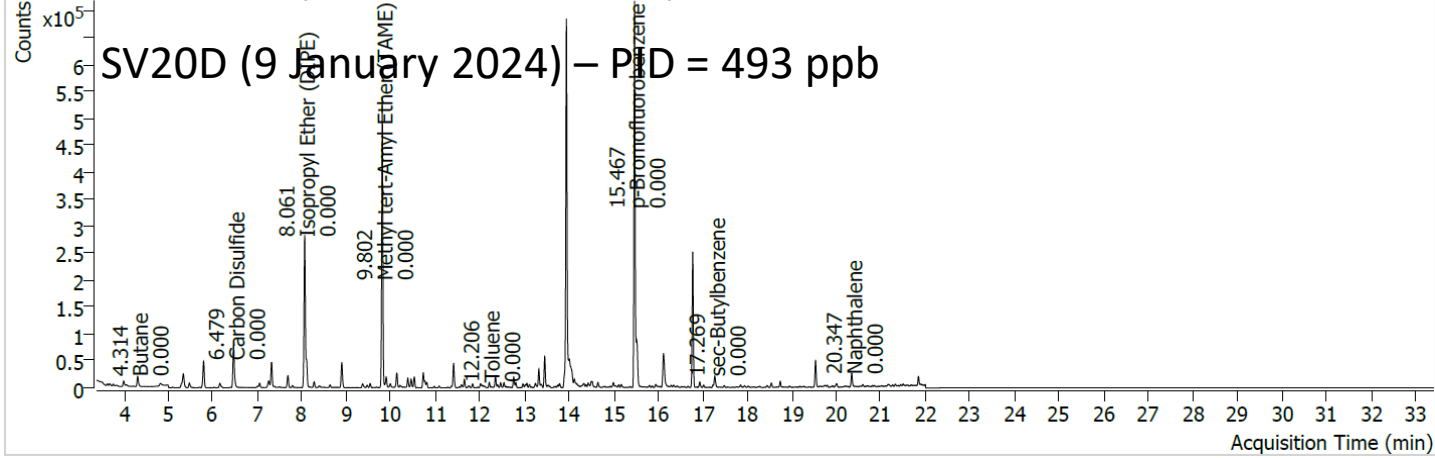
January 2024
Soil Vapor Samples

Mass Spec Chromatograms

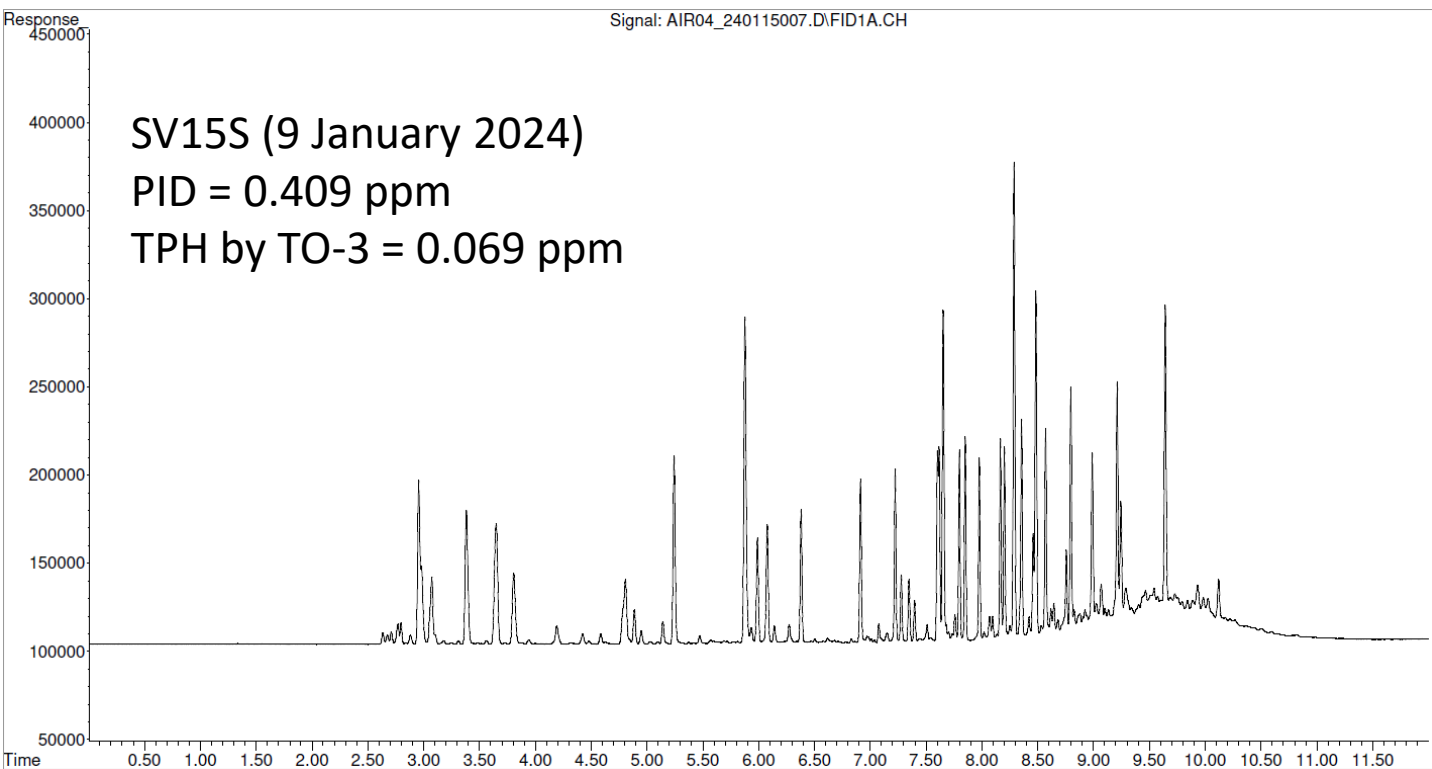
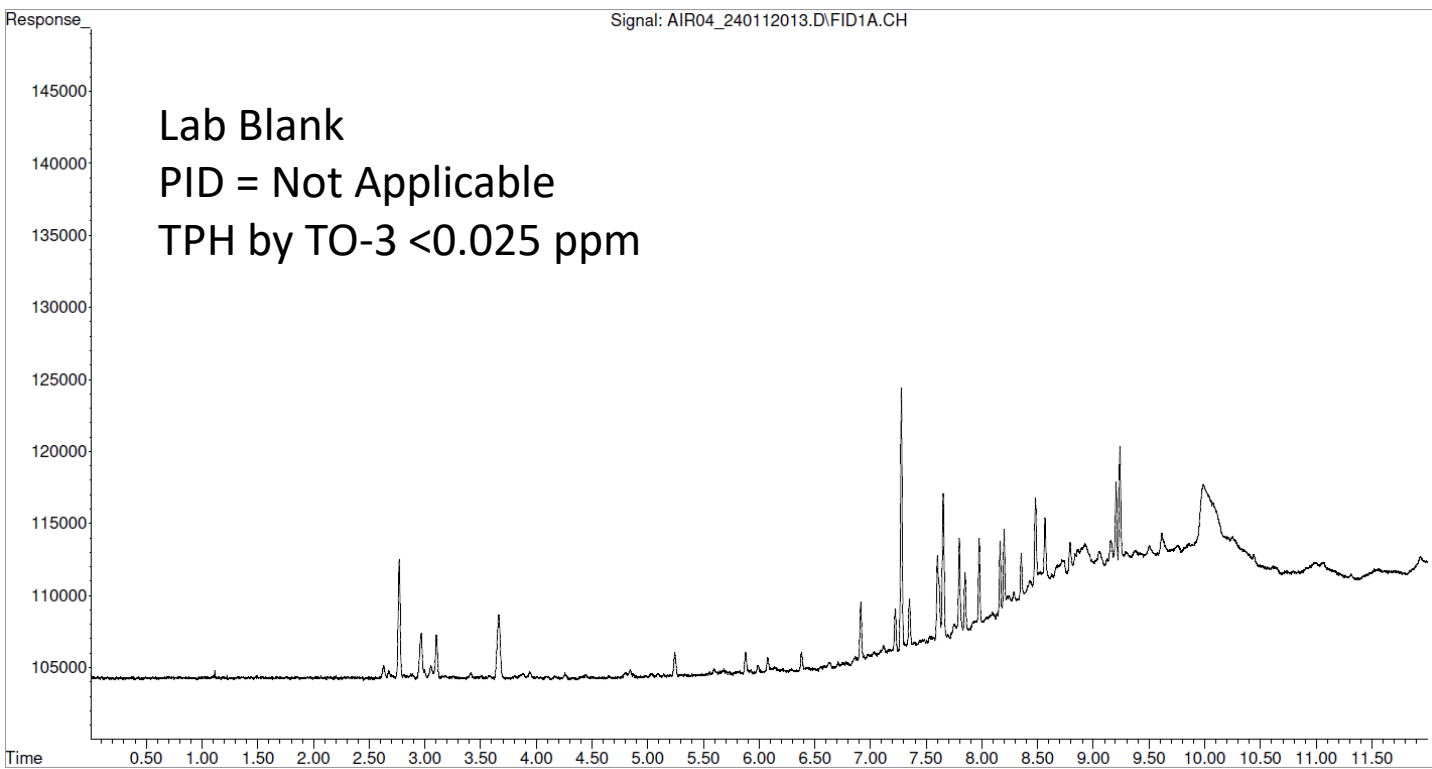


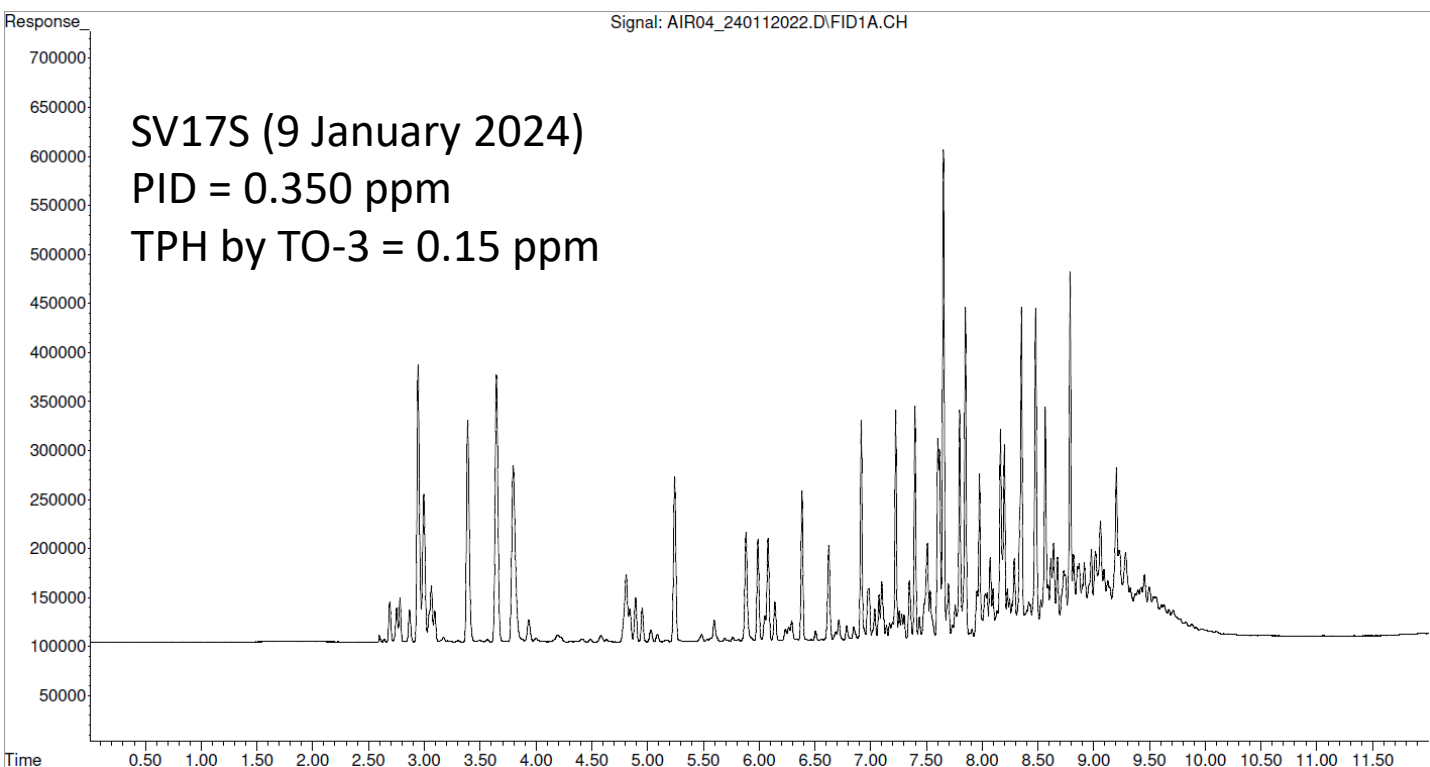
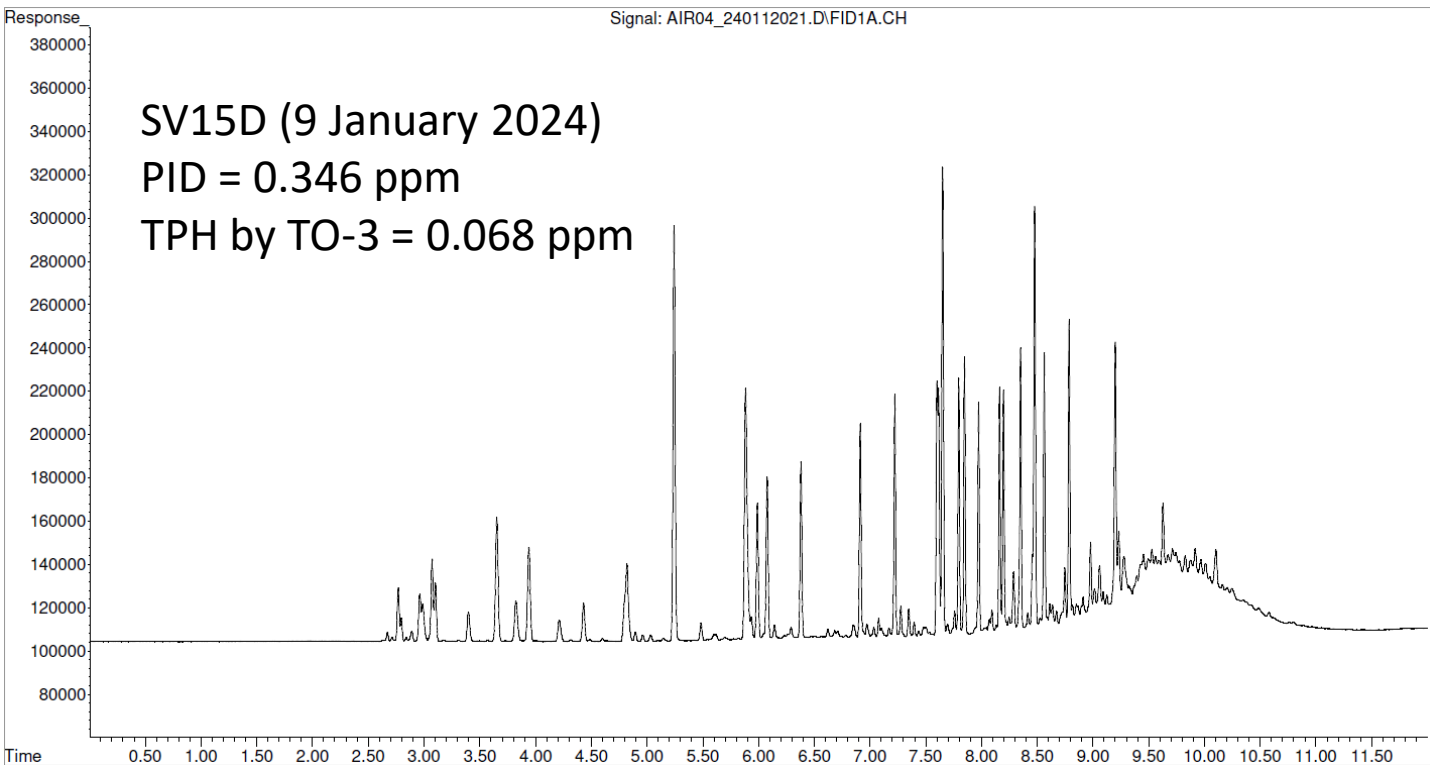


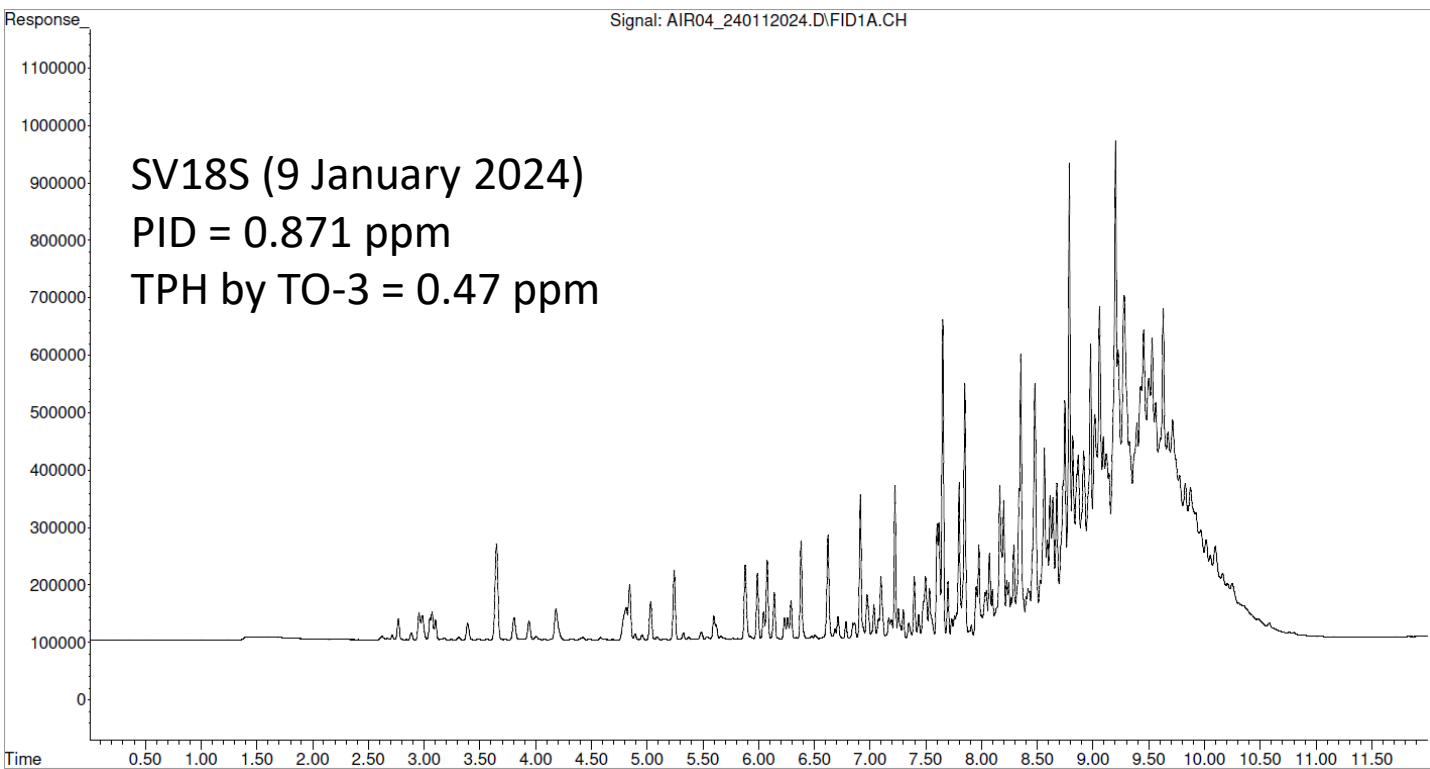
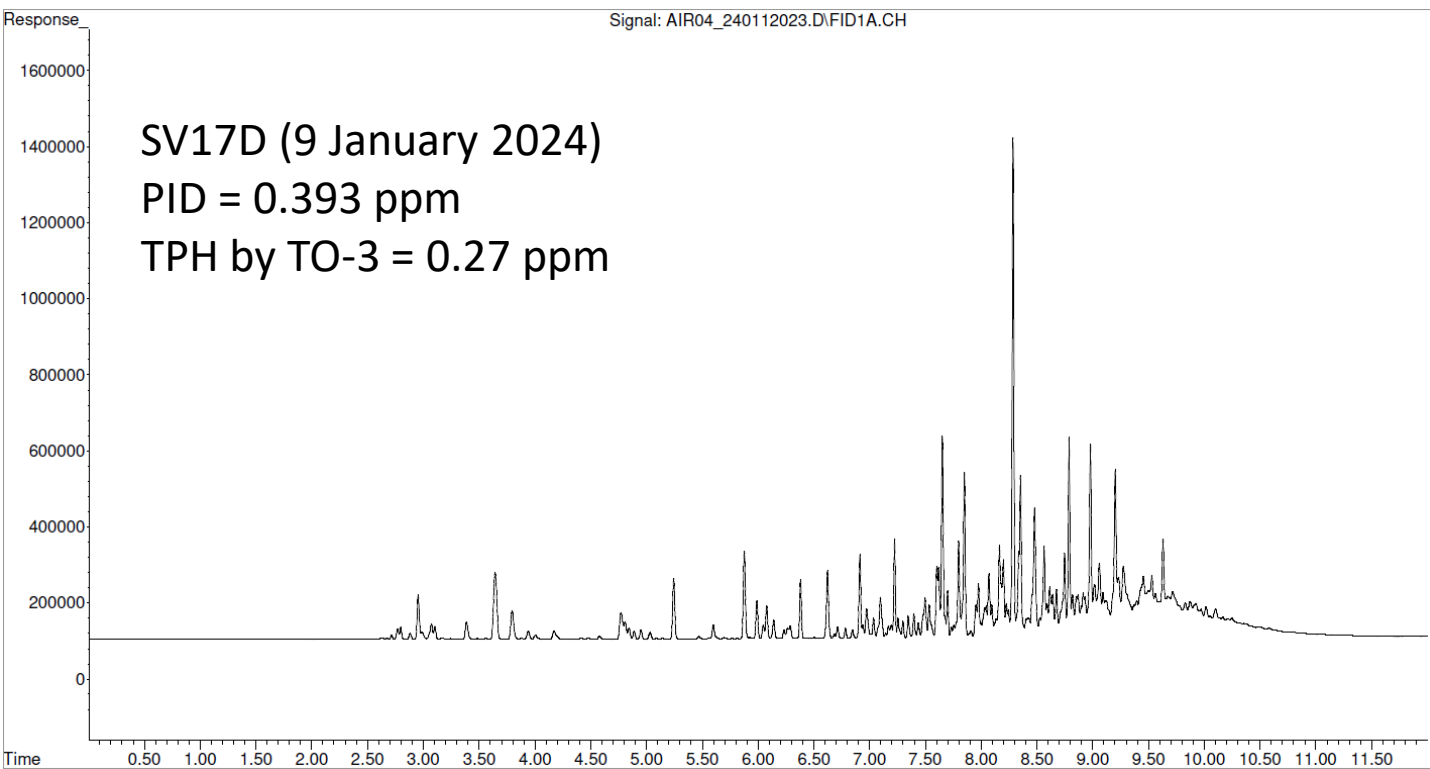
+ TIC Scan Air08_240115019.D (499763-008,330508,2.7x,PDF:1,C10660)

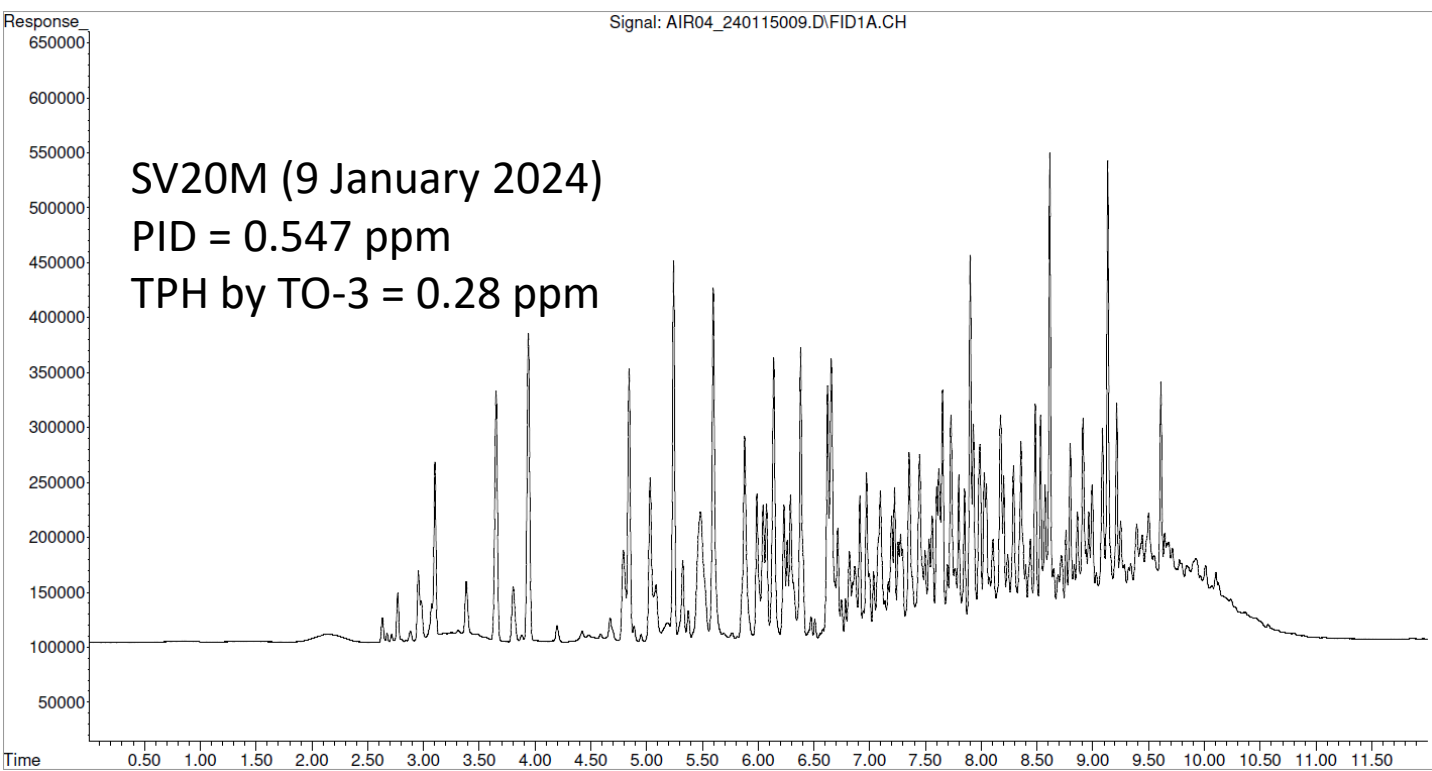
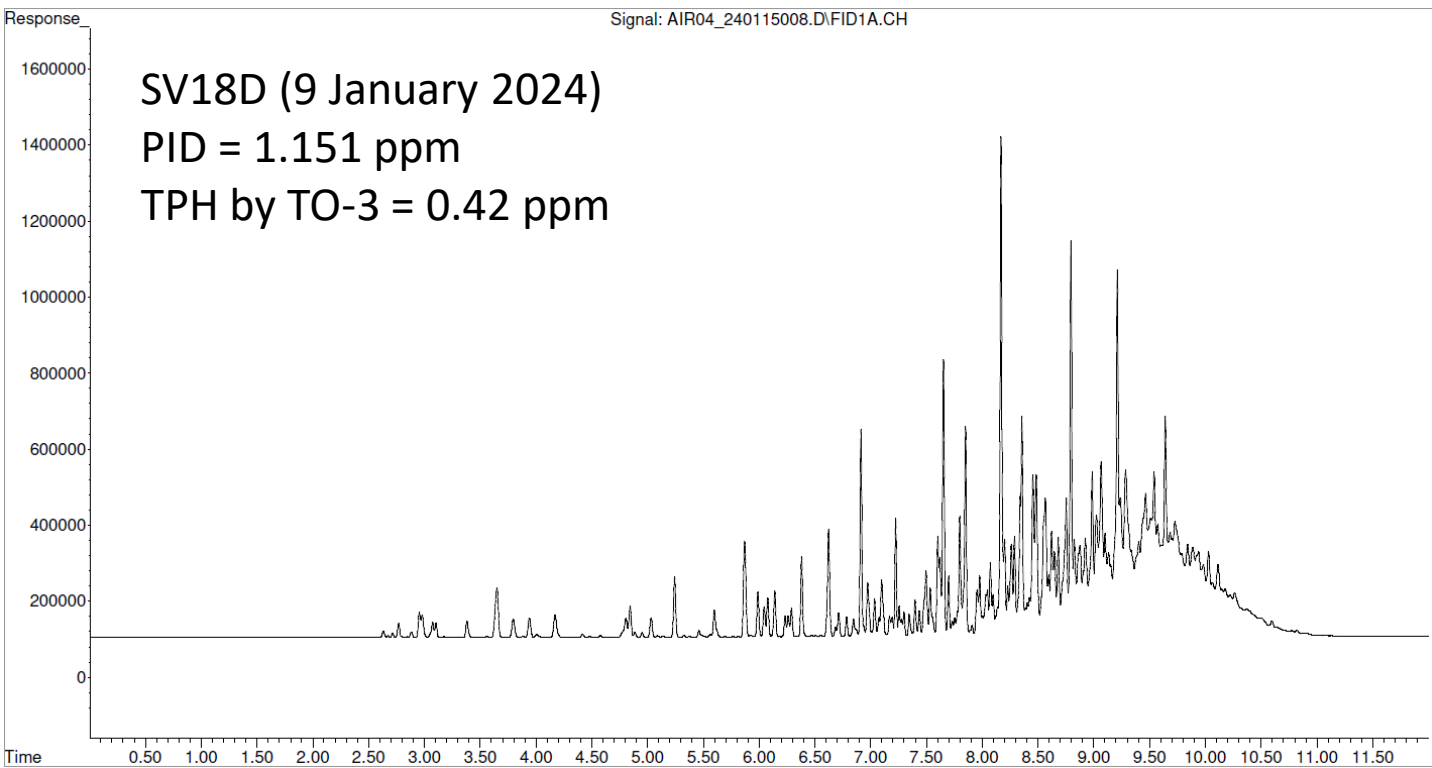


January 2024
Soil Vapor Samples
FID Chromatograms







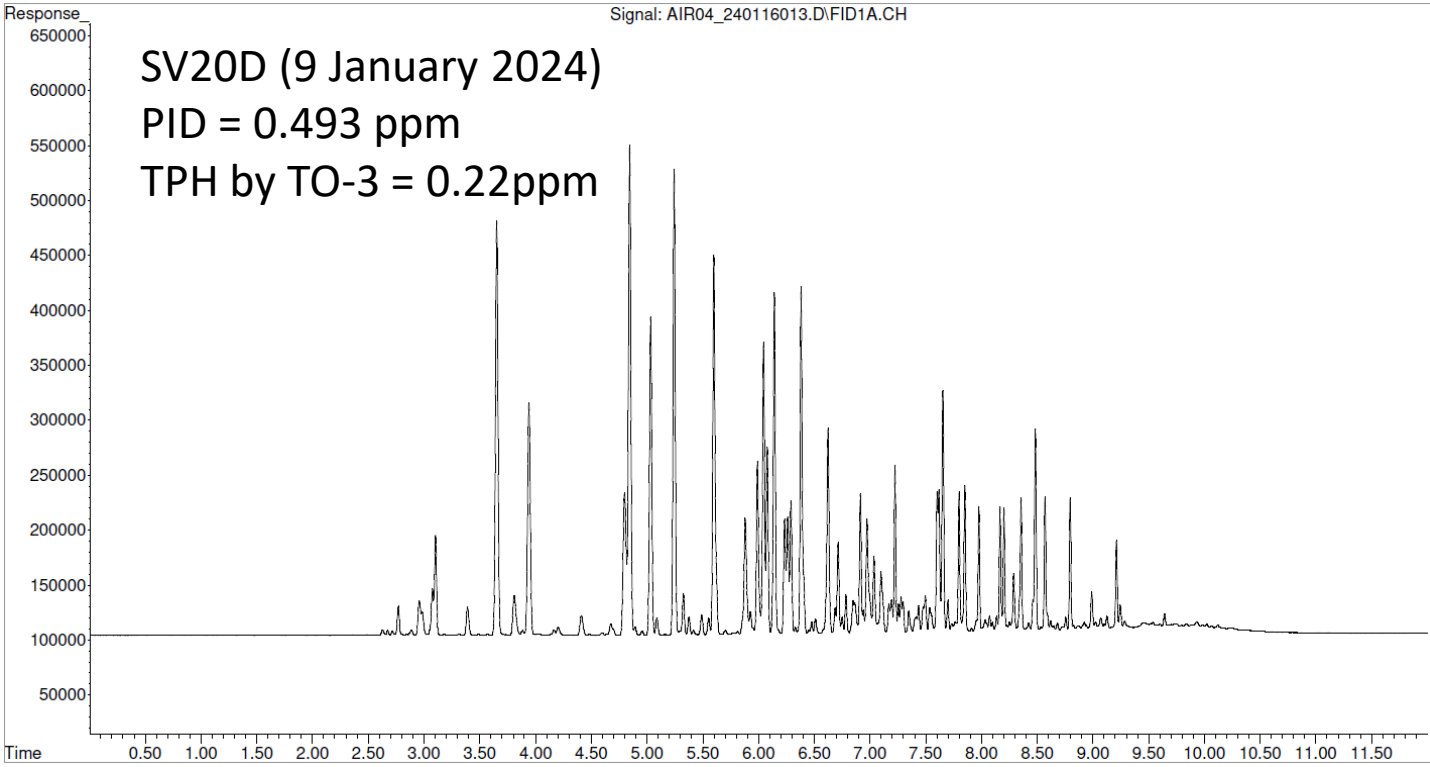


Signal: AIR04_240116013.D\FID1A.CH

SV20D (9 January 2024)

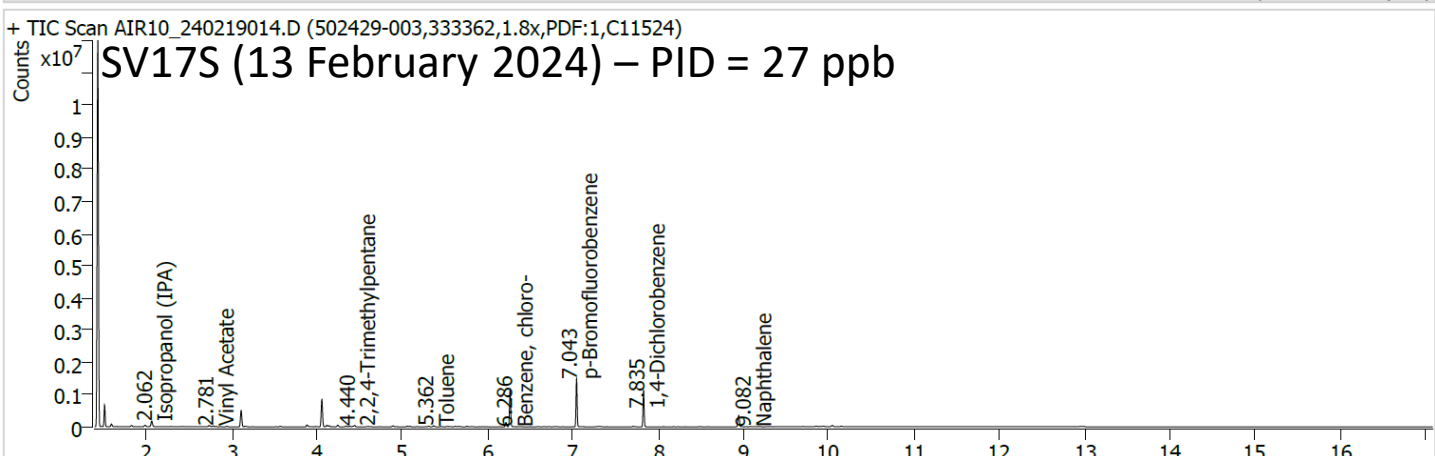
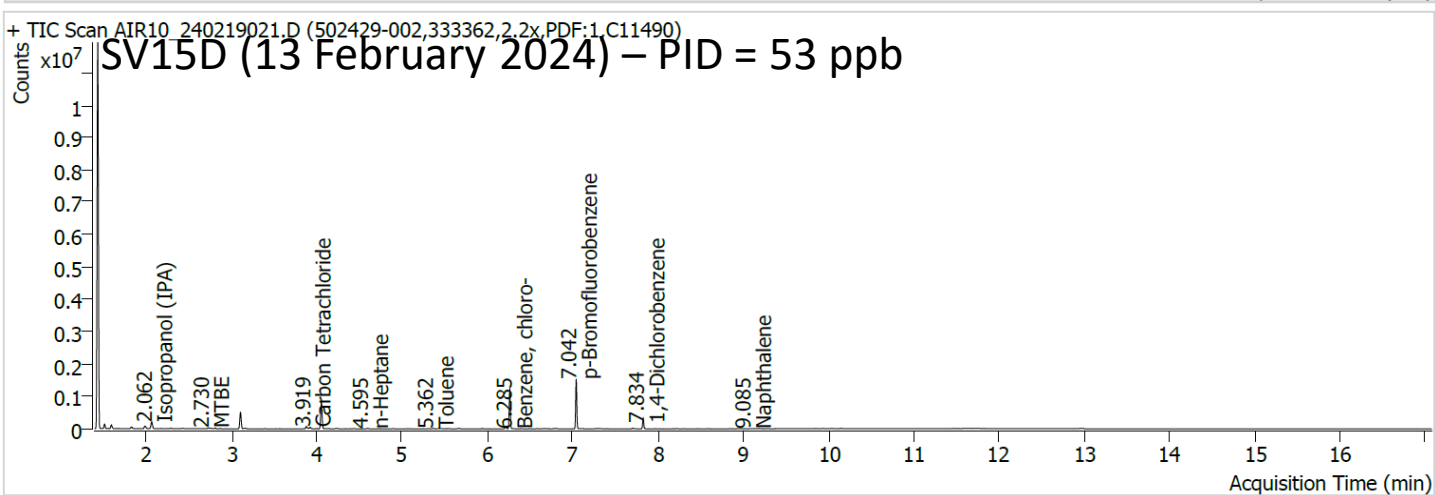
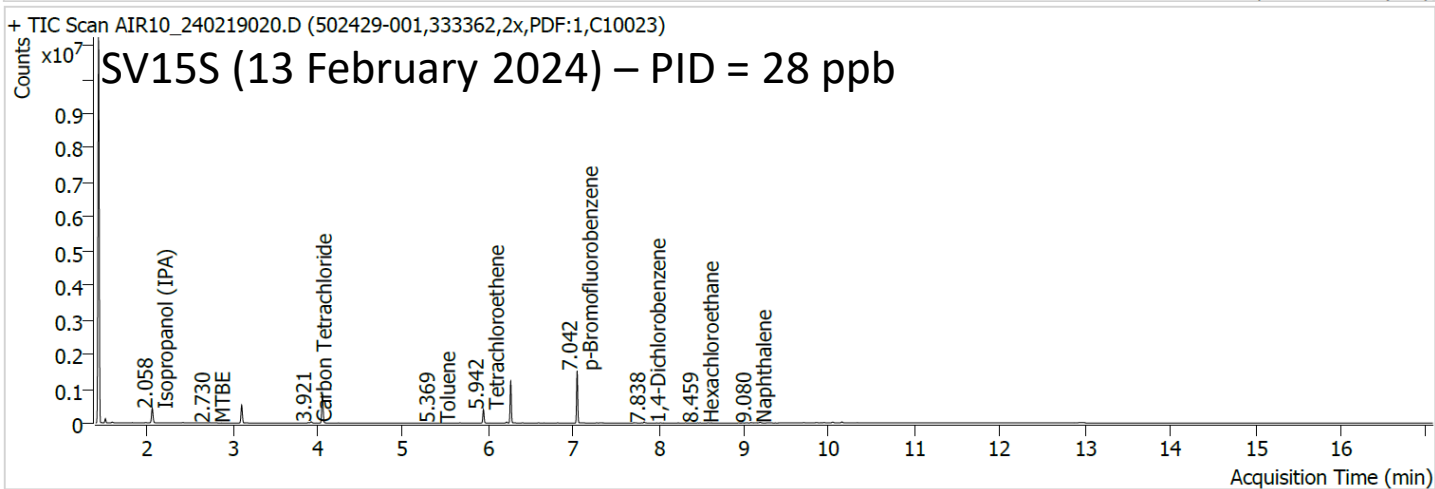
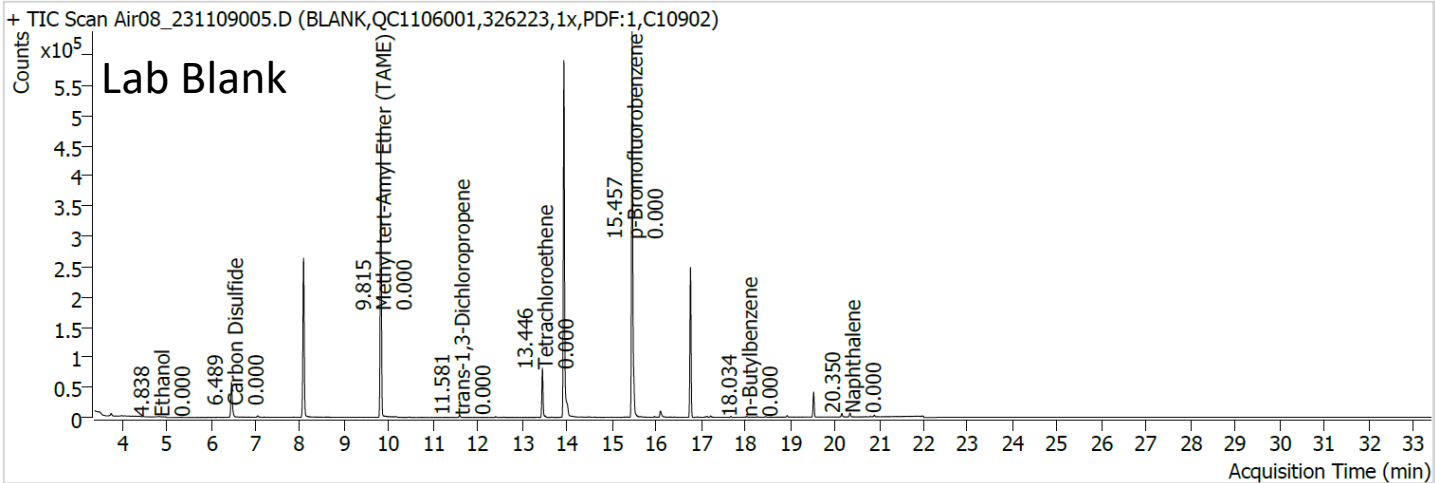
PID = 0.493 ppm

TPH by TO-3 = 0.22ppm

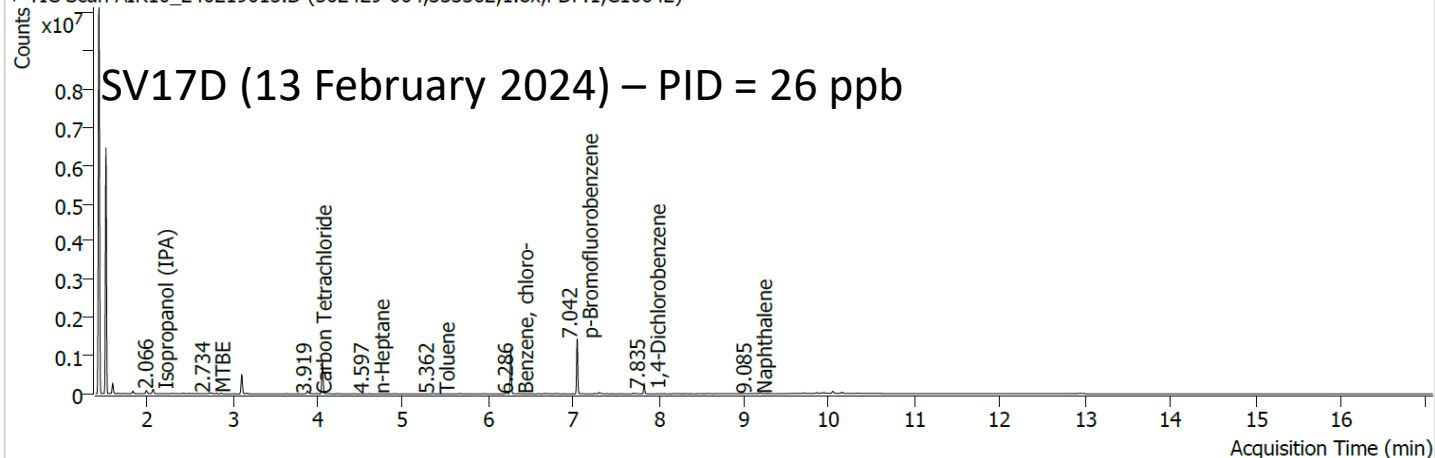


February 2024
Soil Vapor Samples

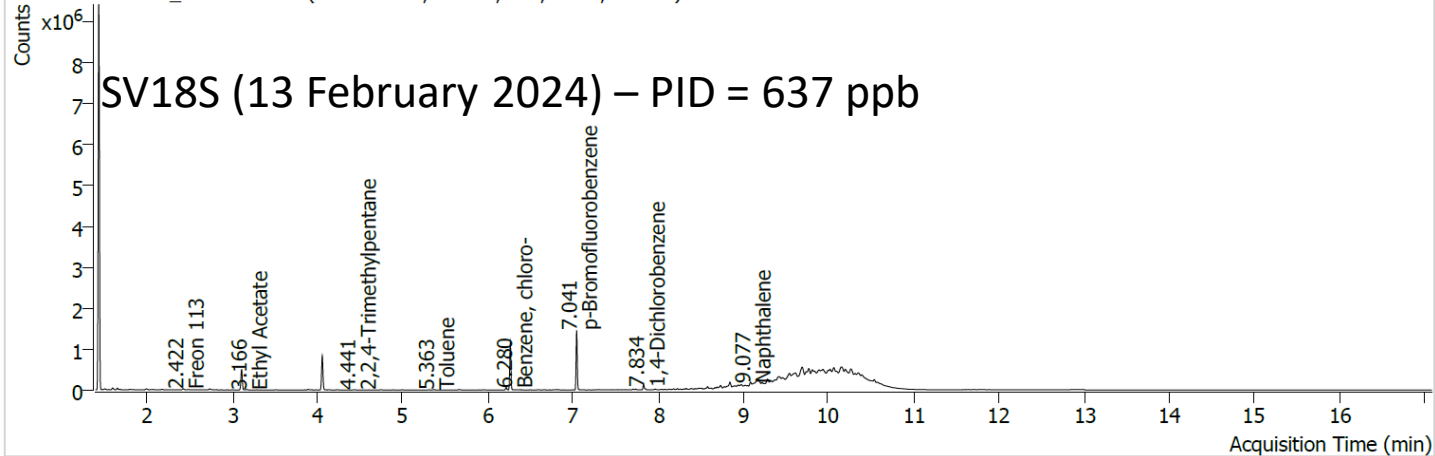
Mass Spec Chromatograms



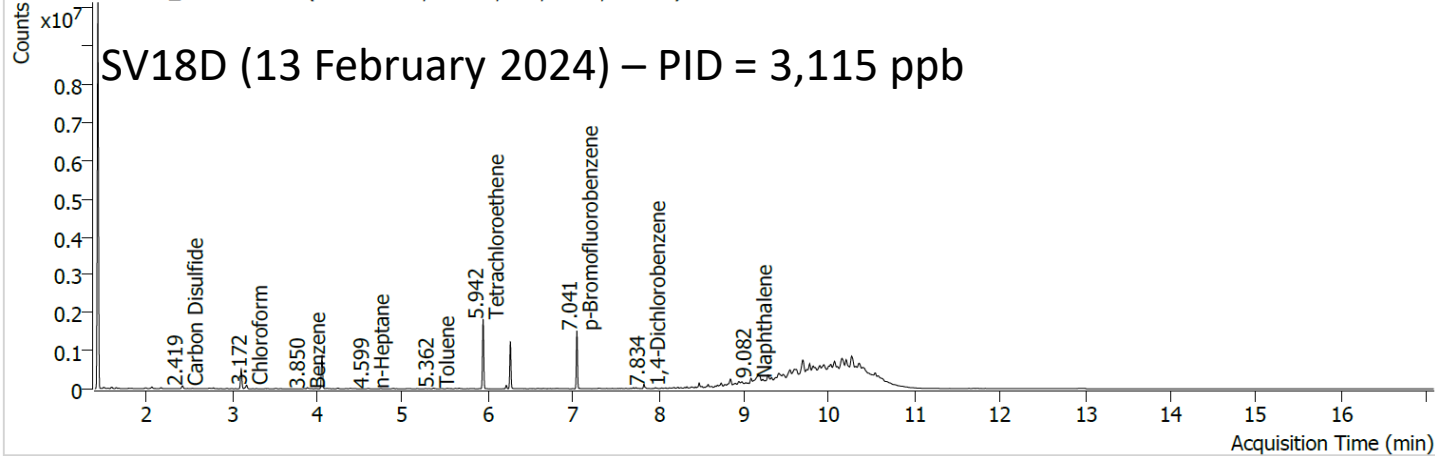
+ TIC Scan AIR10_240219015.D (502429-004,333362,1.8x,PDF:1,C10642)



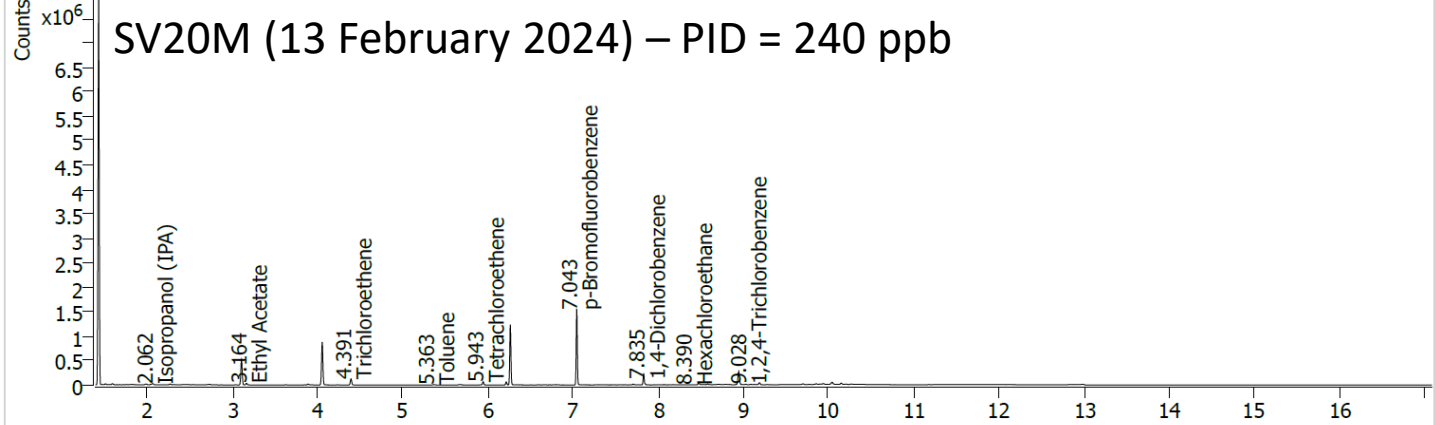
+ TIC Scan AIR10_240219016.D (502429-005,333362,2.2x,PDF:1,C11496)



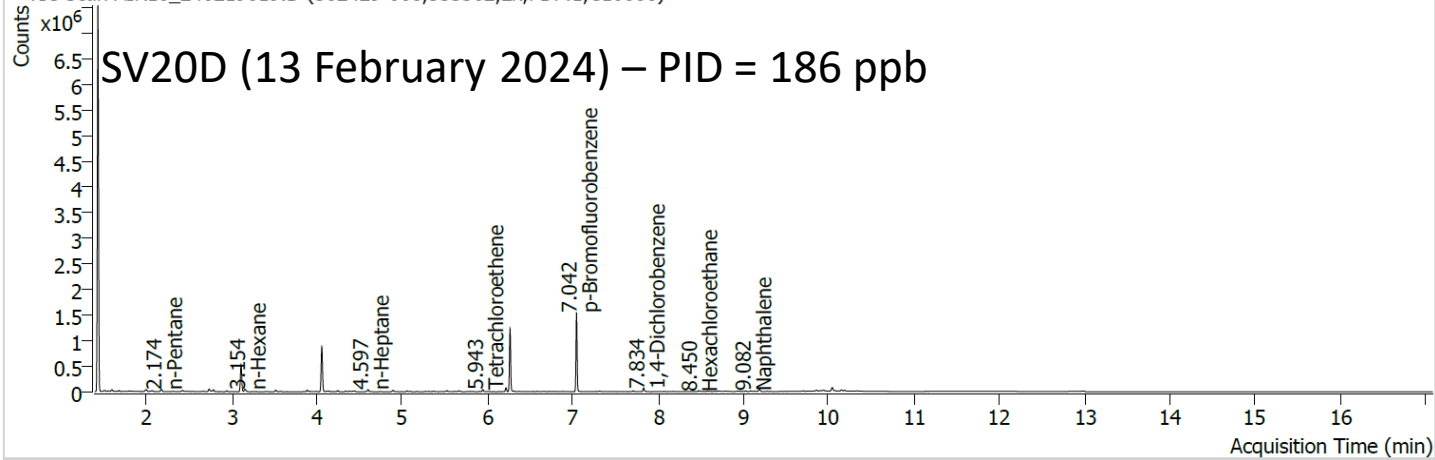
+ TIC Scan AIR10_240219017.D (502429-006,333362,1.8x,PDF:1,C10184)



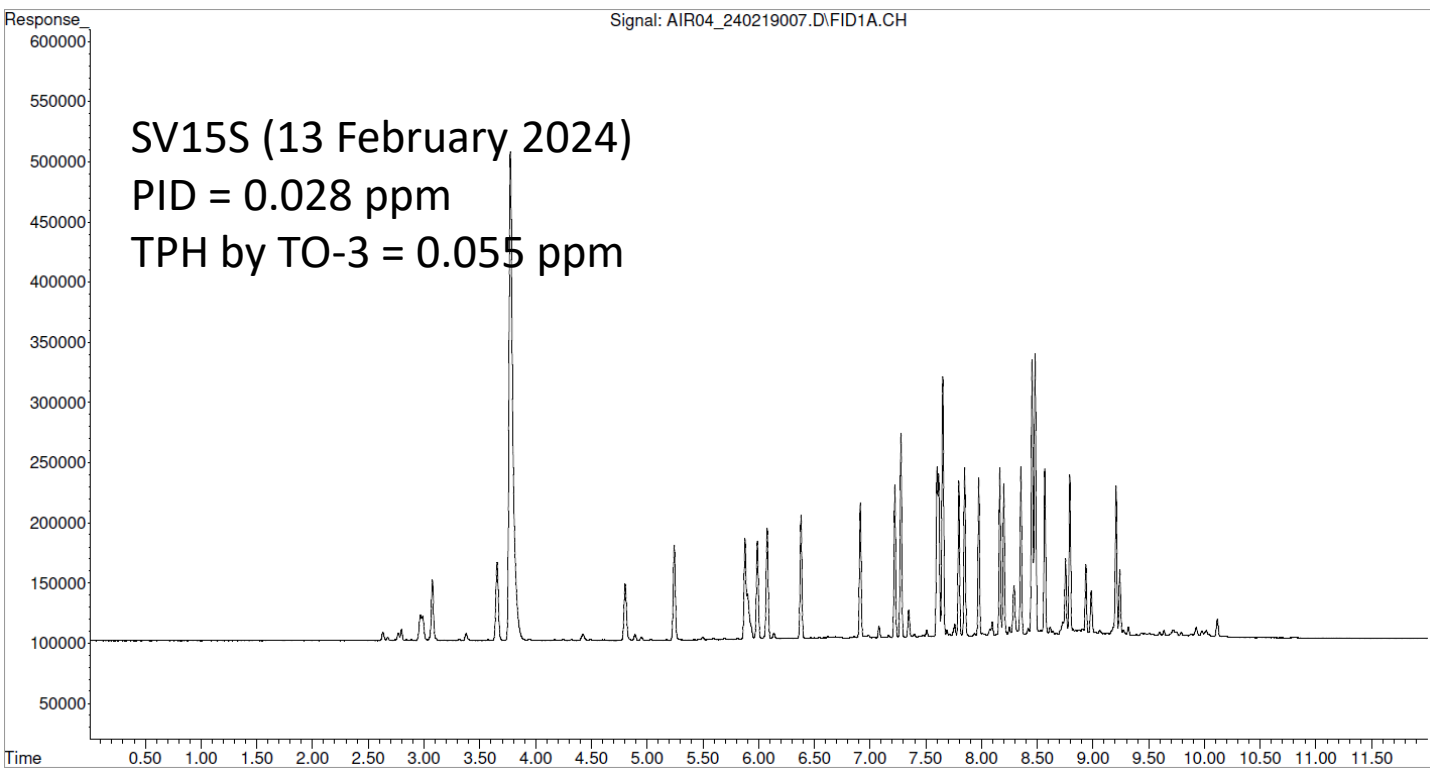
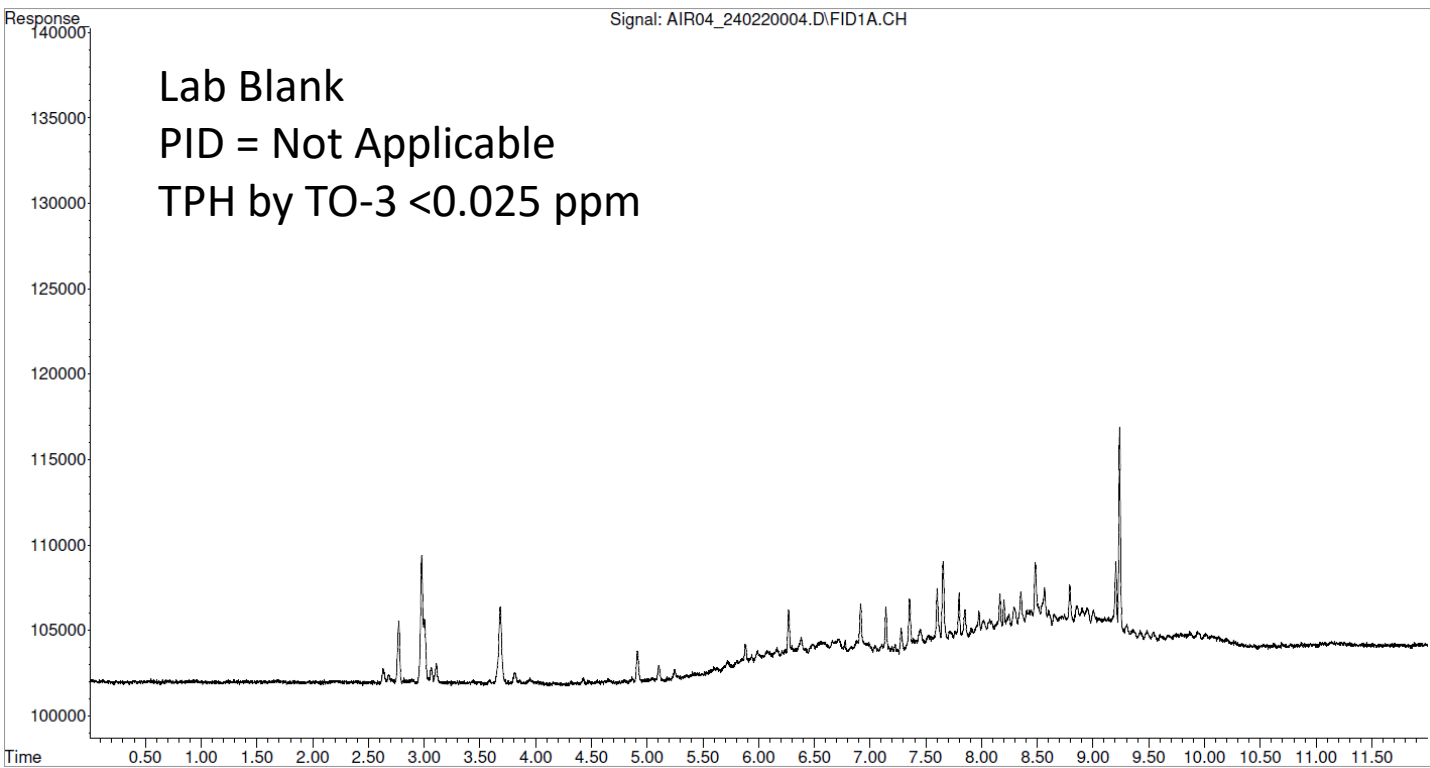
+ TIC Scan AIR10_240219018.D (502429-007,333362,2.2x,PDF:1,C10282)

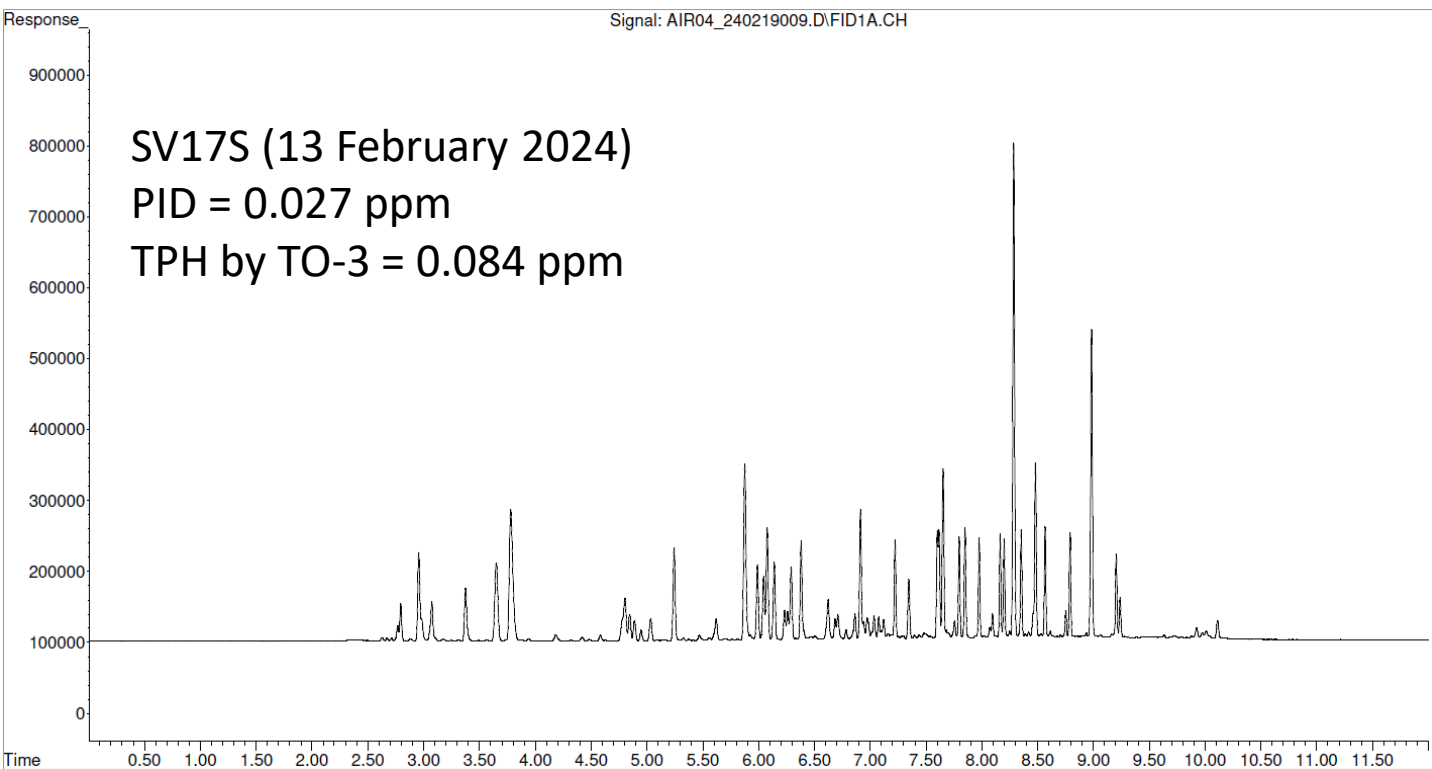
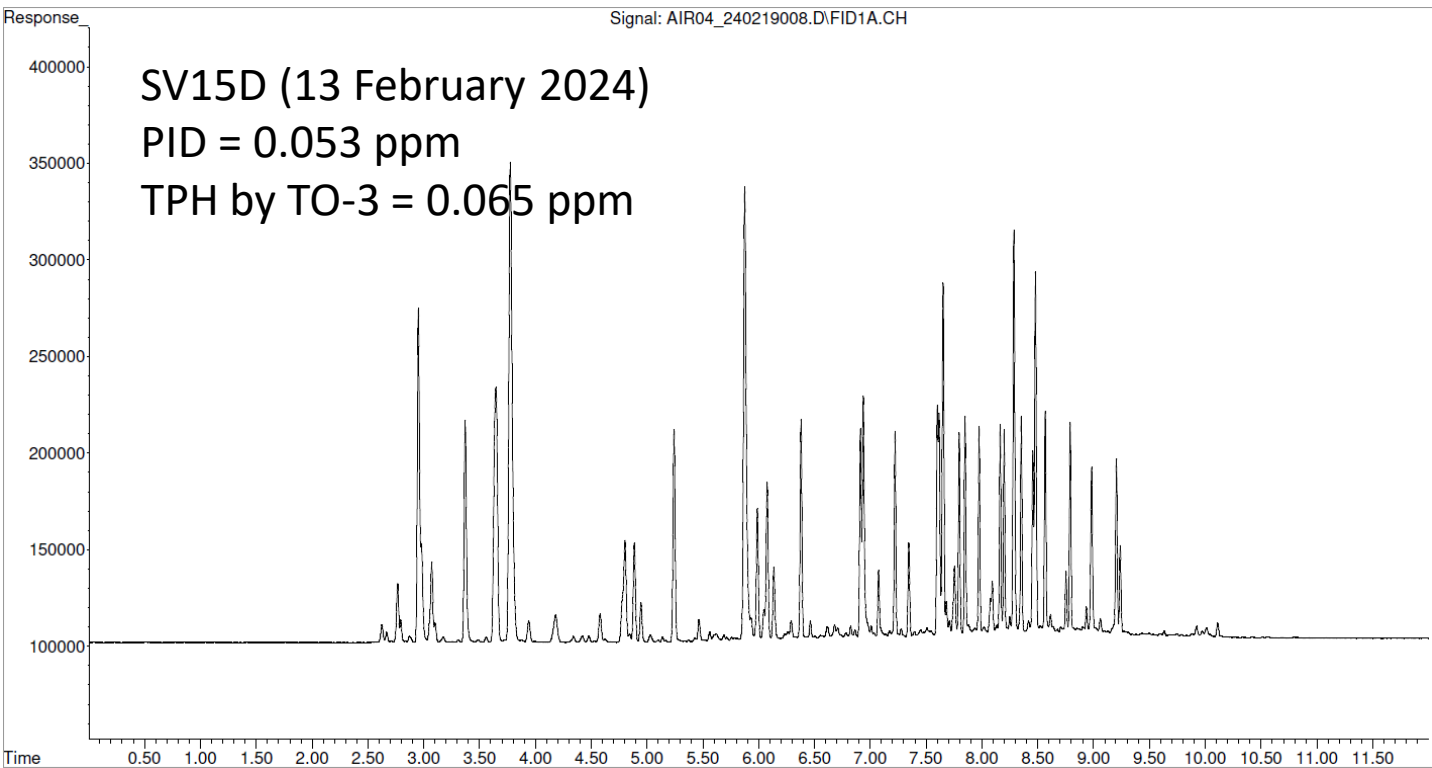


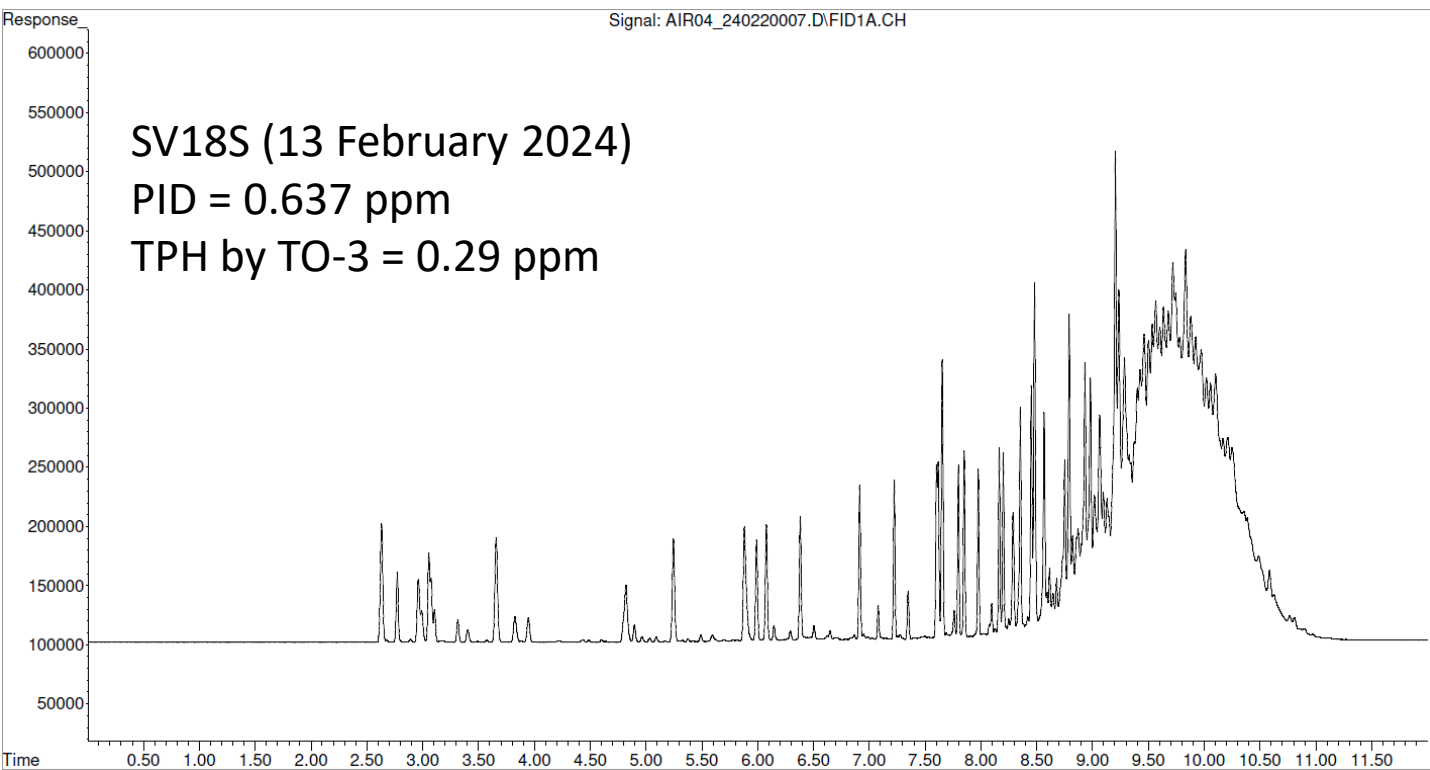
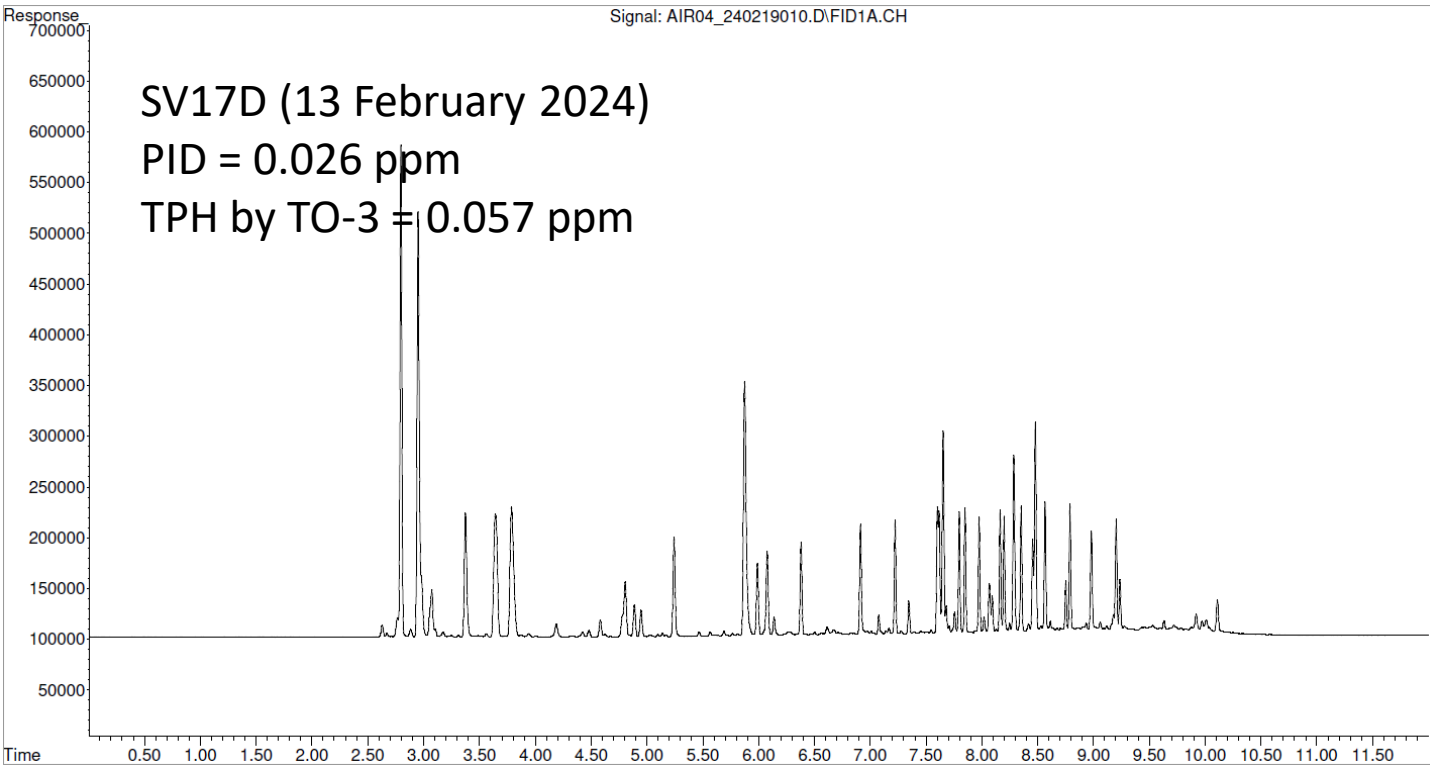
+ TIC Scan AIR10_240219019.D (502429-008,333362,2x,PDF:1,C10666)

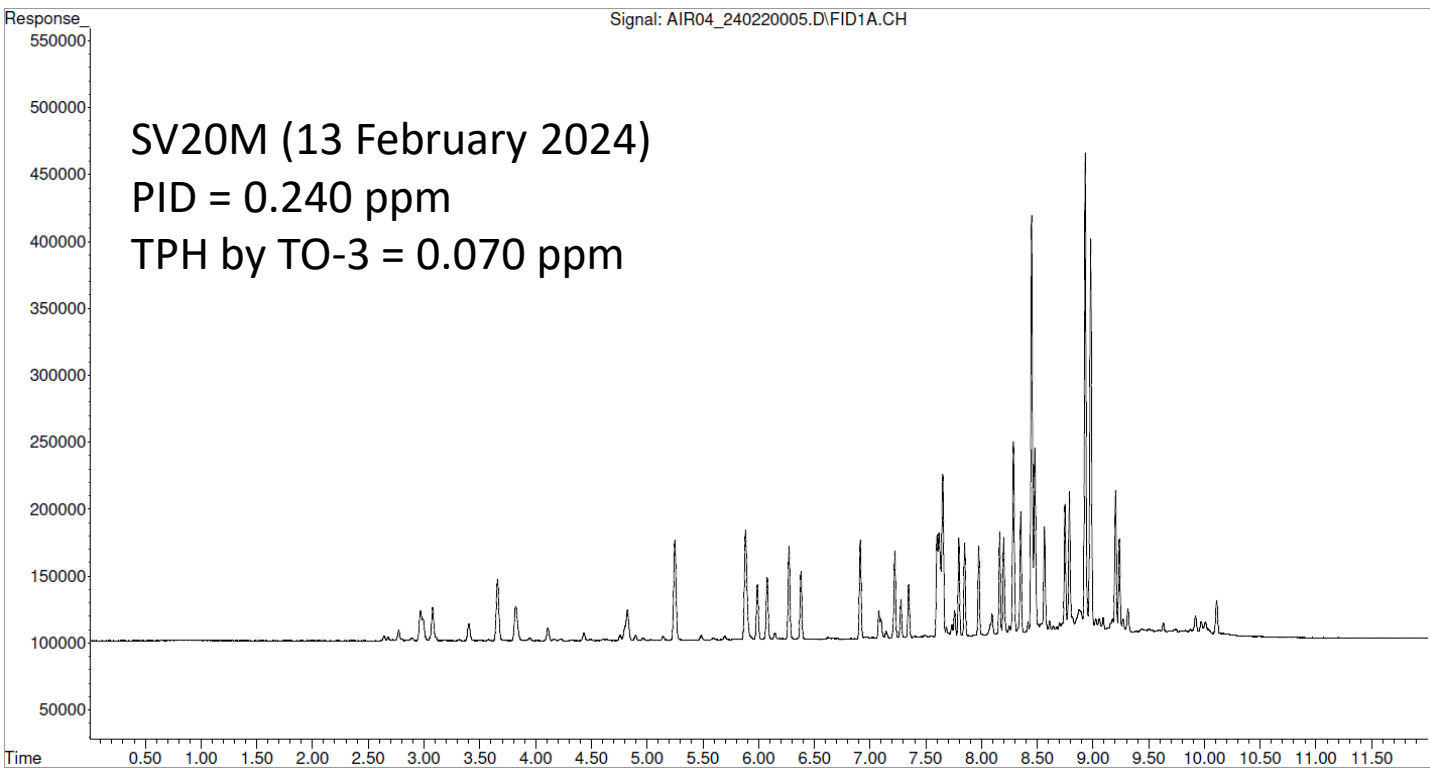
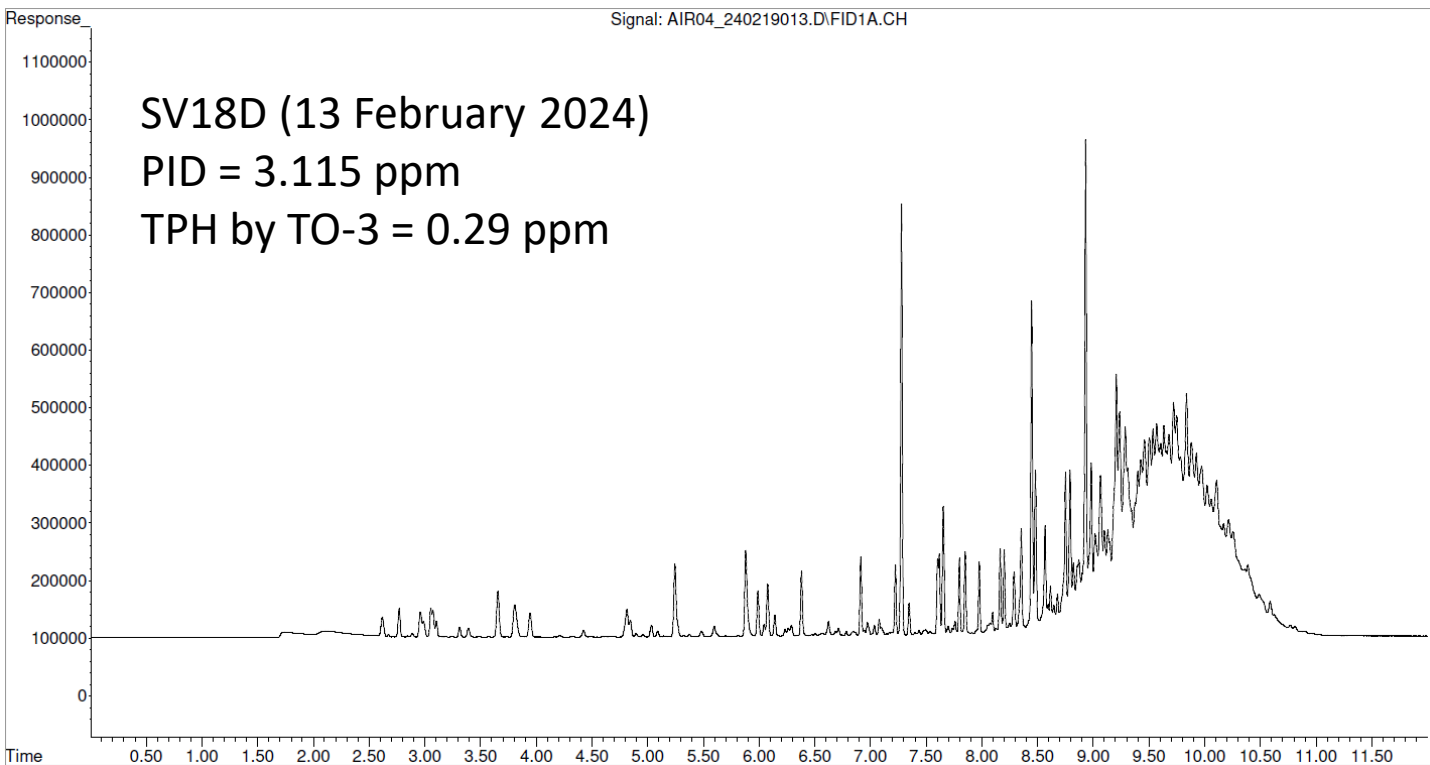


February 2024
Soil Vapor Samples
FID Chromatograms







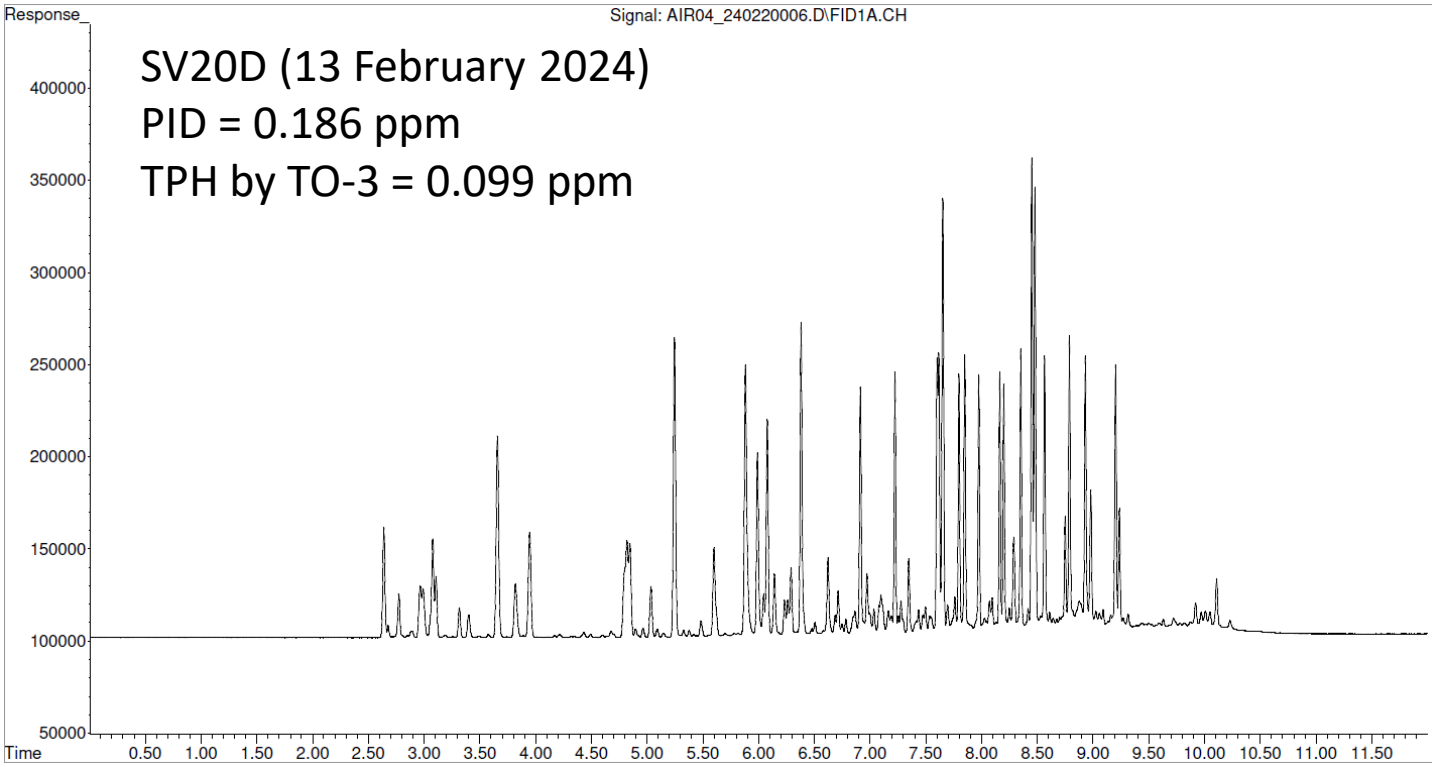


Signal: AIR04_240220006.D\FID1A.CH

SV20D (13 February 2024)

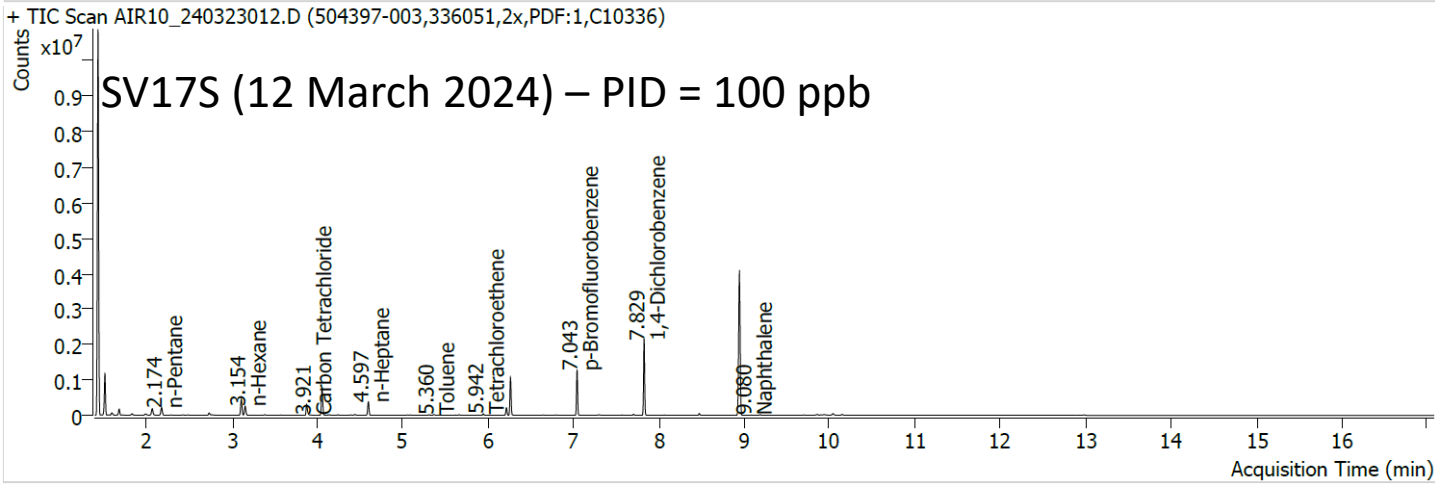
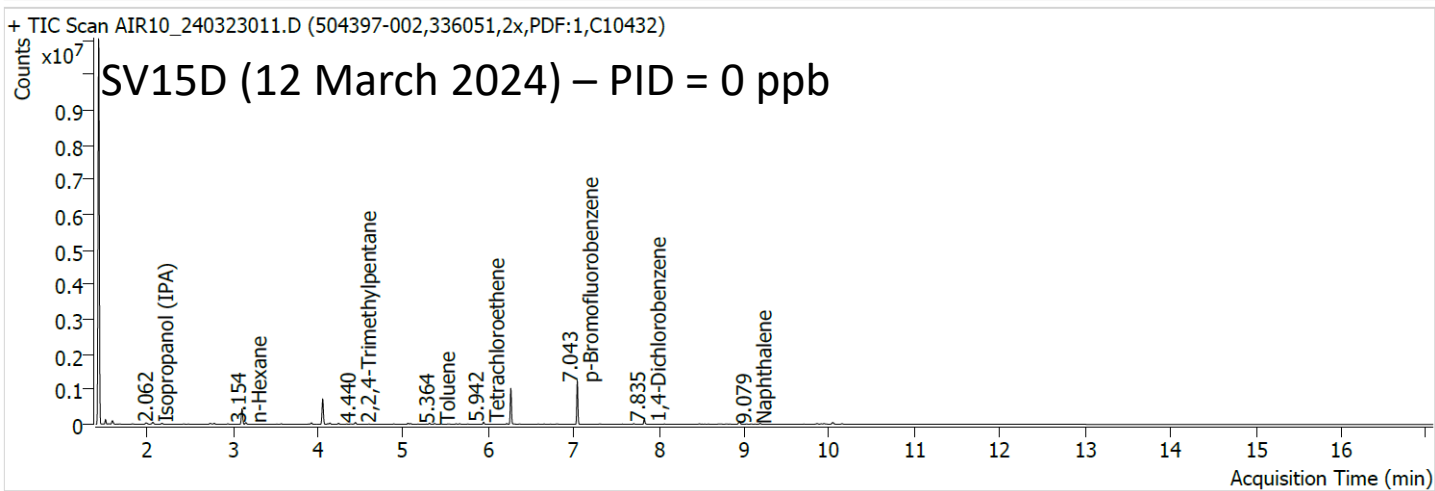
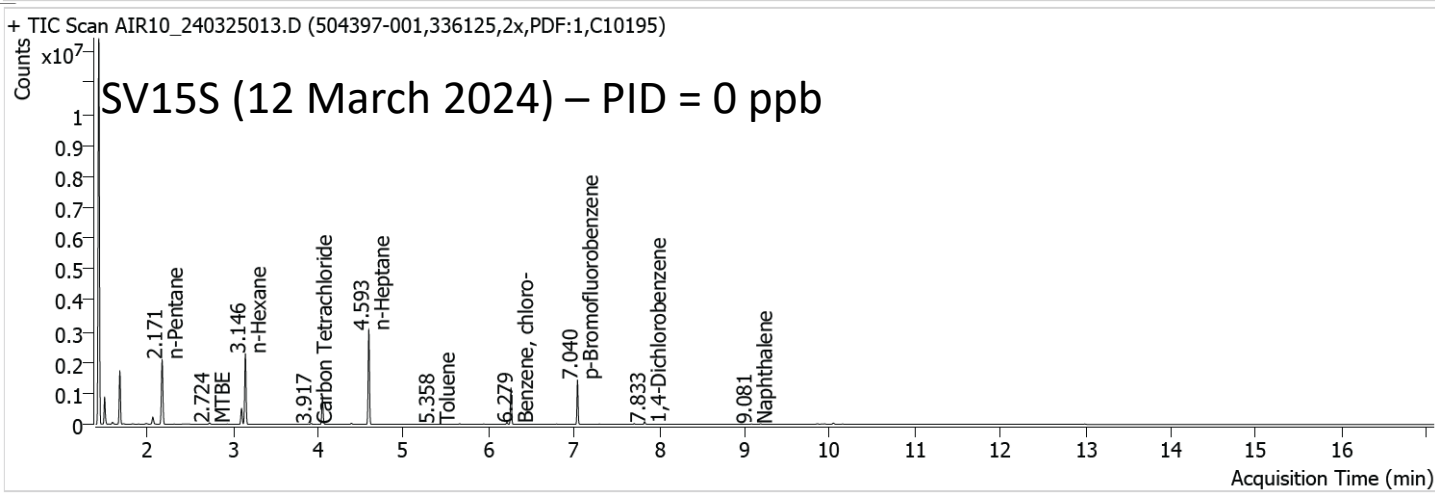
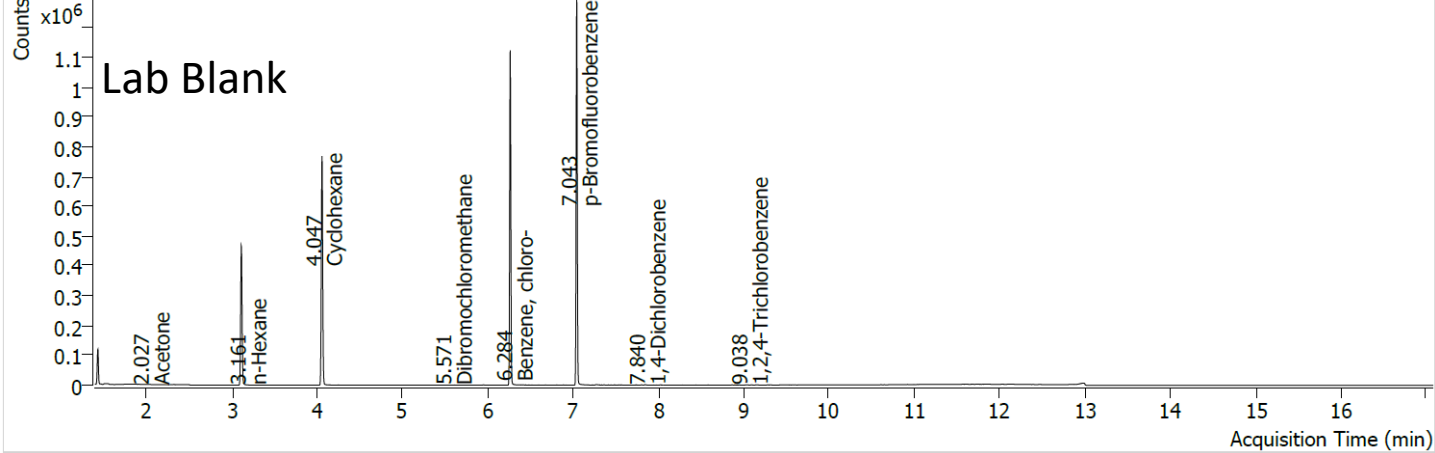
PID = 0.186 ppm

TPH by TO-3 = 0.099 ppm

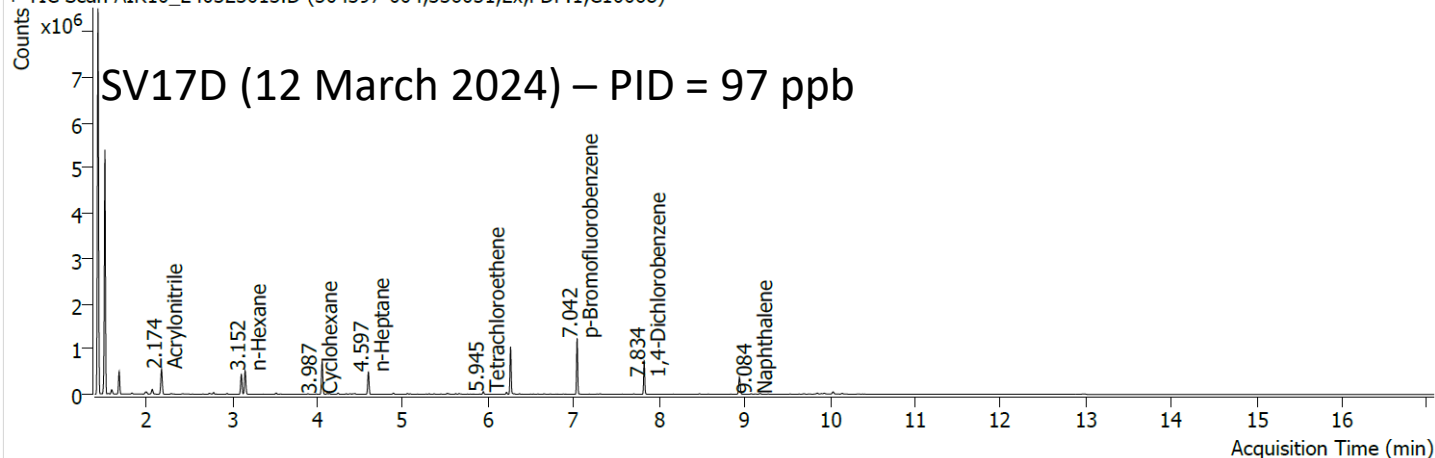


March 2024
Soil Vapor Samples

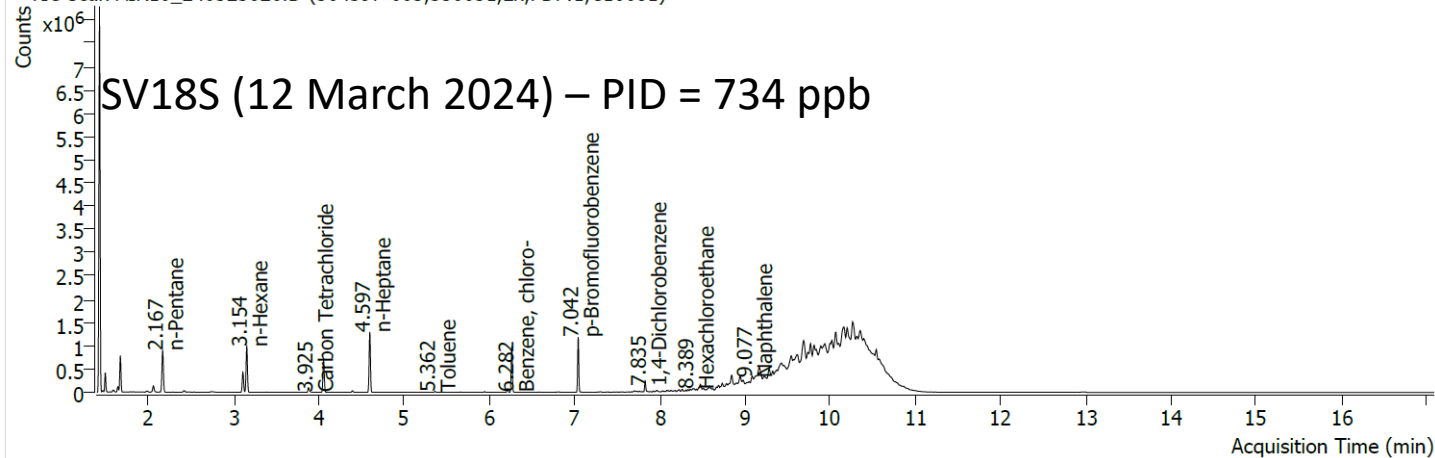
Mass Spec Chromatograms



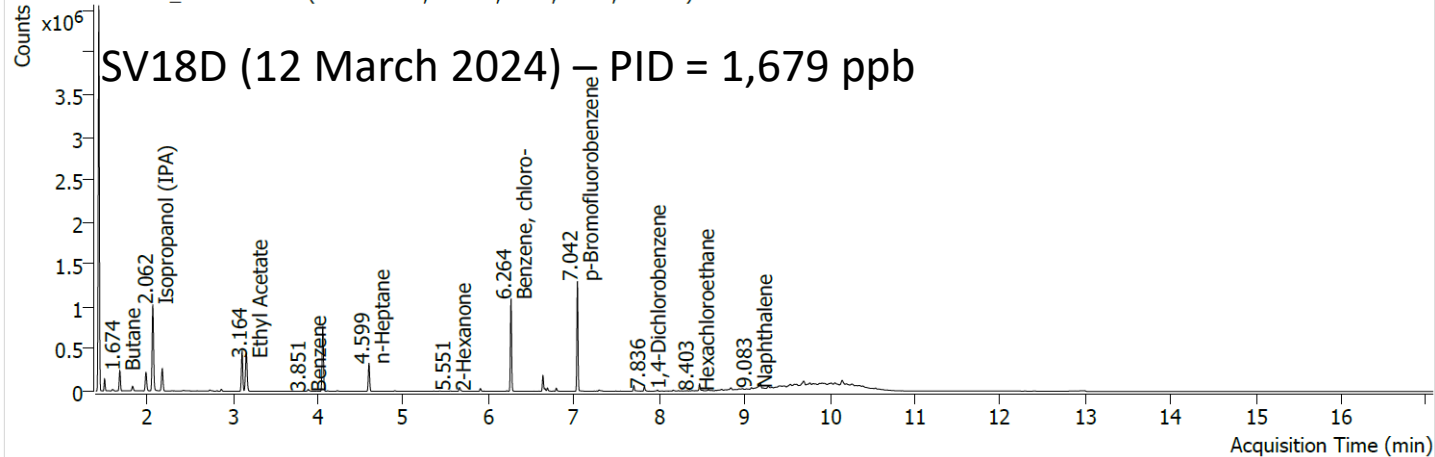
+ TIC Scan AIR10_240323013.D (504397-004,336051,2x,PDF:1,C10068)



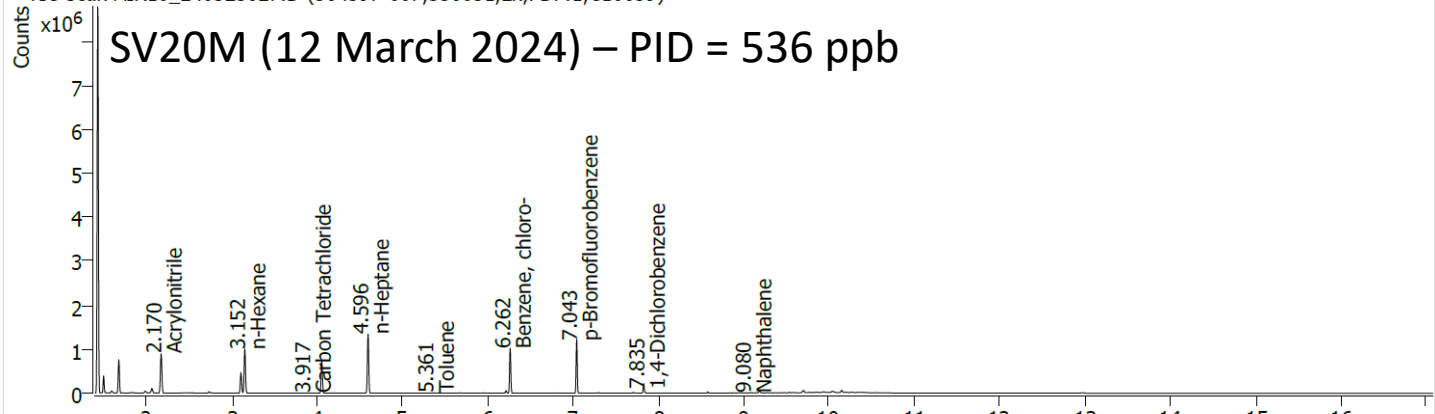
+ TIC Scan AIR10_240323026.D (504397-005,336051,2x,PDF:1,C10081)



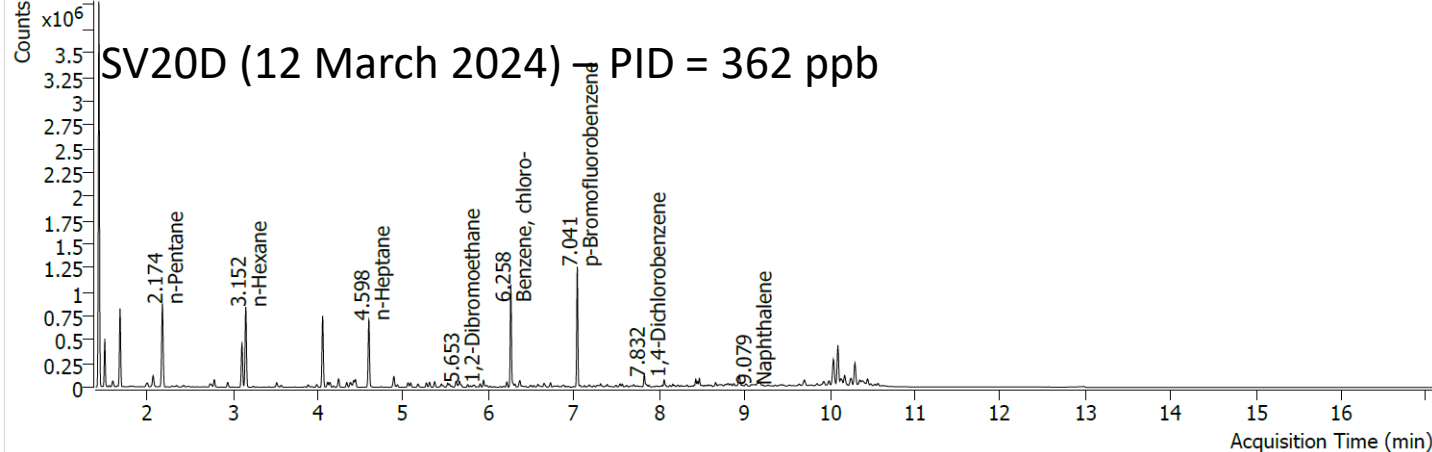
+ TIC Scan AIR10_240323015.D (504397-006,336051,12.5x,PDF:1,C10690)



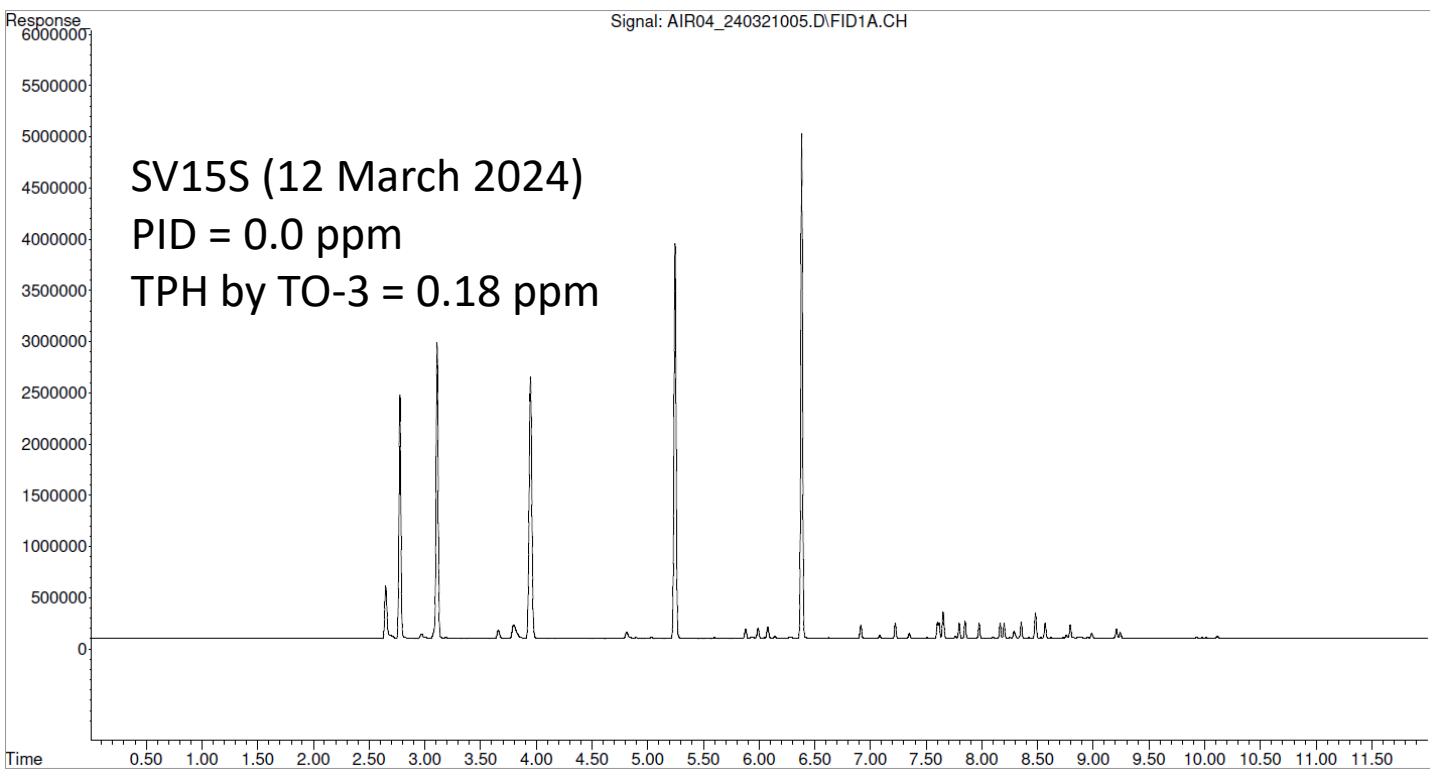
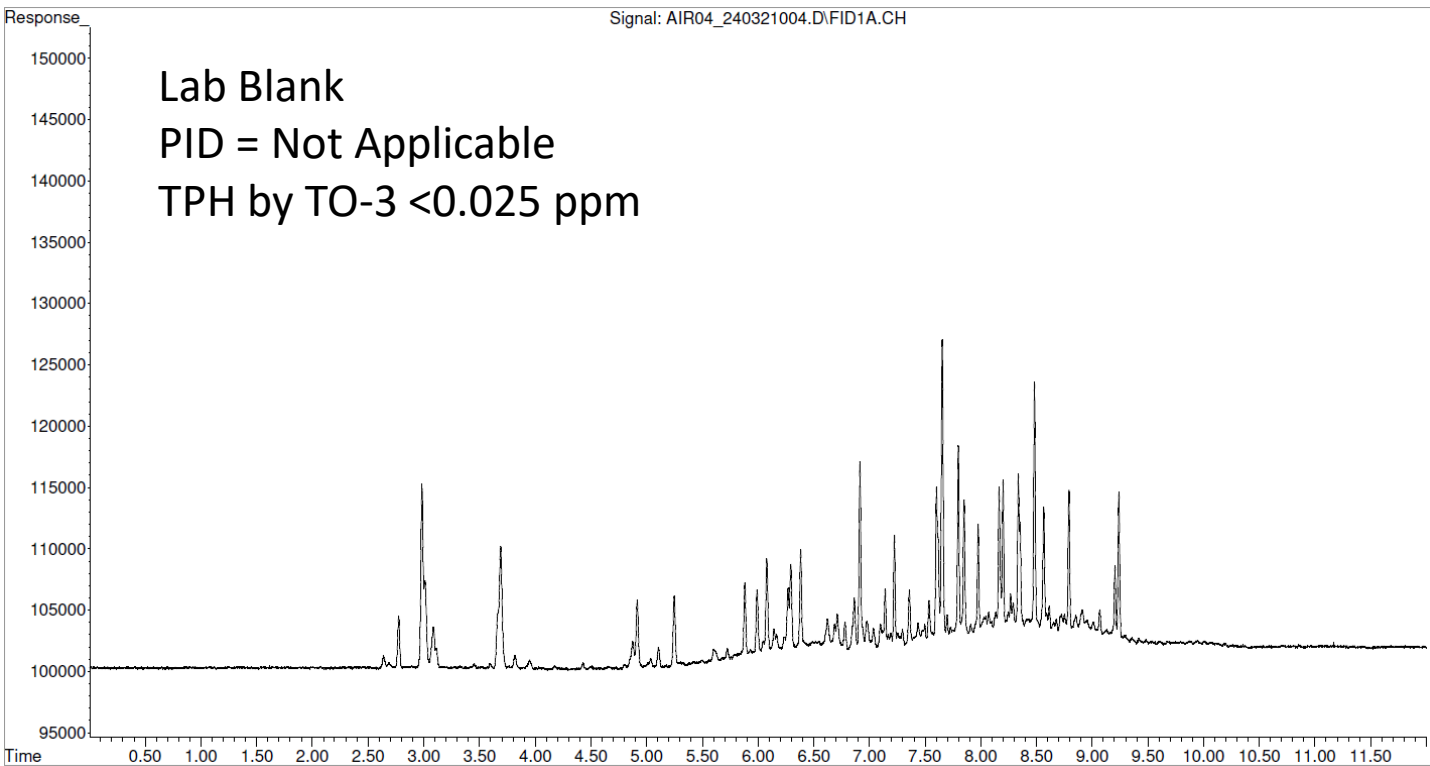
+ TIC Scan AIR10_240323027.D (504397-007,336051,2x,PDF:1,C10059)

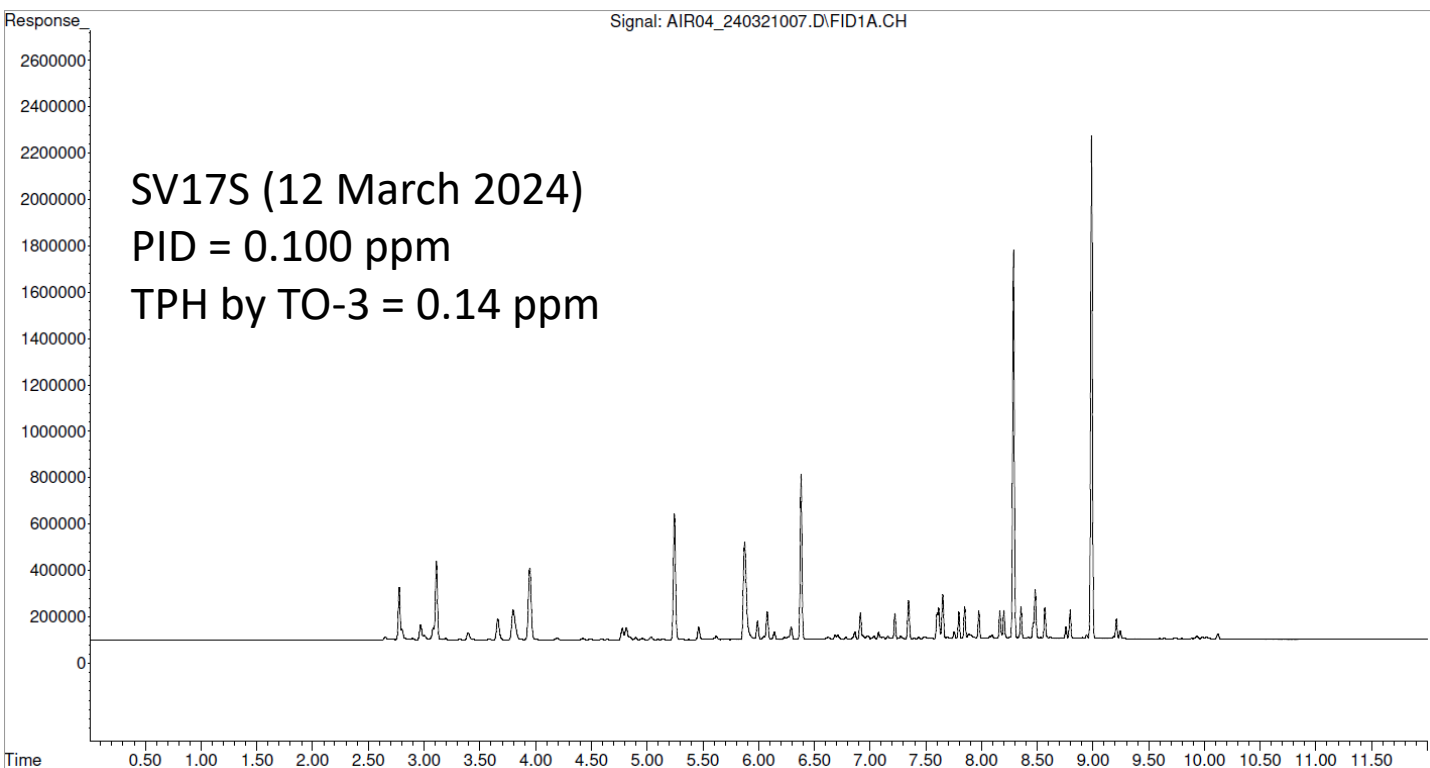
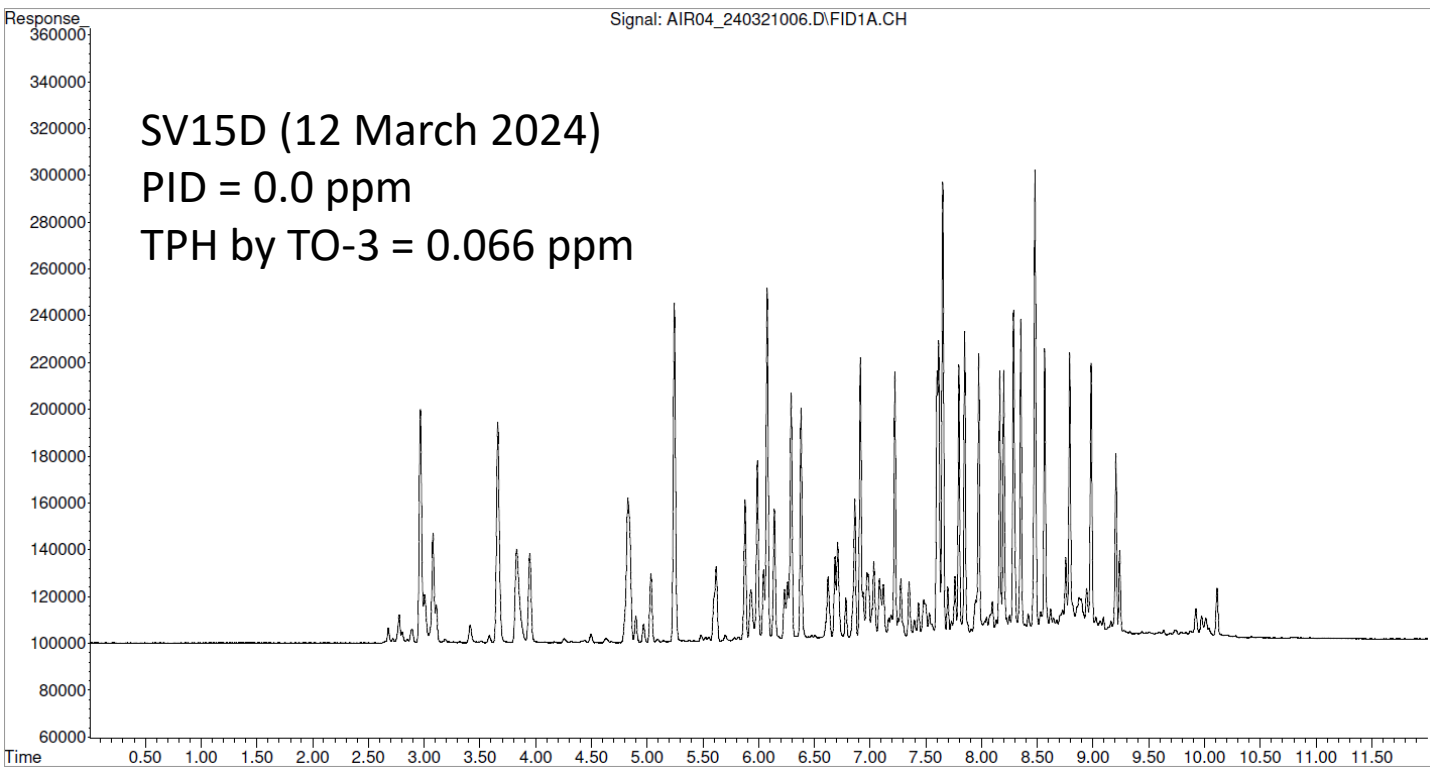


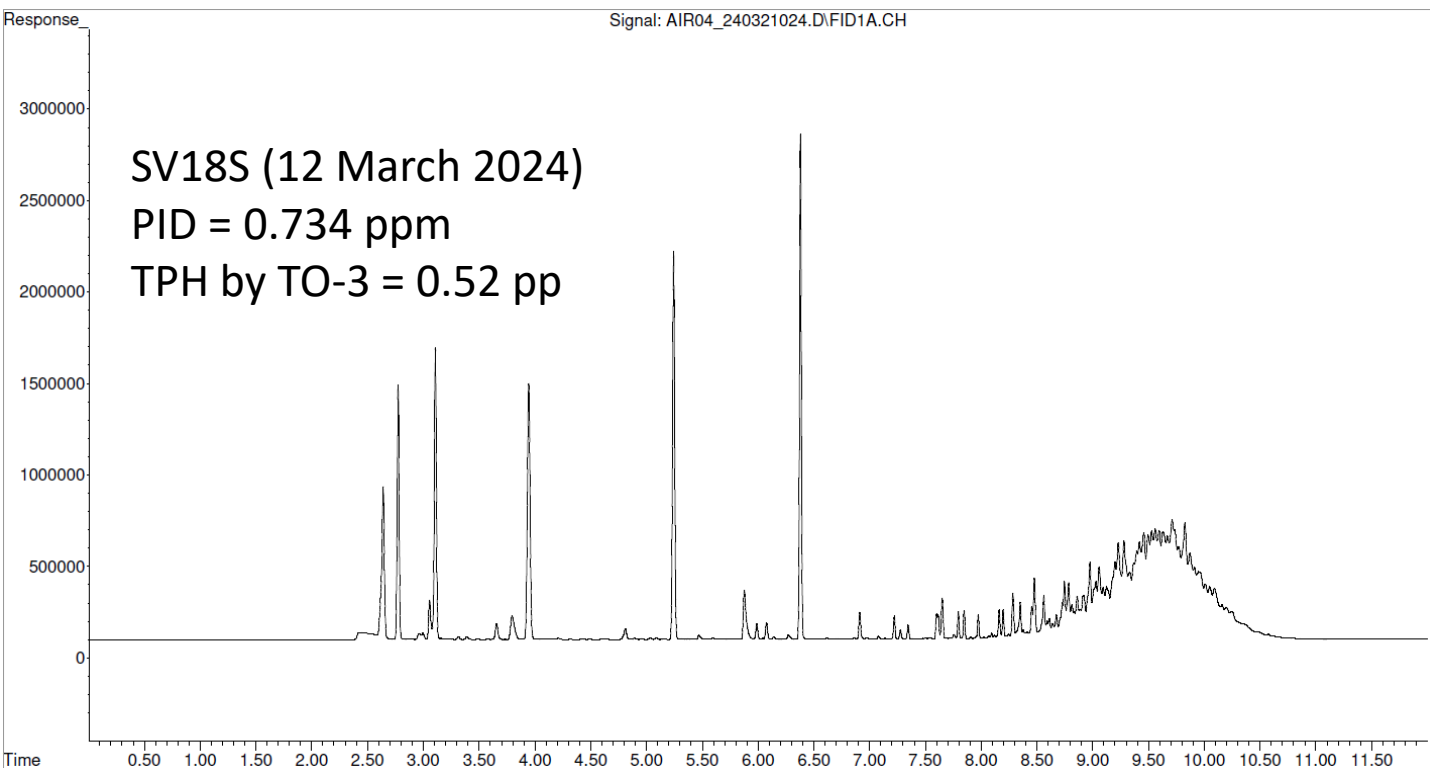
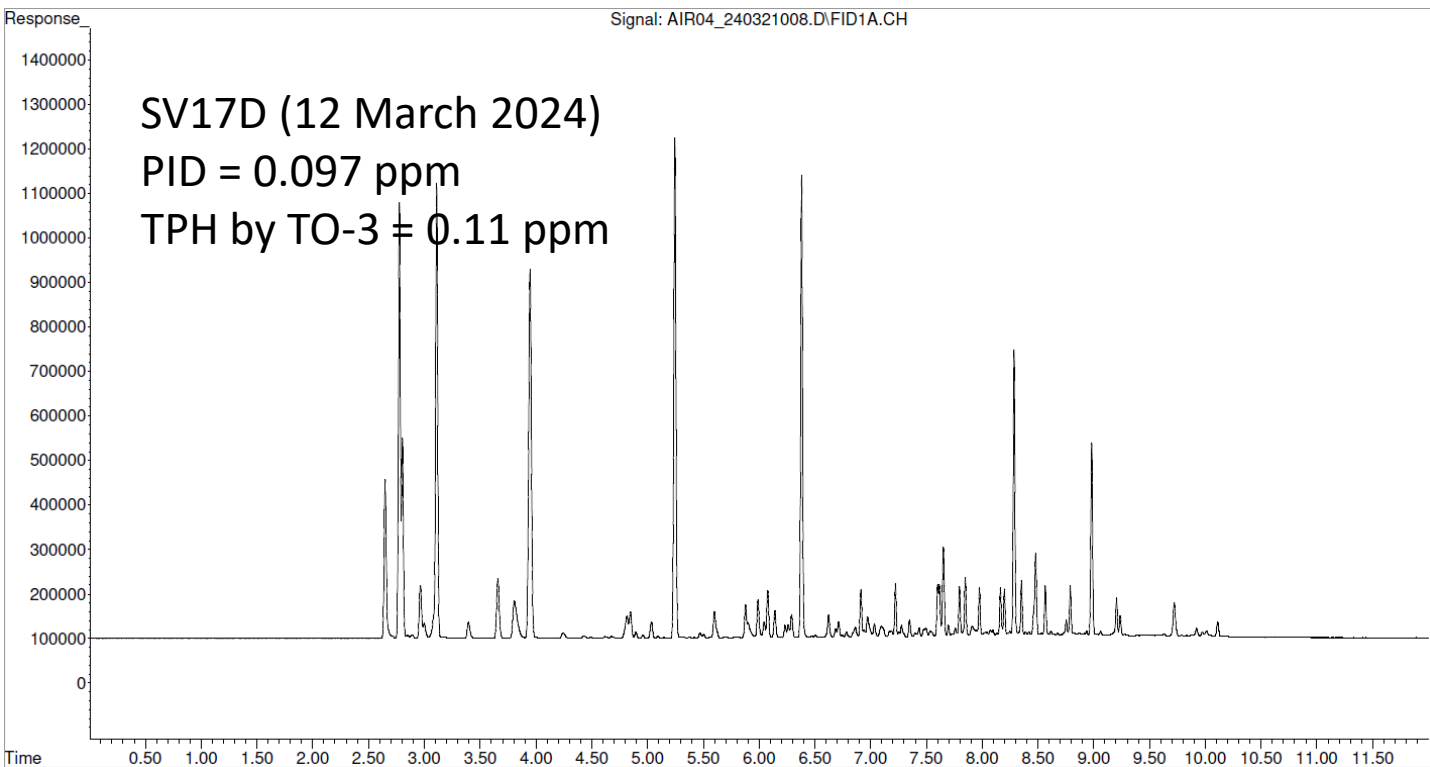
+ TIC Scan AIR10_240323017.D (504397-008,336051,2x,PDF:1,C10364)

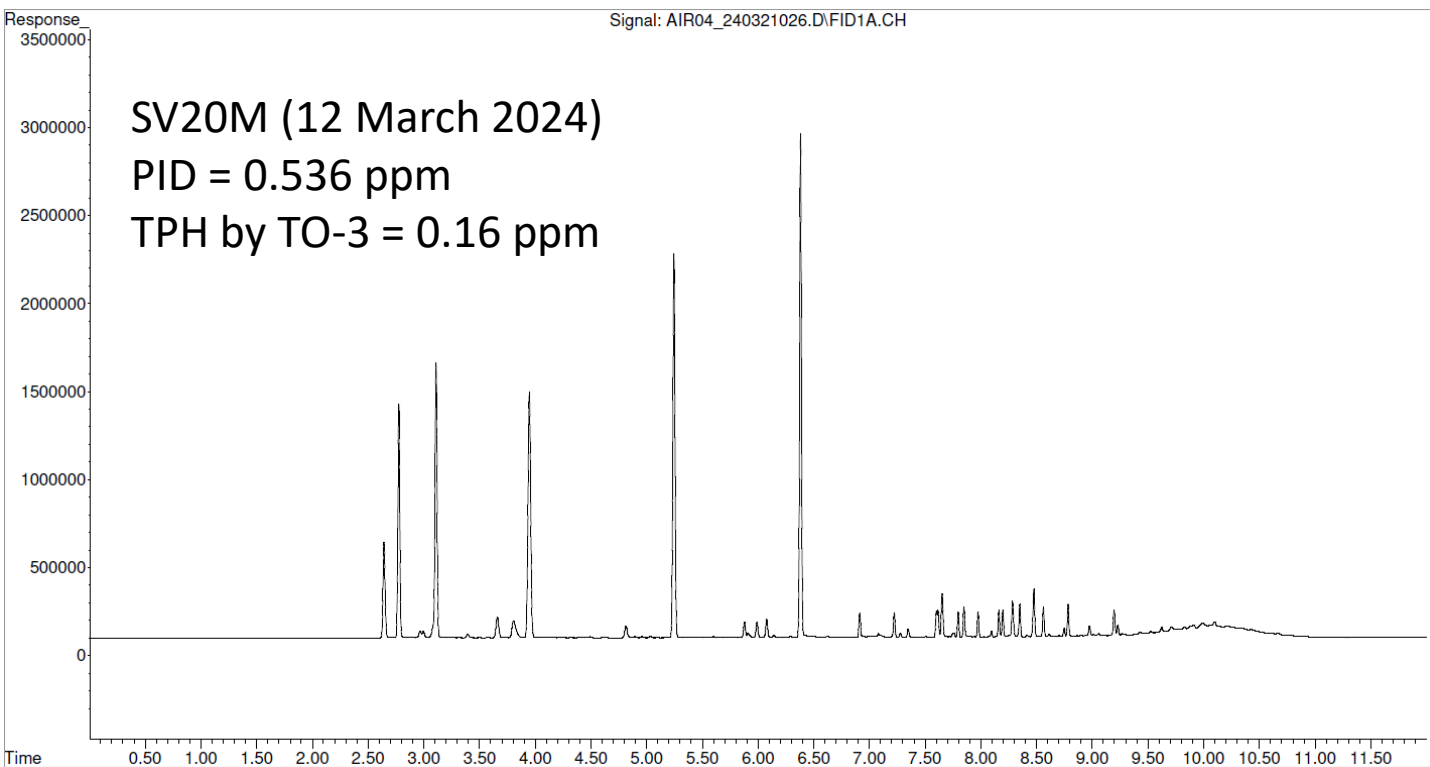
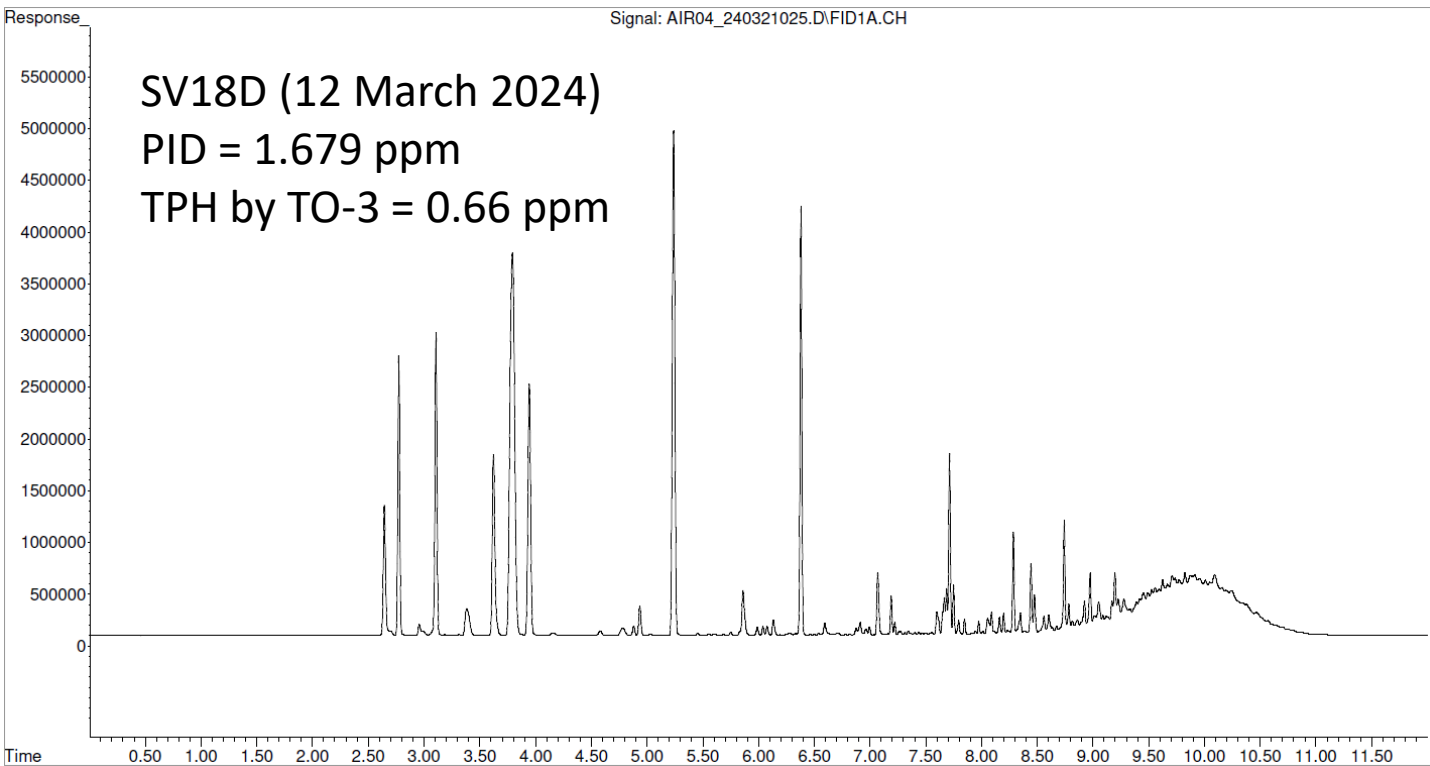


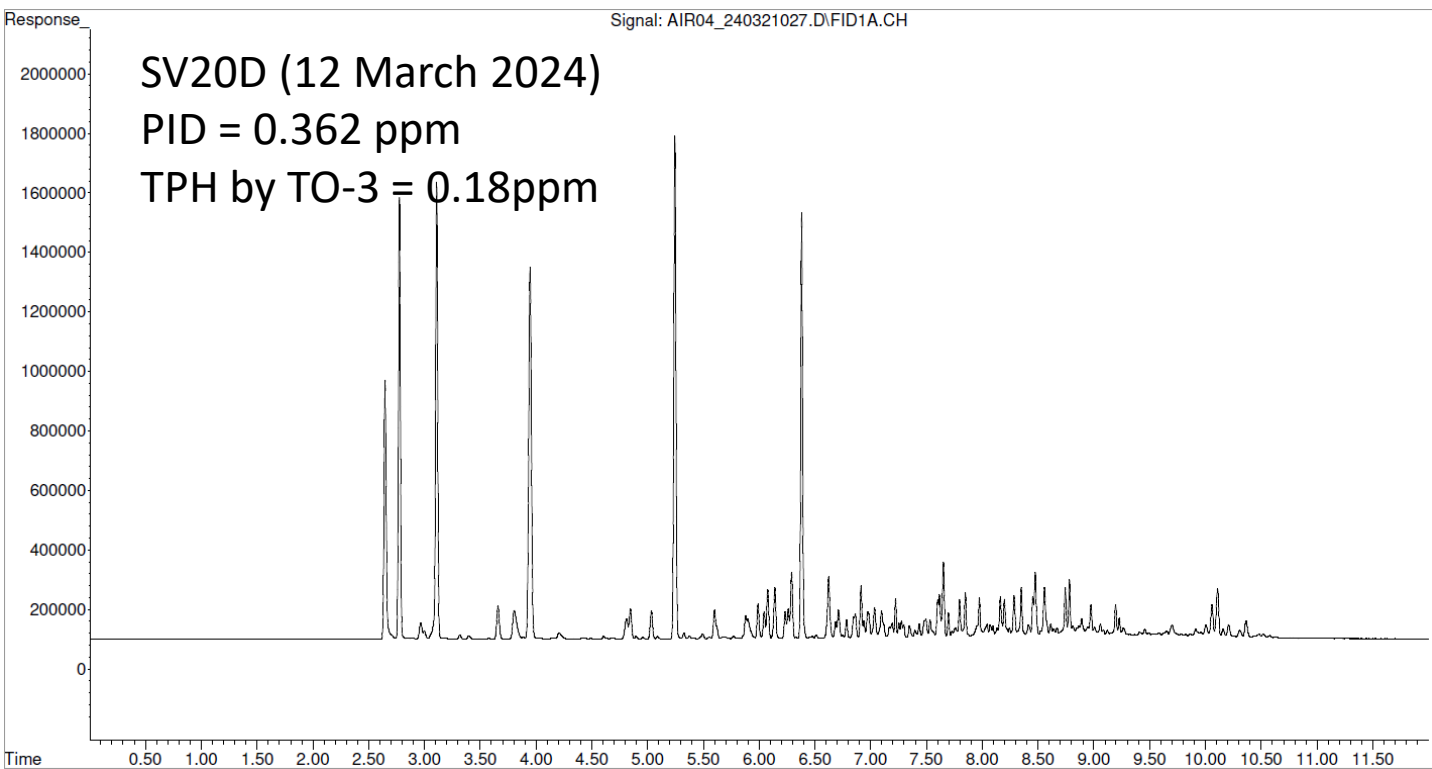
March 2024
Soil Vapor Samples
FID Chromatograms











Appendix B – Groundwater Monitoring Results, Current Reporting Period

Appendix B.1 – Analytical Program for Groundwater Samples Collected During Current Reporting Period

Appendix B.2 – Monitoring Well Measurements

Appendix B.2.1 – Free Product Gauging, Monitoring Well Headspace Measurements, and General Chemistry Parameters

Appendix B.2.2 – Monitoring Well Water Level Measurements

Appendix B.3 – Summary of Groundwater Analytical Results

Appendix B.3.1 – Groundwater Analytical Results

Appendix B.3.2 – Groundwater TPH and PAH Analytical Charts

Appendix B.4 – Chromatograms for Groundwater Detections and Exceedances

Appendix B.5 – Natural Attenuation Parameter

Appendix B.1 – Analytical Program for Groundwater Samples Collected During Current Reporting Period

Event Status Report
RH Consolidated Groundwater Program
RHS CGW UFP-QAPP

Event Name: Defueling and Monthly 2024 January

Event ID: 2137

Site	Location	Location Type	Field Sample ID	Begin Depth	End Depth	Matrix	Sample Type	Sample No.	Samp. Method	Sampling Date	Chain of Custody	Shipping Method	Shipment Tracking Number	Laboratory Shipped Date	Laboratory Receipt Date	Lab	SDG	TAT (Days)	Validation TAT (Days)	Review Type	Sampling Status	22MEE (SW8270D)	BNA SIM SGS 18 Analytes (BNASIME)	EDB SGS (SW8011)	Methane (RSK175)	NPOC (SW9060A)	Phenol SGS (SW8270)	TOC (SW9060A)	TPH Diesel and Oil SGS (SW8015C)	TPH Diesel and Oil Silica Gel EU SGS (M8015D)	TPH Gasoline SGS (M8015V)	VOCs BTEX and 12DCA SGS (SW8260D)	VOCs BTEX SGS (SW8260D)								
Halawa Correctional Facility & Alea	NMW24	WL	NMW24-WGN01LF-2401	0	0	WG	N	1	LF	2024-01-04 08:07 AM	2401SG20DF	UNITED CARGO	016-32427172	1/4/2024	1/5/2024	SGSO	FC12404	7	7	S2BVEM	Sampled; No SGC	*	*	*	*	*	*	*	*	*	*	*									
	HDMW2253-03	WL	HDMW2253-03-WGN01LF-2401	0	0	WG	N	1	LF	2024-01-05 09:30 AM	2401SG29DF	UNITED CARGO	016-32427183	1/5/2024	1/6/2024	SGSO	FC12420	7	7	S2BVEM	Sampled; No SGC	*	*	*	*	*	*	*	*	*	*	*	*								
	RHMW12A	WL	RHMW12A-WGN01LF-2401	0	0	WG	N	1	LF	2024-01-05 11:12 AM	2401SG11DF	UNITED CARGO	016-32427183	1/5/2024	1/6/2024	SGSO	FC12420	7	7	S2BVEM	Sampled; No SGC	*	*	*	*	*	*	*	*	*	*	*	*	*							
	NMW25	WL	NMW25-WGN01LF-2401	0	0	WG	N	1	LF	2024-01-04 10:30 AM	2401SG31DF	UNITED CARGO	016-32427172	1/4/2024	1/5/2024	SGSO	FC12404	7	7	S2BVEM	Sampled; No SGC	*	*	*	*	*	*	*	*	*	*	*	*	*							
	NMW30	WL	NMW30-WGN01LF-2401	0	0	WG	N	1	LF	2024-01-04 08:50 AM	2401SG35DF	UNITED CARGO	016-32427172	1/4/2024	1/5/2024	SGSO	FC12404	7	7	S2BVEM	Sampled; No SGC	*	*	*	*	*	*	*	*	*	*	*	*	*							
	NMW32	WL	NMW32-WGN01LF-2401	0	0	WG	N	1	LF	2024-01-04 10:30 AM	2401SG32DF	UNITED CARGO	016-32427172	1/4/2024	1/5/2024	SGSO	FC12404	7	7	S2BVEM	Sampled; No SGC	*	*	*	*	*	*	*	*	*	*	*	*	*	*						
	NMW33	WL	NMW33-WGN01LF-2401	0	0	WG	N	1	LF	2024-01-05 09:15 AM	2401SG34DF	UNITED CARGO	016-32427183	1/5/2024	1/6/2024	SGSO	FC12420	7	7	S2BVEM	Sampled; No SGC	*	*	*	*	*	*	*	*	*	*	*	*	*							
	S2BVEM Count																						0	7	6	7	0	7	0	7	0	7	0	7	0	7	0	7	5	2	
No Review Type																						0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Site Location Count																						0	7	6	7	0	7	0	7	0	7	0	7	0	7	0	7	0	7	5	2
Total Location Count																						0	7	6	7	0	7	0	7	0	7	0	7	0	7	0	7	0	7	5	2

Note: This event has missing samples in Event Management that are Field QC ONLY. Please refer to the Unplanned Field Samples report to view these samples.

Event Status Report
 RH Consolidated Groundwater Program
 RHS CGW UFP-QAPP

<i>S2BVEM Count</i>	32	28	1	27	32	18	28	1	28	28	23	32	1	23	30	32	12	3	32	18	14
<i>No Review Type</i>	0	0	0	0	0	0	0	0	0	0	5	0	0	5	0	0	23	33	0	0	0
<i>S4VEM Count</i>	4	4	0	4	4	0	4	0	4	4	4	4	0	4	6	4	1	0	4	0	4
<i>Site Location Count</i>	36	32	1	31	36	18	32	1	32	32	32	36	1	32	36	36	36	36	36	18	18
Total Location Count	41	37	1	36	41	20	37	1	37	37	37	41	1	37	41	41	41	41	41	19	22

Note: This event has missing samples in Event Management that are Field QC ONLY. Please refer to the Unplanned Field Samples report to view these samples.

Appendix B.2 – Monitoring Well Measurements

Appendix B.2.1 – Free Product Gauging, Monitoring Well Headspace Measurements, and General Chemistry Parameters

Red Hill Bulk Fuel Storage Facility
 Notice of Interest 20210507-0852 (6 May 2021 Event)
 Notice of Interest 20211120-2330 (20 Nov 2021 Event)
 Headspace, Fuel Product Gauging, and Parameters

HDMW2253-03 Headspace and Product Gauging							HDMW2253-03 Parameter Readings							
WEEK	DATE	AMBIENT	HEADSPACE	Raw DTW	PRODUCT?	THICKNESS	TDS	pH	Sp. Cond.	D.O.	Turbidity	TEMP	ORP	SAL
		(ppmv)	(ppmv)	(ft btoc)	(Yes/No)	(ft)	(ppm)		(mS/cm)	(mg/L)	(NTU)	(°C)	(Mv)	(psu)
02/05/2024	02/09/2024	0.0	0.0	208.05	No	-	280.41	6.39	0.43	0.59	15.54	23.19	67.7	0.21
03/11/2024	03/15/2024	0.0	0.0	208.13	No	-	279.52	6.44	0.43	0.54	17.98	23.06	103.6	0.21
NMW24 Headspace and Product Gauging							NMW24 Parameter Readings							
WEEK	DATE	AMBIENT	HEADSPACE	Raw DTW	PRODUCT?	THICKNESS	TDS	pH	Sp. Cond.	D.O.	Turbidity	TEMP	ORP	SAL
		(ppmv)	(ppmv)	(ft btoc)	(Yes/No)	(ft)	(ppm)		(mS/cm)	(mg/L)	(NTU)	(°C)	(Mv)	(psu)
02/12/2024	02/14/2024	0.0	0.0	90.78	No	-	350.48	7.06	0.54	6.00	0.26	25.32	264.6	0.26
03/18/2024	03/20/2024	0.0	0.0	90.85	No	-	378.20	7.09	0.58	5.94	0.40	25.37	263.1	0.28
04/08/2024	04/10/2024	0.0	0.1	90.84	No	-	378.80	7.00	0.58	5.95	0.70	25.80	247.3	0.30
NMW25 Headspace and Product Gauging							NMW25 Parameter Readings							
WEEK	DATE	AMBIENT	HEADSPACE	Raw DTW	PRODUCT?	THICKNESS	TDS	pH	Sp. Cond.	D.O.	Turbidity	TEMP	ORP	SAL
		(ppmv)	(ppmv)	(ft btoc)	(Yes/No)	(ft)	(ppm)		(mS/cm)	(mg/L)	(NTU)	(°C)	(Mv)	(psu)
02/12/2024	02/14/2024	0.0	0.0	190.66	No	-	907.28	7.04	1.40	7.83	0.71	26.39	257.3	0.71
03/18/2024	03/20/2024	0.0	0.0	190.72	No	-	947.70	7.10	1.46	7.82	1.30	26.50	254.5	0.74
04/08/2024	04/10/2024	0.0	0.0	190.71	No	-	916.87	6.97	1.41	7.92	1.14	26.82	260.6	0.70
NMW26 Headspace and Product Gauging							NMW26 Parameter Readings							
WEEK	DATE	AMBIENT	HEADSPACE	Raw DTW	PRODUCT?	THICKNESS	TDS	pH	Sp. Cond.	D.O.	Turbidity	TEMP	ORP	SAL
		(ppmv)	(ppmv)	(ft btoc)	(Yes/No)	(ft)	(ppm)		(mS/cm)	(mg/L)	(NTU)	(°C)	(Mv)	(psu)
01/29/2024	02/02/2024	0.0	0.0	-	No	-	257.28	7.70	0.40	0.46	8.51	27.73	198.7	0.19
02/12/2024	02/12/2024	0.0	0.0	-	No	-	238.78	7.65	0.37	0.84	1.20	25.77	-8.0	0.18
03/18/2024	03/23/2024	0.0	0.0	-	No	-	221.82	7.62	0.34	0.80	0.54	24.99	74.2	0.20
04/08/2024	04/09/2024	0.0	0.0	-	No	-	216.21	7.58	0.33	0.96	7.10	25.30	245.9	0.16
NMW30 Headspace and Product Gauging							NMW30 Parameter Readings							
WEEK	DATE	AMBIENT	HEADSPACE	Raw DTW	PRODUCT?	THICKNESS	TDS	pH	Sp. Cond.	D.O.	Turbidity	TEMP	ORP	SAL
		(ppmv)	(ppmv)	(ft btoc)	(Yes/No)	(ft)	(ppm)		(mS/cm)	(mg/L)	(NTU)	(°C)	(Mv)	(psu)
02/12/2024	02/15/2024	0.0	0.0	291.35	No	-	445.01	7.47	0.68	0.47	1.27	24.85	-48.0	0.34
03/18/2024	03/20/2024	0.0	0.0	291.43	No	-	421.34	7.46	0.65	0.51	0.90	25.20	42.0	0.32
NMW32 Headspace and Product Gauging							NMW32 Parameter Readings							
WEEK	DATE	AMBIENT	HEADSPACE	Raw DTW	PRODUCT?	THICKNESS	TDS	pH	Sp. Cond.	D.O.	Turbidity	TEMP	ORP	SAL
		(ppmv)	(ppmv)	(ft btoc)	(Yes/No)	(ft)	(ppm)		(mS/cm)	(mg/L)	(NTU)	(°C)	(Mv)	(psu)
02/12/2024	02/15/2024	0.0	0.0	170.53	No	-	680.21	7.27	1.05	5.65	0.00	25.35	223.4	0.52

Red Hill Bulk Fuel Storage Facility
Notice of Interest 20210507-0852 (6 May 2021 Event)
Notice of Interest 20211120-2330 (20 Nov 2021 Event)
Headspace, Fuel Product Gauging, and Parameters

03/18/2024	03/21/2024	0.0	0.0	170.67	No	-	686.11	7.29	1.06	5.95	0.98	25.81	266.1	0.50
NMW33 Headspace and Product Gauging							NMW33 Parameter Readings							
WEEK	DATE	AMBIENT	HEADSPACE	Raw DTW	PRODUCT?	THICKNESS	TDS	pH	Sp. Cond.	D.O.	Turbidity	TEMP	ORP	SAL
		(ppmv)	(ppmv)	(ft btoc)	(Yes/No)	(ft)	(ppm)		(mS/cm)	(mg/L)	(NTU)	(°C)	(Mv)	(psu)
02/12/2024	02/15/2024	0.0	0.0	117.69	No	-	903.23	7.63	1.39	6.60	0.08	25.22	237.3	0.70
03/18/2024	03/21/2024	0.0	0.0	117.84	No	-	917.20	7.60	1.41	6.57	0.81	25.68	266.6	0.70
NMW34 Headspace and Product Gauging							NMW34 Parameter Readings							
WEEK	DATE	AMBIENT	HEADSPACE	Raw DTW	PRODUCT?	THICKNESS	TDS	pH	Sp. Cond.	D.O.	Turbidity	TEMP	ORP	SAL
		(ppmv)	(ppmv)	(ft btoc)	(Yes/No)	(ft)	(ppm)		(mS/cm)	(mg/L)	(NTU)	(°C)	(Mv)	(psu)
03/18/2024	03/19/2024	0.0	0.0	-	No	-	489.60	6.80	0.75	5.76	0.60	25.60	292.1	0.37
04/08/2024	04/10/2024	0.0	0.0	-	No	-	451.10	6.70	0.69	5.56	0.40	25.40	290.8	0.34
RHMW01R Headspace and Product Gauging							RHMW01R Parameter Readings							
WEEK	DATE	AMBIENT	HEADSPACE	Raw DTW	PRODUCT?	THICKNESS	TDS	pH	Sp. Cond.	D.O.	Turbidity	TEMP	ORP	SAL
		(ppmv)	(ppmv)	(ft btoc)	(Yes/No)	(ft)	(ppm)		(mS/cm)	(mg/L)	(NTU)	(°C)	(Mv)	(psu)
02/12/2024	02/16/2024	0.0	0.0	83.99	No	-	189.75	6.93	0.29	0.73	0.44	23.41	-20.6	0.14
03/11/2024	03/13/2024	0.0	0.0	83.98	No	-	190.80	6.90	0.29	0.17	0.10	23.50	-52.4	0.14
04/01/2024	04/04/2024	0.0	0.0	84.06	No	-	185.36	6.91	0.29	0.13	0.11	23.41	-20.6	0.14
RHMW02 Headspace and Product Gauging							RHMW02 Parameter Readings							
WEEK	DATE	AMBIENT	HEADSPACE	Raw DTW	PRODUCT?	THICKNESS	TDS	pH	Sp. Cond.	D.O.	Turbidity	TEMP	ORP	SAL
		(ppmv)	(ppmv)	(ft btoc)	(Yes/No)	(ft)	(ppm)		(mS/cm)	(mg/L)	(NTU)	(°C)	(Mv)	(psu)
02/12/2024	02/13/2024	0.0	0.0	86.89	No	-	297.98	6.72	0.46	0.09	0.78	24.44	-138.3	0.22
03/11/2024	03/15/2024	0.0	0.0	86.91	No	-	303.37	6.61	0.47	0.09	0.33	24.47	-139.5	0.20
04/01/2024	04/04/2024	0.0	0.0	86.96	No	-	298.30	6.60	0.46	0.08	0.10	24.50	-67.2	0.20
RHMW03 Headspace and Product Gauging							RHMW03 Parameter Readings							
WEEK	DATE	AMBIENT	HEADSPACE	Raw DTW	PRODUCT?	THICKNESS	TDS	pH	Sp. Cond.	D.O.	Turbidity	TEMP	ORP	SAL
		(ppmv)	(ppmv)	(ft btoc)	(Yes/No)	(ft)	(ppm)		(mS/cm)	(mg/L)	(NTU)	(°C)	(Mv)	(psu)
02/05/2024	02/06/2024	0.0	3.1	103.18	No	-	492.00	6.80	0.80	0.60	0.80	27.20	157.2	0.37
03/11/2024	03/13/2024	0.0	0.0	103.1	No	-	503.61	6.77	0.77	0.52	0.90	27.30	198.6	0.38
04/01/2024	04/04/2024	0.0	0.0	103.2	No	-	485.80	6.73	0.75	0.50	0.67	27.03	147.3	0.40
RHMW04 Headspace and Product Gauging							RHMW04 Parameter Readings							
WEEK	DATE	AMBIENT	HEADSPACE	Raw DTW	PRODUCT?	THICKNESS	TDS	pH	Sp. Cond.	D.O.	Turbidity	TEMP	ORP	SAL
		(ppmv)	(ppmv)	(ft btoc)	(Yes/No)	(ft)	(ppm)		(mS/cm)	(mg/L)	(NTU)	(°C)	(Mv)	(psu)
02/12/2024	02/12/2024	0.0	0.0	294.4	No	-	256.64	7.34	0.39	8.78	0.36	22.97	268.8	0.19

Red Hill Bulk Fuel Storage Facility
Notice of Interest 20210507-0852 (6 May 2021 Event)
Notice of Interest 20211120-2330 (20 Nov 2021 Event)
Headspace, Fuel Product Gauging, and Parameters

03/18/2024	03/22/2024	0.0	0.0	294.48	No	-	285.57	7.29	0.44	8.68	0.00	22.60	276.8	0.21
04/08/2024	04/08/2024	0.0	0.0	294.48	No	-	265.90	7.30	0.41	8.68	0.20	22.40	245.0	0.20
RHMW05 Headspace and Product Gauging							RHMW05 Parameter Readings							
WEEK	DATE	AMBIENT	HEADSPACE	Raw DTW	PRODUCT?	THICKNESS	TDS	pH	Sp. Cond.	D.O.	Turbidity	TEMP	ORP	SAL
		(ppmv)	(ppmv)	(ft btoc)	(Yes/No)	(ft)	(ppm)		(mS/cm)	(mg/L)	(NTU)	(°C)	(Mv)	(psu)
02/12/2024	02/16/2024	0.0	0.0	83.58	No	-	197.76	7.41	0.30	7.04	0.55	22.93	242.4	0.15
03/11/2024	03/12/2024	0.0	0.0	83.59	No	-	198.40	7.37	0.31	7.76	0.18	22.98	272.8	0.20
04/01/2024	04/03/2024	0.1	0.0	83.69	No	-	209.16	7.23	0.32	7.76	0.10	22.60	247.2	0.15
RHMW06 Headspace and Product Gauging							RHMW06 Parameter Readings							
WEEK	DATE	AMBIENT	HEADSPACE	Raw DTW	PRODUCT?	THICKNESS	TDS	pH	Sp. Cond.	D.O.	Turbidity	TEMP	ORP	SAL
		(ppmv)	(ppmv)	(ft btoc)	(Yes/No)	(ft)	(ppm)		(mS/cm)	(mg/L)	(NTU)	(°C)	(Mv)	(psu)
02/05/2024	02/05/2024	0.0	0.0	241.39	No	-	1108.73	6.95	1.70	6.70	0.36	25.01	280.7	0.90
03/11/2024	03/11/2024	0.0	0.0	241.39	No	-	1093.80	6.90	1.68	6.74	0.22	24.13	235.3	0.90
04/01/2024	04/01/2024	0.0	0.0	241.41	No	-	1056.30	7.00	1.63	6.73	0.08	24.91	211.0	0.80
RHMW08 Headspace and Product Gauging							RHMW08 Parameter Readings							
WEEK	DATE	AMBIENT	HEADSPACE	Raw DTW	PRODUCT?	THICKNESS	TDS	pH	Sp. Cond.	D.O.	Turbidity	TEMP	ORP	SAL
		(ppmv)	(ppmv)	(ft btoc)	(Yes/No)	(ft)	(ppm)		(mS/cm)	(mg/L)	(NTU)	(°C)	(Mv)	(psu)
02/05/2024	02/05/2024	0.0	0.0	292.87	No	-	458.02	8.01	0.70	2.40	0.50	25.00	213.1	0.35
03/11/2024	03/11/2024	0.0	0.0	292.89	No	-	428.80	8.00	0.66	3.15	0.20	24.50	156.5	0.32
04/01/2024	04/01/2024	0.0	0.0	292.91	No	-	408.79	7.96	0.63	3.50	0.57	24.80	136.2	0.30
RHMW09 Headspace and Product Gauging							RHMW09 Parameter Readings							
WEEK	DATE	AMBIENT	HEADSPACE	Raw DTW	PRODUCT?	THICKNESS	TDS	pH	Sp. Cond.	D.O.	Turbidity	TEMP	ORP	SAL
		(ppmv)	(ppmv)	(ft btoc)	(Yes/No)	(ft)	(ppm)		(mS/cm)	(mg/L)	(NTU)	(°C)	(Mv)	(psu)
02/05/2024	02/07/2024	0.0	0.1	378.02	No	-	213.83	7.47	0.30	8.60	0.95	24.13	223.7	0.20
03/11/2024	03/12/2024	0.0	0.0	377.98	No	-	207.41	6.96	0.32	8.51	0.90	24.50	243.2	0.15
04/01/2024	04/02/2024	0.0	0.1	378.02	No	-	198.20	7.40	0.30	8.57	0.11	23.92	273.7	0.15
RHMW10 Headspace and Product Gauging							RHMW10 Parameter Readings							
WEEK	DATE	AMBIENT	HEADSPACE	Raw DTW	PRODUCT?	THICKNESS	TDS	pH	Sp. Cond.	D.O.	Turbidity	TEMP	ORP	SAL
		(ppmv)	(ppmv)	(ft btoc)	(Yes/No)	(ft)	(ppm)		(mS/cm)	(mg/L)	(NTU)	(°C)	(Mv)	(psu)
02/05/2024	02/07/2024	0.0	0.2	477.97	No	-	173.70	7.40	0.27	8.58	0.63	24.21	227.3	0.10
03/11/2024	03/15/2024	0.0	0.0	477.96	No	-	179.00	7.40	0.28	8.49	0.40	24.80	303.2	0.13
04/01/2024	04/05/2024	0.0	0.0	478.08	No	-	206.30	7.40	0.32	8.53	0.00	23.20	298.3	0.15
RHMW11-05 Headspace and Product Gauging							RHMW11-05 Parameter Readings							

Red Hill Bulk Fuel Storage Facility
Notice of Interest 20210507-0852 (6 May 2021 Event)
Notice of Interest 20211120-2330 (20 Nov 2021 Event)
Headspace, Fuel Product Gauging, and Parameters

WEEK	DATE	AMBIENT	HEADSPACE	Raw DTW	PRODUCT?	THICKNESS	TDS	pH	Sp. Cond.	D.O.	Turbidity	TEMP	ORP	SAL
		(ppmv)	(ppmv)	(ft btoc)	(Yes/No)	(ft)	(ppm)		(mS/cm)	(mg/L)	(NTU)	(°C)	(Mv)	(psu)
02/05/2024	02/07/2024	0.0	0.0	-	No	-	266.30	7.90	0.41	1.30	0.10	26.00	-12.9	0.20
03/11/2024	03/13/2024	0.0	0.0	-	No	-	278.20	7.60	0.43	1.59	0.50	25.00	-39.0	0.20
04/01/2024	04/03/2024	0.0	0.0	-	No	-	283.80	8.10	0.44	1.60	0.30	25.40	9.0	0.21
RHMW12A Headspace and Product Gauging							RHMW12A Parameter Readings							
WEEK	DATE	AMBIENT	HEADSPACE	Raw DTW	PRODUCT?	THICKNESS	TDS	pH	Sp. Cond.	D.O.	Turbidity	TEMP	ORP	SAL
		(ppmv)	(ppmv)	(ft btoc)	(Yes/No)	(ft)	(ppm)		(mS/cm)	(mg/L)	(NTU)	(°C)	(Mv)	(psu)
02/12/2024	02/12/2024	0.0	0.0	220.89	No	-	194.84	8.08	0.30	6.95	0.54	24.65	224.6	0.14
03/18/2024	03/18/2024	0.0	0.0	220.87	No	-	199.00	8.30	0.31	6.85	0.60	24.60	226.3	0.15
04/08/2024	04/08/2024	0.0	0.0	220.95	No	-	198.90	8.30	0.31	6.91	0.85	25.98	192.3	0.20
RHMW13-04 Headspace and Product Gauging							RHMW13-04 Parameter Readings							
WEEK	DATE	AMBIENT	HEADSPACE	Raw DTW	PRODUCT?	THICKNESS	TDS	pH	Sp. Cond.	D.O.	Turbidity	TEMP	ORP	SAL
		(ppmv)	(ppmv)	(ft btoc)	(Yes/No)	(ft)	(ppm)		(mS/cm)	(mg/L)	(NTU)	(°C)	(Mv)	(psu)
02/12/2024	02/16/2024	0.0	0.0	-	No	-	193.77	7.82	0.30	2.37	0.66	21.73	195.0	0.14
03/18/2024	03/18/2024	0.0	0.0	-	No	-	227.80	8.10	0.35	1.35	0.30	22.90	148.5	0.20
04/08/2024	04/08/2024	0.0	0.0	-	No	-	230.10	7.70	0.35	4.27	0.00	24.80	207.2	0.17
RHMW14-03 Headspace and Product Gauging							RHMW14-03 Parameter Readings							
WEEK	DATE	AMBIENT	HEADSPACE	Raw DTW	PRODUCT?	THICKNESS	TDS	pH	Sp. Cond.	D.O.	Turbidity	TEMP	ORP	SAL
		(ppmv)	(ppmv)	(ft btoc)	(Yes/No)	(ft)	(ppm)		(mS/cm)	(mg/L)	(NTU)	(°C)	(Mv)	(psu)
02/05/2024	02/07/2024	0.0	0.0	-	No	-	195.62	7.60	0.30	2.60	0.10	26.30	127.5	0.14
03/11/2024	03/13/2024	0.0	0.0	-	No	-	195.54	7.84	0.30	2.03	0.30	23.20	175.0	0.14
04/01/2024	04/03/2024	0.0	0.0	-	No	-	199.20	7.90	0.31	2.78	0.14	24.92	209.0	0.20
RHMW15-05 Headspace and Product Gauging							RHMW15-05 Parameter Readings							
WEEK	DATE	AMBIENT	HEADSPACE	Raw DTW	PRODUCT?	THICKNESS	TDS	pH	Sp. Cond.	D.O.	Turbidity	TEMP	ORP	SAL
		(ppmv)	(ppmv)	(ft btoc)	(Yes/No)	(ft)	(ppm)		(mS/cm)	(mg/L)	(NTU)	(°C)	(Mv)	(psu)
02/05/2024	02/05/2024	0.0	0.3	-	No	-	202.50	7.90	0.31	1.80	0.40	24.30	146.9	0.15
03/11/2024	03/11/2024	0.0	0.0	-	No	-	224.40	7.80	0.35	2.25	0.16	23.40	196.3	0.17
04/01/2024	04/01/2024	0.0	0.0	-	No	-	215.50	7.80	0.33	1.92	0.70	28.70	185.3	0.16
RHMW16 Headspace and Product Gauging							RHMW16 Parameter Readings							
WEEK	DATE	AMBIENT	HEADSPACE	Raw DTW	PRODUCT?	THICKNESS	TDS	pH	Sp. Cond.	D.O.	Turbidity	TEMP	ORP	SAL
		(ppmv)	(ppmv)	(ft btoc)	(Yes/No)	(ft)	(ppm)		(mS/cm)	(mg/L)	(NTU)	(°C)	(Mv)	(psu)
02/05/2024	02/05/2024	0.0	0.0	202.13	No	-	250.70	8.10	0.39	8.48	0.10	23.90	233.0	0.20

Red Hill Bulk Fuel Storage Facility
Notice of Interest 20210507-0852 (6 May 2021 Event)
Notice of Interest 20211120-2330 (20 Nov 2021 Event)
Headspace, Fuel Product Gauging, and Parameters

03/11/2024	03/11/2024	0.0	0.0	202.1	No	-	236.00	7.90	0.36	8.67	0.32	24.41	218.6	0.20
04/01/2024	04/01/2024	0.0	0.0	202.11	No	-	222.80	8.00	0.34	8.67	0.22	25.28	216.8	0.20
RHMW17 Headspace and Product Gauging							RHMW17 Parameter Readings							
WEEK	DATE	AMBIENT	HEADSPACE	Raw DTW	PRODUCT?	THICKNESS	TDS	pH	Sp. Cond.	D.O.	Turbidity	TEMP	ORP	SAL
		(ppmv)	(ppmv)	(ft btoc)	(Yes/No)	(ft)	(ppm)		(mS/cm)	(mg/L)	(NTU)	(°C)	(Mv)	(psu)
02/05/2024	02/09/2024	0.0	0.0	234.69	No	-	235.30	7.40	0.36	4.06	0.90	23.70	243.1	0.17
03/18/2024	03/18/2024	0.0	0.0	234.72	No	-	256.70	7.49	0.39	4.07	0.20	23.30	220.3	0.19
04/08/2024	04/10/2024	0.0	0.0	234.77	No	-	230.00	7.40	0.35	4.40	0.29	24.06	260.7	0.20
RHMW18 Headspace and Product Gauging							RHMW18 Parameter Readings							
WEEK	DATE	AMBIENT	HEADSPACE	Raw DTW	PRODUCT?	THICKNESS	TDS	pH	Sp. Cond.	D.O.	Turbidity	TEMP	ORP	SAL
		(ppmv)	(ppmv)	(ft btoc)	(Yes/No)	(ft)	(ppm)		(mS/cm)	(mg/L)	(NTU)	(°C)	(Mv)	(psu)
02/12/2024	02/15/2024	0.0	0.0	-	No	-	239.64	8.74	0.37	0.74	0.88	24.38	26.4	0.18
03/18/2024	03/21/2024	0.0	0.0	-	No	-	240.40	9.20	0.37	0.77	1.07	24.24	67.6	0.18
RHMW19 Headspace and Product Gauging							RHMW19 Parameter Readings							
WEEK	DATE	AMBIENT	HEADSPACE	Raw DTW	PRODUCT?	THICKNESS	TDS	pH	Sp. Cond.	D.O.	Turbidity	TEMP	ORP	SAL
		(ppmv)	(ppmv)	(ft btoc)	(Yes/No)	(ft)	(ppm)		(mS/cm)	(mg/L)	(NTU)	(°C)	(Mv)	(psu)
02/05/2024	02/07/2024	0.1	0.1	426.97	No	-	182.90	7.60	0.30	8.70	1.17	24.76	190.6	0.14
03/11/2024	03/12/2024	0.0	0.0	426.93	No	-	178.95	7.67	0.28	8.58	0.80	24.90	220.9	0.10
04/01/2024	04/02/2024	0.0	0.0	426.99	No	-	171.30	7.60	0.26	8.62	0.89	25.19	253.0	0.13
RHMW20 Headspace and Product Gauging							RHMW20 Parameter Readings							
WEEK	DATE	AMBIENT	HEADSPACE	Raw DTW	PRODUCT?	THICKNESS	TDS	pH	Sp. Cond.	D.O.	Turbidity	TEMP	ORP	SAL
		(ppmv)	(ppmv)	(ft btoc)	(Yes/No)	(ft)	(ppm)		(mS/cm)	(mg/L)	(NTU)	(°C)	(Mv)	(psu)
02/05/2024	02/09/2024	0.0	0.0	238.02	No	-	1165.70	7.20	1.80	5.80	0.75	23.45	234.3	0.90
03/18/2024	03/22/2024	0.0	0.0	238.15	No	-	1221.90	7.10	1.88	5.95	0.83	24.26	247.0	1.00
RHMW2254-01 Headspace and Product Gauging							RHMW2254-01 Parameter Readings							
WEEK	DATE	AMBIENT	HEADSPACE	Raw DTW	PRODUCT?	THICKNESS	TDS	pH	Sp. Cond.	D.O.	Turbidity	TEMP	ORP	SAL
		(ppmv)	(ppmv)	(ft btoc)	(Yes/No)	(ft)	(ppm)		(mS/cm)	(mg/L)	(NTU)	(°C)	(Mv)	(psu)
02/12/2024	02/13/2024	0.0	0.0	88.47	No	-	380.47	7.58	0.59	8.55	0.59	21.91	258.9	0.29
03/11/2024	03/15/2024	0.0	0.0	88.58	No	-	379.02	7.51	0.58	8.60	0.31	21.80	282.4	0.30
04/01/2024	04/02/2024	0.2	0.2	88.78	No	-	387.50	7.50	0.60	8.20	0.10	22.20	212.6	0.30
RHP01 Headspace and Product Gauging							RHP01 Parameter Readings							
WEEK	DATE	AMBIENT	HEADSPACE	Raw DTW	PRODUCT?	THICKNESS	TDS	pH	Sp. Cond.	D.O.	Turbidity	TEMP	ORP	SAL
		(ppmv)	(ppmv)	(ft btoc)	(Yes/No)	(ft)	(ppm)		(mS/cm)	(mg/L)	(NTU)	(°C)	(Mv)	(psu)

Red Hill Bulk Fuel Storage Facility
Notice of Interest 20210507-0852 (6 May 2021 Event)
Notice of Interest 20211120-2330 (20 Nov 2021 Event)
Headspace, Fuel Product Gauging, and Parameters

02/05/2024	02/08/2024	0.0	0.0	139.44	No	-	426.78	6.65	0.66	6.84	0.90	24.00	189.0	0.30
03/11/2024	03/11/2024	0.0	0.0	139.49	No	-	445.62	6.90	0.69	6.81	0.12	24.57	180.0	0.30
04/01/2024	04/01/2024	0.0	0.1	139.54	No	-	432.00	6.90	0.66	6.78	0.06	23.95	278.8	0.30
RHP02 Headspace and Product Gauging							RHP02 Parameter Readings							
WEEK	DATE	AMBIENT	HEADSPACE	Raw DTW	PRODUCT?	THICKNESS	TDS	pH	Sp. Cond.	D.O.	Turbidity	TEMP	ORP	SAL
		(ppmv)	(ppmv)	(ft btoc)	(Yes/No)	(ft)	(ppm)		(mS/cm)	(mg/L)	(NTU)	(°C)	(Mv)	(psu)
02/05/2024	02/08/2024	0.0	0.1	122.33	No	-	448.40	6.91	0.70	7.80	0.35	24.10	230.7	0.30
03/11/2024	03/14/2024	0.0	0.0	122.3	No	-	454.20	6.90	0.70	7.76	0.00	24.51	299.1	0.30
04/01/2024	04/04/2024	0.0	0.0	122.41	No	-	489.70	6.90	0.75	7.75	0.00	24.66	302.0	0.40
RHP03 Headspace and Product Gauging							RHP03 Parameter Readings							
WEEK	DATE	AMBIENT	HEADSPACE	Raw DTW	PRODUCT?	THICKNESS	TDS	pH	Sp. Cond.	D.O.	Turbidity	TEMP	ORP	SAL
		(ppmv)	(ppmv)	(ft btoc)	(Yes/No)	(ft)	(ppm)		(mS/cm)	(mg/L)	(NTU)	(°C)	(Mv)	(psu)
02/05/2024	02/08/2024	0.0	0.0	119.13	No	-	665.00	7.26	1.00	4.60	0.19	24.15	131.1	0.50
03/11/2024	03/14/2024	0.0	0.0	119.13	No	-	656.54	7.29	1.01	4.67	0.10	24.70	271.1	0.50
04/01/2024	04/04/2024	0.0	0.0	119.22	No	-	674.70	7.30	1.04	4.70	0.00	24.57	255.7	0.50
RHP04A Headspace and Product Gauging							RHP04A Parameter Readings							
WEEK	DATE	AMBIENT	HEADSPACE	Raw DTW	PRODUCT?	THICKNESS	TDS	pH	Sp. Cond.	D.O.	Turbidity	TEMP	ORP	SAL
		(ppmv)	(ppmv)	(ft btoc)	(Yes/No)	(ft)	(ppm)		(mS/cm)	(mg/L)	(NTU)	(°C)	(Mv)	(psu)
02/05/2024	02/09/2024	0.0	0.0	140.1	No	-	601.60	7.40	0.93	3.82	0.63	25.72	154.5	0.50
03/11/2024	03/14/2024	0.0	0.0	140.09	No	-	655.52	7.16	1.01	3.69	0.00	25.60	226.9	0.50
04/01/2024	04/04/2024	0.0	0.0	140.17	No	-	626.80	7.30	0.96	3.93	0.00	24.76	246.3	0.50
RHP04B Headspace and Product Gauging							RHP04B Parameter Readings							
WEEK	DATE	AMBIENT	HEADSPACE	Raw DTW	PRODUCT?	THICKNESS	TDS	pH	Sp. Cond.	D.O.	Turbidity	TEMP	ORP	SAL
		(ppmv)	(ppmv)	(ft btoc)	(Yes/No)	(ft)	(ppm)		(mS/cm)	(mg/L)	(NTU)	(°C)	(Mv)	(psu)
02/12/2024	02/14/2024	0.0	0.0	139.11	No	-	381.45	7.92	0.59	0.22	0.42	25.19	-160.7	0.29
03/18/2024	03/19/2024	0.0	0.0	139.23	No	-	376.88	7.97	0.58	0.19	0.30	25.40	-221.9	0.30
04/08/2024	04/09/2024	0.0	0.0	139.26	No	-	381.80	7.90	0.59	0.17	0.18	25.25	-124.8	0.30
RHP04C Headspace and Product Gauging							RHP04C Parameter Readings							
WEEK	DATE	AMBIENT	HEADSPACE	Raw DTW	PRODUCT?	THICKNESS	TDS	pH	Sp. Cond.	D.O.	Turbidity	TEMP	ORP	SAL
		(ppmv)	(ppmv)	(ft btoc)	(Yes/No)	(ft)	(ppm)		(mS/cm)	(mg/L)	(NTU)	(°C)	(Mv)	(psu)
02/12/2024	02/14/2024	0.0	0.0	138.42	No	-	948.27	7.48	1.46	0.55	0.27	25.01	86.8	0.74
03/18/2024	03/19/2024	0.0	0.0	138.51	No	-	921.16	7.51	1.42	0.40	0.24	25.31	74.6	0.70
04/08/2024	04/09/2024	0.0	0.0	138.57	No	-	937.30	7.50	1.44	0.37	0.26	25.69	115.4	0.70

Red Hill Bulk Fuel Storage Facility
 Notice of Interest 20210507-0852 (6 May 2021 Event)
 Notice of Interest 20211120-2330 (20 Nov 2021 Event)
 Headspace, Fuel Product Gauging, and Parameters

RHP05 Headspace and Product Gauging							RHP05 Parameter Readings							
WEEK	DATE	AMBIENT	HEADSPACE	Raw DTW	PRODUCT?	THICKNESS	TDS	pH	Sp. Cond.	D.O.	Turbidity	TEMP	ORP	SAL
		(ppmv)	(ppmv)	(ft btoc)	(Yes/No)	(ft)	(ppm)		(mS/cm)	(mg/L)	(NTU)	(°C)	(Mv)	(psu)
02/05/2024	02/08/2024	0.0	0.0	212.87	No	-	612.94	7.23	0.90	6.30	0.20	25.30	197.4	0.47
03/11/2024	03/14/2024	0.0	0.1	212.86	No	-	607.80	7.20	0.94	6.35	1.12	25.57	289.1	0.50
04/01/2024	04/05/2024	0.0	0.0	212.95	No	-	593.36	7.13	0.91	6.18	0.80	25.80	252.7	0.45
RHP06 Headspace and Product Gauging							RHP06 Parameter Readings							
WEEK	DATE	AMBIENT	HEADSPACE	Raw DTW	PRODUCT?	THICKNESS	TDS	pH	Sp. Cond.	D.O.	Turbidity	TEMP	ORP	SAL
		(ppmv)	(ppmv)	(ft btoc)	(Yes/No)	(ft)	(ppm)		(mS/cm)	(mg/L)	(NTU)	(°C)	(Mv)	(psu)
02/05/2024	02/08/2024	0.0	0.0	253.35	No	-	647.96	7.01	1.00	7.20	0.40	25.60	192.1	0.50
03/11/2024	03/14/2024	0.0	0.0	253.3	No	-	641.40	7.10	0.99	7.31	1.10	25.60	295.5	0.49
04/01/2024	04/05/2024	0.0	0.0	253.4	No	-	617.20	6.90	0.95	7.28	0.60	24.80	228.2	0.50
RHP07 Headspace and Product Gauging							RHP07 Parameter Readings							
WEEK	DATE	AMBIENT	HEADSPACE	Raw DTW	PRODUCT?	THICKNESS	TDS	pH	Sp. Cond.	D.O.	Turbidity	TEMP	ORP	SAL
		(ppmv)	(ppmv)	(ft btoc)	(Yes/No)	(ft)	(ppm)		(mS/cm)	(mg/L)	(NTU)	(°C)	(Mv)	(psu)
02/05/2024	02/06/2024	0.3	0.2	83.17	No	-	373.65	7.18	0.60	8.00	0.70	23.20	213.4	0.28
03/11/2024	03/12/2024	0.0	0.0	83.14	No	-	369.40	7.20	0.57	8.18	1.20	23.10	252.6	0.28
04/01/2024	04/02/2024	0.0	0.0	83.21	No	-	387.50	7.20	0.60	7.76	0.43	23.10	236.8	0.30
RHP08 Headspace and Product Gauging							RHP08 Parameter Readings							
WEEK	DATE	AMBIENT	HEADSPACE	Raw DTW	PRODUCT?	THICKNESS	TDS	pH	Sp. Cond.	D.O.	Turbidity	TEMP	ORP	SAL
		(ppmv)	(ppmv)	(ft btoc)	(Yes/No)	(ft)	(ppm)		(mS/cm)	(mg/L)	(NTU)	(°C)	(Mv)	(psu)
02/05/2024	02/07/2024	0.0	7.5	285.51	No	-	381.40	7.70	0.59	6.07	1.68	24.72	176.9	0.30
03/18/2024	03/18/2024	0.0	0.0	285.53	No	-	384.47	7.71	0.59	6.68	1.72	25.12	251.0	0.30
04/01/2024	04/05/2024	0.0	0.0	285.6	No	-	447.50	7.70	0.69	6.65	8.50	25.20	263.9	0.30

Red Hill Bulk Fuel Storage Facility
Notice of Interest 20210507-0852 (6 May 2021 Event)
Notice of Interest 20211120-2330 (20 Nov 2021 Event)
Headspace, Fuel Product Gauging, and Parameters

Notes:

NM = No measurement taken, due to equipment installed in well.

DTW = Depth-to-water

ft = feet

ft btoc = feet below top of casing

- = Not applicable / no data available

ppmv = parts-per-million by volume

Depth to water measurements correction factors for Solinst groundwater-level measuring tapes N-1 through N-6 using the USGS calibration results are published in letters titled "Results from Calibration of Groundwater-Level Measuring Tapes" dated January 24, 2020 (N-1 and N-2) and December 14, 2022 (N 1, N-2, N-3, N-4, N 5 and N-6). Depth to water measurements correction factors for horizontal well displacement are derived from gyroscopic survey results for wells RHMW01R through RHMW19, OWDFMW01 through OWDFMW08A, HDMW2253-03, NMW24, RHP01 through RHP04A, RHP04C, and RHP07 and are pending results for wells RHMW20, RHP04B, and RHP05. Groundwater-level measuring tape and horizontal displacement correction factors for N-1 through N-6 for all wells are shown on "Correction Factor Tables".

All Westbay Wells - Westbay is a closed system and the sample port is not located at the water's surface, therefore free product will not be captured or observed. Headspace is measured from Westbay wells for almost all canister pulls. The highest reading measured for each sample is shown in this spreadsheet. Samples collected from Westbay wells are observed for free product during collection and will be noted.

RHP01 - 06/16/2023: Well added as part of the consolidated groundwater sampling program

RHP02 - 06/16/2023: Well added as part of the consolidated groundwater sampling program

RHP03 - 06/16/2023: Well added as part of the consolidated groundwater sampling program

RHP04A - 06/14/2023: Well added as part of the consolidated groundwater sampling program

RHP04B - 06/14/2023: Well added as part of the consolidated groundwater sampling program

RHP04C - 06/16/2023: Well added as part of the consolidated groundwater sampling program

RHP05 - 06/16/2023: Well added as part of the consolidated groundwater sampling program

RHP06 - 07/24/2023: Well added as part of the consolidated groundwater sampling program

RHP07 - 06/15/2023: Well added as part of the consolidated groundwater sampling program

RHP08 - 09/11/2023: Well added as part of the consolidated groundwater sampling program

NMW24 - 06/07/2023: Well added as part of the consolidated groundwater sampling program

NMW25 - 07/26/2023: Well added as part of the consolidated groundwater sampling program

NMW32 - 08/29/2023: Well added as part of the consolidated groundwater sampling program

RHMW03 - 09/07/2023: AquaTroll turbidity sensor wiper not turned on or missing causing bubbles to accumulate on the turbidity sensor and affecting parameter accuracy.

RHMW10 - 06/12/2023: Well added as part of the consolidated groundwater sampling program

RHMW10- 12/13/2023: AquaTroll specific conductivity/TDS/salinity sensor malfunction resulting in loss of recordable data. Parameter stabilization criteria met prior to sampling.

RHMW13 Zone 5 - 09/05/2023: Temperature reading higher than expected due to issue with temperature sensor.

Red Hill Bulk Fuel Storage Facility

Notice of Interest 20210507-0852 (6 May 2021 Event)

Notice of Interest 20211120-2330 (20 Nov 2021 Event)

Headspace, Fuel Product Gauging, and Parameters

RHMW12A - All readings: Well screen is submerged and does not span the water's surface, therefore free product will not be captured or observed. Wells with submerged screens have a one-time bailer sample collected to verify no free product at the water's surface.

RHMW16 - All readings: Well screen is submerged and does not span the water's surface, therefore free product will not be captured or observed. Wells with submerged screens have a one-time bailer sample collected to verify no free product at the water's surface.

RHMW20 - 06/14/2023: Well added as part of the consolidated groundwater sampling program

Red Hill Bulk Fuel Storage Facility
Notice of Interest 20210507-0852 (6 May 2021 Event)
Notice of Interest 20211120-2330 (20 Nov 2021 Event)
Headspace, Fuel Product Gauging, and Parameters

Tape Correction

Serial Number	Calibration Date	Beginning Depth (ft)	End Depth (ft)	Correction (ft)
N-1	2017	0.00	6.41	0.00
N-1	2017	6.42	14.02	0.00
N-1	2017	14.03	52.17	-0.01
N-1	2017	52.18	90.33	-0.02
N-1	2017	90.34	128.49	-0.03
N-1	2017	128.50	166.64	-0.04
N-1	2017	166.65	204.80	-0.05
N-1	2017	204.81	242.96	-0.06
N-1	2017	242.97	392.45	-0.07
N-1	2017	392.46	500.00	-0.07
N-2	2017	0.00	6.40	0.01
N-2	2017	6.41	8.23	0.01
N-2	2017	8.24	80.71	0.00
N-2	2017	80.72	161.31	-0.01
N-2	2017	161.32	253.61	-0.02
N-2	2017	253.62	364.91	-0.03
N-2	2017	364.92	516.53	-0.04
N-2	2017	516.54	593.17	-0.05
N-2	2017	593.18	764.02	-0.05
N-2	2017	764.03	1000.00	-0.06
N-1	2019	0.00	6.30	0.00
N-1	2019	6.31	29.17	0.00
N-1	2019	29.18	108.72	-0.01
N-1	2019	108.73	188.27	-0.02
N-1	2019	188.28	267.83	-0.03
N-1	2019	267.84	347.38	-0.04
N-1	2019	347.39	392.07	-0.05
N-1	2019	392.08	426.93	-0.05
N-1	2019	426.94	500.00	-0.06
N-2	2019	0.00	6.29	0.00
N-2	2019	6.30	48.47	0.00

Red Hill Bulk Fuel Storage Facility
Notice of Interest 20210507-0852 (6 May 2021 Event)
Notice of Interest 20211120-2330 (20 Nov 2021 Event)
Headspace, Fuel Product Gauging, and Parameters

N-2	2019	48.48	113.38	-0.01
N-2	2019	113.39	181.28	-0.02
N-2	2019	181.29	252.63	-0.03
N-2	2019	252.64	328.02	-0.04
N-2	2019	328.03	408.23	-0.05
N-2	2019	408.24	494.31	-0.06
N-2	2019	494.32	587.79	-0.07
N-2	2019	587.80	592.86	-0.08
N-2	2019	592.87	690.98	-0.08
N-2	2019	690.99	807.72	-0.09
N-2	2019	807.73	945.40	-0.10
N-2	2019	945.41	1000.00	-0.11
N-1	2022	0.00	18.17	0.01
N-1	2022	18.18	24.44	0.01
N-1	2022	24.45	49.50	0.00
N-1	2022	49.51	74.57	-0.01
N-1	2022	74.58	99.64	-0.02
N-1	2022	99.65	124.71	-0.03
N-1	2022	124.72	149.78	-0.04
N-1	2022	149.79	174.84	-0.05
N-1	2022	174.85	199.91	-0.06
N-1	2022	199.92	224.98	-0.07
N-1	2022	224.99	250.05	-0.08
N-1	2022	250.06	275.11	-0.09
N-1	2022	275.12	393.17	-0.10
N-1	2022	393.18	500.00	-0.10
N-2	2022	0.00	7.39	-0.01
N-2	2022	7.40	18.18	-0.02
N-2	2022	18.19	28.82	-0.02
N-2	2022	28.83	51.17	-0.03
N-2	2022	51.18	74.58	-0.04
N-2	2022	74.59	99.21	-0.05
N-2	2022	99.22	125.27	-0.06

Red Hill Bulk Fuel Storage Facility
Notice of Interest 20210507-0852 (6 May 2021 Event)
Notice of Interest 20211120-2330 (20 Nov 2021 Event)
Headspace, Fuel Product Gauging, and Parameters

N-2	2022	125.28	153.06	-0.07
N-2	2022	153.07	182.96	-0.08
N-2	2022	182.97	215.55	-0.09
N-2	2022	215.56	251.71	-0.10
N-2	2022	251.72	292.97	-0.11
N-2	2022	292.98	342.39	-0.12
N-2	2022	342.40	408.44	-0.13
N-2	2022	408.45	685.51	-0.14
N-2	2022	685.52	751.56	-0.13
N-2	2022	751.57	800.98	-0.12
N-2	2022	800.99	831.56	-0.11
N-2	2022	831.57	842.44	-0.11
N-2	2022	842.45	882.26	-0.10
N-2	2022	882.27	922.08	-0.09
N-2	2022	922.09	961.90	-0.08
N-2	2022	961.91	1000.00	-0.07
N-3	2022	0.00	7.03	0.00
N-3	2022	7.04	18.18	-0.01
N-3	2022	18.19	20.83	-0.01
N-3	2022	20.84	35.47	-0.02
N-3	2022	35.48	51.15	-0.03
N-3	2022	51.16	68.11	-0.04
N-3	2022	68.12	86.74	-0.05
N-3	2022	86.75	107.64	-0.06
N-3	2022	107.65	131.96	-0.07
N-3	2022	131.97	162.22	-0.08
N-3	2022	162.23	208.21	-0.09
N-3	2022	208.22	308.99	-0.10
N-3	2022	309.00	354.98	-0.09
N-3	2022	354.99	385.24	-0.08
N-3	2022	385.25	393.15	-0.07
N-3	2022	393.16	410.56	-0.07
N-3	2022	410.57	435.64	-0.06

Red Hill Bulk Fuel Storage Facility
Notice of Interest 20210507-0852 (6 May 2021 Event)
Notice of Interest 20211120-2330 (20 Nov 2021 Event)
Headspace, Fuel Product Gauging, and Parameters

N-3	2022	435.65	460.72	-0.05
N-3	2022	460.73	485.80	-0.04
N-3	2022	485.81	500.00	-0.03
N-4	2022	0.00	0.48	-0.01
N-4	2022	0.49	11.83	-0.02
N-4	2022	11.84	18.19	-0.03
N-4	2022	18.20	23.66	-0.03
N-4	2022	23.67	36.04	-0.04
N-4	2022	36.05	49.06	-0.05
N-4	2022	49.07	62.83	-0.06
N-4	2022	62.84	77.49	-0.07
N-4	2022	77.50	93.25	-0.08
N-4	2022	93.26	110.39	-0.09
N-4	2022	110.40	129.36	-0.10
N-4	2022	129.37	150.90	-0.11
N-4	2022	150.91	176.49	-0.12
N-4	2022	176.50	209.96	-0.13
N-4	2022	209.97	368.42	-0.14
N-4	2022	368.43	393.21	-0.13
N-4	2022	393.22	402.24	-0.13
N-4	2022	402.25	433.12	-0.12
N-4	2022	433.13	463.99	-0.11
N-4	2022	464.00	494.86	-0.10
N-4	2022	494.87	500.00	-0.09
N-5	2022	0.00	3.66	0.03
N-5	2022	3.67	18.14	0.02
N-5	2022	18.15	32.69	0.02
N-5	2022	32.70	64.83	0.01
N-5	2022	64.84	101.37	0.00
N-5	2022	101.38	144.83	-0.01
N-5	2022	144.84	201.87	-0.02
N-5	2022	201.88	393.11	-0.03
N-5	2022	393.12	500.00	-0.03

Red Hill Bulk Fuel Storage Facility
Notice of Interest 20210507-0852 (6 May 2021 Event)
Notice of Interest 20211120-2330 (20 Nov 2021 Event)
Headspace, Fuel Product Gauging, and Parameters

N-6	2022	0.00	6.02	-0.03
N-6	2022	6.03	18.20	-0.04
N-6	2022	18.21	37.84	-0.04
N-6	2022	37.85	72.83	-0.05
N-6	2022	72.84	112.18	-0.06
N-6	2022	112.19	158.10	-0.07
N-6	2022	158.11	215.65	-0.08
N-6	2022	215.66	305.93	-0.09
N-6	2022	305.94	393.17	-0.10
N-6	2022	393.18	750.00	-0.10

Tape calibration conducted by USGS on: September 13 - 15, 2017; September 11 - 13, 2019; and September 20 - 22, 2022

Tape Correction for Week of September 19, 2022

Well	Rental Oil/Water Interface Probe SN	Rental Oil/Water Interface Probe DTW (ft)	Reference Oil/Water Interface Probe SN	Reference Oil/Water Interface Probe DTW (ft)	Oil/Water Interface Probe Offset (ft)
RHMW01R	01-8854	83.80	N-3	83.78	-0.02
RHMW02	01-8854	86.70	N-3	86.69	-0.01
RHMW03	01-8854	102.93	N-3	102.90	-0.03
RHMW04	01-8854	294.30	N-5	294.10	-0.20
RHMW05	01-8854	83.40	N-3	83.40	0.00
RHMW06	01-8854	241.25	N-5	241.09	-0.16
RHMW08	01-8854	292.81	N-5	292.61	-0.20
RHMW09	01-8607	378.09	N-3	377.77	-0.32
RHMW12A	01-8854	220.85	N-4	220.81	-0.04
RHMW16	01-8854	202.07	N-4	202.01	-0.06
RHMW17	01-8854	234.51	N-3	234.41	-0.10
RHMW19	01-8607	427.27	N-3	426.90	-0.37
RHMW2254-01	01-8859	88.45	N-3	88.51	0.06
OWDFMW01	287303	120.49	N-3	120.38	-0.11
OWDFMW04A	25142	149.17	N-4	149.16	-0.01
OWDFMW05A	25142	100.98	N-4	100.98	0.00

Red Hill Bulk Fuel Storage Facility
Notice of Interest 20210507-0852 (6 May 2021 Event)
Notice of Interest 20211120-2330 (20 Nov 2021 Event)
Headspace, Fuel Product Gauging, and Parameters

OWDFMW07A	25142	101.77	N-4	101.77	0.00
OWDFMW08A	25142	115.93	N-4	115.93	0.00

Red Hill Bulk Fuel Storage Facility
Notice of Interest 20210507-0852 (6 May 2021 Event)
Notice of Interest 20211120-2330 (20 Nov 2021 Event)
Headspace, Fuel Product Gauging, and Parameters

Monitoring Well Horizontal Displacement

Well	Horizontal Displacement Correction (ft)
RHMW01	None
RHMW01R	-0.06
RHMW02	-0.06
RHMW03	-0.04
RHMW04	-0.02
RHMW05	-0.01
RHMW06	-0.01
RHMW07	-0.01
RHMW08	-0.03
RHMW09	-0.24
RHMW10	-0.09
RHMW12A	-0.06
RHMW16	-0.90
RHMW17	-0.01
RHMW19	-0.21
RHMW20	pending
RHMW2254-01	NA
OWDFMW01	-0.03
OWDFMW04A	-0.03
OWDFMW05A	-0.03
OWDFMW07A	-0.08
OWDFMW08A	-0.08
HDMW2253-03	-0.01
NMW24	-0.06
NMW25	pending
NMW32	pending
NMW33	pending
NMW30	pending
RHP01	-0.04
RHP02	-0.02

Red Hill Bulk Fuel Storage Facility
Notice of Interest 20210507-0852 (6 May 2021 Event)
Notice of Interest 20211120-2330 (20 Nov 2021 Event)
Headspace, Fuel Product Gauging, and Parameters

RHP03	-0.02
RHP04A	-0.04
RHP04B	pending
RHP04C	-0.02
RHP05	pending
RHP06	pending
RHP07	0.00
RHP08	pending

Not all wells currently have horizontal displacement correction factors. Horizontal displacement corrections will be updated once available.

Horizontal displacement cannot be calculated for RHMW01. RHMW01 is a 1-inch well, which is too narrow for the gyroscopic survey tool.

Appendix B.2.2 – Monitoring Well Water Level Measurements

Appendix B.2.2 Groundwater Elevation Data, Current Reporting Period

Location	Measurement Date	Measuring Point Elevation*	Depth to Water from TOC (Feet BMP)	Measuring Tape Correction Factor [Tape ID] (ft)	Well Displacement Correction Factor (ft)	Corrected Depth to Water (ft btoc)	Groundwater Elevation (ft msl)
HDMW2253-03	09/05/2023	226.68	208.30	-0.08 [N-6]	—	208.22	18.46
	10/03/2023	226.68	208.37	-0.08 [N-6]	—	208.29	18.39
	11/07/2023	226.68	208.51	-0.13 [N-4]	—	208.38	18.3
	12/08/2023	226.68	208.33	-0.03 [N-5]	—	208.30	18.38
	12/15/2023	226.68	208.33	-0.03 [N-5]	—	208.30	18.38
	01/05/2024	226.68	208.29	-0.08 [N-6]	—	208.21	18.47
	02/09/2024	226.68	208.05	-0.08 [N-6]	—	207.97	18.71
	03/15/2024	226.68	208.13	-0.03 [N-5]	—	208.10	18.58
	04/12/2024	226.68	208.28	-0.13 [N-4]	—	208.15	18.53
NMW24	09/08/2023	107.18	91.07	-0.08 [N-4]	—	90.99	16.19
	10/02/2023	107.18	91.06	0.00 [N-5]	—	91.06	16.12
	10/13/2023	107.18	91.13	0.00 [N-5]	—	91.13	16.05
	11/09/2023	107.18	91.17	-0.06 [N-3]	—	91.11	16.07
	12/08/2023	107.18	90.97	-0.06 [N-6]	—	90.91	16.27
	01/04/2024	107.18	90.93	-0.06 [N-3]	—	90.87	16.31
	02/14/2024	107.18	90.78	-0.08 [N-4]	—	90.70	16.48
	03/20/2024	107.18	90.85	-0.08 [N-4]	—	90.77	16.41
	04/10/2024	107.18	90.84	0.00 [N-5]	—	90.84	16.34
NMW25	09/07/2023	208.43	190.84	-0.08 [N-6]	—	190.76	17.67
	10/02/2023	208.43	190.89	-0.02 [N-5]	—	190.87	17.56
	10/13/2023	208.43	190.94	-0.02 [N-5]	—	190.92	17.51
	11/09/2023	208.43	190.99	-0.08 [N-6]	—	190.91	17.52
	12/07/2023	208.43	190.85	-0.09 [N-3]	—	190.76	17.67
	01/04/2024	208.43	190.73	-0.09 [N-3]	—	190.64	17.79
	02/14/2024	208.43	190.66	-0.13 [N-4]	—	190.53	17.9
	03/20/2024	208.43	190.72	-0.13 [N-4]	—	190.59	17.84
	04/10/2024	208.43	190.71	-0.02 [N-5]	—	190.69	17.74
NMW30	10/19/2023	308.85	291.65	-0.03 [N-5]	—	291.62	17.23
	11/09/2023	308.85	291.71	-0.03 [N-5]	—	291.68	17.17
	12/07/2023	308.85	291.54	-0.10 [N-3]	—	291.44	17.41
	01/04/2024	308.85	291.45	-0.03 [N-5]	—	291.42	17.43
	02/15/2024	308.85	291.35	-0.09 [N-6]	—	291.26	17.59
	03/20/2024	308.85	291.43	-0.11 [N-2]	—	291.32	17.53
	04/11/2024	308.85	291.45	-0.09 [N-6]	—	291.36	17.49
NMW32	09/13/2023	188.27	170.68	-0.02 [N-5]	—	170.66	17.61
	10/10/2023	188.27	170.88	-0.09 [N-3]	—	170.79	17.48
	10/03/2023	188.27	170.79	-0.02 [N-5]	—	170.77	17.5
	11/10/2023	188.27	170.90	-0.02 [N-5]	—	170.88	17.39
	12/08/2023	188.27	170.77	-0.08 [N-6]	—	170.69	17.58
	01/04/2024	188.27	170.66	-0.02 [N-5]	—	170.64	17.63
	02/15/2024	188.27	170.53	-0.02 [N-5]	—	170.51	17.76
	03/21/2024	188.27	170.67	-0.12 [N-4]	—	170.55	17.72
	04/11/2024	188.27	170.64	-0.02 [N-5]	—	170.62	17.65
NMW33	10/03/2023	130.76	118.92	-0.01 [N-5]	—	118.91	11.85
	10/09/2023	130.76	119.00	-0.07 [N-3]	—	118.93	11.83
	11/10/2023	130.76	117.32	-0.01 [N-5]	—	117.31	13.45
	12/08/2023	130.76	117.41	-0.01 [N-5]	—	117.40	13.36
	01/05/2024	130.76	117.57	-0.01 [N-5]	—	117.56	13.2
	02/15/2024	130.76	117.69	-0.01 [N-5]	—	117.68	13.08
	03/21/2024	130.76	117.84	-0.10 [N-4]	—	117.74	13.02
	04/11/2024	130.76	117.80	-0.01 [N-5]	—	117.79	12.97
RHMW01R	06/15/2023	101.76	83.72	-0.05 [N-3]	-0.06	83.61	18.15
	09/05/2023	101.76	84.16	-0.08 [N-4]	-0.06	84.02	17.74
	10/04/2023	101.76	83.28	-0.08 [N-4]	-0.06	83.14	18.62
	10/12/2023	101.76	84.33	-0.08 [N-4]	-0.06	84.19	17.57
	10/17/2023	101.76	83.34	-0.08 [N-4]	-0.06	83.20	18.56
	10/24/2023	101.76	84.35	-0.08 [N-4]	-0.06	84.21	17.55
	11/7/2023	101.76	84.34	0.00 [N-5]	-0.06	84.28	17.48
	10/31/2023	101.76	84.31	-0.06 [N-6]	-0.06	84.19	17.57
	11/06/2023	101.76	84.39	-0.08 [N-4]	-0.06	84.25	17.51
	11/7/2023	101.76	84.34	0.00 [N-5]	-0.06	84.28	17.48
	11/13/2023	101.76	84.34	-0.05 [N-3]	-0.06	84.23	17.53
	11/24/2023	101.76	84.31	0.00 [N-5]	-0.06	84.25	17.51
	12/1/2023	101.76	84.31	-0.08 [N-4]	-0.06	84.17	17.59
	12/08/2023	101.76	84.21	-0.08 [N-4]	-0.06	84.07	17.69
	12/15/2023	101.76	84.19	-0.05 [N-3]	-0.06	84.08	17.68
	12/19/2023	101.76	84.19	0.00 [N-5]	-0.06	84.13	17.63
	12/26/2023	101.76	84.12	0.00 [N-5]	-0.06	84.06	17.7
	01/05/2024	101.76	84.15	-0.08 [N-4]	-0.06	84.01	17.75
	1/12/2024	101.76	84.08	-0.05 [N-3]	-0.06	83.97	17.79
	1/19/2024	101.76	84.07	-0.08 [N-4]	-0.06	83.93	17.83
02/16/2024	101.76	83.99	0.00 [N-5]	-0.06	83.93	17.83	
03/13/2024	101.76	83.98	0.00 [N-5]	-0.06	83.92	17.84	

Appendix B.2.2 Groundwater Elevation Data, Current Reporting Period (cont'd)

Location	Measurement Date	Measuring Point Elevation*	Depth to Water from TOC (Feet BMP)	Measuring Tape Correction Factor [Tape ID] (ft)	Well Displacement Correction Factor (ft)	Corrected Depth to Water (ft btoc)	Groundwater Elevation (ft msl)
	12/22/2023	101.31	83.75	-0.08 [N-4]	-0.01	83.66	17.65
	12/29/2023	101.31	83.73	-0.08 [N-4]	-0.01	83.64	17.67
	01/02/2024	101.31	83.74	0.00 [N-5]	-0.01	83.73	17.58
	1/9/2024	101.31	83.64	0.00 [N-5]	-0.01	83.63	17.68
	1/16/2024	101.31	83.61	0.00 [N-5]	-0.01	83.60	17.71
	02/16/2024	101.31	83.58	0.00 [N-5]	-0.01	83.57	17.74
	03/12/2024	101.31	83.59	0.00 [N-5]	-0.01	83.58	17.73
	04/03/2024	101.31	83.69	0.00 [N-5]	-0.01	83.68	17.63
RHMW06	06/14/2023	259.09	241.12	-0.14 [N-4]	-0.01	240.97	18.12
	09/08/2023	259.09	241.53	-0.03 [N-5]	-0.01	241.49	17.6
	10/06/2023	259.09	241.63	-0.09 [N-6]	-0.01	241.53	17.56
	10/13/2023	259.09	241.70	-0.14 [N-4]	-0.01	241.55	17.54
	10/23/2023	259.09	241.66	-0.10 [N-3]	-0.01	241.55	17.54
	10/30/2023	259.09	241.71	-0.09 [N-6]	-0.01	241.61	17.48
	11/07/2023	259.09	241.69	-0.09 [N-6]	-0.01	241.59	17.5
	11/13/2023	259.09	241.75	-0.14 [N-4]	-0.01	241.60	17.49
	11/20/2023	259.09	241.67	-0.03 [N-5]	-0.01	241.63	17.46
	11/27/2023	259.09	241.68	-0.09 [N-6]	-0.01	241.58	17.51
	12/05/2023	259.09	241.61	-0.14 [N-4]	-0.01	241.46	17.63
	12/11/2023	259.09	241.59	-0.14 [N-4]	-0.01	241.44	17.65
	12/18/2023	259.09	241.58	-0.14 [N-4]	-0.01	241.43	17.66
	12/27/2023	259.09	241.47	-0.09 [N-6]	-0.01	241.37	17.72
	01/02/2024	259.09	241.43	-0.10 [N-3]	-0.01	241.32	17.77
	1/8/2024	259.09	241.4	-0.10 [N-3]	-0.01	241.29	17.8
	1/15/2024	259.09	241.38	-0.03 [N-5]	-0.01	241.34	17.75
	02/05/2024	259.09	241.39	-0.09 [N-6]	-0.01	241.29	17.8
	03/11/2024	259.09	241.39	-0.09 [N-6]	-0.01	241.29	17.8
	04/01/2024	259.09	241.41	-0.09 [N-6]	-0.01	241.31	17.78
RHMW08	09/06/2023	310.43	293.03	-0.03 [N-5]	-0.03	292.97	17.46
	10/04/2023	310.43	293.09	-0.09 [N-6]	-0.03	292.97	17.46
	10/11/2023	310.43	293.18	-0.14 [N-4]	-0.03	293.01	17.42
	10/18/2023	310.43	293.17	-0.14 [N-4]	-0.03	293.00	17.43
	10/25/2023	310.43	293.12	-0.10 [N-3]	-0.03	292.99	17.44
	11/1/2023	310.43	293.16	-0.14 [N-4]	-0.03	292.99	17.44
	11/10/2023	310.43	293.18	-0.09 [N-6]	-0.03	293.06	17.37
	11/14/2023	310.43	293.14	-0.10 [N-3]	-0.03	293.01	17.42
	11/20/2023	310.43	293.23	-0.14 [N-4]	-0.03	293.06	17.37
	11/28/2023	310.43	293.14	-0.09 [N-6]	-0.03	293.02	17.41
	12/04/2023	310.43	293.05	-0.03 [N-5]	-0.03	292.99	17.44
	12/11/2023	310.43	293.02	-0.03 [N-5]	-0.03	292.96	17.47
	12/18/2023	310.43	293.02	-0.03 [N-5]	-0.03	292.96	17.47
	12/26/2023	310.43	292.99	-0.09 [N-6]	-0.03	292.87	17.56
	01/03/2024	310.43	292.86	-0.09 [N-6]	-0.03	292.74	17.69
	1/8/2024	310.43	292.88	-0.03 [N-5]	-0.03	292.82	17.61
	1/15/2024	310.43	292.84	-0.10 [N-3]	-0.03	292.71	17.72
	02/05/2024	310.43	292.87	-0.09 [N-6]	-0.03	292.75	17.68
	03/11/2024	310.43	292.89	-0.09 [N-6]	-0.03	292.77	17.66
	04/01/2024	310.43	292.91	-0.09 [N-6]	-0.03	292.79	17.64
RHMW09	06/13/2023	395.37	377.55	-0.10 [N-6]	-0.24	377.21	18.16
	09/05/2023	395.37	378.09	-0.03 [N-5]	-0.24	377.82	17.55
	10/05/2023	395.37	378.23	-0.10 [N-6]	-0.24	377.89	17.48
	10/12/2023	395.37	378.25	-0.10 [N-6]	-0.24	377.91	17.46
	10/24/2023	395.37	378.31	-0.10 [N-6]	-0.24	377.97	17.4
	10/30/2023	395.37	378.3	-0.13 [N-4]	-0.24	377.93	17.44
	11/06/2023	395.37	378.34	-0.10 [N-6]	-0.24	378.00	17.37
	11/14/2023	395.37	378.30	-0.10 [N-6]	-0.24	377.96	17.41
	11/20/2023	395.37	378.32	-0.08 [N-3]	-0.24	378.00	17.37
	11/27/2023	395.37	378.23	-0.03 [N-5]	-0.24	377.96	17.41
	12/04/2023	395.37	378.23	-0.13 [N-4]	-0.24	377.86	17.51
	12/12/2023	395.37	378.18	-0.13 [N-4]	-0.24	377.81	17.56
	12/19/2023	395.37	378.18	-0.10 [N-6]	-0.24	377.84	17.53
	12/27/2023	395.37	378.1	-0.13 [N-4]	-0.24	377.73	17.64
	01/04/2024	395.37	378.09	-0.13 [N-4]	-0.24	377.72	17.65
	1/9/2024	395.37	378.05	-0.13 [N-4]	-0.24	377.68	17.69
	1/16/2024	395.37	377.94	-0.03 [N-5]	-0.24	377.67	17.7
	02/07/2024	395.37	378.02	-0.13 [N-4]	-0.24	377.65	17.72
	03/12/2024	395.37	377.98	-0.10 [N-6]	-0.24	377.64	17.73
	04/02/2024	395.37	378.02	-0.10 [N-6]	-0.24	377.68	17.69
RHMW10	06/14/2023	495.59	477.69	-0.10 [N-6]	-0.09	477.50	18.09
	09/05/2023	495.59	478.13	-0.10 [N-6]	-0.09	477.94	17.65
	10/05/2023	495.59	478.20	-0.04 [N-3]	-0.09	478.07	17.52
	10/10/2023	495.59	478.23	-0.04 [N-3]	-0.09	478.10	17.49
	10/26/2023	495.59	478.34	-0.10 [N-4]	-0.09	478.15	17.44

Appendix B.2.2 Groundwater Elevation Data, Current Reporting Period (cont'd)

Location	Measurement Date	Measuring Point Elevation*	Depth to Water from TOC (Feet BMP)	Measuring Tape Correction Factor [Tape ID] (ft)	Well Displacement Correction Factor (ft)	Corrected Depth to Water (ft btoc)	Groundwater Elevation (ft msl)
	10/31/2023	495.59	478.32	-0.10 [N-6]	-0.09	478.13	17.46
	11/10/2023	495.59	478.34	-0.10 [N-6]	-0.09	478.15	17.44
	11/13/2023	495.59	478.35	-0.10 [N-6]	-0.09	478.16	17.43
	11/21/2023	495.59	478.26	-0.10 [N-6]	-0.09	478.07	17.52
	11/29/2023	495.59	478.21	-0.04 [N-3]	-0.09	478.08	17.51
	12/05/2023	495.59	478.20	-0.10 [N-6]	-0.09	478.01	17.58
	12/13/2023	495.59	478.20	-0.10 [N-6]	-0.09	478.01	17.58
	12/20/2023	495.59	478.16	-0.10 [N-6]	-0.09	477.97	17.62
	01/02/2024	495.59	478.19	-0.10 [N-4]	-0.09	478.00	17.59
	1/10/2024	495.59	478.05	-0.10 [N-6]	-0.09	477.86	17.73
	1/17/2024	495.59	478	-0.10 [N-6]	-0.09	477.81	17.78
	02/07/2024	495.59	477.97	-0.03 [N-5]	-0.09	477.85	17.74
	03/15/2024	495.59	477.96	-0.03 [N-5]	-0.09	477.84	17.75
	04/05/2024	495.59	478.08	-0.10 [N-6]	-0.09	477.89	17.7
RHMW11-05	10/2/2023	210.38	192.72	—	-0.09	192.63	17.75
	10/9/2023	210.38	193.87	—	-0.09	193.78	16.60
	10/24/2023	210.38	193.00	—	-0.09	192.91	17.47
	10/30/2023	210.38	192.93	—	-0.09	192.84	17.54
	11/6/2023	210.38	193.74	—	-0.09	193.65	16.73
	11/15/2023	210.38	192.84	—	-0.09	192.75	17.63
	11/22/2023	210.38	192.79	—	-0.09	192.70	17.68
	11/27/2023	210.38	192.95	—	-0.09	192.86	17.52
	12/4/2023	210.38	192.72	—	-0.09	192.63	17.75
	12/13/2023	210.38	192.67	—	-0.09	192.58	17.80
	12/20/2023	210.38	192.65	—	-0.09	192.56	17.82
	12/28/2023	210.38	192.63	—	-0.09	192.54	17.84
	1/4/2024	210.38	192.56	—	-0.09	192.47	17.91
	1/10/2024	210.38	192.56	—	-0.09	192.47	17.91
	1/17/2024	210.38	192.51	—	-0.09	192.42	17.96
	2/7/2024	210.38	192.49	—	-0.09	192.40	17.98
	3/13/2024	210.38	192.47	—	-0.09	192.38	18.00
	4/3/2024	210.38	192.51	—	-0.09	192.42	17.96
RHMW12A	9/7/2023	238.43	221.04	-0.03 [N-5]	-0.06	220.95	17.48
	10/3/2024	238.43	221.09	-0.09 [N-6]	-0.06	220.94	17.49
	10/12/2023	238.43	221.14	-0.10 [N-3]	-0.06	220.98	17.45
	11/09/2023	238.43	221.22	-0.03 [N-5]	-0.06	221.13	17.30
	12/07/2023	238.43	221.09	-0.14 [N-4]	-0.06	220.89	17.54
	01/05/2024	238.43	221.03	-0.09 [N-6]	-0.06	220.88	17.55
	02/12/2024	238.43	220.89	-0.14 [N-4]	-0.06	220.69	17.74
	03/18/2024	238.43	220.87	-0.09 [N-6]	-0.06	220.72	17.71
	04/08/2024	238.43	220.95	-0.03 [N-5]	-0.06	220.86	17.57
RHMW13-04	9/5/2023	248.41	230.89	—	—	230.89	17.52
	10/5/2023	248.41	231.03	—	—	231.03	17.38
	10/10/2023	248.41	231.10	—	—	231.10	17.31
	10/13/2023	248.41	231.10	—	—	231.10	17.31
	10/25/2023	248.41	231.10	—	—	231.10	17.31
	10/31/2023	248.41	230.75	—	—	230.75	17.66
	11/9/2023	248.41	231.44	—	—	231.44	16.97
	11/14/2023	248.41	230.98	—	—	230.98	17.43
	11/20/2023	248.41	231.07	—	—	231.07	17.34
	11/28/2023	248.41	230.98	—	—	230.98	17.43
	12/7/2023	248.41	230.84	—	—	230.84	17.57
	12/12/2023	248.41	231.05	—	—	231.05	17.36
	12/19/2023	248.41	230.89	—	—	230.89	17.52
	12/27/2023	248.41	230.80	—	—	230.80	17.61
	1/3/2024	248.41	230.84	—	—	230.84	17.57
	1/9/2024	248.41	230.80	—	—	230.80	17.61
	1/16/2024	248.41	231.26	—	—	231.26	17.15
	2/16/2024	248.41	230.75	—	—	230.75	17.66
	3/18/2024	248.41	232.32	—	—	232.32	16.09
	4/8/2024	248.41	230.75	—	—	230.75	17.66
RHMW13-05	9/5/2023	248.41	230.83	—	—	230.83	17.58
	10/5/2023	248.41	231.02	—	—	231.02	17.39
	10/10/2023	248.41	231.02	—	—	231.02	17.39
	10/13/2023	248.41	231.02	—	—	231.02	17.39
	10/25/2023	248.41	231.07	—	—	231.07	17.34
	10/31/2023	248.41	230.70	—	—	230.70	17.71
	11/9/2023	248.41	231.39	—	—	231.39	17.02
RHWM14-03	10/2/2023	179.78	162.58	—	—	162.58	17.20
	10/9/2023	179.78	162.58	—	—	162.58	17.20
	10/24/2023	179.78	162.99	—	—	162.99	16.79
	10/30/2023	179.78	163.20	—	—	163.20	16.58
	11/6/2023	179.78	163.39	—	—	163.39	16.39

Appendix B.2.2 Groundwater Elevation Data, Current Reporting Period (cont'd)

Location	Measurement Date	Measuring Point Elevation*	Depth to Water from TOC (Feet BMP)	Measuring Tape Correction Factor [Tape ID] (ft)	Well Displacement Correction Factor (ft)	Corrected Depth to Water (ft btoc)	Groundwater Elevation (ft msl)
	11/15/2023	179.78	162.72	—	—	162.72	17.06
	11/22/2023	179.78	162.72	—	—	162.72	17.06
	11/27/2023	179.78	162.69	—	—	162.69	17.09
	12/4/2023	179.78	162.58	—	—	162.58	17.20
	12/13/2023	179.78	162.58	—	—	162.58	17.20
	12/20/2023	179.78	162.53	—	—	162.53	17.25
	12/28/2023	179.78	164.79	—	—	164.79	14.99
	1/4/2024	179.78	162.44	—	—	162.44	17.34
	1/10/2024	179.78	162.44	—	—	162.44	17.34
	1/17/2024	179.78	162.39	—	—	162.39	17.39
	2/7/2024	179.78	162.39	—	—	162.39	17.39
	3/13/2024	179.78	162.32	—	—	162.32	17.46
	4/3/2024	179.78	162.42	—	—	162.42	17.36
RHMW15-05	9/7/2023	310.00	292.12	—	—	292.12	17.88
	10/4/2023	310.00	291.96	—	—	291.96	18.04
	10/11/2023	310.00	292.6084	—	—	292.61	17.39
	10/23/2023	310.00	292.8856	—	—	292.89	17.11
	11/1/2023	310.00	293.0704	—	—	293.07	16.93
	11/8/2023	310.00	292.7008	—	—	292.70	17.30
	11/13/2023	310.00	292.3312	—	—	292.33	17.67
	11/21/2023	310.00	292.3543	—	—	292.35	17.65
	11/29/2023	310.00	292.285	—	—	292.29	17.72
	12/6/2023	310.00	292.2388	—	—	292.24	17.76
	12/11/2023	310.00	292.1695	—	—	292.17	17.83
	12/18/2023	310.00	292.2157	—	—	292.22	17.78
	12/29/2023	310.00	292.1002	—	—	292.10	17.90
	1/5/2024	310.00	292.0771	—	—	292.08	17.92
	1/8/2024	310.00	292.0771	—	—	292.08	17.92
	1/15/2024	310.00	291.8894	—	—	291.89	18.11
	2/5/2024	310.00	291.8663	—	—	291.87	18.13
	3/11/2024	310.00	291.8663	—	—	291.87	18.13
	4/1/2024	310.00	291.9587	—	—	291.96	18.04
RHMW16	9/7/2023	218.94	202.25	-0.08 [N-6]	-0.90	201.27	17.67
	10/5/2023	218.94	202.29	-0.09 [N-3]	-0.90	201.30	17.64
	10/12/2023	218.94	202.35	-0.09 [N-3]	-0.90	201.36	17.58
	10/26/2023	218.94	202.47	-0.13 [N-4]	-0.90	201.44	17.50
	10/31/2023	218.94	202.39	-0.08 [N-6]	-0.90	201.41	17.53
	11/06/2023	218.94	202.48	-0.13 [N-4]	-0.90	201.45	17.49
	11/13/2023	218.94	202.45	-0.08 [N-6]	-0.90	201.47	17.47
	11/20/2023	218.94	202.39	-0.03 [N-5]	-0.90	201.46	17.48
	11/28/2023	218.94	202.41	-0.08 [N-6]	-0.90	201.43	17.51
	12/04/2023	218.94	202.32	-0.03 [N-5]	-0.90	201.39	17.55
	12/11/2023	218.94	202.28	-0.03 [N-5]	-0.90	201.35	17.59
	12/18/2023	218.94	202.3	-0.03 [N-5]	-0.90	201.37	17.57
	12/26/2023	218.94	202.24	-0.08 [N-6]	-0.90	201.26	17.68
	01/03/2024	218.94	202.20	-0.09 [N-3]	-0.90	201.21	17.73
	1/8/2024	218.94	202.14	-0.09 [N-3]	-0.90	201.15	17.79
	1/15/2024	218.94	202.09	-0.03 [N-5]	-0.90	201.16	17.78
	02/05/2024	218.94	202.13	-0.08 [N-6]	-0.90	201.15	17.79
	03/11/2024	218.94	202.10	-0.08 [N-6]	-0.90	201.12	17.82
	04/01/2024	218.94	202.11	-0.08 [N-6]	-0.90	201.13	17.81
RHMW17	06/15/2023	252.34	234.40	-0.08 [N-1]	-0.01	234.31	18.03
	09/08/2023	252.34	234.84	-0.09 [N-6]	-0.01	234.74	17.60
	10/04/2023	252.34	234.86	-0.09 [N-6]	-0.01	234.76	17.58
	10/11/2023	252.34	234.94	-0.10 [N-3]	-0.01	234.83	17.51
	10/25/2023	252.34	235.06	-0.14 [N-4]	-0.01	234.91	17.43
	11/2/2023	252.34	234.99	-0.09 [N-6]	-0.01	234.89	17.45
	11/08/2023	252.34	235.02	-0.10 [N-3]	-0.01	234.91	17.43
	11/15/2023	252.34	235.02	-0.10 [N-3]	-0.01	234.91	17.43
	11/22/2023	252.34	234.98	-0.03 [N-5]	-0.01	234.94	17.40
	11/28/2023	252.34	234.9	-0.03 [N-5]	-0.01	234.86	17.48
	12/06/2023	252.34	234.85	-0.03 [N-5]	-0.01	234.81	17.53
	12/12/2023	252.34	234.86	-0.03 [N-5]	-0.01	234.82	17.52
	12/19/2023	252.34	234.85	-0.10 [N-3]	-0.01	234.74	17.60
	12/27/2023	252.34	234.81	-0.03 [N-5]	-0.01	234.77	17.57
	01/03/2024	252.34	234.85	-0.14 [N-4]	-0.01	234.70	17.64
	1/9/2024	252.34	234.75	-0.09 [N-6]	-0.01	234.65	17.69
	1/16/2024	252.34	234.73	-0.14 [N-4]	-0.01	234.58	17.76
	02/09/2024	252.34	234.69	-0.14 [N-4]	-0.01	234.54	17.80
	03/18/2024	252.34	234.72	-0.14 [N-4]	-0.01	234.57	17.77
	04/10/2024	252.34	234.77	-0.14 [N-4]	-0.01	234.62	17.72
RHMW19	06/13/2023	444.82	426.50	-0.10 [N-6]	-0.21	426.19	18.63
	09/05/2023	444.82	427.09	-0.03 [N-5]	-0.21	426.85	17.97

Appendix B.2.2 Groundwater Elevation Data, Current Reporting Period (cont'd)

Location	Measurement Date	Measuring Point Elevation*	Depth to Water from TOC (Feet BMP)	Measuring Tape Correction Factor [Tape ID] (ft)	Well Displacement Correction Factor (ft)	Corrected Depth to Water (ft btoc)	Groundwater Elevation (ft msl)	
RHP02	02/08/2024	156.79	139.44	-0.01 [N-5]	-0.04	139.39	17.40	
	03/11/2024	156.79	139.49	-0.01 [N-5]	-0.04	139.44	17.35	
	04/01/2024	156.79	139.54	-0.01 [N-5]	-0.04	139.49	17.30	
	09/06/2023	140.36	122.65	-0.07 [N-6]	-0.02	122.56	17.80	
	10/06/2023	140.36	122.66	-0.07 [N-6]	-0.02	122.57	17.79	
	10/13/2023	140.36	122.75	-0.07 [N-6]	-0.02	122.66	17.70	
	11/08/2023	140.36	122.73	-0.01 [N-5]	-0.02	122.70	17.66	
	11/14/2023	140.36	122.78	-0.10 [N-4]	-0.02	122.66	17.70	
	11/22/2023	140.36	122.78	-0.01 [N-5]	-0.02	122.75	17.61	
	11/27/2023	140.36	122.73	-0.07 [N-3]	-0.02	122.64	17.72	
	12/06/2023	140.36	122.58	-0.07 [N-3]	-0.02	122.49	17.87	
	12/11/2023	140.36	122.56	-0.07 [N-3]	-0.02	122.47	17.89	
	12/18/2023	140.36	122.57	-0.07 [N-3]	-0.02	122.48	17.88	
	12/26/2023	140.36	122.46	-0.07 [N-3]	-0.02	122.37	17.99	
	01/02/2024	140.36	122.49	-0.07 [N-3]	-0.02	122.40	17.96	
	1/8/2024	140.36	122.37	-0.07 [N-6]	-0.02	122.28	18.08	
	1/15/2024	140.36	122.37	-0.10 [N-4]	-0.02	122.25	18.11	
	02/08/2024	140.36	122.33	-0.10 [N-4]	-0.02	122.21	18.15	
	03/14/2024	140.36	122.30	-0.01 [N-5]	-0.02	122.27	18.09	
04/04/2024	140.36	122.41	-0.07 [N-6]	-0.02	122.32	18.04		
RHP03	09/08/2023	136.78	119.33	-0.07 [N-3]	-0.02	119.24	17.54	
	10/06/2023	136.78	119.39	-0.07 [N-3]	-0.02	119.30	17.48	
	10/13/2023	136.78	119.43	-0.07 [N-3]	-0.02	119.34	17.44	
	10/26/2023	136.78	119.45	-0.07 [N-3]	-0.02	119.36	17.42	
	11/2/2023	136.78	119.43	-0.07 [N-3]	-0.02	119.34	17.44	
	11/08/2023	136.78	119.46	-0.01 [N-5]	-0.02	119.43	17.35	
	11/14/2023	136.78	119.52	-0.10 [N-4]	-0.02	119.40	17.38	
	11/22/2023	136.78	119.48	-0.01 [N-5]	-0.02	119.45	17.33	
	11/27/2023	136.78	119.44	-0.07 [N-3]	-0.02	119.35	17.43	
	12/06/2023	136.78	119.34	-0.07 [N-3]	-0.02	119.25	17.53	
	12/11/2023	136.78	119.32	-0.07 [N-3]	-0.02	119.23	17.55	
	01/02/2024	136.78	119.28	-0.01 [N-5]	-0.02	119.25	17.53	
	1/8/2024	136.78	119.24	-0.10 [N-4]	-0.02	119.12	17.66	
	1/15/2024	136.78	119.17	-0.10 [N-4]	-0.04	119.03	17.75	
	02/08/2024	136.78	119.13	-0.01 [N-5]	-0.02	119.10	17.68	
	03/14/2024	136.78	119.13	-0.01 [N-5]	-0.02	119.10	17.68	
	04/04/2024	136.78	119.22	-0.07 [N-6]	-0.02	119.13	17.65	
	RHP04A	06/14/2023	157.70	139.83	-0.07 [N-6]	-0.04	139.72	17.98
		09/11/2023	157.70	140.33	-0.07 [N-6]	-0.04	140.22	17.48
10/06/2023		157.70	140.34	-0.01 [N-5]	-0.04	140.29	17.41	
10/12/2023		157.70	140.37	-0.01 [N-5]	-0.04	140.32	17.38	
11/07/2023		157.70	140.40	-0.08 [N-3]	-0.04	140.28	17.42	
11/15/2023		157.70	140.43	-0.07 [N-6]	-0.04	140.32	17.38	
11/22/2023		157.70	140.41	-0.08 [N-3]	-0.04	140.29	17.41	
11/28/2023		157.70	140.36	-0.08 [N-3]	-0.04	140.24	17.46	
12/05/2023		157.70	140.27	-0.08 [N-3]	-0.04	140.15	17.55	
12/12/2023		157.70	140.26	-0.08 [N-3]	-0.04	140.14	17.56	
12/19/2023		157.70	140.29	-0.08 [N-3]	-0.04	140.17	17.53	
12/27/2023		157.70	140.16	-0.08 [N-3]	-0.04	140.04	17.66	
01/03/2024		157.70	140.17	-0.01 [N-5]	-0.04	140.12	17.58	
1/9/2024		157.70	140.1	-0.08 [N-3]	-0.04	139.98	17.72	
1/16/2024		157.70	140.08	-0.07 [N-6]	-0.04	139.97	17.73	
02/09/2024		157.70	140.10	-0.07 [N-6]	-0.04	139.99	17.71	
03/14/2024		157.70	140.09	-0.01 [N-5]	-0.04	140.04	17.66	
04/04/2024		157.70	140.17	-0.07 [N-6]	-0.04	140.06	17.64	
RHP04B		06/14/2023	156.81	138.95	-0.07 [N-6]	—	138.88	17.93
	9/11/2023	156.81	139.45	-0.07 [N-6]	—	139.38	17.43	
	10/06/2023	156.81	139.48	-0.01 [N-5]	—	139.47	17.34	
	10/12/2023	156.81	139.40	-0.01 [N-5]	—	139.39	17.42	
	10/23/2023	156.81	139.57	-0.07 [N-6]	—	139.50	17.31	
	11/3/2023	156.81	139.5	-0.08 [N-3]	—	139.42	17.39	
	11/07/2023	156.81	139.52	-0.08 [N-3]	—	139.44	17.37	
	11/15/2023	156.81	139.57	-0.07 [N-6]	—	139.50	17.31	
	11/22/2023	156.81	139.54	-0.08 [N-3]	—	139.46	17.35	
	11/28/2023	156.81	139.43	-0.08 [N-3]	—	139.35	17.46	
	12/05/2023	156.81	139.40	-0.08 [N-3]	—	139.32	17.49	
	12/12/2023	156.81	139.34	-0.08 [N-3]	—	139.26	17.55	
	12/19/2023	156.81	139.36	-0.08 [N-3]	—	139.28	17.53	
	12/27/2023	156.81	139.27	-0.08 [N-3]	—	139.19	17.62	
	01/03/2024	156.81	139.29	-0.01 [N-5]	—	139.28	17.53	
	1/9/2024	156.81	139.23	-0.08 [N-3]	—	139.15	17.66	
	1/16/2024	156.81	139.19	-0.08 [N-3]	—	139.11	17.70	
	02/14/2024	156.81	139.11	-0.01 [N-5]	—	139.10	17.71	

Appendix B.2.2 Groundwater Elevation Data, Current Reporting Period (cont'd)

Location	Measurement Date	Measuring Point Elevation*	Depth to Water from TOC (Feet BMP)	Measuring Tape Correction Factor [Tape ID] (ft)	Well Displacement Correction Factor (ft)	Corrected Depth to Water (ft btoc)	Groundwater Elevation (ft msl)
RHP04C	03/19/2024	156.81	139.23	-0.11 [N-4]	-	139.12	17.69
	04/09/2024	156.81	139.26	-0.07 [N-6]	-	139.19	17.62
	09/08/2023	156.08	138.66	-0.08 [N-3]	-0.02	138.56	17.52
	10/06/2023	156.08	138.73	-0.08 [N-3]	-0.02	138.63	17.45
	10/13/2023	156.08	138.81	-0.07 [N-6]	-0.02	138.72	17.36
	10/25/2023	156.08	138.79	-0.08 [N-3]	-0.02	138.69	17.39
	11/1/2023	156.08	138.8	-0.11 [N-4]	-0.02	138.67	17.41
	11/06/2023	156.08	138.83	-0.08 [N-3]	-0.02	138.73	17.35
	11/15/2023	156.08	138.81	-0.08 [N-3]	-0.02	138.71	17.37
	11/20/2023	156.08	138.87	-0.11 [N-4]	-0.02	138.74	17.34
	11/29/2023	156.08	138.72	-0.01 [N-5]	-0.02	138.69	17.39
	12/04/2023	156.08	138.73	-0.07 [N-6]	-0.02	138.64	17.44
	12/13/2023	156.08	138.69	-0.08 [N-3]	-0.02	138.59	17.49
	12/20/2023	156.08	138.69	-0.11 [N-4]	-0.02	138.56	17.52
	12/28/2023	156.08	138.57	-0.08 [N-3]	-0.02	138.47	17.61
	01/05/2024	156.08	138.58	-0.01 [N-5]	-0.02	138.55	17.53
	1/10/2024	156.08	138.57	-0.11 [N-4]	-0.02	138.44	17.64
	1/17/2024	156.08	138.48	-0.01 [N-5]	-0.02	138.45	17.63
	02/14/2024	156.08	138.42	-0.01 [N-5]	-0.02	138.39	17.69
	03/19/2024	156.08	138.51	-0.11 [N-4]	-0.02	138.38	17.70
04/09/2024	156.08	138.57	-0.07 [N-6]	-0.02	138.48	17.60	
RHP05	09/08/2023	230.28	213.09	-0.14 [N-4]	-	212.95	17.33
	10/02/2023	230.28	213.15	-0.14 [N-4]	-	213.01	17.27
	10/13/2023	230.28	213.17	-0.10 [N-3]	-	213.07	17.21
	10/26/2023	230.28	213.18	-0.10 [N-3]	-	213.08	17.20
	11/2/2023	230.28	213.17	-0.10 [N-3]	-	213.07	17.21
	11/08/2023	230.28	213.26	-0.14 [N-4]	-	213.12	17.16
	11/15/2023	230.28	213.21	-0.03 [N-5]	-	213.18	17.10
	11/22/2023	230.28	213.25	-0.08 [N-6]	-	213.17	17.11
	11/29/2023	230.28	213.15	-0.08 [N-6]	-	213.07	17.21
	12/06/2023	230.28	213.11	-0.14 [N-4]	-	212.97	17.31
	12/13/2023	230.28	213.11	-0.14 [N-4]	-	212.97	17.31
	12/20/2023	230.28	213.04	-0.03 [N-5]	-	213.01	17.27
	12/28/2023	230.28	212.97	-0.03 [N-5]	-	212.94	17.34
	01/03/2024	230.28	212.90	-0.10 [N-3]	-	212.80	17.48
	1/10/2024	230.28	212.9	-0.08 [N-6]	-	212.82	17.46
	1/17/2024	230.28	212.94	-0.08 [N-6]	-	212.86	17.42
	02/08/2024	230.28	212.87	-0.08 [N-6]	-	212.79	17.49
	03/14/2024	230.28	212.86	-0.03 [N-5]	-	212.83	17.45
	04/05/2024	230.28	212.95	-0.03 [N-5]	-	212.92	17.36
	RHP06	09/07/2023	270.84	253.55	-0.09 [N-6]	-	253.46
10/02/2023		270.84	253.61	-0.14 [N-4]	-	253.47	17.37
10/11/2023		270.84	253.60	-0.10 [N-3]	-	253.50	17.34
10/27/2023		270.84	253.6	-0.10 [N-3]	-	253.50	17.34
11/2/2023		270.84	253.66	-0.14 [N-4]	-	253.52	17.32
11/08/2023		270.84	253.69	-0.14 [N-4]	-	253.55	17.29
11/15/2023		270.84	253.65	-0.03 [N-5]	-	253.62	17.22
11/22/2023		270.84	253.69	-0.09 [N-6]	-	253.60	17.24
11/29/2023		270.84	253.61	-0.09 [N-6]	-	253.52	17.32
12/06/2023		270.84	253.59	-0.14 [N-4]	-	253.45	17.39
12/13/2023		270.84	253.56	-0.14 [N-4]	-	253.42	17.42
12/20/2023		270.84	253.43	-0.03 [N-5]	-	253.40	17.44
12/28/2023		270.84	253.43	-0.03 [N-5]	-	253.40	17.44
01/02/2024		270.84	253.40	-0.10 [N-3]	-	253.30	17.54
1/8/2024		270.84	253.39	-0.03 [N-5]	-	253.36	17.48
1/17/2024		270.84	253.39	-0.09 [N-6]	-	253.30	17.54
02/08/2024		270.84	253.35	-0.09 [N-6]	-	253.26	17.58
03/14/2024		270.84	253.30	-0.03 [N-5]	-	253.27	17.57
04/05/2024		270.84	253.40	-0.03 [N-5]	-	253.37	17.47
RHP07		06/15/2023	100.83	82.37	-0.08 [N-4]	-0.0026	82.29
	09/06/2023	100.83	83.36	-0.08 [N-4]	-0.0026	83.28	17.55
	10/05/2023	100.83	83.56	-0.08 [N-4]	-0.0026	83.48	17.35
	10/10/2023	100.83	83.64	-0.08 [N-4]	-0.0026	83.56	17.27
	10/17/2023	100.83	83.54	0.00 [N-5]	-0.0026	83.54	17.29
	10/24/2023	100.83	83.55	-0.05 [N-3]	-0.0026	83.50	17.33
	10/31/2023	100.83	83.54	-0.08 [N-4]	-0.0026	83.46	17.37
	11/10/2023	100.83	83.59	-0.05 [N-3]	-0.0026	83.54	17.29
	11/14/2023	100.83	83.86	0.00 [N-5]	-0.0026	83.86	16.97
	11/21/2023	100.83	83.67	-0.08 [N-4]	-0.0026	83.59	17.24
	11/28/2023	100.83	83.53	-0.08 [N-4]	-0.0026	83.45	17.38
	12/05/2023	100.83	83.43	0.00 [N-5]	-0.0026	83.43	17.40
	12/12/2023	100.83	83.40	-0.05 [N-3]	-0.0026	83.35	17.48
	12/22/2023	100.83	83.33	-0.08 [N-4]	-0.0026	83.25	17.58

Appendix B.2.2 Groundwater Elevation Data, Current Reporting Period (cont'd)

Location	Measurement Date	Measuring Point Elevation*	Depth to Water from TOC (Feet BMP)	Measuring Tape Correction Factor [Tape ID] (ft)	Well Displacement Correction Factor (ft)	Corrected Depth to Water (ft btoc)	Groundwater Elevation (ft msl)
	12/29/2023	100.83	83.32	-0.08 [N-4]	-0.0026	83.24	17.59
	01/02/2024	100.83	83.33	0.00 [N-5]	-0.0026	83.33	17.50
	1/9/2024	100.83	83.22	0.00 [N-5]	-0.0026	83.22	17.61
	1/16/2024	100.83	83.12	-0.06 [N-6]	-0.0026	83.06	17.77
	02/06/2024	100.83	83.17	0.00 [N-5]	-0.0026	83.17	17.66
	03/12/2024	100.83	83.14	0.00 [N-5]	-0.0026	83.14	17.69
	04/02/2024	100.83	83.21	0.00 [N-5]	-0.0026	83.21	17.62
RHP08	09/11/2023	302.96	285.70	-0.14 [N-4]	—	285.56	17.40
	10/03/2023	302.96	285.76	-0.14 [N-4]	—	285.62	17.34
	10/11/2023	302.96	285.84	-0.14 [N-4]	—	285.70	17.26
	10/27/2023	302.96	285.79	-0.10 [N-3]	—	285.69	17.27
	11/2/2023	302.96	285.82	-0.14 [N-4]	—	285.68	17.28
	11/06/2023	302.96	285.82	-0.10 [N-3]	—	285.72	17.24
	11/13/2023	302.96	285.86	-0.09 [N-6]	—	285.77	17.19
	11/21/2023	302.96	285.86	-0.09 [N-6]	—	285.77	17.19
	11/29/2023	302.96	285.73	-0.10 [N-3]	—	285.63	17.33
	12/05/2023	302.96	285.72	-0.09 [N-6]	—	285.63	17.33
	12/13/2023	302.96	285.70	-0.09 [N-6]	—	285.61	17.35
	12/20/2023	302.96	285.67	-0.09 [N-6]	—	285.58	17.38
	12/28/2023	302.96	285.64	-0.14 [N-4]	—	285.50	17.46
	01/02/2024	302.96	285.69	-0.14 [N-4]	—	285.55	17.41
	1/10/2024	302.96	285.52	-0.09 [N-6]	—	285.43	17.53
	1/15/2024	302.96	285.48	-0.10 [N-3]	—	285.38	17.58
	02/07/2024	302.96	285.51	-0.03 [N-5]	—	285.48	17.48
	03/18/2024	302.96	285.53	-0.09 [N-6]	—	285.44	17.52
	04/05/2024	302.96	285.60	-0.09 [N-6]	—	285.51	17.45

* All Elevations are reported in feet relative to NAVD88 vertical datum.

If NAPL is present, the Groundwater Elevation needs to be corrected for NAPL den

MPE = Measuring Point Elevation

BMP = below measuring point

BGS = below ground surface

NC = not collected

Appendix B.3 – Summary of Groundwater Analytical Results

Appendix B.3.1 – Groundwater Analytical Results

App. B.3.1 Groundwater Analytical Data: Red Hill Bulk Fuel Storage Facility
Consolidated Sampling Program
Groundwater Sampling: Data Legend

Non-bold text indicates non-detected value

Bold text indicates detected value, but below the Environmental Action Level (EAL).

Bold and orange shaded text indicates exceeds the Department of Health Tier 1 EAL.

Green text indicates results have completed third-party validation.

Specific EPA method revision used for analyses vary by lab and compound. The lab report associated with a sample specifies the exact method revision used.

– = not analyzed or not applicable

µg/L = microgram per liter (same as parts per billion)

CAS = Chemical Abstracts Service

^a = Uses 3510 extraction method for Consolidated. Additional 3520 for Quarterly

^b = Consolidated Quarterly parameter only.

J = estimated value

J- = estimated value, low bias

J+ = estimated value, high bias

no. = number

QC = quality control

U = nondetect value

TPH-g = total petroleum hydrocarbons-gasoline range organics

TPH-d = total petroleum hydrocarbons-diesel range organics

TPH-o = total petroleum hydrocarbons-residual range

R = Exclusion of data recommended. The sample result was affected by serious deficiencies in the ability to analyze the sample and to meet published method and project quality control criteria.

App. B.3.1 Groundwater Analytical Data: Red Hill Bulk Fuel Storage Facility
 Consolidated Sampling Program & Groundwater Protection Plan-Defueling Sampling
 Groundwater Sampling: NMW24

						Total Petroleum Hydrocarbons					Volatile Organic Compounds				Polycyclic Aromatic Hydrocarbons (PAHs) - AOC/LTM												
						TPH-g PHCC6C10	TPH-d ⁴ PHCC10C24	TPH-o ⁴ PHCC24C40	TPH-d with Silica Gel Cleanup ³ PHCC10C24SGC	TPH-o with Silica Gel Cleanup ³ PHCC24C40SGC	Benzene 71-43-2	Ethylbenzene 100-41-4	Toluene 108-88-3	Xylenes 1330-20-7	1-Methylnaphthalene 90-12-0	2-Methylnaphthalene 91-57-6	Naphthalene 91-20-3										
Method						8260	8015	8015	8015	8015	8260	8260	8260	8260	8270 SIM	8270 SIM	8270 SIM										
DOH Tier 1 EAL						300	400	500	—	—	5	30	40	20	10	10	17										
Units						µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L										
Minimum						ND	ND	ND	—	—	ND	ND	ND	ND	ND	ND	ND										
Maximum						42.5	ND	ND	—	—	ND	ND	ND	ND	ND	ND	ND										
Location	Lab	SDG	Sample ID	Sampling Date	Type	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result										
NMW24	SGS Orlando	FC12404	NMW24-WGN01LF-2401	1/4/2024	Primary	42.5	J	<100	U	<170	U	—	—	<0.5	U	<0.5	U	<0.5	U	<1.5	U	<0.42	U	<0.42	U	<0.42	U
NMW24	APPL	24B0101	NMW24-WGN01LF-2402	2/14/2024	Primary	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	
NMW24	Energy	B24020997	NMW24-WGN01LF-2402	2/14/2024	Primary	—	—	<141	U	<141	U	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	
NMW24	SGS Anchorage	1240615	NMW24-WGN01LF-2402	2/14/2024	Primary	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	
NMW24	SGS Orlando	FC13419	NMW24-WGN01LF-2402	2/14/2024	Primary	<50	U	<100	U	<160	U	—	—	<0.5	U	<0.5	U	<0.5	U	<1.5	U	<0.4	U	<0.4	U	<0.4	U
NMW24	SGS Anchorage	1241109	NMW24-WGN01LF-2403	3/20/2024	Primary	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	

Notes:
 See Data Legend

App. B.3.1 Groundwater Analytical Data: Red Hill Bulk Fuel Storage Facility
 Consolidated Sampling Program & Groundwater Protection Plan-Defueling Sampling
 Groundwater Sampling: NMW24

						Polycyclic Aromatic Hydrocarbons (PAHs) - NOI																			
						Acenaphthene (SIM)	Acenaphthylene (SIM)	Anthracene (SIM)	Benzo(a)anthracene (SIM)	Benzo(a)pyrene (SIM)	Benzo(b)fluoranthene (SIM)	Benzo(g,h,i)perylene (SIM)	Benzo(k)fluoranthene (SIM)	Chrysene (SIM)	Dibenzo(a,h)anthracene (SIM)	Fluoranthene (SIM)	Fluorene (SIM)	Indeno(1,2,3-cd)pyrene (SIM)	Phenanthrene (SIM)	Pyrene (SIM)					
						83-32-9	208-96-8	120-12-7	56-55-3	50-32-8	205-99-2	191-24-2	207-08-9	218-01-8	53-70-3	206-44-0	86-73-7	193-39-5	85-01-8	129-00-0					
						Method	8270SIM	8270SIM	8270SIM	8270SIM	8270SIM	8270SIM	8270SIM	8270SIM	8270SIM	8270SIM	8270SIM	8270SIM	8270SIM	8270SIM	8270SIM				
						DOH Tier 1 EAL	20	240	0.18	0.029	0.2	0.22	0.13	0.4	1	0.022	13	240	0.095	210	68				
						Units	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L				
						Minimum	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND				
						Maximum	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND				
Location	Lab	SDG	Sample ID	Sampling Date	Type	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result					
NMW24	SGS Orlando	FC12404	NMW24-WGN01F-2401	1/4/2024	Primary	<0.42	U	<0.42	U	<0.42	U	<0.042	U	<0.042	U	<0.042	U	<0.042	U	<0.042	U	<0.042	U	<0.42	U
NMW24	APPL	24B0101	NMW24-WGN01F-2402	2/14/2024	Primary	-		-		-		-		-		-		-		-		-		-	
NMW24	Energy	B24020997	NMW24-WGN01F-2402	2/14/2024	Primary	-		-		-		-		-		-		-		-		-		-	
NMW24	SGS Anchorage	1240615	NMW24-WGN01F-2402	2/14/2024	Primary	-		-		-		-		-		-		-		-		-		-	
NMW24	SGS Orlando	FC13419	NMW24-WGN01F-2402	2/14/2024	Primary	<0.4	U	<0.4	U	<0.4	U	<0.04	U	<0.04	U	<0.04	U	<0.04	U	<0.04	U	<0.04	U	<0.4	U
NMW24	SGS Anchorage	1241109	NMW24-WGN01F-2403	3/20/2024	Primary	-		-		-		-		-		-		-		-		-		-	

Notes:
 See Data Legend

App. B.3.1 Groundwater Analytical Data: Red Hill Bulk Fuel Storage Facility
 Consolidated Sampling Program & Groundwater Protection Plan-Defueling Sampling
 Groundwater Sampling: NMW24

						Fuel Additive		Lead Scavengers				Natural Attenuation Parameters				
						2-(2- Methoxyethoxy)-ethanol ⁵	Phenol	1,2-Dibromoethane	1,2-Dichloroethane	Methane	Total Organic Carbon	NV Dissolved Organic Carbon				
						111-77-3	108-95-2	106-93-4	107-06-2	74-82-8	TOC	Carbon				
						Method 8270D	SW8270	8011	8260	RSK 175	9060	9060				
						DOH Tier 1 EAL 800	300	0.04	5	—	—	—				
						Units µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L				
						Minimum ND	ND	ND	ND	ND	ND	ND				
						Maximum ND	ND	ND	ND	ND	345	739				
Location	Lab	SDG	Sample ID	Sampling Date	Type	Result	Result	Result	Result	Result	Result	Result	Result			
NMW24	SGS Orlando	FC12404	NMW24-WGN01F-2401	1/4/2024	Primary	—	<2	U	<0.014	U	<0.5	U	<0.25	U	—	—
NMW24	APPL	24B0101	NMW24-WGN01F-2402	2/14/2024	Primary	<80	UJ	—	—	—	—	—	—	—	—	—
NMW24	Energy	B24020997	NMW24-WGN01F-2402	2/14/2024	Primary	—	—	—	—	—	—	—	—	—	—	—
NMW24	SGS Anchorage	1240615	NMW24-WGN01F-2402	2/14/2024	Primary	—	—	—	—	—	—	—	345	J	739	J
NMW24	SGS Orlando	FC13419	NMW24-WGN01F-2402	2/14/2024	Primary	—	<2	U	<0.014	U	<0.5	U	<0.25	U	—	—
NMW24	SGS Anchorage	1241109	NMW24-WGN01F-2403	3/20/2024	Primary	—	—	—	—	—	—	—	<750	U	<750	U

Notes:
 See Data Legend

App. B.3.1 Groundwater Analytical Data: Red Hill Bulk Fuel Storage Facility
 Consolidated Sampling Program & Groundwater Protection Plan-Defueling Sampling
 Groundwater Sampling: NMW25

						Total Petroleum Hydrocarbons					Volatile Organic Compounds				Polycyclic Aromatic Hydrocarbons (PAHs) - AOC/LTM												
						TPH-g PHCC6C10	TPH-d ⁴ PHCC10C24	TPH-o ⁴ PHCC24C40	TPH-d with Silica Gel Cleanup ³ PHCC10C24SGC	TPH-o with Silica Gel Cleanup ³ PHCC24C40SGC	Benzene 71-43-2	Ethylbenzene 100-41-4	Toluene 108-88-3	Xylenes 1330-20-7	1-Methylnaphthalene 90-12-0	2-Methylnaphthalene 91-57-6	Naphthalene 91-20-3										
Method						8260	8015	8015	8015	8015	8260	8260	8260	8260	8270 SIM	8270 SIM	8270 SIM										
DOH Tier 1 EAL						300	400	500	—	—	5	30	40	20	10	10	17										
Units						µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L										
Minimum						ND	ND	ND	—	—	ND	ND	ND	ND	ND	ND	ND										
Maximum						ND	ND	ND	—	—	ND	ND	ND	ND	ND	ND	ND										
Location	Lab	SDG	Sample ID	Sampling Date	Type	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result										
NMW25	SGS Orlando	FC12404	NMW25-WGN01F-2401	1/4/2024	Primary	<50	U	<100	U	<170	U	—	—	<0.5	U	<0.5	U	<0.5	U	<1.5	U	<0.42	U	<0.42	U	<0.42	U
NMW25	APPL	24B0101	NMW25-WGN01F-2402	2/14/2024	Primary	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
NMW25	Energy	B24020997	NMW25-WGN01F-2402	2/14/2024	Primary	—	—	<144	U	<144	U	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
NMW25	SGS Anchorage	1240615	NMW25-WGN01F-2402	2/14/2024	Primary	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
NMW25	SGS Orlando	FC13419	NMW25-WGN01F-2402	2/14/2024	Primary	<50	U	<100	U	<170	U	—	—	<0.5	U	<0.5	U	<0.5	U	<1.5	U	<0.42	U	<0.42	U	<0.42	U
NMW25	SGS Anchorage	1241109	NMW25-WGN01F-2403	3/20/2024	Primary	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Notes:
 See Data Legend

App. B.3.1 Groundwater Analytical Data: Red Hill Bulk Fuel Storage Facility
 Consolidated Sampling Program & Groundwater Protection Plan-Defueling Sampling
 Groundwater Sampling: NMW25

						Polycyclic Aromatic Hydrocarbons (PAHs) - NOI																											
						Acenaphthene (SIM)	Acenaphthylene (SIM)	Anthracene (SIM)	Benzo(a)anthracene (SIM)	Benzo(a)pyrene (SIM)	Benzo(b)fluoranthene (SIM)	Benzo(g,h,i)perylene (SIM)	Benzo(k)fluoranthene (SIM)	Chrysene (SIM)	Dibenzo(a,h)anthracene (SIM)	Fluoranthene (SIM)	Fluorene (SIM)	Indeno(1,2,3-cd)pyrene (SIM)	Phenanthrene (SIM)	Pyrene (SIM)													
						83-32-9	208-96-8	120-12-7	56-55-3	50-32-8	205-99-2	191-24-2	207-08-9	218-01-9	53-70-3	206-44-0	86-73-7	193-39-5	85-01-8	129-00-0													
						8270SIM	8270SIM	8270SIM	8270SIM	8270SIM	8270SIM	8270SIM	8270SIM	8270SIM	8270SIM	8270SIM	8270SIM	8270SIM	8270SIM	8270SIM	8270SIM												
						20	240	0.18	0.029	0.2	0.22	0.13	0.4	1	0.022	13	240	0.095	210	68													
						µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L												
						ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND												
						ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND												
Location	Lab	SDG	Sample ID	Sampling Date	Type	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result													
NMW25	SGS Orlando	FC12404	NMW25-WGN01LF-2401	1/4/2024	Primary	<0.42	U	<0.42	U	<0.42	U	<0.042	U	<0.042	U	<0.042	U	<0.042	U	<0.083	U	<0.042	U	<0.42	U	<0.42	U	<0.042	U	<0.42	U	<0.42	U
NMW25	APPL	24B0101	NMW25-WGN01LF-2402	2/14/2024	Primary	-		-		-		-		-		-		-		-		-		-		-		-		-		-	
NMW25	Energy	B24020997	NMW25-WGN01LF-2402	2/14/2024	Primary	-		-		-		-		-		-		-		-		-		-		-		-		-		-	
NMW25	SGS Anchorage	1240615	NMW25-WGN01LF-2402	2/14/2024	Primary	-		-		-		-		-		-		-		-		-		-		-		-		-		-	
NMW25	SGS Orlando	FC13419	NMW25-WGN01LF-2402	2/14/2024	Primary	<0.42	U	<0.42	U	<0.42	U	<0.042	U	<0.042	U	<0.042	U	<0.083	U	<0.042	U	<0.42	U	<0.42	U	<0.42	U	<0.042	U	<0.42	U	<0.42	U
NMW25	SGS Anchorage	1241109	NMW25-WGN01LF-2403	3/20/2024	Primary	-		-		-		-		-		-		-		-		-		-		-		-		-		-	

Notes:
 See Data Legend

App. B.3.1 Groundwater Analytical Data: Red Hill Bulk Fuel Storage Facility
 Consolidated Sampling Program & Groundwater Protection Plan-Defueling Sampling
 Groundwater Sampling: NMW25

						Fuel Additive		Lead Scavengers				Natural Attenuation Parameters				
						2-(2-Methoxyethoxy)-ethanol ⁵	Phenol	1,2-Dibromoethane	1,2-Dichloroethane	Methane	Total Organic Carbon	NV Dissolved Organic Carbon				
Analyte						111-77-3	108-95-2	106-93-4	107-06-2	74-82-8	TOC	Carbon				
CAS No.						8270D	SW8270	8011	8260	RSK 175	9060	9060				
Method						800	300	0.04	5	—	—	—				
DOH Tier 1 EAL						µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L				
Units						ND	ND	ND	ND	ND	814	867				
Minimum						ND	ND	ND	ND	ND	907	1330				
Maximum																
Location	Lab	SDG	Sample ID	Sampling Date	Type	Result	Result	Result	Result	Result	Result	Result	Result			
NMW25	SGS Orlando	FC12404	NMW25-WGN01F-2401	1/4/2024	Primary	—	<2	U	<0.015	U	<0.5	U	<0.25	U	—	—
NMW25	APPL	24B0101	NMW25-WGN01F-2402	2/14/2024	Primary	<80	UJ	—	—	—	—	—	—	—	—	—
NMW25	Energy	B24020997	NMW25-WGN01F-2402	2/14/2024	Primary	—	—	—	—	—	—	—	—	—	—	—
NMW25	SGS Anchorage	1240615	NMW25-WGN01F-2402	2/14/2024	Primary	—	—	—	—	—	—	—	814	J	867	J
NMW25	SGS Orlando	FC13419	NMW25-WGN01F-2402	2/14/2024	Primary	—	<2	U	<0.014	U	<0.5	U	<0.25	U	—	—
NMW25	SGS Anchorage	1241109	NMW25-WGN01F-2403	3/20/2024	Primary	—	—	—	—	—	—	—	907	J+	1330	—

Notes:
 See Data Legend

App. B.3.1 Groundwater Analytical Data: Red Hill Bulk Fuel Storage Facility
 Consolidated Sampling Program & Groundwater Protection Plan-Defueling Sampling
 Groundwater Sampling: NMW26

						Total Petroleum Hydrocarbons					Volatile Organic Compounds				Polycyclic Aromatic Hydrocarbons (PAHs) - AOC/LTM														
						TPH-g PHCC6C10	TPH-d ⁴ PHCC10C24	TPH-o ⁴ PHCC24C40	TPH-d with Silica Gel Cleanup ³ PHCC10C24SGC	TPH-o with Silica Gel Cleanup ³ PHCC24C40SGC	Benzene 71-43-2	Ethylbenzene 100-41-4	Toluene 108-88-3	Xylenes 1330-20-7	1-Methylnaphthalene 90-12-0	2-Methylnaphthalene 91-57-6	Naphthalene 91-20-3												
Method						8260	8015	8015	8015	8015	8260	8260	8260	8260	8270 SIM	8270 SIM	8270 SIM												
DOH Tier 1 EAL						300	400	500	—	—	5	30	40	20	10	10	17												
Units						µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L												
Minimum						ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND												
Maximum						ND	104	121	ND	111	ND	ND	ND	ND	ND	ND	ND												
Location	Lab	SDG	Sample ID	Sampling Date	Type	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result												
NMW26	SGS Anchorage	1240463	NMW26-WGN02LF-2401	2/2/2024	Primary	—	—	—	—	—	—	—	—	—	—	—	—												
NMW26	SGS Orlando	FC13080	NMW26-WGN02LF-2401	2/2/2024	Primary	<50	U	<100	U	121	J	<100	U	111	J	<0.5	U	<0.5	U	<0.5	U	<1.5	U	<0.4	U	<0.4	U	<0.4	U
NMW26	APPL	24B0081	NMW26-WGN01LF-2402	2/12/2024	Primary	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	
NMW26	Energy	B24020801	NMW26-WGN01LF-2402	2/12/2024	Primary	—	—	104	J	117	J	<141	U	<141	U	—	—	—	—	—	—	—	—	—	—	—	—	—	
NMW26	SGS Anchorage	1240595	NMW26-WGN01LF-2402	2/12/2024	Primary	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	
NMW26	SGS Orlando	FC13346	NMW26-WGN01LF-2402	2/12/2024	Primary	<50	U	<100	U	<170	U	—	—	—	—	<0.5	U	<0.5	U	<0.5	U	<1.5	U	<0.42	U	<0.42	U	<0.42	U
NMW26	SGS Anchorage	1241150	NMW26-WGN01LF-2403	3/23/2024	Primary	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	

Notes:
 See Data Legend

App. B.3.1 Groundwater Analytical Data: Red Hill Bulk Fuel Storage Facility
 Consolidated Sampling Program & Groundwater Protection Plan-Defueling Sampling
 Groundwater Sampling: NMW26

						Polycyclic Aromatic Hydrocarbons (PAHs) - NOI																								
						Acenaphthene (SIM)	Acenaphthylene (SIM)	Anthracene (SIM)	Benzo(a)anthracene (SIM)	Benzo(a)pyrene (SIM)	Benzo(b)fluoranthene (SIM)	Benzo(g,h,i)perylene (SIM)	Benzo(k)fluoranthene (SIM)	Chrysene (SIM)	Dibenzo(a,h)anthracene (SIM)	Fluoranthene (SIM)	Fluorene (SIM)	Indeno(1,2,3-cd)pyrene (SIM)	Phenanthrene (SIM)	Pyrene (SIM)										
Analyte	CAS No.	Method	DOH Tier 1 EAL	Units	Minimum	Maximum	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result			
	83-32-9	8270SIM	20	µg/L	ND	ND	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-			
	208-96-8	8270SIM	240	µg/L	ND	ND	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-			
	120-12-7	8270SIM	0.18	µg/L	ND	ND	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-			
	56-55-3	8270SIM	0.029	µg/L	ND	ND	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-			
	50-32-8	8270SIM	0.2	µg/L	ND	ND	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-			
	205-99-2	8270SIM	0.22	µg/L	ND	ND	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-			
	191-24-2	8270SIM	0.13	µg/L	ND	ND	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-			
	207-08-9	8270SIM	0.4	µg/L	ND	ND	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-			
	218-01-8	8270SIM	1	µg/L	ND	ND	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-			
	53-70-3	8270SIM	0.022	µg/L	ND	ND	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-			
	206-44-0	8270SIM	13	µg/L	ND	ND	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-			
	86-73-7	8270SIM	240	µg/L	ND	ND	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-			
	193-39-5	8270SIM	0.095	µg/L	ND	ND	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-			
	85-01-8	8270SIM	210	µg/L	ND	ND	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-			
	129-00-0	8270SIM	68	µg/L	ND	ND	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-			
Location	Lab	SDG	Sample ID	Sampling Date	Type		Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result		
NMW26	SGS Anchorage	1240463	NMW26-WGN02LF-2401	2/2/2024	Primary		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-			
NMW26	SGS Orlando	FC13080	NMW26-WGN02LF-2401	2/2/2024	Primary		<0.4	U	<0.4	U	<0.4	U	<0.04	U	<0.04	U	<0.04	U	<0.08	U	<0.04	U	<0.4	U	<0.4	U	<0.04	U	<0.4	U
NMW26	APPL	24B0081	NMW26-WGN01LF-2402	2/12/2024	Primary		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-			
NMW26	Energy	B24020801	NMW26-WGN01LF-2402	2/12/2024	Primary		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-			
NMW26	SGS Anchorage	1240595	NMW26-WGN01LF-2402	2/12/2024	Primary		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-			
NMW26	SGS Orlando	FC13346	NMW26-WGN01LF-2402	2/12/2024	Primary		<0.42	U	<0.42	U	<0.42	U	<0.042	U	<0.042	U	<0.042	U	<0.083	U	<0.042	U	<0.42	U	<0.42	U	<0.042	U	<0.42	U
NMW26	SGS Anchorage	1241150	NMW26-WGN01LF-2403	3/23/2024	Primary		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-			

Notes:
 See Data Legend

App. B.3.1 Groundwater Analytical Data: Red Hill Bulk Fuel Storage Facility
 Consolidated Sampling Program & Groundwater Protection Plan-Defueling Sampling
 Groundwater Sampling: NMW26

						Fuel Additive		Lead Scavengers				Natural Attenuation Parameters		
						2-(2-Methoxyethoxy)-ethanol ⁵	Phenol	1,2-Dibromoethane	1,2-Dichloroethane	Methane	Total Organic Carbon	NV Dissolved Organic Carbon		
						CAS No.	108-95-2	106-93-4	107-06-2	74-82-8	TOC			
						Method	SW8270	8011	8260	RSK 175	9060	9060		
						DOH Tier 1 EAL	800	0.04	5	—	—	—		
						Units	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L		
						Minimum	ND	ND	ND	ND	2850	2990		
						Maximum	ND	ND	ND	0.21	3440	3690		
Location	Lab	SDG	Sample ID	Sampling Date	Type	Result	Result	Result	Result	Result	Result	Result	Result	
NMW26	SGS Anchorage	1240463	NMW26-WGN02LF-2401	2/2/2024	Primary	—	—	—	—	—	3440	—	3690	
NMW26	SGS Orlando	FC13080	NMW26-WGN02LF-2401	2/2/2024	Primary	—	<2 U	<0.015 U	<0.5 U	<0.25 U	—	—	—	
NMW26	APPL	24B0081	NMW26-WGN01LF-2402	2/12/2024	Primary	<80 U	—	—	—	—	—	—	—	
NMW26	Energy	B24020801	NMW26-WGN01LF-2402	2/12/2024	Primary	—	—	—	—	—	—	—	—	
NMW26	SGS Anchorage	1240595	NMW26-WGN01LF-2402	2/12/2024	Primary	—	—	—	—	—	3110	—	3300	
NMW26	SGS Orlando	FC13346	NMW26-WGN01LF-2402	2/12/2024	Primary	—	<2 U	<0.014 U	<0.5 U	0.21 J	—	—	—	
NMW26	SGS Anchorage	1241150	NMW26-WGN01LF-2403	3/23/2024	Primary	—	—	—	—	—	2850	—	2990	

Notes:
 See Data Legend

App. B.3.1 Groundwater Analytical Data: Red Hill Bulk Fuel Storage Facility
 Consolidated Sampling Program & Groundwater Protection Plan-Defueling Sampling
 Groundwater Sampling: NMW30

						Total Petroleum Hydrocarbons					Volatile Organic Compounds				Polycyclic Aromatic Hydrocarbons (PAHs) - AOC/LTM												
						TPH-g PHCC6C10	TPH-d ⁴ PHCC10C24	TPH-o ⁴ PHCC24C40	TPH-d with Silica Gel Cleanup ³ PHCC10C24SGC	TPH-o with Silica Gel Cleanup ³ PHCC24C40SGC	Benzene 71-43-2	Ethylbenzene 100-41-4	Toluene 108-88-3	Xylenes 1330-20-7	1-Methylnaphthalene 90-12-0	2-Methylnaphthalene 91-57-6	Naphthalene 91-20-3										
Method						8260	8015	8015	8015	8015	8260	8260	8260	8260	8270 SIM	8270 SIM	8270 SIM										
DOH Tier 1 EAL						300	400	500	—	—	5	30	40	20	10	10	17										
Units						µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L										
Minimum						ND	ND	ND	—	—	ND	ND	ND	ND	ND	ND	ND										
Maximum						ND	ND	ND	—	—	ND	ND	ND	ND	ND	ND	ND										
Location	Lab	SDG	Sample ID	Sampling Date	Type	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result										
NMW30	SGS Orlando	FC12404	NMW30-WGN01LF-2401	1/4/2024	Primary	<50	U	<100	U	<170	U	—	—	<0.5	U	<0.5	U	<0.5	U	<1.5	U	<0.42	U	<0.42	U	<0.42	U
NMW30	APPL	24B0112	NMW30-WGN01LF-2402	2/15/2024	Primary	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
NMW30	Energy	B24021083	NMW30-WGN01LF-2402	2/15/2024	Primary	—	—	<141	U	<189	U	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
NMW30	SGS Anchorage	1240641	NMW30-WGN01LF-2402	2/15/2024	Primary	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
NMW30	SGS Orlando	FC13450	NMW30-WGN01LF-2402	2/15/2024	Primary	<50	U	<100	U	<160	U	—	—	<0.5	U	<0.5	U	<0.5	U	<1.5	U	<0.4	U	<0.4	U	<0.4	U
NMW30	SGS Anchorage	1241109	NMW30-WGN01LF-2403	3/20/2024	Primary	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Notes:
 See Data Legend

App. B.3.1 Groundwater Analytical Data: Red Hill Bulk Fuel Storage Facility
 Consolidated Sampling Program & Groundwater Protection Plan-Defueling Sampling
 Groundwater Sampling: NMW30

						Polycyclic Aromatic Hydrocarbons (PAHs)																					
						Acenaphthene (SIM)	Acenaphthylene (SIM)	Anthracene (SIM)	Benzo(a)anthracene (SIM)	Benzo(a)pyrene (SIM)	Benzo(b)fluoranthene (SIM)	Benzo(g,h,i)perylene (SIM)	Benzo(k)fluoranthene (SIM)	Chrysene (SIM)	Dibenzo(a,h)anthracene (SIM)	Fluoranthene (SIM)	Fluorene (SIM)	Indeno(1,2,3-cd)pyrene (SIM)	Phenanthrene (SIM)	Pyrene (SIM)							
						83-32-9	208-96-8	120-12-7	56-55-3	50-32-8	205-99-2	191-24-2	207-08-9	218-01-9	53-70-3	206-44-0	86-73-7	193-39-5	85-01-8	129-00-0							
						8270SIM	8270SIM	8270SIM	8270SIM	8270SIM	8270SIM	8270SIM	8270SIM	8270SIM	8270SIM	8270SIM	8270SIM	8270SIM	8270SIM	8270SIM	8270SIM						
						20	240	0.18	0.029	0.2	0.22	0.4	1	0.022	13	240	0.095	210	68								
						µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L							
						ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND							
						ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND							
Location	Lab	SDG	Sample ID	Sampling Date	Type	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result							
NMW30	SGS Orlando	FC12404	NMW30-WGN01F-2401	1/4/2024	Primary	<0.42	U	<0.42	U	<0.42	U	<0.042	U	<0.042	U	<0.042	U	<0.042	U	<0.042	U	<0.42	U	<0.42	U	<0.42	U
NMW30	APPL	24B0112	NMW30-WGN01F-2402	2/15/2024	Primary	-		-		-		-		-		-		-		-		-		-		-	
NMW30	Energy	B24021083	NMW30-WGN01F-2402	2/15/2024	Primary	-		-		-		-		-		-		-		-		-		-		-	
NMW30	SGS Anchorage	1240641	NMW30-WGN01F-2402	2/15/2024	Primary	-		-		-		-		-		-		-		-		-		-		-	
NMW30	SGS Orlando	FC13450	NMW30-WGN01F-2402	2/15/2024	Primary	<0.4	U	<0.4	U	<0.4	U	<0.04	U	<0.04	U	<0.04	U	<0.04	U	<0.04	U	<0.4	U	<0.4	U	<0.4	U
NMW30	SGS Anchorage	1241109	NMW30-WGN01F-2403	3/20/2024	Primary	-		-		-		-		-		-		-		-		-		-		-	

Notes:
 See Data Legend

App. B.3.1 Groundwater Analytical Data: Red Hill Bulk Fuel Storage Facility
 Consolidated Sampling Program & Groundwater Protection Plan-Defueling Sampling
 Groundwater Sampling: NMW30

						Fuel Additive		Lead Scavengers				Natural Attenuation Parameters				
						2-(2-Methoxyethoxy)-ethanol ⁵	Phenol	1,2-Dibromoethane	1,2-Dichloroethane	Methane	Total Organic Carbon	NV Dissolved Organic Carbon				
Analyte						111-77-3	108-95-2	106-93-4	107-06-2	74-82-8	TOC	—				
CAS No.						8270D	SW8270	8011	8260	RSK 175	9060	9060				
Method						800	300	0.04	5	—	—	—				
DOH Tier 1 EAL						—	—	—	—	—	—	—				
Units						µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L				
Minimum						ND	ND	ND	ND	182	ND	775				
Maximum						ND	ND	ND	ND	263	747	973				
Location	Lab	SDG	Sample ID	Sampling Date	Type	Result	Result	Result	Result	Result	Result	Result				
NMW30	SGS Orlando	FC12404	NMW30-WGN01LF-2401	1/4/2024	Primary	—	<2	U	<0.014	U	<0.5	U	182	—	—	—
NMW30	APPL	24B0112	NMW30-WGN01LF-2402	2/15/2024	Primary	<80	UJ	—	—	—	—	—	—	—	—	—
NMW30	Energy	B24021083	NMW30-WGN01LF-2402	2/15/2024	Primary	—	—	—	—	—	—	—	—	—	—	—
NMW30	SGS Anchorage	1240641	NMW30-WGN01LF-2402	2/15/2024	Primary	—	—	—	—	—	—	—	747	J	775	J
NMW30	SGS Orlando	FC13450	NMW30-WGN01LF-2402	2/15/2024	Primary	—	<2	U	<0.015	U	<0.5	U	263	—	—	—
NMW30	SGS Anchorage	1241109	NMW30-WGN01LF-2403	3/20/2024	Primary	—	—	—	—	—	—	—	<750	U	973	J+

Notes:
 See Data Legend

App. B.3.1 Groundwater Analytical Data: Red Hill Bulk Fuel Storage Facility
 Consolidated Sampling Program & Groundwater Protection Plan-Defueling Sampling
 Groundwater Sampling: NMW32

						Total Petroleum Hydrocarbons					Volatile Organic Compounds				Polycyclic Aromatic Hydrocarbons (PAHs) - AOC/LTM												
						TPH-g PHCC6C10	TPH-d ⁴ PHCC10C24	TPH-o ⁴ PHCC24C40	TPH-d with Silica Gel Cleanup ³ PHCC10C24SGC	TPH-o with Silica Gel Cleanup ³ PHCC24C40SGC	Benzene 71-43-2	Ethylbenzene 100-41-4	Toluene 108-88-3	Xylenes 1330-20-7	1-Methylnaphthalene 90-12-0	2-Methylnaphthalene 91-57-6	Naphthalene 91-20-3										
Method						8260	8015	8015	8015	8015	8260	8260	8260	8260	8270 SIM	8270 SIM	8270 SIM										
DOH Tier 1 EAL						300	400	500	—	—	5	30	40	20	10	10	17										
Units						µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L										
Minimum						ND	ND	ND	—	—	ND	ND	ND	ND	ND	ND	ND										
Maximum						ND	ND	ND	—	—	ND	ND	ND	ND	ND	ND	ND										
Location	Lab	SDG	Sample ID	Sampling Date	Type	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result										
NMW32	SGS Orlando	FC12404	NMW32-WGN01F-2401	1/4/2024	Primary	<50	U	<100	U	<170	U	—	—	<0.5	U	<0.5	U	<0.5	U	<1.5	U	<0.42	U	<0.42	U	<0.42	U
NMW32	APPL	24B0112	NMW32-WGN01F-2402	2/15/2024	Primary	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
NMW32	Energy	B24021083	NMW32-WGN01F-2402	2/15/2024	Primary	—	—	<141	U	<189	U	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
NMW32	SGS Anchorage	1240641	NMW32-WGN01F-2402	2/15/2024	Primary	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
NMW32	SGS Orlando	FC13450	NMW32-WGN01F-2402	2/15/2024	Primary	<50	U	<100	U	<170	U	—	—	<0.5	U	<0.5	U	<0.5	U	<1.5	U	<0.38	U	<0.38	U	<0.38	U
NMW32	SGS Anchorage	1241118	NMW32-WGN01F-2403	3/21/2024	Primary	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Notes:
 See Data Legend

App. B.3.1 Groundwater Analytical Data: Red Hill Bulk Fuel Storage Facility
 Consolidated Sampling Program & Groundwater Protection Plan-Defueling Sampling
 Groundwater Sampling: NMW32

						Polycyclic Aromatic Hydrocarbons (PAHs) - NOI																					
						Acenaphthene (SIM)	Acenaphthylene (SIM)	Anthracene (SIM)	Benzo(a)anthracene (SIM)	Benzo(a)pyrene (SIM)	Benzo(b)fluoranthene (SIM)	Benzo(g,h,i)perylene (SIM)	Benzo(k)fluoranthene (SIM)	Chrysene (SIM)	Dibenzo(a,h)anthracene (SIM)	Fluoranthene (SIM)	Fluorene (SIM)	Indeno(1,2,3-cd)pyrene (SIM)	Phenanthrene (SIM)	Pyrene (SIM)							
						83-32-9	208-96-8	120-12-7	56-55-3	50-32-8	205-99-2	191-24-2	207-08-9	218-01-9	53-70-3	206-44-0	86-73-7	193-39-5	85-01-8	129-00-0							
						8270SIM	8270SIM	8270SIM	8270SIM	8270SIM	8270SIM	8270SIM	8270SIM	8270SIM	8270SIM	8270SIM	8270SIM	8270SIM	8270SIM	8270SIM	8270SIM						
						20	240	0.18	0.029	0.2	0.22	0.13	0.4	1	0.022	13	240	0.095	210	68							
						µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L						
						ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND						
						ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND						
Location	Lab	SDG	Sample ID	Sampling Date	Type	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result							
NMW32	SGS Orlando	FC12404	NMW32-WGN01F-2401	1/4/2024	Primary	<0.42	U	<0.42	U	<0.42	U	<0.042	U	<0.042	U	<0.042	U	<0.042	U	<0.042	U	<0.042	U	<0.42	U	<0.42	U
NMW32	APPL	24B0112	NMW32-WGN01F-2402	2/15/2024	Primary	-		-		-		-		-		-		-		-		-		-		-	
NMW32	Energy	B24021083	NMW32-WGN01F-2402	2/15/2024	Primary	-		-		-		-		-		-		-		-		-		-		-	
NMW32	SGS Anchorage	1240641	NMW32-WGN01F-2402	2/15/2024	Primary	-		-		-		-		-		-		-		-		-		-		-	
NMW32	SGS Orlando	FC13450	NMW32-WGN01F-2402	2/15/2024	Primary	<0.38	U	<0.38	U	<0.38	U	<0.038	U	<0.038	U	<0.038	U	<0.077	U	<0.038	U	<0.38	U	<0.38	U	<0.38	U
NMW32	SGS Anchorage	1241118	NMW32-WGN01F-2403	3/21/2024	Primary	-		-		-		-		-		-		-		-		-		-		-	

Notes:
 See Data Legend

App. B.3.1 Groundwater Analytical Data: Red Hill Bulk Fuel Storage Facility
 Consolidated Sampling Program & Groundwater Protection Plan-Defueling Sampling
 Groundwater Sampling: NMW32

						Fuel Additive		Lead Scavengers				Natural Attenuation Parameters					
						2-(2-Methoxyethoxy)-ethanol ⁵	Phenol	1,2-Dibromoethane	1,2-Dichloroethane	Methane	Total Organic Carbon	NV Dissolved Organic Carbon					
						CAS No.	108-95-2	106-93-4	107-06-2	74-82-8	TOC						
						Method	SW8270	8011	8260	RSK 175	9060	9060					
						DOH Tier 1 EAL	300	0.04	5	—	—	—					
						Units	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L					
						Minimum	ND	ND	ND	ND	755	1170					
						Maximum	ND	ND	ND	0.54	798	1320					
Location	Lab	SDG	Sample ID	Sampling Date	Type	Result	Result	Result	Result	Result	Result	Result	Result				
NMW32	SGS Orlando	FC12404	NMW32-WGN01F-2401	1/4/2024	Primary	—	<2	U	<0.014	U	<0.5	U	<0.25	U	—	—	—
NMW32	APPL	24B0112	NMW32-WGN01F-2402	2/15/2024	Primary	<80	UJ	—	—	—	—	—	—	—	—	—	—
NMW32	Energy	B24021083	NMW32-WGN01F-2402	2/15/2024	Primary	—	—	—	—	—	—	—	—	—	—	—	—
NMW32	SGS Anchorage	1240641	NMW32-WGN01F-2402	2/15/2024	Primary	—	—	—	—	—	—	—	798	J	1320	—	—
NMW32	SGS Orlando	FC13450	NMW32-WGN01F-2402	2/15/2024	Primary	—	<2	U	<0.015	U	<0.5	U	0.54	—	—	—	—
NMW32	SGS Anchorage	1241118	NMW32-WGN01F-2403	3/21/2024	Primary	—	—	—	—	—	—	—	755	J+	1170	J+	J+

Notes:
 See Data Legend

App. B.3.1 Groundwater Analytical Data: Red Hill Bulk Fuel Storage Facility
 Consolidated Sampling Program & Groundwater Protection Plan-Defueling Sampling
 Groundwater Sampling: NMW33

						Total Petroleum Hydrocarbons					Volatile Organic Compounds				Polycyclic Aromatic Hydrocarbons (PAHs) - AOC/LTM												
						TPH-g PHCC6C10	TPH-d ⁴ PHCC10C24	TPH-o ⁴ PHCC24C40	TPH-d with Silica Gel Cleanup ³ PHCC10C24SGC	TPH-o with Silica Gel Cleanup ³ PHCC24C40SGC	Benzene 71-43-2	Ethylbenzene 100-41-4	Toluene 108-88-3	Xylenes 1330-20-7	1-Methylnaphthalene 90-12-0	2-Methylnaphthalene 91-57-6	Naphthalene 91-20-3										
Method						8260	8015	8015	8015	8015	8260	8260	8260	8260	8270 SIM	8270 SIM	8270 SIM										
DOH Tier 1 EAL						300	400	500	—	—	5	30	40	20	10	10	17										
Units						µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L										
Minimum						ND	ND	ND	—	—	ND	ND	ND	ND	ND	ND	ND										
Maximum						ND	ND	ND	—	—	ND	ND	ND	ND	ND	ND	ND										
Location	Lab	SDG	Sample ID	Sampling Date	Type	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result										
NMW33	SGS Orlando	FC12420	NMW33-WGN01F-2401	1/5/2024	Primary	<50	U	<100	U	<170	U	—	—	<0.5	U	<0.5	U	<0.5	U	<1.5	U	<0.42	U	<0.42	U	<0.42	U
NMW33	APPL	24B0112	NMW33-WGN01F-2402	2/15/2024	Primary	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	
NMW33	Energy	B24021083	NMW33-WGN01F-2402	2/15/2024	Primary	—	—	<141	U	<189	U	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	
NMW33	SGS Anchorage	1240641	NMW33-WGN01F-2402	2/15/2024	Primary	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	
NMW33	SGS Orlando	FC13450	NMW33-WGN01F-2402	2/15/2024	Primary	<50	U	<100	U	<170	U	—	—	<0.5	U	<0.5	U	<0.5	U	<1.5	U	<0.42	U	<0.42	U	<0.42	U
NMW33	SGS Anchorage	1241118	NMW33-WGN01F-2403	3/21/2024	Primary	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	

Notes:
 See Data Legend

App. B.3.1 Groundwater Analytical Data: Red Hill Bulk Fuel Storage Facility
 Consolidated Sampling Program & Groundwater Protection Plan-Defueling Sampling
 Groundwater Sampling: NMW33

						Polycyclic Aromatic Hydrocarbons (PAHs) - NOI																											
						Acenaphthene (SIM)	Acenaphthylene (SIM)	Anthracene (SIM)	Benzo(a)anthracene (SIM)	Benzo(a)pyrene (SIM)	Benzo(b)fluoranthene (SIM)	Benzo(g,h,i)perylene (SIM)	Benzo(k)fluoranthene (SIM)	Chrysene (SIM)	Dibenzo(a,h)anthracene (SIM)	Fluoranthene (SIM)	Fluorene (SIM)	Indeno(1,2,3-cd)pyrene (SIM)	Phenanthrene (SIM)	Pyrene (SIM)													
						83-32-9	208-96-8	120-12-7	56-55-3	50-32-8	205-99-2	191-24-2	207-08-9	218-01-9	53-70-3	206-44-0	86-73-7	193-39-5	85-01-8	129-00-0													
						8270SIM	8270SIM	8270SIM	8270SIM	8270SIM	8270SIM	8270SIM	8270SIM	8270SIM	8270SIM	8270SIM	8270SIM	8270SIM	8270SIM	8270SIM	8270SIM												
						20	240	0.18	0.029	0.2	0.22	0.13	0.4	1	0.022	13	240	0.095	210	68													
						µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L												
						ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND												
						ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND												
Location	Lab	SDG	Sample ID	Sampling Date	Type	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result													
NMW33	SGS Orlando	FC12420	NMW33-WGN01F-2401	1/5/2024	Primary	<0.42	U	<0.42	U	<0.42	U	<0.042	U	<0.042	U	<0.042	U	<0.042	U	<0.083	U	<0.042	U	<0.42	U	<0.42	U	<0.042	U	<0.42	U	<0.42	U
NMW33	APPL	24B0112	NMW33-WGN01F-2402	2/15/2024	Primary	-		-		-		-		-		-		-		-		-		-		-		-		-			
NMW33	Energy	B24021083	NMW33-WGN01F-2402	2/15/2024	Primary	-		-		-		-		-		-		-		-		-		-		-		-		-			
NMW33	SGS Anchorage	1240641	NMW33-WGN01F-2402	2/15/2024	Primary	-		-		-		-		-		-		-		-		-		-		-		-		-			
NMW33	SGS Orlando	FC13450	NMW33-WGN01F-2402	2/15/2024	Primary	-		<0.42	U	<0.42	U	<0.042	U	<0.042	U	<0.042	U	<0.083	U	<0.042	U	<0.42	U	<0.42	U	<0.42	U	<0.042	U	<0.42	U	<0.42	U
NMW33	SGS Anchorage	1241118	NMW33-WGN01F-2403	3/21/2024	Primary	-		-		-		-		-		-		-		-		-		-		-		-		-			

Notes:
 See Data Legend

App. B.3.1 Groundwater Analytical Data: Red Hill Bulk Fuel Storage Facility
 Consolidated Sampling Program & Groundwater Protection Plan-Defueling Sampling
 Groundwater Sampling: NMW33

						Fuel Additive		Lead Scavengers				Natural Attenuation Parameters				
						2-(2-Methoxyethoxy)-ethanol ⁵	Phenol	1,2-Dibromoethane	1,2-Dichloroethane	Methane	Total Organic Carbon	NV Dissolved Organic Carbon				
Analyte	111-77-3	108-95-2	106-93-4	107-06-2	74-82-8	TOC										
CAS No.	8270D	SW8270	8011	8260	RSK 175	9060	9060									
Method	800	300	0.04	5	—	—	—									
DOH Tier 1 EAL	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L									
Units	ND	ND	ND	ND	ND	ND	ND	428								
Minimum	ND	ND	ND	ND	ND	ND	ND	835								
Maximum	ND	ND	ND	ND	ND	ND	ND	1600								
Location	Lab	SDG	Sample ID	Sampling Date	Type	Result	Result	Result	Result	Result	Result	Result				
NMW33	SGS Orlando	FC12420	NMW33-WGN01LF-2401	1/5/2024	Primary	—	<2	U	<0.014	U	<0.5	U	<0.25	U	—	—
NMW33	APPL	24B0112	NMW33-WGN01LF-2402	2/15/2024	Primary	<80	UJ	—	—	—	—	—	—	—	—	—
NMW33	Energy	B24021083	NMW33-WGN01LF-2402	2/15/2024	Primary	—	—	—	—	—	—	—	—	—	—	—
NMW33	SGS Anchorage	1240641	NMW33-WGN01LF-2402	2/15/2024	Primary	—	—	—	—	—	—	—	428	J	835	J
NMW33	SGS Orlando	FC13450	NMW33-WGN01LF-2402	2/15/2024	Primary	—	<2	U	<0.015	U	<0.5	U	<0.25	U	—	—
NMW33	SGS Anchorage	1241118	NMW33-WGN01LF-2403	3/21/2024	Primary	—	—	—	—	—	—	—	<750	U	1600	—

Notes:
 See Data Legend

App. B.3.1 Groundwater Analytical Data: Red Hill Bulk Fuel Storage Facility
 Consolidated Sampling Program & Groundwater Protection Plan-Defueling Sampling
 Groundwater Sampling: HDMW2253-01

						Total Petroleum Hydrocarbons					Volatile Organic Compounds				Polycyclic Aromatic Hydrocarbons (PAHs) - AOC/LTM												
						TPH-g PHCC6C10	TPH-d ⁴ PHCC10C24	TPH-o ⁴ PHCC24C40	TPH-d with Silica Gel Cleanup ³ PHCC10C24SGC	TPH-o with Silica Gel Cleanup ³ PHCC24C40SGC	Benzene 71-43-2	Ethylbenzene 100-41-4	Toluene 108-88-3	Xylenes 1330-20-7	1-Methylnaphthalene 90-12-0	2-Methylnaphthalene 91-57-6	Naphthalene 91-20-3										
Analyte						8260	8015	8015	8015	8015	8260	8260	8260	8260	8270 SIM	8270 SIM	8270 SIM										
CAS No.						300	400	500	—	—	5	30	40	20	10	10	17										
Method						—	—	—	—	—	—	—	—	—	—	—	—										
DOH Tier 1 EAL						—	—	—	—	—	—	—	—	—	—	—	—										
Units						µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L										
Minimum						ND	ND	ND	—	—	ND	ND	ND	ND	ND	ND	ND										
Maximum						ND	ND	ND	—	—	ND	ND	ND	ND	ND	ND	ND										
Location	Lab	SDG	Sample ID	Sampling Date	Type	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result										
HDMW2253-03	SGS Orlando	FC12420	HDMW2253-03-WGN01F-2401	1/5/2024	Primary	<50	U	<100	U	<170	U	—	—	<0.5	U	<0.5	U	<0.5	U	<1.5	U	<0.42	U	<0.42	U	<0.42	U
HDMW2253-03	APPL	24B0068	HDMW2253-03-WGN01F-2402	2/9/2024	Primary	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	
HDMW2253-03	Energy	B24020703	HDMW2253-03-WGN01F-2402	2/9/2024	Primary	—	—	<141	U	<189	U	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	
HDMW2253-03	SGS Anchorage	1240594	HDMW2253-03-WGN01F-2402	2/9/2024	Primary	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	
HDMW2253-03	SGS Orlando	FC13292	HDMW2253-03-WGN01F-2402	2/9/2024	Primary	<50	U	<100	U	<170	U	—	—	<0.5	U	<0.5	U	<0.5	U	<1.5	U	<0.42	U	<0.42	U	<0.42	U
HDMW2253-03	SGS Anchorage	1241067	HDMW2253-03-WGN01F-2403	3/15/2024	Primary	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	
HDMW2253-03	SGS Orlando	FC14139	HDMW2253-03-WGN01F-2403	3/15/2024	Primary	<50	U	<100	U	<170	U	—	—	<0.5	U	<0.5	U	<0.5	U	<1.5	U	<0.42	U	<0.42	U	<0.42	U

Notes:
 See Data Legend

App. B.3.1 Groundwater Analytical Data: Red Hill Bulk Fuel Storage Facility
 Consolidated Sampling Program & Groundwater Protection Plan-Defueling Sampling
 Groundwater Sampling: HDMW2253-01

						Polycyclic Aromatic Hydrocarbons (PAHs) - NOI																									
						Acenaphthene (SIM)	Acenaphthylene (SIM)	Anthracene (SIM)	Benzo(a)anthracene (SIM)	Benzo(a)pyrene (SIM)	Benzo(b)fluoranthene (SIM)	Benzo(g,h,i)perylene (SIM)	Benzo(k)fluoranthene (SIM)	Chrysene (SIM)	Dibenzo(a,h)anthracene (SIM)	Fluoranthene (SIM)	Fluorene (SIM)	Indeno(1,2,3-cd)pyrene (SIM)	Phenanthrene (SIM)	Pyrene (SIM)											
						83-32-9	208-96-8	120-12-7	56-55-3	50-32-8	205-99-2	191-24-2	207-08-9	218-01-9	53-70-3	206-44-0	86-73-7	193-39-5	85-01-8	129-00-0											
						Method	8270SIM	8270SIM	8270SIM	8270SIM	8270SIM	8270SIM	8270SIM	8270SIM	8270SIM	8270SIM	8270SIM	8270SIM	8270SIM	8270SIM	8270SIM										
						DOH Tier 1 EAL	20	240	0.18	0.029	0.2	0.22	0.13	0.4	1	0.022	13	240	0.095	210	68										
						Units	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L										
						Minimum	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND										
						Maximum	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND										
Location	Lab	SDG	Sample ID	Sampling Date	Type	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result											
HDMW2253-03	SGS Orlando	FC12420	HDMW2253-03-WGN01F-2401	1/5/2024	Primary	<0.42	U	<0.42	U	<0.42	U	<0.042	U	<0.042	U	<0.042	U	<0.083	U	<0.042	U	<0.42	U	<0.42	U	<0.042	U	<0.42	U	<0.42	U
HDMW2253-03	APPL	24B0068	HDMW2253-03-WGN01F-2402	2/9/2024	Primary	-		-		-		-		-		-		-		-		-		-		-		-		-	
HDMW2253-03	Energy	B24020703	HDMW2253-03-WGN01F-2402	2/9/2024	Primary	-		-		-		-		-		-		-		-		-		-		-		-		-	
HDMW2253-03	SGS Anchorage	1240594	HDMW2253-03-WGN01F-2402	2/9/2024	Primary	-		-		-		-		-		-		-		-		-		-		-		-		-	
HDMW2253-03	SGS Orlando	FC13292	HDMW2253-03-WGN01F-2402	2/9/2024	Primary	<0.42	U	<0.42	U	<0.42	U	<0.042	U	<0.042	U	<0.042	U	<0.083	U	<0.042	U	<0.42	U	<0.42	U	<0.042	U	<0.42	U	<0.42	U
HDMW2253-03	SGS Anchorage	1241067	HDMW2253-03-WGN01F-2403	3/15/2024	Primary	-		-		-		-		-		-		-		-		-		-		-		-		-	
HDMW2253-03	SGS Orlando	FC14139	HDMW2253-03-WGN01F-2403	3/15/2024	Primary	<0.42	U	<0.42	U	<0.42	U	<0.042	U	<0.042	U	<0.042	U	<0.083	U	<0.042	U	<0.42	U	<0.42	U	<0.042	U	<0.42	U	<0.42	U

Notes:
 See Data Legend

App. B.3.1 Groundwater Analytical Data: Red Hill Bulk Fuel Storage Facility
 Consolidated Sampling Program & Groundwater Protection Plan-Defueling Sampling
 Groundwater Sampling: HDMW2253-01

						Fuel Additive		Lead Scavengers		Natural Attenuation Parameters		
						2-(2-Methoxyethoxy)-ethanol ⁵	Phenol	1,2-Dibromoethane	1,2-Dichloroethane	Methane	Total Organic Carbon	NV Dissolved Organic Carbon
Analyte						111-77-3	108-95-2	106-93-4	107-06-2	74-82-8	TOC	—
CAS No.						8270D	SW8270	8011	8260	RSK 175	9060	9060
Method						800	300	0.04	5	—	—	—
DOH Tier 1 EAL						—	—	—	—	—	—	—
Units						µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
Minimum						ND	ND	—	—	1.5	263	327
Maximum						ND	ND	—	—	1.7	272	1150
Location	Lab	SDG	Sample ID	Sampling Date	Type	Result	Result	Result	Result	Result	Result	Result
HDMW2253-03	SGS Orlando	FC12420	HDMW2253-03-WGN01F-2401	1/5/2024	Primary	—	<2	U	—	—	1.5	—
HDMW2253-03	APPL	24B0068	HDMW2253-03-WGN01F-2402	2/9/2024	Primary	<80	U	—	—	—	—	—
HDMW2253-03	Energy	B24020703	HDMW2253-03-WGN01F-2402	2/9/2024	Primary	—	—	—	—	—	—	—
HDMW2253-03	SGS Anchorage	1240594	HDMW2253-03-WGN01F-2402	2/9/2024	Primary	—	—	—	—	—	263	J
HDMW2253-03	SGS Orlando	FC13292	HDMW2253-03-WGN01F-2402	2/9/2024	Primary	—	<2	U	—	—	1.5	—
HDMW2253-03	SGS Anchorage	1241067	HDMW2253-03-WGN01F-2403	3/15/2024	Primary	—	—	—	—	—	272	J
HDMW2253-03	SGS Orlando	FC14139	HDMW2253-03-WGN01F-2403	3/15/2024	Primary	—	<1.9	U	—	—	1.7	—

Notes:
 See Data Legend

App. B.3.1 Groundwater Analytical Data: Red Hill Bulk Fuel Storage Facility
 Consolidated Sampling Program & Groundwater Protection Plan-Defueling Sampling
 Groundwater Sampling: RHMW01R

						Total Petroleum Hydrocarbons					Volatile Organic Compounds				Polycyclic Aromatic Hydrocarbons (PAHs) - AOC/LTM														
						TPH-g PHCC6C10	TPH-d ⁴ PHCC10C24	TPH-o ⁴ PHCC24C40	TPH-d with Silica Gel Cleanup ³ PHCC10C24SGC	TPH-o with Silica Gel Cleanup ³ PHCC24C40SGC	Benzene 71-43-2	Ethylbenzene 100-41-4	Toluene 108-88-3	Xylenes 1330-20-7	1-Methylnaphthalene 90-12-0	2-Methylnaphthalene 91-57-6	Naphthalene 91-20-3												
Method						8260	8015	8015	8015	8015	8260	8260	8260	8260	8270 SIM	8270 SIM	8270 SIM												
DOH Tier 1 EAL						300	400	500	—	—	5	30	40	20	10	10	17												
Units						µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L												
Minimum						ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND												
Maximum						ND	182	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND												
Location	Lab	SDG	Sample ID	Sampling Date	Type	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result												
RHMW01R	APPL	24B0117	RHMW01R-WGN01LF-2402	2/16/2024	Primary	—	—	—	—	—	—	—	—	—	—	—	—												
RHMW01R	APPL	24B0117	RHMW01R-WGFD01LF-2402	2/16/2024	Field Duplicate	—	—	—	—	—	—	—	—	—	—	—	—												
RHMW01R	Energy	B24021107	RHMW01R-WGN01LF-2402	2/16/2024	Primary	—	182	J	<189	U	<141	U	<189	U	—	—	—												
RHMW01R	Energy	B24021107	RHMW01R-WGFD01LF-2402	2/16/2024	Field Duplicate	—	158	J	<189	U	<141	U	<189	U	—	—	—												
RHMW01R	SGS Anchorage	1240674	RHMW01R-WGN01LF-2402	2/16/2024	Primary	—	—	—	—	—	—	—	—	—	—	—	—												
RHMW01R	SGS Orlando	FC13462	RHMW01R-WGN01LF-2402	2/16/2024	Primary	<50	U	<100	U	<160	U	—	—	<0.5	U	<0.5	U	<0.5	U	<1.5	U	<0.42	U	<0.42	U	<0.42	U		
RHMW01R	SGS Orlando	FC13462	RHMW01R-WGFD01LF-2402	2/16/2024	Field Duplicate	<50	U	89	J	<160	U	<100	U	<160	U	<0.5	U	<0.5	U	<0.5	U	<1.5	U	<0.4	U	<0.4	U	<0.4	U
RHMW01R	SGS Anchorage	1241012	RHMW01R-WGN01LF-2403	3/13/2024	Primary	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	
RHMW01R	SGS Orlando	FC14092	RHMW01R-WGN01LF-2403	3/13/2024	Primary	<50	U	113	J	<170	U	<100	U	<170	U	<0.5	U	<0.5	U	<0.5	U	<1.5	U	<0.4	U	<0.4	U	<0.4	U
RHMW01R	SGS Orlando	FC14092	RHMW01R-WGFD01LF-2403	3/13/2024	Field Duplicate	<50	U	106	J	<170	U	<100	U	<170	U	<0.5	U	<0.5	U	<0.5	U	<1.5	U	<0.42	U	<0.42	U	<0.42	U

Notes:
 See Data Legend

App. B.3.1 Groundwater Analytical Data: Red Hill Bulk Fuel Storage Facility
 Consolidated Sampling Program & Groundwater Protection Plan-Defueling Sampling
 Groundwater Sampling: RHMW01R

						Polycyclic Aromatic Hydrocarbons (PAHs) - NOI																					
						Acenaphthene (SIM)	Acenaphthylene (SIM)	Anthracene (SIM)	Benzo(a)anthracene (SIM)	Benzo(a)pyrene (SIM)	Benzo(b)fluoranthene (SIM)	Benzo(g,h,i)perylene (SIM)	Benzo(k)fluoranthene (SIM)	Chrysene (SIM)	Dibenzo(a,h)anthracene (SIM)	Fluoranthene (SIM)	Fluorene (SIM)	Indeno(1,2,3-cd)pyrene (SIM)	Phenanthrene (SIM)	Pyrene (SIM)							
						83-32-9	208-96-8	120-12-7	56-55-3	50-32-8	205-99-2	191-24-2	207-08-9	218-01-9	53-70-3	206-44-0	86-73-7	193-39-5	85-01-8	129-00-0							
						8270SIM	8270SIM	8270SIM	8270SIM	8270SIM	8270SIM	8270SIM	8270SIM	8270SIM	8270SIM	8270SIM	8270SIM	8270SIM	8270SIM	8270SIM	8270SIM						
						20	240	0.18	0.029	0.2	0.22	0.13	0.4	1	0.022	13	240	0.095	210	68							
						µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L							
						ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND							
						ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND							
Location	Lab	SDG	Sample ID	Sampling Date	Type	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result							
RHMW01R	APPL	24B0117	RHMW01R-WGN01LF-2402	2/16/2024	Primary	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--							
RHMW01R	APPL	24B0117	RHMW01R-WGFD01LF-2402	2/16/2024	Field Duplicate	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--							
RHMW01R	Energy	B24021107	RHMW01R-WGN01LF-2402	2/16/2024	Primary	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--							
RHMW01R	Energy	B24021107	RHMW01R-WGFD01LF-2402	2/16/2024	Field Duplicate	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--							
RHMW01R	SGS Anchorage	1240674	RHMW01R-WGN01LF-2402	2/16/2024	Primary	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--							
RHMW01R	SGS Orlando	FC13462	RHMW01R-WGN01LF-2402	2/16/2024	Primary	<0.42	U	<0.42	U	<0.42	U	<0.042	U	<0.042	U	<0.042	U	<0.083	U	<0.042	U	<0.42	U	<0.42	U	<0.42	U
RHMW01R	SGS Orlando	FC13462	RHMW01R-WGFD01LF-2402	2/16/2024	Field Duplicate	<0.4	U	<0.4	U	<0.4	U	<0.04	U	<0.04	U	<0.04	U	<0.08	U	<0.04	U	<0.4	U	<0.4	U	<0.4	U
RHMW01R	SGS Anchorage	1241012	RHMW01R-WGN01LF-2403	3/13/2024	Primary	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
RHMW01R	SGS Orlando	FC14092	RHMW01R-WGN01LF-2403	3/13/2024	Primary	<0.4	U	<0.4	U	<0.4	U	<0.04	U	<0.04	U	<0.04	U	<0.08	U	<0.04	U	<0.4	U	<0.4	U	<0.4	U
RHMW01R	SGS Orlando	FC14092	RHMW01R-WGFD01LF-2403	3/13/2024	Field Duplicate	<0.42	U	<0.42	U	<0.42	U	<0.042	U	<0.042	U	<0.042	U	<0.083	U	<0.042	U	<0.42	U	<0.42	U	<0.42	U

Notes:
 See Data Legend

App. B.3.1 Groundwater Analytical Data: Red Hill Bulk Fuel Storage Facility
 Consolidated Sampling Program & Groundwater Protection Plan-Defueling Sampling
 Groundwater Sampling: RHMW01R

						Fuel Additive		Lead Scavengers				Natural Attenuation Parameters		
						2-(2- Methoxyethoxy)-ethanol ⁵	Phenol	1,2-Dibromoethane	1,2-Dichloroethane	Methane	Total Organic Carbon	NV Dissolved Organic Carbon		
Analyte						111-77-3	108-95-2	106-93-4	107-06-2	74-82-8	TOC	Carbon		
CAS No.						8270D	SW8270	8011	8260	RSK 175	9060	9060		
Method						800	300	0.04	5	—	—	—		
DOH Tier 1 EAL						—	—	—	—	—	—	—		
Units						µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L		
Minimum						ND	ND	—	—	317	ND	810		
Maximum						ND	ND	—	—	335	652	831		
Location	Lab	SDG	Sample ID	Sampling Date	Type	Result	Result	Result	Result	Result	Result	Result	Result	
RHMW01R	APPL	24B0117	RHMW01R-WGN01LF-2402	2/16/2024	Primary	<80	UJ	—	—	—	—	—	—	
RHMW01R	APPL	24B0117	RHMW01R-WGFD01LF-2402	2/16/2024	Field Duplicate	<80	UJ	—	—	—	—	—	—	
RHMW01R	Energy	B24021107	RHMW01R-WGN01LF-2402	2/16/2024	Primary	—	—	—	—	—	—	—	—	
RHMW01R	Energy	B24021107	RHMW01R-WGFD01LF-2402	2/16/2024	Field Duplicate	—	—	—	—	—	—	—	—	
RHMW01R	SGS Anchorage	1240674	RHMW01R-WGN01LF-2402	2/16/2024	Primary	—	—	—	—	—	652	J	810	
RHMW01R	SGS Orlando	FC13462	RHMW01R-WGN01LF-2402	2/16/2024	Primary	—	<2	U	—	—	335	—	—	
RHMW01R	SGS Orlando	FC13462	RHMW01R-WGFD01LF-2402	2/16/2024	Field Duplicate	—	<2	U	—	—	—	—	—	
RHMW01R	SGS Anchorage	1241012	RHMW01R-WGN01LF-2403	3/13/2024	Primary	—	—	—	—	—	<750	U	831	
RHMW01R	SGS Orlando	FC14092	RHMW01R-WGN01LF-2403	3/13/2024	Primary	—	<1.9	U	—	—	317	—	—	
RHMW01R	SGS Orlando	FC14092	RHMW01R-WGFD01LF-2403	3/13/2024	Field Duplicate	—	<1.9	U	—	—	—	—	—	

Notes:
 See Data Legend

App. B.3.1 Groundwater Analytical Data: Red Hill Bulk Fuel Storage Facility
 Consolidated Sampling Program & Groundwater Protection Plan-Defueling Sampling
 Groundwater Sampling: RHMW02

						Total Petroleum Hydrocarbons					Volatile Organic Compounds				Polycyclic Aromatic Hydrocarbons (PAHs) - AOC/LTM		
						TPH-g PHCC6C10	TPH-d ⁴ PHCC10C24	TPH-o ⁴ PHCC24C40	TPH-d with Silica Gel Cleanup ³ PHCC10C24SGC	TPH-o with Silica Gel Cleanup ³ PHCC24C40SGC	Benzene 71-43-2	Ethylbenzene 100-41-4	Toluene 108-88-3	Xylenes 1330-20-7	1-Methylnaphthalene 90-12-0	2-Methylnaphthalene 91-57-6	Naphthalene 91-20-3
Method						8260	8015	8015	8015	8015	8260	8260	8260	8260	8270 SIM	8270 SIM	8270 SIM
DOH Tier 1 EAL						300	400	500	—	—	5	30	40	20	10	10	17
Units						µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
Minimum						ND	981	ND	124	ND	ND	ND	ND	0.76	ND	ND	1.7
Maximum						46.3	1460	313	1200	ND	ND	ND	ND	1.7	0.86	3.6	
Location	Lab	SDG	Sample ID	Sampling Date	Type	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result
RHMW02	APPL	24B0092	RHMW02-WGN01LF-2402	2/13/2024	Primary	—	—	—	—	—	—	—	—	—	—	—	—
RHMW02	APPL	24B0092	RHMW02-WGFD01LF-2402	2/13/2024	Field Duplicate	—	—	—	—	—	—	—	—	—	—	—	—
RHMW02	Energy	B24020912	RHMW02-WGN01LF-2402	2/13/2024	Primary	—	1210	298 J	124 J	<143 U	—	—	—	—	—	—	—
RHMW02	Energy	B24020912	RHMW02-WGFD01LF-2402	2/13/2024	Field Duplicate	—	1460	313 J	137 J	<141 U	—	—	—	—	—	—	—
RHMW02	SGS Anchorage	1240593	RHMW02-WGN01LF-2402	2/13/2024	Primary	—	—	—	—	—	—	—	—	—	—	—	—
RHMW02	SGS Orlando	FC13371	RHMW02-WGN01LF-2402	2/13/2024	Primary	<50 U	981	<160 U	766	<160 U	<0.5 U	<0.5 U	<0.5 U	<1.5 U	1.2	0.59 J	2.7 J
RHMW02	SGS Orlando	FC13371	RHMW02-WGFD01LF-2402	2/13/2024	Field Duplicate	<50 U	1030	<170 U	751	<170 U	<0.5 U	<0.5 U	<0.5 U	<1.5 U	1.7	0.86	3.6 J
RHMW02	SGS Anchorage	1241067	RHMW02-WGN01LF-2403	3/15/2024	Primary	—	—	—	—	—	—	—	—	—	—	—	—
RHMW02	SGS Orlando	FC14139	RHMW02-WGN01LF-2403	3/15/2024	Primary	<50 U	1270	<170 U	1110	<170 U	<0.5 U	<0.5 U	<0.5 U	<1.5 U	0.93	0.34 J	1.7
RHMW02	SGS Orlando	FC14139	RHMW02-WGFD01LF-2403	3/15/2024	Field Duplicate	46.3 J	1390	88.4 J	1200	<170 U	<0.5 U	<0.5 U	<0.5 U	<1.5 U	0.76 J	<0.42 U	1.8

Notes:
 See Data Legend

App. B.3.1 Groundwater Analytical Data: Red Hill Bulk Fuel Storage Facility
 Consolidated Sampling Program & Groundwater Protection Plan-Defueling Sampling
 Groundwater Sampling: RHMW02

						Polycyclic Aromatic Hydrocarbons (PAHs) - NOI																	
						Acenaphthene (SIM)	Acenaphthylene (SIM)	Anthracene (SIM)	Benzo(a)anthracene (SIM)	Benzo(a)pyrene (SIM)	Benzo(b)fluoranthene (SIM)	Benzo(g,h,i)perylene (SIM)	Benzo(k)fluoranthene (SIM)	Chrysene (SIM)	Dibenzo(a,h)anthracene (SIM)	Fluoranthene (SIM)	Fluorene (SIM)	Indeno(1,2,3-cd)pyrene (SIM)	Phenanthrene (SIM)	Pyrene (SIM)			
						83-32-9	208-96-8	120-12-7	56-55-3	50-32-8	205-99-2	191-24-2	207-08-9	218-01-9	53-70-3	206-44-0	86-73-7	193-39-5	85-01-8	129-00-0			
						Method	8270SIM	8270SIM	8270SIM	8270SIM	8270SIM	8270SIM	8270SIM	8270SIM	8270SIM	8270SIM	8270SIM	8270SIM	8270SIM	8270SIM	8270SIM		
						DOH Tier 1 EAL	20	240	0.18	0.029	0.2	0.22	0.13	0.4	1	0.022	13	240	0.095	210	68		
						Units	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L			
						Minimum	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND		
						Maximum	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND		
Location	Lab	SDG	Sample ID	Sampling Date	Type	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result		
RHMW02	APPL	24B0092	RHMW02-WGN01LF-2402	2/13/2024	Primary	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
RHMW02	APPL	24B0092	RHMW02-WGFD01LF-2402	2/13/2024	Field Duplicate	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
RHMW02	Energy	B24020912	RHMW02-WGN01LF-2402	2/13/2024	Primary	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
RHMW02	Energy	B24020912	RHMW02-WGFD01LF-2402	2/13/2024	Field Duplicate	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
RHMW02	SGS Anchorage	1240593	RHMW02-WGN01LF-2402	2/13/2024	Primary	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
RHMW02	SGS Orlando	FC13371	RHMW02-WGN01LF-2402	2/13/2024	Primary	<0.42	U	<0.42	U	<0.042	U	<0.042	U	<0.042	U	<0.083	U	<0.042	U	<0.42	U	<0.42	U
RHMW02	SGS Orlando	FC13371	RHMW02-WGFD01LF-2402	2/13/2024	Field Duplicate	<0.4	U	<0.4	U	<0.04	U	<0.04	U	<0.04	U	<0.08	U	<0.04	U	<0.4	U	<0.4	U
RHMW02	SGS Anchorage	1241067	RHMW02-WGN01LF-2403	3/15/2024	Primary	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
RHMW02	SGS Orlando	FC14139	RHMW02-WGN01LF-2403	3/15/2024	Primary	<0.42	U	<0.42	U	<0.042	U	<0.042	U	<0.042	U	<0.083	U	<0.042	U	<0.42	U	<0.42	U
RHMW02	SGS Orlando	FC14139	RHMW02-WGFD01LF-2403	3/15/2024	Field Duplicate	<0.42	U	<0.42	U	<0.042	U	<0.042	U	<0.042	U	<0.083	U	<0.042	U	<0.42	U	<0.42	U

Notes:
 See Data Legend

App. B.3.1 Groundwater Analytical Data: Red Hill Bulk Fuel Storage Facility
 Consolidated Sampling Program & Groundwater Protection Plan-Defueling Sampling
 Groundwater Sampling: RHMW02

						Fuel Additive		Lead Scavengers				Natural Attenuation Parameters		
						2-(2-Methoxyethoxy)-ethanol ⁵	Phenol	1,2-Dibromoethane	1,2-Dichloroethane	Methane	Total Organic Carbon	NV Dissolved Organic Carbon		
						111-77-3	108-95-2	106-93-4	107-06-2	74-82-8	TOC	Carbon		
						Method 8270D	SW8270	8011	8260	RSK 175	9060	9060		
						DOH Tier 1 EAL	800	300	0.04	5	—	—		
						Units	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L		
						Minimum	ND	ND	—	—	2350	3710		
						Maximum	ND	—	—	—	2770	4540		
Location	Lab	SDG	Sample ID	Sampling Date	Type	Result	Result	Result	Result	Result	Result	Result	Result	
RHMW02	APPL	24B0092	RHMW02-WGN01LF-2402	2/13/2024	Primary	<80	U	—	—	—	—	—	—	
RHMW02	APPL	24B0092	RHMW02-WGFD01LF-2402	2/13/2024	Field Duplicate	<80	U	—	—	—	—	—	—	
RHMW02	Energy	B24020912	RHMW02-WGN01LF-2402	2/13/2024	Primary	—	—	—	—	—	—	—	—	
RHMW02	Energy	B24020912	RHMW02-WGFD01LF-2402	2/13/2024	Field Duplicate	—	—	—	—	—	—	—	—	
RHMW02	SGS Anchorage	1240593	RHMW02-WGN01LF-2402	2/13/2024	Primary	—	—	—	—	—	3710	3150	—	
RHMW02	SGS Orlando	FC13371	RHMW02-WGN01LF-2402	2/13/2024	Primary	—	<2	U	—	2350	—	—	—	
RHMW02	SGS Orlando	FC13371	RHMW02-WGFD01LF-2402	2/13/2024	Field Duplicate	—	<2	U	—	—	—	—	—	
RHMW02	SGS Anchorage	1241067	RHMW02-WGN01LF-2403	3/15/2024	Primary	—	—	—	—	—	4540	3930	—	
RHMW02	SGS Orlando	FC14139	RHMW02-WGN01LF-2403	3/15/2024	Primary	—	<1.9	U	—	2770	—	—	—	
RHMW02	SGS Orlando	FC14139	RHMW02-WGFD01LF-2403	3/15/2024	Field Duplicate	—	<1.9	U	—	—	—	—	—	

Notes:
 See Data Legend

App. B.3.1 Groundwater Analytical Data: Red Hill Bulk Fuel Storage Facility
 Consolidated Sampling Program & Groundwater Protection Plan-Defueling Sampling
 Groundwater Sampling: RHMW03

						Total Petroleum Hydrocarbons					Volatile Organic Compounds				Polycyclic Aromatic Hydrocarbons (PAHs) - AOC/LTM		
						TPH-g PHCC6C10	TPH-d ⁴ PHCC10C24	TPH-o ⁴ PHCC24C40	TPH-d with Silica Gel Cleanup ³ PHCC10C24SGC	TPH-o with Silica Gel Cleanup ³ PHCC24C40SGC	Benzene 71-43-2	Ethylbenzene 100-41-4	Toluene 108-88-3	Xylenes 1330-20-7	1-Methylnaphthalene 90-12-0	2-Methylnaphthalene 91-57-6	Naphthalene 91-20-3
Method						8260	8015	8015	8015	8015	8260	8260	8260	8260	8270 SIM	8270 SIM	8270 SIM
DOH Tier 1 EAL						300	400	500	—	—	5	30	40	20	10	10	17
Units						µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
Minimum						ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Maximum						ND	ND	184	ND	ND	ND	ND	ND	ND	ND	ND	ND
Location	Lab	SDG	Sample ID	Sampling Date	Type	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result
RHMW03	APPL	24B0033	RHMW03-WGN01LF-2402	2/6/2024	Primary	—	—	—	—	—	—	—	—	—	—	—	—
RHMW03	Energy	B24020463	RHMW03-WGN01LF-2402	2/6/2024	Primary	—	<141 U	184 J*	<141 U	<141 U	—	—	—	—	—	—	—
RHMW03	SGS Anchorage	1240483	RHMW03-WGN01LF-2402	2/6/2024	Primary	—	—	—	—	—	—	—	—	—	—	—	—
RHMW03	SGS Orlando	FC13169	RHMW03-WGN01LF-2402	2/6/2024	Primary	<50 U	<100 U	<160 U	—	—	<0.5 U	<0.5 U	<0.5 U	<1.5 U	<0.42 U	<0.42 U	<0.42 U
RHMW03	SGS Anchorage	1241012	RHMW03-WGN01LF-2403	3/13/2024	Primary	—	—	—	—	—	—	—	—	—	—	—	—
RHMW03	SGS Orlando	FC14092	RHMW03-WGN01LF-2403	3/13/2024	Primary	<50 U	<96 U	<150 U	—	—	<0.5 U	<0.5 U	<0.5 U	<1.5 U	<0.38 U	<0.38 U	<0.38 U

Notes:
 See Data Legend

App. B.3.1 Groundwater Analytical Data: Red Hill Bulk Fuel Storage Facility
 Consolidated Sampling Program & Groundwater Protection Plan-Defueling Sampling
 Groundwater Sampling: RHMW03

						Polycyclic Aromatic Hydrocarbons (PAHs) - NOI															
						Acenaphthene (SIM)	Acenaphthylene (SIM)	Anthracene (SIM)	Benzo(a)anthracene (SIM)	Benzo(a)pyrene (SIM)	Benzo(b)fluoranthene (SIM)	Benzo(g,h,i)perylene (SIM)	Benzo(k)fluoranthene (SIM)	Chrysene (SIM)	Dibenzo(a,h)anthracene (SIM)	Fluoranthene (SIM)	Fluorene (SIM)	Indeno(1,2,3-cd)pyrene (SIM)	Phenanthrene (SIM)	Pyrene (SIM)	
						83-32-9	208-96-8	120-12-7	56-55-3	50-32-8	205-99-2	191-24-2	207-08-9	218-01-9	53-70-3	206-44-0	86-73-7	193-39-5	85-01-8	129-00-0	
						8270SIM	8270SIM	8270SIM	8270SIM	8270SIM	8270SIM	8270SIM	8270SIM	8270SIM	8270SIM	8270SIM	8270SIM	8270SIM	8270SIM	8270SIM	
						20	240	0.18	0.029	0.2	0.22	0.13	0.4	1	0.022	13	240	0.095	210	68	
						µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	
						ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
						ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
Location	Lab	SDG	Sample ID	Sampling Date	Type	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	
RHMW03	APPL	24B0033	RHMW03-WGN01LF-2402	2/6/2024	Primary	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
RHMW03	Energy	B24020463	RHMW03-WGN01LF-2402	2/6/2024	Primary	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
RHMW03	SGS Anchorage	1240483	RHMW03-WGN01LF-2402	2/6/2024	Primary	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
RHMW03	SGS Orlando	FC13169	RHMW03-WGN01LF-2402	2/6/2024	Primary	<0.42	U	<0.42	U	<0.42	U	<0.042	U	<0.042	UJ	<0.042	U	<0.083	U	<0.042	U
RHMW03	SGS Anchorage	1241012	RHMW03-WGN01LF-2403	3/13/2024	Primary	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
RHMW03	SGS Orlando	FC14092	RHMW03-WGN01LF-2403	3/13/2024	Primary	<0.38	U	<0.38	U	<0.38	U	<0.038	U	<0.038	U	<0.038	U	<0.077	U	<0.038	U

Notes:
 See Data Legend

App. B.3.1 Groundwater Analytical Data: Red Hill Bulk Fuel Storage Facility
 Consolidated Sampling Program & Groundwater Protection Plan-Defueling Sampling
 Groundwater Sampling: RHMW03

						Fuel Additive		Lead Scavengers				Natural Attenuation Parameters			
						2-(2-Methoxyethoxy)-ethanol ⁵	Phenol	1,2-Dibromoethane	1,2-Dichloroethane	Methane	Total Organic Carbon	NV Dissolved Organic Carbon			
						CAS No.	108-95-2	106-93-4	107-06-2	74-82-8	TOC				
						Method	SW8270	8011	8260	RSK 175	9060	9060			
						DOH Tier 1 EAL	300	0.04	5	—	—	—			
						Units	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L			
						Minimum	ND	ND	—	ND	1270	1360			
						Maximum	ND	—	—	0.21	1350	1540			
Location	Lab	SDG	Sample ID	Sampling Date	Type	Result	Result	Result	Result	Result	Result	Result	Result		
RHMW03	APFL	24B0033	RHMW03-WGN01LF-2402	2/6/2024	Primary	<80	UJ	—	—	—	—	—	—		
RHMW03	Energy	B24020463	RHMW03-WGN01LF-2402	2/6/2024	Primary	—	—	—	—	—	—	—	—		
RHMW03	SGS Anchorage	1240483	RHMW03-WGN01LF-2402	2/6/2024	Primary	—	—	—	—	—	1270	J+	1360		
RHMW03	SGS Orlando	FC13169	RHMW03-WGN01LF-2402	2/6/2024	Primary	—	<2	U	—	—	0.21	J	—		
RHMW03	SGS Anchorage	1241012	RHMW03-WGN01LF-2403	3/13/2024	Primary	—	—	—	—	—	1350	J+	1540		
RHMW03	SGS Orlando	FC14092	RHMW03-WGN01LF-2403	3/13/2024	Primary	—	<1.9	U	—	—	<0.25	U	—		

Notes:
 See Data Legend

App. B.3.1 Groundwater Analytical Data: Red Hill Bulk Fuel Storage Facility
 Consolidated Sampling Program & Groundwater Protection Plan-Defueling Sampling
 Groundwater Sampling: RHMW04

						Total Petroleum Hydrocarbons					Volatile Organic Compounds				Polycyclic Aromatic Hydrocarbons (PAHs) - AOC/LTM		
						TPH-g PHCC6C10	TPH-d ⁴ PHCC10C24	TPH-o ⁴ PHCC24C40	TPH-d with Silica Gel Cleanup ³ PHCC10C24SGC	TPH-o with Silica Gel Cleanup ³ PHCC24C40SGC	Benzene 71-43-2	Ethylbenzene 100-41-4	Toluene 108-88-3	Xylenes 1330-20-7	1-Methylnaphthalene 90-12-0	2-Methylnaphthalene 91-57-6	Naphthalene 91-20-3
Method						8260	8015	8015	8015	8015	8260	8260	8260	8260	8270 SIM	8270 SIM	8270 SIM
DOH Tier 1 EAL						300	400	500	—	—	5	30	40	20	10	10	17
Units						µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
Minimum						ND	ND	ND	—	—	ND	ND	ND	ND	ND	ND	ND
Maximum						ND	ND	ND	—	—	ND	ND	ND	ND	ND	ND	ND
Location	Lab	SDG	Sample ID	Sampling Date	Type	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result
RHMW04	APPL	24B0081	RHMW04-WGN01LF-2402	2/12/2024	Primary	—	—	—	—	—	—	—	—	—	—	—	—
RHMW04	Energy	B24020801	RHMW04-WGN01LF-2402	2/12/2024	Primary	—	<141 U	<141 U	—	—	—	—	—	—	—	—	—
RHMW04	SGS Anchorage	1240595	RHMW04-WGN01LF-2402	2/12/2024	Primary	—	—	—	—	—	—	—	—	—	—	—	—
RHMW04	SGS Orlando	FC13346	RHMW04-WGN01LF-2402	2/12/2024	Primary	<50	<100 U	<160 U	—	<0.5 U	<0.5 U	<0.5 U	<1.5 U	<0.42 U	<0.42 U	<0.42 U	<0.42 U
RHMW04	SGS Anchorage	1241150	RHMW04-WGN01LF-2403	3/22/2024	Primary	—	—	—	—	—	—	—	—	—	—	—	—

Notes:
 See Data Legend

App. B.3.1 Groundwater Analytical Data: Red Hill Bulk Fuel Storage Facility
 Consolidated Sampling Program & Groundwater Protection Plan-Defueling Sampling
 Groundwater Sampling: RHMW04

						Polycyclic Aromatic Hydrocarbons (PAHs) - NOI																	
						Acenaphthene (SIM)	Acenaphthylene (SIM)	Anthracene (SIM)	Benzo(a)anthracene (SIM)	Benzo(a)pyrene (SIM)	Benzo(b)fluoranthene (SIM)	Benzo(g,h,i)perylene (SIM)	Benzo(k)fluoranthene (SIM)	Chrysene (SIM)	Dibenzo(a,h)anthracene (SIM)	Fluoranthene (SIM)	Fluorene (SIM)	Indeno(1,2,3-cd)pyrene (SIM)	Phenanthrene (SIM)	Pyrene (SIM)			
						83-32-9	208-96-8	120-12-7	56-55-3	50-32-8	205-99-2	191-24-2	207-08-9	218-01-9	53-70-3	206-44-0	86-73-7	193-39-5	85-01-8	129-00-0			
						8270SIM	8270SIM	8270SIM	8270SIM	8270SIM	8270SIM	8270SIM	8270SIM	8270SIM	8270SIM	8270SIM	8270SIM	8270SIM	8270SIM	8270SIM	8270SIM		
						20	240	0.18	0.029	0.2	0.22	0.13	0.4	1	0.022	13	240	0.095	210	68			
						µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L		
						ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND		
						ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND		
Location	Lab	SDG	Sample ID	Sampling Date	Type	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result		
RHMW04	APPL	24B0081	RHMW04-WGN01LF-2402	2/12/2024	Primary	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
RHMW04	Energy	B24020801	RHMW04-WGN01LF-2402	2/12/2024	Primary	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
RHMW04	SGS Anchorage	1240595	RHMW04-WGN01LF-2402	2/12/2024	Primary	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
RHMW04	SGS Orlando	FC13346	RHMW04-WGN01LF-2402	2/12/2024	Primary	<0.42	U	<0.42	U	<0.42	U	<0.042	U	<0.042	U	<0.042	U	<0.083	U	<0.042	U	<0.42	U
RHMW04	SGS Anchorage	1241150	RHMW04-WGN01LF-2403	3/22/2024	Primary	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		

Notes:
 See Data Legend

App. B.3.1 Groundwater Analytical Data: Red Hill Bulk Fuel Storage Facility
 Consolidated Sampling Program & Groundwater Protection Plan-Defueling Sampling
 Groundwater Sampling: RHMW04

						Fuel Additive		Lead Scavengers				Natural Attenuation Parameters			
						2-(2- Methoxyethoxy)-ethanol ⁵	Phenol	1,2-Dibromoethane	1,2-Dichloroethane	Methane	Total Organic Carbon	NV Dissolved Organic Carbon			
Analyte						111-77-3	108-95-2	106-93-4	107-06-2	74-82-8	TOC	—			
CAS No.						8270D	SW8270	8011	8260	RSK 175	9060	9060			
Method						800	300	0.04	5	—	—	—			
DOH Tier 1 EAL						—	—	—	—	—	—	—			
Units						µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L			
Minimum						ND	ND	—	—	ND	ND	ND			
Maximum						ND	ND	—	—	ND	339	409			
Location	Lab	SDG	Sample ID	Sampling Date	Type	Result	Result	Result	Result	Result	Result	Result	Result		
RHMW04	APFL	24B0081	RHMW04-WGN01LF-2402	2/12/2024	Primary	<80	U	—	—	—	—	—	—		
RHMW04	Energy	B24020801	RHMW04-WGN01LF-2402	2/12/2024	Primary	—	—	—	—	—	—	—	—		
RHMW04	SGS Anchorage	1240595	RHMW04-WGN01LF-2402	2/12/2024	Primary	—	—	—	—	—	339	J	409		
RHMW04	SGS Orlando	FC13346	RHMW04-WGN01LF-2402	2/12/2024	Primary	—	<2	U	—	—	<0.25	U	—		
RHMW04	SGS Anchorage	1241150	RHMW04-WGN01LF-2403	3/22/2024	Primary	—	—	—	—	—	<750	U	<750		

Notes:
 See Data Legend

App. B.3.1 Groundwater Analytical Data: Red Hill Bulk Fuel Storage Facility
 Consolidated Sampling Program & Groundwater Protection Plan-Defueling Sampling
 Groundwater Sampling: RHMW05

						Total Petroleum Hydrocarbons					Volatile Organic Compounds				Polycyclic Aromatic Hydrocarbons (PAHs) - AOC/LTM		
						TPH-g PHCC6C10	TPH-d ⁴ PHCC10C24	TPH-o ⁴ PHCC24C40	TPH-d with Silica Gel Cleanup ³ PHCC10C24SGC	TPH-o with Silica Gel Cleanup ³ PHCC24C40SGC	Benzene 71-43-2	Ethylbenzene 100-41-4	Toluene 108-88-3	Xylenes 1330-20-7	1-Methylnaphthalene 90-12-0	2-Methylnaphthalene 91-57-6	Naphthalene 91-20-3
Method						8260	8015	8015	8015	8015	8260	8260	8260	8260	8270 SIM	8270 SIM	8270 SIM
DOH Tier 1 EAL						300	400	500	—	—	5	30	40	20	10	10	17
Units						µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
Minimum						ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Maximum						ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Location	Lab	SDG	Sample ID	Sampling Date	Type	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result
RHMW05	APPL	24B0117	RHMW05-WGN01LF-2402	2/16/2024	Primary	—	—	—	—	—	—	—	—	—	—	—	—
RHMW05	Energy	B24021107	RHMW05-WGN01LF-2402	2/16/2024	Primary	—	<141 U	<199 U	<141 U	<199 U	—	—	—	—	—	—	—
RHMW05	SGS Anchorage	1240674	RHMW05-WGN01LF-2402	2/16/2024	Primary	—	—	—	—	—	—	—	—	—	—	—	—
RHMW05	SGS Orlando	FC13462	RHMW05-WGN01LF-2402	2/16/2024	Primary	<50 U	<100 U	<170 U	—	—	<0.5 U	<0.5 U	<0.5 U	<1.5 U	<0.43 U	<0.43 U	<0.43 U
RHMW05	SGS Anchorage	1240991	RHMW05-WGN01LF-2403	3/12/2024	Primary	—	—	—	—	—	—	—	—	—	—	—	—
RHMW05	SGS Orlando	FC14055	RHMW05-WGN01LF-2403	3/12/2024	Primary	<50 U	<100 U	<170 U	—	—	<0.5 U	<0.5 U	<0.5 U	<1.5 U	<0.42 U	<0.42 U	<0.42 U

Notes:
 See Data Legend

App. B.3.1 Groundwater Analytical Data: Red Hill Bulk Fuel Storage Facility
 Consolidated Sampling Program & Groundwater Protection Plan-Defueling Sampling
 Groundwater Sampling: RHMW05

						Polycyclic Aromatic Hydrocarbons (PAHs) - NOI																									
						Acenaphthene (SIM)		Acenaphthylene (SIM)		Anthracene (SIM)		Benzo(a)anthracene (SIM)		Benzo(a)pyrene (SIM)		Benzo(b)fluoranthene (SIM)		Benzo(g,h,i)perylene (SIM)		Benzo(k)fluoranthene (SIM)		Chrysene (SIM)		Dibenzo(a,h)anthracene (SIM)		Fluoranthene (SIM)		Fluorene (SIM)		Indeno(1,2,3-cd)pyrene (SIM)	
Location	Lab	SDG	Sample ID	Sampling Date	Type	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	
RHMW05	APPL	24B0117	RHMW05-WGN01LF-2402	2/16/2024	Primary	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
RHMW05	Energy	B24021107	RHMW05-WGN01LF-2402	2/16/2024	Primary	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
RHMW05	SGS Anchorage	1240674	RHMW05-WGN01LF-2402	2/16/2024	Primary	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
RHMW05	SGS Orlando	FC13462	RHMW05-WGN01LF-2402	2/16/2024	Primary	<0.43	U	<0.43	U	<0.43	U	<0.043	U	<0.043	U	<0.043	U	<0.043	U	<0.087	U	<0.043	U	<0.43	U	<0.43	U	<0.043	U	<0.43	U
RHMW05	SGS Anchorage	1240991	RHMW05-WGN01LF-2403	3/12/2024	Primary	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
RHMW05	SGS Orlando	FC14055	RHMW05-WGN01LF-2403	3/12/2024	Primary	<0.42	U	<0.42	U	<0.42	U	<0.042	U	<0.042	U	<0.042	U	<0.042	U	<0.093	U	<0.042	U	<0.42	U	<0.42	U	<0.042	U	<0.42	U

Notes:
 See Data Legend

App. B.3.1 Groundwater Analytical Data: Red Hill Bulk Fuel Storage Facility
 Consolidated Sampling Program & Groundwater Protection Plan-Defueling Sampling
 Groundwater Sampling: RHMW05

						Fuel Additive		Lead Scavengers				Natural Attenuation Parameters			
						2-(2-Methoxyethoxy)-ethanol ⁵		Phenol	1,2-Dibromoethane		1,2-Dichloroethane		Methane	Total Organic Carbon	
Analyte						111-77-3	108-95-2	106-93-4	107-06-2		74-82-8	TOC		Carbon	
CAS No.						8270D	SW8270	8011	8260		RSK 175	9060		9060	
Method						800	300	0.04	5		—	—		—	
DOH Tier 1 EAL						—	—	—	—		—	—		—	
Units						µg/L	µg/L	µg/L	µg/L		µg/L	µg/L		µg/L	
Minimum						ND	ND	—	—		ND	ND		ND	
Maximum						ND	ND	—	—		ND	347		999	
Location	Lab	SDG	Sample ID	Sampling Date	Type	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result
RHMW05	APFL	24B0117	RHMW05-WGN01LF-2402	2/16/2024	Primary	<80	UJ	—	—	—	—	—	—	—	—
RHMW05	Energy	B24021107	RHMW05-WGN01LF-2402	2/16/2024	Primary	—	—	—	—	—	—	—	—	—	—
RHMW05	SGS Anchorage	1240674	RHMW05-WGN01LF-2402	2/16/2024	Primary	—	—	—	—	—	347	J	999	J	—
RHMW05	SGS Orlando	FC13462	RHMW05-WGN01LF-2402	2/16/2024	Primary	—	<2	U	—	—	<0.25	U	—	—	—
RHMW05	SGS Anchorage	1240991	RHMW05-WGN01LF-2403	3/12/2024	Primary	—	—	—	—	—	—	<750	U	<750	U
RHMW05	SGS Orlando	FC14055	RHMW05-WGN01LF-2403	3/12/2024	Primary	—	<2	U	—	—	<0.25	U	—	—	—

Notes:
 See Data Legend

App. B.3.1 Groundwater Analytical Data: Red Hill Bulk Fuel Storage Facility
 Consolidated Sampling Program & Groundwater Protection Plan-Defueling Sampling
 Groundwater Sampling: RHMW06

						Total Petroleum Hydrocarbons					Volatile Organic Compounds				Polycyclic Aromatic Hydrocarbons (PAHs) - AOC/LTM		
						TPH-g PHCC6C10	TPH-d ⁴ PHCC10C24	TPH-o ⁴ PHCC24C40	TPH-d with Silica Gel Cleanup ³ PHCC10C24SGC	TPH-o with Silica Gel Cleanup ³ PHCC24C40SGC	Benzene 71-43-2	Ethylbenzene 100-41-4	Toluene 108-88-3	Xylenes 1330-20-7	1-Methylnaphthalene 90-12-0	2-Methylnaphthalene 91-57-6	Naphthalene 91-20-3
Method						8260	8015	8015	8015	8015	8260	8260	8260	8260	8270 SIM	8270 SIM	8270 SIM
DOH Tier 1 EAL						300	400	500	—	—	5	30	40	20	10	10	17
Units						µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
Minimum						ND	ND	ND	—	—	ND	ND	ND	ND	ND	ND	ND
Maximum						ND	ND	ND	—	—	ND	ND	ND	ND	ND	ND	ND
Location	Lab	SDG	Sample ID	Sampling Date	Type	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result
RHMW06	APPL	24B0029	RHMW06-WGN01LF-2402	2/5/2024	Primary	—	—	—	—	—	—	—	—	—	—	—	—
RHMW06	Energy	B24020306	RHMW06-WGN01LF-2402	2/5/2024	Primary	—	<141 U	<141 U	—	—	—	—	—	—	—	—	—
RHMW06	SGS Anchorage	1240462	RHMW06-WGN01LF-2402	2/5/2024	Primary	—	—	—	—	—	—	—	—	—	—	—	—
RHMW06	SGS Orlando	FC13124	RHMW06-WGN01LF-2402	2/5/2024	Primary	<50 U	<100 U	<170 U	—	<0.5 U	<0.5 U	<0.5 U	<1.5 U	<0.42 U	<0.42 U	<0.42 U	U
RHMW06	SGS Anchorage	1240955	RHMW06-WGN01LF-2403	3/11/2024	Primary	—	—	—	—	—	—	—	—	—	—	—	—
RHMW06	SGS Orlando	FC14005	RHMW06-WGN01LF-2403	3/11/2024	Primary	<50 U	<100 U	<160 U	—	<0.5 U	<0.5 U	<0.5 U	<1.5 U	<0.4 U	<0.4 U	<0.4 U	U

Notes:
 See Data Legend

App. B.3.1 Groundwater Analytical Data: Red Hill Bulk Fuel Storage Facility
 Consolidated Sampling Program & Groundwater Protection Plan-Defueling Sampling
 Groundwater Sampling: RHMW06

						Polycyclic Aromatic Hydrocarbons (PAHs) - NOI															
						Acenaphthene (SIM)	Acenaphthylene (SIM)	Anthracene (SIM)	Benzo(a)anthracene (SIM)	Benzo(a)pyrene (SIM)	Benzo(b)fluoranthene (SIM)	Benzo(g,h,i)perylene (SIM)	Benzo(k)fluoranthene (SIM)	Chrysene (SIM)	Dibenzo(a,h)anthracene (SIM)	Fluoranthene (SIM)	Fluorene (SIM)	Indeno(1,2,3-cd)pyrene (SIM)	Phenanthrene (SIM)	Pyrene (SIM)	
						83-32-9	208-96-8	120-12-7	56-55-3	50-32-8	205-99-2	191-24-2	207-08-9	218-01-9	53-70-3	206-44-0	86-73-7	193-39-5	85-01-8	129-00-0	
						Method	8270SIM	8270SIM	8270SIM	8270SIM	8270SIM	8270SIM	8270SIM	8270SIM	8270SIM	8270SIM	8270SIM	8270SIM	8270SIM	8270SIM	8270SIM
						DOH Tier 1 EAL	20	240	0.18	0.029	0.2	0.22	0.13	0.4	1	0.022	13	240	0.095	210	68
						Units	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	
						Minimum	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
						Maximum	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
Location	Lab	SDG	Sample ID	Sampling Date	Type	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	
RHMW06	APPL	24B0029	RHMW06-WGN01LF-2402	2/5/2024	Primary	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
RHMW06	Energy	B24020306	RHMW06-WGN01LF-2402	2/5/2024	Primary	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
RHMW06	SGS Anchorage	1240462	RHMW06-WGN01LF-2402	2/5/2024	Primary	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
RHMW06	SGS Orlando	FC13124	RHMW06-WGN01LF-2402	2/5/2024	Primary	<0.42	U	<0.42	U	<0.42	U	<0.042	U	<0.042	UJ	<0.042	U	<0.083	U	<0.042	U
RHMW06	SGS Anchorage	1240955	RHMW06-WGN01LF-2403	3/11/2024	Primary	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
RHMW06	SGS Orlando	FC14005	RHMW06-WGN01LF-2403	3/11/2024	Primary	<0.4	U	<0.4	U	<0.4	U	<0.04	U	<0.04	U	<0.04	U	<0.08	U	<0.04	U

Notes:
 See Data Legend

App. B.3.1 Groundwater Analytical Data: Red Hill Bulk Fuel Storage Facility
 Consolidated Sampling Program & Groundwater Protection Plan-Defueling Sampling
 Groundwater Sampling: RHMW06

						Fuel Additive		Lead Scavengers				Natural Attenuation Parameters			
						2-(2- Methoxyethoxy)-ethanol ⁵		Phenol	1,2-Dibromoethane		1,2-Dichloroethane		Methane	Total Organic Carbon	
Analyte						111-77-3	108-95-2	106-93-4	107-06-2		74-82-8	TOC		—	
CAS No.						8270D	SW8270	8011	8260		RSK 175	9060		9060	
Method						800	300	0.04	5		—	—		—	
DOH Tier 1 EAL						—	—	—	—		—	—		—	
Units						µg/L	µg/L	µg/L	µg/L		µg/L	µg/L		µg/L	
Minimum						ND	ND	—	—		ND	ND		520	
Maximum						ND	ND	—	—		ND	370		1100	
Location	Lab	SDG	Sample ID	Sampling Date	Type	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result
RHMW06	APFL	24B0029	RHMW06-WGN01LF-2402	2/5/2024	Primary	<80	UJ	—	—	—	—	—	—	—	—
RHMW06	Energy	B24020306	RHMW06-WGN01LF-2402	2/5/2024	Primary	—	—	—	—	—	—	—	—	—	—
RHMW06	SGS Anchorage	1240462	RHMW06-WGN01LF-2402	2/5/2024	Primary	—	—	—	—	—	370	J	520	J	—
RHMW06	SGS Orlando	FC13124	RHMW06-WGN01LF-2402	2/5/2024	Primary	—	<2	U	—	—	<0.25	U	—	—	—
RHMW06	SGS Anchorage	1240955	RHMW06-WGN01LF-2403	3/11/2024	Primary	—	—	—	—	—	<750	U	1100	J+	—
RHMW06	SGS Orlando	FC14005	RHMW06-WGN01LF-2403	3/11/2024	Primary	—	<2	U	—	—	<0.25	U	—	—	—

Notes:
 See Data Legend

App. B.3.1 Groundwater Analytical Data: Red Hill Bulk Fuel Storage Facility
 Consolidated Sampling Program & Groundwater Protection Plan-Defueling Sampling
 Groundwater Sampling: RHMW08

						Total Petroleum Hydrocarbons					Volatile Organic Compounds				Polycyclic Aromatic Hydrocarbons (PAHs) - AOC/LTM		
						TPH-g PHCC6C10	TPH-d ⁴ PHCC10C24	TPH-o ⁴ PHCC24C40	TPH-d with Silica Gel Cleanup ³ PHCC10C24SGC	TPH-o with Silica Gel Cleanup ³ PHCC24C40SGC	Benzene 71-43-2	Ethylbenzene 100-41-4	Toluene 108-88-3	Xylenes 1330-20-7	1-Methylnaphthalene 90-12-0	2-Methylnaphthalene 91-57-6	Naphthalene 91-20-3
Method						8260	8015	8015	8015	8015	8260	8260	8260	8260	8270 SIM	8270 SIM	8270 SIM
DOH Tier 1 EAL						300	400	500	—	—	5	30	40	20	10	10	17
Units						µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
Minimum						ND	ND	ND	—	—	ND	ND	ND	ND	ND	ND	ND
Maximum						ND	ND	ND	—	—	ND	ND	ND	ND	ND	ND	ND
Location	Lab	SDG	Sample ID	Sampling Date	Type	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result
RHMW08	APPL	24B0029	RHMW08-WGN01LF-2402	2/5/2024	Primary	—	—	—	—	—	—	—	—	—	—	—	—
RHMW08	Energy	B24020306	RHMW08-WGN01LF-2402	2/5/2024	Primary	—	<141 U	<141 U	—	—	—	—	—	—	—	—	—
RHMW08	SGS Anchorage	1240462	RHMW08-WGN01LF-2402	2/5/2024	Primary	—	—	—	—	—	—	—	—	—	—	—	—
RHMW08	SGS Orlando	FC13124	RHMW08-WGN01LF-2402	2/5/2024	Primary	<50 U	<100 U	<160 U	—	<0.5 U	<0.5 U	<0.5 U	<1.5 U	<0.4 U	<0.4 U	<0.4 U	<0.4 U
RHMW08	SGS Anchorage	1240955	RHMW08-WGN01LF-2403	3/11/2024	Primary	—	—	—	—	—	—	—	—	—	—	—	—
RHMW08	SGS Orlando	FC14005	RHMW08-WGN01LF-2403	3/11/2024	Primary	<50 U	<100 U	<160 U	—	<0.5 U	<0.5 U	<0.5 U	<1.5 U	<0.42 U	<0.42 U	<0.42 U	<0.42 U

Notes:
 See Data Legend

App. B.3.1 Groundwater Analytical Data: Red Hill Bulk Fuel Storage Facility
 Consolidated Sampling Program & Groundwater Protection Plan-Defueling Sampling
 Groundwater Sampling: RHMW08

						Polycyclic Aromatic Hydrocarbons (PAHs) - NOI															
						Acenaphthene (SIM)	Acenaphthylene (SIM)	Anthracene (SIM)	Benzo(a)anthracene (SIM)	Benzo(a)pyrene (SIM)	Benzo(b)fluoranthene (SIM)	Benzo(g,h,i)perylene (SIM)	Benzo(k)fluoranthene (SIM)	Chrysene (SIM)	Dibenzo(a,h)anthracene (SIM)	Fluoranthene (SIM)	Fluorene (SIM)	Indeno(1,2,3-cd)pyrene (SIM)	Phenanthrene (SIM)	Pyrene (SIM)	
						83-32-9	208-96-8	120-12-7	56-55-3	50-32-8	205-99-2	191-24-2	207-08-9	218-01-9	53-70-3	206-44-0	86-73-7	193-39-5	85-01-8	129-00-0	
						Method	8270SIM	8270SIM	8270SIM	8270SIM	8270SIM	8270SIM	8270SIM	8270SIM	8270SIM	8270SIM	8270SIM	8270SIM	8270SIM	8270SIM	8270SIM
						DOH Tier 1 EAL	20	240	0.18	0.029	0.2	0.13	0.4	1	0.022	13	240	0.095	210	68	
						Units	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	
						Minimum	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
						Maximum	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
Location	Lab	SDG	Sample ID	Sampling Date	Type	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	
RHMW08	APPL	24B0029	RHMW08-WGN01LF-2402	2/5/2024	Primary	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
RHMW08	Energy	B24020306	RHMW08-WGN01LF-2402	2/5/2024	Primary	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
RHMW08	SGS Anchorage	1240462	RHMW08-WGN01LF-2402	2/5/2024	Primary	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
RHMW08	SGS Orlando	FC13124	RHMW08-WGN01LF-2402	2/5/2024	Primary	<0.4	U	<0.4	U	<0.4	U	<0.04	U	<0.04	UJ	<0.04	U	<0.04	U	<0.04	U
RHMW08	SGS Anchorage	1240955	RHMW08-WGN01LF-2403	3/11/2024	Primary	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
RHMW08	SGS Orlando	FC14005	RHMW08-WGN01LF-2403	3/11/2024	Primary	<0.42	U	<0.42	U	<0.42	U	<0.042	U	<0.042	U	<0.042	U	<0.042	U	<0.042	U

Notes:
 See Data Legend

App. B.3.1 Groundwater Analytical Data: Red Hill Bulk Fuel Storage Facility
 Consolidated Sampling Program & Groundwater Protection Plan-Defueling Sampling
 Groundwater Sampling: RHMW08

						Fuel Additive		Lead Scavengers				Natural Attenuation Parameters			
						2-(2-Methoxyethoxy)-ethanol ⁵	Phenol	1,2-Dibromoethane	1,2-Dichloroethane	Methane	Total Organic Carbon	NV Dissolved Organic Carbon			
						CAS No.	108-95-2	106-93-4	107-06-2	74-82-8	TOC				
						Method	SW8270	8011	8260	RSK 175	9060	9060			
						DOH Tier 1 EAL	300	0.04	5	—	—	—			
						Units	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L			
						Minimum	ND	—	—	ND	ND	800			
						Maximum	ND	—	—	ND	564	979			
Location	Lab	SDG	Sample ID	Sampling Date	Type	Result	Result	Result	Result	Result	Result	Result	Result		
RHMW08	APFL	24B0029	RHMW08-WGN01LF-2402	2/5/2024	Primary	<80	UJ	—	—	—	—	—	—		
RHMW08	Energy	B24020306	RHMW08-WGN01LF-2402	2/5/2024	Primary	—	—	—	—	—	—	—	—		
RHMW08	SGS Anchorage	1240462	RHMW08-WGN01LF-2402	2/5/2024	Primary	—	—	—	—	—	564	J	800 J		
RHMW08	SGS Orlando	FC13124	RHMW08-WGN01LF-2402	2/5/2024	Primary	—	<2 U	—	—	<0.25 U	—	—	—		
RHMW08	SGS Anchorage	1240955	RHMW08-WGN01LF-2403	3/11/2024	Primary	—	—	—	—	—	<750 U	—	979 J+		
RHMW08	SGS Orlando	FC14005	RHMW08-WGN01LF-2403	3/11/2024	Primary	—	<1.9 U	—	—	<0.25 U	—	—	—		

Notes:
 See Data Legend

App. B.3.1 Groundwater Analytical Data: Red Hill Bulk Fuel Storage Facility
 Consolidated Sampling Program & Groundwater Protection Plan-Defueling Sampling
 Groundwater Sampling: RHMW09

						Total Petroleum Hydrocarbons					Volatile Organic Compounds				Polycyclic Aromatic Hydrocarbons (PAHs) - AOC/LTM		
						TPH-g PHCC6C10	TPH-d ⁴ PHCC10C24	TPH-o ⁴ PHCC24C40	TPH-d with Silica Gel Cleanup ³ PHCC10C24SGC	TPH-o with Silica Gel Cleanup ³ PHCC24C40SGC	Benzene 71-43-2	Ethylbenzene 100-41-4	Toluene 108-88-3	Xylenes 1330-20-7	1-Methylnaphthalene 90-12-0	2-Methylnaphthalene 91-57-6	Naphthalene 91-20-3
Method						8260	8015	8015	8015	8015	8260	8260	8260	8260	8270 SIM	8270 SIM	8270 SIM
DOH Tier 1 EAL						300	400	500	—	—	5	30	40	20	10	10	17
Units						µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
Minimum						ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Maximum						41.7	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Location	Lab	SDG	Sample ID	Sampling Date	Type	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result
RHMW09	APPL	24B0042	RHMW09-WGN01LF-2402	2/7/2024	Primary	—	—	—	—	—	—	—	—	—	—	—	—
RHMW09	Energy	B24020580	RHMW09-WGN01LF-2402	2/7/2024	Primary	—	<142 U	<190 U	<142 U	<190 U	—	—	—	—	—	—	—
RHMW09	SGS Anchorage	1240512	RHMW09-WGN01LF-2402	2/7/2024	Primary	—	—	—	—	—	—	—	—	—	—	—	—
RHMW09	SGS Orlando	FC13229	RHMW09-WGN01LF-2402	2/7/2024	Primary	41.7	J <100 U	<170 U	—	—	<0.5 U	<0.5 U	<0.5 U	<1.5 U	<0.42 U	<0.42 U	<0.42 U
RHMW09	SGS Anchorage	1240991	RHMW09-WGN01LF-2403	3/12/2024	Primary	—	—	—	—	—	—	—	—	—	—	—	—
RHMW09	SGS Orlando	FC14055	RHMW09-WGN01LF-2403	3/12/2024	Primary	<50 U	<100 U	<170 U	—	—	<0.5 U	<0.5 U	<0.5 U	<1.5 U	<0.42 U	<0.42 U	<0.42 U

Notes:
 See Data Legend

App. B.3.1 Groundwater Analytical Data: Red Hill Bulk Fuel Storage Facility
 Consolidated Sampling Program & Groundwater Protection Plan-Defueling Sampling
 Groundwater Sampling: RHMW09

						Polycyclic Aromatic Hydrocarbons (PAHs) - NOI															
						Acenaphthene (SIM)	Acenaphthylene (SIM)	Anthracene (SIM)	Benzo(a)anthracene (SIM)	Benzo(a)pyrene (SIM)	Benzo(b)fluoranthene (SIM)	Benzo(g,h,i)perylene (SIM)	Benzo(k)fluoranthene (SIM)	Chrysene (SIM)	Dibenzo(a,h)anthracene (SIM)	Fluoranthene (SIM)	Fluorene (SIM)	Indeno(1,2,3-cd)pyrene (SIM)	Phenanthrene (SIM)	Pyrene (SIM)	
						83-32-9	208-96-8	120-12-7	56-55-3	50-32-8	205-99-2	191-24-2	207-08-9	218-01-9	53-70-3	206-44-0	86-73-7	193-39-5	85-01-8	129-00-0	
						8270SIM	8270SIM	8270SIM	8270SIM	8270SIM	8270SIM	8270SIM	8270SIM	8270SIM	8270SIM	8270SIM	8270SIM	8270SIM	8270SIM	8270SIM	
						20	240	0.18	0.029	0.2	0.22	0.13	0.4	1	0.022	13	240	0.095	210	68	
						µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	
						ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
						ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
Location	Lab	SDG	Sample ID	Sampling Date	Type	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	
RHMW09	APPL	24B0042	RHMW09-WGN01LF-2402	2/7/2024	Primary	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
RHMW09	Energy	B24020580	RHMW09-WGN01LF-2402	2/7/2024	Primary	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
RHMW09	SGS Anchorage	1240512	RHMW09-WGN01LF-2402	2/7/2024	Primary	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
RHMW09	SGS Orlando	FC13229	RHMW09-WGN01LF-2402	2/7/2024	Primary	<0.42	U	<0.42	U	<0.42	U	<0.042	U	<0.042	U	<0.042	U	<0.083	U	<0.042	U
RHMW09	SGS Anchorage	1240991	RHMW09-WGN01LF-2403	3/12/2024	Primary	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
RHMW09	SGS Orlando	FC14055	RHMW09-WGN01LF-2403	3/12/2024	Primary	<0.42	U	<0.42	U	<0.42	U	<0.042	U	<0.042	U	<0.042	U	<0.083	U	<0.042	U

Notes:
 See Data Legend

App. B.3.1 Groundwater Analytical Data: Red Hill Bulk Fuel Storage Facility
 Consolidated Sampling Program & Groundwater Protection Plan-Defueling Sampling
 Groundwater Sampling: RHMW09

						Fuel Additive		Lead Scavengers				Natural Attenuation Parameters			
						2-(2-Methoxyethoxy)-ethanol ⁵	Phenol	1,2-Dibromoethane	1,2-Dichloroethane	Methane	Total Organic Carbon	NV Dissolved Organic Carbon			
						111-77-3	108-95-2	106-93-4	107-06-2	74-82-8	TOC	Carbon			
						Method 8270D	SW8270	8011	8260	RSK 175	9060	9060			
						DOH Tier 1 EAL	800	300	0.04	5	—	—			
						Units	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L			
						Minimum	ND	ND	—	ND	ND	ND			
						Maximum	ND	—	—	ND	ND	ND			
Location	Lab	SDG	Sample ID	Sampling Date	Type	Result	Result	Result	Result	Result	Result	Result	Result		
RHMW09	APFL	24B0042	RHMW09-WGN01LF-2402	2/7/2024	Primary	<80	U	—	—	—	—	—	—		
RHMW09	Energy	B24020580	RHMW09-WGN01LF-2402	2/7/2024	Primary	—	—	—	—	—	—	—	—		
RHMW09	SGS Anchorage	1240512	RHMW09-WGN01LF-2402	2/7/2024	Primary	—	—	—	—	—	<750	U	<750 U		
RHMW09	SGS Orlando	FC13229	RHMW09-WGN01LF-2402	2/7/2024	Primary	—	<2 U	—	—	<0.25 U	—	—	—		
RHMW09	SGS Anchorage	1240991	RHMW09-WGN01LF-2403	3/12/2024	Primary	—	—	—	—	—	<750	U	<750 U		
RHMW09	SGS Orlando	FC14055	RHMW09-WGN01LF-2403	3/12/2024	Primary	—	<2 U	—	—	<0.25 U	—	—	—		

Notes:
 See Data Legend

App. B.3.1 Groundwater Analytical Data: Red Hill Bulk Fuel Storage Facility
 Consolidated Sampling Program & Groundwater Protection Plan-Defueling Sampling
 Groundwater Sampling: RHMW10

						Total Petroleum Hydrocarbons					Volatile Organic Compounds				Polycyclic Aromatic Hydrocarbons (PAHs) - AOC/LTM		
						TPH-g PHCC6C10	TPH-d ⁴ PHCC10C24	TPH-o ⁴ PHCC24C40	TPH-d with Silica Gel Cleanup ³ PHCC10C24SGC	TPH-o with Silica Gel Cleanup ³ PHCC24C40SGC	Benzene 71-43-2	Ethylbenzene 100-41-4	Toluene 108-88-3	Xylenes 1330-20-7	1-Methylnaphthalene 90-12-0	2-Methylnaphthalene 91-57-6	Naphthalene 91-20-3
Method						8260	8015	8015	8015	8015	8260	8260	8260	8260	8270 SIM	8270 SIM	8270 SIM
DOH Tier 1 EAL						300	400	500	—	—	5	30	40	20	10	10	17
Units						µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
Minimum						ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Maximum						ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Location	Lab	SDG	Sample ID	Sampling Date	Type	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result
RHMW10	APPL	24B0042	RHMW10-WGN01LF-2402	2/7/2024	Primary	—	—	—	—	—	—	—	—	—	—	—	—
RHMW10	Energy	B24020580	RHMW10-WGN01LF-2402	2/7/2024	Primary	—	<141 U	<198 U	<141 U	<198 U	—	—	—	—	—	—	—
RHMW10	SGS Anchorage	1240512	RHMW10-WGN01LF-2402	2/7/2024	Primary	—	—	—	—	—	—	—	—	—	—	—	—
RHMW10	SGS Orlando	FC13229	RHMW10-WGN01LF-2402	2/7/2024	Primary	<50 U	<100 U	<170 U	—	—	<0.5 U	<0.5 U	<0.5 U	<1.5 U	<0.42 U	<0.42 U	<0.42 U
RHMW10	SGS Anchorage	1241067	RHMW10-WGN01LF-2403	3/15/2024	Primary	—	—	—	—	—	—	—	—	—	—	—	—
RHMW10	SGS Orlando	FC14139	RHMW10-WGN01LF-2403	3/15/2024	Primary	<50 U	<100 U	<160 U	—	—	<0.5 U	<0.5 U	<0.5 U	<1.5 U	<0.4 U	<0.4 U	<0.4 U

Notes:
 See Data Legend

App. B.3.1 Groundwater Analytical Data: Red Hill Bulk Fuel Storage Facility
 Consolidated Sampling Program & Groundwater Protection Plan-Defueling Sampling
 Groundwater Sampling: RHMW10

						Polycyclic Aromatic Hydrocarbons (PAHs) - NOI																	
						Acenaphthene (SIM)	Acenaphthylene (SIM)	Anthracene (SIM)	Benzo(a)anthracene (SIM)	Benzo(a)pyrene (SIM)	Benzo(b)fluoranthene (SIM)	Benzo(g,h,i)perylene (SIM)	Benzo(k)fluoranthene (SIM)	Chrysene (SIM)	Dibenzo(a,h)anthracene (SIM)	Fluoranthene (SIM)	Fluorene (SIM)	Indeno(1,2,3-cd)pyrene (SIM)	Phenanthrene (SIM)	Pyrene (SIM)			
						83-32-9	208-96-8	120-12-7	56-55-3	50-32-8	205-99-2	191-24-2	207-08-9	218-01-9	53-70-3	206-44-0	86-73-7	193-39-5	85-01-8	129-00-0			
						Method	8270SIM	8270SIM	8270SIM	8270SIM	8270SIM	8270SIM	8270SIM	8270SIM	8270SIM	8270SIM	8270SIM	8270SIM	8270SIM	8270SIM	8270SIM		
						DOH Tier 1 EAL	20	240	0.18	0.029	0.2	0.22	0.13	0.4	1	0.022	13	240	0.095	210	68		
						Units	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L			
						Minimum	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND			
						Maximum	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND			
Location	Lab	SDG	Sample ID	Sampling Date	Type	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result		
RHMW10	APPL	24B0042	RHMW10-WGN01LF-2402	2/7/2024	Primary	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
RHMW10	Energy	B24020580	RHMW10-WGN01LF-2402	2/7/2024	Primary	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
RHMW10	SGS Anchorage	1240512	RHMW10-WGN01LF-2402	2/7/2024	Primary	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
RHMW10	SGS Orlando	FC13229	RHMW10-WGN01LF-2402	2/7/2024	Primary	<0.42	U	<0.42	U	<0.42	U	<0.042	U	<0.042	UJ	<0.042	U	<0.42	U	<0.42	U	<0.42	U
RHMW10	SGS Anchorage	1241067	RHMW10-WGN01LF-2403	3/15/2024	Primary	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
RHMW10	SGS Orlando	FC14139	RHMW10-WGN01LF-2403	3/15/2024	Primary	<0.4	U	<0.4	U	<0.4	U	<0.04	U	<0.04	U	<0.04	U	<0.04	U	<0.4	U	<0.4	U

Notes:
 See Data Legend

App. B.3.1 Groundwater Analytical Data: Red Hill Bulk Fuel Storage Facility
 Consolidated Sampling Program & Groundwater Protection Plan-Defueling Sampling
 Groundwater Sampling: RHMW10

						Fuel Additive		Lead Scavengers				Natural Attenuation Parameters			
						2-(2-Methoxyethoxy)-ethanol ⁵	Phenol	1,2-Dibromoethane	1,2-Dichloroethane	Methane	Total Organic Carbon	NV Dissolved Organic Carbon			
Analyte						111-77-3	108-95-2	106-93-4	107-06-2	74-82-8	TOC				
CAS No.						8270D	SW8270	8011	8260	RSK 175	9060	9060			
Method						800	300	0.04	5	—	—	—			
DOH Tier 1 EAL						—	—	—	—	—	—	—			
Units						µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L			
Minimum						ND	ND	—	—	ND	ND	ND			
Maximum						ND	ND	—	—	ND	291	711			
Location	Lab	SDG	Sample ID	Sampling Date	Type	Result	Result	Result	Result	Result	Result	Result	Result		
RHMW10	APFL	24B0042	RHMW10-WGN01LF-2402	2/7/2024	Primary	<80	U	—	—	—	—	—	—		
RHMW10	Energy	B24020580	RHMW10-WGN01LF-2402	2/7/2024	Primary	—	—	—	—	—	—	—	—		
RHMW10	SGS Anchorage	1240512	RHMW10-WGN01LF-2402	2/7/2024	Primary	—	—	—	—	—	<750	U	<750		
RHMW10	SGS Orlando	FC13229	RHMW10-WGN01LF-2402	2/7/2024	Primary	—	<2	U	—	<0.25	U	—	—		
RHMW10	SGS Anchorage	1241067	RHMW10-WGN01LF-2403	3/15/2024	Primary	—	—	—	—	—	291	J	711		
RHMW10	SGS Orlando	FC14139	RHMW10-WGN01LF-2403	3/15/2024	Primary	—	<1.9	U	—	<0.25	U	—	—		

Notes:
 See Data Legend

App. B.3.1 Groundwater Analytical Data: Red Hill Bulk Fuel Storage Facility
 Consolidated Sampling Program & Groundwater Protection Plan-Defueling Sampling
 Groundwater Sampling: RHMW11-05

						Total Petroleum Hydrocarbons					Volatile Organic Compounds				Polycyclic Aromatic Hydrocarbons (PAHs) - AOC/LTM		
						TPH-g PHCC6C10	TPH-d ⁴ PHCC10C24	TPH-o ⁴ PHCC24C40	TPH-d with Silica Gel Cleanup ³ PHCC10C24SGC	TPH-o with Silica Gel Cleanup ³ PHCC24C40SGC	Benzene 71-43-2	Ethylbenzene 100-41-4	Toluene 108-88-3	Xylenes 1330-20-7	1-Methylnaphthalene 90-12-0	2-Methylnaphthalene 91-57-6	Naphthalene 91-20-3
Method						8260	8015	8015	8015	8015	8260	8260	8260	8260	8270 SIM	8270 SIM	8270 SIM
DOH Tier 1 EAL						300	400	500	—	—	5	30	40	20	10	10	17
Units						µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
Minimum						ND	ND	ND	—	—	ND	ND	ND	ND	ND	ND	ND
Maximum						51.9	ND	ND	—	—	ND	ND	ND	ND	ND	ND	ND
Location	Lab	SDG	Sample ID	Sampling Date	Type	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result
RHMW11-05	APPL	24B0042	RHMW11-05-WGN01G-2402	2/7/2024	Primary	—	—	—	—	—	—	—	—	—	—	—	—
RHMW11-05	Energy	B24020580	RHMW11-05-WGN01G-2402	2/7/2024	Primary	—	<140 U	<197 U	—	—	—	—	—	—	—	—	—
RHMW11-05	SGS Anchorage	1240512	RHMW11-05-WGN01G-2402	2/7/2024	Primary	—	—	—	—	—	—	—	—	—	—	—	—
RHMW11-05	SGS Orlando	FC13229	RHMW11-05-WGN01G-2402	2/7/2024	Primary	<50 U	<100 U	<170 U	—	<0.5 U	<0.5 U	<0.5 U	<1.5 U	<0.42 U	<0.42 U	<0.42 U	<0.42 U
RHMW11-05	SGS Anchorage	1241012	RHMW11-05-WGN01G-2403	3/13/2024	Primary	—	—	—	—	—	—	—	—	—	—	—	—
RHMW11-05	SGS Orlando	FC14092	RHMW11-05-WGN01G-2403	3/13/2024	Primary	51.9 J	<110 U	<170 U	—	<0.5 U	<0.5 U	<0.5 U	<1.5 U	<0.42 U	<0.42 U	<0.42 U	<0.42 U

Notes:
 See Data Legend

App. B.3.1 Groundwater Analytical Data: Red Hill Bulk Fuel Storage Facility
 Consolidated Sampling Program & Groundwater Protection Plan-Defueling Sampling
 Groundwater Sampling: RHMW11-05

						Polycyclic Aromatic Hydrocarbons (PAHs) - NOI																						
						Acenaphthene (SIM)	Acenaphthylene (SIM)	Anthracene (SIM)	Benzo(a)anthracene (SIM)	Benzo(a)pyrene (SIM)	Benzo(b)fluoranthene (SIM)	Benzo(g,h,i)perylene (SIM)	Benzo(k)fluoranthene (SIM)	Chrysene (SIM)	Dibenzo(a,h)anthracene (SIM)	Fluoranthene (SIM)	Fluorene (SIM)	Indeno(1,2,3-cd)pyrene (SIM)	Phenanthrene (SIM)	Pyrene (SIM)								
Analyte	CAS No.	Method	DOH Tier 1 EAL	Units	Minimum	Maximum	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	
	83-32-9	8270SIM	20	µg/L	ND	ND	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	208-96-8	8270SIM	240	µg/L	ND	ND	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	120-12-7	8270SIM	0.18	µg/L	ND	ND	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	56-55-3	8270SIM	0.029	µg/L	ND	ND	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	50-32-8	8270SIM	0.2	µg/L	ND	ND	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	205-99-2	8270SIM	0.22	µg/L	ND	ND	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	191-24-2	8270SIM	0.13	µg/L	ND	ND	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	207-08-9	8270SIM	0.4	µg/L	ND	ND	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	218-01-8	8270SIM	1	µg/L	ND	ND	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	53-70-3	8270SIM	0.022	µg/L	ND	ND	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	206-44-0	8270SIM	13	µg/L	ND	ND	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	86-73-7	8270SIM	240	µg/L	ND	ND	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	193-39-5	8270SIM	0.095	µg/L	ND	ND	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	85-01-8	8270SIM	210	µg/L	ND	ND	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	129-00-0	8270SIM	68	µg/L	ND	ND	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
RHMW11-05	APPL	24B0042	RHMW11-05-WGN01G-2402	2/7/2024	Primary		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
RHMW11-05	Energy	B24020580	RHMW11-05-WGN01G-2402	2/7/2024	Primary		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
RHMW11-05	SGS Anchorage	1240512	RHMW11-05-WGN01G-2402	2/7/2024	Primary		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
RHMW11-05	SGS Orlando	FC13229	RHMW11-05-WGN01G-2402	2/7/2024	Primary		<0.42	U	<0.42	U	<0.42	U	<0.042	U	<0.042	U	<0.042	U	<0.083	U	<0.042	U	<0.42	U	<0.42	U	<0.042	U
RHMW11-05	SGS Anchorage	1241012	RHMW11-05-WGN01G-2403	3/13/2024	Primary		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
RHMW11-05	SGS Orlando	FC14092	RHMW11-05-WGN01G-2403	3/13/2024	Primary		<0.42	U	<0.42	U	<0.42	U	<0.042	U	<0.042	U	<0.042	U	<0.083	U	<0.042	U	<0.42	U	<0.42	U	<0.042	U

Notes:
 See Data Legend

App. B.3.1 Groundwater Analytical Data: Red Hill Bulk Fuel Storage Facility
 Consolidated Sampling Program & Groundwater Protection Plan-Defueling Sampling
 Groundwater Sampling: RHMW11-05

						Fuel Additive		Lead Scavengers				Natural Attenuation Parameters		
						2-(2-Methoxyethoxy)-ethanol ⁵	Phenol	1,2-Dibromoethane	1,2-Dichloroethane	Methane	Total Organic Carbon	NV Dissolved Organic Carbon		
Analyte						111-77-3	108-95-2	106-93-4	107-06-2	74-82-8	TOC	Carbon		
CAS No.						8270D	SW8270	8011	8260	RSK 175	9060	9060		
Method						800	300	0.04	5	—	—	—		
DOH Tier 1 EAL						—	—	—	—	—	—	—		
Units						µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L		
Minimum						ND	ND	—	—	0.42	ND	ND		
Maximum						ND	ND	—	—	0.59	ND	772		
Location	Lab	SDG	Sample ID	Sampling Date	Type	Result	Result	Result	Result	Result	Result	Result	Result	
RHMW11-05	APPL	24B0042	RHMW11-05-WGN01G-2402	2/7/2024	Primary	<80	U	—	—	—	—	—	—	
RHMW11-05	Energy	B24020580	RHMW11-05-WGN01G-2402	2/7/2024	Primary	—	—	—	—	—	—	—	—	
RHMW11-05	SGS Anchorage	1240512	RHMW11-05-WGN01G-2402	2/7/2024	Primary	—	—	—	—	—	<750	U	772 J*	
RHMW11-05	SGS Orlando	FC13229	RHMW11-05-WGN01G-2402	2/7/2024	Primary	—	<2 U	—	—	0.42 J	—	—	—	
RHMW11-05	SGS Anchorage	1241012	RHMW11-05-WGN01G-2403	3/13/2024	Primary	—	—	—	—	—	<750	U	<750 U	
RHMW11-05	SGS Orlando	FC14092	RHMW11-05-WGN01G-2403	3/13/2024	Primary	—	<1.9 U	—	—	0.59	—	—	—	

Notes:
 See Data Legend

App. B.3.1 Groundwater Analytical Data: Red Hill Bulk Fuel Storage Facility
 Consolidated Sampling Program & Groundwater Protection Plan-Defueling Sampling
 Groundwater Sampling: RHMW12A

						Total Petroleum Hydrocarbons					Volatile Organic Compounds				Polycyclic Aromatic Hydrocarbons (PAHs) - AOC/LTM												
						TPH-g PHCC6C10	TPH-d ⁴ PHCC10C24	TPH-o ⁴ PHCC24C40	TPH-d with Silica Gel Cleanup ³ PHCC10C24SGC	TPH-o with Silica Gel Cleanup ³ PHCC24C40SGC	Benzene 71-43-2	Ethylbenzene 100-41-4	Toluene 108-88-3	Xylenes 1330-20-7	1-Methylnaphthalene 90-12-0	2-Methylnaphthalene 91-57-6	Naphthalene 91-20-3										
Method						8260	8015	8015	8015	8015	8260	8260	8260	8270 SIM	8270 SIM	8270 SIM											
DOH Tier 1 EAL						300	400	500	—	—	5	30	40	20	10	10	17										
Units						µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L										
Minimum						ND	ND	ND	—	—	ND	ND	ND	ND	ND	ND	ND										
Maximum						ND	ND	ND	—	—	ND	ND	ND	ND	ND	ND	ND										
Location	Lab	SDG	Sample ID	Sampling Date	Type	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result										
RHMW12A	SGS Orlando	FC12420	RHMW12A-WGN01LF-2401	1/5/2024	Primary	<50	U	<100	U	<170	U	—	—	<0.5	U	<0.5	U	<0.5	U	<1.5	U	<0.42	U	<0.42	U	<0.42	U
RHMW12A	APPL	24B0081	RHMW12A-WGN01LF-2402	2/12/2024	Primary	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
RHMW12A	Energy	B24020801	RHMW12A-WGN01LF-2402	2/12/2024	Primary	—	—	<141	U	<141	U	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
RHMW12A	SGS Anchorage	1240595	RHMW12A-WGN01LF-2402	2/12/2024	Primary	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
RHMW12A	SGS Orlando	FC13346	RHMW12A-WGN01LF-2402	2/12/2024	Primary	<50	U	<110	U	<170	U	—	—	<0.5	U	<0.5	U	<0.5	U	<1.5	U	<0.42	U	<0.42	U	<0.42	U
RHMW12A	SGS Anchorage	1241067	RHMW12A-WGN01LF-2403	3/18/2024	Primary	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
RHMW12A	SGS Orlando	FC14185	RHMW12A-WGN01LF-2403	3/18/2024	Primary	<50	U	<100	U	<170	U	—	—	<0.5	U	<0.5	U	<0.5	U	<1.5	U	<0.4	U	<0.4	U	<0.4	U

Notes:
 See Data Legend

App. B.3.1 Groundwater Analytical Data: Red Hill Bulk Fuel Storage Facility
 Consolidated Sampling Program & Groundwater Protection Plan-Defueling Sampling
 Groundwater Sampling: RHMW12A

						Polycyclic Aromatic Hydrocarbons (PAHs) - NOI																											
						Acenaphthene (SIM)	Acenaphthylene (SIM)	Anthracene (SIM)	Benzo(a)anthracene (SIM)	Benzo(a)pyrene (SIM)	Benzo(b)fluoranthene (SIM)	Benzo(g,h,i)perylene (SIM)	Benzo(k)fluoranthene (SIM)	Chrysene (SIM)	Dibenzo(a,h)anthracene (SIM)	Fluoranthene (SIM)	Fluorene (SIM)	Indeno(1,2,3-cd)pyrene (SIM)	Phenanthrene (SIM)	Pyrene (SIM)													
						83-32-9	208-96-8	120-12-7	56-55-3	50-32-8	205-99-2	191-24-2	207-08-9	218-01-9	53-70-3	206-44-0	86-73-7	193-39-5	85-01-8	129-00-0													
						8270SIM	8270SIM	8270SIM	8270SIM	8270SIM	8270SIM	8270SIM	8270SIM	8270SIM	8270SIM	8270SIM	8270SIM	8270SIM	8270SIM	8270SIM													
						20	240	0.18	0.029	0.2	0.22	0.13	0.4	1	0.022	13	240	0.095	210	68													
						µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L													
						ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND													
						ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND													
Location	Lab	SDG	Sample ID	Sampling Date	Type	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result													
RHMW12A	SGS Orlando	FC12420	RHMW12A-WGN01LF-2401	1/5/2024	Primary	<0.42	U	<0.42	U	<0.42	U	<0.042	U	<0.042	U	<0.042	U	<0.042	U	<0.083	U	<0.042	U	<0.42	U	<0.42	U	<0.042	U	<0.42	U	<0.42	U
RHMW12A	APPL	24B0081	RHMW12A-WGN01LF-2402	2/12/2024	Primary	-		-		-		-		-		-		-		-		-		-		-		-		-		-	
RHMW12A	Energy	B24020801	RHMW12A-WGN01LF-2402	2/12/2024	Primary	-		-		-		-		-		-		-		-		-		-		-		-		-		-	
RHMW12A	SGS Anchorage	1240595	RHMW12A-WGN01LF-2402	2/12/2024	Primary	-		-		-		-		-		-		-		-		-		-		-		-		-		-	
RHMW12A	SGS Orlando	FC13346	RHMW12A-WGN01LF-2402	2/12/2024	Primary	<0.42	U	<0.42	U	<0.42	U	<0.042	U	<0.042	U	<0.042	U	<0.042	U	<0.083	U	<0.042	U	<0.42	U	<0.42	U	<0.042	U	<0.42	U	<0.42	U
RHMW12A	SGS Anchorage	1241067	RHMW12A-WGN01LF-2403	3/18/2024	Primary	-		-		-		-		-		-		-		-		-		-		-		-		-		-	
RHMW12A	SGS Orlando	FC14185	RHMW12A-WGN01LF-2403	3/18/2024	Primary	<0.4	U	<0.4	U	<0.4	U	<0.04	U	<0.04	U	<0.04	U	<0.04	U	<0.08	U	<0.04	U	<0.4	U	<0.4	U	<0.04	U	<0.4	U	<0.4	U

Notes:
 See Data Legend

App. B.3.1 Groundwater Analytical Data: Red Hill Bulk Fuel Storage Facility
 Consolidated Sampling Program & Groundwater Protection Plan-Defueling Sampling
 Groundwater Sampling: RHMW12A

						Fuel Additive		Lead Scavengers				Natural Attenuation Parameters				
						2-(2-Methoxyethoxy)-ethanol ⁵	Phenol	1,2-Dibromoethane	1,2-Dichloroethane	Methane	Total Organic Carbon	NV Dissolved Organic Carbon				
						CAS No.	108-95-2	106-93-4	107-06-2	74-82-8	TOC					
						Method	SW8270	8011	8260	RSK 175	9060	9060				
						DOH Tier 1 EAL	300	0.04	5	—	—	—				
						Units	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L				
						Minimum	ND	ND	ND	ND	297	323				
						Maximum	ND	ND	ND	ND	305	395				
Location	Lab	SDG	Sample ID	Sampling Date	Type	Result	Result	Result	Result	Result	Result	Result	Result			
RHMW12A	SGS Orlando	FC12420	RHMW12A-WGN01LF-2401	1/5/2024	Primary	—	<2	U	<0.014	U	—	<0.25	U	—	—	—
RHMW12A	APPL	24B0081	RHMW12A-WGN01LF-2402	2/12/2024	Primary	<80	U	—	—	—	—	—	—	—	—	—
RHMW12A	Energy	B24020801	RHMW12A-WGN01LF-2402	2/12/2024	Primary	—	—	—	—	—	—	—	—	—	—	—
RHMW12A	SGS Anchorage	1240595	RHMW12A-WGN01LF-2402	2/12/2024	Primary	—	—	—	—	—	—	305	J	395	J	J
RHMW12A	SGS Orlando	FC13346	RHMW12A-WGN01LF-2402	2/12/2024	Primary	—	<2	U	<0.015	U	—	<0.25	U	—	—	—
RHMW12A	SGS Anchorage	1241067	RHMW12A-WGN01LF-2403	3/18/2024	Primary	—	—	—	—	—	—	297	J	323	J	J
RHMW12A	SGS Orlando	FC14185	RHMW12A-WGN01LF-2403	3/18/2024	Primary	—	<1.9	U	<0.014	U	—	<0.25	U	—	—	—

Notes:
 See Data Legend

App. B.3.1 Groundwater Analytical Data: Red Hill Bulk Fuel Storage Facility
 Consolidated Sampling Program & Groundwater Protection Plan-Defueling Sampling
 Groundwater Sampling: RHMW13

						Total Petroleum Hydrocarbons					Volatile Organic Compounds				Polycyclic Aromatic Hydrocarbons (PAHs) - AOC/LTM		
						TPH-g PHCC6C10	TPH-d ⁴ PHCC10C24	TPH-o ⁴ PHCC24C40	TPH-d with Silica Gel Cleanup ³ PHCC10C24SGC	TPH-o with Silica Gel Cleanup ³ PHCC24C40SGC	Benzene 71-43-2	Ethylbenzene 100-41-4	Toluene 108-88-3	Xylenes 1330-20-7	1-Methylnaphthalene 90-12-0	2-Methylnaphthalene 91-57-6	Naphthalene 91-20-3
Method						8260	8015	8015	8015	8015	8260	8260	8260	8260	8270 SIM	8270 SIM	8270 SIM
DOH Tier 1 EAL						300	400	500	—	—	5	30	40	20	10	10	17
Units						µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
Minimum						ND	ND	ND	—	—	ND	ND	ND	ND	ND	ND	ND
Maximum						ND	ND	ND	—	—	ND	ND	ND	ND	ND	ND	ND
Location	Lab	SDG	Sample ID	Sampling Date	Type	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result
RHMW13-04	APPL	24B0117	RHMW13-04-WGN01G-2402	2/16/2024	Primary	—	—	—	—	—	—	—	—	—	—	—	—
RHMW13-04	Energy	B24021107	RHMW13-04-WGN01G-2402	2/16/2024	Primary	—	<141 U	<189 U	—	—	—	—	—	—	—	—	—
RHMW13-04	SGS Anchorage	1240674	RHMW13-04-WGN01G-2402	2/16/2024	Primary	—	—	—	—	—	—	—	—	—	—	—	—
RHMW13-04	SGS Orlando	FC13462	RHMW13-04-WGN01G-2402	2/16/2024	Primary	<50 U	<100 U	<170 U	—	<0.5 U	<0.5 U	<0.5 U	<1.5 U	<0.42 U	<0.42 U	<0.42 U	U
RHMW13-04	SGS Anchorage	1241067	RHMW13-04-WGN01G-2403	3/18/2024	Primary	—	—	—	—	—	—	—	—	—	—	—	—
RHMW13-04	SGS Orlando	FC14185	RHMW13-04-WGN01G-2403	3/18/2024	Primary	<50 U	<100 U	<160 U	—	<0.5 U	<0.5 U	<0.5 U	<1.5 U	<0.4 U	<0.4 U	<0.4 U	U

Notes:
 See Data Legend

App. B.3.1 Groundwater Analytical Data: Red Hill Bulk Fuel Storage Facility
 Consolidated Sampling Program & Groundwater Protection Plan-Defueling Sampling
 Groundwater Sampling: RHMW13

						Polycyclic Aromatic Hydrocarbons (PAHs) - NOI																	
						Acenaphthene (SIM)	Acenaphthylene (SIM)	Anthracene (SIM)	Benzo(a)anthracene (SIM)	Benzo(a)pyrene (SIM)	Benzo(b)fluoranthene (SIM)	Benzo(g,h,i)perylene (SIM)	Benzo(k)fluoranthene (SIM)	Chrysene (SIM)	Dibenzo(a,h)anthracene (SIM)	Fluoranthene (SIM)	Fluorene (SIM)	Indeno(1,2,3-cd)pyrene (SIM)	Phenanthrene (SIM)	Pyrene (SIM)			
Analyte	CAS No.	Method	DOH Tier 1 EAL	Units	Minimum	Maximum	83-32-9	208-96-8	120-12-7	56-55-3	50-32-8	205-99-2	191-24-2	207-08-9	218-01-9	53-70-3	206-44-0	86-73-7	193-39-5	85-01-8	129-00-0		
Method	8270SIM	8270SIM	8270SIM	8270SIM	8270SIM	8270SIM	20	240	0.18	0.029	0.2	0.22	0.13	0.4	1	0.022	13	240	0.095	210	68		
Units	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND		
Minimum	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND		
Maximum	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND		
Location	Lab	SDG	Sample ID	Sampling Date	Type	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result		
RHMW13-04	APPL	24B0117	RHMW13-04-WGN01G-2402	2/16/2024	Primary	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
RHMW13-04	Energy	B24021107	RHMW13-04-WGN01G-2402	2/16/2024	Primary	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
RHMW13-04	SGS Anchorage	1240674	RHMW13-04-WGN01G-2402	2/16/2024	Primary	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
RHMW13-04	SGS Orlando	FC13462	RHMW13-04-WGN01G-2402	2/16/2024	Primary	<0.42	U	<0.42	U	<0.42	U	<0.042	U	<0.042	U	<0.042	U	<0.083	U	<0.042	U	<0.42	U
RHMW13-04	SGS Anchorage	1241067	RHMW13-04-WGN01G-2403	3/18/2024	Primary	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
RHMW13-04	SGS Orlando	FC14185	RHMW13-04-WGN01G-2403	3/18/2024	Primary	<0.4	U	<0.4	U	<0.4	U	<0.04	U	<0.04	U	<0.04	U	<0.04	U	<0.4	U	<0.4	U

Notes:
 See Data Legend

App. B.3.1 Groundwater Analytical Data: Red Hill Bulk Fuel Storage Facility
 Consolidated Sampling Program & Groundwater Protection Plan-Defueling Sampling
 Groundwater Sampling: RHMW13

						Fuel Additive		Lead Scavengers				Natural Attenuation Parameters			
						2-(2-Methoxyethoxy)-ethanol ⁵	Phenol	1,2-Dibromoethane	1,2-Dichloroethane	Methane	Total Organic Carbon	NV Dissolved Organic Carbon			
						CAS No.	111-77-3	108-95-2	106-93-4	107-06-2	74-82-8	TOC			
						Method	8270D	SW8270	8011	8260	RSK 175	9060	9060		
						DOH Tier 1 EAL	800	300	0.04	5	—	—	—		
						Units	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L		
						Minimum	ND	ND	—	—	ND	349	675		
						Maximum	ND	ND	—	—	ND	454	919		
Location	Lab	SDG	Sample ID	Sampling Date	Type	Result	Result	Result	Result	Result	Result	Result	Result		
RHMW13-04	APPL	24B0117	RHMW13-04-WGN01G-2402	2/16/2024	Primary	<80	UJ	—	—	—	—	—	—		
RHMW13-04	Energy	B24021107	RHMW13-04-WGN01G-2402	2/16/2024	Primary	—	—	—	—	—	—	—	—		
RHMW13-04	SGS Anchorage	1240674	RHMW13-04-WGN01G-2402	2/16/2024	Primary	—	—	—	—	—	349	J	675 J		
RHMW13-04	SGS Orlando	FC13462	RHMW13-04-WGN01G-2402	2/16/2024	Primary	—	<2 U	—	—	<0.25 U	—	—	—		
RHMW13-04	SGS Anchorage	1241067	RHMW13-04-WGN01G-2403	3/18/2024	Primary	—	—	—	—	—	454	J	919 J		
RHMW13-04	SGS Orlando	FC14185	RHMW13-04-WGN01G-2403	3/18/2024	Primary	—	<1.9 U	—	—	<0.25 U	—	—	—		

Notes:
 See Data Legend

App. B.3.1 Groundwater Analytical Data: Red Hill Bulk Fuel Storage Facility
 Consolidated Sampling Program & Groundwater Protection Plan-Defueling Sampling
 Groundwater Sampling: RHMW14-03

						Total Petroleum Hydrocarbons					Volatile Organic Compounds				Polycyclic Aromatic Hydrocarbons (PAHs) - AOC/LTM		
						TPH-g PHCC6C10	TPH-d ⁴ PHCC10C24	TPH-o ⁴ PHCC24C40	TPH-d with Silica Gel Cleanup ³ PHCC10C24SGC	TPH-o with Silica Gel Cleanup ³ PHCC24C40SGC	Benzene 71-43-2	Ethylbenzene 100-41-4	Toluene 108-88-3	Xylenes 1330-20-7	1-Methylnaphthalene 90-12-0	2-Methylnaphthalene 91-57-6	Naphthalene 91-20-3
Method						8260	8015	8015	8015	8015	8260	8260	8260	8260	8270 SIM	8270 SIM	8270 SIM
DOH Tier 1 EAL						300	400	500	—	—	5	30	40	20	10	10	17
Units						µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
Minimum						ND	ND	ND	—	—	ND	ND	ND	ND	ND	ND	ND
Maximum						ND	ND	ND	—	—	ND	ND	ND	ND	ND	ND	ND
Location	Lab	SDG	Sample ID	Sampling Date	Type	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result
RHMW14-03	APPL	24B0042	RHMW14-03-WGN01G-2402	2/7/2024	Primary	—	—	—	—	—	—	—	—	—	—	—	—
RHMW14-03	Energy	B24020580	RHMW14-03-WGN01G-2402	2/7/2024	Primary	—	<141 U	<189 U	—	—	—	—	—	—	—	—	—
RHMW14-03	SGS Anchorage	1240512	RHMW14-03-WGN01G-2402	2/7/2024	Primary	—	—	—	—	—	—	—	—	—	—	—	—
RHMW14-03	SGS Orlando	FC13229	RHMW14-03-WGN01G-2402	2/7/2024	Primary	<50 U	<100 U	<170 U	—	<0.5 U	<0.5 U	<0.5 U	<1.5 U	<0.42 U	<0.42 U	<0.42 U	<0.42 U
RHMW14-03	SGS Anchorage	1241012	RHMW14-03-WGN01G-2403	3/13/2024	Primary	—	—	—	—	—	—	—	—	—	—	—	—
RHMW14-03	SGS Orlando	FC14092	RHMW14-03-WGN01G-2403	3/13/2024	Primary	<50 U	<100 U	<170 U	—	<0.5 U	<0.5 U	<0.5 U	<1.5 U	<0.42 U	<0.42 U	<0.42 U	<0.42 U

Notes:
 See Data Legend

App. B.3.1 Groundwater Analytical Data: Red Hill Bulk Fuel Storage Facility
 Consolidated Sampling Program & Groundwater Protection Plan-Defueling Sampling
 Groundwater Sampling: RHMW14-03

						Polycyclic Aromatic Hydrocarbons (PAHs) - NOI															
						Acenaphthene (SIM)	Acenaphthylene (SIM)	Anthracene (SIM)	Benzo(a)anthracene (SIM)	Benzo(a)pyrene (SIM)	Benzo(b)fluoranthene (SIM)	Benzo(g,h,i)perylene (SIM)	Benzo(k)fluoranthene (SIM)	Chrysene (SIM)	Dibenzo(a,h)anthracene (SIM)	Fluoranthene (SIM)	Fluorene (SIM)	Indeno(1,2,3-cd)pyrene (SIM)	Phenanthrene (SIM)	Pyrene (SIM)	
						83-32-9	208-96-8	120-12-7	56-55-3	50-32-8	205-99-2	191-24-2	207-08-9	218-01-9	53-70-3	206-44-0	86-73-7	193-39-5	85-01-8	129-00-0	
						8270SIM	8270SIM	8270SIM	8270SIM	8270SIM	8270SIM	8270SIM	8270SIM	8270SIM	8270SIM	8270SIM	8270SIM	8270SIM	8270SIM	8270SIM	
						20	240	0.18	0.029	0.2	0.22	0.13	0.4	1	0.022	13	240	0.095	210	68	
						µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	
						ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
						ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
Location	Lab	SDG	Sample ID	Sampling Date	Type	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	
RHMW14-03	APPL	24B0042	RHMW14-03-WGN01G-2402	2/7/2024	Primary	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
RHMW14-03	Energy	B24020580	RHMW14-03-WGN01G-2402	2/7/2024	Primary	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
RHMW14-03	SGS Anchorage	1240512	RHMW14-03-WGN01G-2402	2/7/2024	Primary	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
RHMW14-03	SGS Orlando	FC13229	RHMW14-03-WGN01G-2402	2/7/2024	Primary	<0.42	U	<0.42	U	<0.42	U	<0.042	U	<0.042	UJ	<0.042	U	<0.042	UJ	<0.083	U
RHMW14-03	SGS Anchorage	1241012	RHMW14-03-WGN01G-2403	3/13/2024	Primary	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
RHMW14-03	SGS Orlando	FC14092	RHMW14-03-WGN01G-2403	3/13/2024	Primary	<0.42	U	<0.42	U	<0.42	U	<0.042	U	<0.042	U	<0.042	U	<0.042	UJ	<0.042	U

Notes:
 See Data Legend

App. B.3.1 Groundwater Analytical Data: Red Hill Bulk Fuel Storage Facility
 Consolidated Sampling Program & Groundwater Protection Plan-Defueling Sampling
 Groundwater Sampling: RHMW14-03

						Fuel Additive		Lead Scavengers				Natural Attenuation Parameters			
						2-(2-Methoxyethoxy)-ethanol ⁵	Phenol	1,2-Dibromoethane	1,2-Dichloroethane	Methane	Total Organic Carbon	NV Dissolved Organic Carbon			
						CAS No.	108-95-2	106-93-4	107-06-2	74-82-8	TOC				
						Method	SW8270	8011	8260	RSK 175	9060	9060			
						DOH Tier 1 EAL	300	0.04	5	—	—	—			
						Units	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L			
						Minimum	ND	—	—	ND	ND	ND			
						Maximum	ND	—	—	ND	ND	ND			
Location	Lab	SDG	Sample ID	Sampling Date	Type	Result	Result	Result	Result	Result	Result	Result	Result		
RHMW14-03	APPL	24B0042	RHMW14-03-WGN01G-2402	2/7/2024	Primary	<80	U	—	—	—	—	—	—		
RHMW14-03	Energy	B24020580	RHMW14-03-WGN01G-2402	2/7/2024	Primary	—	—	—	—	—	—	—	—		
RHMW14-03	SGS Anchorage	1240512	RHMW14-03-WGN01G-2402	2/7/2024	Primary	—	—	—	—	—	<750	U	<750 U		
RHMW14-03	SGS Orlando	FC13229	RHMW14-03-WGN01G-2402	2/7/2024	Primary	—	<2 U	—	—	<0.25	U	—	—		
RHMW14-03	SGS Anchorage	1241012	RHMW14-03-WGN01G-2403	3/13/2024	Primary	—	—	—	—	—	<750	U	<750 U		
RHMW14-03	SGS Orlando	FC14092	RHMW14-03-WGN01G-2403	3/13/2024	Primary	—	<1.9 U	—	—	<0.25	U	—	—		

Notes:
 See Data Legend

App. B.3.1 Groundwater Analytical Data: Red Hill Bulk Fuel Storage Facility
 Consolidated Sampling Program & Groundwater Protection Plan-Defueling Sampling
 Groundwater Sampling: RHMW15-05

						Total Petroleum Hydrocarbons					Volatile Organic Compounds				Polycyclic Aromatic Hydrocarbons (PAHs) - AOC/LTM		
						TPH-g PHCC6C10	TPH-d ⁴ PHCC10C24	TPH-o ⁴ PHCC24C40	TPH-d with Silica Gel Cleanup ³ PHCC10C24SGC	TPH-o with Silica Gel Cleanup ³ PHCC24C40SGC	Benzene 71-43-2	Ethylbenzene 100-41-4	Toluene 108-88-3	Xylenes 1330-20-7	1-Methylnaphthalene 90-12-0	2-Methylnaphthalene 91-57-6	Naphthalene 91-20-3
Method						8260	8015	8015	8015	8015	8260	8260	8260	8260	8270 SIM	8270 SIM	8270 SIM
DOH Tier 1 EAL						300	400	500	—	—	5	30	40	20	10	10	17
Units						µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
Minimum						ND	ND	ND	—	—	ND	ND	ND	ND	ND	ND	ND
Maximum						ND	ND	ND	—	—	ND	ND	ND	ND	ND	ND	ND
Location	Lab	SDG	Sample ID	Sampling Date	Type	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result
RHMW15-05	APPL	24B0029	RHMW15-05-WGN01G-2402	2/5/2024	Primary	—	—	—	—	—	—	—	—	—	—	—	—
RHMW15-05	Energy	B24020306	RHMW15-05-WGN01G-2402	2/5/2024	Primary	—	<141 U	<141 U	—	—	—	—	—	—	—	—	—
RHMW15-05	SGS Anchorage	1240462	RHMW15-05-WGN01G-2402	2/5/2024	Primary	—	—	—	—	—	—	—	—	—	—	—	—
RHMW15-05	SGS Orlando	FC13124	RHMW15-05-WGN01G-2402	2/5/2024	Primary	<50 U	<100 U	<160 U	—	<0.5 U	<0.5 U	<0.5 U	<1.5 U	<0.42 U	<0.42 U	<0.42 U	<0.42 U
RHMW15-05	SGS Anchorage	1240955	RHMW15-05-WGN01G-2403	3/11/2024	Primary	—	—	—	—	—	—	—	—	—	—	—	—
RHMW15-05	SGS Orlando	FC14005	RHMW15-05-WGN01G-2403	3/11/2024	Primary	<50 U	<100 U	<160 U	—	<0.5 U	<0.5 U	<0.5 U	<1.5 U	<0.42 U	<0.42 U	<0.42 U	<0.42 U

Notes:
 See Data Legend

App. B.3.1 Groundwater Analytical Data: Red Hill Bulk Fuel Storage Facility
 Consolidated Sampling Program & Groundwater Protection Plan-Defueling Sampling
 Groundwater Sampling: RHMW15-05

						Polycyclic Aromatic Hydrocarbons (PAHs) - NOI																			
						Acenaphthene (SIM)	Acenaphthylene (SIM)	Anthracene (SIM)	Benzo(a)anthracene (SIM)	Benzo(a)pyrene (SIM)	Benzo(b)fluoranthene (SIM)	Benzo(g,h,i)perylene (SIM)	Benzo(k)fluoranthene (SIM)	Chrysene (SIM)	Dibenzo(a,h)anthracene (SIM)	Fluoranthene (SIM)	Fluorene (SIM)	Indeno(1,2,3-cd)pyrene (SIM)	Phenanthrene (SIM)	Pyrene (SIM)					
Analyte	CAS No.	Method	DOH Tier 1 EAL	Units	Minimum	Maximum																			
	83-32-9	8270SIM	20	µg/L	ND	ND																			
	208-96-8	8270SIM	240	µg/L	ND	ND																			
	120-12-7	8270SIM	0.18	µg/L	ND	ND																			
	56-55-3	8270SIM	0.029	µg/L	ND	ND																			
	50-32-8	8270SIM	0.2	µg/L	ND	ND																			
	205-99-2	8270SIM	0.22	µg/L	ND	ND																			
	191-24-2	8270SIM	0.13	µg/L	ND	ND																			
	207-08-9	8270SIM	0.4	µg/L	ND	ND																			
	218-01-8	8270SIM	1	µg/L	ND	ND																			
	53-70-3	8270SIM	0.022	µg/L	ND	ND																			
	206-44-0	8270SIM	13	µg/L	ND	ND																			
	86-73-7	8270SIM	240	µg/L	ND	ND																			
	193-39-5	8270SIM	0.095	µg/L	ND	ND																			
	85-01-8	8270SIM	210	µg/L	ND	ND																			
	129-00-0	8270SIM	68	µg/L	ND	ND																			
Location	Lab	SDG	Sample ID	Sampling Date	Type	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	
RHMW15-05	APPL	24B0029	RHMW15-05-WGN01G-2402	2/5/2024	Primary	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
RHMW15-05	Energy	B24020306	RHMW15-05-WGN01G-2402	2/5/2024	Primary	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
RHMW15-05	SGS Anchorage	1240462	RHMW15-05-WGN01G-2402	2/5/2024	Primary	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
RHMW15-05	SGS Orlando	FC13124	RHMW15-05-WGN01G-2402	2/5/2024	Primary	<0.42	U	<0.42	U	<0.42	U	<0.042	U	<0.042	U	<0.042	U	<0.083	U	<0.042	U	<0.42	U	<0.42	U
RHMW15-05	SGS Anchorage	1240955	RHMW15-05-WGN01G-2403	3/11/2024	Primary	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
RHMW15-05	SGS Orlando	FC14005	RHMW15-05-WGN01G-2403	3/11/2024	Primary	<0.42	U	<0.42	U	<0.42	U	<0.042	U	<0.042	U	<0.042	U	<0.083	U	<0.042	U	<0.42	U	<0.42	U

Notes:
 See Data Legend

App. B.3.1 Groundwater Analytical Data: Red Hill Bulk Fuel Storage Facility
 Consolidated Sampling Program & Groundwater Protection Plan-Defueling Sampling
 Groundwater Sampling: RHMW15-05

						Fuel Additive		Lead Scavengers				Natural Attenuation Parameters			
						2-(2-Methoxyethoxy)-ethanol ⁵	Phenol	1,2-Dibromoethane	1,2-Dichloroethane	Methane	Total Organic Carbon	NV Dissolved Organic Carbon			
						CAS No.	108-95-2	106-93-4	107-06-2	74-82-8	TOC	Carbon			
						Method	SW8270	8011	8260	RSK 175	9060	9060			
						DOH Tier 1 EAL	300	0.04	5	—	—	—			
						Units	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L			
						Minimum	ND	—	—	ND	ND	499			
						Maximum	ND	—	—	ND	420	916			
Location	Lab	SDG	Sample ID	Sampling Date	Type	Result	Result	Result	Result	Result	Result	Result	Result		
RHMW15-05	APPL	24B0029	RHMW15-05-WGN01G-2402	2/5/2024	Primary	<80	UJ	—	—	—	—	—	—		
RHMW15-05	Energy	B24020306	RHMW15-05-WGN01G-2402	2/5/2024	Primary	—	—	—	—	—	—	—	—		
RHMW15-05	SGS Anchorage	1240462	RHMW15-05-WGN01G-2402	2/5/2024	Primary	—	—	—	—	—	420	J	499 J		
RHMW15-05	SGS Orlando	FC13124	RHMW15-05-WGN01G-2402	2/5/2024	Primary	—	<2 U	—	—	<0.25 U	—	—	—		
RHMW15-05	SGS Anchorage	1240955	RHMW15-05-WGN01G-2403	3/11/2024	Primary	—	—	—	—	—	<750 U	—	916 J+		
RHMW15-05	SGS Orlando	FC14005	RHMW15-05-WGN01G-2403	3/11/2024	Primary	—	<1.9 U	—	—	<0.25 U	—	—	—		

Notes:
 See Data Legend

App. B.3.1 Groundwater Analytical Data: Red Hill Bulk Fuel Storage Facility
 Consolidated Sampling Program & Groundwater Protection Plan-Defueling Sampling
 Groundwater Sampling: RHMW16

						Total Petroleum Hydrocarbons					Volatile Organic Compounds				Polycyclic Aromatic Hydrocarbons (PAHs) - AOC/LTM		
						TPH-g PHCC6C10	TPH-d ⁴ PHCC10C24	TPH-o ⁴ PHCC24C40	TPH-d with Silica Gel Cleanup ³ PHCC10C24SGC	TPH-o with Silica Gel Cleanup ³ PHCC24C40SGC	Benzene 71-43-2	Ethylbenzene 100-41-4	Toluene 108-88-3	Xylenes 1330-20-7	1-Methylnaphthalene 90-12-0	2-Methylnaphthalene 91-57-6	Naphthalene 91-20-3
Method						8260	8015	8015	8015	8015	8260	8260	8260	8260	8270 SIM	8270 SIM	8270 SIM
DOH Tier 1 EAL						300	400	500	—	—	5	30	40	20	10	10	17
Units						µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
Minimum						ND	ND	ND	—	—	ND	ND	ND	ND	ND	ND	ND
Maximum						ND	ND	ND	—	—	ND	ND	ND	ND	ND	ND	ND
Location	Lab	SDG	Sample ID	Sampling Date	Type	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result
RHMW16	APPL	24B0029	RHMW16-WGN01LF-2402	2/5/2024	Primary	—	—	—	—	—	—	—	—	—	—	—	—
RHMW16	Energy	B24020306	RHMW16-WGN01LF-2402	2/5/2024	Primary	—	<141 U	<141 U	—	—	—	—	—	—	—	—	—
RHMW16	SGS Anchorage	1240462	RHMW16-WGN01LF-2402	2/5/2024	Primary	—	—	—	—	—	—	—	—	—	—	—	—
RHMW16	SGS Orlando	FC13124	RHMW16-WGN01LF-2402	2/5/2024	Primary	<50 U	<100 U	<170 U	—	<0.5 U	<0.5 U	<0.5 U	<1.5 U	<0.4 U	<0.4 U	<0.4 U	
RHMW16	SGS Anchorage	1240955	RHMW16-WGN01LF-2403	3/11/2024	Primary	—	—	—	—	—	—	—	—	—	—	—	
RHMW16	SGS Orlando	FC14005	RHMW16-WGN01LF-2403	3/11/2024	Primary	<50 U	<96 U	<150 U	—	<0.5 U	<0.5 U	<0.5 U	<1.5 U	<0.42 U	<0.42 U	<0.42 U	

Notes:
 See Data Legend

App. B.3.1 Groundwater Analytical Data: Red Hill Bulk Fuel Storage Facility
 Consolidated Sampling Program & Groundwater Protection Plan-Defueling Sampling
 Groundwater Sampling: RHMW16

						Polycyclic Aromatic Hydrocarbons (PAHs) - NOI															
						Acenaphthene (SIM)	Acenaphthylene (SIM)	Anthracene (SIM)	Benzo(a)anthracene (SIM)	Benzo(a)pyrene (SIM)	Benzo(b)fluoranthene (SIM)	Benzo(g,h,i)perylene (SIM)	Benzo(k)fluoranthene (SIM)	Chrysene (SIM)	Dibenzo(a,h)anthracene (SIM)	Fluoranthene (SIM)	Fluorene (SIM)	Indeno(1,2,3-cd)pyrene (SIM)	Phenanthrene (SIM)	Pyrene (SIM)	
						83-32-9	208-96-8	120-12-7	56-55-3	50-32-8	205-99-2	191-24-2	207-08-9	218-01-9	53-70-3	206-44-0	86-73-7	193-39-5	85-01-8	129-00-0	
						8270SIM	8270SIM	8270SIM	8270SIM	8270SIM	8270SIM	8270SIM	8270SIM	8270SIM	8270SIM	8270SIM	8270SIM	8270SIM	8270SIM	8270SIM	
						20	240	0.18	0.029	0.2	0.22	0.13	0.4	1	0.022	13	240	0.095	210	68	
						µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	
						ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
						ND	ND	ND	0.043	ND	0.042	ND	0.036	0.036	ND	ND	ND	ND	ND	ND	
Location	Lab	SDG	Sample ID	Sampling Date	Type	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	
RHMW16	APPL	24B0029	RHMW16-WGN01LF-2402	2/5/2024	Primary	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
RHMW16	Energy	B24020306	RHMW16-WGN01LF-2402	2/5/2024	Primary	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
RHMW16	SGS Anchorage	1240462	RHMW16-WGN01LF-2402	2/5/2024	Primary	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
RHMW16	SGS Orlando	FC13124	RHMW16-WGN01LF-2402	2/5/2024	Primary	<0.4	U	<0.4	U	<0.4	U	<0.04	U	<0.04	UJ	<0.04	U	<0.04	U	<0.4	U
RHMW16	SGS Anchorage	1240955	RHMW16-WGN01LF-2403	3/11/2024	Primary	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
RHMW16	SGS Orlando	FC14005	RHMW16-WGN01LF-2403	3/11/2024	Primary	<0.42	U	<0.42	U	<0.42	U	0.043	J	<0.042	U	0.042	J	<0.042	U	<0.42	U

Notes:
 See Data Legend

App. B.3.1 Groundwater Analytical Data: Red Hill Bulk Fuel Storage Facility
 Consolidated Sampling Program & Groundwater Protection Plan-Defueling Sampling
 Groundwater Sampling: RHMW16

						Fuel Additive		Lead Scavengers				Natural Attenuation Parameters			
						2-(2-Methoxyethoxy)-ethanol ⁵	Phenol	1,2-Dibromoethane	1,2-Dichloroethane	Methane	Total Organic Carbon	NV Dissolved Organic Carbon			
Analyte						111-77-3	108-95-2	106-93-4	107-06-2	74-82-8	TOC	Carbon			
CAS No.						8270D	SW8270	8011	8260	RSK 175	9060	9060			
Method						800	300	0.04	5	—	—	—			
DOH Tier 1 EAL						µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L			
Units						ND	ND	—	—	ND	ND	363			
Minimum						ND	ND	—	—	ND	318	1480			
Maximum						Result	Result	Result	Result	Result	Result	Result			
RHMW16	APPL	24B0029	RHMW16-WGN01LF-2402	2/5/2024	Primary	<80	UJ	—	—	—	—	—	—		
RHMW16	Energy	B24020306	RHMW16-WGN01LF-2402	2/5/2024	Primary	—	—	—	—	—	—	—	—		
RHMW16	SGS Anchorage	1240462	RHMW16-WGN01LF-2402	2/5/2024	Primary	—	—	—	—	—	318	J	363 J		
RHMW16	SGS Orlando	FC13124	RHMW16-WGN01LF-2402	2/5/2024	Primary	—	<2 U	—	—	<0.25 U	—	—	—		
RHMW16	SGS Anchorage	1240955	RHMW16-WGN01LF-2403	3/11/2024	Primary	—	—	—	—	—	<750 U	—	1480 J*		
RHMW16	SGS Orlando	FC14005	RHMW16-WGN01LF-2403	3/11/2024	Primary	—	<2 U	—	—	<0.25 U	—	—	—		

Notes:
 See Data Legend

App. B.3.1 Groundwater Analytical Data: Red Hill Bulk Fuel Storage Facility
 Consolidated Sampling Program & Groundwater Protection Plan-Defueling Sampling
 Groundwater Sampling: RHMW17

						Total Petroleum Hydrocarbons					Volatile Organic Compounds				Polycyclic Aromatic Hydrocarbons (PAHs) - AOC/LTM		
						TPH-g PHCC6C10	TPH-d ⁴ PHCC10C24	TPH-o ⁴ PHCC24C40	TPH-d with Silica Gel Cleanup ³ PHCC10C24SGC	TPH-o with Silica Gel Cleanup ³ PHCC24C40SGC	Benzene 71-43-2	Ethylbenzene 100-41-4	Toluene 108-88-3	Xylenes 1330-20-7	1-Methylnaphthalene 90-12-0	2-Methylnaphthalene 91-57-6	Naphthalene 91-20-3
Method						8260	8015	8015	8015	8015	8260	8260	8260	8260	8270 SIM	8270 SIM	8270 SIM
DOH Tier 1 EAL						300	400	500	—	—	5	30	40	20	10	10	17
Units						µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
Minimum						ND	ND	ND	—	—	ND	ND	ND	ND	ND	ND	ND
Maximum						ND	ND	ND	—	—	ND	ND	ND	ND	ND	ND	ND
Location	Lab	SDG	Sample ID	Sampling Date	Type	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result
RHMW17	APPL	24B0068	RHMW17-WGN01LF-2402	2/9/2024	Primary	—	—	—	—	—	—	—	—	—	—	—	—
RHMW17	APPL	24B0068	RHMW17-WGFD01LF-2402	2/9/2024	Field Duplicate	—	—	—	—	—	—	—	—	—	—	—	—
RHMW17	Energy	B24020703	RHMW17-WGN01LF-2402	2/9/2024	Primary	—	<141 U	<189 U	—	—	—	—	—	—	—	—	—
RHMW17	Energy	B24020703	RHMW17-WGFD01LF-2402	2/9/2024	Field Duplicate	—	<141 U	<189 U	—	—	—	—	—	—	—	—	—
RHMW17	SGS Anchorage	1240594	RHMW17-WGN01LF-2402	2/9/2024	Primary	—	—	—	—	—	—	—	—	—	—	—	—
RHMW17	SGS Orlando	FC13292	RHMW17-WGN01LF-2402	2/9/2024	Primary	<50 U	<100 U	<160 U	—	<0.5 U	<0.5 U	<0.5 U	<1.5 U	<0.4 U	<0.4 U	<0.4 U	<0.4 U
RHMW17	SGS Orlando	FC13292	RHMW17-WGFD01LF-2402	2/9/2024	Field Duplicate	<50 U	<100 U	<160 U	—	<0.5 U	<0.5 U	<0.5 U	<1.5 U	<0.4 U	<0.4 U	<0.4 U	<0.4 U
RHMW17	SGS Anchorage	1241067	RHMW17-WGN01LF-2403	3/18/2024	Primary	—	—	—	—	—	—	—	—	—	—	—	—
RHMW17	SGS Orlando	FC14185	RHMW17-WGN01LF-2403	3/18/2024	Primary	<50 U	<100 U	<160 U	—	<0.5 U	<0.5 U	<0.5 U	<1.5 U	<0.4 U	<0.4 U	<0.4 U	<0.4 U
RHMW17	SGS Orlando	FC14185	RHMW17-WGFD01LF-2403	3/18/2024	Field Duplicate	<50 U	<100 U	<170 U	—	<0.5 U	<0.5 U	<0.5 U	<1.5 U	<0.42 U	<0.42 U	<0.42 U	<0.42 U

Notes:
 See Data Legend

App. B.3.1 Groundwater Analytical Data: Red Hill Bulk Fuel Storage Facility
 Consolidated Sampling Program & Groundwater Protection Plan-Defueling Sampling
 Groundwater Sampling: RHMW17

						Polycyclic Aromatic Hydrocarbons (PAHs) - NOI															
						Acenaphthene (SIM)	Acenaphthylene (SIM)	Anthracene (SIM)	Benzo(a)anthracene (SIM)	Benzo(a)pyrene (SIM)	Benzo(b)fluoranthene (SIM)	Benzo(g,h,i)perylene (SIM)	Benzo(k)fluoranthene (SIM)	Chrysene (SIM)	Dibenzo(a,h)anthracene (SIM)	Fluoranthene (SIM)	Fluorene (SIM)	Indeno(1,2,3-cd)pyrene (SIM)	Phenanthrene (SIM)	Pyrene (SIM)	
						83-32-9	208-96-8	120-12-7	56-55-3	50-32-8	205-99-2	191-24-2	207-08-9	218-01-9	53-70-3	206-44-0	86-73-7	193-39-5	85-01-8	129-00-0	
						Method	8270SIM	8270SIM	8270SIM	8270SIM	8270SIM	8270SIM	8270SIM	8270SIM	8270SIM	8270SIM	8270SIM	8270SIM	8270SIM	8270SIM	8270SIM
						DOH Tier 1 EAL	20	240	0.18	0.029	0.2	0.22	0.13	0.4	1	0.022	13	240	0.095	210	68
						Units	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	
						Minimum	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
						Maximum	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
Location	Lab	SDG	Sample ID	Sampling Date	Type	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	
RHMW17	APPL	24B0068	RHMW17-WGN01LF-2402	2/9/2024	Primary	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
RHMW17	APPL	24B0068	RHMW17-WGFD01LF-2402	2/9/2024	Field Duplicate	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
RHMW17	Energy	B24020703	RHMW17-WGN01LF-2402	2/9/2024	Primary	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
RHMW17	Energy	B24020703	RHMW17-WGFD01LF-2402	2/9/2024	Field Duplicate	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
RHMW17	SGS Anchorage	1240594	RHMW17-WGN01LF-2402	2/9/2024	Primary	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
RHMW17	SGS Orlando	FC13292	RHMW17-WGN01LF-2402	2/9/2024	Primary	<0.4	U	<0.4	U	<0.4	U	<0.04	U	<0.04	U	<0.04	U	<0.04	U	<0.4	U
RHMW17	SGS Orlando	FC13292	RHMW17-WGFD01LF-2402	2/9/2024	Field Duplicate	<0.4	U	<0.4	U	<0.4	U	<0.04	U	<0.04	U	<0.04	U	<0.04	U	<0.4	U
RHMW17	SGS Anchorage	1241067	RHMW17-WGN01LF-2403	3/18/2024	Primary	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
RHMW17	SGS Orlando	FC14185	RHMW17-WGN01LF-2403	3/18/2024	Primary	<0.4	U	<0.4	U	<0.4	U	<0.04	U	<0.04	U	<0.04	U	<0.04	U	<0.4	U
RHMW17	SGS Orlando	FC14185	RHMW17-WGFD01LF-2403	3/18/2024	Field Duplicate	<0.42	U	<0.42	U	<0.42	U	<0.042	U	<0.042	U	<0.042	U	<0.042	U	<0.42	U

Notes:
 See Data Legend

App. B.3.1 Groundwater Analytical Data: Red Hill Bulk Fuel Storage Facility
 Consolidated Sampling Program & Groundwater Protection Plan-Defueling Sampling
 Groundwater Sampling: RHMW17

						Fuel Additive		Lead Scavengers				Natural Attenuation Parameters		
						2-(2-Methoxyethoxy)-ethanol ⁵	Phenol	1,2-Dibromoethane	1,2-Dichloroethane	Methane	Total Organic Carbon	NV Dissolved Organic Carbon		
						CAS No.	108-95-2	106-93-4	107-06-2	74-82-8	TOC	Carbon		
						Method	SW8270	8011	8260	RSK 175	9060	9060		
						DOH Tier 1 EAL	300	0.04	5	—	—	—		
						Units	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L		
						Minimum	ND	—	—	ND	316	379		
						Maximum	ND	—	—	0.22	373	490		
Location	Lab	SDG	Sample ID	Sampling Date	Type	Result	Result	Result	Result	Result	Result	Result		
RHMW17	APPL	24B0068	RHMW17-WGN01LF-2402	2/9/2024	Primary	<80	U	—	—	—	—	—		
RHMW17	APPL	24B0068	RHMW17-WGFD01LF-2402	2/9/2024	Field Duplicate	<80	U	—	—	—	—	—		
RHMW17	Energy	B24020703	RHMW17-WGN01LF-2402	2/9/2024	Primary	—	—	—	—	—	—	—		
RHMW17	Energy	B24020703	RHMW17-WGFD01LF-2402	2/9/2024	Field Duplicate	—	—	—	—	—	—	—		
RHMW17	SGS Anchorage	1240594	RHMW17-WGN01LF-2402	2/9/2024	Primary	—	—	—	—	—	373	J		
RHMW17	SGS Orlando	FC13292	RHMW17-WGN01LF-2402	2/9/2024	Primary	—	<2	U	—	0.22	J	—		
RHMW17	SGS Orlando	FC13292	RHMW17-WGFD01LF-2402	2/9/2024	Field Duplicate	—	<2	U	—	—	—	—		
RHMW17	SGS Anchorage	1241067	RHMW17-WGN01LF-2403	3/18/2024	Primary	—	—	—	—	—	316	J		
RHMW17	SGS Orlando	FC14185	RHMW17-WGN01LF-2403	3/18/2024	Primary	—	<1.9	U	—	<0.25	U	—		
RHMW17	SGS Orlando	FC14185	RHMW17-WGFD01LF-2403	3/18/2024	Field Duplicate	—	<1.9	U	—	—	—	—		

Notes:
 See Data Legend

App. B.3.1 Groundwater Analytical Data: Red Hill Bulk Fuel Storage Facility
 Consolidated Sampling Program & Groundwater Protection Plan-Defueling Sampling
 Groundwater Sampling: RHMW18

						Total Petroleum Hydrocarbons					Volatile Organic Compounds				Polycyclic Aromatic Hydrocarbons (PAHs) - AOC/LTM		
						TPH-g PHCC6C10	TPH-d ⁴ PHCC10C24	TPH-o ⁴ PHCC24C40	TPH-d with Silica Gel Cleanup ³ PHCC10C24SGC	TPH-o with Silica Gel Cleanup ³ PHCC24C40SGC	Benzene 71-43-2	Ethylbenzene 100-41-4	Toluene 108-88-3	Xylenes 1330-20-7	1-Methylnaphthalene 90-12-0	2-Methylnaphthalene 91-57-6	Naphthalene 91-20-3
Method						8260	8015	8015	8015	8015	8260	8260	8260	8260	8270 SIM	8270 SIM	8270 SIM
DOH Tier 1 EAL						300	400	500	—	—	5	30	40	20	10	10	17
Units						µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
Minimum						ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Maximum						ND	98	145	ND	ND	ND	ND	ND	ND	ND	ND	ND
Location	Lab	SDG	Sample ID	Sampling Date	Type	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result
RHMW18	APPL	24B0112	RHMW18-WGN01LF-2402	2/15/2024	Primary	—	—	—	—	—	—	—	—	—	—	—	—
RHMW18	Energy	B24021083	RHMW18-WGN01LF-2402	2/15/2024	Primary	—	98 J	145 J	<141 U	<199 U	—	—	—	—	—	—	—
RHMW18	SGS Anchorage	1240641	RHMW18-WGN01LF-2402	2/15/2024	Primary	—	—	—	—	—	—	—	—	—	—	—	—
RHMW18	SGS Orlando	FC13450	RHMW18-WGN01LF-2402	2/15/2024	Primary	<50 U	<100 U	<170 U	—	—	<0.5 U	<0.5 U	<0.5 U	<1.5 U	<0.42 U	<0.42 U	<0.42 U
RHMW18	SGS Anchorage	1241118	RHMW18-WGN01LF-2403	3/21/2024	Primary	—	—	—	—	—	—	—	—	—	—	—	—

Notes:
 See Data Legend

App. B.3.1 Groundwater Analytical Data: Red Hill Bulk Fuel Storage Facility
 Consolidated Sampling Program & Groundwater Protection Plan-Defueling Sampling
 Groundwater Sampling: RHMW18

						Polycyclic Aromatic Hydrocarbons (PAHs) - NOI																	
						Acenaphthene (SIM)	Acenaphthylene (SIM)	Anthracene (SIM)	Benzo(a)anthracene (SIM)	Benzo(a)pyrene (SIM)	Benzo(b)fluoranthene (SIM)	Benzo(g,h,i)perylene (SIM)	Benzo(k)fluoranthene (SIM)	Chrysene (SIM)	Dibenzo(a,h)anthracene (SIM)	Fluoranthene (SIM)	Fluorene (SIM)	Indeno(1,2,3-cd)pyrene (SIM)	Phenanthrene (SIM)	Pyrene (SIM)			
Analyte	CAS No.	Method	DOH Tier 1 EAL	Units	Minimum	Maximum																	
	83-32-9	8270SIM	20	µg/L	ND	ND																	
	208-96-8	8270SIM	240	µg/L	ND	ND																	
	120-12-7	8270SIM	0.18	µg/L	ND	ND																	
	56-55-3	8270SIM	0.029	µg/L	ND	ND																	
	50-32-8	8270SIM	0.2	µg/L	ND	ND																	
	205-99-2	8270SIM	0.22	µg/L	ND	ND																	
	191-24-2	8270SIM	0.13	µg/L	ND	ND																	
	207-08-9	8270SIM	0.4	µg/L	ND	ND																	
	218-01-9	8270SIM	1	µg/L	ND	ND																	
	53-70-3	8270SIM	0.022	µg/L	ND	ND																	
	206-44-0	8270SIM	13	µg/L	ND	ND																	
	86-73-7	8270SIM	240	µg/L	ND	ND																	
	193-39-5	8270SIM	0.095	µg/L	ND	ND																	
	85-01-8	8270SIM	210	µg/L	ND	ND																	
	129-00-0	8270SIM	68	µg/L	ND	ND																	
Location	Lab	SDG	Sample ID	Sampling Date	Type	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result
RHMW18	APPL	24B0112	RHMW18-WGN01LF-2402	2/15/2024	Primary	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
RHMW18	Energy	B24021083	RHMW18-WGN01LF-2402	2/15/2024	Primary	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
RHMW18	SGS Anchorage	1240641	RHMW18-WGN01LF-2402	2/15/2024	Primary	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
RHMW18	SGS Orlando	FC13450	RHMW18-WGN01LF-2402	2/15/2024	Primary	<0.42	U	<0.42	U	<0.42	U	<0.042	U	<0.042	U	<0.042	U	<0.083	U	<0.042	U	<0.42	U
RHMW18	SGS Anchorage	1241118	RHMW18-WGN01LF-2403	3/21/2024	Primary	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Notes:
 See Data Legend

App. B.3.1 Groundwater Analytical Data: Red Hill Bulk Fuel Storage Facility
 Consolidated Sampling Program & Groundwater Protection Plan-Defueling Sampling
 Groundwater Sampling: RHMW18

						Fuel Additive		Lead Scavengers				Natural Attenuation Parameters			
						2-(2- Methoxyethoxy)-ethanol ⁵	Phenol	1,2-Dibromoethane	1,2-Dichloroethane	Methane	Total Organic Carbon	NV Dissolved Organic Carbon			
						CAS No.	108-95-2	106-93-4	107-06-2	74-82-8	TOC	Carbon			
						Method	SW8270	8011	8260	RSK 175	9060	9060			
						DOH Tier 1 EAL	300	0.04	5	—	—	—			
						Units	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L			
						Minimum	ND	ND	ND	ND	ND	ND			
						Maximum	ND	ND	ND	ND	1000	988			
Location	Lab	SDG	Sample ID	Sampling Date	Type	Result	Result	Result	Result	Result	Result	Result	Result		
RHMW18	APFL	24B0112	RHMW18-WGN01LF-2402	2/15/2024	Primary	<80	UJ	—	—	—	—	—	—		
RHMW18	Energy	B24021083	RHMW18-WGN01LF-2402	2/15/2024	Primary	—	—	—	—	—	—	—	—		
RHMW18	SGS Anchorage	1240641	RHMW18-WGN01LF-2402	2/15/2024	Primary	—	—	—	—	—	1000	988	J		
RHMW18	SGS Orlando	FC13450	RHMW18-WGN01LF-2402	2/15/2024	Primary	—	<2 U	<0.015 U	<0.5 U	<0.25 U	—	—	—		
RHMW18	SGS Anchorage	1241118	RHMW18-WGN01LF-2403	3/21/2024	Primary	—	—	—	—	—	<750 U	<750 U	U		

Notes:
 See Data Legend

App. B.3.1 Groundwater Analytical Data: Red Hill Bulk Fuel Storage Facility
 Consolidated Sampling Program & Groundwater Protection Plan-Defueling Sampling
 Groundwater Sampling: RHMW19

						Total Petroleum Hydrocarbons					Volatile Organic Compounds				Polycyclic Aromatic Hydrocarbons (PAHs) - AOC/LTM		
						TPH-g PHCC6C10	TPH-d ⁴ PHCC10C24	TPH-o ⁴ PHCC24C40	TPH-d with Silica Gel Cleanup ³ PHCC10C24SGC	TPH-o with Silica Gel Cleanup ³ PHCC24C40SGC	Benzene 71-43-2	Ethylbenzene 100-41-4	Toluene 108-88-3	Xylenes 1330-20-7	1-Methylnaphthalene 90-12-0	2-Methylnaphthalene 91-57-6	Naphthalene 91-20-3
Method						8260	8015	8015	8015	8015	8260	8260	8260	8260	8270 SIM	8270 SIM	8270 SIM
DOH Tier 1 EAL						300	400	500	—	—	5	30	40	20	10	10	17
Units						µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
Minimum						ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Maximum						ND	89.2	186	ND	ND	ND	ND	ND	ND	ND	ND	ND
Location	Lab	SDG	Sample ID	Sampling Date	Type	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result
RHMW19	APPL	24B0042	RHMW19-WGN01LF-2402	2/7/2024	Primary	—	—	—	—	—	—	—	—	—	—	—	—
RHMW19	Energy	B24020580	RHMW19-WGN01LF-2402	2/7/2024	Primary	—	89.2	J	186	J	<141	U	<199	U	—	—	—
RHMW19	SGS Anchorage	1240512	RHMW19-WGN01LF-2402	2/7/2024	Primary	—	—	—	—	—	—	—	—	—	—	—	—
RHMW19	SGS Orlando	FC13229	RHMW19-WGN01LF-2402	2/7/2024	Primary	<50	U	<100	U	<170	U	—	—	—	—	—	—
RHMW19	SGS Anchorage	1240991	RHMW19-WGN01LF-2403	3/12/2024	Primary	—	—	—	—	—	—	—	—	—	—	—	—
RHMW19	SGS Orlando	FC14055	RHMW19-WGN01LF-2403	3/12/2024	Primary	<50	U	<100	U	<170	U	—	—	—	—	—	—

Notes:
 See Data Legend

App. B.3.1 Groundwater Analytical Data: Red Hill Bulk Fuel Storage Facility
 Consolidated Sampling Program & Groundwater Protection Plan-Defueling Sampling
 Groundwater Sampling: RHMW19

						Polycyclic Aromatic Hydrocarbons (PAHs) - NOI																															
						Acenaphthene (SIM)	Acenaphthylene (SIM)	Anthracene (SIM)	Benzo(a)anthracene (SIM)	Benzo(a)pyrene (SIM)	Benzo(b)fluoranthene (SIM)	Benzo(g,h,i)perylene (SIM)	Benzo(k)fluoranthene (SIM)	Chrysene (SIM)	Dibenzo(a,h)anthracene (SIM)	Fluoranthene (SIM)	Fluorene (SIM)	Indeno(1,2,3-cd)pyrene (SIM)	Phenanthrene (SIM)	Pyrene (SIM)																	
Analyte	CAS No.	Method	DOH Tier 1 EAL	Units	Minimum	Maximum																															
Location	Lab	SDG	Sample ID	Sampling Date	Type	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result										
RHMW19	APPL	24B0042	RHMW19-WGN01LF-2402	2/7/2024	Primary	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-										
RHMW19	Energy	B24020580	RHMW19-WGN01LF-2402	2/7/2024	Primary	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-										
RHMW19	SGS Anchorage	1240512	RHMW19-WGN01LF-2402	2/7/2024	Primary	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-										
RHMW19	SGS Orlando	FC13229	RHMW19-WGN01LF-2402	2/7/2024	Primary	<0.42	U	<0.42	U	<0.42	U	<0.042	U	<0.042	U	<0.042	UJ	<0.042	U	<0.042	UJ	<0.083	U	<0.042	U	<0.42	U	<0.42	U	<0.042	U	<0.42	U	<0.42	U	<0.42	U
RHMW19	SGS Anchorage	1240991	RHMW19-WGN01LF-2403	3/12/2024	Primary	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-										
RHMW19	SGS Orlando	FC14055	RHMW19-WGN01LF-2403	3/12/2024	Primary	<0.42	U	<0.42	U	<0.42	U	<0.042	U	<0.042	U	<0.042	U	<0.042	U	<0.042	U	<0.083	U	<0.042	U	<0.42	U	<0.42	U	<0.042	UJ	<0.42	U	<0.42	U		

Notes:
 See Data Legend

App. B.3.1 Groundwater Analytical Data: Red Hill Bulk Fuel Storage Facility
 Consolidated Sampling Program & Groundwater Protection Plan-Defueling Sampling
 Groundwater Sampling: RHMW19

						Fuel Additive		Lead Scavengers				Natural Attenuation Parameters			
						2-(2-Methoxyethoxy)-ethanol ⁵	Phenol	1,2-Dibromoethane	1,2-Dichloroethane	Methane	Total Organic Carbon	NV Dissolved Organic Carbon			
						CAS No.	108-95-2	106-93-4	107-06-2	74-82-8	TOC				
						Method	SW8270	8011	8260	RSK 175	9060	9060			
						DOH Tier 1 EAL	300	0.04	5	—	—	—			
						Units	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L			
						Minimum	ND	ND	—	0.16	ND	ND			
						Maximum	ND	ND	—	0.25	ND	1230			
Location	Lab	SDG	Sample ID	Sampling Date	Type	Result	Result	Result	Result	Result	Result	Result	Result		
RHMW19	APFL	24B0042	RHMW19-WGN01LF-2402	2/7/2024	Primary	<80	U	—	—	—	—	—	—		
RHMW19	Energy	B24020580	RHMW19-WGN01LF-2402	2/7/2024	Primary	—	—	—	—	—	—	—	—		
RHMW19	SGS Anchorage	1240512	RHMW19-WGN01LF-2402	2/7/2024	Primary	—	—	—	—	—	<750	U	<750		
RHMW19	SGS Orlando	FC13229	RHMW19-WGN01LF-2402	2/7/2024	Primary	—	<2	U	<0.014	U	0.25	J	—		
RHMW19	SGS Anchorage	1240991	RHMW19-WGN01LF-2403	3/12/2024	Primary	—	—	—	—	—	<750	U	1230		
RHMW19	SGS Orlando	FC14055	RHMW19-WGN01LF-2403	3/12/2024	Primary	—	<2	U	<0.014	U	0.16	J	—		

Notes:
 See Data Legend

App. B.3.1 Groundwater Analytical Data: Red Hill Bulk Fuel Storage Facility
 Consolidated Sampling Program & Groundwater Protection Plan-Defueling Sampling
 Groundwater Sampling: RHMW20

						Total Petroleum Hydrocarbons					Volatile Organic Compounds				Polycyclic Aromatic Hydrocarbons (PAHs) - AOC/LTM		
						TPH-g PHCC6C10	TPH-d ⁴ PHCC10C24	TPH-o ⁴ PHCC24C40	TPH-d with Silica Gel Cleanup ³ PHCC10C24SGC	TPH-o with Silica Gel Cleanup ³ PHCC24C40SGC	Benzene 71-43-2	Ethylbenzene 100-41-4	Toluene 108-88-3	Xylenes 1330-20-7	1-Methylnaphthalene 90-12-0	2-Methylnaphthalene 91-57-6	Naphthalene 91-20-3
Method						8260	8015	8015	8015	8015	8260	8260	8260	8260	8270 SIM	8270 SIM	8270 SIM
DOH Tier 1 EAL						300	400	500	—	—	5	30	40	20	10	10	17
Units						µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
Minimum						ND	ND	ND	—	—	ND	ND	ND	ND	ND	ND	ND
Maximum						ND	ND	ND	—	—	ND	ND	ND	ND	ND	ND	ND
Location	Lab	SDG	Sample ID	Sampling Date	Type	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result
RHMW20	APFL	24B0068	RHMW20-WGN01LF-2402	2/9/2024	Primary	—	—	—	—	—	—	—	—	—	—	—	—
RHMW20	Energy	B24020703	RHMW20-WGN01LF-2402	2/9/2024	Primary	—	<141 U	<199 U	—	—	—	—	—	—	—	—	—
RHMW20	SGS Anchorage	1240594	RHMW20-WGN01LF-2402	2/9/2024	Primary	—	—	—	—	—	—	—	—	—	—	—	—
RHMW20	SGS Orlando	FC13292	RHMW20-WGN01LF-2402	2/9/2024	Primary	<50	<100 U	<160 U	—	<0.5 U	<0.5 U	<0.5 U	<1.5 U	<0.4 U	<0.4 U	<0.4 U	U
RHMW20	SGS Anchorage	1241150	RHMW20-WGN01LF-2403	3/22/2024	Primary	—	—	—	—	—	—	—	—	—	—	—	—

Notes:
 See Data Legend

App. B.3.1 Groundwater Analytical Data: Red Hill Bulk Fuel Storage Facility
 Consolidated Sampling Program & Groundwater Protection Plan-Defueling Sampling
 Groundwater Sampling: RHMW20

						Polycyclic Aromatic Hydrocarbons (PAHs) - NOI																						
						Acenaphthene (SIM)	Acenaphthylene (SIM)	Anthracene (SIM)	Benzo(a)anthracene (SIM)	Benzo(a)pyrene (SIM)	Benzo(b)fluoranthene (SIM)	Benzo(g,h,i)perylene (SIM)	Benzo(k)fluoranthene (SIM)	Chrysene (SIM)	Dibenzo(a,h)anthracene (SIM)	Fluoranthene (SIM)	Fluorene (SIM)	Indeno(1,2,3-cd)pyrene (SIM)	Phenanthrene (SIM)	Pyrene (SIM)								
Analyte	CAS No.	Method	DOH Tier 1 EAL	Units	Minimum	Maximum	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result		
	83-32-9	8270SIM	20	µg/L	ND	ND	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
	208-96-8	8270SIM	240	µg/L	ND	ND	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
	120-12-7	8270SIM	0.18	µg/L	ND	ND	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
	56-55-3	8270SIM	0.029	µg/L	ND	ND	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
	50-32-8	8270SIM	0.2	µg/L	ND	ND	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
	205-99-2	8270SIM	0.22	µg/L	ND	ND	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
	191-24-2	8270SIM	0.13	µg/L	ND	ND	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
	207-08-9	8270SIM	0.4	µg/L	ND	ND	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
	218-01-8	8270SIM	1	µg/L	ND	ND	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
	53-70-3	8270SIM	0.022	µg/L	ND	ND	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
	206-44-0	8270SIM	13	µg/L	ND	ND	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
	86-73-7	8270SIM	240	µg/L	ND	ND	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
	193-39-5	8270SIM	0.095	µg/L	ND	ND	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
	85-01-8	8270SIM	210	µg/L	ND	ND	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
	129-00-0	8270SIM	68	µg/L	ND	ND	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
Location	Lab	SDG	Sample ID	Sampling Date	Type		Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result		
RHMW20	APFL	24B0068	RHMW20-WGN01LF-2402	2/9/2024	Primary		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
RHMW20	Energy	B24020703	RHMW20-WGN01LF-2402	2/9/2024	Primary		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
RHMW20	SGS Anchorage	1240594	RHMW20-WGN01LF-2402	2/9/2024	Primary		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
RHMW20	SGS Orlando	FC13292	RHMW20-WGN01LF-2402	2/9/2024	Primary		<0.4	U	<0.4	U	<0.4	U	<0.04	U	<0.04	U	<0.04	U	<0.08	U	<0.04	U	<0.4	U	<0.4	U	<0.4	U
RHMW20	SGS Anchorage	1241150	RHMW20-WGN01LF-2403	3/22/2024	Primary		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		

Notes:
 See Data Legend

App. B.3.1 Groundwater Analytical Data: Red Hill Bulk Fuel Storage Facility
 Consolidated Sampling Program & Groundwater Protection Plan-Defueling Sampling
 Groundwater Sampling: RHMW20

						Fuel Additive		Lead Scavengers				Natural Attenuation Parameters			
						2-(2-Methoxyethoxy)-ethanol ⁵	Phenol	1,2-Dibromoethane	1,2-Dichloroethane	Methane	Total Organic Carbon	NV Dissolved Organic Carbon			
						CAS No.	108-95-2	106-93-4	107-06-2	74-82-8	TOC				
						Method	SW8270	8011	8260	RSK 175	9060	9060			
						DOH Tier 1 EAL	300	0.04	5	—	—	—			
						Units	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L			
						Minimum	ND	ND	ND	0.19	ND	ND			
						Maximum	ND	ND	ND	0.19	380	630			
Location	Lab	SDG	Sample ID	Sampling Date	Type	Result	Result	Result	Result	Result	Result	Result	Result		
RHMW20	APFL	24B0068	RHMW20-WGN01LF-2402	2/9/2024	Primary	<80	U	—	—	—	—	—	—		
RHMW20	Energy	B24020703	RHMW20-WGN01LF-2402	2/9/2024	Primary	—	—	—	—	—	—	—	—		
RHMW20	SGS Anchorage	1240594	RHMW20-WGN01LF-2402	2/9/2024	Primary	—	—	—	—	—	380	J	630		
RHMW20	SGS Orlando	FC13292	RHMW20-WGN01LF-2402	2/9/2024	Primary	—	<2 U	<0.014 U	<0.5 U	0.19	J	—	—		
RHMW20	SGS Anchorage	1241150	RHMW20-WGN01LF-2403	3/22/2024	Primary	—	—	—	—	—	<750	U	<750		

Notes:
 See Data Legend

App. B.3.1 Groundwater Analytical Data: Red Hill Bulk Fuel Storage Facility
 Consolidated Sampling Program & Groundwater Protection Plan-Defueling Sampling
 Groundwater Sampling: RHMW2254-01

						Total Petroleum Hydrocarbons					Volatile Organic Compounds				Polycyclic Aromatic Hydrocarbons (PAHs) - AOC/LTM		
						TPH-g PHCC6C10	TPH-d ⁴ PHCC10C24	TPH-o ⁴ PHCC24C40	TPH-d with Silica Gel Cleanup ³ PHCC10C24SGC	TPH-o with Silica Gel Cleanup ³ PHCC24C40SGC	Benzene 71-43-2	Ethylbenzene 100-41-4	Toluene 108-88-3	Xylenes 1330-20-7	1-Methylnaphthalene 90-12-0	2-Methylnaphthalene 91-57-6	Naphthalene 91-20-3
Method						8260	8015	8015	8015	8015	8260	8260	8260	8260	8270 SIM	8270 SIM	8270 SIM
DOH Tier 1 EAL						300	400	500	—	—	5	30	40	20	10	10	17
Units						µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
Minimum						ND	ND	ND	—	—	ND	ND	ND	ND	ND	ND	ND
Maximum						ND	ND	ND	—	—	ND	ND	ND	ND	ND	ND	ND
Location	Lab	SDG	Sample ID	Sampling Date	Type	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result
RHMW2254-01	APPL	24B0092	RHMW2254-01-WGN01LF-2402	2/13/2024	Primary	—	—	—	—	—	—	—	—	—	—	—	—
RHMW2254-01	Energy	B24020912	RHMW2254-01-WGN01LF-2402	2/13/2024	Primary	—	<141 U	<141 U	—	—	—	—	—	—	—	—	—
RHMW2254-01	SGS Anchorage	1240593	RHMW2254-01-WGN01LF-2402	2/13/2024	Primary	—	—	—	—	—	—	—	—	—	—	—	—
RHMW2254-01	SGS Orlando	FC13371	RHMW2254-01-WGN01LF-2402	2/13/2024	Primary	<50 U	<100 U	<160 U	—	<0.5 U	<0.5 U	<0.5 U	<1.5 U	<0.4 U	<0.4 U	<0.4 U	<0.4 U
RHMW2254-01	SGS Anchorage	1241067	RHMW2254-01-WGN01LF-2403	3/15/2024	Primary	—	—	—	—	—	—	—	—	—	—	—	—
RHMW2254-01	SGS Orlando	FC14139	RHMW2254-01-WGN01LF-2403	3/15/2024	Primary	<50 U	<100 U	<160 U	—	<0.5 U	<0.5 U	<0.5 U	<1.5 U	<0.4 U	<0.4 U	<0.4 U	<0.4 U

Notes:
 See Data Legend

App. B.3.1 Groundwater Analytical Data: Red Hill Bulk Fuel Storage Facility
 Consolidated Sampling Program & Groundwater Protection Plan-Defueling Sampling
 Groundwater Sampling: RHMW2254-01

						Polycyclic Aromatic Hydrocarbons (PAHs) - NOI															
						Acenaphthene (SIM)	Acenaphthylene (SIM)	Anthracene (SIM)	Benzo(a)anthracene (SIM)	Benzo(a)pyrene (SIM)	Benzo(b)fluoranthene (SIM)	Benzo(g,h,i)perylene (SIM)	Benzo(k)fluoranthene (SIM)	Chrysene (SIM)	Dibenzo(a,h)anthracene (SIM)	Fluoranthene (SIM)	Fluorene (SIM)	Indeno(1,2,3-cd)pyrene (SIM)	Phenanthrene (SIM)	Pyrene (SIM)	
						83-32-9	208-96-8	120-12-7	56-55-3	50-32-8	205-99-2	191-24-2	207-08-9	218-01-9	53-70-3	206-44-0	86-73-7	193-39-5	85-01-8	129-00-0	
						8270SIM	8270SIM	8270SIM	8270SIM	8270SIM	8270SIM	8270SIM	8270SIM	8270SIM	8270SIM	8270SIM	8270SIM	8270SIM	8270SIM	8270SIM	
						20	240	0.18	0.029	0.2	0.22	0.13	0.4	1	0.022	13	240	0.095	210	68	
						µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	
						ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
						ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
Location	Lab	SDG	Sample ID	Sampling Date	Type	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	
RHMW2254-01	APPL	24B0092	RHMW2254-01-WGN01F-2402	2/13/2024	Primary	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
RHMW2254-01	Energy	B24020912	RHMW2254-01-WGN01F-2402	2/13/2024	Primary	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
RHMW2254-01	SGS Anchorage	1240593	RHMW2254-01-WGN01F-2402	2/13/2024	Primary	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
RHMW2254-01	SGS Orlando	FC13371	RHMW2254-01-WGN01F-2402	2/13/2024	Primary	<0.4	U	<0.4	U	<0.4	U	<0.04	U	<0.04	U	<0.04	U	<0.08	U	<0.04	U
RHMW2254-01	SGS Anchorage	1241067	RHMW2254-01-WGN01F-2403	3/15/2024	Primary	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
RHMW2254-01	SGS Orlando	FC14139	RHMW2254-01-WGN01F-2403	3/15/2024	Primary	<0.4	U	<0.4	U	<0.4	U	<0.04	U	<0.04	U	<0.04	U	<0.08	U	<0.04	U

Notes:
 See Data Legend

App. B.3.1 Groundwater Analytical Data: Red Hill Bulk Fuel Storage Facility
 Consolidated Sampling Program & Groundwater Protection Plan-Defueling Sampling
 Groundwater Sampling: RHMW2254-01

						Fuel Additive		Lead Scavengers				Natural Attenuation Parameters		
						2-(2-Methoxyethoxy)-ethanol ⁵	Phenol	1,2-Dibromoethane	1,2-Dichloroethane	Methane	Total Organic Carbon	NV Dissolved Organic Carbon		
Analyte						111-77-3	108-95-2	106-93-4	107-06-2	74-82-8	TOC	-		
CAS No.						8270D	SW8270	8011	8260	RSK 175	9060	9060		
Method						800	300	0.04	5	-	-	-		
DOH Tier 1 EAL						µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L		
Units						ND	ND	-	-	ND	356	381		
Minimum						ND	ND	-	-	0.31	365	475		
Maximum														
Location	Lab	SDG	Sample ID	Sampling Date	Type	Result	Result	Result	Result	Result	Result	Result	Result	
RHMW2254-01	APPL	24B0092	RHMW2254-01-WGN01F-2402	2/13/2024	Primary	<80	U	-	-	-	-	-	-	
RHMW2254-01	Energy	B24020912	RHMW2254-01-WGN01F-2402	2/13/2024	Primary	-	-	-	-	-	-	-	-	
RHMW2254-01	SGS Anchorage	1240593	RHMW2254-01-WGN01F-2402	2/13/2024	Primary	-	-	-	-	-	356	J	381	
RHMW2254-01	SGS Orlando	FC13371	RHMW2254-01-WGN01F-2402	2/13/2024	Primary	-	<2	U	-	<0.25	U	-	-	
RHMW2254-01	SGS Anchorage	1241067	RHMW2254-01-WGN01F-2403	3/15/2024	Primary	-	-	-	-	-	365	J	475	
RHMW2254-01	SGS Orlando	FC14139	RHMW2254-01-WGN01F-2403	3/15/2024	Primary	-	<1.9	U	-	0.31	J	-	-	

Notes:
 See Data Legend

App. B.3.1 Groundwater Analytical Data: Red Hill Bulk Fuel Storage Facility
 Consolidated Sampling Program & Groundwater Protection Plan-Defueling Sampling
 Groundwater Sampling: RHP01

						Total Petroleum Hydrocarbons					Volatile Organic Compounds				Polycyclic Aromatic Hydrocarbons (PAHs) - AOC/LTM		
						TPH-g PHCC6C10	TPH-d ⁴ PHCC10C24	TPH-o ⁴ PHCC24C40	TPH-d with Silica Gel Cleanup ³ PHCC10C24SGC	TPH-o with Silica Gel Cleanup ³ PHCC24C40SGC	Benzene 71-43-2	Ethylbenzene 100-41-4	Toluene 108-88-3	Xylenes 1330-20-7	1-Methylnaphthalene 90-12-0	2-Methylnaphthalene 91-57-6	Naphthalene 91-20-3
Method						8260	8015	8015	8015	8015	8260	8260	8260	8260	8270 SIM	8270 SIM	8270 SIM
DOH Tier 1 EAL						300	400	500	—	—	5	30	40	20	10	10	17
Units						µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
Minimum						ND	ND	ND	—	—	ND	ND	ND	ND	ND	ND	ND
Maximum						ND	ND	ND	—	—	ND	ND	ND	ND	ND	ND	ND
Location	Lab	SDG	Sample ID	Sampling Date	Type	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result
RHP01	APPL	24B0052	RHP01-WGN01LF-2402	2/8/2024	Primary	—	—	—	—	—	—	—	—	—	—	—	—
RHP01	Energy	B24020698	RHP01-WGN01LF-2402	2/8/2024	Primary	—	<140 U	<197 U	—	—	—	—	—	—	—	—	—
RHP01	SGS Anchorage	1240537	RHP01-WGN01LF-2402	2/8/2024	Primary	—	—	—	—	—	—	—	—	—	—	—	—
RHP01	SGS Orlando	FC13269	RHP01-WGN01LF-2402	2/8/2024	Primary	<50 U	<100 U	<160 U	—	<0.5 U	<0.5 U	<0.5 U	<1.5 U	<0.42 U	<0.42 U	<0.42 U	U
RHP01	SGS Anchorage	1240955	RHP01-WGN01LF-2403	3/11/2024	Primary	—	—	—	—	—	—	—	—	—	—	—	—
RHP01	SGS Orlando	FC14005	RHP01-WGN01LF-2403	3/11/2024	Primary	<50 U	<100 U	<160 U	—	<0.5 U	<0.5 U	<0.5 U	<1.5 U	<0.4 U	<0.4 U	<0.4 U	U

Notes:
 See Data Legend

App. B.3.1 Groundwater Analytical Data: Red Hill Bulk Fuel Storage Facility
 Consolidated Sampling Program & Groundwater Protection Plan-Defueling Sampling
 Groundwater Sampling: RHP01

						Polycyclic Aromatic Hydrocarbons (PAHs) - NOI															
						Acenaphthene (SIM)	Acenaphthylene (SIM)	Anthracene (SIM)	Benzo(a)anthracene (SIM)	Benzo(a)pyrene (SIM)	Benzo(b)fluoranthene (SIM)	Benzo(g,h,i)perylene (SIM)	Benzo(k)fluoranthene (SIM)	Chrysene (SIM)	Dibenzo(a,h)anthracene (SIM)	Fluoranthene (SIM)	Fluorene (SIM)	Indeno(1,2,3-cd)pyrene (SIM)	Phenanthrene (SIM)	Pyrene (SIM)	
						83-32-9	208-96-8	120-12-7	56-55-3	50-32-8	205-99-2	191-24-2	207-08-9	218-01-9	53-70-3	206-44-0	86-73-7	193-39-5	85-01-8	129-00-0	
						8270SIM	8270SIM	8270SIM	8270SIM	8270SIM	8270SIM	8270SIM	8270SIM	8270SIM	8270SIM	8270SIM	8270SIM	8270SIM	8270SIM	8270SIM	
						20	240	0.18	0.029	0.2	0.22	0.13	0.4	1	0.022	13	240	0.095	210	68	
						µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	
						ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
						ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
Location	Lab	SDG	Sample ID	Sampling Date	Type	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	
RHP01	APPL	24B0052	RHP01-WGN01LF-2402	2/8/2024	Primary	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
RHP01	Energy	B24020698	RHP01-WGN01LF-2402	2/8/2024	Primary	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
RHP01	SGS Anchorage	1240537	RHP01-WGN01LF-2402	2/8/2024	Primary	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
RHP01	SGS Orlando	FC13269	RHP01-WGN01LF-2402	2/8/2024	Primary	<0.42	U	<0.42	U	<0.42	U	<0.042	U	<0.042	U	<0.042	U	<0.083	U	<0.042	U
RHP01	SGS Anchorage	1240955	RHP01-WGN01LF-2403	3/11/2024	Primary	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
RHP01	SGS Orlando	FC14005	RHP01-WGN01LF-2403	3/11/2024	Primary	<0.4	U	<0.4	U	<0.4	U	<0.04	U	<0.04	U	<0.04	U	<0.08	U	<0.04	U

Notes:
 See Data Legend

App. B.3.1 Groundwater Analytical Data: Red Hill Bulk Fuel Storage Facility
 Consolidated Sampling Program & Groundwater Protection Plan-Defueling Sampling
 Groundwater Sampling: RHP01

						Fuel Additive		Lead Scavengers				Natural Attenuation Parameters			
						2-(2-Methoxyethoxy)-ethanol ⁵	Phenol	1,2-Dibromoethane	1,2-Dichloroethane	Methane	Total Organic Carbon	NV Dissolved Organic Carbon			
						CAS No.	108-95-2	106-93-4	107-06-2	74-82-8	TOC				
						Method	SW8270	8011	8260	RSK 175	9060	9060			
						DOH Tier 1 EAL	300	0.04	5	—	—	—			
						Units	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L			
						Minimum	ND	ND	ND	ND	0.18	705			
						Maximum	ND	ND	ND	0.2	910	992			
Location	Lab	SDG	Sample ID	Sampling Date	Type	Result	Result	Result	Result	Result	Result	Result	Result		
RHP01	APFL	24B0052	RHP01-WGN01LF-2402	2/8/2024	Primary	<80	U	—	—	—	—	—	—		
RHP01	Energy	B24020698	RHP01-WGN01LF-2402	2/8/2024	Primary	—	—	—	—	—	—	—	—		
RHP01	SGS Anchorage	1240537	RHP01-WGN01LF-2402	2/8/2024	Primary	—	—	—	—	—	705	J	992		
RHP01	SGS Orlando	FC13269	RHP01-WGN01LF-2402	2/8/2024	Primary	<2	U	<0.015	U	<0.5	U	0.18	J		
RHP01	SGS Anchorage	1240955	RHP01-WGN01LF-2403	3/11/2024	Primary	—	—	—	—	—	910	J+	811		
RHP01	SGS Orlando	FC14005	RHP01-WGN01LF-2403	3/11/2024	Primary	—	<1.9	U	<0.015	U	<0.5	U	0.2		

Notes:
 See Data Legend

App. B.3.1 Groundwater Analytical Data: Red Hill Bulk Fuel Storage Facility
 Consolidated Sampling Program & Groundwater Protection Plan-Defueling Sampling
 Groundwater Sampling: RHP02

						Total Petroleum Hydrocarbons					Volatile Organic Compounds				Polycyclic Aromatic Hydrocarbons (PAHs) - AOC/LTM		
						TPH-g PHCC6C10	TPH-d ⁴ PHCC10C24	TPH-o ⁴ PHCC24C40	TPH-d with Silica Gel Cleanup ³ PHCC10C24SGC	TPH-o with Silica Gel Cleanup ³ PHCC24C40SGC	Benzene 71-43-2	Ethylbenzene 100-41-4	Toluene 108-88-3	Xylenes 1330-20-7	1-Methylnaphthalene 90-12-0	2-Methylnaphthalene 91-57-6	Naphthalene 91-20-3
Analyte						8260	8015	8015	8015	8015	8260	8260	8260	8260	8270 SIM	8270 SIM	8270 SIM
CAS No.						300	400	500	—	—	5	30	40	20	10	10	17
Method						—	—	—	—	—	—	—	—	—	—	—	—
DOH Tier 1 EAL						—	—	—	—	—	—	—	—	—	—	—	—
Units						µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
Minimum						ND	ND	ND	—	—	ND	ND	ND	ND	ND	ND	ND
Maximum						ND	ND	ND	—	—	ND	ND	ND	ND	ND	ND	ND
Location	Lab	SDG	Sample ID	Sampling Date	Type	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result
RHP02	APPL	24B0052	RHP02-WGN01LF-2402	2/8/2024	Primary	—	—	—	—	—	—	—	—	—	—	—	—
RHP02	APPL	24B0052	RHP02-WGFD01LF-2402	2/8/2024	Field Duplicate	—	—	—	—	—	—	—	—	—	—	—	—
RHP02	Energy	B24020698	RHP02-WGN01LF-2402	2/8/2024	Primary	—	<140 U	<187 U	—	—	—	—	—	—	—	—	—
RHP02	Energy	B24020698	RHP02-WGFD01LF-2402	2/8/2024	Field Duplicate	—	<141 U	<189 U	—	—	—	—	—	—	—	—	—
RHP02	SGS Anchorage	1240537	RHP02-WGN01LF-2402	2/8/2024	Primary	—	—	—	—	—	—	—	—	—	—	—	—
RHP02	SGS Orlando	FC13269	RHP02-WGN01LF-2402	2/8/2024	Primary	<50 U	<100 U	<170 U	—	—	<0.5 U	<0.5 U	<0.5 U	<1.5 U	<0.42 U	<0.42 U	<0.42 U
RHP02	SGS Orlando	FC13269	RHP02-WGFD01LF-2402	2/8/2024	Field Duplicate	<50 U	<100 U	<170 U	—	—	<0.5 U	<0.5 U	<0.5 U	<1.5 U	<0.42 U	<0.42 U	<0.42 U
RHP02	SGS Anchorage	1241022	RHP02-WGN01LF-2403	3/14/2024	Primary	—	—	—	—	—	—	—	—	—	—	—	—

Notes:
 See Data Legend

App. B.3.1 Groundwater Analytical Data: Red Hill Bulk Fuel Storage Facility
 Consolidated Sampling Program & Groundwater Protection Plan-Defueling Sampling
 Groundwater Sampling: RHP02

						Polycyclic Aromatic Hydrocarbons (PAHs) - NOI																			
						Acenaphthene (SIM)	Acenaphthylene (SIM)	Anthracene (SIM)	Benzo(a)anthracene (SIM)	Benzo(a)pyrene (SIM)	Benzo(b)fluoranthene (SIM)	Benzo(g,h,i)perylene (SIM)	Benzo(k)fluoranthene (SIM)	Chrysene (SIM)	Dibenzo(a,h)anthracene (SIM)	Fluoranthene (SIM)	Fluorene (SIM)	Indeno(1,2,3-cd)pyrene (SIM)	Phenanthrene (SIM)	Pyrene (SIM)					
Analyte	CAS No.	Method	DOH Tier 1 EAL	Units	Minimum	Maximum																			
	83-32-9	8270SIM	20	µg/L	ND	ND																			
	208-96-8	8270SIM	240	µg/L	ND	ND																			
	120-12-7	8270SIM	0.18	µg/L	ND	ND																			
	56-55-3	8270SIM	0.029	µg/L	ND	ND																			
	50-32-8	8270SIM	0.2	µg/L	ND	ND																			
	205-99-2	8270SIM	0.22	µg/L	ND	ND																			
	191-24-2	8270SIM	0.13	µg/L	ND	ND																			
	207-08-9	8270SIM	0.4	µg/L	ND	ND																			
	218-01-9	8270SIM	1	µg/L	ND	ND																			
	53-70-3	8270SIM	0.022	µg/L	ND	ND																			
	206-44-0	8270SIM	13	µg/L	ND	ND																			
	86-73-7	8270SIM	240	µg/L	ND	ND																			
	193-39-5	8270SIM	0.095	µg/L	ND	ND																			
	85-01-8	8270SIM	210	µg/L	ND	ND																			
	129-00-0	8270SIM	68	µg/L	ND	ND																			
Location	Lab	SDG	Sample ID	Sampling Date	Type	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	
RHP02	APPL	24B0052	RHP02-WGN01LF-2402	2/8/2024	Primary	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
RHP02	APPL	24B0052	RHP02-WGFD01LF-2402	2/8/2024	Field Duplicate	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
RHP02	Energy	B24020698	RHP02-WGN01LF-2402	2/8/2024	Primary	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
RHP02	Energy	B24020698	RHP02-WGFD01LF-2402	2/8/2024	Field Duplicate	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
RHP02	SGS Anchorage	1240537	RHP02-WGN01LF-2402	2/8/2024	Primary	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
RHP02	SGS Orlando	FC13269	RHP02-WGN01LF-2402	2/8/2024	Primary	<0.42	U	<0.42	U	<0.42	U	<0.042	U	<0.042	U	<0.042	U	<0.042	U	<0.083	U	<0.042	U	<0.42	U
RHP02	SGS Orlando	FC13269	RHP02-WGFD01LF-2402	2/8/2024	Field Duplicate	<0.42	U	<0.42	U	<0.42	U	<0.042	U	<0.042	U	<0.042	U	<0.042	U	<0.083	U	<0.042	U	<0.42	U
RHP02	SGS Anchorage	1241022	RHP02-WGN01LF-2403	3/14/2024	Primary	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	

Notes:
 See Data Legend

App. B.3.1 Groundwater Analytical Data: Red Hill Bulk Fuel Storage Facility
 Consolidated Sampling Program & Groundwater Protection Plan-Defueling Sampling
 Groundwater Sampling: RHP02

						Fuel Additive		Lead Scavengers				Natural Attenuation Parameters			
						2-(2-Methoxyethoxy)-ethanol ⁵	Phenol	1,2-Dibromoethane	1,2-Dichloroethane	Methane	Total Organic Carbon	NV Dissolved Organic Carbon			
						111-77-3	108-95-2	106-93-4	107-06-2	74-82-8	TOC	Carbon			
						Method 8270D	SW8270	8011	8260	RSK 175	9060	9060			
						DOH Tier 1 EAL	800	300	0.04	5	—	—			
						Units	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L			
						Minimum	ND	ND	ND	ND	0.26	827			
						Maximum	ND	ND	ND	ND	0.26	836			
Location	Lab	SDG	Sample ID	Sampling Date	Type	Result	Result	Result	Result	Result	Result	Result	Result		
RHP02	APPL	24B0052	RHP02-WGN01LF-2402	2/8/2024	Primary	<80	UJ	—	—	—	—	—	—		
RHP02	APPL	24B0052	RHP02-WGFD01LF-2402	2/8/2024	Field Duplicate	<80	UJ	—	—	—	—	—	—		
RHP02	Energy	B24020698	RHP02-WGN01LF-2402	2/8/2024	Primary	—	—	—	—	—	—	—	—		
RHP02	Energy	B24020698	RHP02-WGFD01LF-2402	2/8/2024	Field Duplicate	—	—	—	—	—	—	—	—		
RHP02	SGS Anchorage	1240537	RHP02-WGN01LF-2402	2/8/2024	Primary	—	—	—	—	—	827	J	882		
RHP02	SGS Orlando	FC13269	RHP02-WGN01LF-2402	2/8/2024	Primary	—	<2	U	<0.015	U	<0.5	U	0.26		
RHP02	SGS Orlando	FC13269	RHP02-WGFD01LF-2402	2/8/2024	Field Duplicate	—	<2	U	—	—	<0.5	U	—		
RHP02	SGS Anchorage	1241022	RHP02-WGN01LF-2403	3/14/2024	Primary	—	—	—	—	—	836	J+	1020		

Notes:
 See Data Legend

App. B.3.1 Groundwater Analytical Data: Red Hill Bulk Fuel Storage Facility
 Consolidated Sampling Program & Groundwater Protection Plan-Defueling Sampling
 Groundwater Sampling: RHP03

						Total Petroleum Hydrocarbons					Volatile Organic Compounds				Polycyclic Aromatic Hydrocarbons (PAHs) - AOC/LTM		
						TPH-g PHCC6C10	TPH-d ⁴ PHCC10C24	TPH-o ⁴ PHCC24C40	TPH-d with Silica Gel Cleanup ³ PHCC10C24SGC	TPH-o with Silica Gel Cleanup ³ PHCC24C40SGC	Benzene 71-43-2	Ethylbenzene 100-41-4	Toluene 108-88-3	Xylenes 1330-20-7	1-Methylnaphthalene 90-12-0	2-Methylnaphthalene 91-57-6	Naphthalene 91-20-3
Method						8260	8015	8015	8015	8015	8260	8260	8260	8260	8270 SIM	8270 SIM	8270 SIM
DOH Tier 1 EAL						300	400	500	—	—	5	30	40	20	10	10	17
Units						µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
Minimum						ND	ND	ND	—	—	ND	ND	ND	ND	ND	ND	ND
Maximum						ND	ND	ND	—	—	ND	ND	ND	ND	ND	ND	ND
Location	Lab	SDG	Sample ID	Sampling Date	Type	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result
RHP03	APPL	24B0052	RHP03-WGN01LF-2402	2/8/2024	Primary	—	—	—	—	—	—	—	—	—	—	—	—
RHP03	Energy	B24020698	RHP03-WGN01LF-2402	2/8/2024	Primary	—	<140 U	<197 U	—	—	—	—	—	—	—	—	—
RHP03	SGS Anchorage	1240537	RHP03-WGN01LF-2402	2/8/2024	Primary	—	—	—	—	—	—	—	—	—	—	—	—
RHP03	SGS Orlando	FC13269	RHP03-WGN01LF-2402	2/8/2024	Primary	<50	<100 U	<170 U	—	<0.5 U	<0.5 U	<0.5 U	<1.5 U	<0.38 U	<0.38 U	<0.38 U	U
RHP03	SGS Anchorage	1241022	RHP03-WGN01LF-2403	3/14/2024	Primary	—	—	—	—	—	—	—	—	—	—	—	—

Notes:
 See Data Legend

App. B.3.1 Groundwater Analytical Data: Red Hill Bulk Fuel Storage Facility
 Consolidated Sampling Program & Groundwater Protection Plan-Defueling Sampling
 Groundwater Sampling: RHP03

						Polycyclic Aromatic Hydrocarbons (PAHs) - NOI																			
						Acenaphthene (SIM)	Acenaphthylene (SIM)	Anthracene (SIM)	Benzo(a)anthracene (SIM)	Benzo(a)pyrene (SIM)	Benzo(b)fluoranthene (SIM)	Benzo(g,h,i)perylene (SIM)	Benzo(k)fluoranthene (SIM)	Chrysene (SIM)	Dibenzo(a,h)anthracene (SIM)	Fluoranthene (SIM)	Fluorene (SIM)	Indeno(1,2,3-cd)pyrene (SIM)	Phenanthrene (SIM)	Pyrene (SIM)					
Analyte	CAS No.	Method	DOH Tier 1 EAL	Units	Minimum	Maximum																			
Location	Lab	SDG	Sample ID	Sampling Date	Type	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result		
RHP03	APPL	24B0052	RHP03-WGN01LF-2402	2/8/2024	Primary	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
RHP03	Energy	B24020698	RHP03-WGN01LF-2402	2/8/2024	Primary	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
RHP03	SGS Anchorage	1240537	RHP03-WGN01LF-2402	2/8/2024	Primary	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
RHP03	SGS Orlando	FC13269	RHP03-WGN01LF-2402	2/8/2024	Primary	<0.38	U	<0.38	U	<0.38	U	<0.038	U	<0.038	U	<0.038	U	<0.077	U	<0.038	U	<0.38	U	<0.38	U
RHP03	SGS Anchorage	1241022	RHP03-WGN01LF-2403	3/14/2024	Primary	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		

Notes:
 See Data Legend

App. B.3.1 Groundwater Analytical Data: Red Hill Bulk Fuel Storage Facility
 Consolidated Sampling Program & Groundwater Protection Plan-Defueling Sampling
 Groundwater Sampling: RHP03

						Fuel Additive		Lead Scavengers				Natural Attenuation Parameters			
						2-(2-Methoxyethoxy)-ethanol ⁵	Phenol	1,2-Dibromoethane	1,2-Dichloroethane	Methane	Total Organic Carbon	NV Dissolved Organic Carbon			
						CAS No.	108-95-2	106-93-4	107-06-2	74-82-8	TOC				
						Method	SW8270	8011	8260	RSK 175	9060	9060			
						DOH Tier 1 EAL	300	0.04	5	—	—	—			
						Units	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L			
						Minimum	ND	ND	ND	ND	ND	725			
						Maximum	ND	ND	ND	ND	493	832			
Location	Lab	SDG	Sample ID	Sampling Date	Type	Result	Result	Result	Result	Result	Result	Result	Result		
RHP03	APPL	24B0052	RHP03-WGN01LF-2402	2/8/2024	Primary	<80	U	—	—	—	—	—	—		
RHP03	Energy	B24020698	RHP03-WGN01LF-2402	2/8/2024	Primary	—	—	—	—	—	—	—	—		
RHP03	SGS Anchorage	1240537	RHP03-WGN01LF-2402	2/8/2024	Primary	—	—	—	—	—	493	J	725		
RHP03	SGS Orlando	FC13269	RHP03-WGN01LF-2402	2/8/2024	Primary	—	<2	U	<0.014	U	<0.5	U	<0.25	U	
RHP03	SGS Anchorage	1241022	RHP03-WGN01LF-2403	3/14/2024	Primary	—	—	—	—	—	<750	U	832		

Notes:
 See Data Legend

App. B.3.1 Groundwater Analytical Data: Red Hill Bulk Fuel Storage Facility
 Consolidated Sampling Program & Groundwater Protection Plan-Defueling Sampling
 Groundwater Sampling: RHP04A

						Total Petroleum Hydrocarbons					Volatile Organic Compounds				Polycyclic Aromatic Hydrocarbons (PAHs) - AOC/LTM		
						TPH-g PHCC6C10	TPH-d ⁴ PHCC10C24	TPH-o ⁴ PHCC24C40	TPH-d with Silica Gel Cleanup ³ PHCC10C24SGC	TPH-o with Silica Gel Cleanup ³ PHCC24C40SGC	Benzene 71-43-2	Ethylbenzene 100-41-4	Toluene 108-88-3	Xylenes 1330-20-7	1-Methylnaphthalene 90-12-0	2-Methylnaphthalene 91-57-6	Naphthalene 91-20-3
Method						8260	8015	8015	8015	8015	8260	8260	8260	8260	8270 SIM	8270 SIM	8270 SIM
DOH Tier 1 EAL						300	400	500	—	—	5	30	40	20	10	10	17
Units						µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
Minimum						ND	ND	ND	—	—	ND	ND	ND	ND	ND	ND	ND
Maximum						ND	ND	ND	—	—	ND	ND	ND	ND	ND	ND	ND
Location	Lab	SDG	Sample ID	Sampling Date	Type	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result
RHP04A	APPL	24B0068	RHP04A-WGN01LF-2402	2/9/2024	Primary	—	—	—	—	—	—	—	—	—	—	—	—
RHP04A	Energy	B24020703	RHP04A-WGN01LF-2402	2/9/2024	Primary	—	<140 U	<197 U	—	—	—	—	—	—	—	—	—
RHP04A	SGS Anchorage	1240594	RHP04A-WGN01LF-2402	2/9/2024	Primary	—	—	—	—	—	—	—	—	—	—	—	—
RHP04A	SGS Orlando	FC13292	RHP04A-WGN01LF-2402	2/9/2024	Primary	<50	<100 U	<170 U	—	<0.5 U	<0.5 U	<0.5 U	<1.5 U	<0.42 U	<0.42 U	<0.42 U	U
RHP04A	SGS Anchorage	1241022	RHP04A-WGN01LF-2403	3/14/2024	Primary	—	—	—	—	—	—	—	—	—	—	—	—

Notes:
 See Data Legend

App. B.3.1 Groundwater Analytical Data: Red Hill Bulk Fuel Storage Facility
 Consolidated Sampling Program & Groundwater Protection Plan-Defueling Sampling
 Groundwater Sampling: RHP04A

						Polycyclic Aromatic Hydrocarbons (PAHs) - NOI																	
						Acenaphthene (SIM)	Acenaphthylene (SIM)	Anthracene (SIM)	Benzo(a)anthracene (SIM)	Benzo(a)pyrene (SIM)	Benzo(b)fluoranthene (SIM)	Benzo(g,h,i)perylene (SIM)	Benzo(k)fluoranthene (SIM)	Chrysene (SIM)	Dibenzo(a,h)anthracene (SIM)	Fluoranthene (SIM)	Fluorene (SIM)	Indeno(1,2,3-cd)pyrene (SIM)	Phenanthrene (SIM)	Pyrene (SIM)			
Analyte	CAS No.	Method	DOH Tier 1 EAL	Units	Minimum	Maximum	83-32-9	208-96-8	120-12-7	56-55-3	50-32-8	205-99-2	191-24-2	207-08-9	218-01-9	53-70-3	206-44-0	86-73-7	193-39-5	85-01-8	129-00-0		
Method	8270SIM	8270SIM	8270SIM	8270SIM	8270SIM	8270SIM	20	240	0.18	0.029	0.2	0.22	0.13	0.4	1	0.022	13	240	0.095	210	68		
Units	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L		
Minimum	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND		
Maximum	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND		
Location	Lab	SDG	Sample ID	Sampling Date	Type	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result		
RHP04A	APPL	24B0068	RHP04A-WGN01LF-2402	2/9/2024	Primary	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
RHP04A	Energy	B24020703	RHP04A-WGN01LF-2402	2/9/2024	Primary	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
RHP04A	SGS Anchorage	1240594	RHP04A-WGN01LF-2402	2/9/2024	Primary	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
RHP04A	SGS Orlando	FC13292	RHP04A-WGN01LF-2402	2/9/2024	Primary	<0.42	U	<0.42	U	<0.42	U	<0.042	U	<0.042	U	<0.042	U	<0.083	U	<0.042	U	<0.42	U
RHP04A	SGS Anchorage	1241022	RHP04A-WGN01LF-2403	3/14/2024	Primary	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		

Notes:
 See Data Legend

App. B.3.1 Groundwater Analytical Data: Red Hill Bulk Fuel Storage Facility
 Consolidated Sampling Program & Groundwater Protection Plan-Defueling Sampling
 Groundwater Sampling: RHP04A

						Fuel Additive		Lead Scavengers				Natural Attenuation Parameters			
						2-(2-Methoxyethoxy)-ethanol ⁵	Phenol	1,2-Dibromoethane	1,2-Dichloroethane	Methane	Total Organic Carbon	NV Dissolved Organic Carbon			
Analyte						111-77-3	108-95-2	106-93-4	107-06-2	74-82-8	TOC	Carbon			
CAS No.						8270D	SW8270	8011	8260	RSK 175	9060	9060			
Method						800	300	0.04	5	—	—	—			
DOH Tier 1 EAL						—	—	—	—	—	—	—			
Units						µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L			
Minimum						ND	ND	ND	ND	ND	ND	805			
Maximum						ND	ND	ND	ND	ND	534	812			
Location	Lab	SDG	Sample ID	Sampling Date	Type	Result	Result	Result	Result	Result	Result	Result	Result		
RHP04A	APFL	24B0068	RHP04A-WGN01LF-2402	2/9/2024	Primary	<80	U	—	—	—	—	—	—		
RHP04A	Energy	B24020703	RHP04A-WGN01LF-2402	2/9/2024	Primary	—	—	—	—	—	—	—	—		
RHP04A	SGS Anchorage	1240594	RHP04A-WGN01LF-2402	2/9/2024	Primary	—	—	—	—	—	534	J	812		
RHP04A	SGS Orlando	FC13292	RHP04A-WGN01LF-2402	2/9/2024	Primary	<2	U	<0.014	U	<0.5	U	<0.25	U		
RHP04A	SGS Anchorage	1241022	RHP04A-WGN01LF-2403	3/14/2024	Primary	—	—	—	—	—	<750	U	805		

Notes:
 See Data Legend

App. B.3.1 Groundwater Analytical Data: Red Hill Bulk Fuel Storage Facility
 Consolidated Sampling Program & Groundwater Protection Plan-Defueling Sampling
 Groundwater Sampling: RHP04B

						Total Petroleum Hydrocarbons					Volatile Organic Compounds				Polycyclic Aromatic Hydrocarbons (PAHs) - AOC/LTM		
						TPH-g PHCC6C10	TPH-d ⁴ PHCC10C24	TPH-o ⁴ PHCC24C40	TPH-d with Silica Gel Cleanup ³ PHCC10C24SGC	TPH-o with Silica Gel Cleanup ³ PHCC24C40SGC	Benzene 71-43-2	Ethylbenzene 100-41-4	Toluene 108-88-3	Xylenes 1330-20-7	1-Methylnaphthalene 90-12-0	2-Methylnaphthalene 91-57-6	Naphthalene 91-20-3
Method						8260	8015	8015	8015	8015	8260	8260	8260	8260	8270 SIM	8270 SIM	8270 SIM
DOH Tier 1 EAL						300	400	500	—	—	5	30	40	20	10	10	17
Units						µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
Minimum						ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Maximum						ND	1170	777	ND	ND	ND	ND	ND	ND	ND	ND	ND
Location	Lab	SDG	Sample ID	Sampling Date	Type	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result
RHP04B	APPL	24B0101	RHP04B-WGN01LF-2402	2/14/2024	Primary	—	—	—	—	—	—	—	—	—	—	—	—
RHP04B	Energy	B24020997	RHP04B-WGN01LF-2402	2/14/2024	Primary	—	1170	777	<141	U	<141	U	—	—	—	—	—
RHP04B	SGS Anchorage	1240615	RHP04B-WGN01LF-2402	2/14/2024	Primary	—	—	—	—	—	—	—	—	—	—	—	—
RHP04B	SGS Orlando	FC13419	RHP04B-WGN01LF-2402	2/14/2024	Primary	<50	U	<100	UJ	<170	U	—	—	—	—	—	—
RHP04B	SGS Anchorage	1241091	RHP04B-WGN01LF-2403	3/19/2024	Primary	—	—	—	—	—	—	—	—	—	—	—	—

Notes:
 See Data Legend

App. B.3.1 Groundwater Analytical Data: Red Hill Bulk Fuel Storage Facility
 Consolidated Sampling Program & Groundwater Protection Plan-Defueling Sampling
 Groundwater Sampling: RHP04B

						Polycyclic Aromatic Hydrocarbons (PAHs) - NOI																	
						Acenaphthene (SIM)	Acenaphthylene (SIM)	Anthracene (SIM)	Benzo(a)anthracene (SIM)	Benzo(a)pyrene (SIM)	Benzo(b)fluoranthene (SIM)	Benzo(g,h,i)perylene (SIM)	Benzo(k)fluoranthene (SIM)	Chrysene (SIM)	Dibenzo(a,h)anthracene (SIM)	Fluoranthene (SIM)	Fluorene (SIM)	Indeno(1,2,3-cd)pyrene (SIM)	Phenanthrene (SIM)	Pyrene (SIM)			
Analyte	CAS No.	Method	DOH Tier 1 EAL	Units	Minimum	Maximum	83-32-9	208-96-8	120-12-7	56-55-3	50-32-8	205-99-2	191-24-2	207-08-9	218-01-9	53-70-3	206-44-0	86-73-7	193-39-5	85-01-8	129-00-0		
Method	8270SIM	8270SIM	8270SIM	8270SIM	8270SIM	8270SIM	20	240	0.18	0.029	0.2	0.22	0.13	0.4	1	0.022	13	240	0.095	210	68		
Units	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L		
Minimum	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND		
Maximum	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND		
Location	Lab	SDG	Sample ID	Sampling Date	Type	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result		
RHP04B	APPL	24B0101	RHP04B-WGN01LF-2402	2/14/2024	Primary	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
RHP04B	Energy	B24020997	RHP04B-WGN01LF-2402	2/14/2024	Primary	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
RHP04B	SGS Anchorage	1240615	RHP04B-WGN01LF-2402	2/14/2024	Primary	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
RHP04B	SGS Orlando	FC13419	RHP04B-WGN01LF-2402	2/14/2024	Primary	<0.42	U	<0.42	U	<0.42	U	<0.042	U	<0.042	U	<0.042	U	<0.083	U	<0.042	U	<0.42	U
RHP04B	SGS Anchorage	1241091	RHP04B-WGN01LF-2403	3/19/2024	Primary	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		

Notes:
 See Data Legend

App. B.3.1 Groundwater Analytical Data: Red Hill Bulk Fuel Storage Facility
 Consolidated Sampling Program & Groundwater Protection Plan-Defueling Sampling
 Groundwater Sampling: RHP04B

						Fuel Additive		Lead Scavengers				Natural Attenuation Parameters		
						2-(2- Methoxyethoxy)-ethanol ⁵	Phenol	1,2-Dibromoethane	1,2-Dichloroethane	Methane	Total Organic Carbon	NV Dissolved Organic Carbon		
Analyte						111-77-3	108-95-2	106-93-4	107-06-2	74-82-8	TOC	—		
CAS No.						8270D	SW8270	8011	8260	RSK 175	9060	9060		
Method						800	300	0.04	5	—	—	—		
DOH Tier 1 EAL						—	—	—	—	—	—	—		
Units						µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L		
Minimum						ND	ND	ND	ND	2.3	2950	2980		
Maximum						ND	ND	ND	ND	2.3	3230	3210		
Location	Lab	SDG	Sample ID	Sampling Date	Type	Result	Result	Result	Result	Result	Result	Result		
RHP04B	APPL	24B0101	RHP04B-WGN01LF-2402	2/14/2024	Primary	<80	UJ	—	—	—	—	—		
RHP04B	Energy	B24020997	RHP04B-WGN01LF-2402	2/14/2024	Primary	—	—	—	—	—	—	—		
RHP04B	SGS Anchorage	1240615	RHP04B-WGN01LF-2402	2/14/2024	Primary	—	—	—	—	3230	2980	—		
RHP04B	SGS Orlando	FC13419	RHP04B-WGN01LF-2402	2/14/2024	Primary	—	<2 U	<0.015 U	<0.5 U	2.3	—	—		
RHP04B	SGS Anchorage	1241091	RHP04B-WGN01LF-2403	3/19/2024	Primary	—	—	—	—	2950	3210	—		

Notes:
 See Data Legend

App. B.3.1 Groundwater Analytical Data: Red Hill Bulk Fuel Storage Facility
 Consolidated Sampling Program & Groundwater Protection Plan-Defueling Sampling
 Groundwater Sampling: RHP04C

						Total Petroleum Hydrocarbons					Volatile Organic Compounds				Polycyclic Aromatic Hydrocarbons (PAHs) - AOC/LTM		
						TPH-g PHCC6C10	TPH-d ⁴ PHCC10C24	TPH-o ⁴ PHCC24C40	TPH-d with Silica Gel Cleanup ³ PHCC10C24SGC	TPH-o with Silica Gel Cleanup ³ PHCC24C40SGC	Benzene 71-43-2	Ethylbenzene 100-41-4	Toluene 108-88-3	Xylenes 1330-20-7	1-Methylnaphthalene 90-12-0	2-Methylnaphthalene 91-57-6	Naphthalene 91-20-3
Method						8260	8015	8015	8015	8015	8260	8260	8260	8260	8270 SIM	8270 SIM	8270 SIM
DOH Tier 1 EAL						300	400	500	—	—	5	30	40	20	10	10	17
Units						µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
Minimum						ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Maximum						ND	51.4	90.6	ND	ND	ND	ND	ND	ND	ND	ND	ND
Location	Lab	SDG	Sample ID	Sampling Date	Type	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result
RHP04C	APPL	24B0101	RHP04C-WGN01LF-2402	2/14/2024	Primary	—	—	—	—	—	—	—	—	—	—	—	—
RHP04C	Energy	B24020997	RHP04C-WGN01LF-2402	2/14/2024	Primary	—	51.4	J	90.6	J	<146	U	<146	U	—	—	—
RHP04C	SGS Anchorage	1240615	RHP04C-WGN01LF-2402	2/14/2024	Primary	—	—	—	—	—	—	—	—	—	—	—	—
RHP04C	SGS Orlando	FC13419	RHP04C-WGN01LF-2402	2/14/2024	Primary	<50	U	<100	U	<170	U	—	—	—	—	—	—
RHP04C	SGS Anchorage	1241091	RHP04C-WGN01LF-2403	3/19/2024	Primary	—	—	—	—	—	—	—	—	—	—	—	—

Notes:
 See Data Legend

App. B.3.1 Groundwater Analytical Data: Red Hill Bulk Fuel Storage Facility
 Consolidated Sampling Program & Groundwater Protection Plan-Defueling Sampling
 Groundwater Sampling: RHP04C

						Polycyclic Aromatic Hydrocarbons (PAHs) - NOI															
						Acenaphthene (SIM)	Acenaphthylene (SIM)	Anthracene (SIM)	Benzo(a)anthracene (SIM)	Benzo(a)pyrene (SIM)	Benzo(b)fluoranthene (SIM)	Benzo(g,h,i)perylene (SIM)	Benzo(k)fluoranthene (SIM)	Chrysene (SIM)	Dibenzo(a,h)anthracene (SIM)	Fluoranthene (SIM)	Fluorene (SIM)	Indeno(1,2,3-cd)pyrene (SIM)	Phenanthrene (SIM)	Pyrene (SIM)	
						83-32-9	208-96-8	120-12-7	56-55-3	50-32-8	205-99-2	191-24-2	207-08-9	218-01-9	53-70-3	206-44-0	86-73-7	193-39-5	85-01-8	129-00-0	
						Method	8270SIM	8270SIM	8270SIM	8270SIM	8270SIM	8270SIM	8270SIM	8270SIM	8270SIM	8270SIM	8270SIM	8270SIM	8270SIM	8270SIM	8270SIM
						DOH Tier 1 EAL	20	240	0.18	0.029	0.2	0.22	0.13	0.4	1	0.022	13	240	0.095	210	68
						Units	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	
						Minimum	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
						Maximum	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
Location	Lab	SDG	Sample ID	Sampling Date	Type	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	
RHP04C	APPL	24B0101	RHP04C-WGN01LF-2402	2/14/2024	Primary	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
RHP04C	Energy	B24020997	RHP04C-WGN01LF-2402	2/14/2024	Primary	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
RHP04C	SGS Anchorage	1240615	RHP04C-WGN01LF-2402	2/14/2024	Primary	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
RHP04C	SGS Orlando	FC13419	RHP04C-WGN01LF-2402	2/14/2024	Primary	<0.42	U	<0.42	U	<0.42	U	<0.042	U	<0.042	U	<0.042	U	<0.083	U	<0.042	U
RHP04C	SGS Anchorage	1241091	RHP04C-WGN01LF-2403	3/19/2024	Primary	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	

Notes:
 See Data Legend

App. B.3.1 Groundwater Analytical Data: Red Hill Bulk Fuel Storage Facility
 Consolidated Sampling Program & Groundwater Protection Plan-Defueling Sampling
 Groundwater Sampling: RHP04C

						Fuel Additive		Lead Scavengers				Natural Attenuation Parameters			
						2-(2- Methoxyethoxy)-ethanol ⁵	Phenol	1,2-Dibromoethane	1,2-Dichloroethane	Methane	Total Organic Carbon	NV Dissolved Organic Carbon			
						CAS No.	108-95-2	106-93-4	107-06-2	74-82-8	TOC	Carbon			
						Method	SW8270	8011	8260	RSK 175	9060	9060			
						DOH Tier 1 EAL	300	0.04	5	—	—	—			
						Units	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L			
						Minimum	ND	ND	ND	0.69	1200	1290			
						Maximum	ND	ND	ND	0.69	1250	1290			
Location	Lab	SDG	Sample ID	Sampling Date	Type	Result	Result	Result	Result	Result	Result	Result	Result		
RHP04C	APPL	24B0101	RHP04C-WGN01LF-2402	2/14/2024	Primary	<80	UJ	—	—	—	—	—	—		
RHP04C	Energy	B24020997	RHP04C-WGN01LF-2402	2/14/2024	Primary	—	—	—	—	—	—	—	—		
RHP04C	SGS Anchorage	1240615	RHP04C-WGN01LF-2402	2/14/2024	Primary	—	—	—	—	—	1250	—	1290		
RHP04C	SGS Orlando	FC13419	RHP04C-WGN01LF-2402	2/14/2024	Primary	—	<2 U	<0.014 U	<0.5 U	0.69	—	—	—		
RHP04C	SGS Anchorage	1241091	RHP04C-WGN01LF-2403	3/19/2024	Primary	—	—	—	—	—	1200	J+	1290		

Notes:
 See Data Legend

App. B.3.1 Groundwater Analytical Data: Red Hill Bulk Fuel Storage Facility
 Consolidated Sampling Program & Groundwater Protection Plan-Defueling Sampling
 Groundwater Sampling: RHP05

						Total Petroleum Hydrocarbons					Volatile Organic Compounds				Polycyclic Aromatic Hydrocarbons (PAHs) - AOC/LTM		
						TPH-g PHCC6C10	TPH-d ⁴ PHCC10C24	TPH-o ⁴ PHCC24C40	TPH-d with Silica Gel Cleanup ³ PHCC10C24SGC	TPH-o with Silica Gel Cleanup ³ PHCC24C40SGC	Benzene 71-43-2	Ethylbenzene 100-41-4	Toluene 108-88-3	Xylenes 1330-20-7	1-Methylnaphthalene 90-12-0	2-Methylnaphthalene 91-57-6	Naphthalene 91-20-3
Method						8260	8015	8015	8015	8015	8260	8260	8260	8260	8270 SIM	8270 SIM	8270 SIM
DOH Tier 1 EAL						300	400	500	—	—	5	30	40	20	10	10	17
Units						µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
Minimum						ND	ND	ND	—	—	ND	ND	ND	ND	ND	ND	ND
Maximum						ND	ND	ND	—	—	ND	ND	ND	ND	ND	ND	ND
Location	Lab	SDG	Sample ID	Sampling Date	Type	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result
RHP05	APPL	24B0052	RHP05-WGN01LF-2402	2/8/2024	Primary	—	—	—	—	—	—	—	—	—	—	—	—
RHP05	Energy	B24020698	RHP05-WGN01LF-2402	2/8/2024	Primary	—	<140 U	<197 U	—	—	—	—	—	—	—	—	—
RHP05	SGS Anchorage	1240537	RHP05-WGN01LF-2402	2/8/2024	Primary	—	—	—	—	—	—	—	—	—	—	—	—
RHP05	SGS Orlando	FC13269	RHP05-WGN01LF-2402	2/8/2024	Primary	<50	<110 U	<170 U	—	<0.5 U	<0.5 U	<0.5 U	<1.5 U	<0.42 U	<0.42 U	<0.42 U	—
RHP05	SGS Anchorage	1241022	RHP05-WGN01LF-2403	3/14/2024	Primary	—	—	—	—	—	—	—	—	—	—	—	—

Notes:
 See Data Legend

App. B.3.1 Groundwater Analytical Data: Red Hill Bulk Fuel Storage Facility
 Consolidated Sampling Program & Groundwater Protection Plan-Defueling Sampling
 Groundwater Sampling: RHP05

						Polycyclic Aromatic Hydrocarbons (PAHs) - NOI																	
						Acenaphthene (SIM)	Acenaphthylene (SIM)	Anthracene (SIM)	Benzo(a)anthracene (SIM)	Benzo(a)pyrene (SIM)	Benzo(b)fluoranthene (SIM)	Benzo(g,h,i)perylene (SIM)	Benzo(k)fluoranthene (SIM)	Chrysene (SIM)	Dibenzo(a,h)anthracene (SIM)	Fluoranthene (SIM)	Fluorene (SIM)	Indeno(1,2,3-cd)pyrene (SIM)	Phenanthrene (SIM)	Pyrene (SIM)			
						83-32-9	208-96-8	120-12-7	56-55-3	50-32-8	205-99-2	191-24-2	207-08-9	218-01-9	53-70-3	206-44-0	86-73-7	193-39-5	85-01-8	129-00-0			
						Method	8270SIM	8270SIM	8270SIM	8270SIM	8270SIM	8270SIM	8270SIM	8270SIM	8270SIM	8270SIM	8270SIM	8270SIM	8270SIM	8270SIM	8270SIM		
						DOH Tier 1 EAL	20	240	0.18	0.029	0.2	0.22	0.13	0.4	1	0.022	13	240	0.095	210	68		
						Units	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L			
						Minimum	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND			
						Maximum	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND			
Location	Lab	SDG	Sample ID	Sampling Date	Type	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result		
RHP05	APPL	24B0052	RHP05-WGN01LF-2402	2/8/2024	Primary	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
RHP05	Energy	B24020698	RHP05-WGN01LF-2402	2/8/2024	Primary	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
RHP05	SGS Anchorage	1240537	RHP05-WGN01LF-2402	2/8/2024	Primary	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
RHP05	SGS Orlando	FC13269	RHP05-WGN01LF-2402	2/8/2024	Primary	<0.42	U	<0.42	U	<0.42	U	<0.042	U	<0.042	U	<0.042	U	<0.083	U	<0.042	U	<0.42	U
RHP05	SGS Anchorage	1241022	RHP05-WGN01LF-2403	3/14/2024	Primary	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		

Notes:
 See Data Legend

App. B.3.1 Groundwater Analytical Data: Red Hill Bulk Fuel Storage Facility
 Consolidated Sampling Program & Groundwater Protection Plan-Defueling Sampling
 Groundwater Sampling: RHP05

						Fuel Additive		Lead Scavengers				Natural Attenuation Parameters			
						2-(2-Methoxyethoxy)-ethanol ⁵	Phenol	1,2-Dibromoethane	1,2-Dichloroethane	Methane	Total Organic Carbon	NV Dissolved Organic Carbon			
						CAS No.	108-95-2	106-93-4	107-06-2	74-82-8	TOC				
						Method	SW8270	8011	8260	RSK 175	9060	9060			
						DOH Tier 1 EAL	300	0.04	5	—	—	—			
						Units	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L			
						Minimum	ND	ND	ND	ND	ND	740			
						Maximum	ND	ND	ND	ND	531	2020			
Location	Lab	SDG	Sample ID	Sampling Date	Type	Result	Result	Result	Result	Result	Result	Result	Result		
RHP05	APPL	24B0052	RHP05-WGN01LF-2402	2/8/2024	Primary	<80	U	—	—	—	—	—	—		
RHP05	Energy	B24020698	RHP05-WGN01LF-2402	2/8/2024	Primary	—	—	—	—	—	—	—	—		
RHP05	SGS Anchorage	1240537	RHP05-WGN01LF-2402	2/8/2024	Primary	—	—	—	—	—	531	J	740		
RHP05	SGS Orlando	FC13269	RHP05-WGN01LF-2402	2/8/2024	Primary	<2	U	<0.015	U	<0.5	U	<0.25	U		
RHP05	SGS Anchorage	1241022	RHP05-WGN01LF-2403	3/14/2024	Primary	—	—	—	—	—	<750	U	2020		

Notes:
 See Data Legend

App. B.3.1 Groundwater Analytical Data: Red Hill Bulk Fuel Storage Facility
 Consolidated Sampling Program & Groundwater Protection Plan-Defueling Sampling
 Groundwater Sampling: RHP06

						Total Petroleum Hydrocarbons					Volatile Organic Compounds				Polycyclic Aromatic Hydrocarbons (PAHs) - AOC/LTM		
						TPH-g PHCC6C10	TPH-d ⁴ PHCC10C24	TPH-o ⁴ PHCC24C40	TPH-d with Silica Gel Cleanup ³ PHCC10C24SGC	TPH-o with Silica Gel Cleanup ³ PHCC24C40SGC	Benzene 71-43-2	Ethylbenzene 100-41-4	Toluene 108-88-3	Xylenes 1330-20-7	1-Methylnaphthalene 90-12-0	2-Methylnaphthalene 91-57-6	Naphthalene 91-20-3
Method						8260	8015	8015	8015	8015	8260	8260	8260	8260	8270 SIM	8270 SIM	8270 SIM
DOH Tier 1 EAL						300	400	500	—	—	5	30	40	20	10	10	17
Units						µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
Minimum						ND	ND	ND	—	—	ND	ND	ND	ND	ND	ND	ND
Maximum						ND	ND	ND	—	—	ND	ND	ND	ND	ND	ND	ND
Location	Lab	SDG	Sample ID	Sampling Date	Type	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result
RHP06	APPL	24B0052	RHP06-WGN01LF-2402	2/8/2024	Primary	—	—	—	—	—	—	—	—	—	—	—	—
RHP06	Energy	B24020698	RHP06-WGN01LF-2402	2/8/2024	Primary	—	<140 U	<197 U	—	—	—	—	—	—	—	—	—
RHP06	SGS Anchorage	1240537	RHP06-WGN01LF-2402	2/8/2024	Primary	—	—	—	—	—	—	—	—	—	—	—	—
RHP06	SGS Orlando	FC13269	RHP06-WGN01LF-2402	2/8/2024	Primary	<50	<110 U	<170 U	—	<0.5 U	<0.5 U	<0.5 U	<1.5 U	<0.42 U	<0.42 U	<0.42 U	—
RHP06	SGS Anchorage	1241022	RHP06-WGN01LF-2403	3/14/2024	Primary	—	—	—	—	—	—	—	—	—	—	—	—

Notes:
 See Data Legend

App. B.3.1 Groundwater Analytical Data: Red Hill Bulk Fuel Storage Facility
 Consolidated Sampling Program & Groundwater Protection Plan-Defueling Sampling
 Groundwater Sampling: RHP06

						Polycyclic Aromatic Hydrocarbons (PAHs) - NOI															
						Acenaphthene (SIM)	Acenaphthylene (SIM)	Anthracene (SIM)	Benzo(a)anthracene (SIM)	Benzo(a)pyrene (SIM)	Benzo(b)fluoranthene (SIM)	Benzo(g,h,i)perylene (SIM)	Benzo(k)fluoranthene (SIM)	Chrysene (SIM)	Dibenzo(a,h)anthracene (SIM)	Fluoranthene (SIM)	Fluorene (SIM)	Indeno(1,2,3-cd)pyrene (SIM)	Phenanthrene (SIM)	Pyrene (SIM)	
Analyte	CAS No.	Method	DOH Tier 1 EAL	Units	Minimum	Maximum	20	240	0.18	0.029	0.2	0.22	0.13	0.4	1	0.022	13	240	0.095	210	68
Location	Lab	SDG	Sample ID	Sampling Date	Type	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result
RHP06	APPL	24B0052	RHP06-WGN01LF-2402	2/8/2024	Primary	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
RHP06	Energy	B24020698	RHP06-WGN01LF-2402	2/8/2024	Primary	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
RHP06	SGS Anchorage	1240537	RHP06-WGN01LF-2402	2/8/2024	Primary	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
RHP06	SGS Orlando	FC13269	RHP06-WGN01LF-2402	2/8/2024	Primary	<0.42	U	<0.42	U	<0.42	U	<0.042	U	<0.042	U	<0.042	U	<0.042	U	<0.42	U
RHP06	SGS Anchorage	1241022	RHP06-WGN01LF-2403	3/14/2024	Primary	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Notes:
 See Data Legend

App. B.3.1 Groundwater Analytical Data: Red Hill Bulk Fuel Storage Facility
 Consolidated Sampling Program & Groundwater Protection Plan-Defueling Sampling
 Groundwater Sampling: RHP06

						Fuel Additive		Lead Scavengers				Natural Attenuation Parameters			
						2-(2-Methoxyethoxy)-ethanol ⁵	Phenol	1,2-Dibromoethane	1,2-Dichloroethane	Methane	Total Organic Carbon	NV Dissolved Organic Carbon			
						CAS No.	108-95-2	106-93-4	107-06-2	74-82-8	TOC				
						Method	SW8270	8011	8260	RSK 175	9060	9060			
						DOH Tier 1 EAL	300	0.04	5	—	—	—			
						Units	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L			
						Minimum	ND	ND	ND	ND	748	766			
						Maximum	ND	ND	ND	ND	878	1100			
Location	Lab	SDG	Sample ID	Sampling Date	Type	Result	Result	Result	Result	Result	Result	Result	Result		
RHP06	APFL	24B0052	RHP06-WGN01LF-2402	2/8/2024	Primary	<80	U	—	—	—	—	—	—		
RHP06	Energy	B24020698	RHP06-WGN01LF-2402	2/8/2024	Primary	—	—	—	—	—	—	—	—		
RHP06	SGS Anchorage	1240537	RHP06-WGN01LF-2402	2/8/2024	Primary	—	—	—	—	—	748	J	766 J		
RHP06	SGS Orlando	FC13269	RHP06-WGN01LF-2402	2/8/2024	Primary	—	<2 U	<0.015 U	<0.5 U	<0.25 U	—	—	—		
RHP06	SGS Anchorage	1241022	RHP06-WGN01LF-2403	3/14/2024	Primary	—	—	—	—	—	878	J+	1100 J+		

Notes:
 See Data Legend

App. B.3.1 Groundwater Analytical Data: Red Hill Bulk Fuel Storage Facility
 Consolidated Sampling Program & Groundwater Protection Plan-Defueling Sampling
 Groundwater Sampling: RHP07

						Total Petroleum Hydrocarbons					Volatile Organic Compounds				Polycyclic Aromatic Hydrocarbons (PAHs) - AOC/LTM		
						TPH-g PHCC6C10	TPH-d ⁴ PHCC10C24	TPH-o ⁴ PHCC24C40	TPH-d with Silica Gel Cleanup ³ PHCC10C24SGC	TPH-o with Silica Gel Cleanup ³ PHCC24C40SGC	Benzene 71-43-2	Ethylbenzene 100-41-4	Toluene 108-88-3	Xylenes 1330-20-7	1-Methylnaphthalene 90-12-0	2-Methylnaphthalene 91-57-6	Naphthalene 91-20-3
Analyte						8260	8015	8015	8015	8015	8260	8260	8260	8260	8270 SIM	8270 SIM	8270 SIM
CAS No.						300	400	500	--	--	5	30	40	20	10	10	17
Method						µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
DOH Tier 1 EAL						ND	ND	ND	--	--	ND	ND	ND	ND	ND	ND	ND
Units						ND	ND	ND	--	--	ND	ND	ND	ND	ND	ND	ND
Minimum						ND	ND	ND	--	--	ND	ND	ND	ND	ND	ND	ND
Maximum						ND	ND	ND	--	--	ND	ND	ND	ND	ND	ND	ND
Location	Lab	SDG	Sample ID	Sampling Date	Type	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result
RHP07	APPL	24B0033	RHP07-WGN01LF-2402	2/6/2024	Primary	--	--	--	--	--	--	--	--	--	--	--	--
RHP07	Energy	B24020463	RHP07-WGN01LF-2402	2/6/2024	Primary	--	<142 U	<142 U	--	--	--	--	--	--	--	--	--
RHP07	SGS Anchorage	1240483	RHP07-WGN01LF-2402	2/6/2024	Primary	--	--	--	--	--	--	--	--	--	--	--	--
RHP07	SGS Orlando	FC13169	RHP07-WGN01LF-2402	2/6/2024	Primary	<50 U	<96 U	<150 U	--	--	<0.5 U	<0.5 U	<0.5 U	<1.5 U	<0.38 U	<0.38 U	<0.38 U
RHP07	SGS Anchorage	1240991	RHP07-WGN01LF-2403	3/12/2024	Primary	--	--	--	--	--	--	--	--	--	--	--	--
RHP07	SGS Orlando	FC14055	RHP07-WGN01LF-2403	3/12/2024	Primary	<50 U	<100 U	<170 U	--	--	<0.5 U	<0.5 U	<0.5 U	<1.5 U	<0.42 U	<0.42 U	<0.42 U

Notes:
 See Data Legend

App. B.3.1 Groundwater Analytical Data: Red Hill Bulk Fuel Storage Facility
 Consolidated Sampling Program & Groundwater Protection Plan-Defueling Sampling
 Groundwater Sampling: RHP07

						Polycyclic Aromatic Hydrocarbons (PAHs) - NOI															
						Acenaphthene (SIM)	Acenaphthylene (SIM)	Anthracene (SIM)	Benzo(a)anthracene (SIM)	Benzo(a)pyrene (SIM)	Benzo(b)fluoranthene (SIM)	Benzo(g,h,i)perylene (SIM)	Benzo(k)fluoranthene (SIM)	Chrysene (SIM)	Dibenzo(a,h)anthracene (SIM)	Fluoranthene (SIM)	Fluorene (SIM)	Indeno(1,2,3-cd)pyrene (SIM)	Phenanthrene (SIM)	Pyrene (SIM)	
						83-32-9	208-96-8	120-12-7	56-55-3	50-32-8	205-99-2	191-24-2	207-08-9	218-01-8	53-70-3	206-44-0	86-73-7	193-39-5	85-01-8	129-00-0	
						8270SIM	8270SIM	8270SIM	8270SIM	8270SIM	8270SIM	8270SIM	8270SIM	8270SIM	8270SIM	8270SIM	8270SIM	8270SIM	8270SIM	8270SIM	8270SIM
DOH Tier 1 EAL						20	240	0.18	0.029	0.2	0.22	0.13	0.4	1	0.022	13	240	0.095	210	68	
Units						µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
Minimum						ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Maximum						ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Location	Lab	SDG	Sample ID	Sampling Date	Type	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result
RHP07	APPL	24B0033	RHP07-WGN01LF-2402	2/6/2024	Primary	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
RHP07	Energy	B24020463	RHP07-WGN01LF-2402	2/6/2024	Primary	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
RHP07	SGS Anchorage	1240483	RHP07-WGN01LF-2402	2/6/2024	Primary	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
RHP07	SGS Orlando	FC13169	RHP07-WGN01LF-2402	2/6/2024	Primary	<0.38	U	<0.38	U	<0.38	U	<0.038	U	<0.038	U	<0.038	U	<0.38	U	<0.38	U
RHP07	SGS Anchorage	1240991	RHP07-WGN01LF-2403	3/12/2024	Primary	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
RHP07	SGS Orlando	FC14055	RHP07-WGN01LF-2403	3/12/2024	Primary	<0.42	U	<0.42	U	<0.42	U	<0.042	U	<0.042	U	<0.042	U	<0.42	U	<0.42	U

Notes:
 See Data Legend

App. B.3.1 Groundwater Analytical Data: Red Hill Bulk Fuel Storage Facility
 Consolidated Sampling Program & Groundwater Protection Plan-Defueling Sampling
 Groundwater Sampling: RHP07

						Fuel Additive		Lead Scavengers				Natural Attenuation Parameters			
						2-(2-Methoxyethoxy)-ethanol ⁵	Phenol	1,2-Dibromoethane	1,2-Dichloroethane	Methane	Total Organic Carbon	NV Dissolved Organic Carbon			
						111-77-3	108-95-2	106-93-4	107-06-2	74-82-8	TOC	Carbon			
						Method 8270D	SW8270	8011	8260	RSK 175	9060	9060			
						DOH Tier 1 EAL	800	300	0.04	5	--	--			
						Units	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L			
						Minimum	ND	ND	ND	ND	ND	ND			
						Maximum	ND	ND	ND	ND	760	857			
Location	Lab	SDG	Sample ID	Sampling Date	Type	Result	Result	Result	Result	Result	Result	Result	Result	Result	
RHP07	APPL	24B0033	RHP07-WGN01LF-2402	2/6/2024	Primary	-90 UJ	-	-	-	-	-	-	-	-	
RHP07	Energy	B24020463	RHP07-WGN01LF-2402	2/6/2024	Primary	-	-	-	-	-	-	-	-	-	
RHP07	SGS Anchorage	1240483	RHP07-WGN01LF-2402	2/6/2024	Primary	-	-	-	-	-	760	J+	857	J+	
RHP07	SGS Orlando	FC13169	RHP07-WGN01LF-2402	2/6/2024	Primary	-	<2 U	<0.015 U	<0.5 U	<0.25 U	-	-	-	-	
RHP07	SGS Anchorage	1240991	RHP07-WGN01LF-2403	3/12/2024	Primary	-	-	-	-	-	<750 U	U	<750 U	U	
RHP07	SGS Orlando	FC14055	RHP07-WGN01LF-2403	3/12/2024	Primary	-	<2 U	<0.014 U	<0.5 U	<0.25 U	-	-	-	-	

Notes:
 See Data Legend

App. B.3.1 Groundwater Analytical Data: Red Hill Bulk Fuel Storage Facility
 Consolidated Sampling Program & Groundwater Protection Plan-Defueling Sampling
 Groundwater Sampling: RHP08

						Total Petroleum Hydrocarbons					Volatile Organic Compounds				Polycyclic Aromatic Hydrocarbons (PAHs) - AOC/LTM			
						TPH-g PHCC6C10	TPH-d ⁴ PHCC10C24	TPH-o ⁴ PHCC24C40	TPH-d with Silica Gel Cleanup ³ PHCC10C24SGC	TPH-o with Silica Gel Cleanup ³ PHCC24C40SGC	Benzene 71-43-2	Ethylbenzene 100-41-4	Toluene 108-88-3	Xylenes 1330-20-7	1-Methylnaphthalene 90-12-0	2-Methylnaphthalene 91-57-6	Naphthalene 91-20-3	
DOH Tier 1 EAL						300	400	500	--	--	5	30	40	20	10	10	17	
Units						µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
Minimum						ND	ND	ND	ND	111	ND	ND	ND	ND	ND	ND	ND	ND
Maximum						ND	ND	91.5	ND	111	ND	ND	ND	ND	ND	ND	ND	ND
Location	Lab	SDG	Sample ID	Sampling Date	Type	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result
RHP08	APPL	24B0042	RHP08-WGN01LF-2402	2/7/2024	Primary	--	--	--	--	--	--	--	--	--	--	--	--	--
RHP08	Energy	B24020580	RHP08-WGN01LF-2402	2/7/2024	Primary	--	<141 U	<188 U	--	--	--	--	--	--	--	--	--	--
RHP08	SGS Anchorage	1240512	RHP08-WGN01LF-2402	2/7/2024	Primary	--	--	--	--	--	--	--	--	--	--	--	--	--
RHP08	SGS Orlando	FC13229	RHP08-WGN01LF-2402	2/7/2024	Primary	<50 U	<100 U	<170 U	--	--	<0.5 U	<0.5 U	<0.5 U	<1.5 U	<0.42 U	<0.42 U	<0.42 U	U
RHP08	SGS Anchorage	1241067	RHP08-WGN01LF-2403	3/18/2024	Primary	--	--	--	--	--	--	--	--	--	--	--	--	--
RHP08	SGS Orlando	FC14185	RHP08-WGN01LF-2403	3/18/2024	Primary	<50 U	<100 U	91.5 J	<100 U	111 J	<0.5 U	<0.5 U	<0.5 U	<1.5 U	<0.4 U	<0.4 U	<0.4 U	U

Notes:
 See Data Legend

App. B.3.1 Groundwater Analytical Data: Red Hill Bulk Fuel Storage Facility
 Consolidated Sampling Program & Groundwater Protection Plan-Defueling Sampling
 Groundwater Sampling: RHP08

						Polycyclic Aromatic Hydrocarbons (PAHs) - NOI																			
						Acenaphthene (SIM)	Acenaphthylene (SIM)	Anthracene (SIM)	Benzo(a)anthracene (SIM)	Benzo(a)pyrene (SIM)	Benzo(b)fluoranthene (SIM)	Benzo(g,h,i)perylene (SIM)	Benzo(k)fluoranthene (SIM)	Chrysene (SIM)	Dibenzo(a,h)anthracene (SIM)	Fluoranthene (SIM)	Fluorene (SIM)	Indeno(1,2,3-cd)pyrene (SIM)	Phenanthrene (SIM)	Pyrene (SIM)					
						83-32-9	208-96-8	120-12-7	56-55-3	50-32-8	205-99-2	191-24-2	207-08-9	218-01-9	53-70-3	206-44-0	86-73-7	193-39-5	85-01-8	129-00-0					
						8270SIM	8270SIM	8270SIM	8270SIM	8270SIM	8270SIM	8270SIM	8270SIM	8270SIM	8270SIM	8270SIM	8270SIM	8270SIM	8270SIM	8270SIM					
DOH Tier 1 EAL						20	240	0.18	0.029	0.2	0.22	0.13	0.4	1	0.022	13	240	0.095	210	68					
Units						µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L					
Minimum						ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND					
Maximum						ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND					
Location	Lab	SDG	Sample ID	Sampling Date	Type	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result					
RHP08	APPL	24B0042	RHP08-WGN01LF-2402	2/7/2024	Primary	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-					
RHP08	Energy	B24020580	RHP08-WGN01LF-2402	2/7/2024	Primary	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-					
RHP08	SGS Anchorage	1240512	RHP08-WGN01LF-2402	2/7/2024	Primary	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-					
RHP08	SGS Orlando	FC13229	RHP08-WGN01LF-2402	2/7/2024	Primary	<0.42	U	<0.42	U	<0.42	U	<0.042	U	<0.042	U	<0.042	U	<0.083	U	<0.042	U	<0.42	U	<0.42	U
RHP08	SGS Anchorage	1241067	RHP08-WGN01LF-2403	3/18/2024	Primary	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
RHP08	SGS Orlando	FC14185	RHP08-WGN01LF-2403	3/18/2024	Primary	<0.4	U	<0.4	U	<0.4	U	<0.04	U	<0.04	U	<0.04	U	<0.04	U	<0.04	U	<0.4	U	<0.4	U

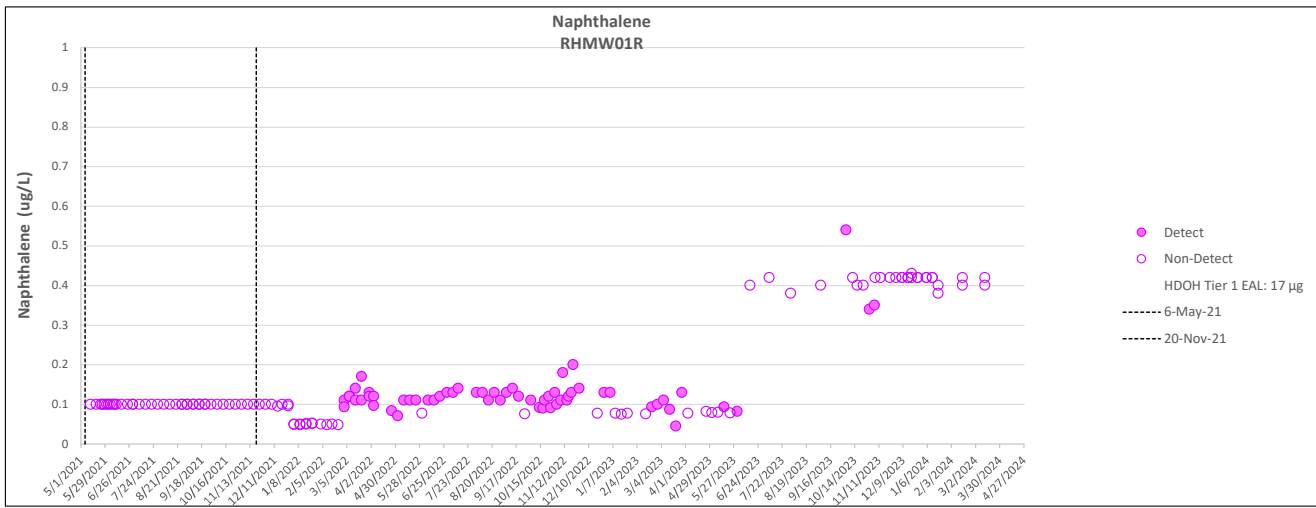
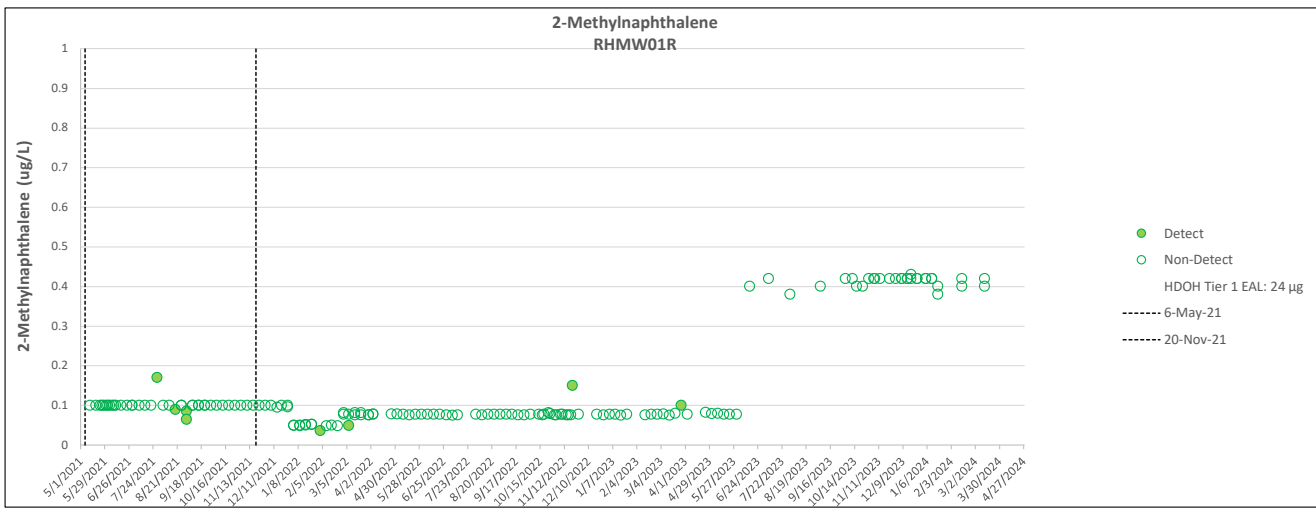
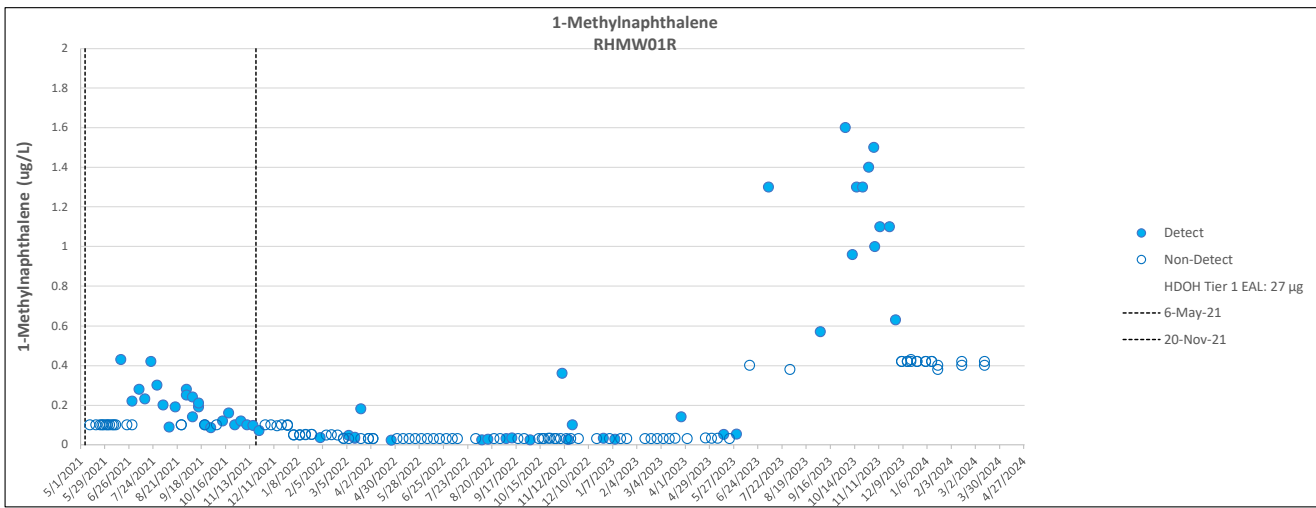
Notes:
 See Data Legend

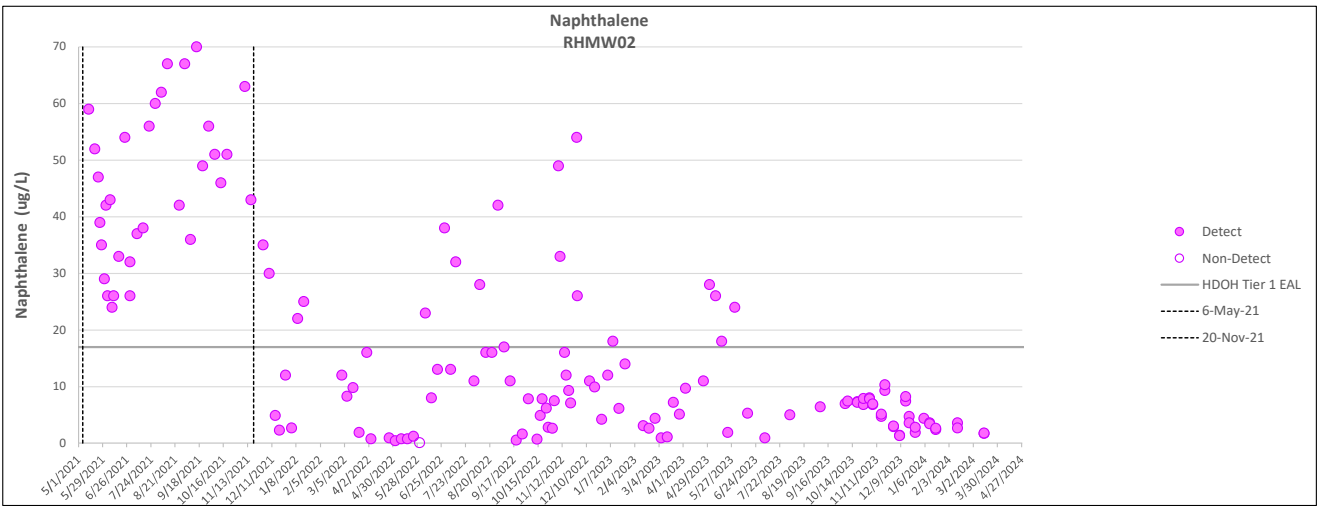
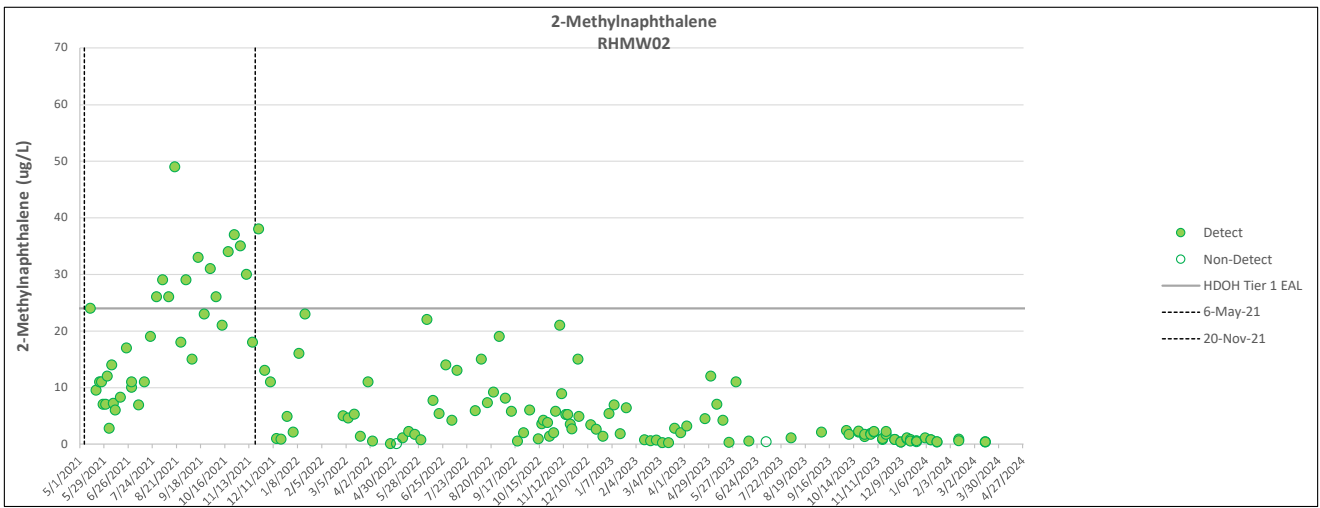
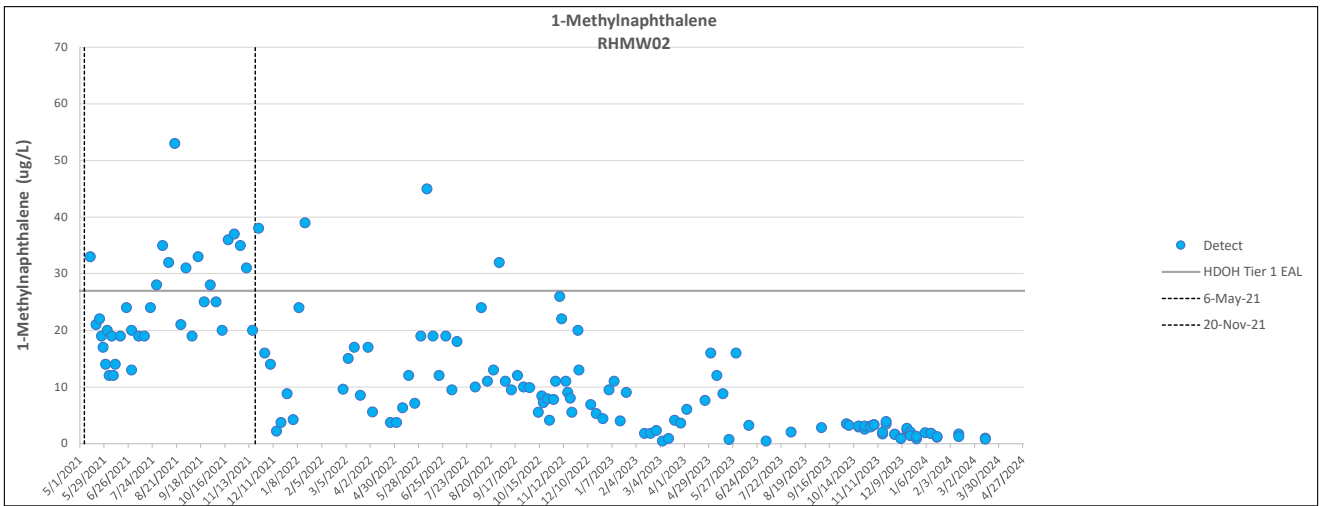
App. B.3.1 Groundwater Analytical Data: Red Hill Bulk Fuel Storage Facility
 Consolidated Sampling Program & Groundwater Protection Plan-Defueling Sampling
 Groundwater Sampling: RHP08

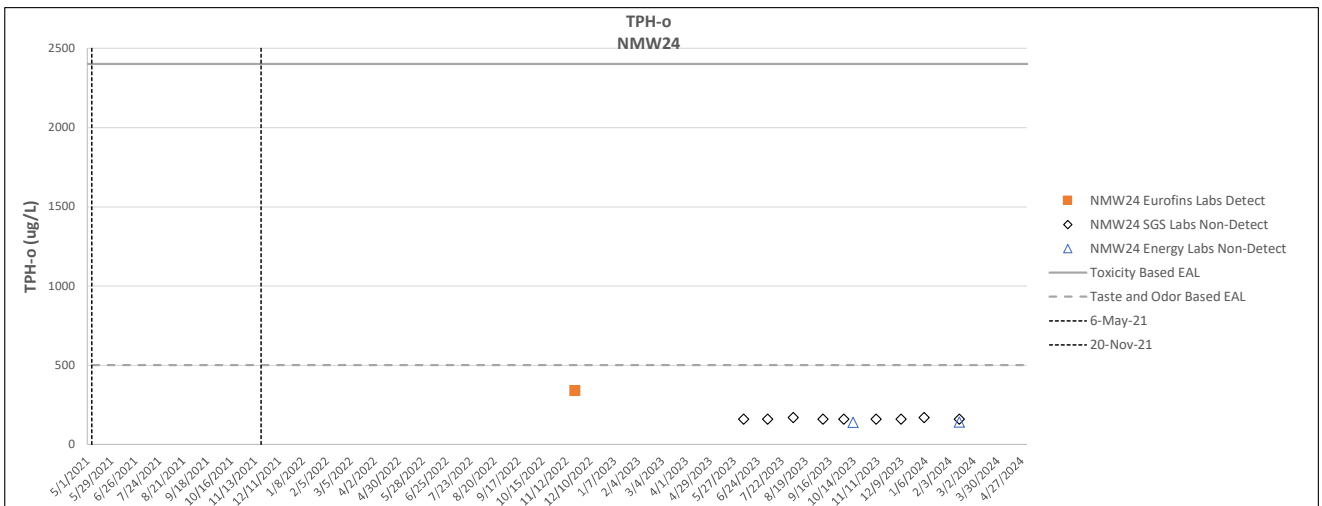
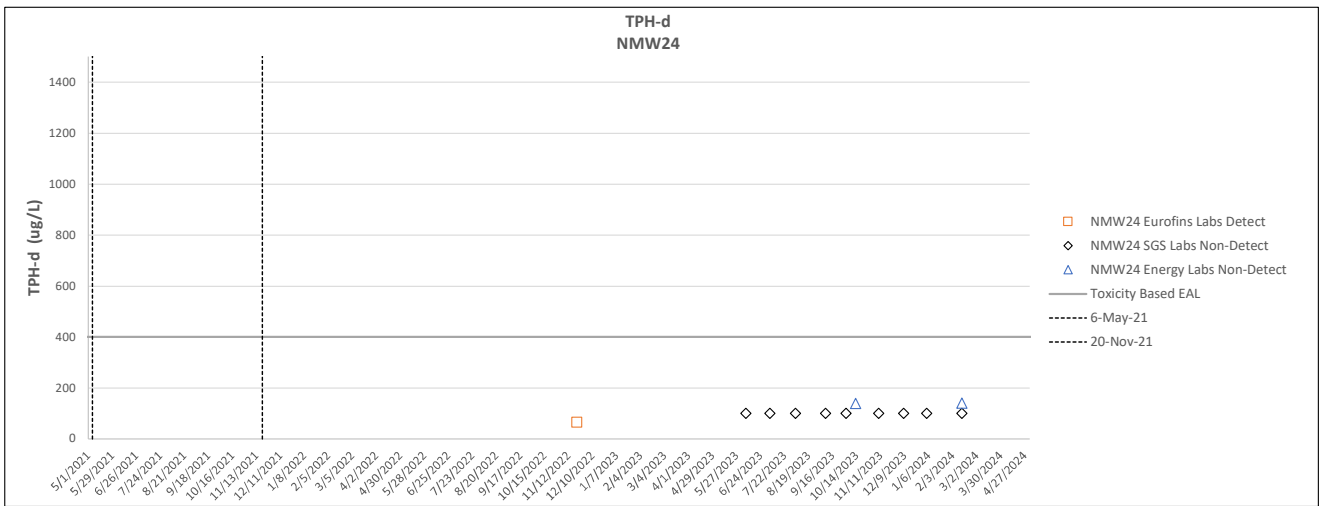
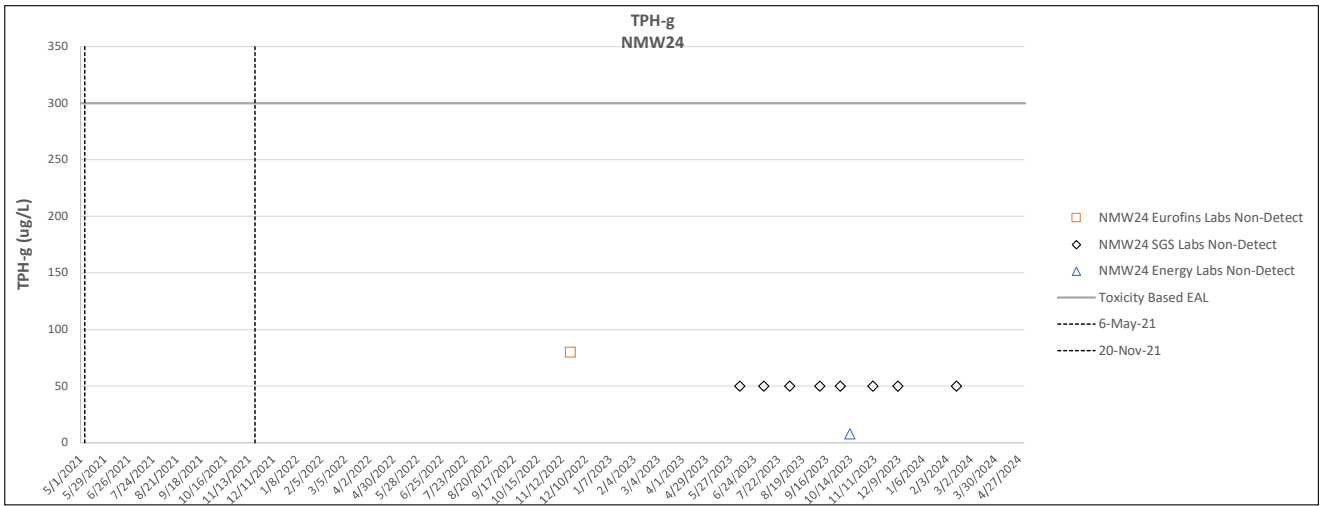
						Fuel Additive		Lead Scavengers				Natural Attenuation Parameters		
						2-(2-Methoxyethoxy)-ethanol ⁵	Phenol	1,2-Dibromoethane	1,2-Dichloroethane	Methane	Total Organic Carbon	NV Dissolved Organic Carbon		
Analyte						111-77-3	108-95-2	106-93-4	107-06-2	74-82-8	TOC	--		
CAS No.						8270D	SW8270	8011	8260	RSK 175	9060	9060		
Method						800	300	0.04	5	--	--	--		
DOH Tier 1 EAL						µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L		
Units						ND	ND	ND	ND	ND	ND	ND		
Minimum						ND	ND	ND	ND	ND	523	813		
Maximum														
Location	Lab	SDG	Sample ID	Sampling Date	Type	Result	Result	Result	Result	Result	Result	Result	Result	
RHP08	APPL	24B0042	RHP08-WGN01LF-2402	2/7/2024	Primary	<80	U	--	--	--	--	--	--	
RHP08	Energy	B24020580	RHP08-WGN01LF-2402	2/7/2024	Primary	--	--	--	--	--	--	--	--	
RHP08	SGS Anchorage	1240512	RHP08-WGN01LF-2402	2/7/2024	Primary	--	--	--	--	--	<750	U	<750	
RHP08	SGS Orlando	FC13229	RHP08-WGN01LF-2402	2/7/2024	Primary	--	--	<2	U	<0.015	U	<0.5	U	
RHP08	SGS Anchorage	1241067	RHP08-WGN01LF-2403	3/18/2024	Primary	--	--	--	--	--	523	J	813	
RHP08	SGS Orlando	FC14185	RHP08-WGN01LF-2403	3/18/2024	Primary	--	--	<1.9	U	<0.014	U	<0.5	U	

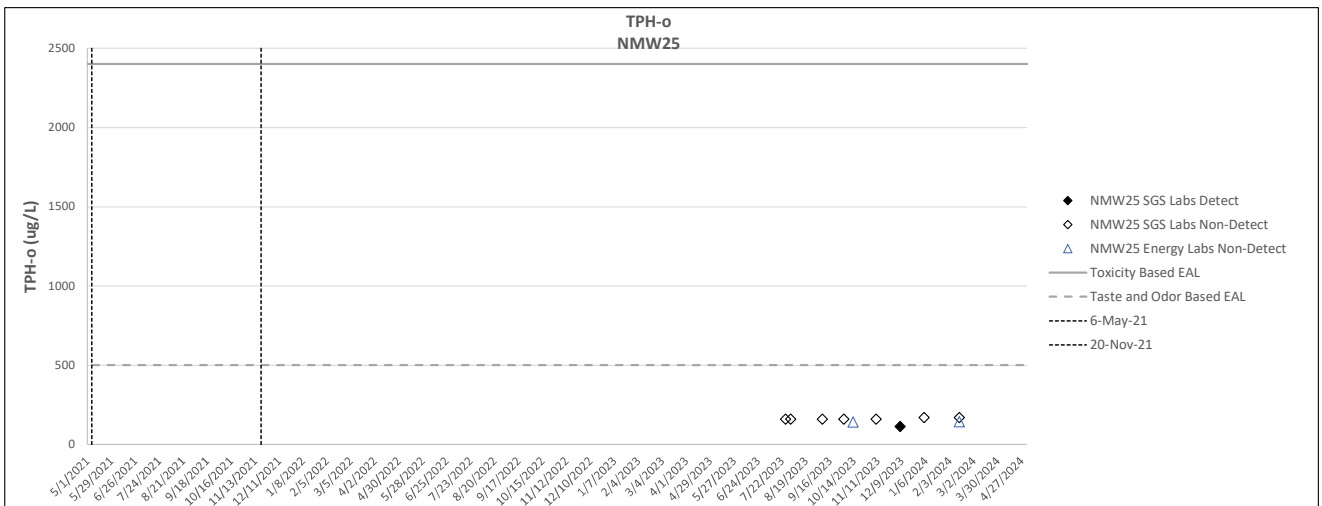
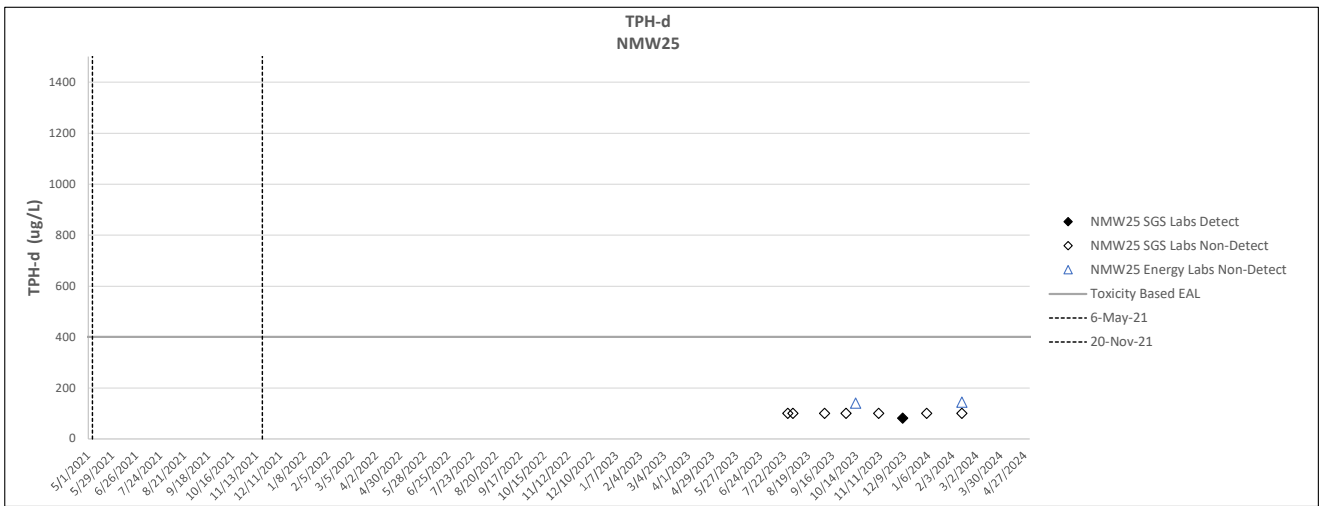
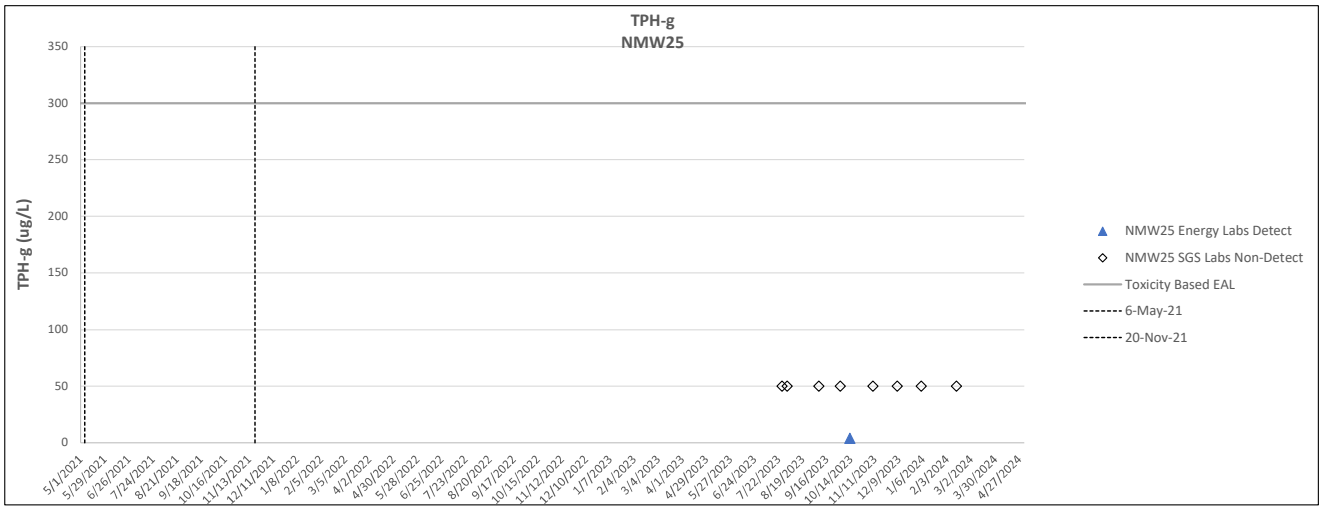
Notes:
 See Data Legend

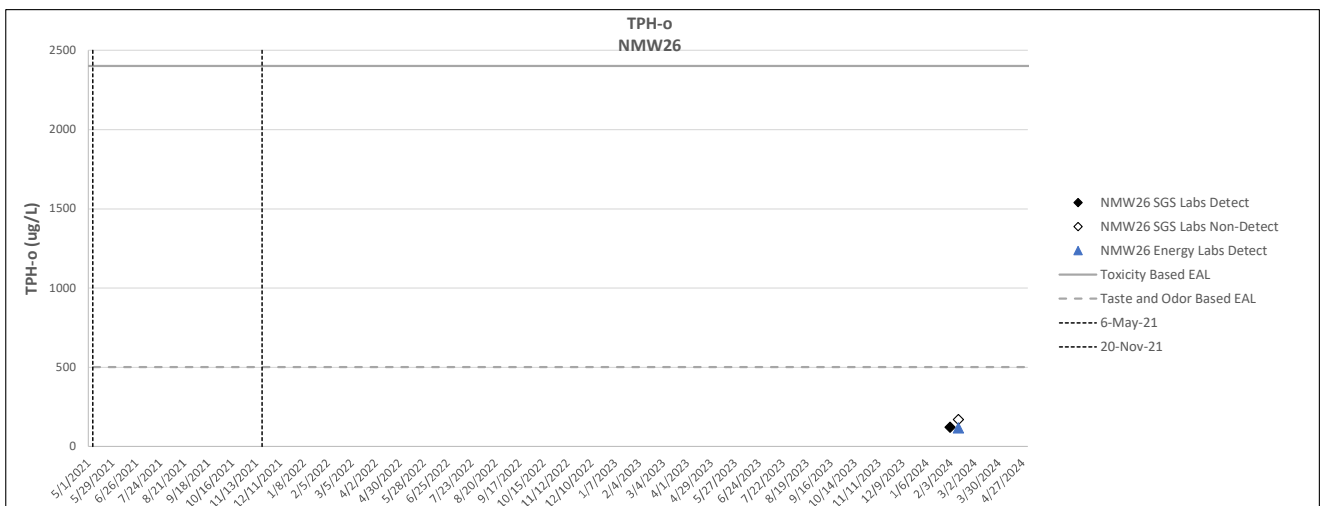
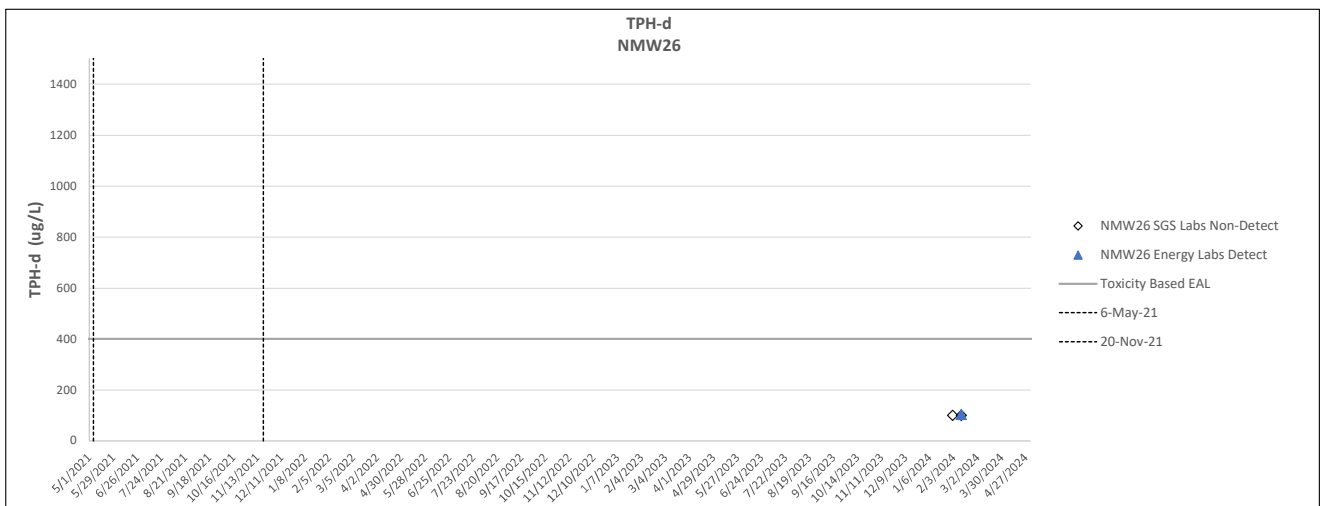
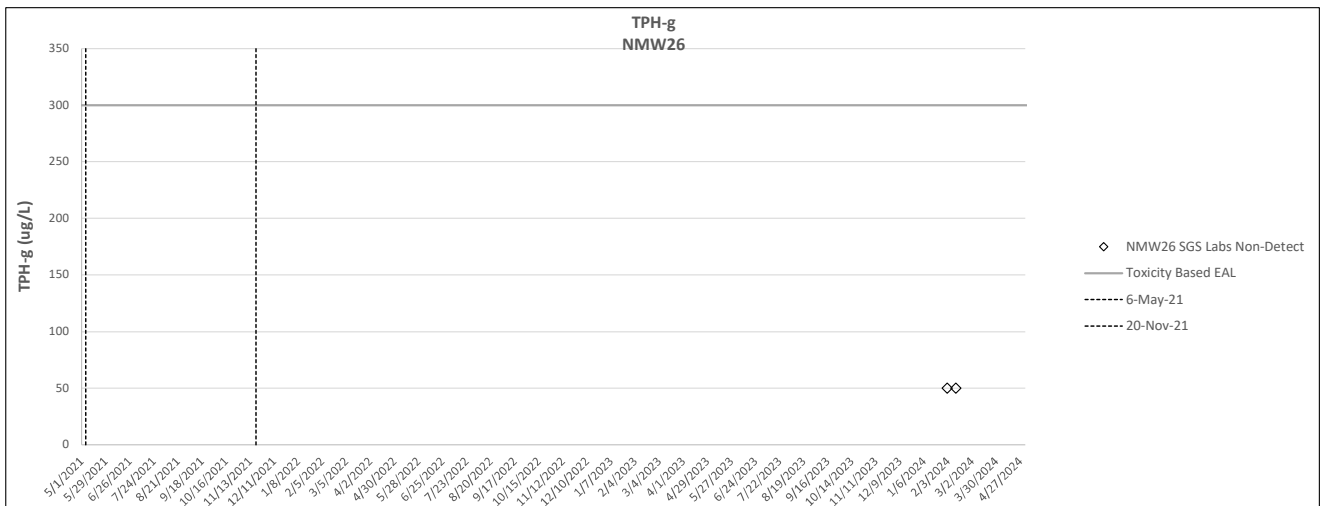
Appendix B.3.2 – Groundwater TPH and PAH Analytical Charts

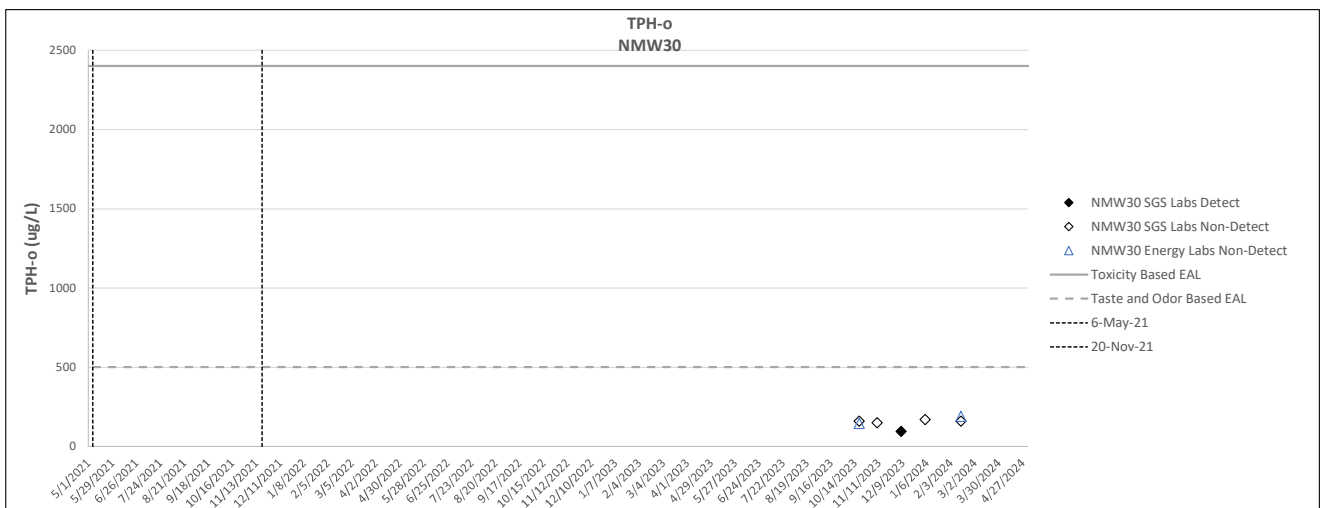
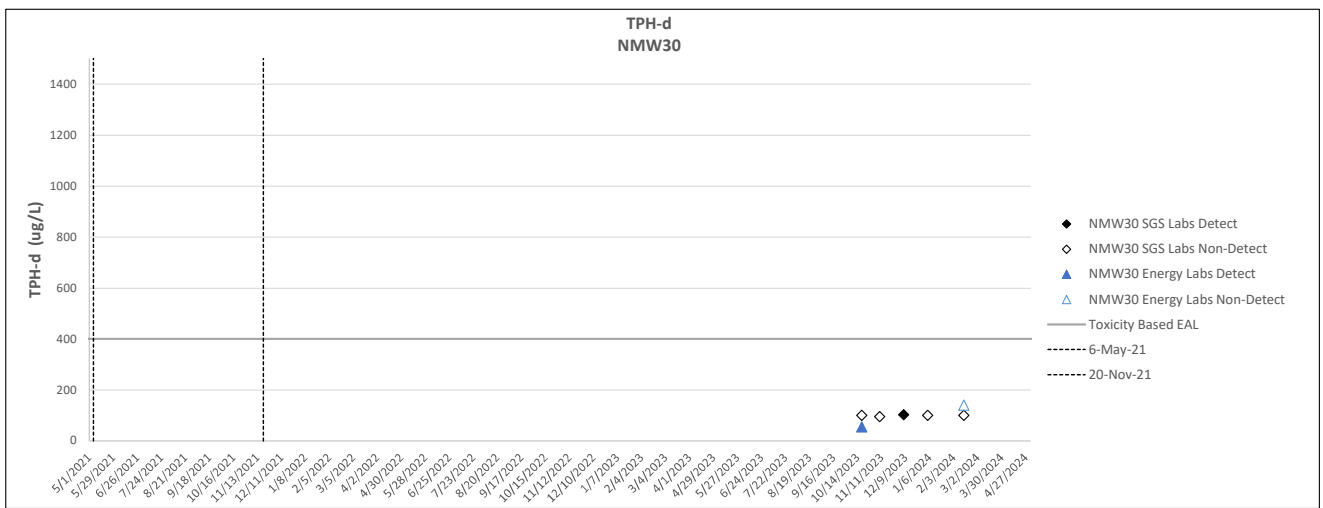
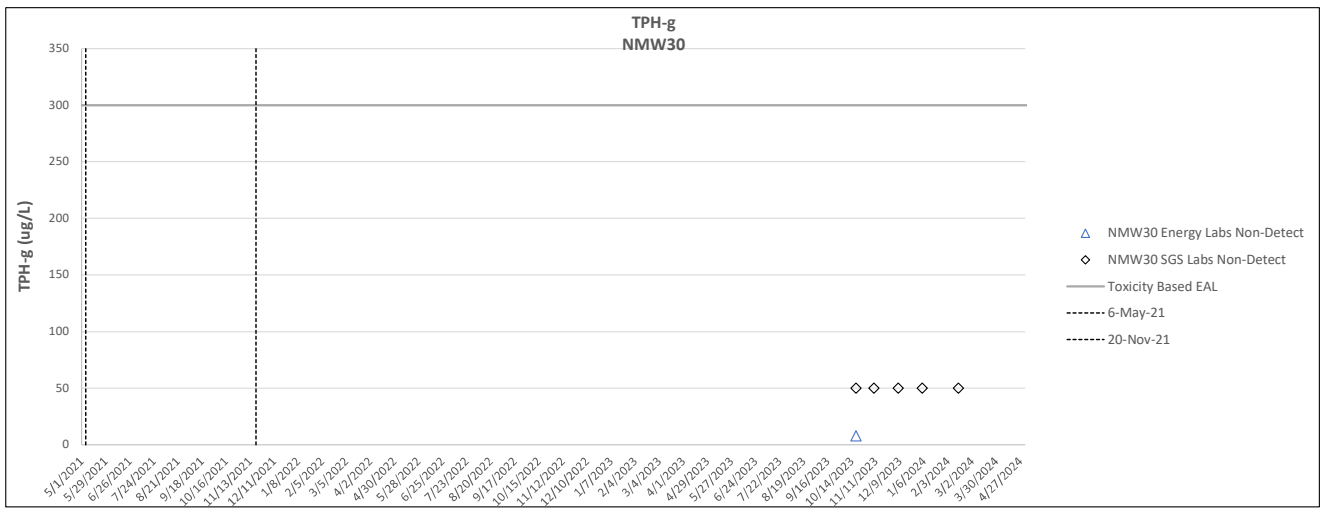


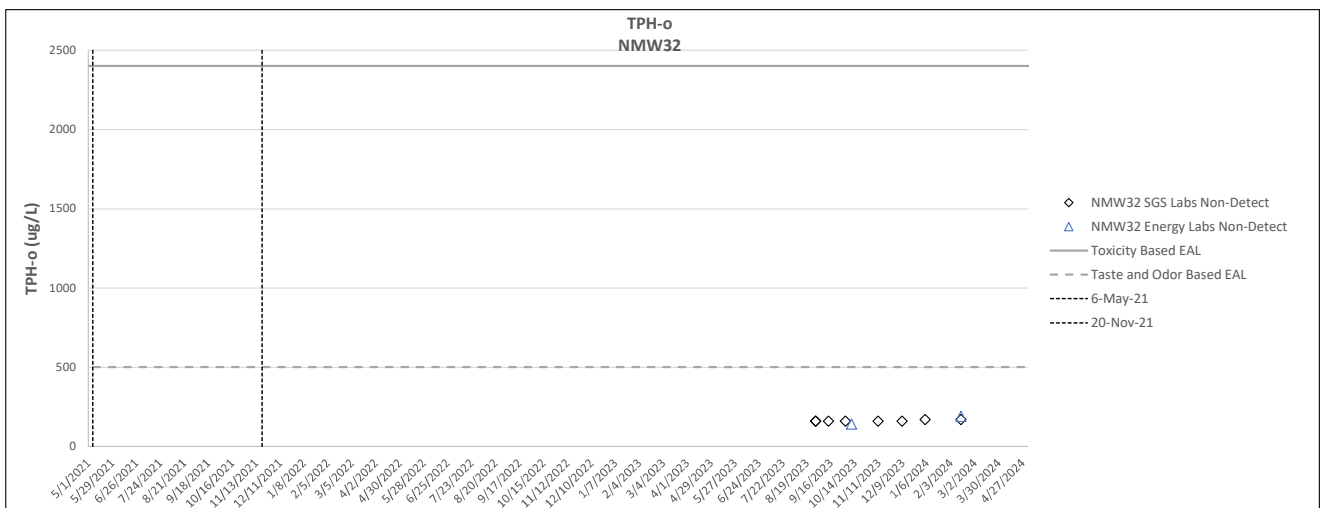
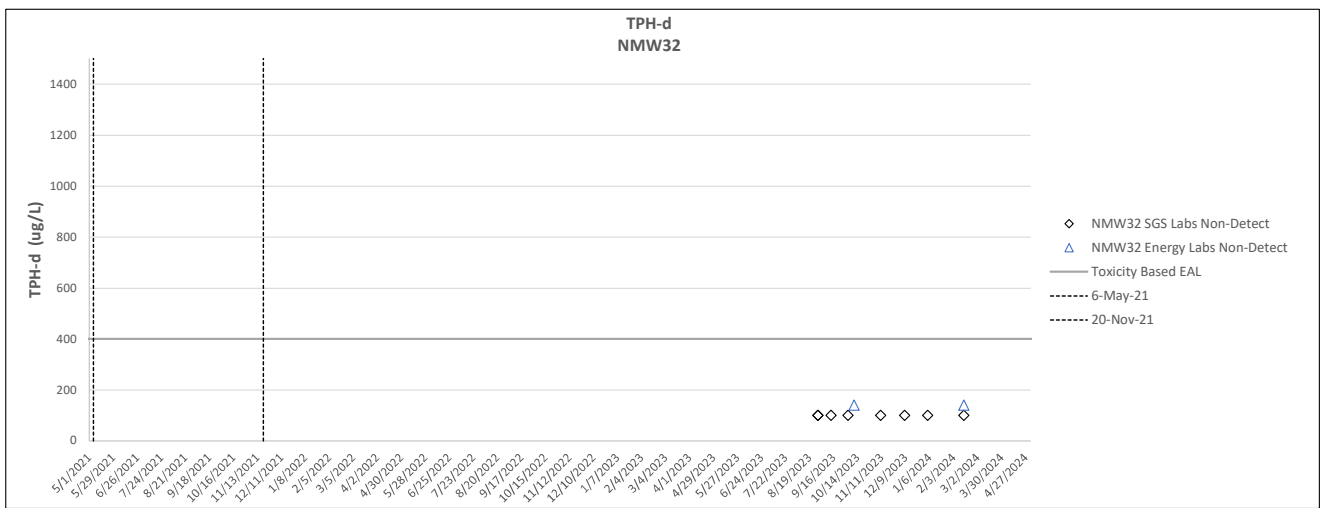
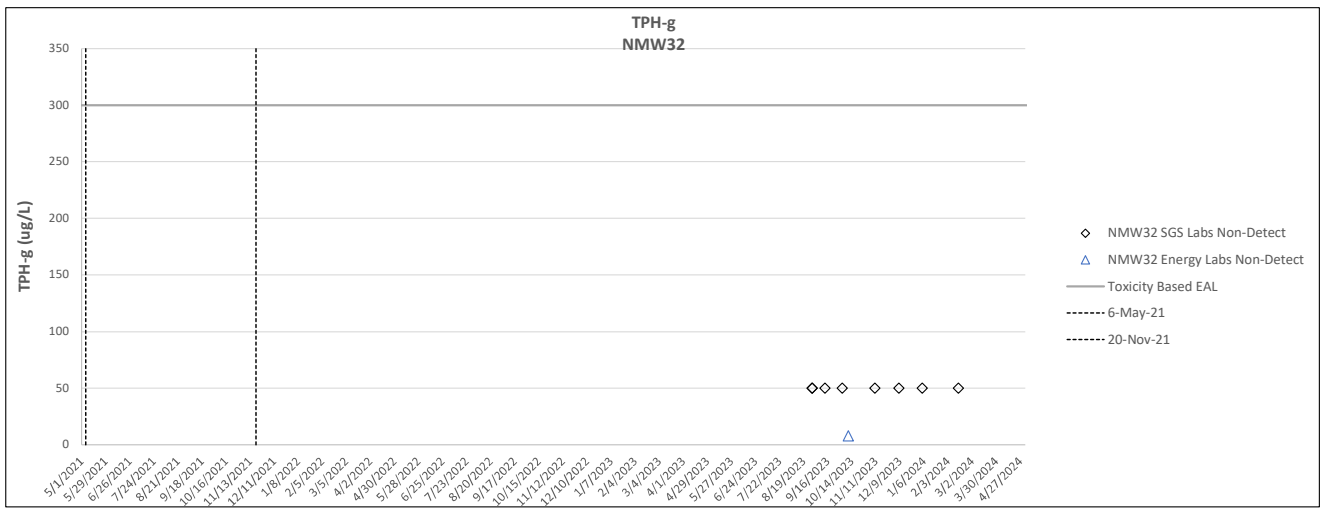


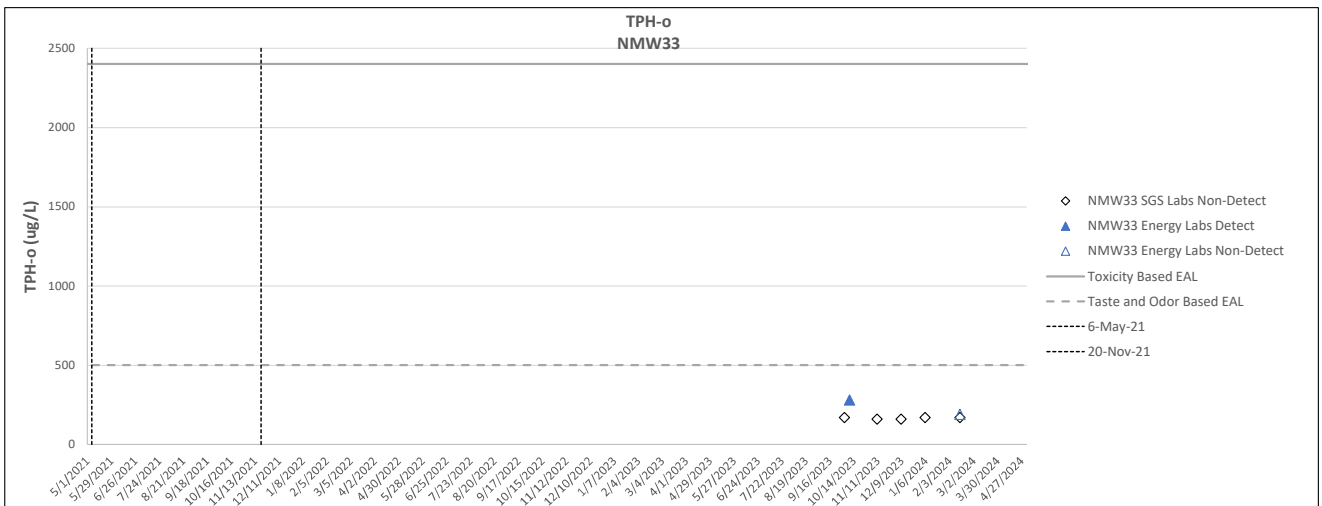
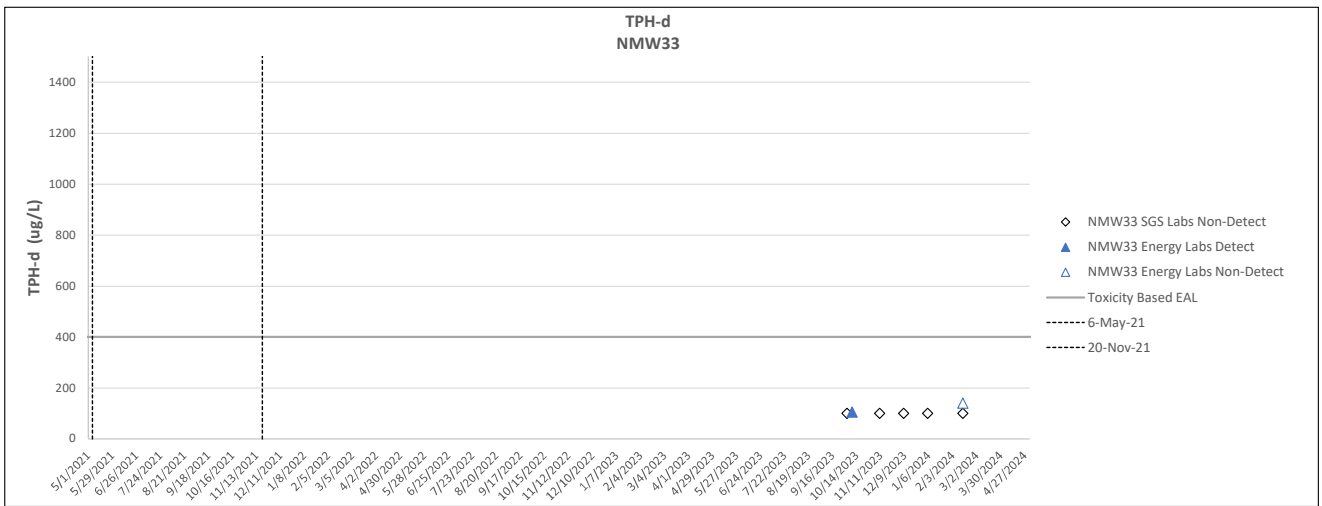
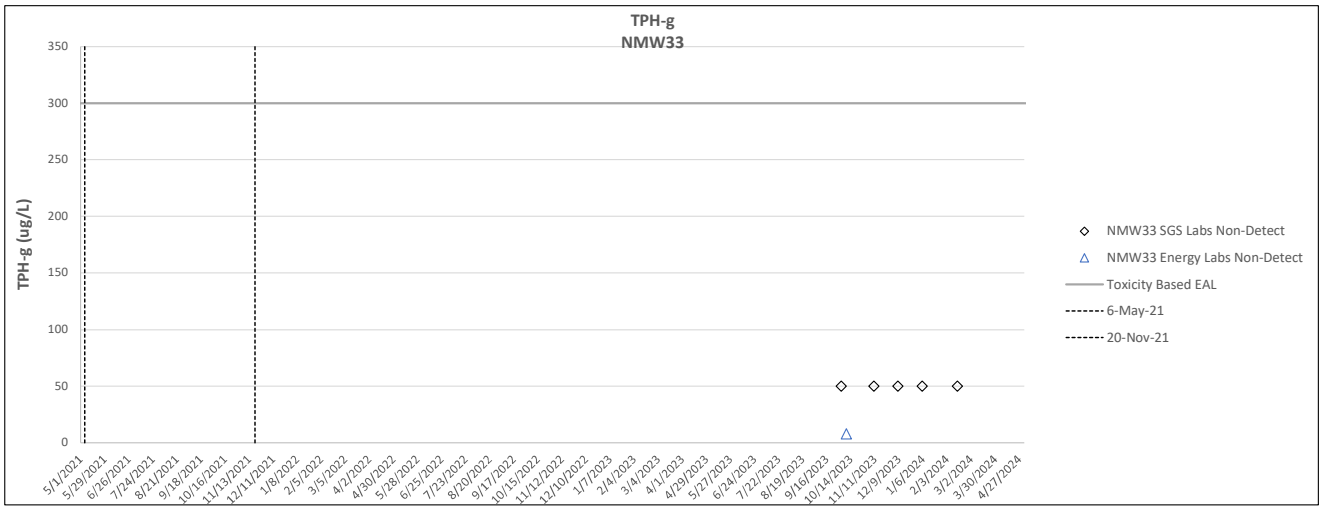


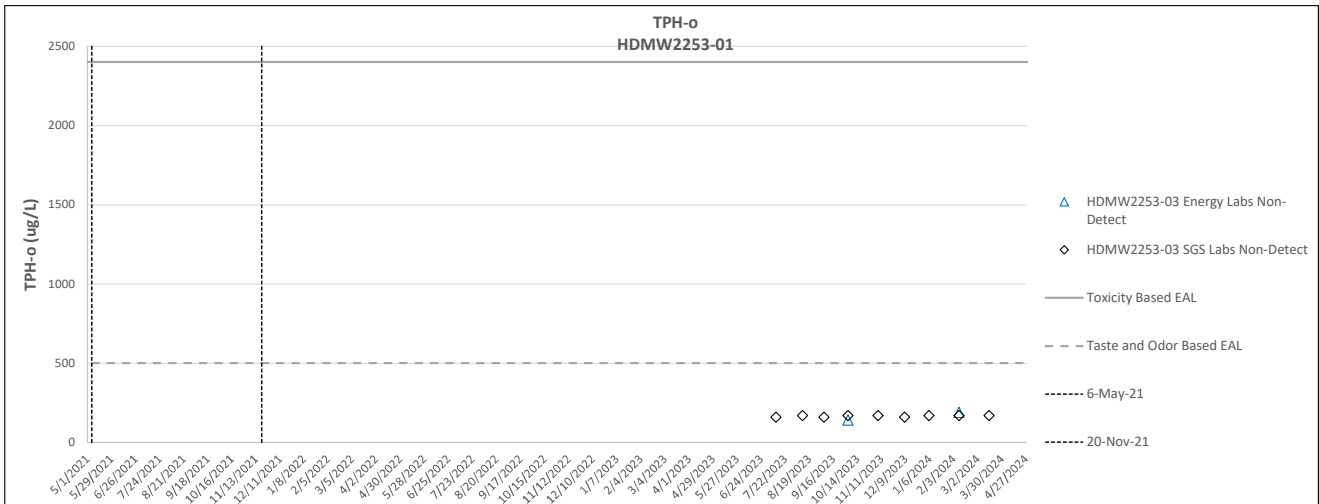
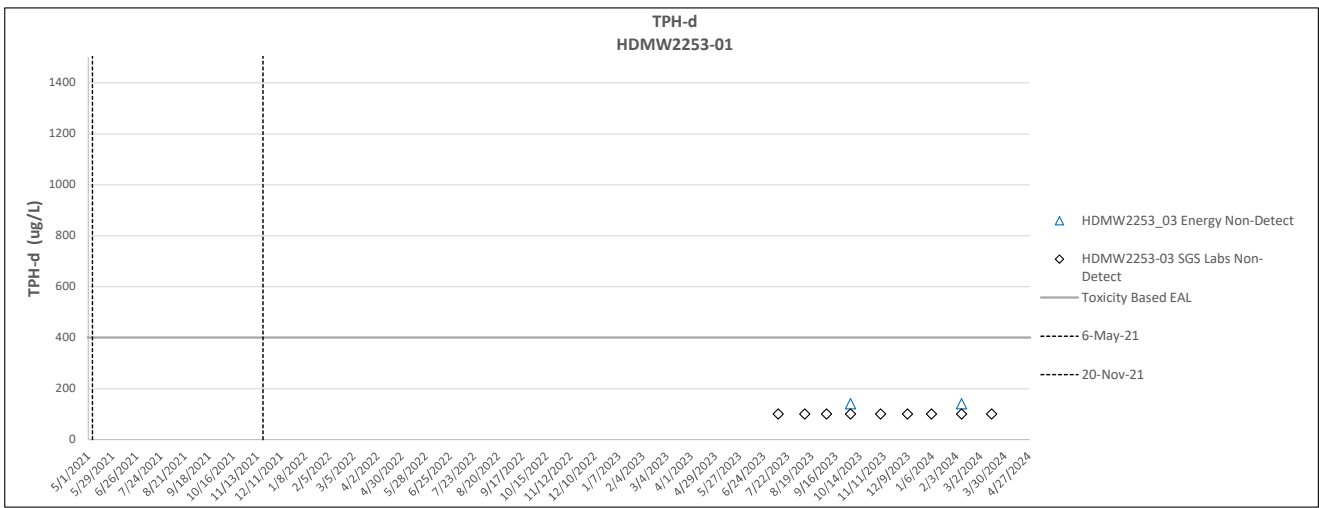
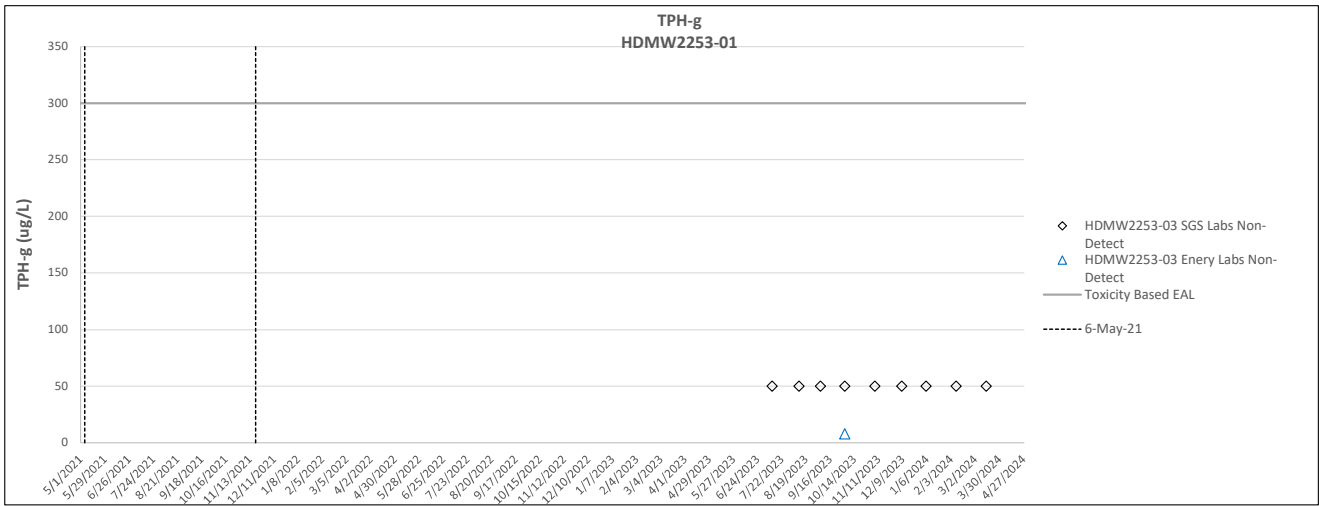


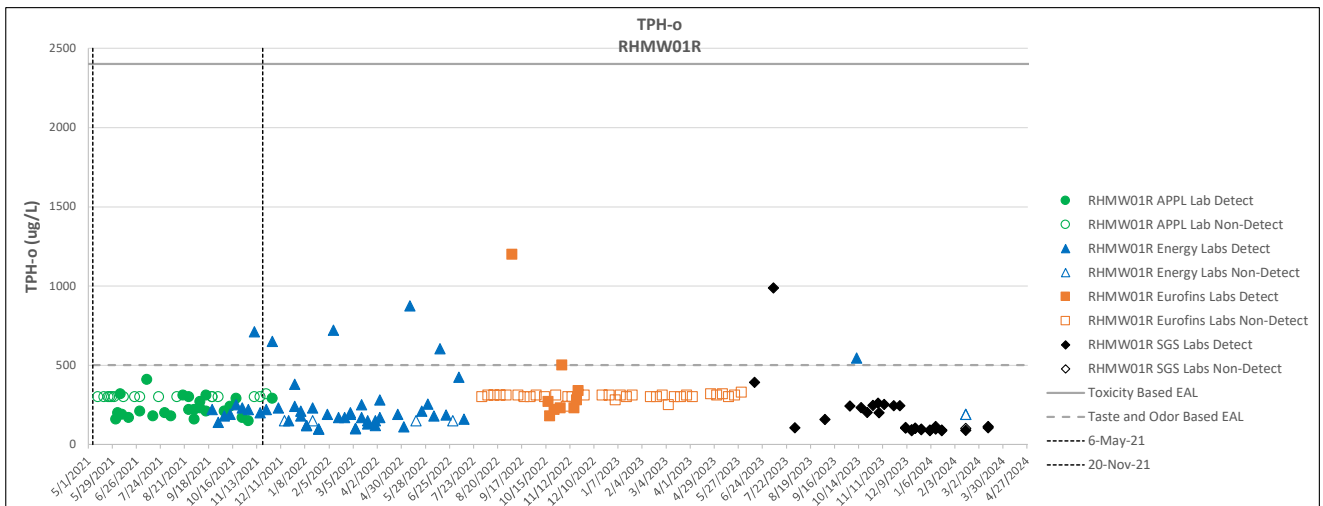
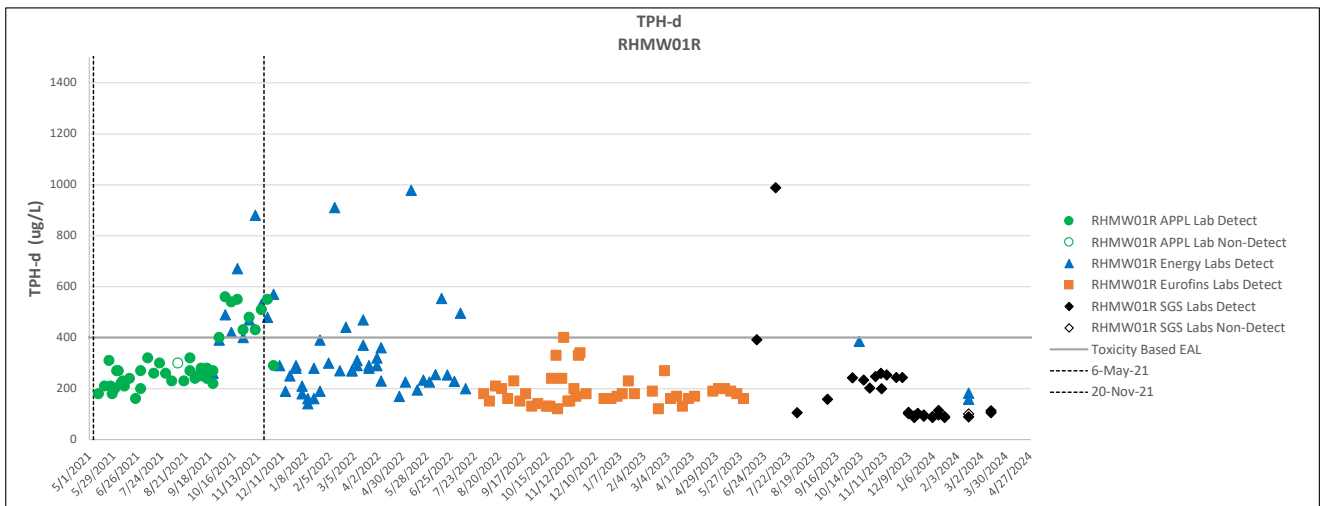
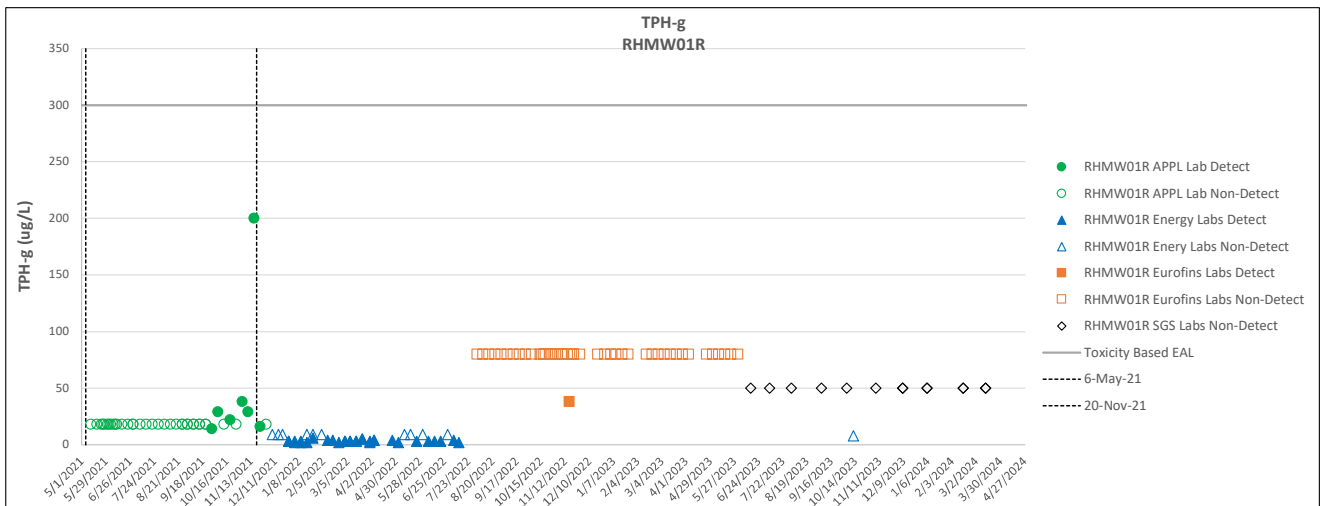




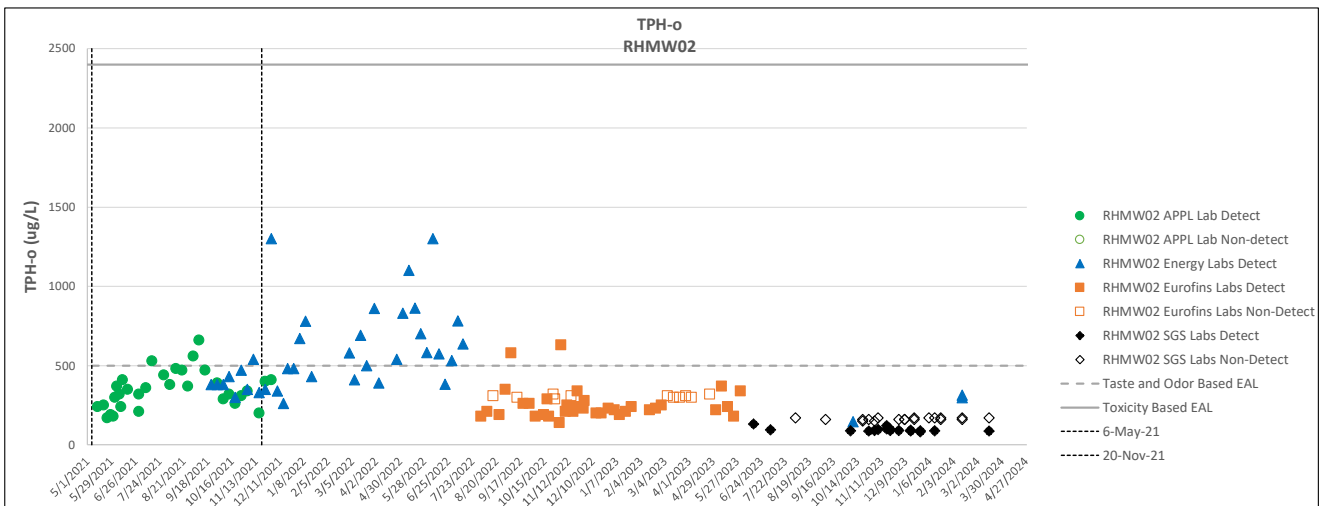
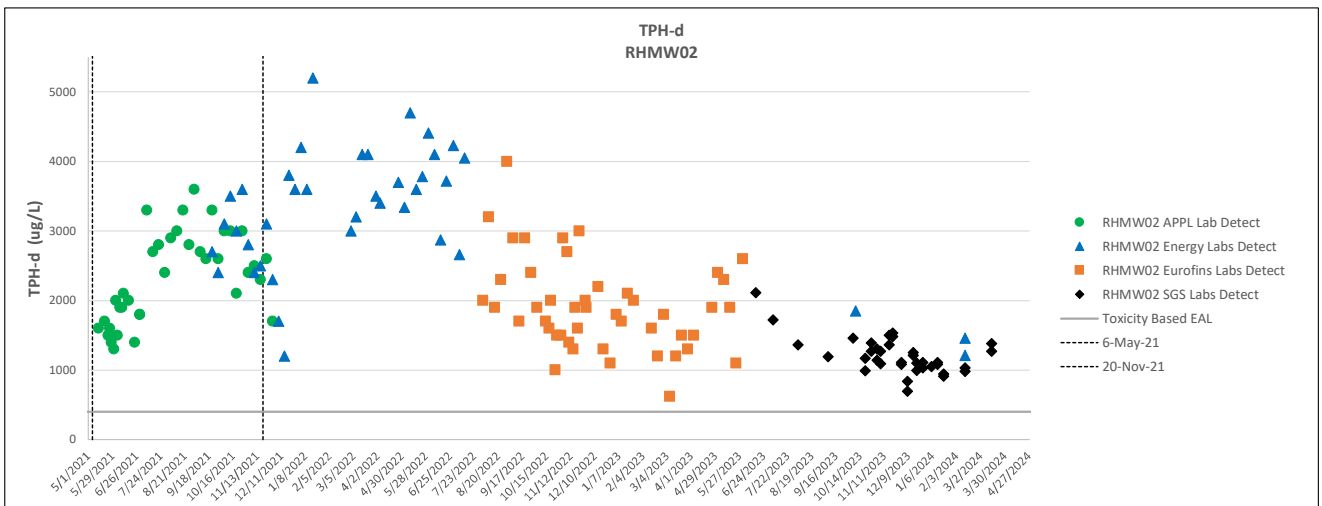
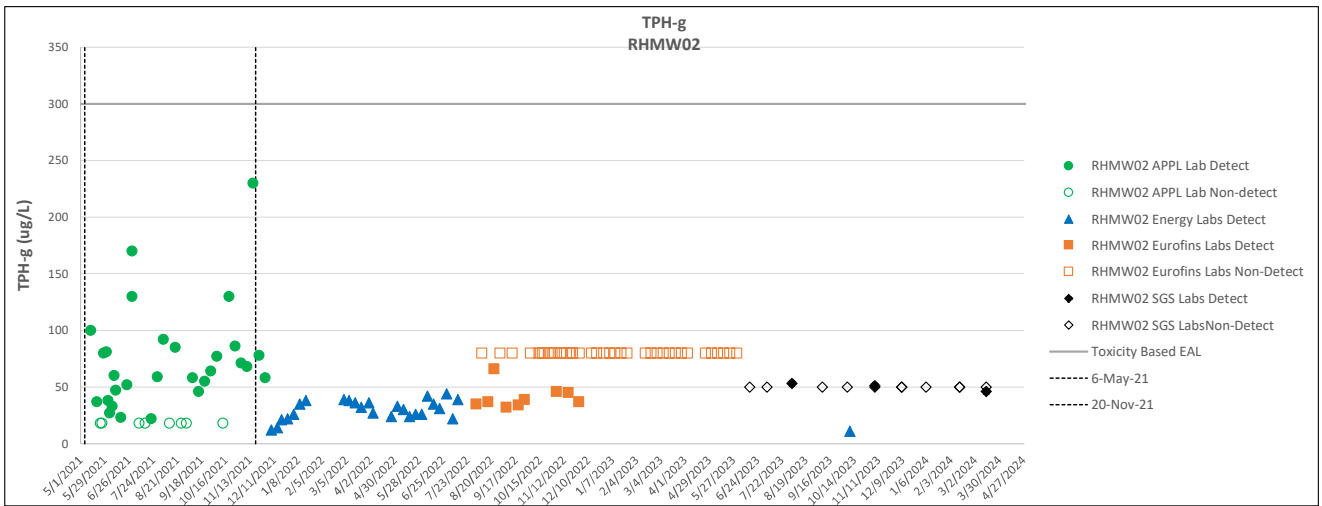


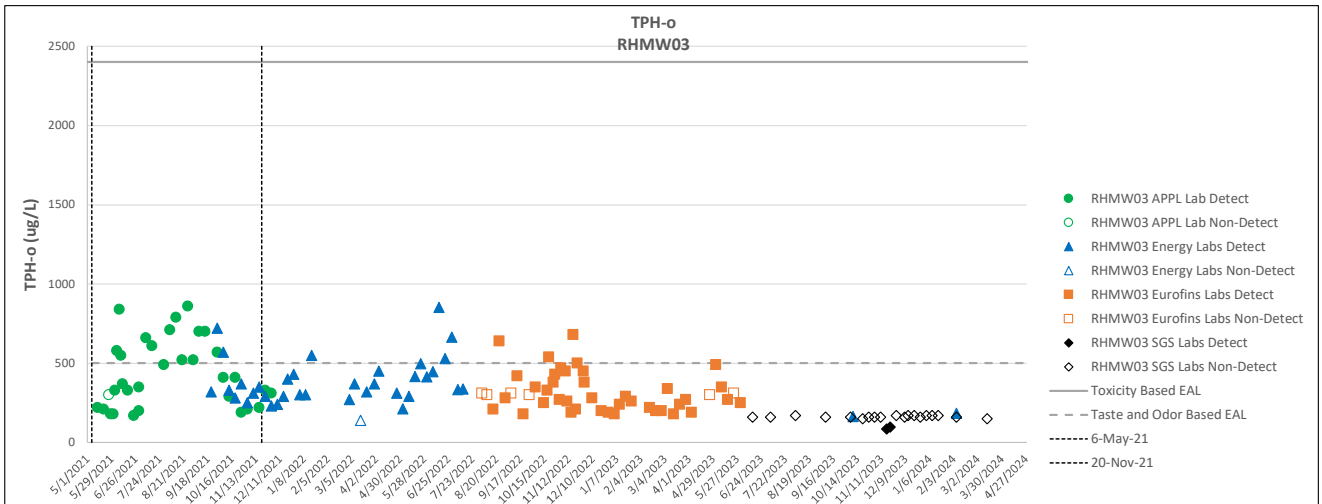
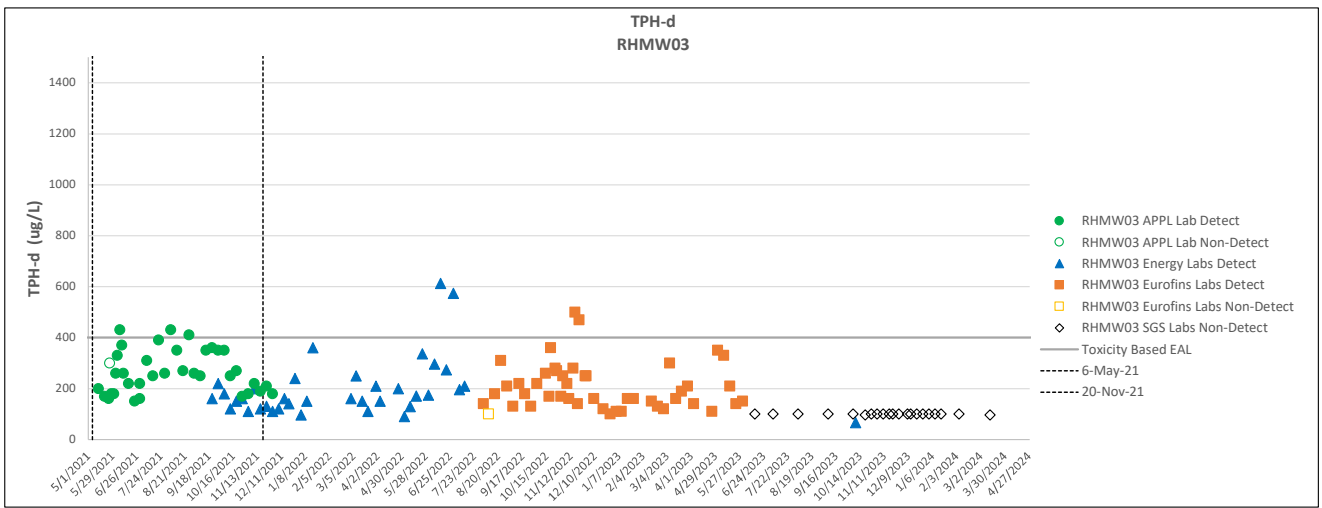
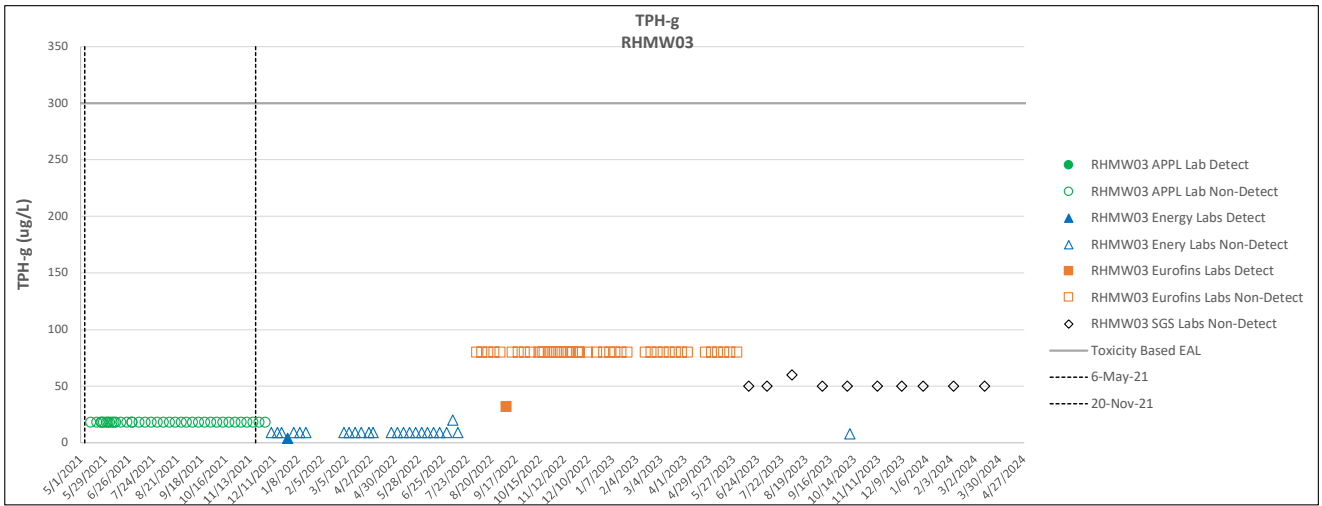


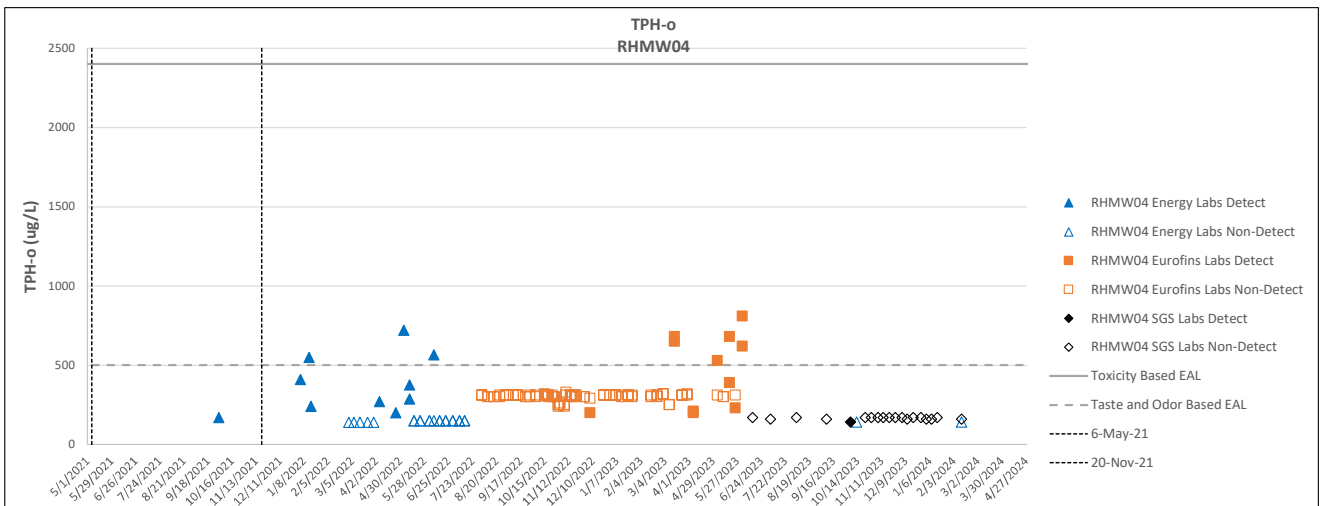
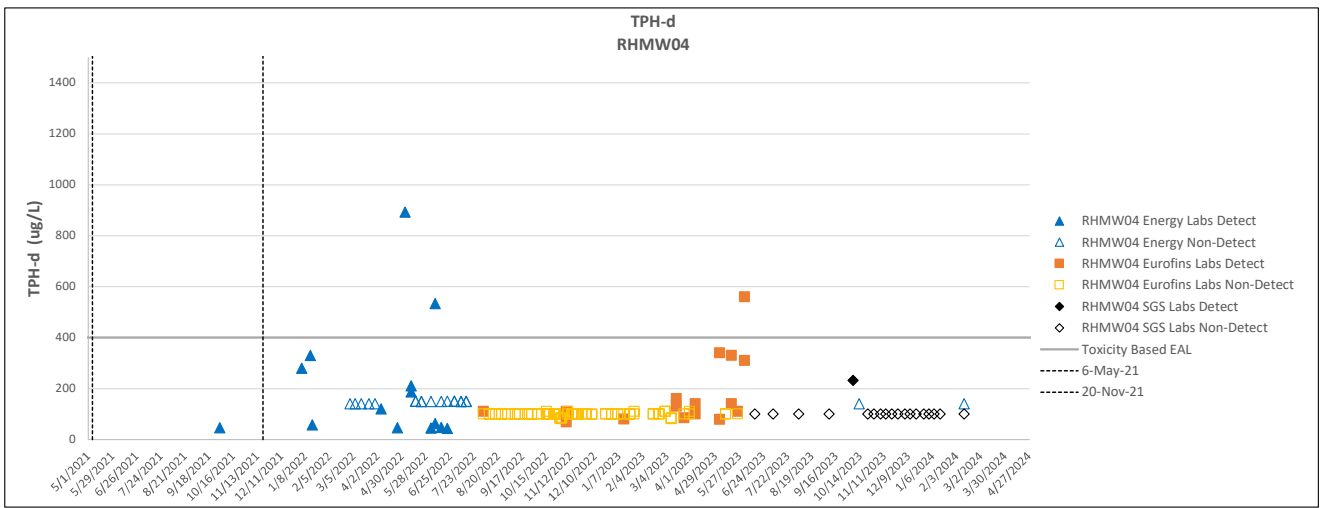
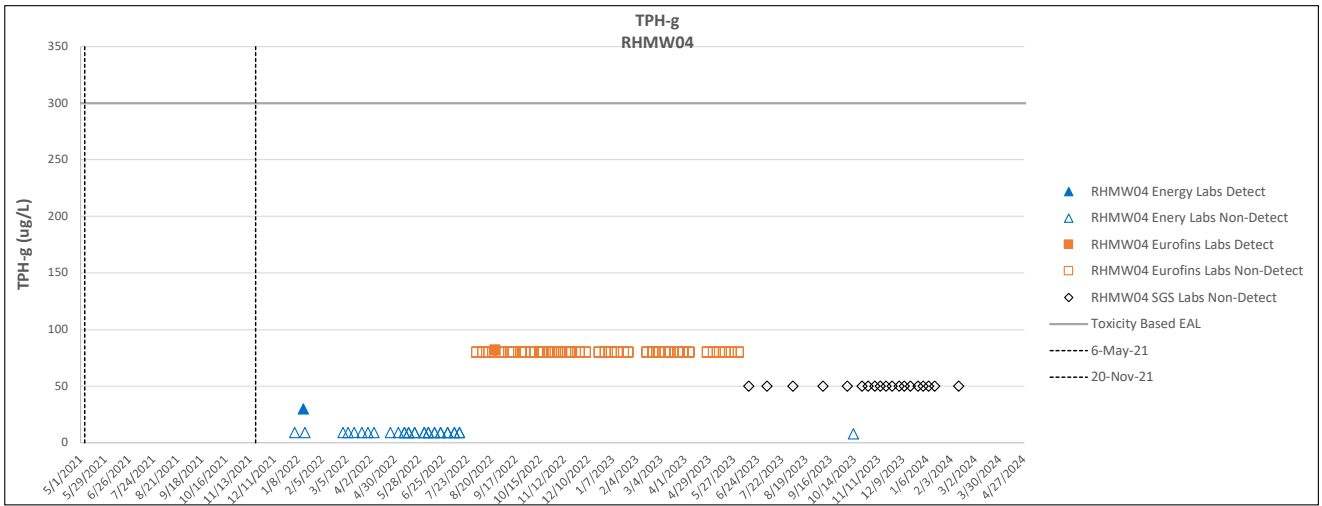


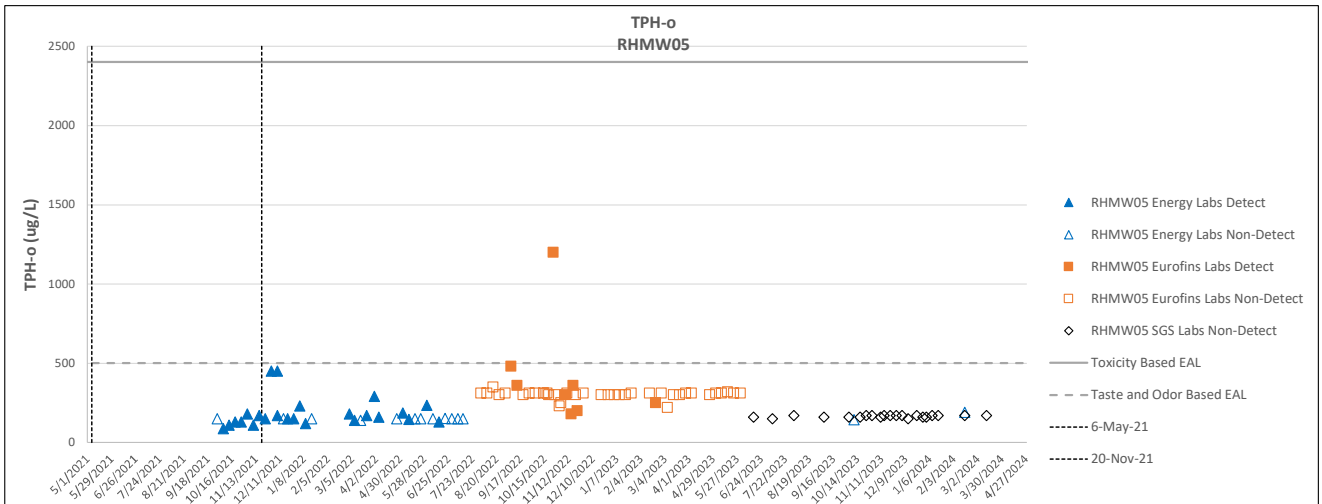
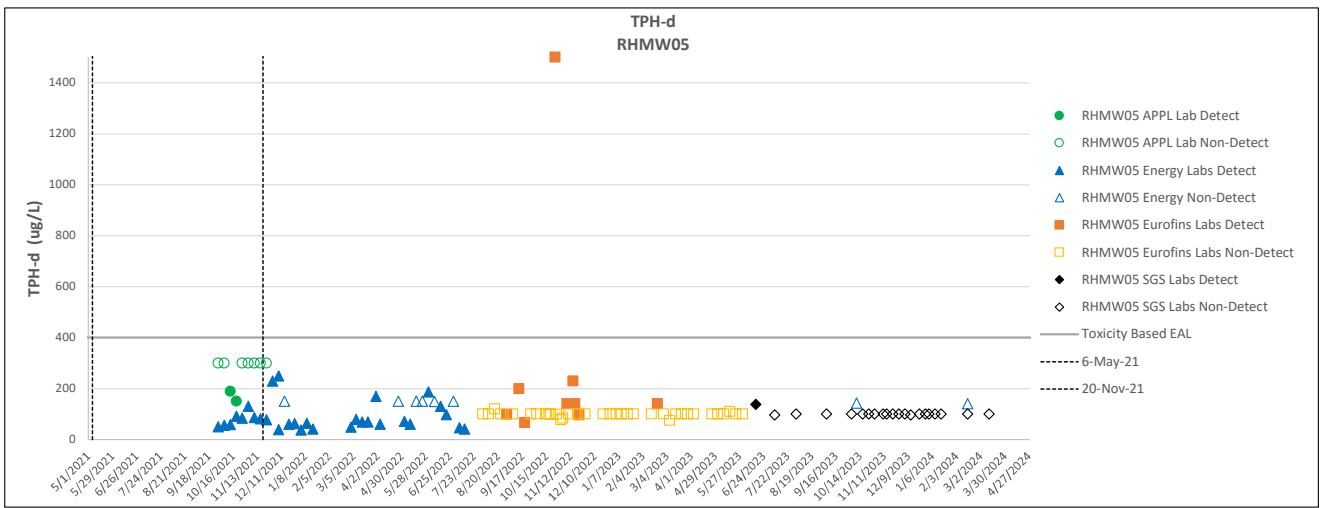
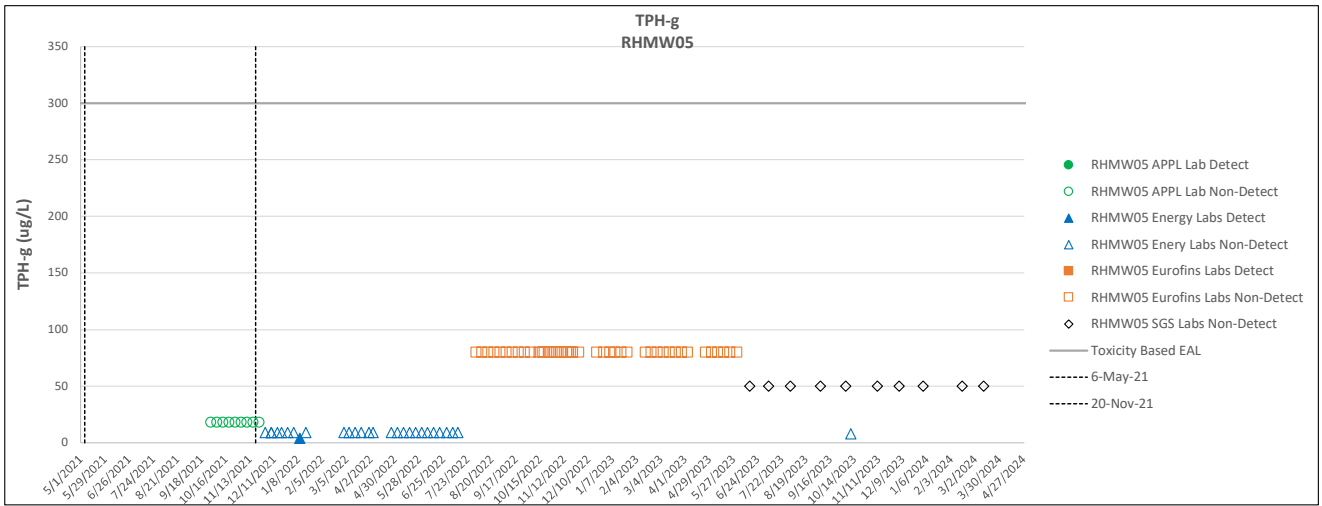


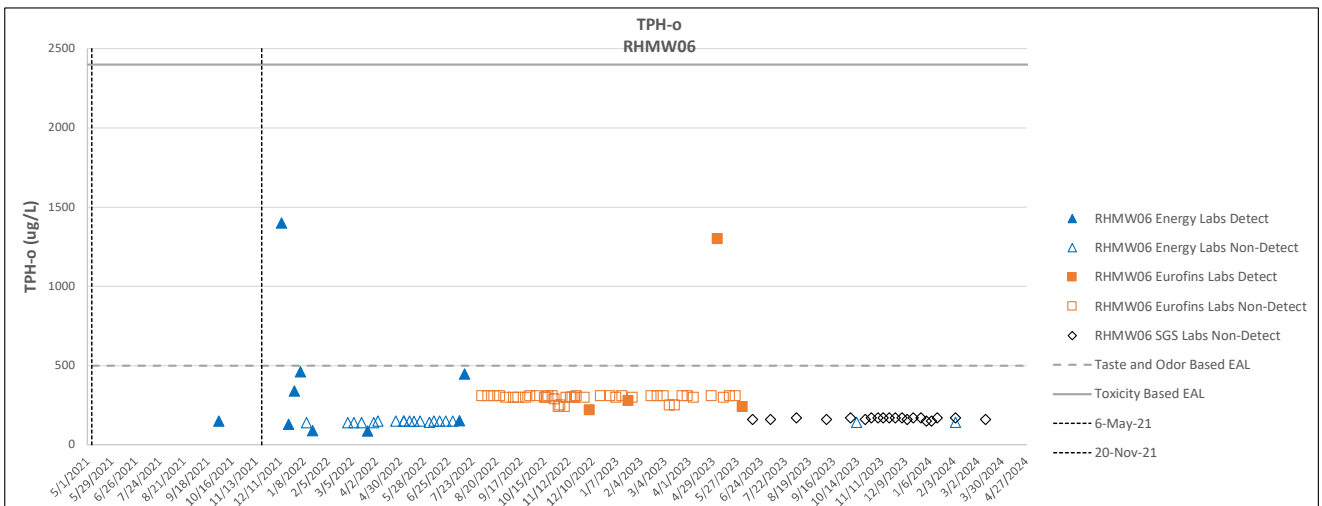
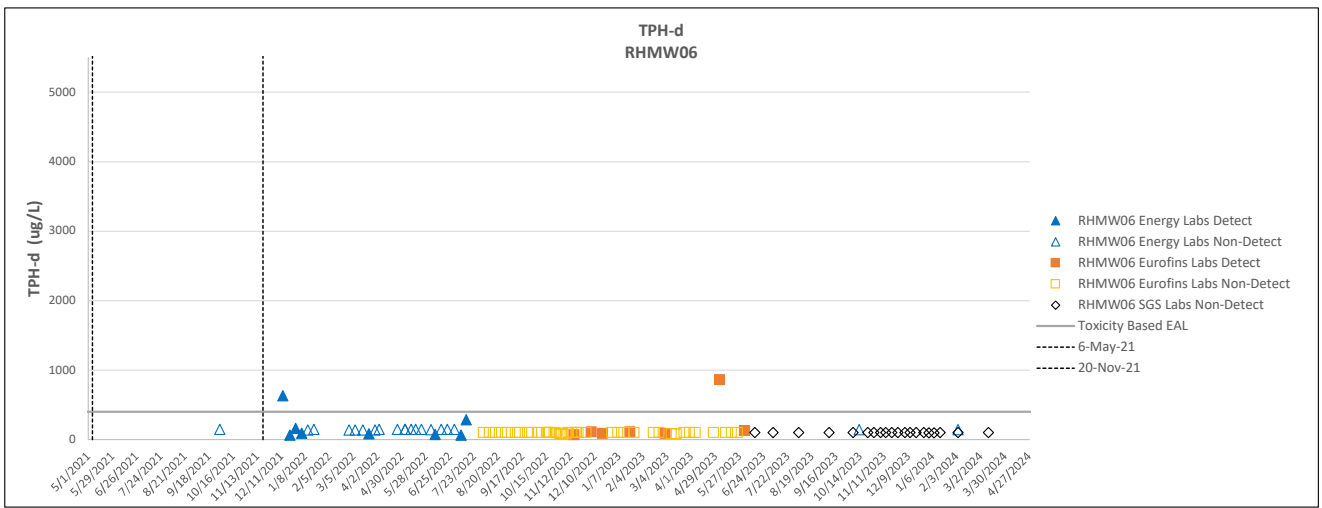
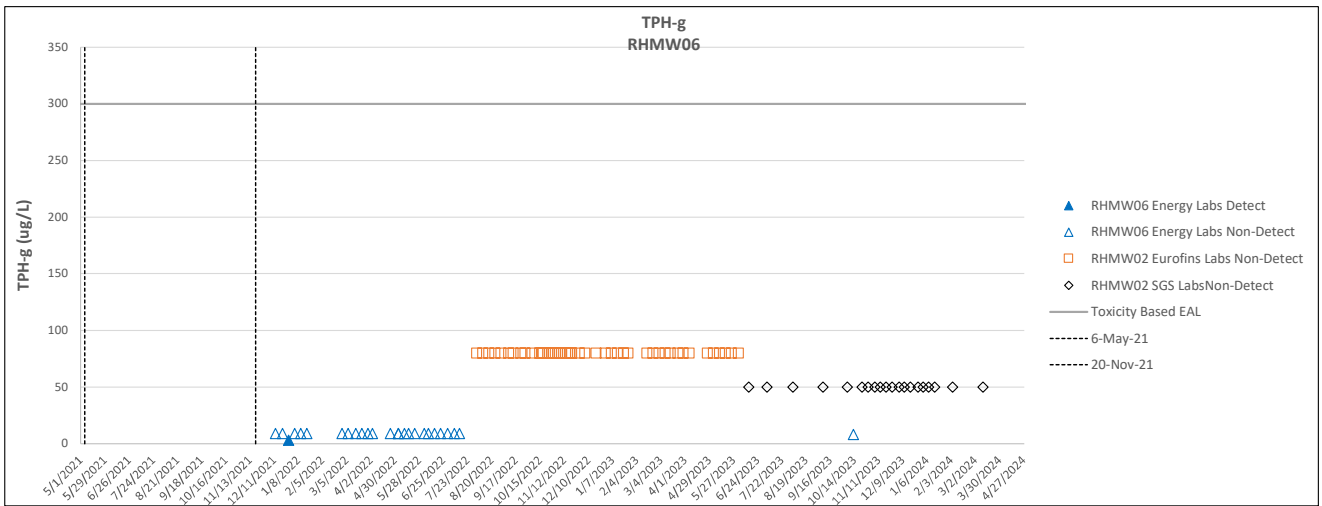
Notes:
¹ Sample collected on 12/20/2021 was reanalyzed due to inconsistency with historic trend and suspected container switch. Reanalysis results reported.

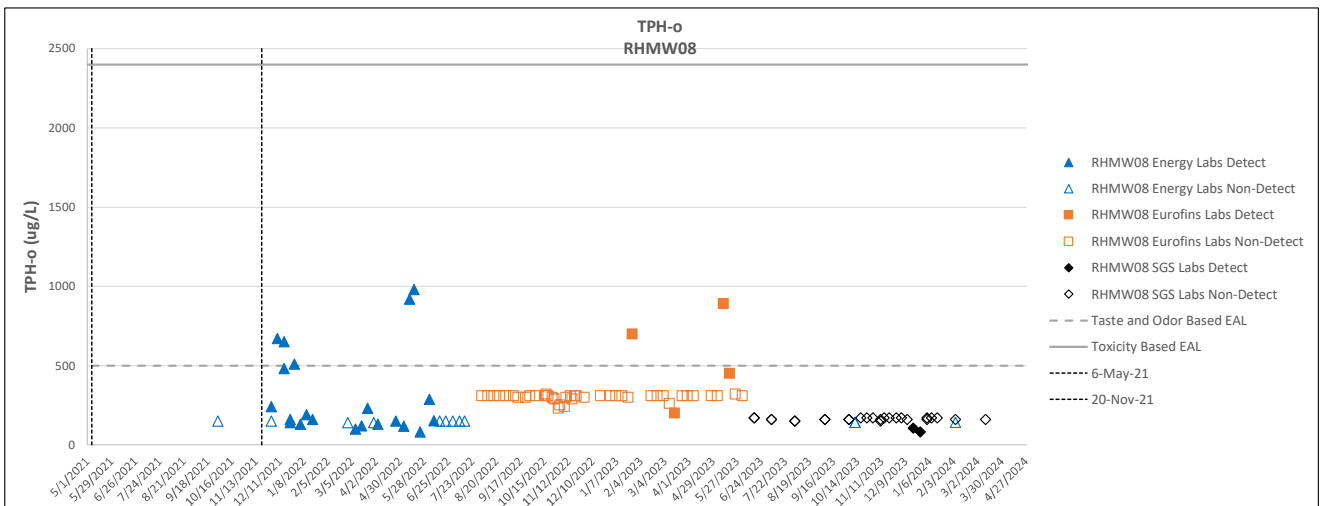
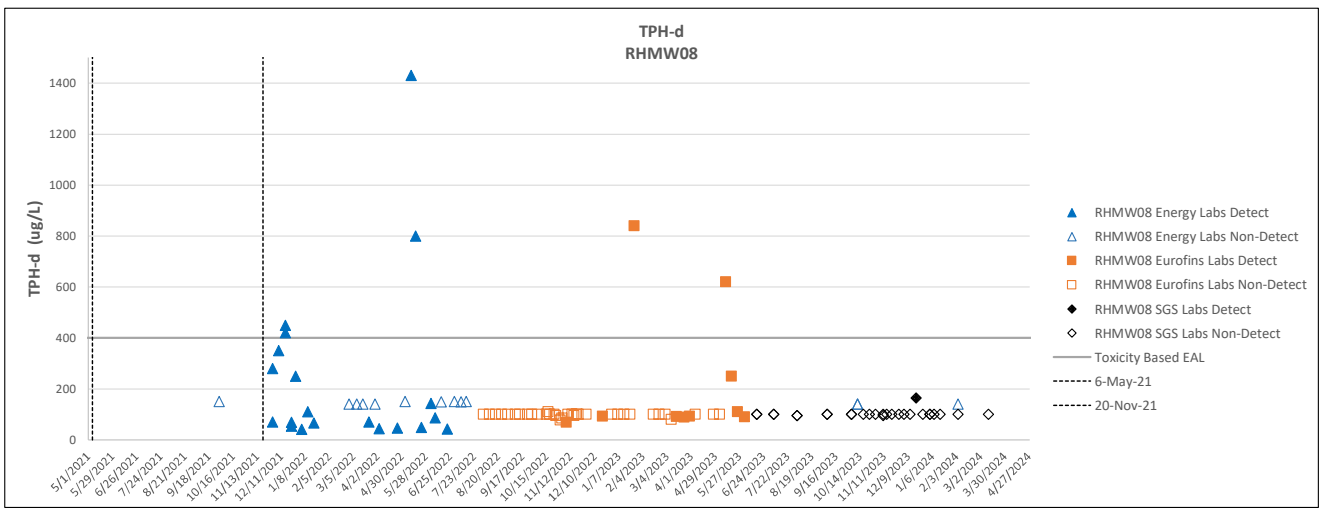
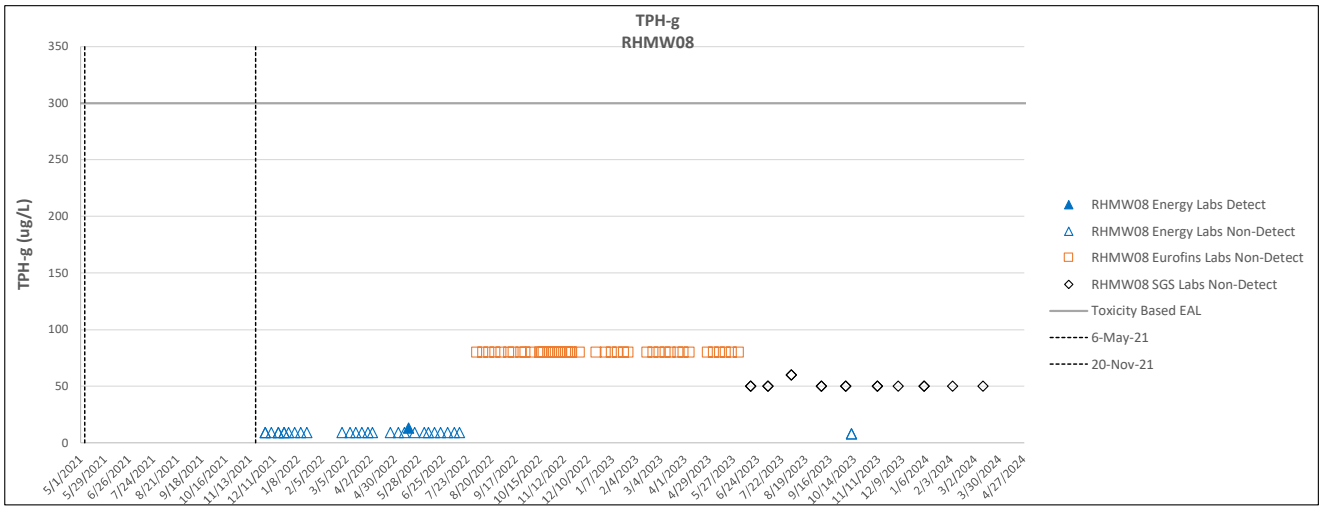


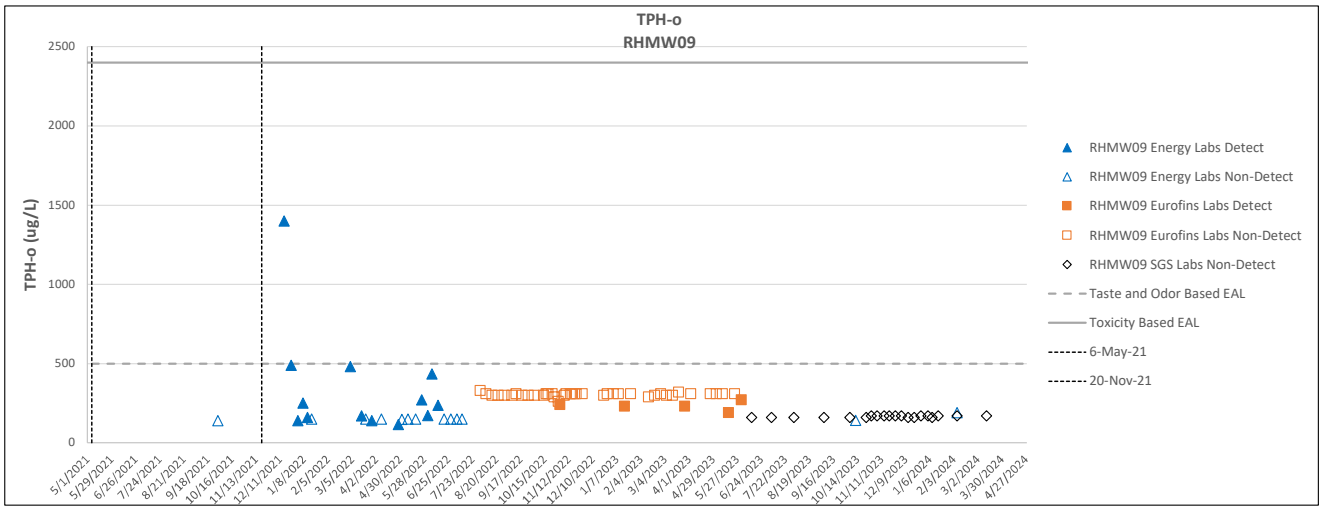
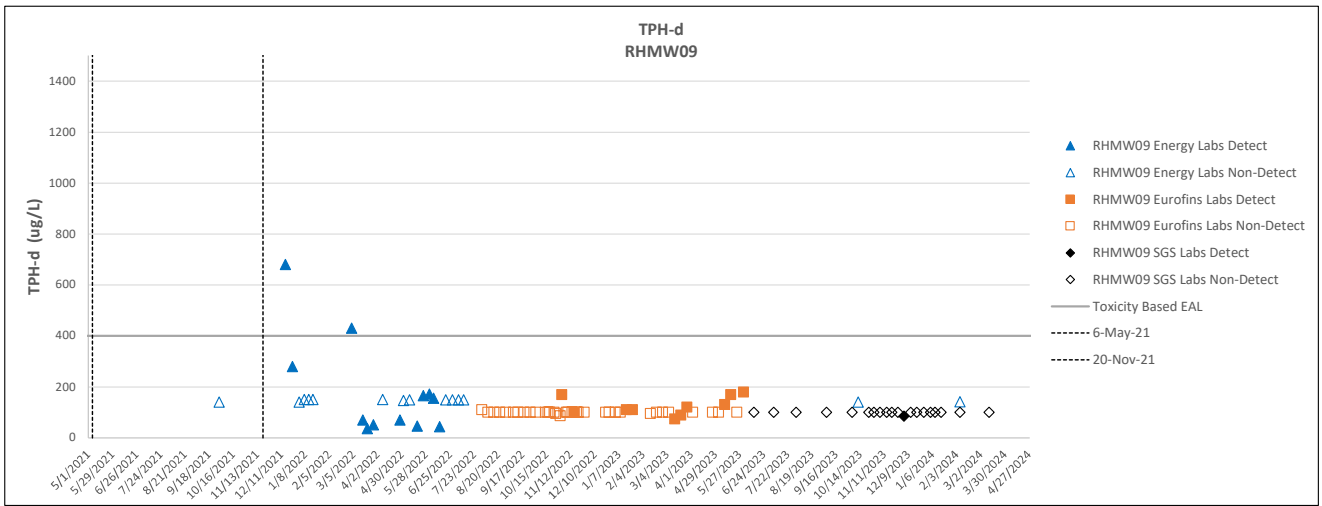
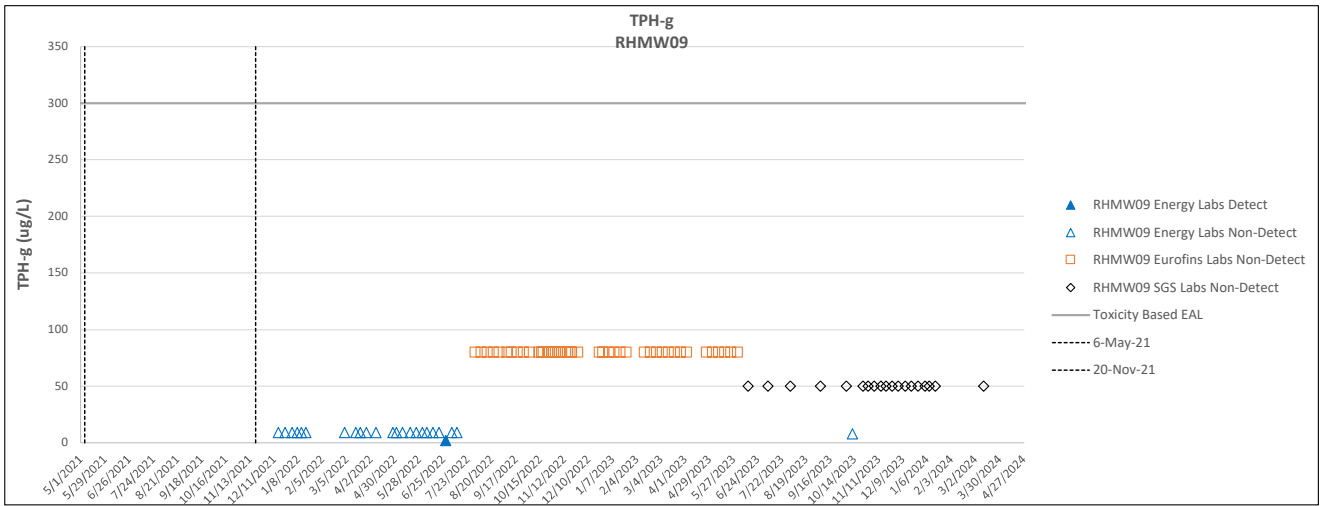


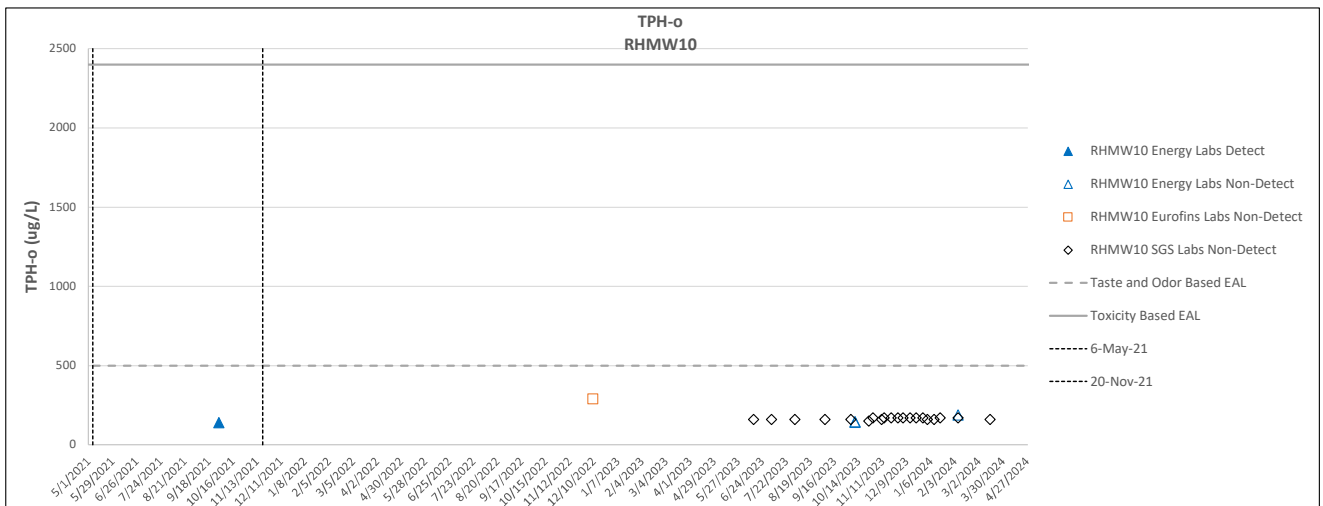
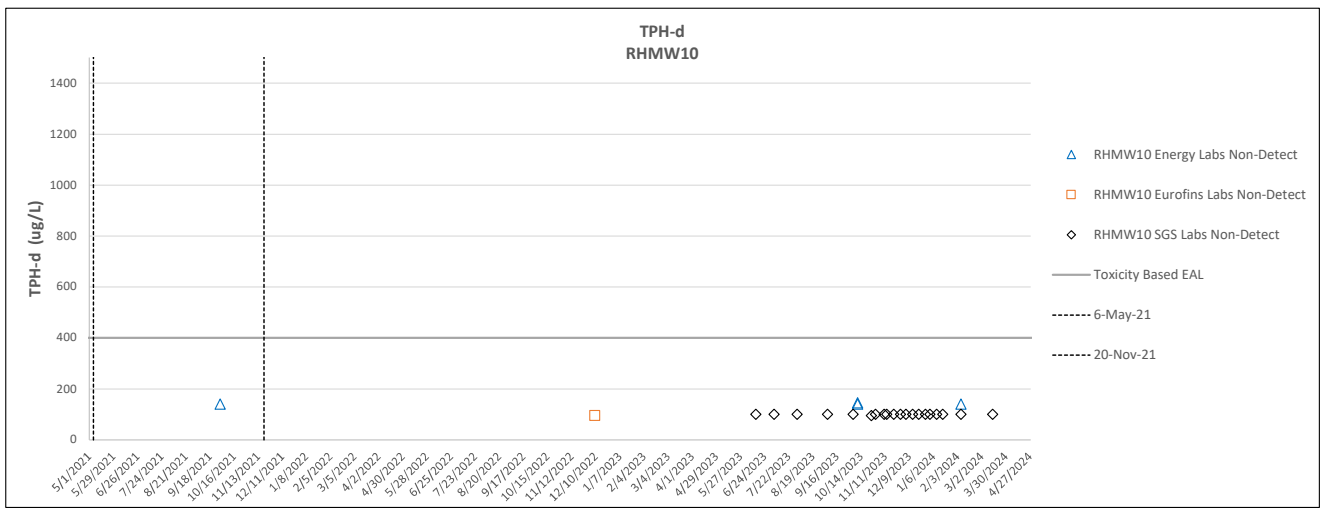
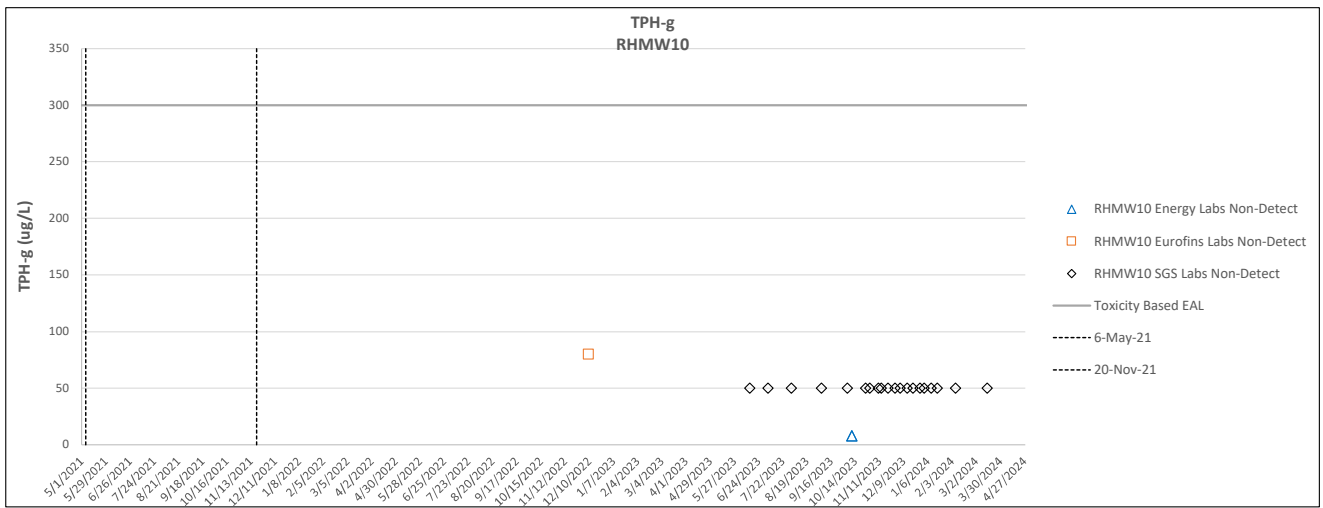


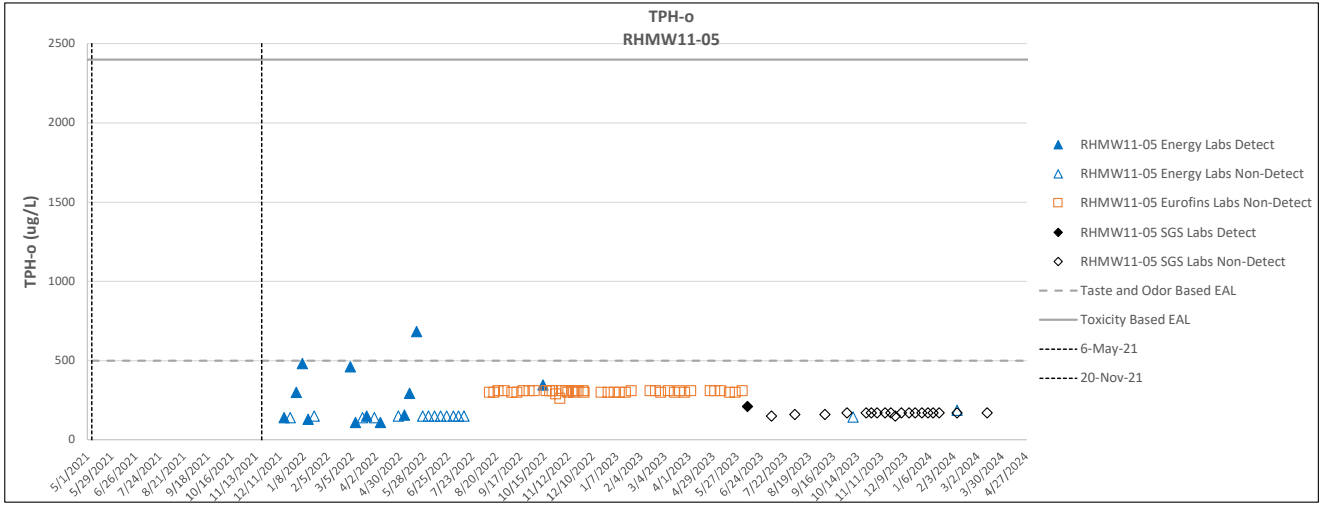
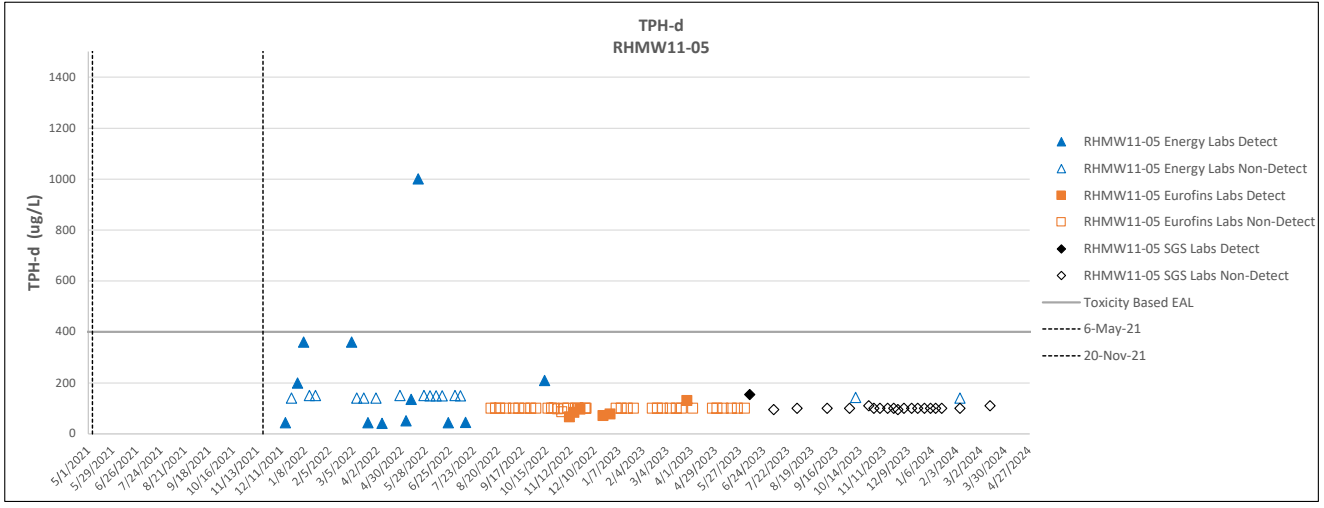
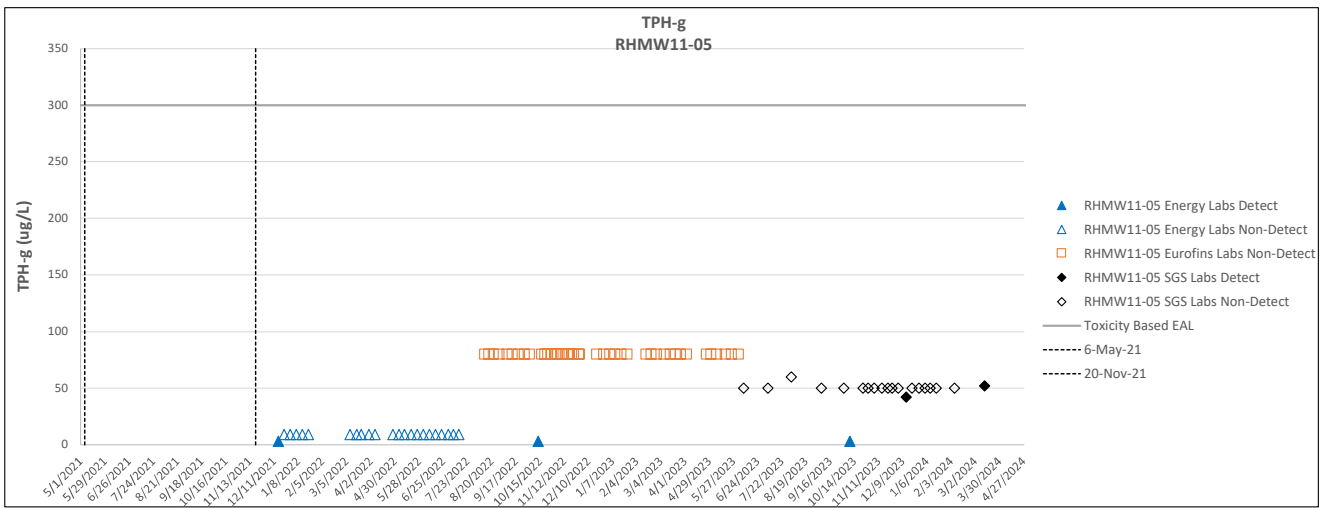


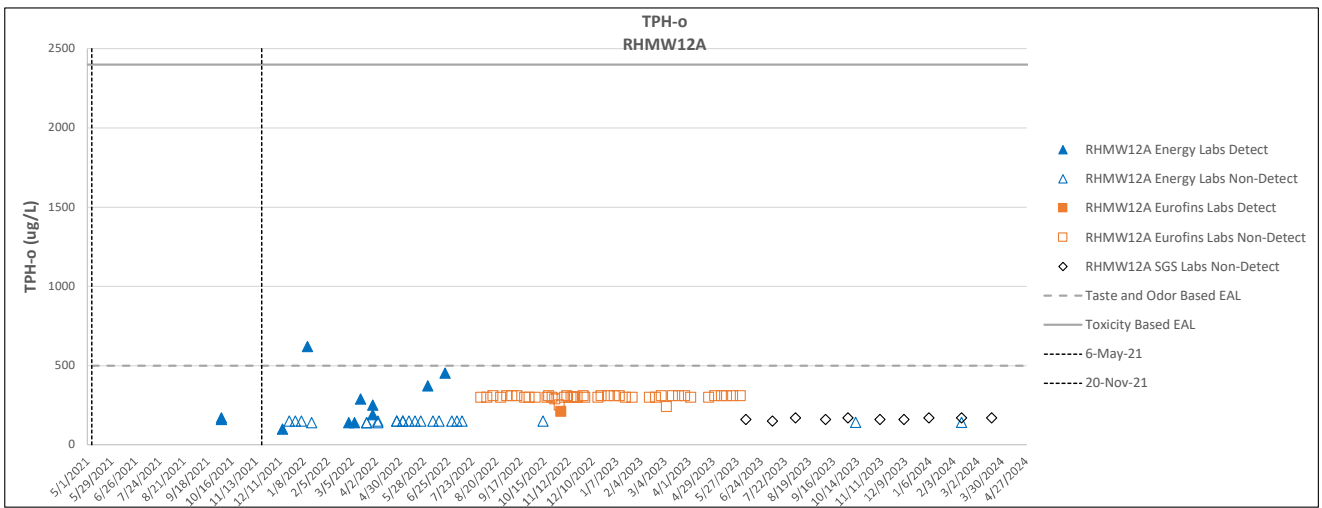
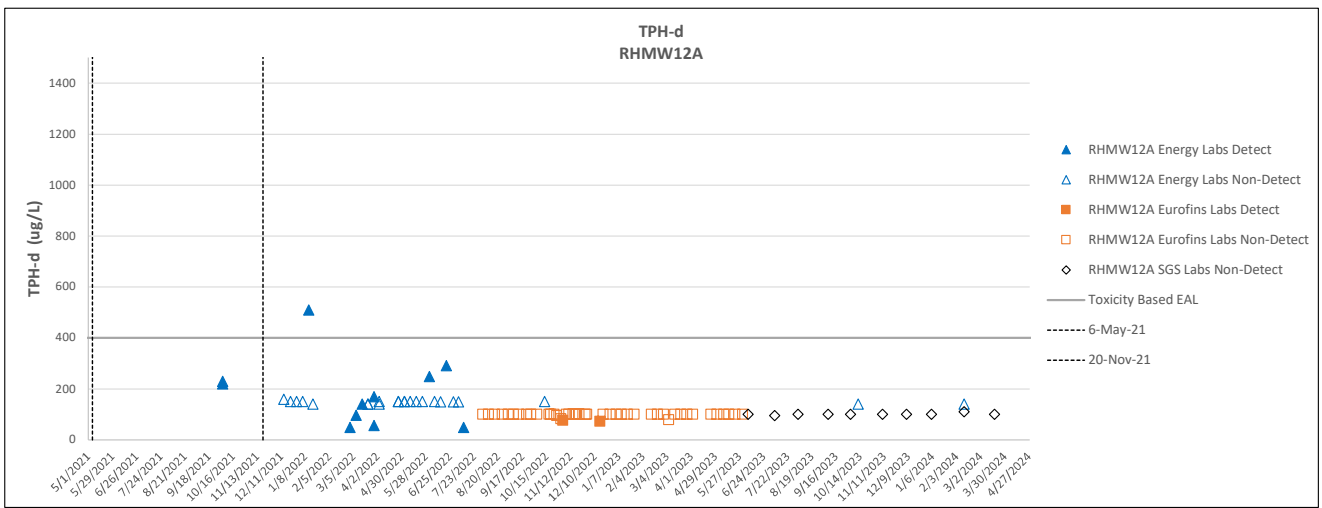
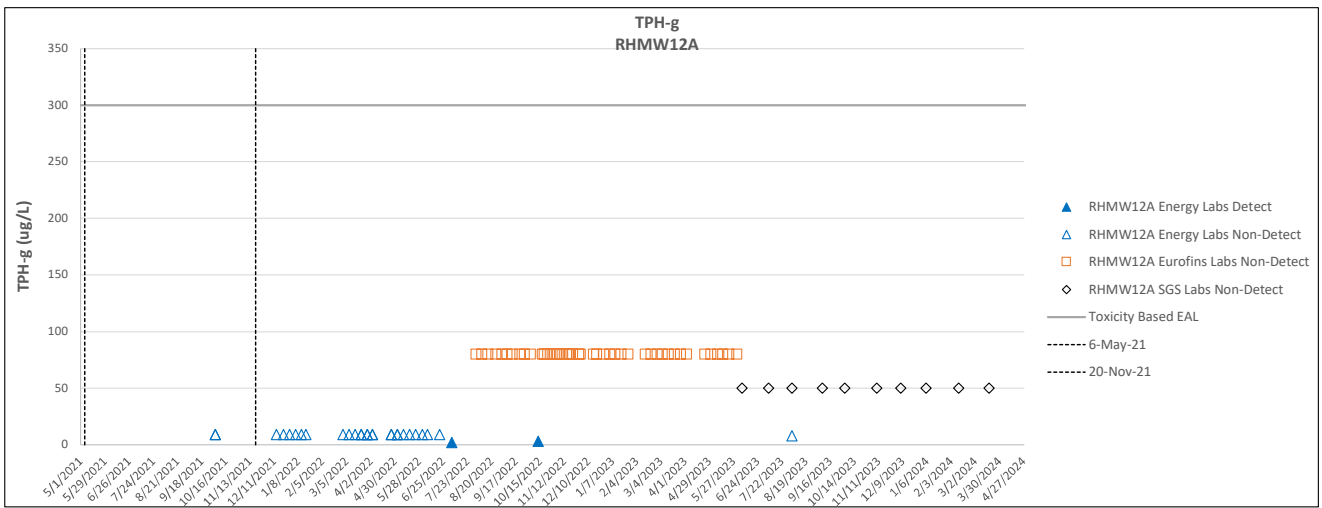


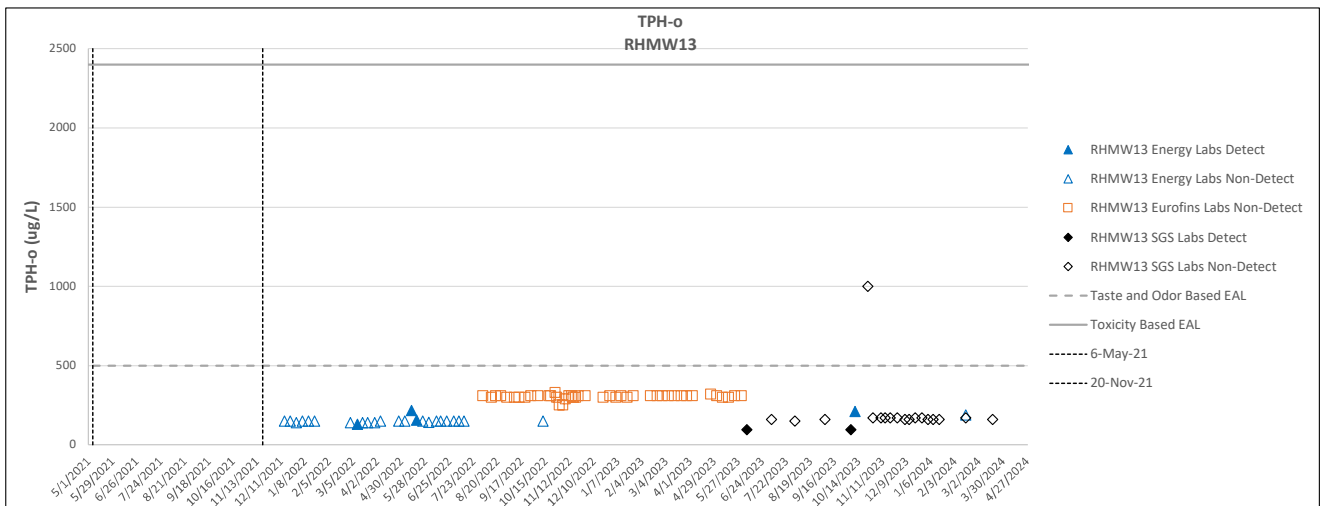
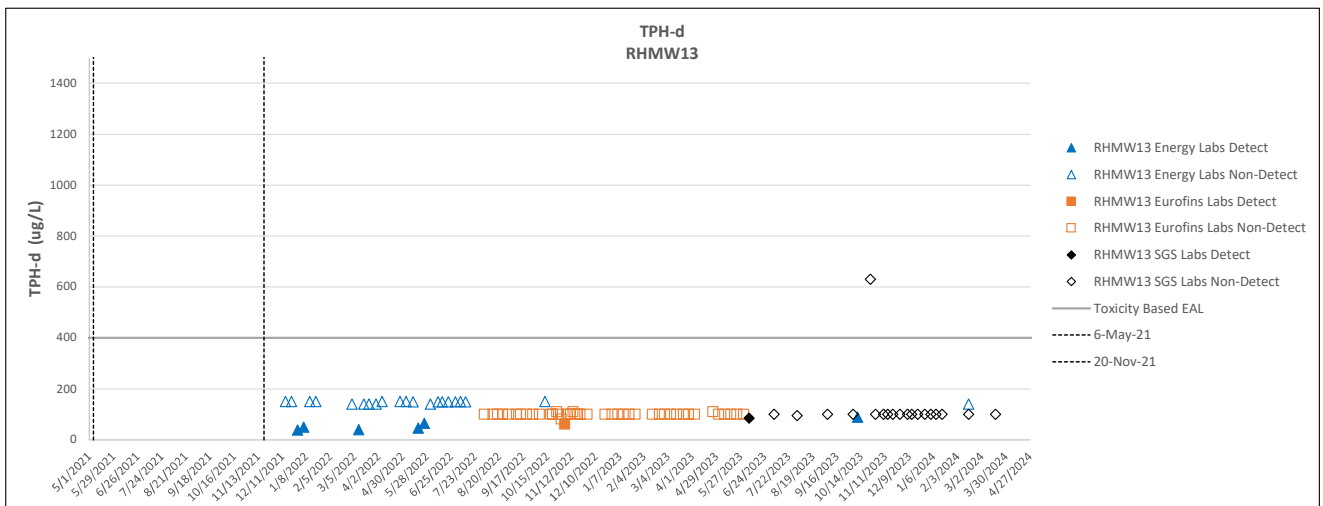
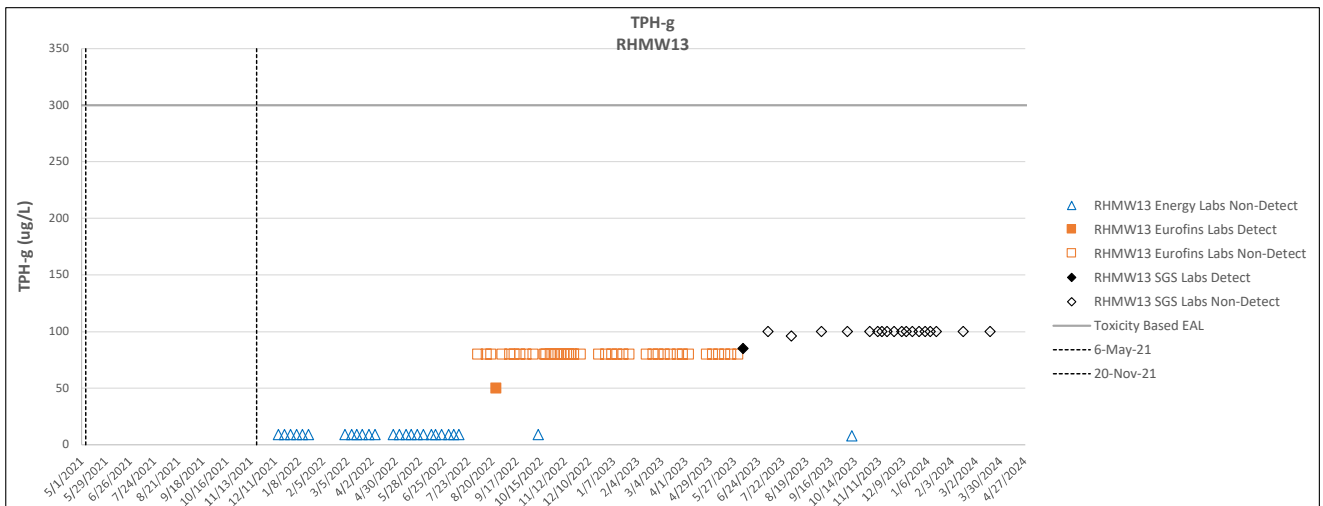




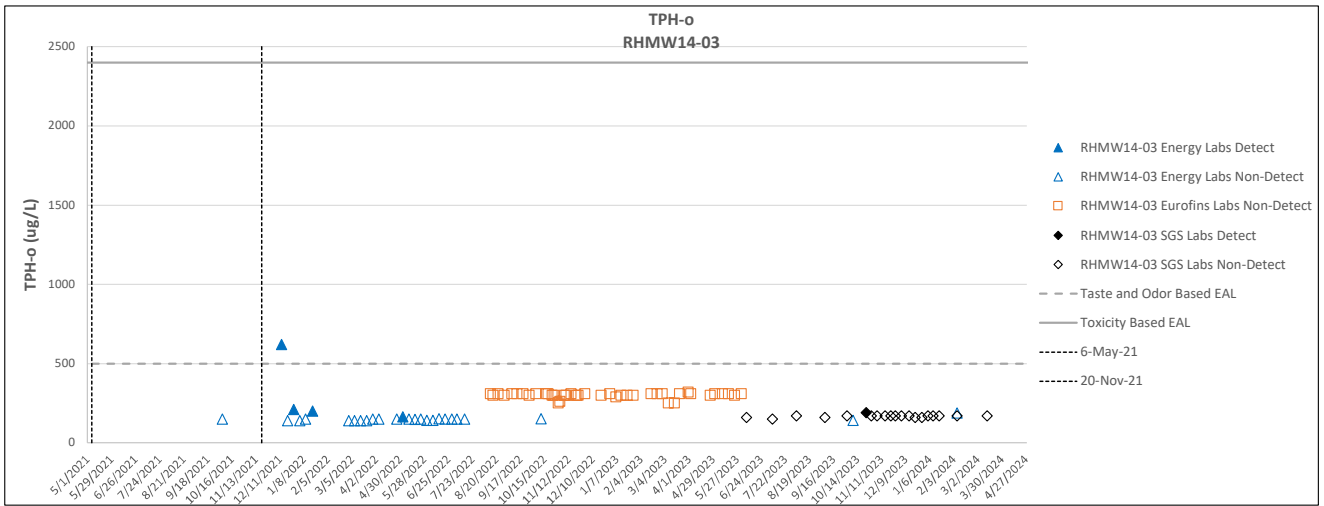
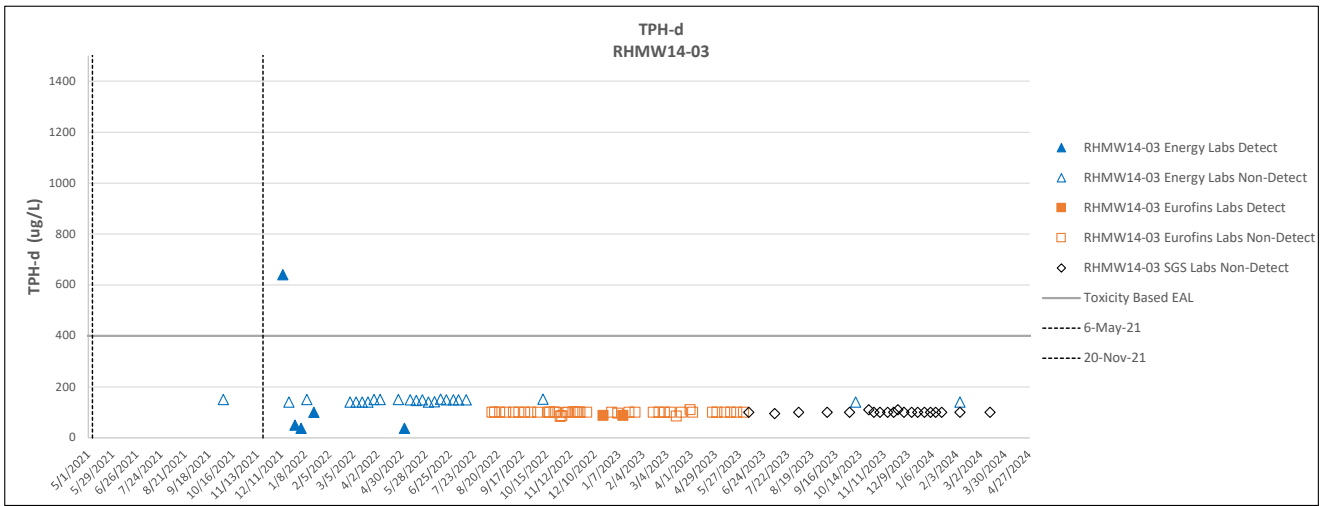
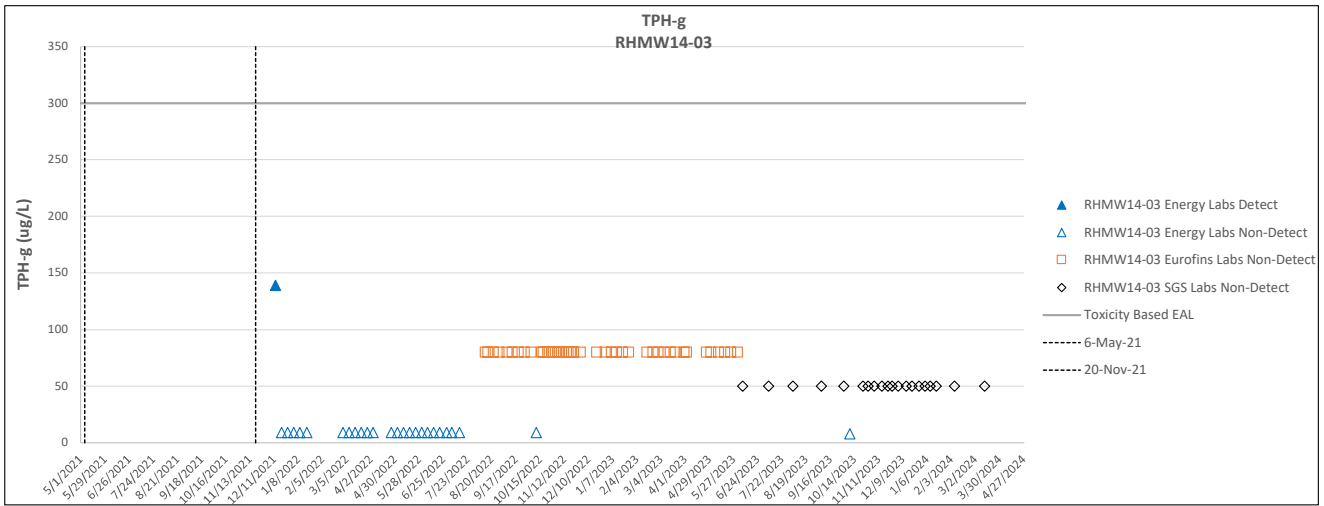


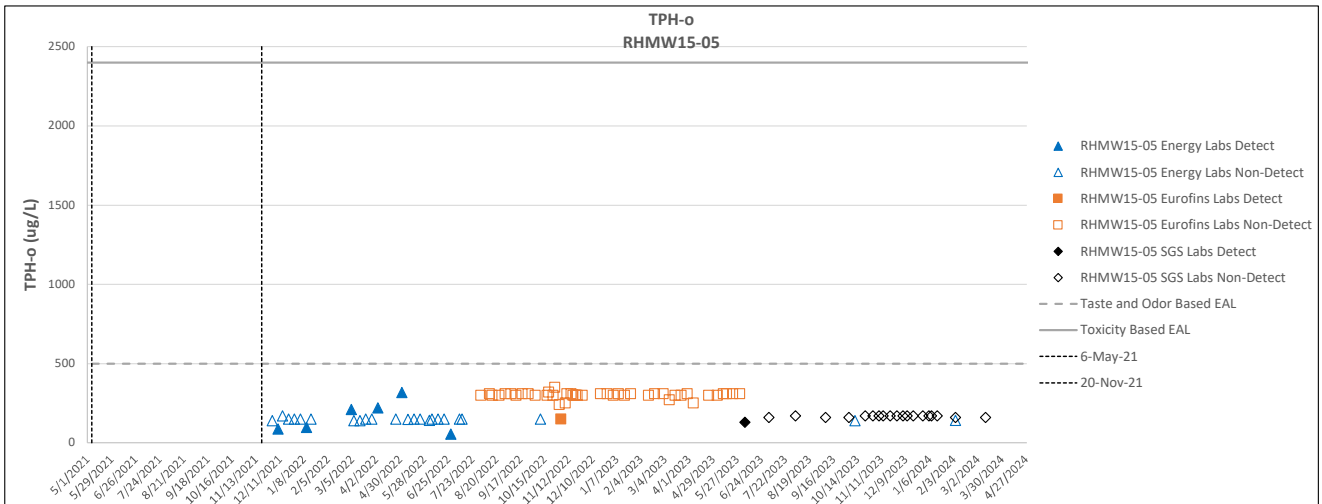
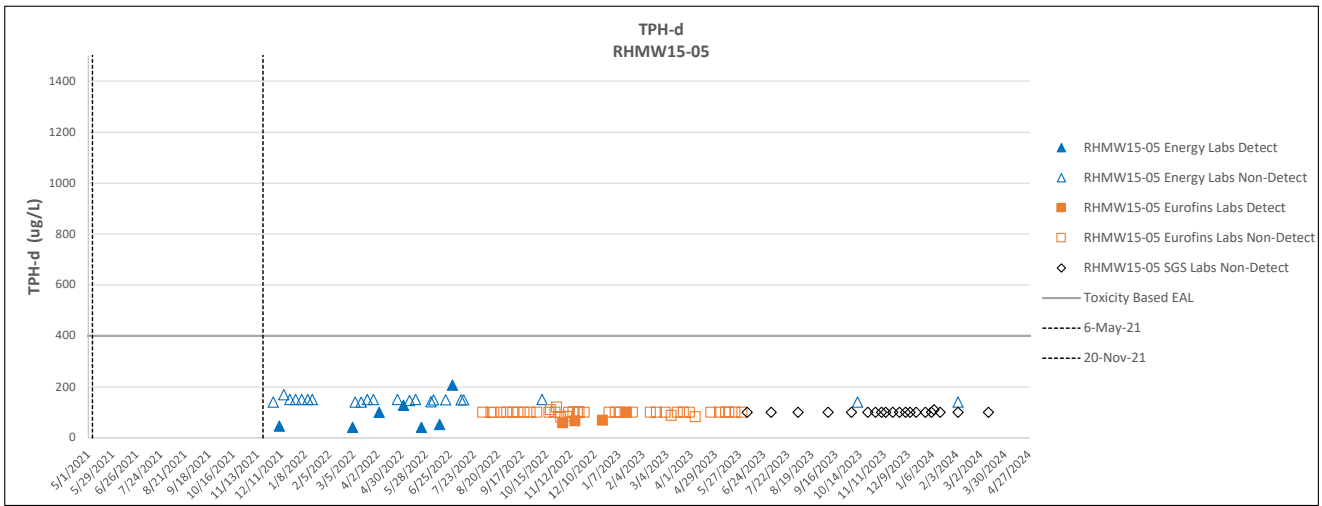
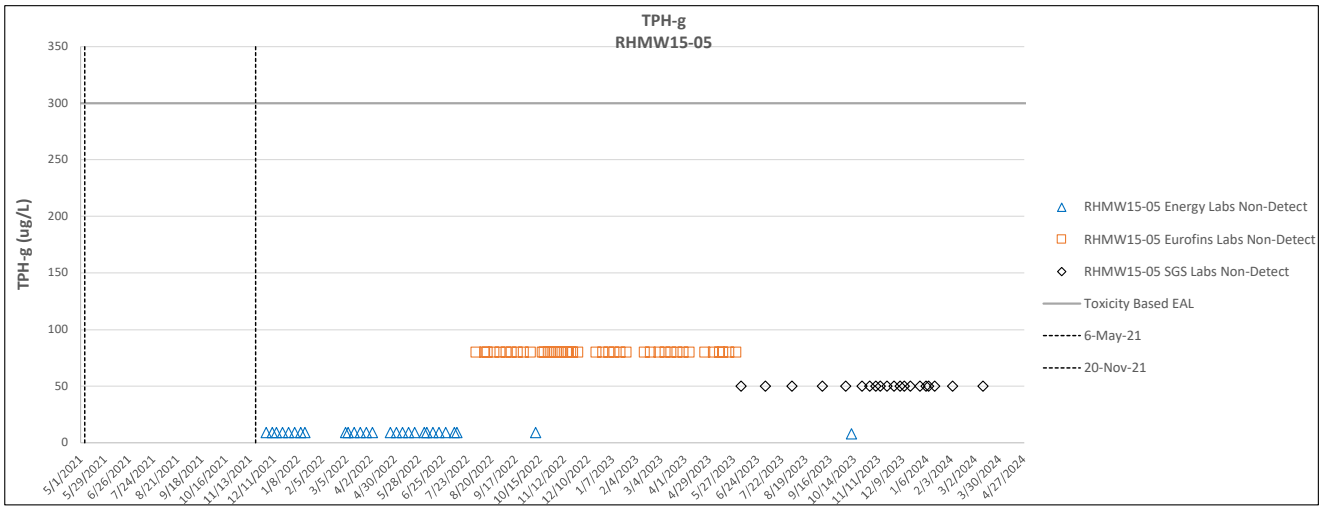


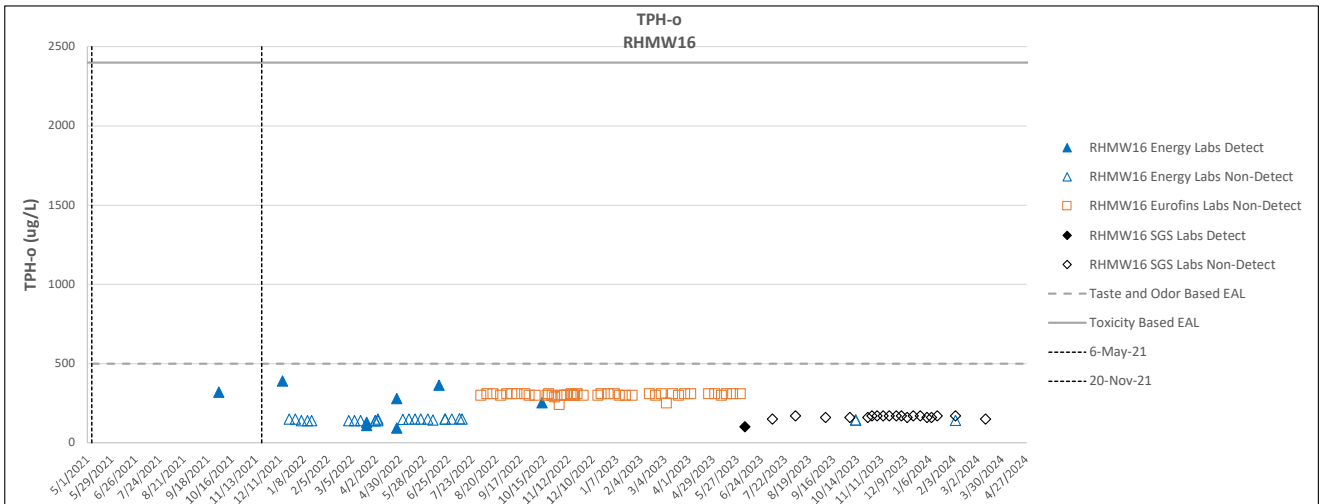
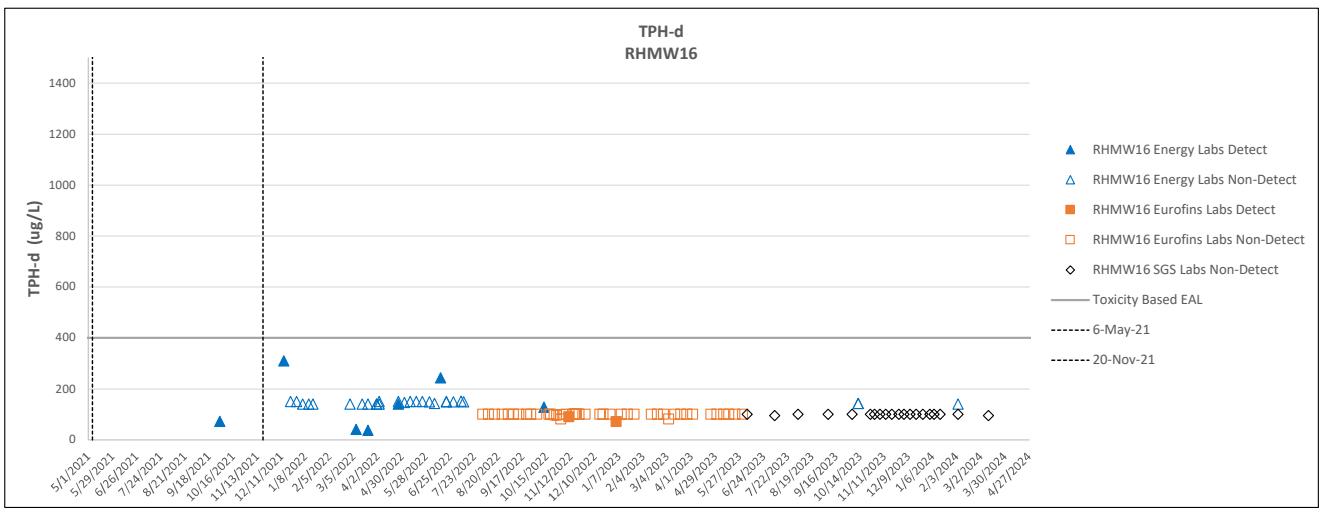
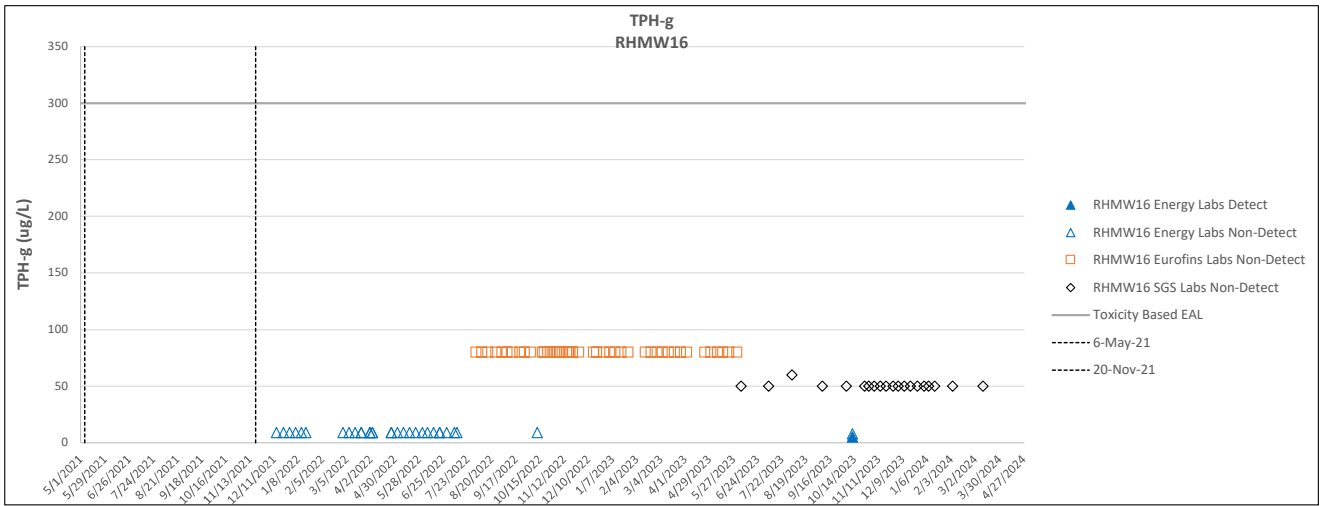


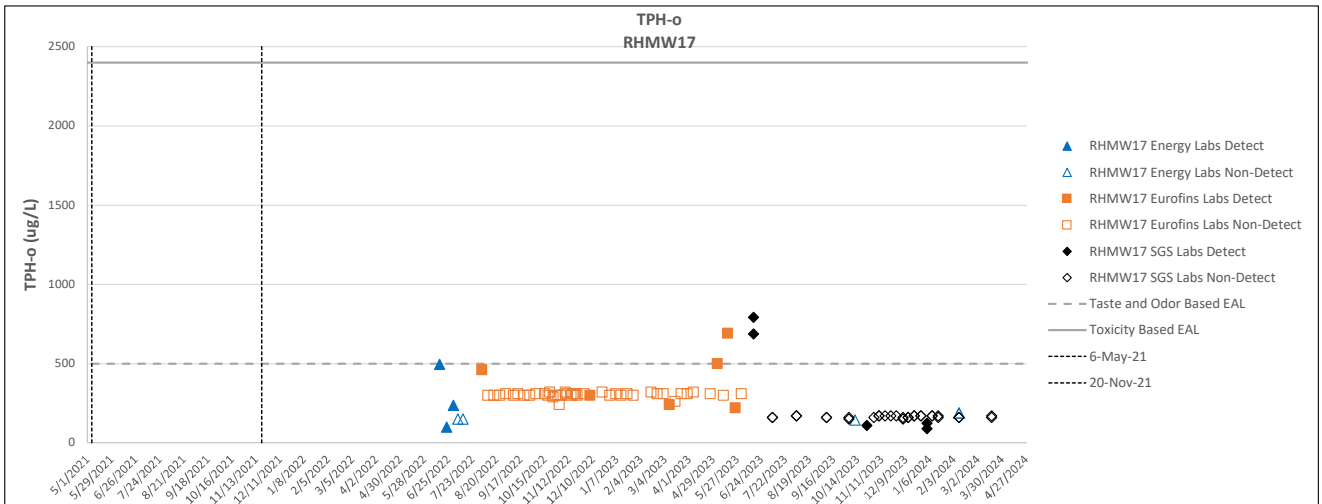
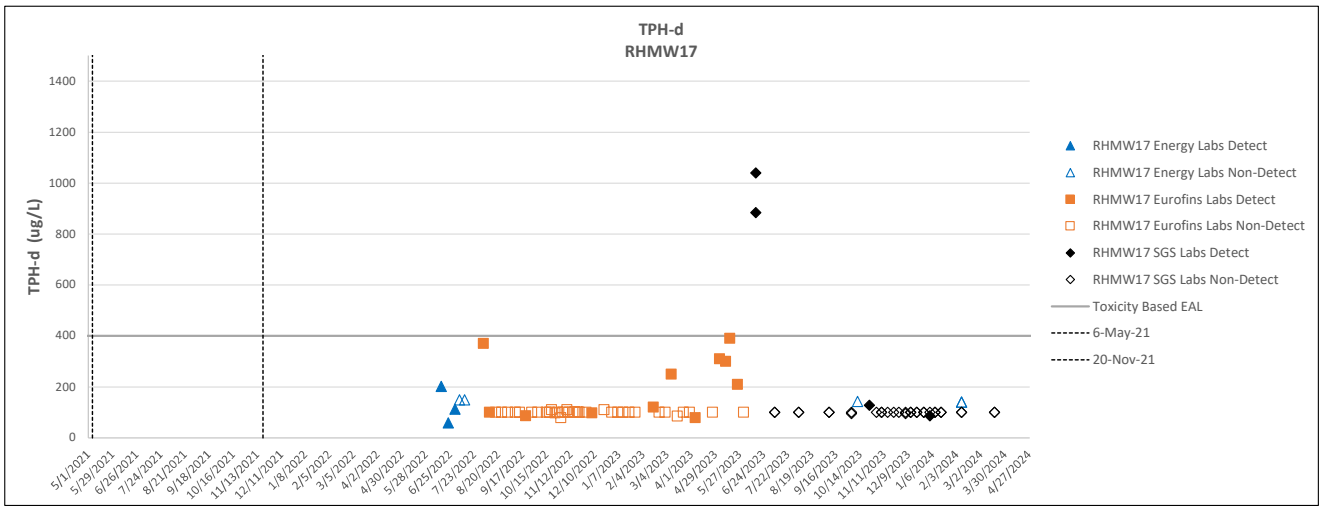
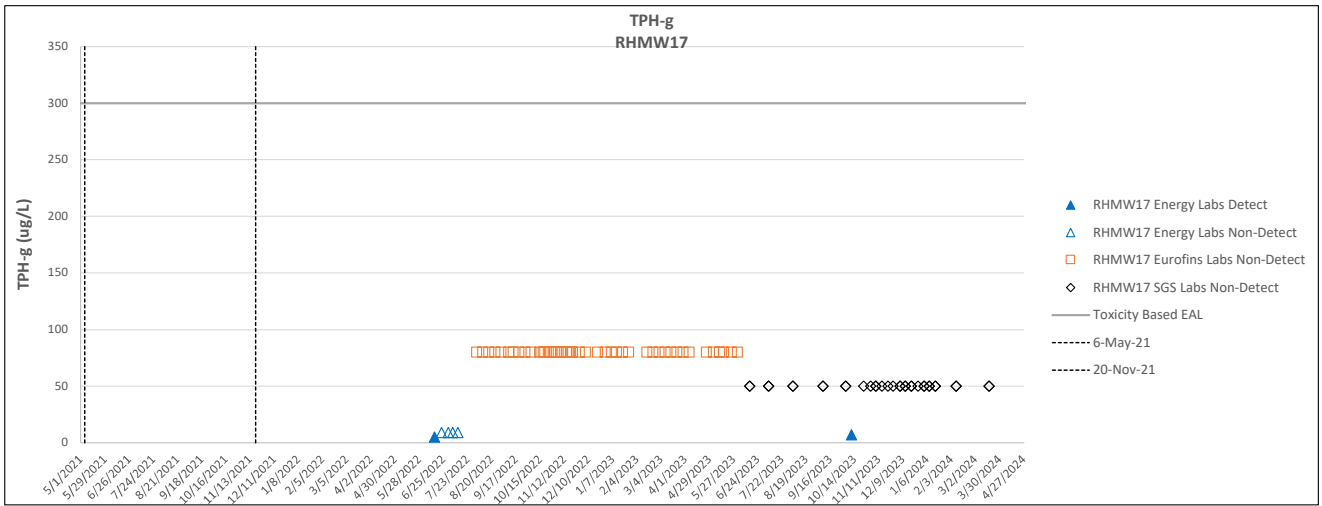


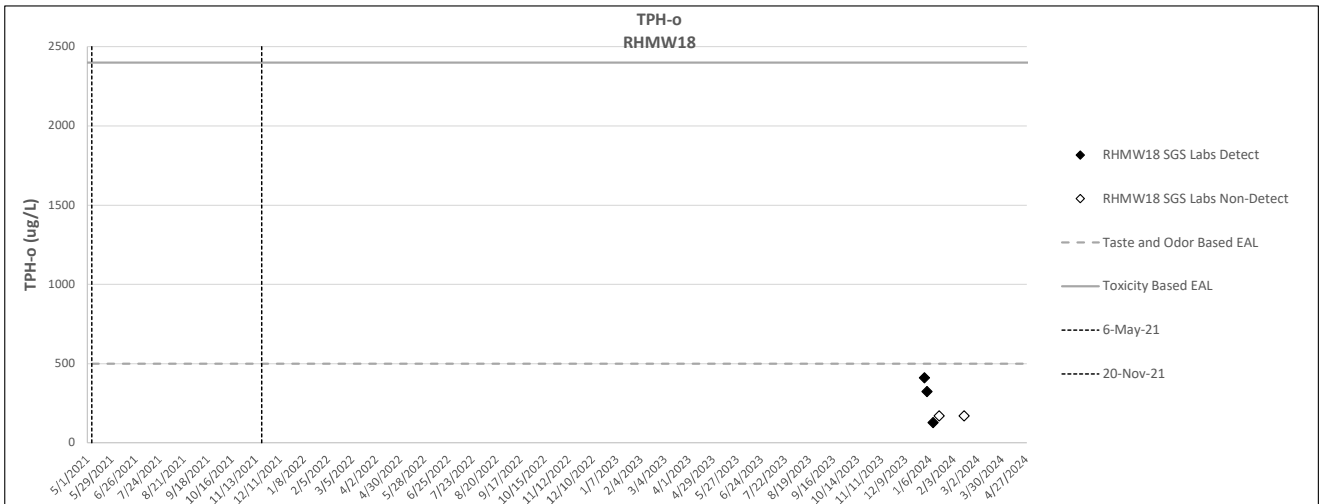
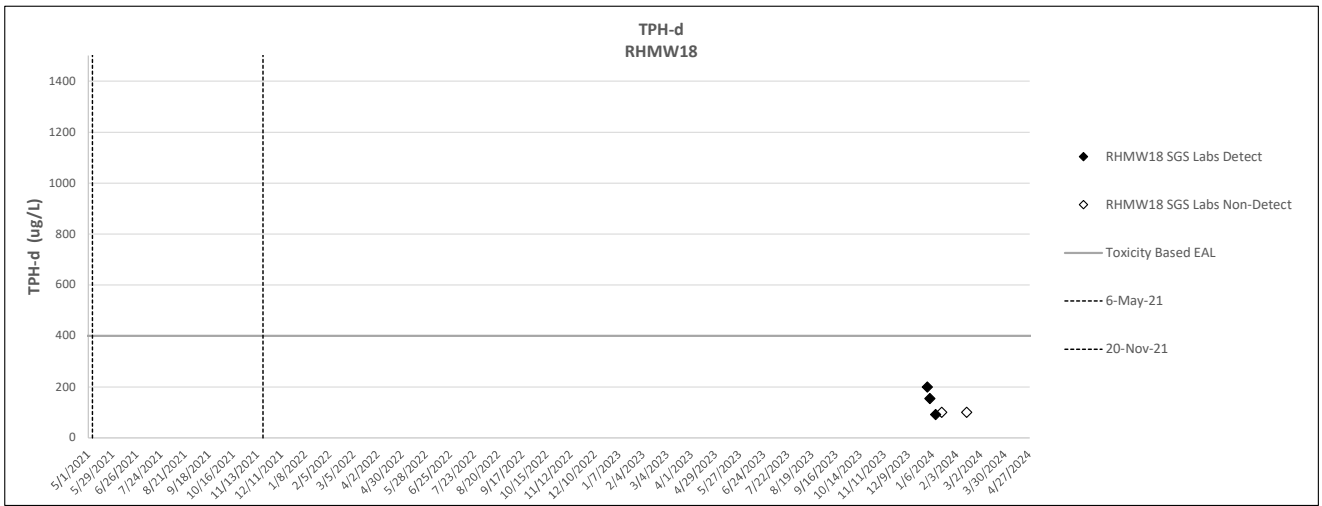
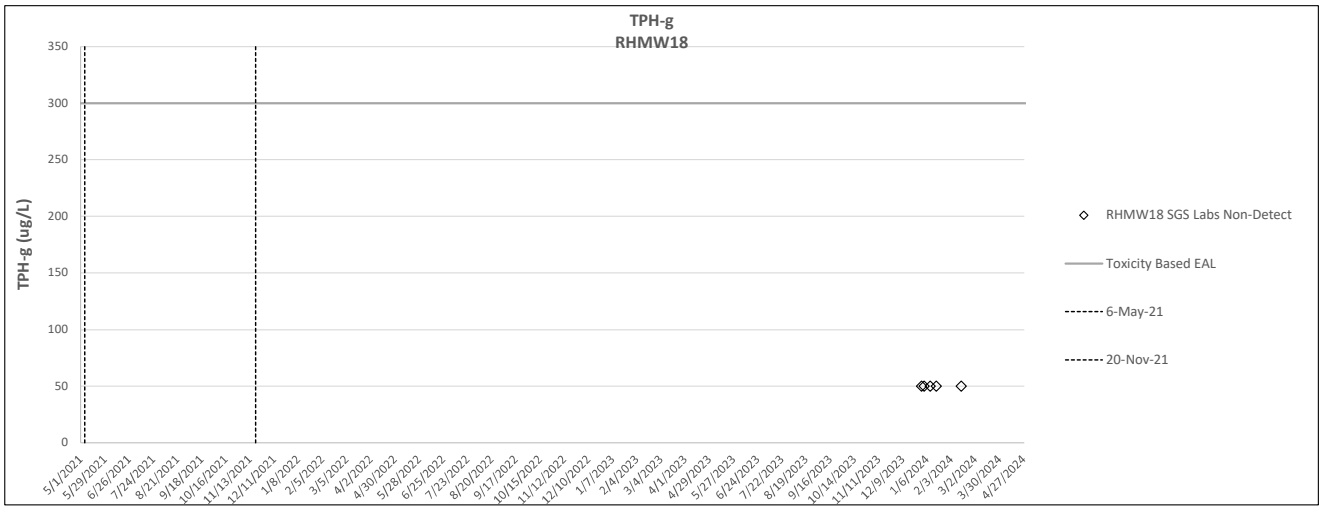
Notes:
¹ Sampling points include RHMW13-05, and RHMW13-04 collected as part of defueling program.

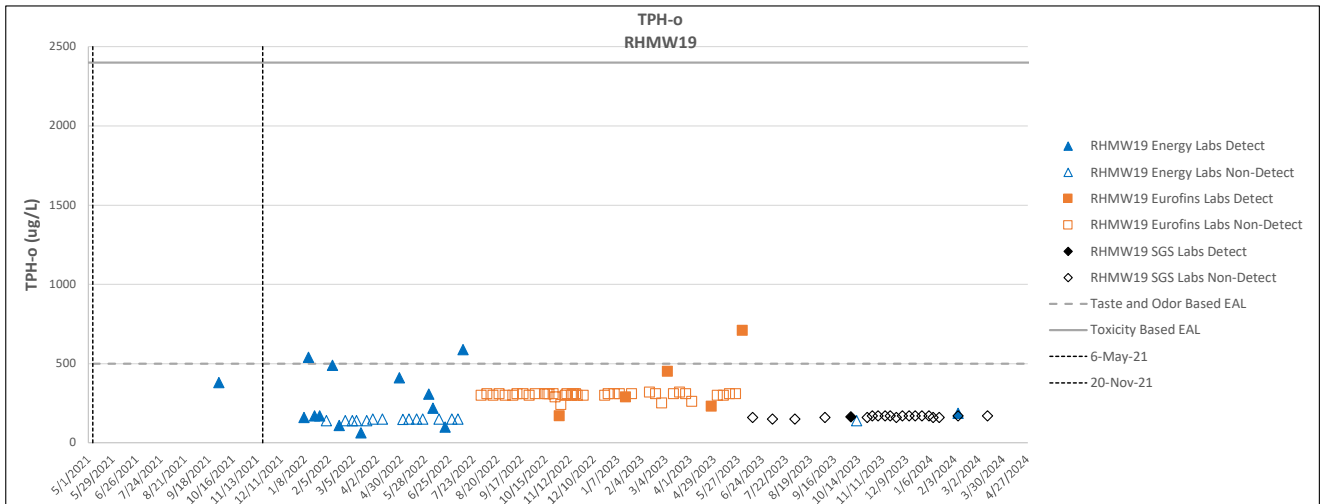
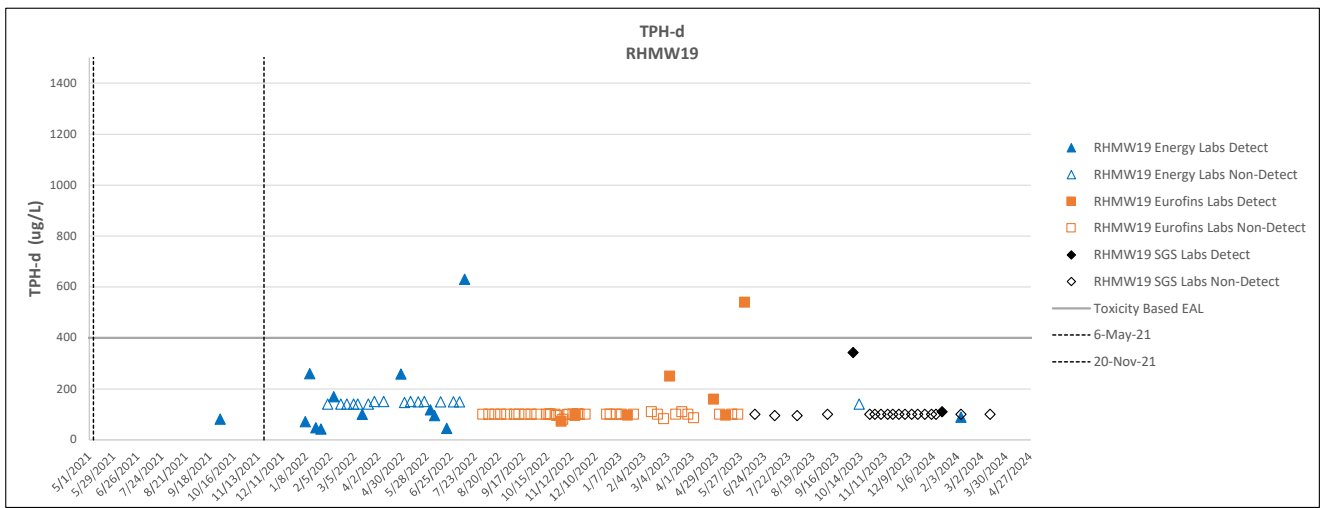
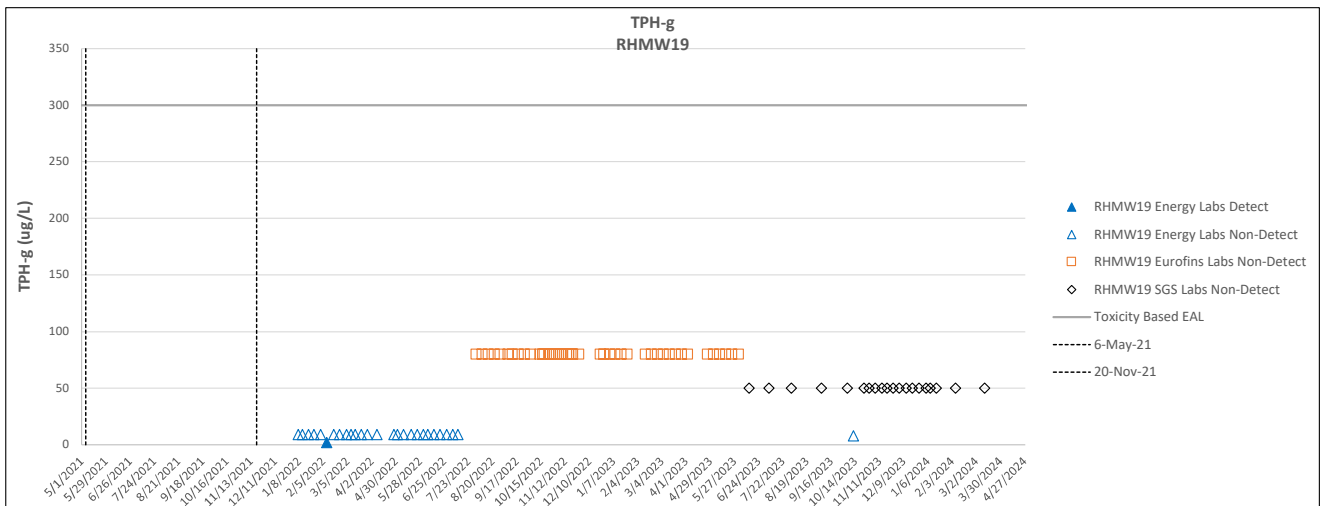


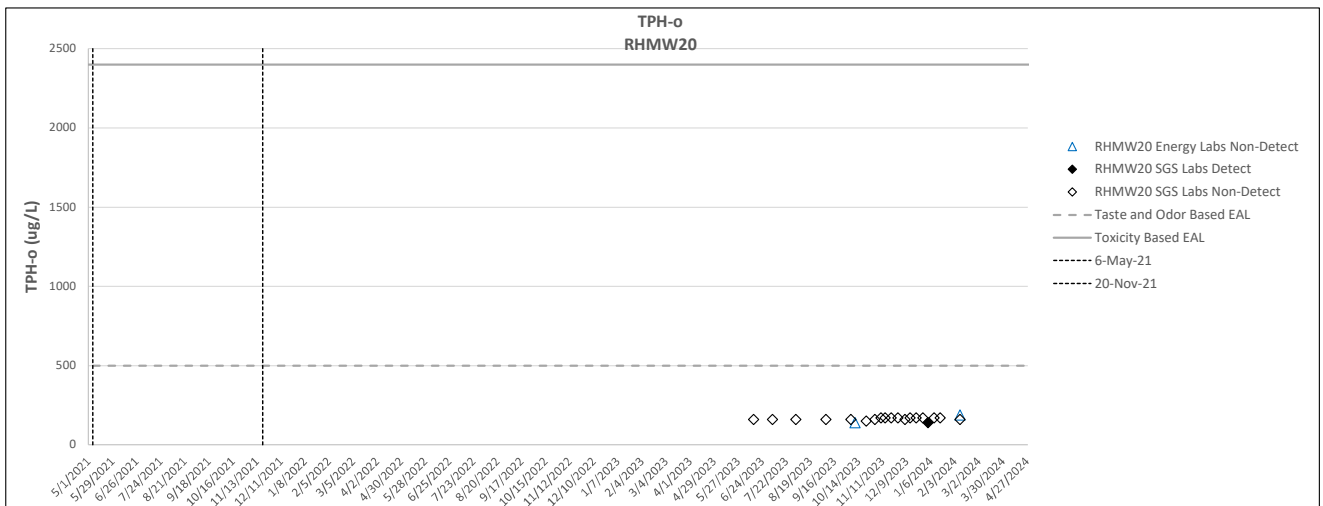
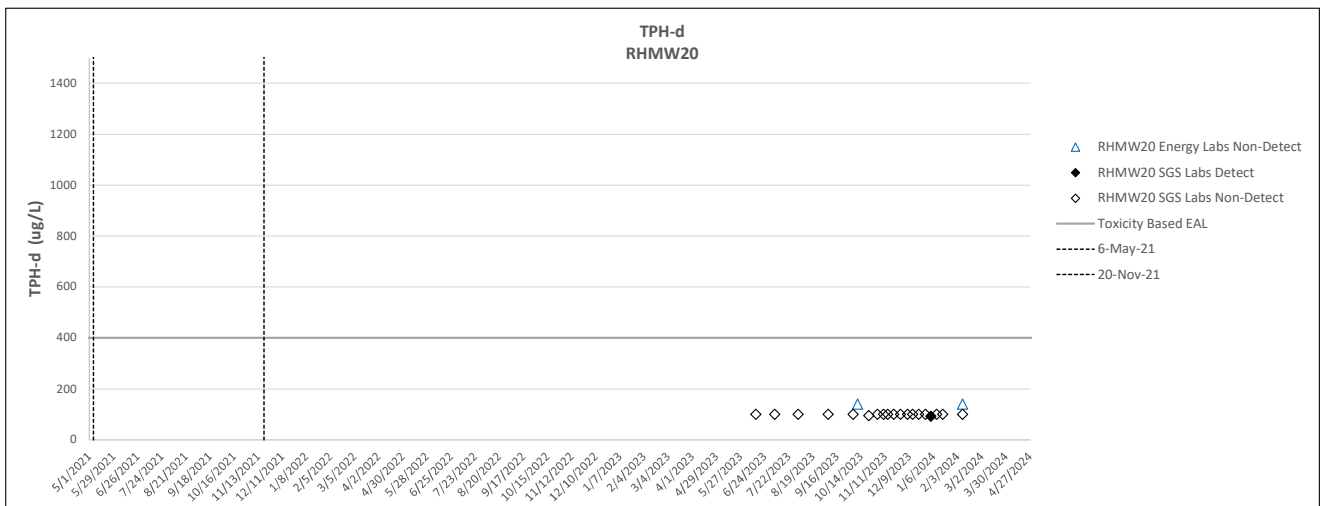
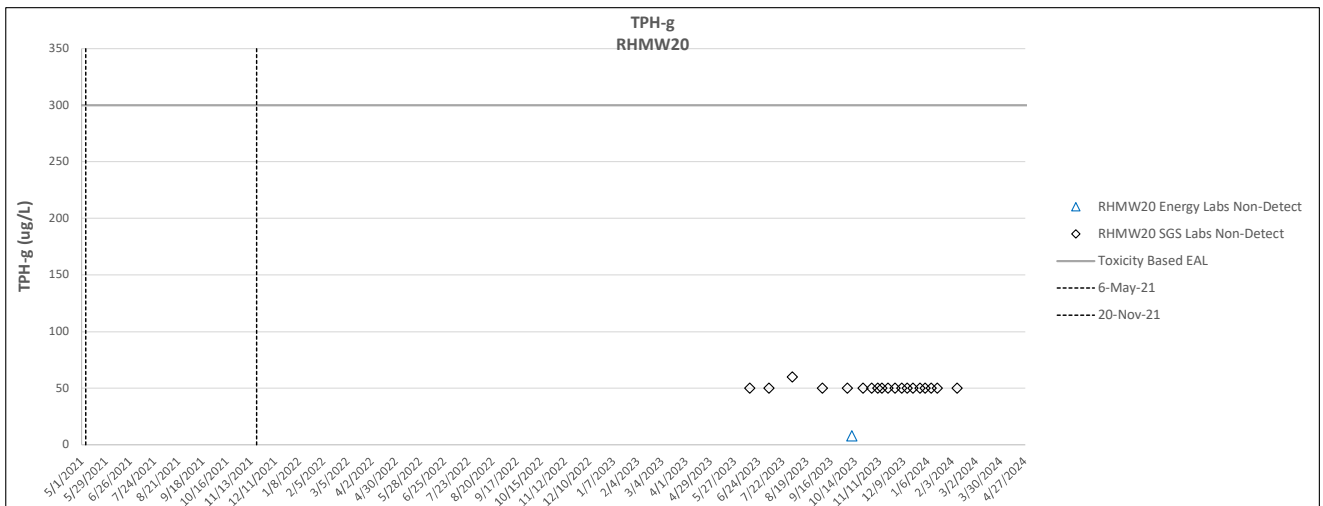


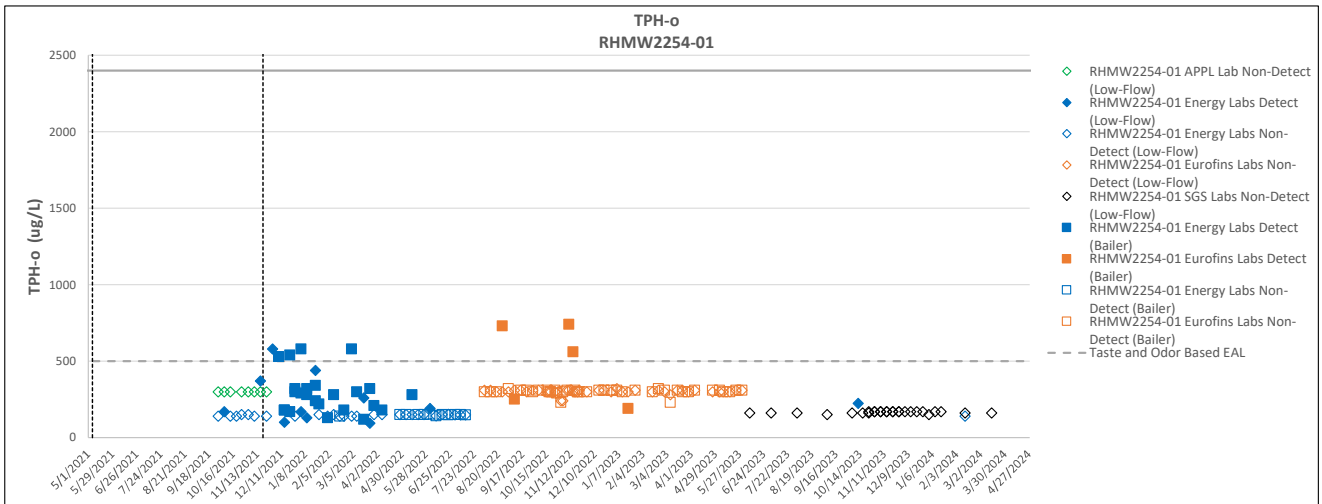
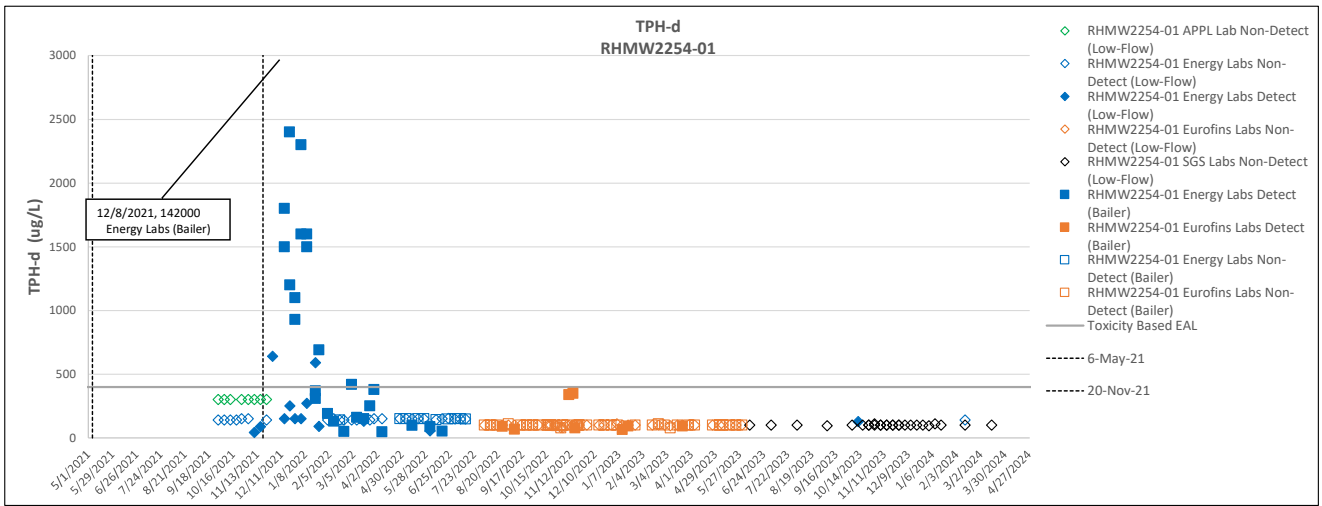
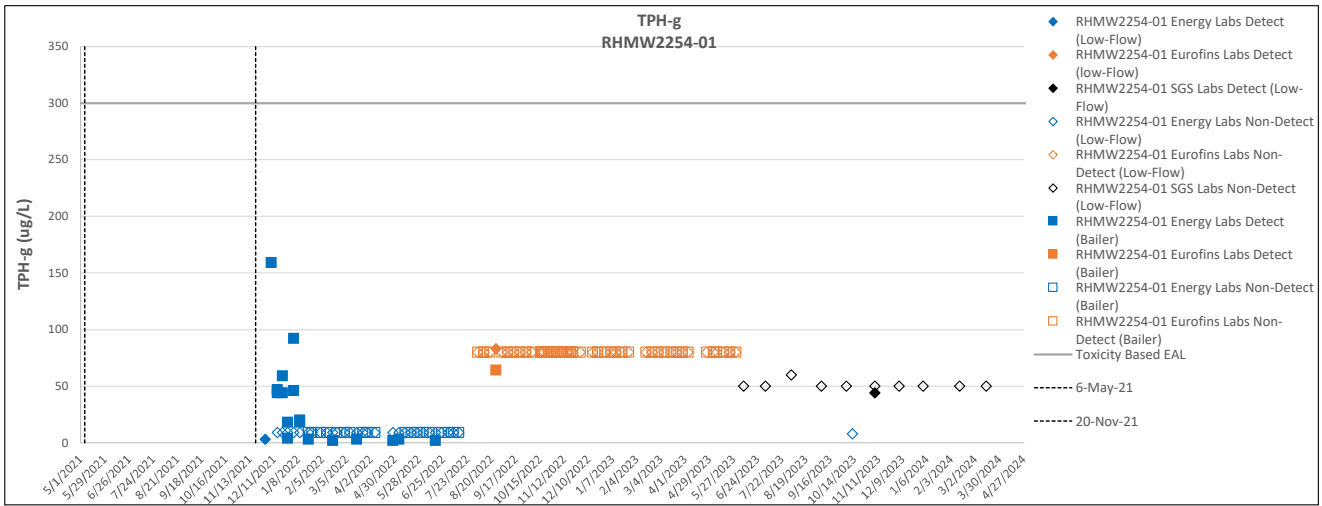


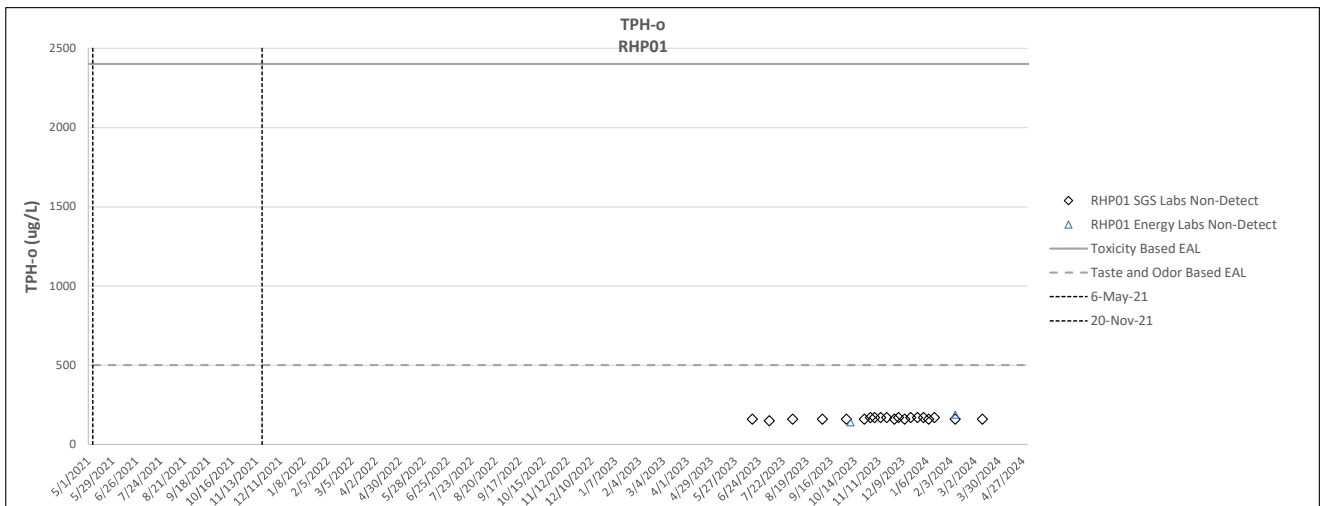
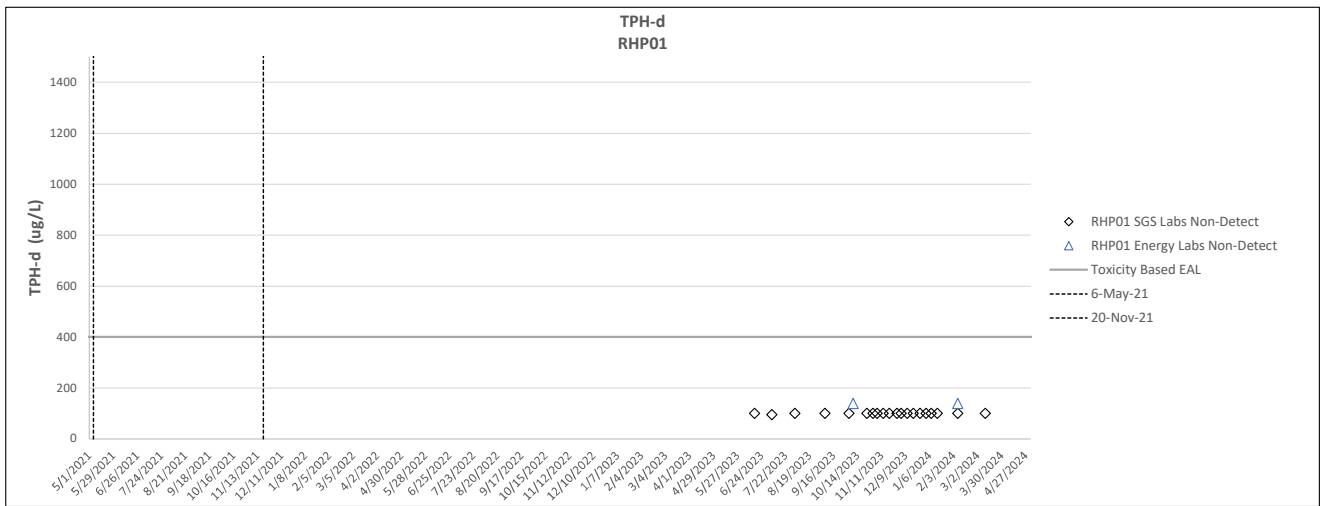
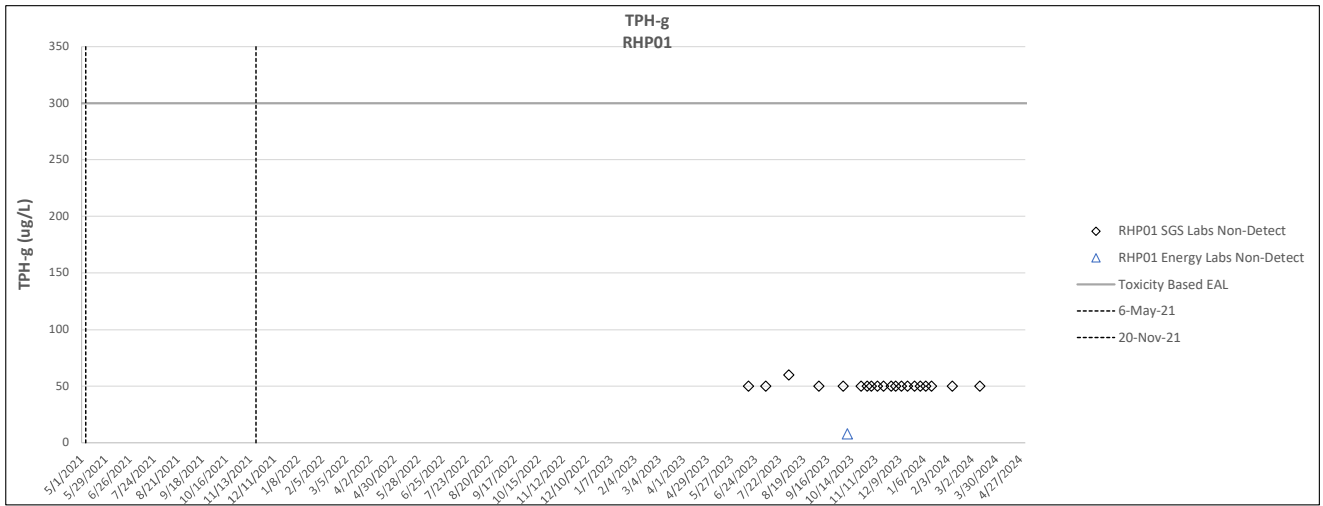


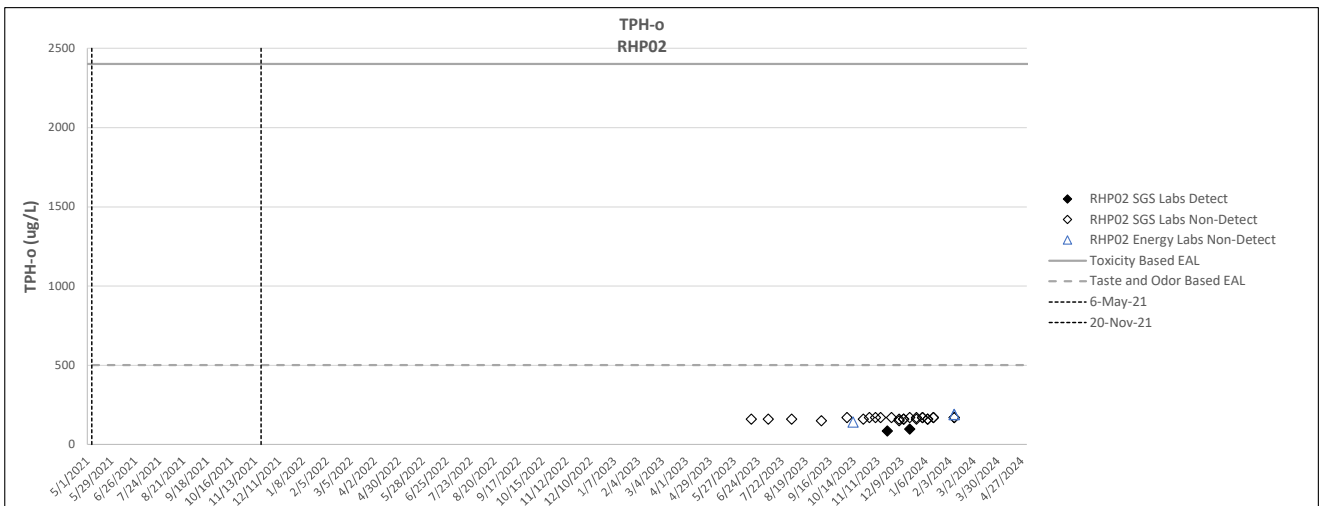
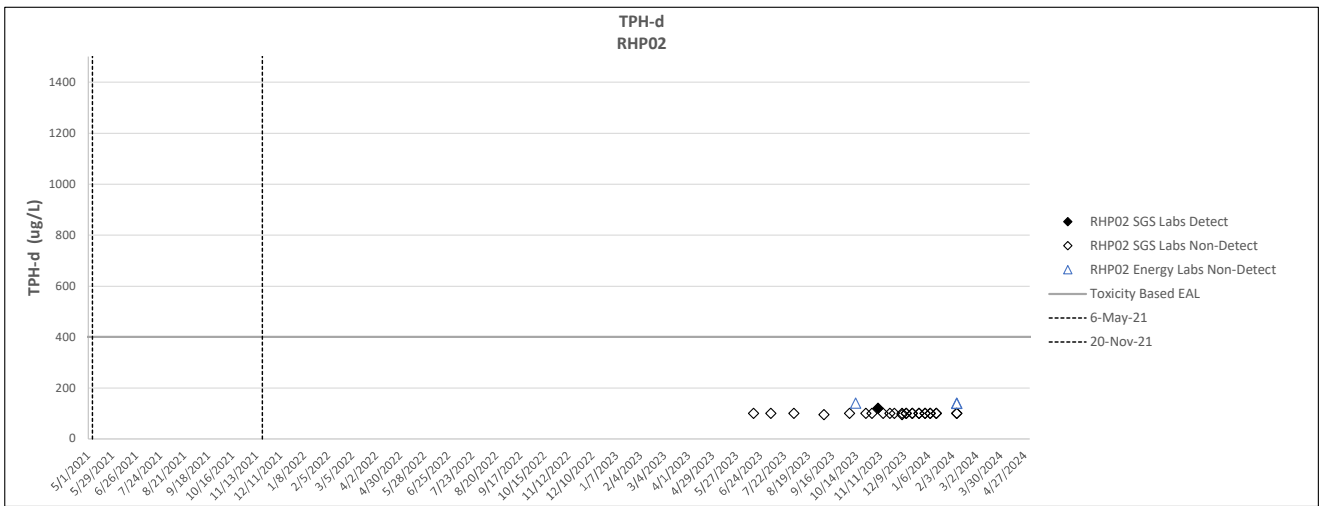
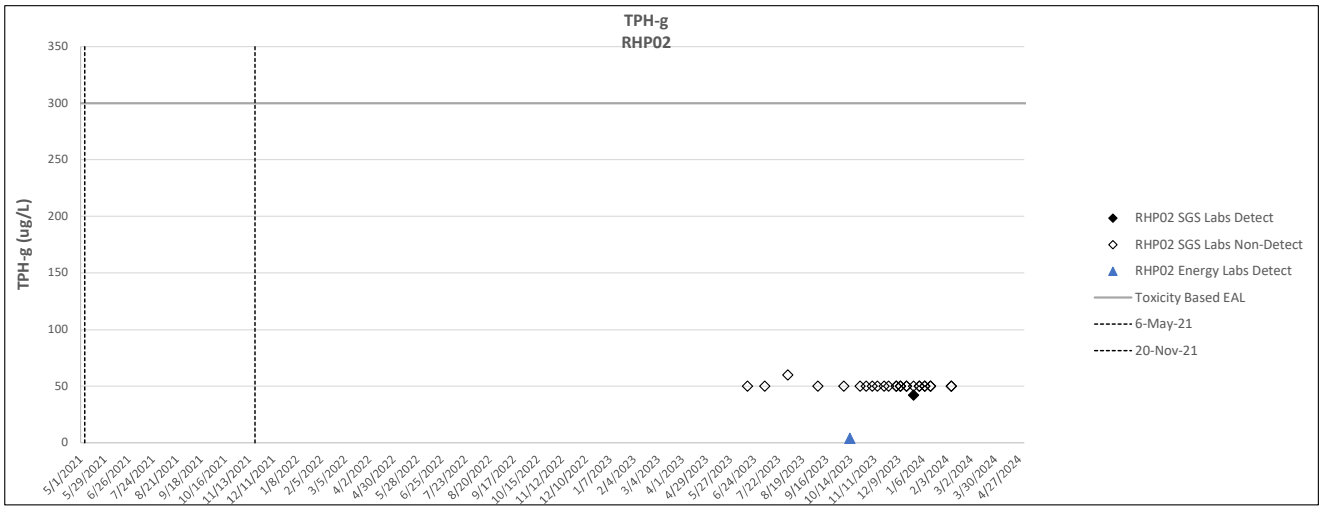


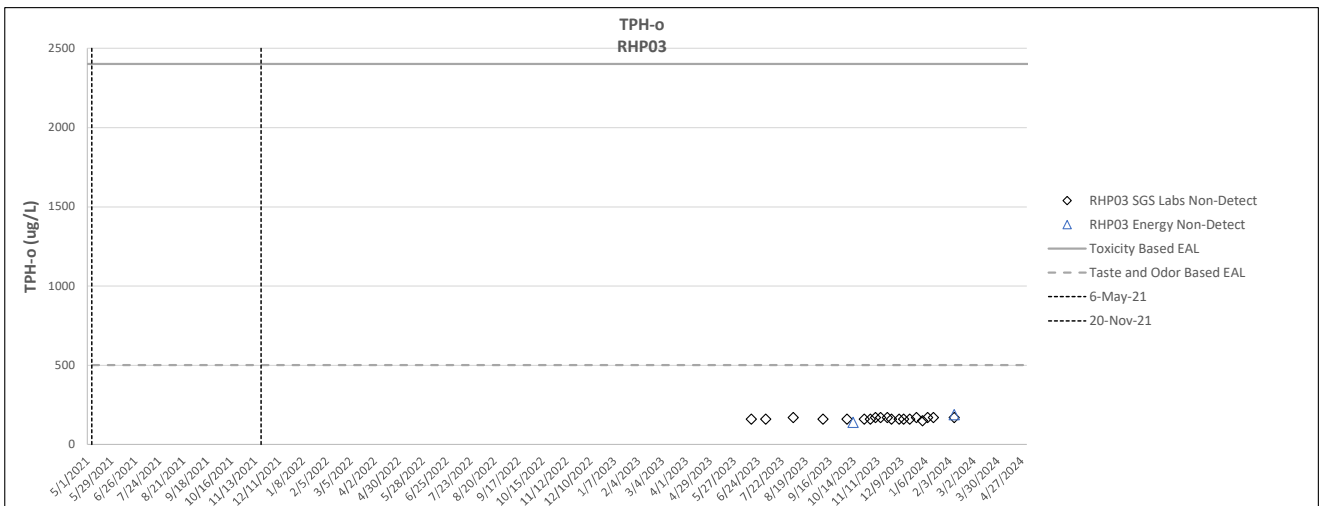
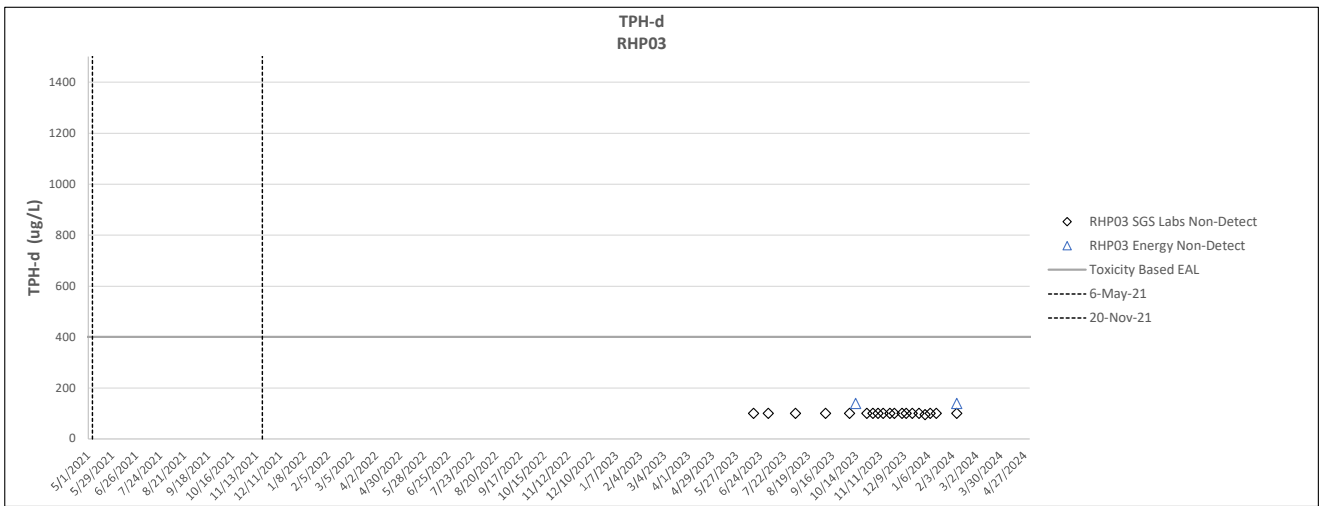
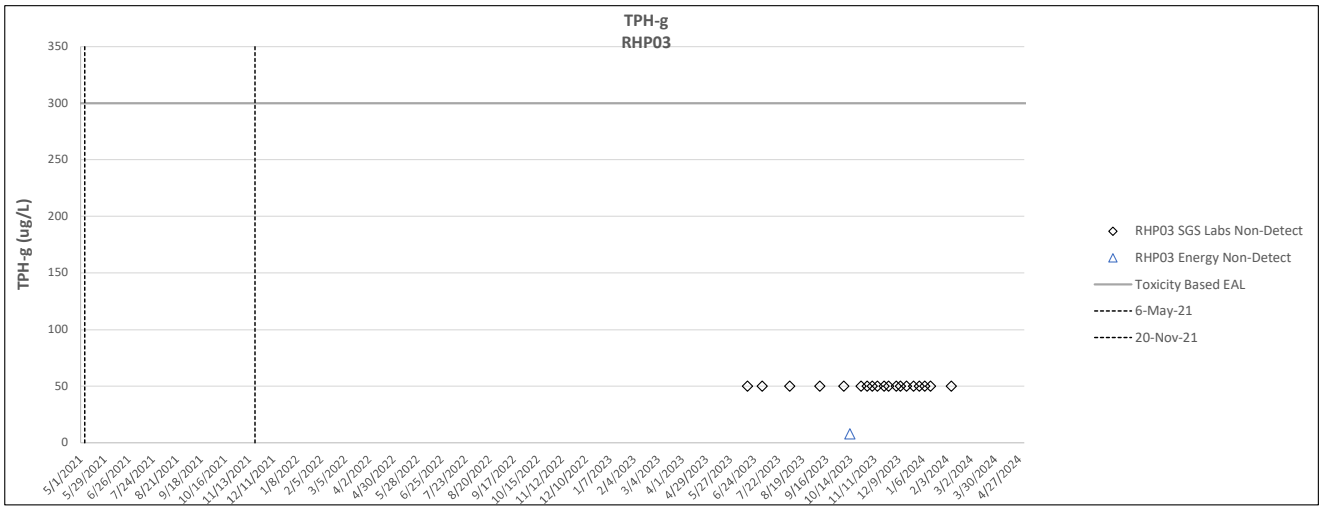


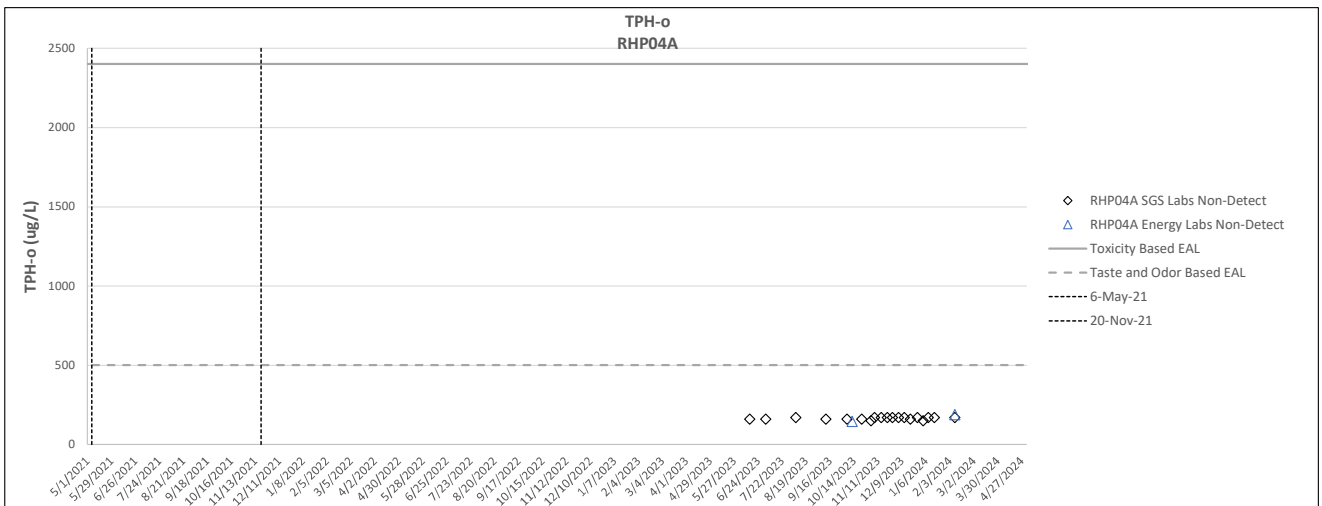
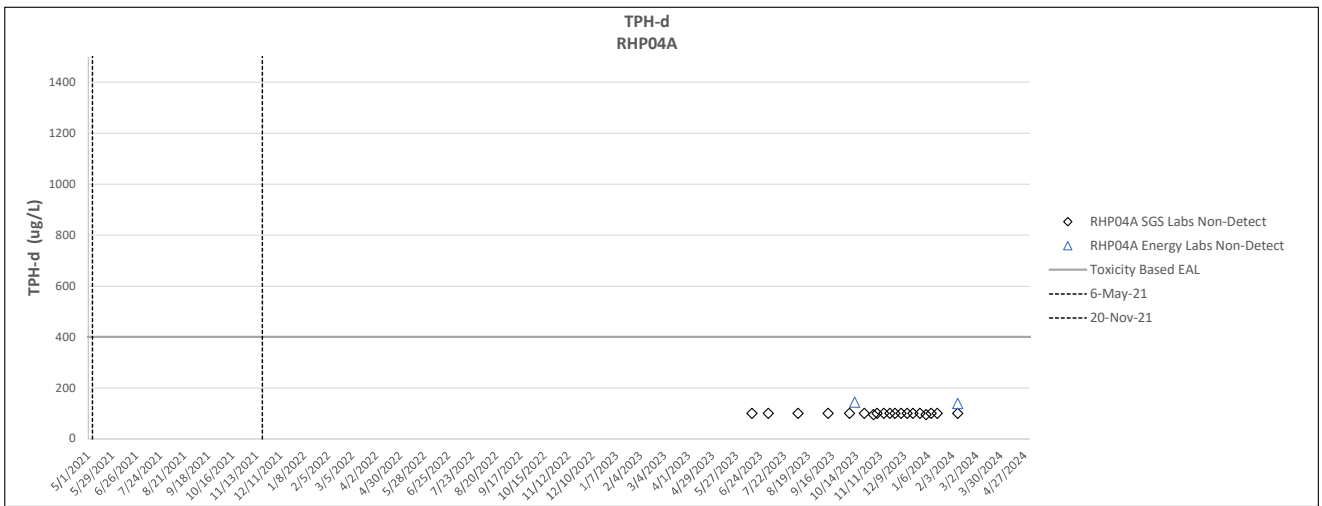
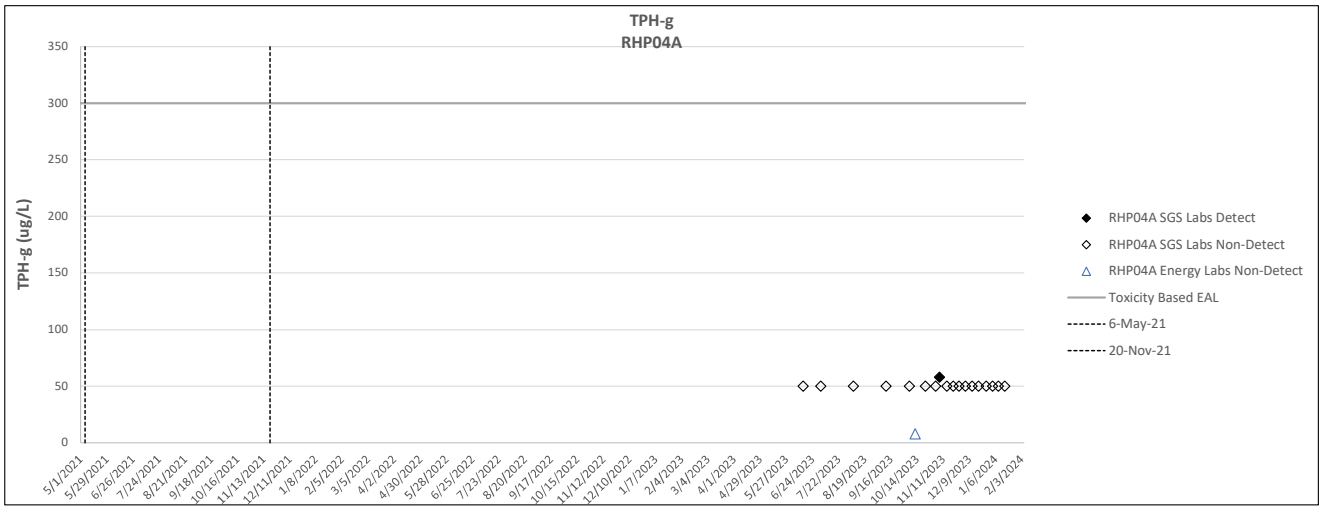


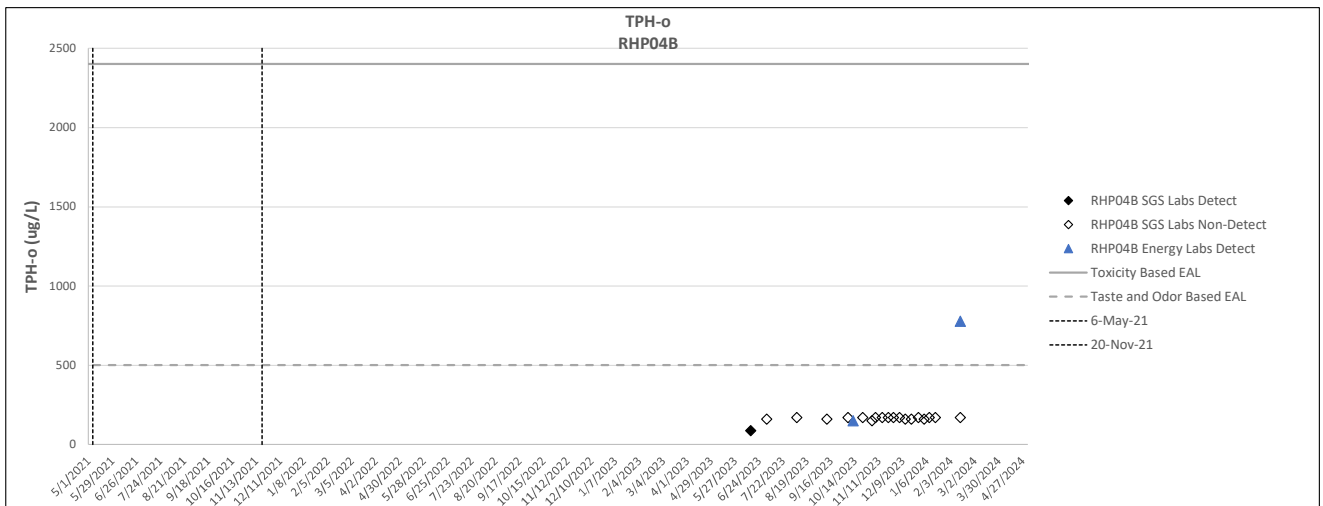
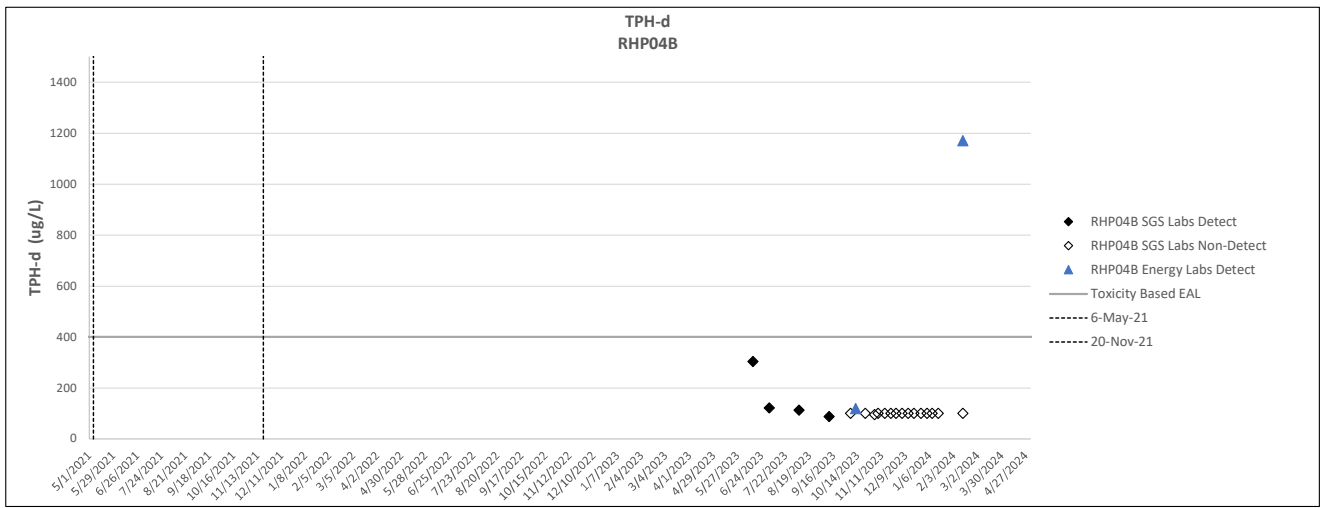
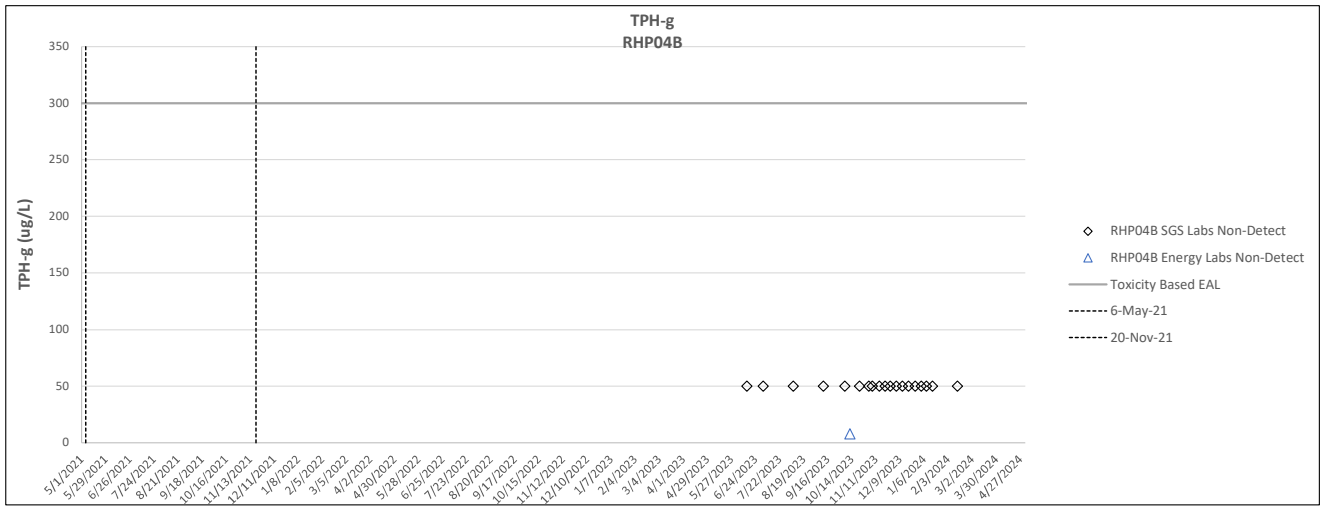


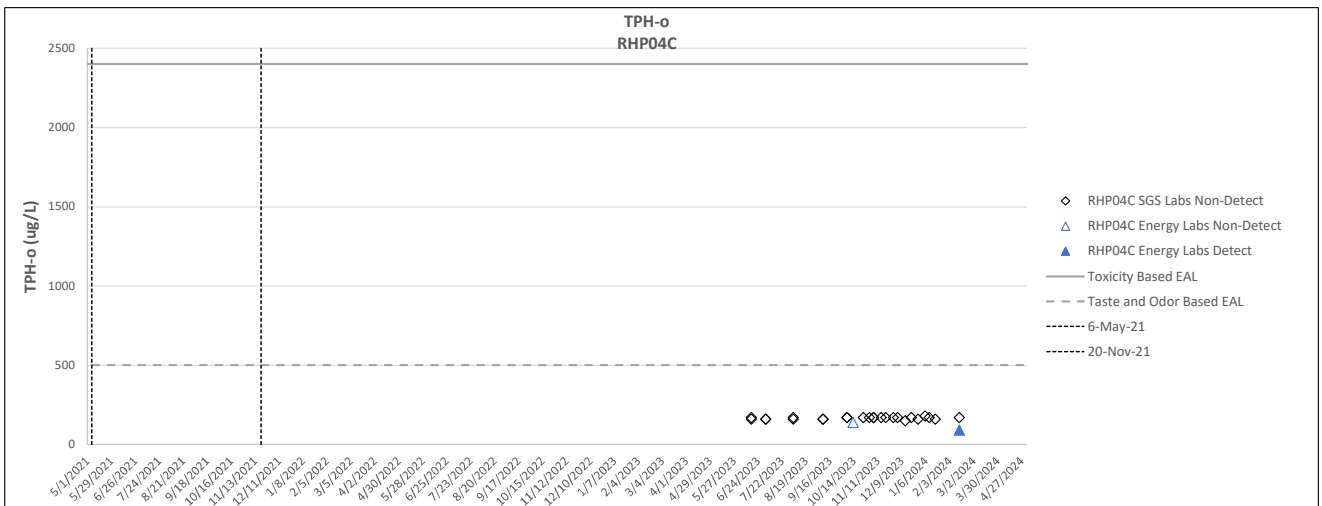
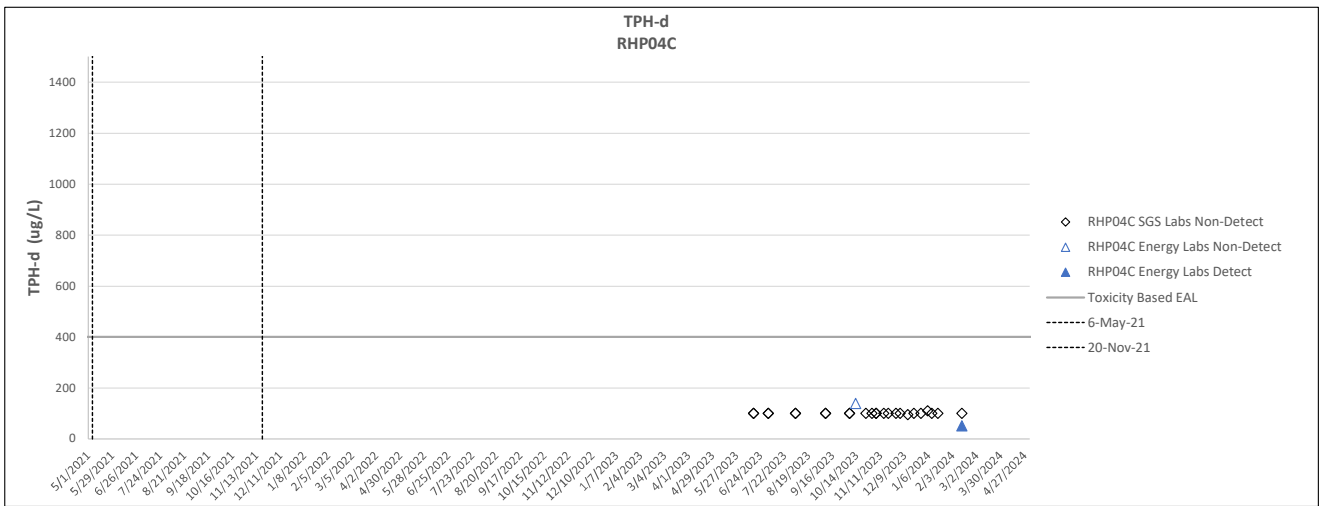
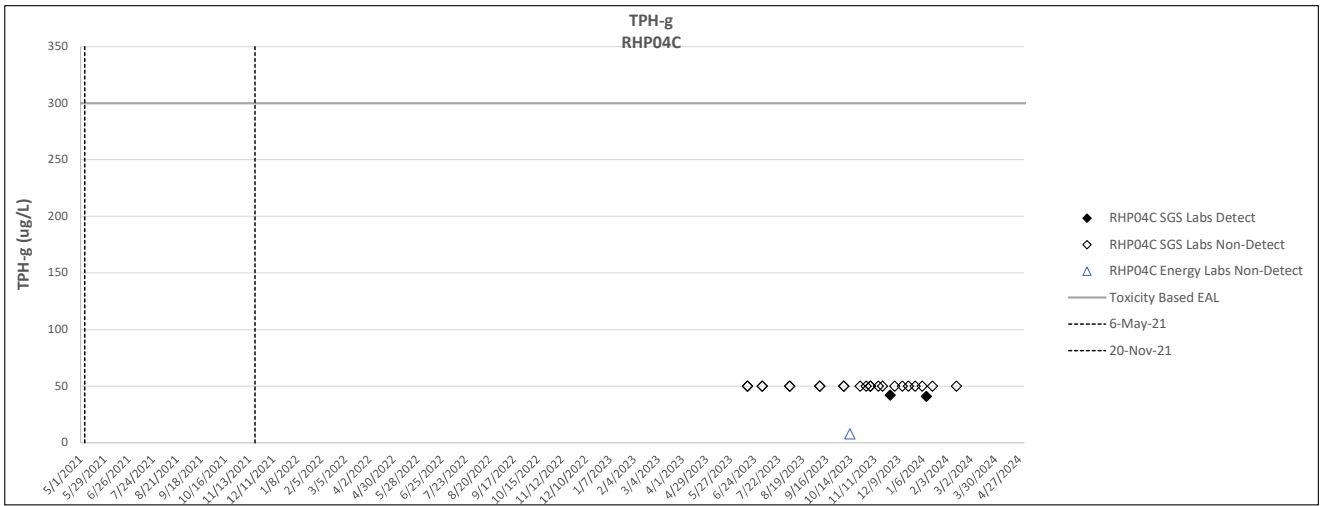


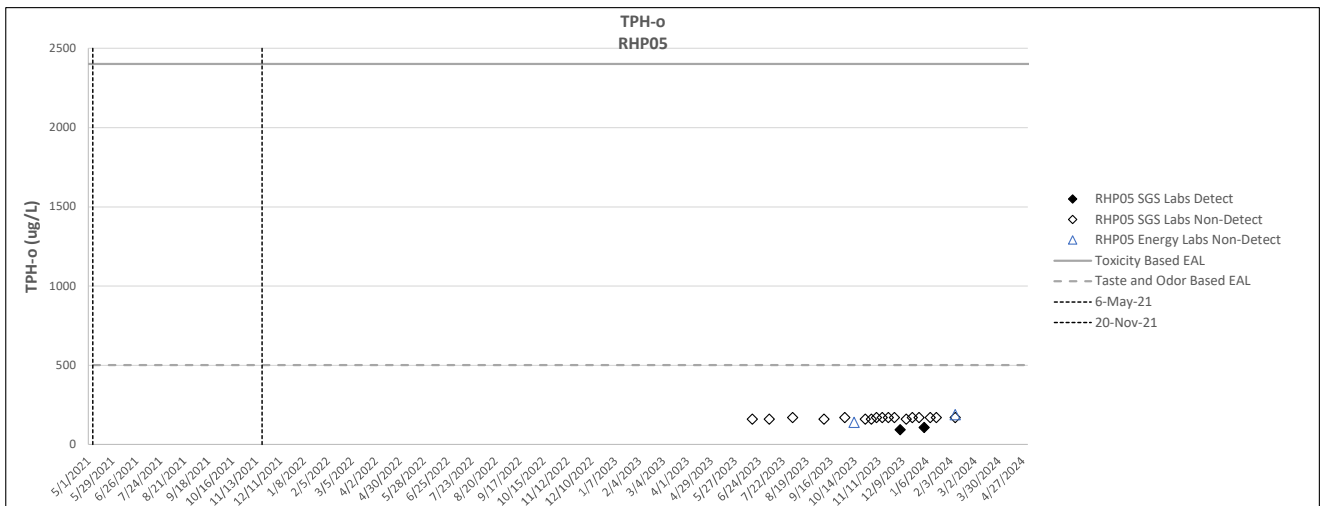
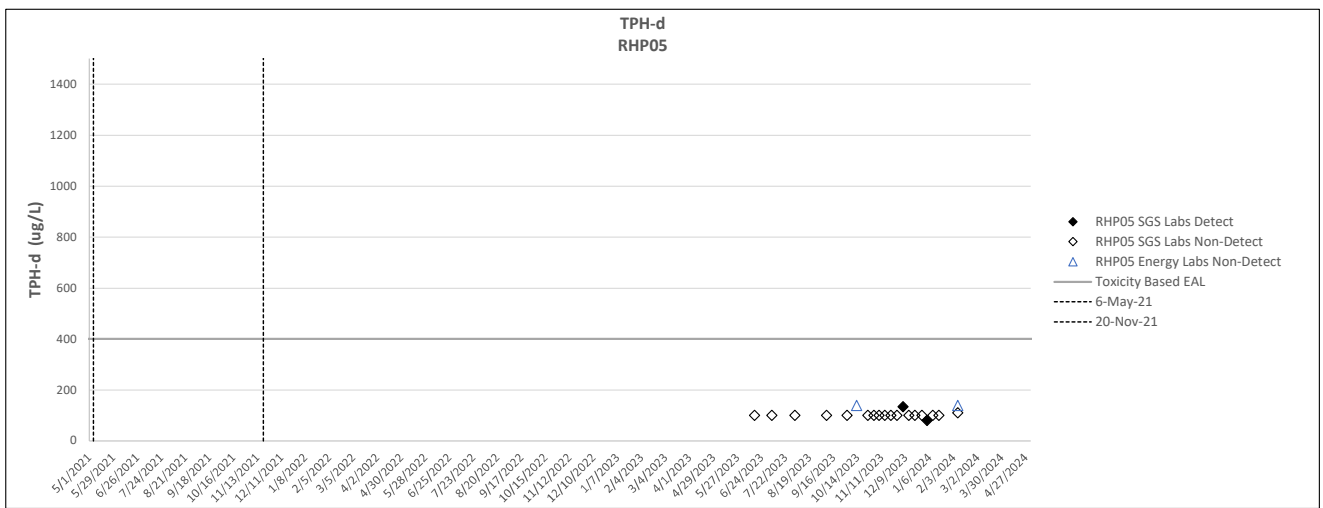
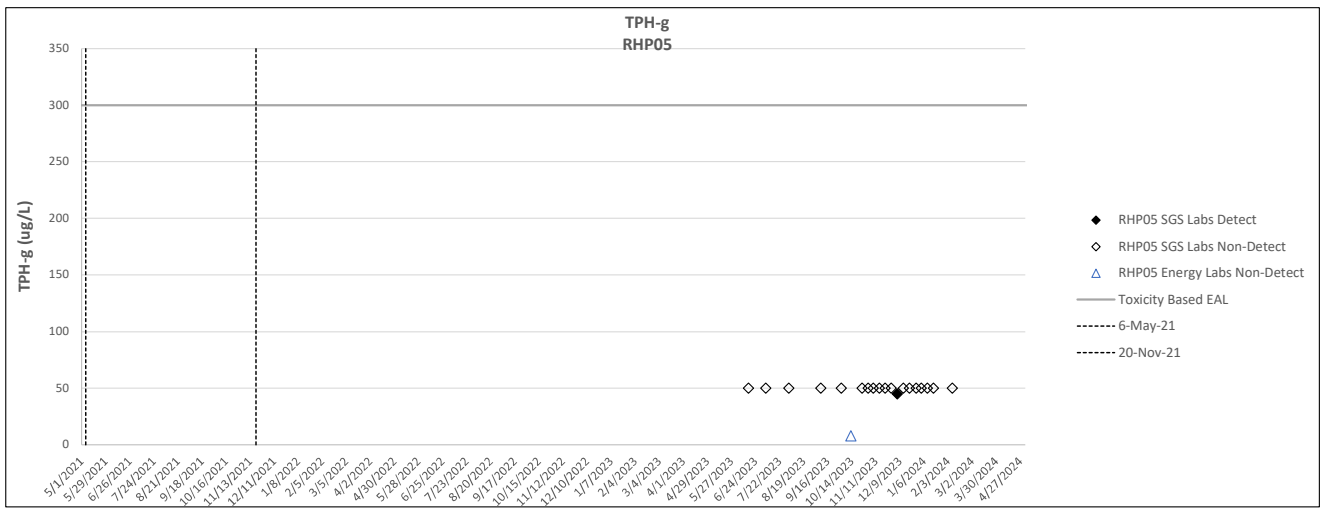


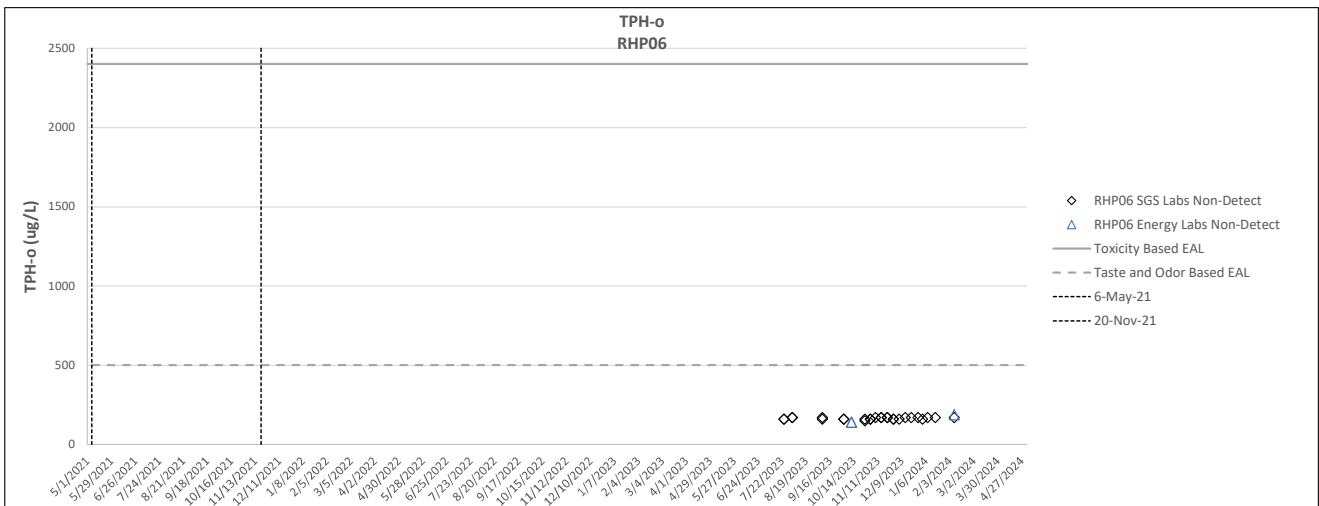
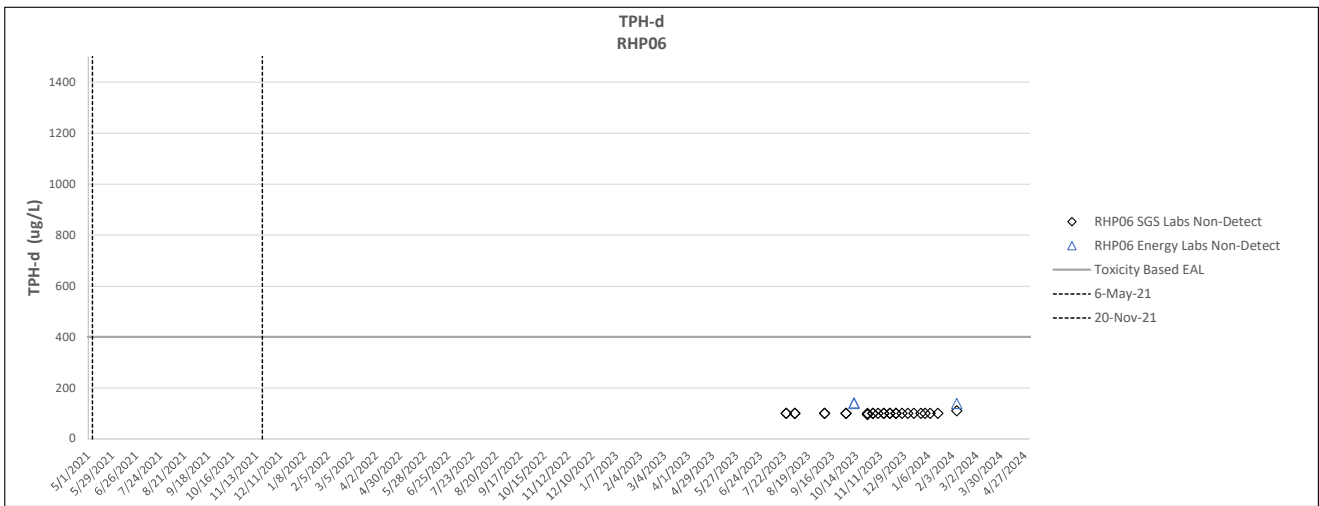
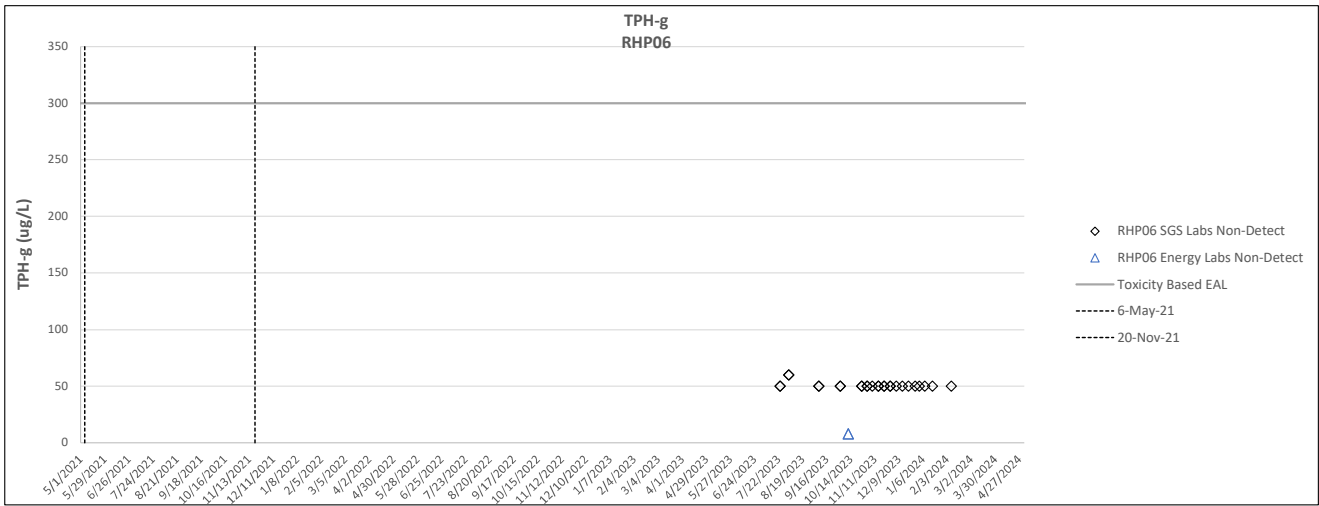


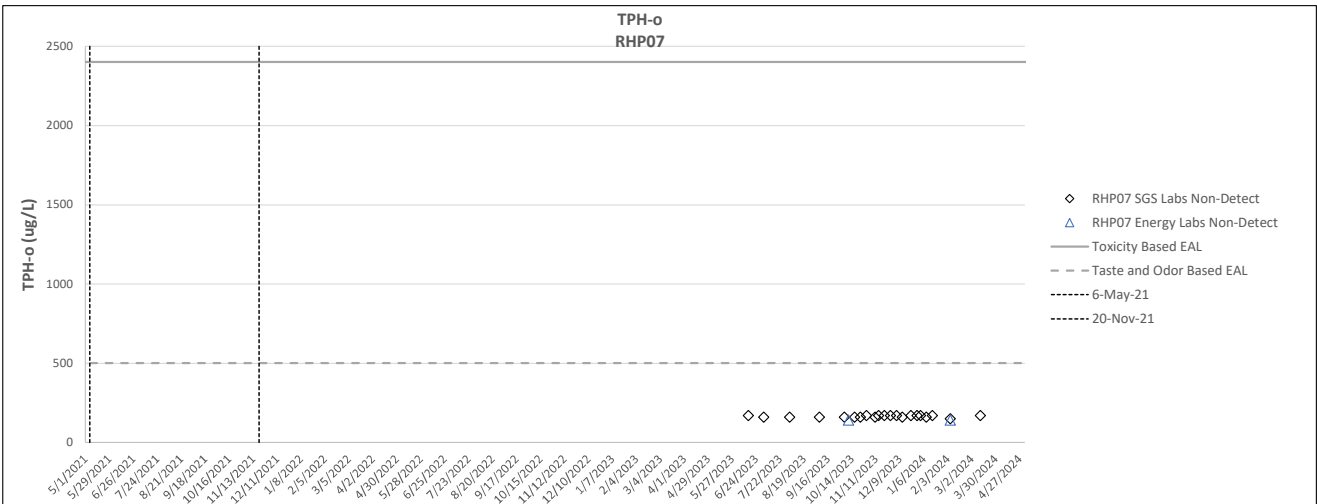
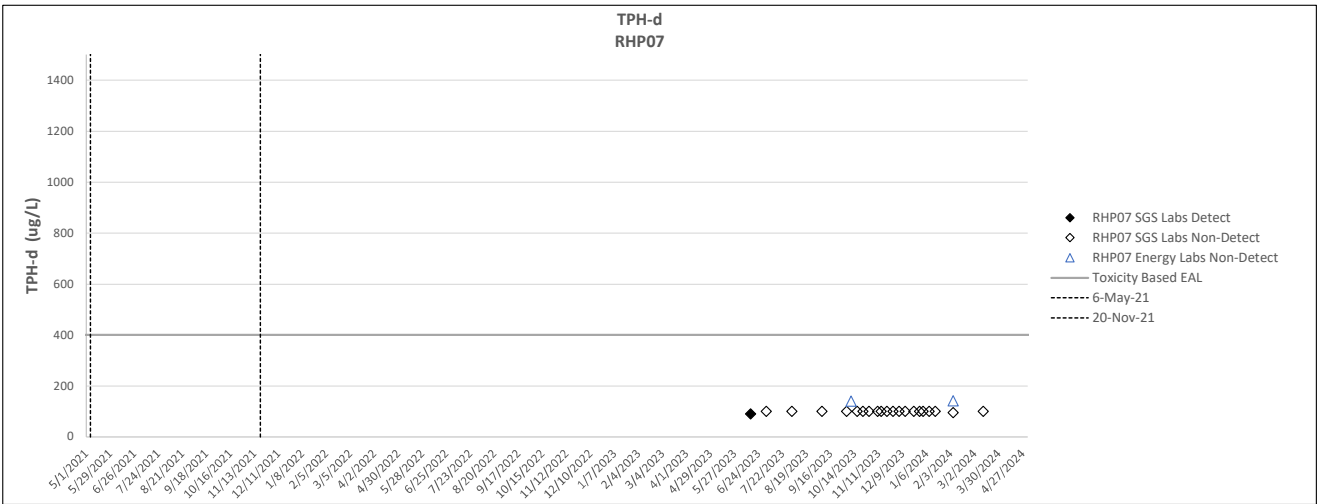
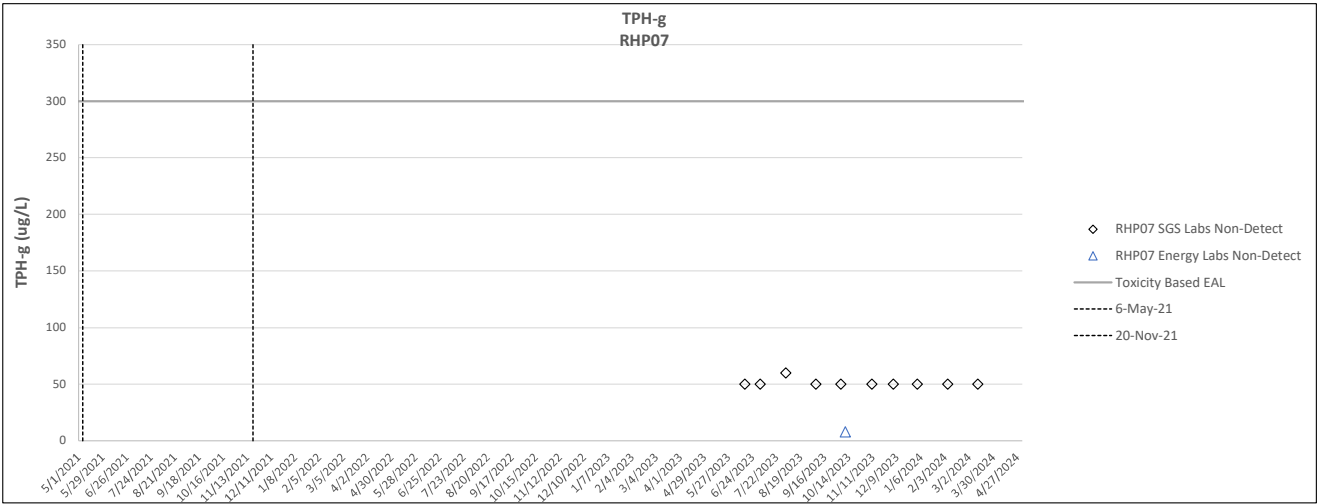


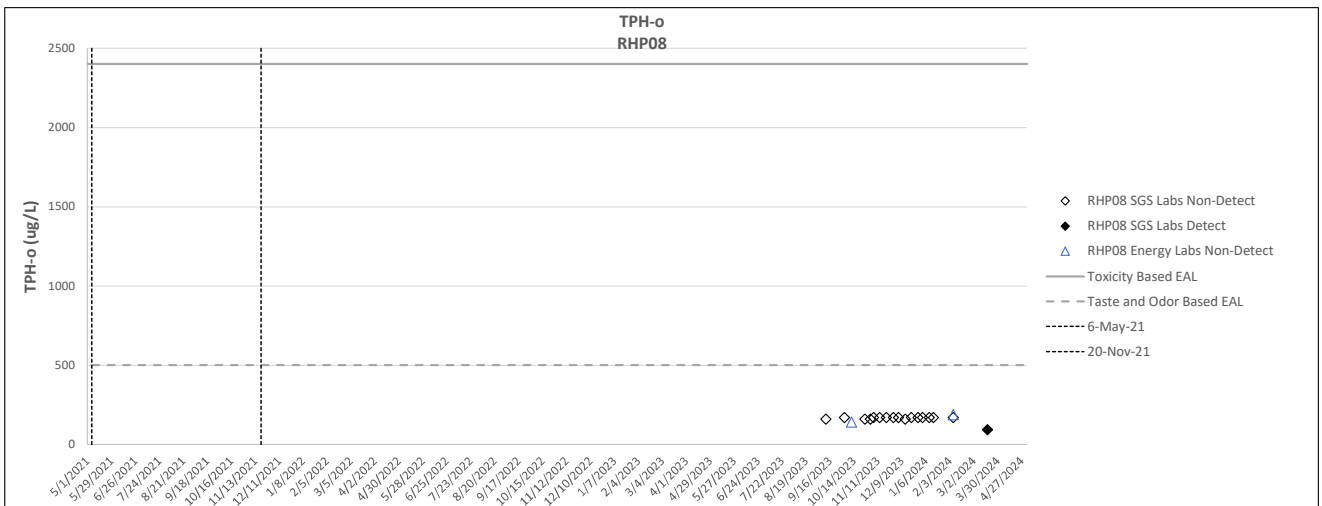
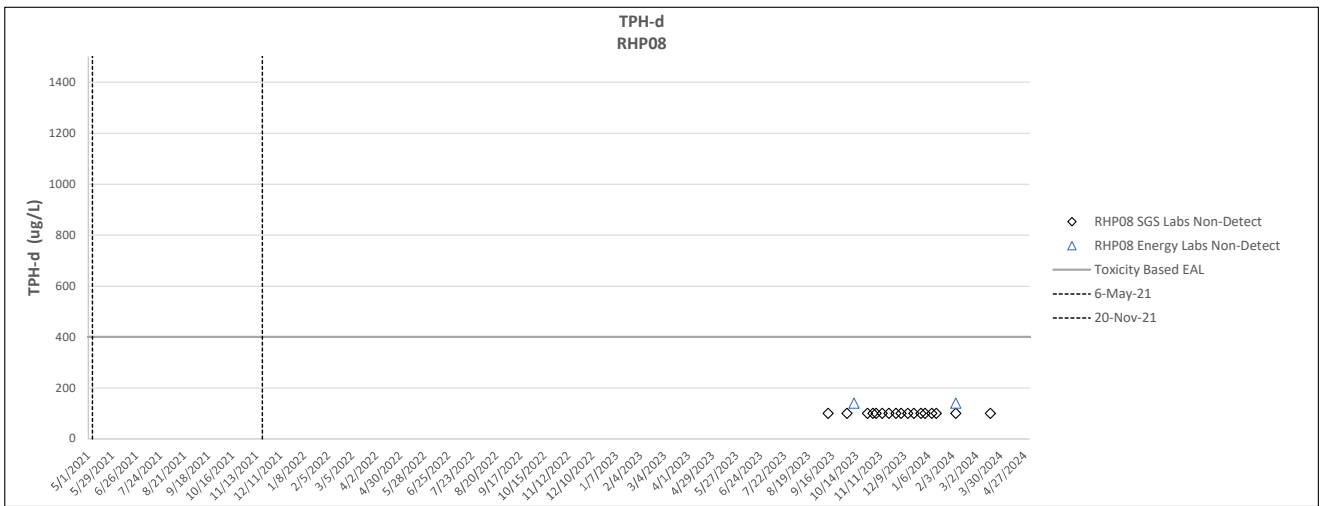
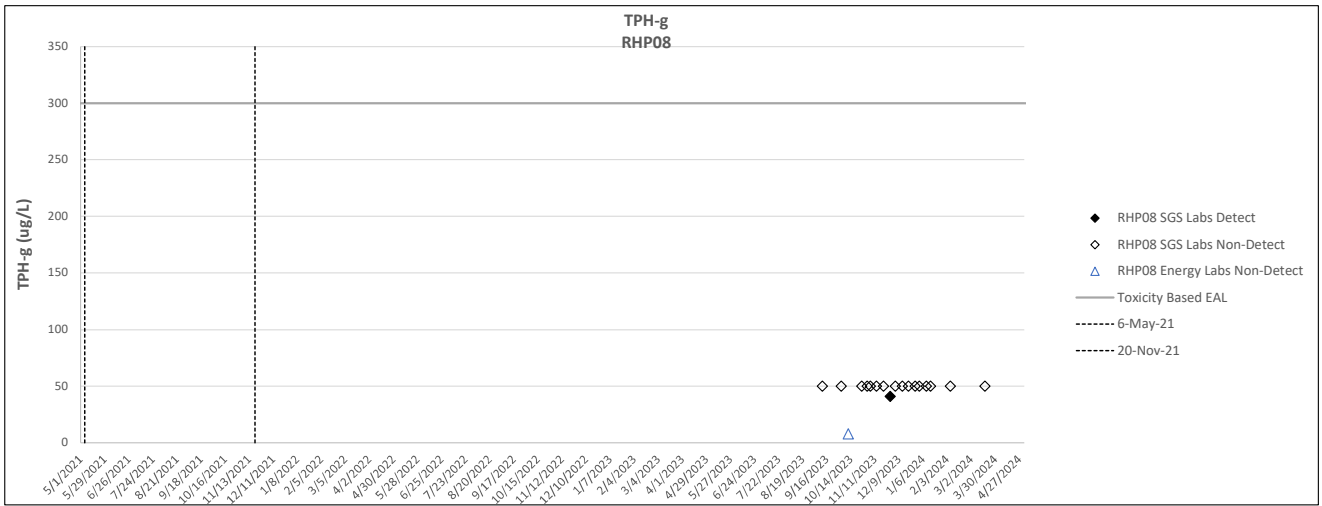












Appendix B.4 – Chromatograms for Groundwater Detections and Exceedances

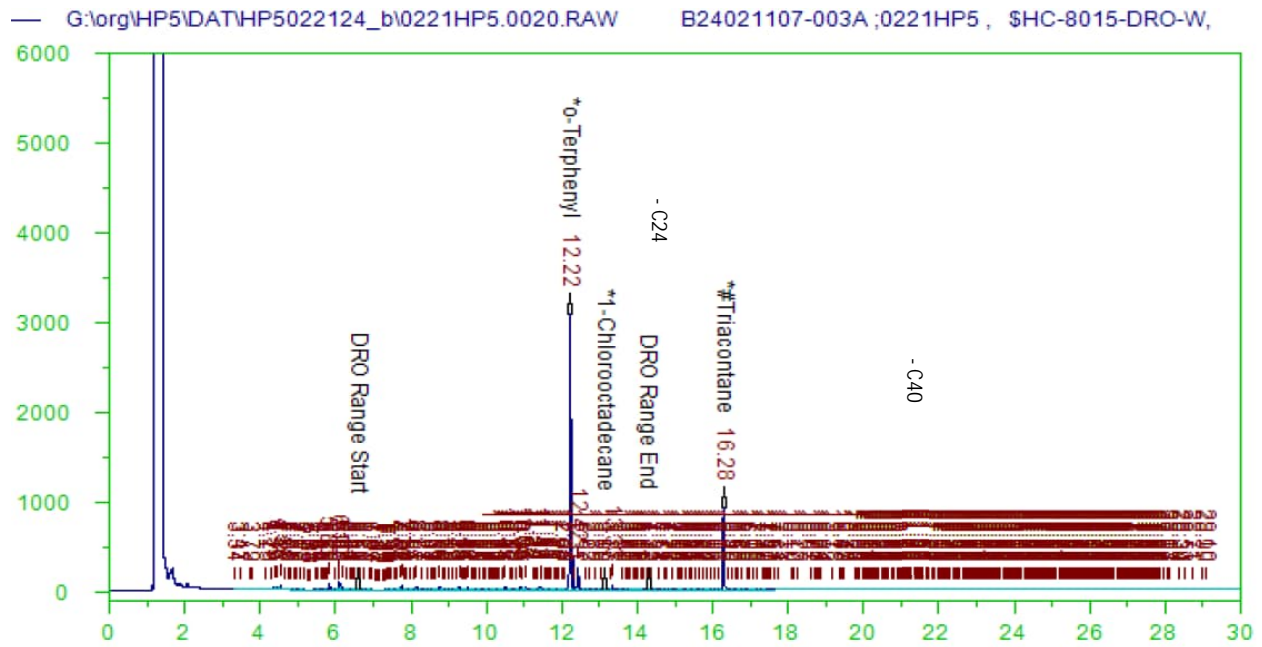
Location: RHMW01R Sample ID: RHMW01R-WGN01LF-2402

Sample Date: 2/16/2024

Lab: Energy

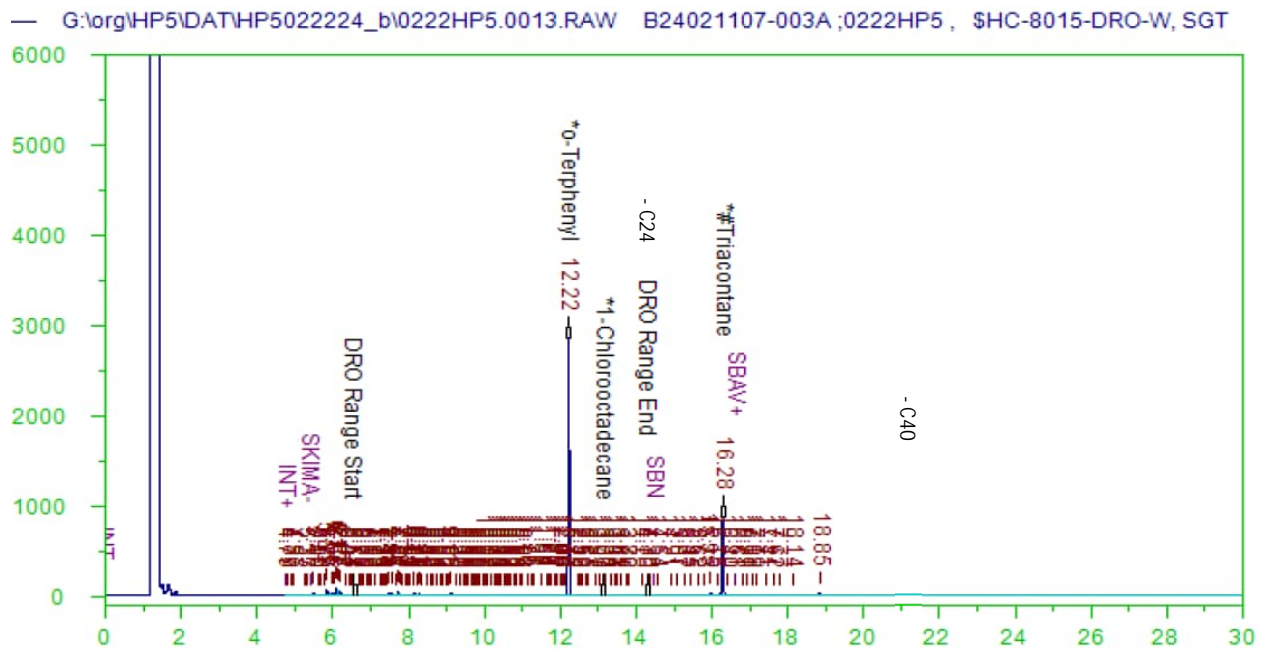
Results (ug/L): TPH-d (C10 to C24) 182 J

TPH-o (C24 to C40) <189 U



Results (ug/L): TPH-d SGC (C10 to C24) <141 U

TPH-o SGC (C24 to C40) <189 U



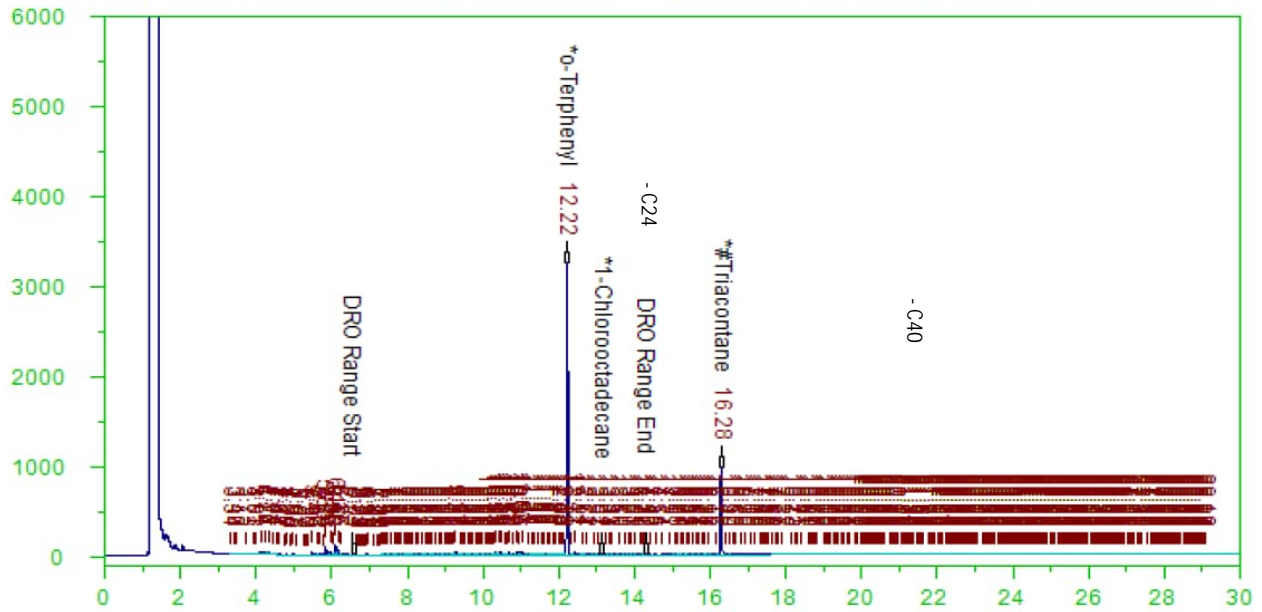
Location: RHMW01R Sample ID: RHMW01R-WGFD01LF-2402
Lab: Energy

Sample Date: 2/16/2024

Results (ug/L): TPH-d (C10 to C24) 158 J

TPH-o (C24 to C40) <189 U

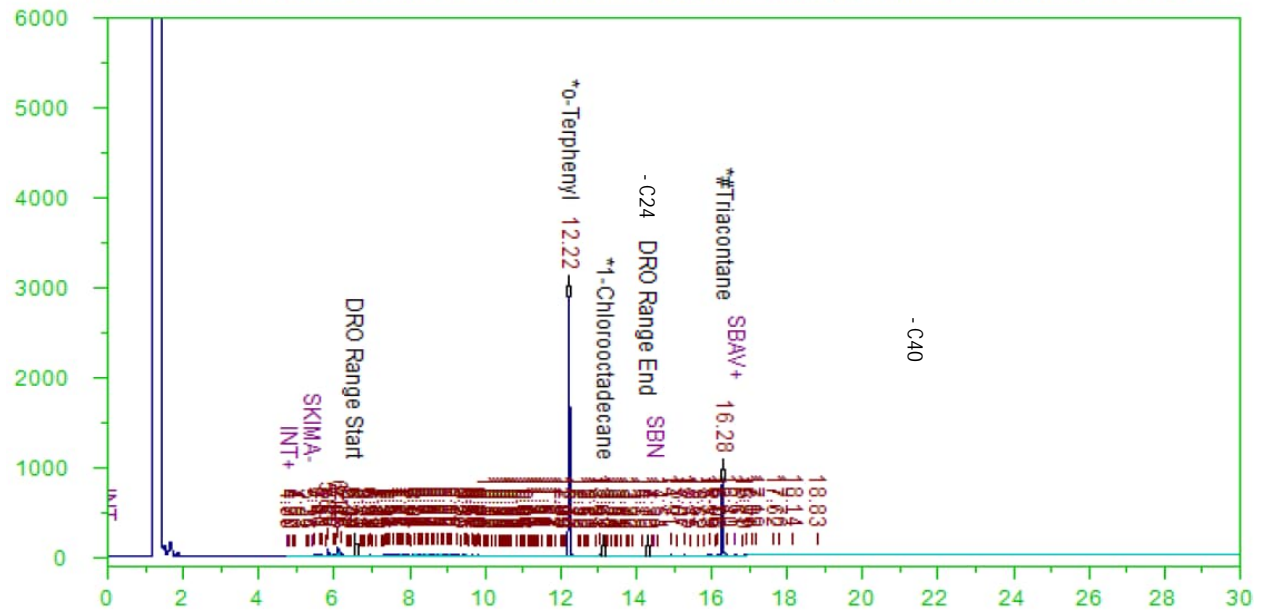
G:\org\HP5\DAT\HP5022124_b\0221HP5.0021.RAW B24021107-004A ;0221HP5 , \$HC-8015-DRO-W,



Results (ug/L): TPH-d SGC (C10 to C24) <141 U

TPH-o SGC (C24 to C40) <189 U

G:\org\HP5\DAT\HP5022224_b\0222HP5.0014.RAW B24021107-004A ;0222HP5 , \$HC-8015-DRO-W, SGT



Location: RHMW01R Sample ID: RHMW01R-WGFD01LF-2402

Sample Date: 2/16/2024

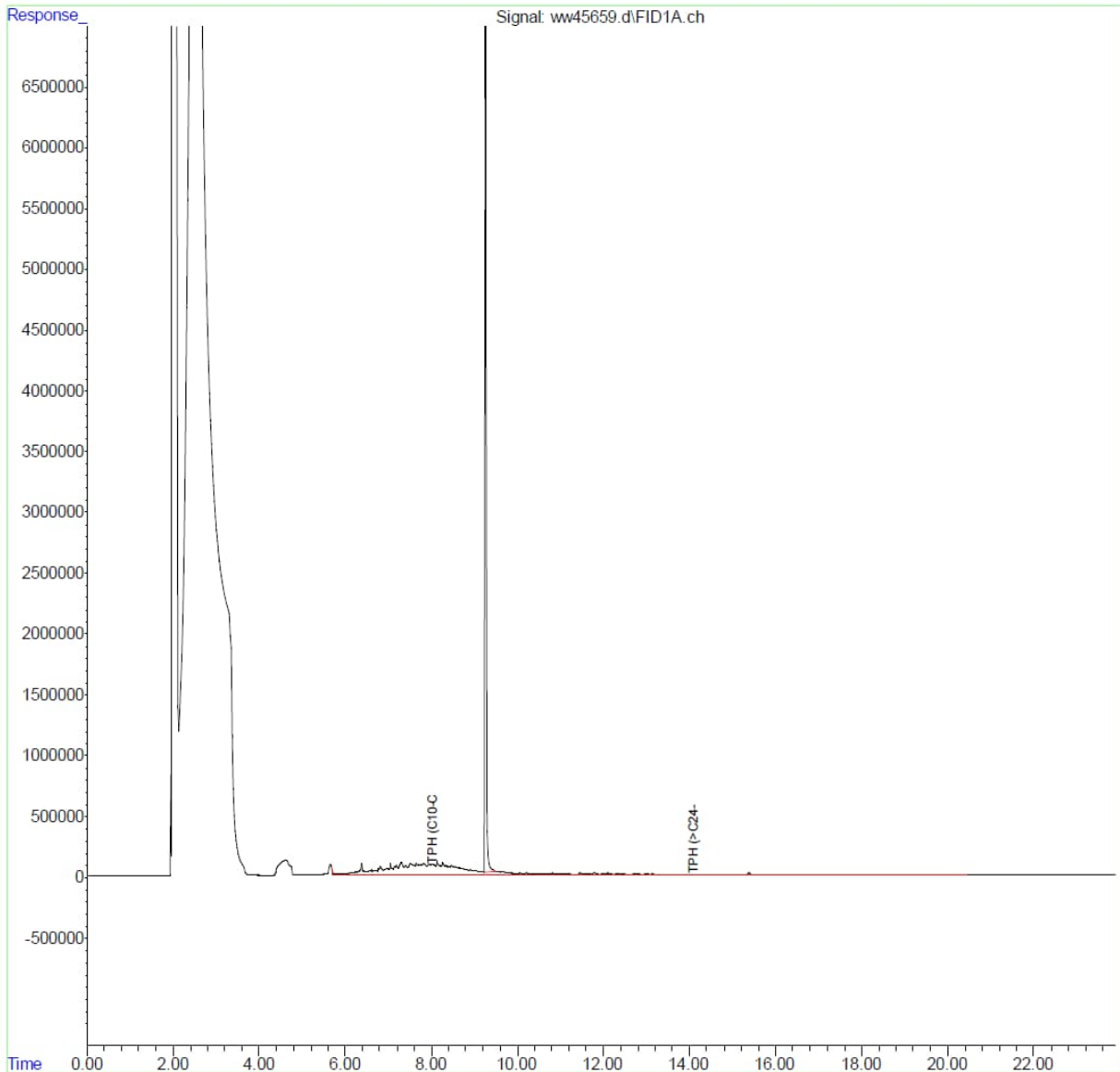
Lab: SGS

Results (ug/L): TPH-d (C10 to C24) 89 J

TPH-o (C24 to C40) <160 U

Quant Time: Feb 21 12:44:09 2024
Quant Method : C:\msdchem\2\methods\DRO_ORO2_091523_.M
Quant Title : TPH by SW846 8015C
QLast Update : Fri Sep 15 10:20:15 2023
Response via : Initial Calibration

Volume Inj. :
Signal Phase : DB-5
Signal Info : 0.25 mm

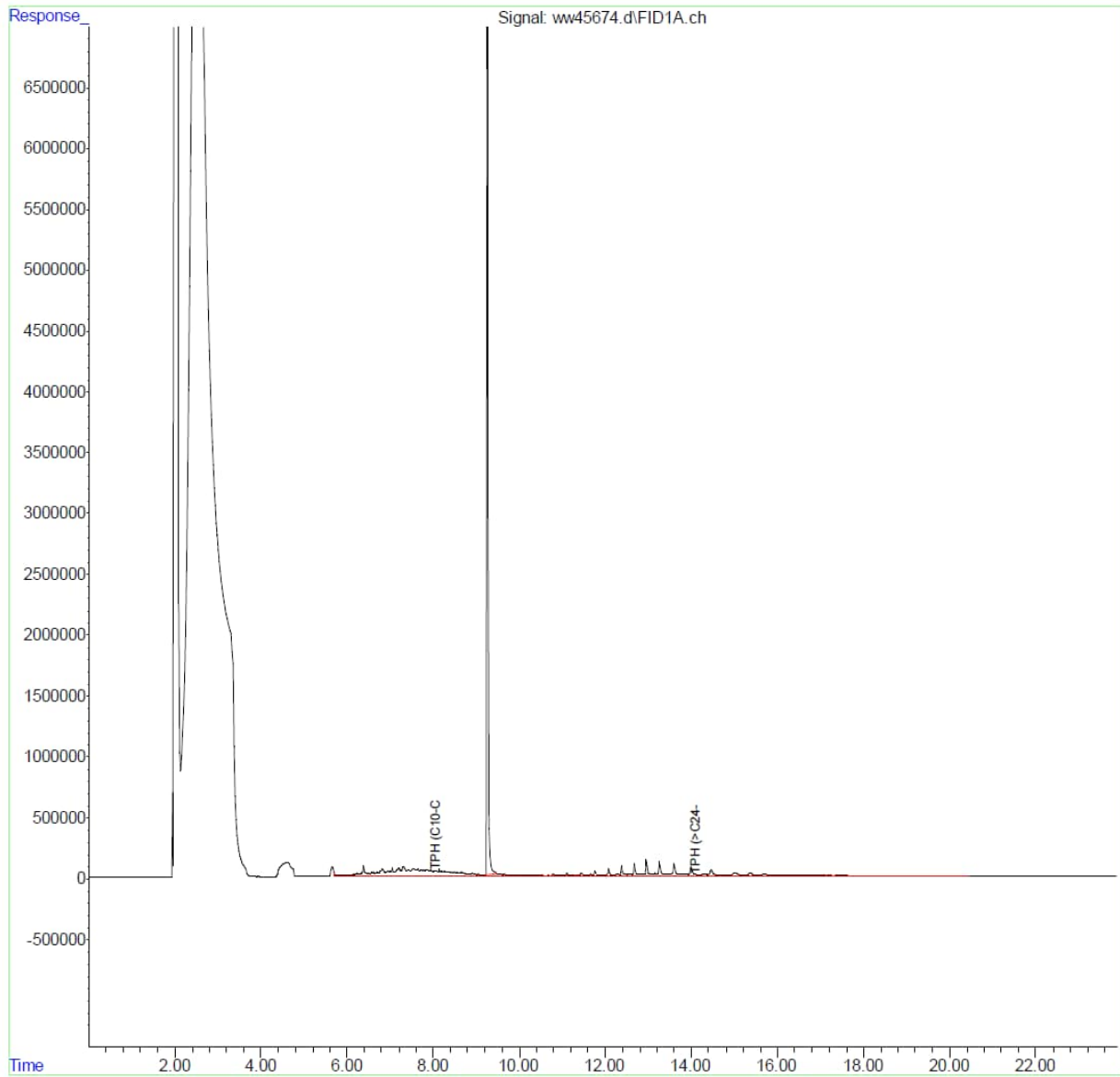


Results (ug/L): TPH-d SGC (C10 to C24) <100

TPH-o SGC (C24 to C40) <160 U

Quant Time: Feb 21 16:23:47 2024
Quant Method : C:\msdchem\2\methods\DRO_ORO2_091523_.M
Quant Title : TPH by SW846 8015C
QLast Update : Fri Sep 15 10:20:15 2023
Response via : Initial Calibration

Volume Inj. :
Signal Phase : DB-5
Signal Info : 0.25 mm



Location: RHMW01R Sample ID: RHMW01R-WGN01LF-2403

Sample Date: 3/13/2024

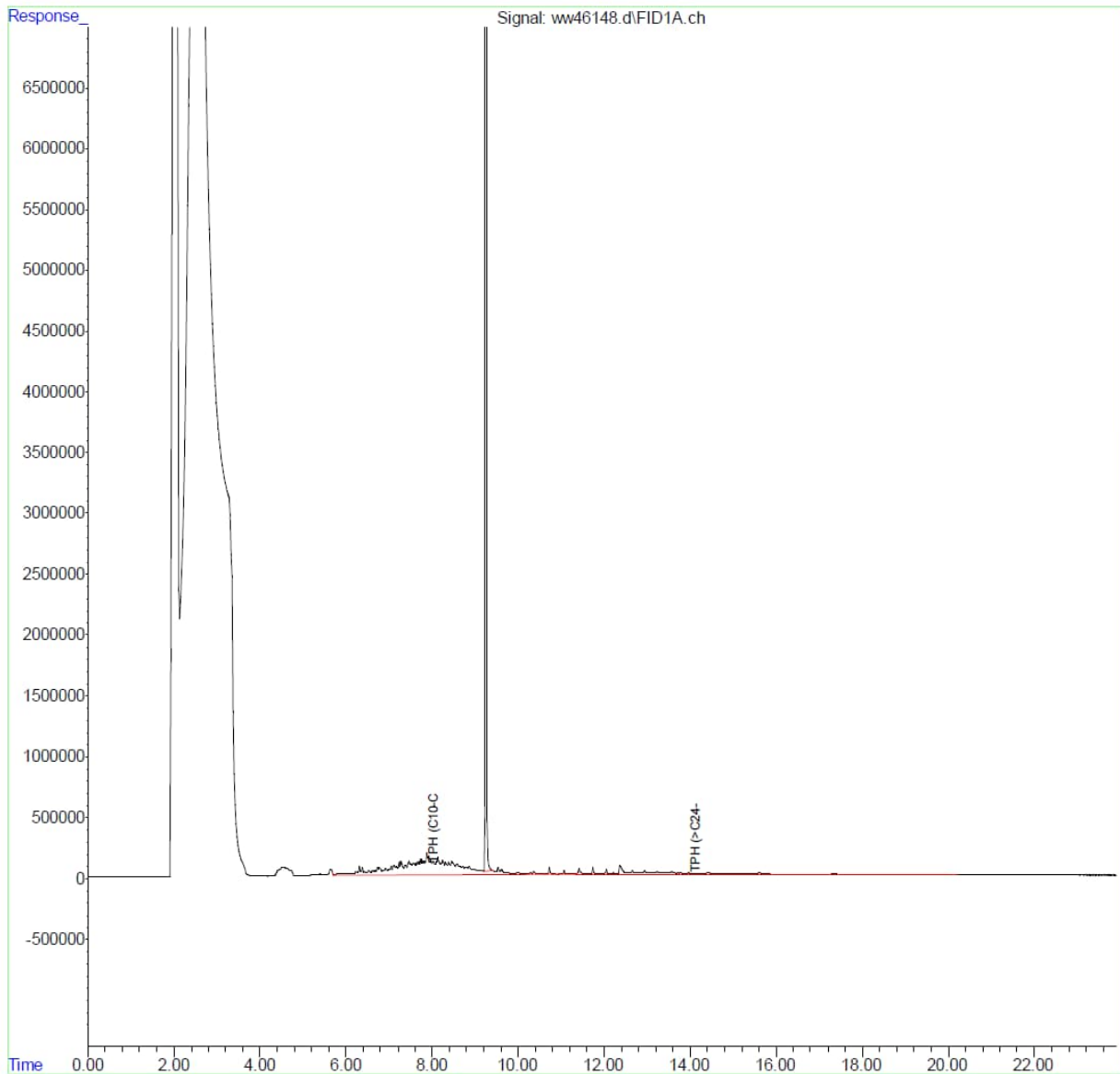
Lab: SGS

Results (ug/L): TPH-d (C10 to C24) 113 J

TPH-o (C24 to C40) <170 U

Quant Time: Mar 19 14:45:18 2024
Quant Method : C:\msdchem\2\methods\DRO_ORO2_091523_.M
Quant Title : TPH by SW846 8015C
QLast Update : Fri Sep 15 10:20:15 2023
Response via : Initial Calibration

Volume Inj. :
Signal Phase : DB-5
Signal Info : 0.25 mm

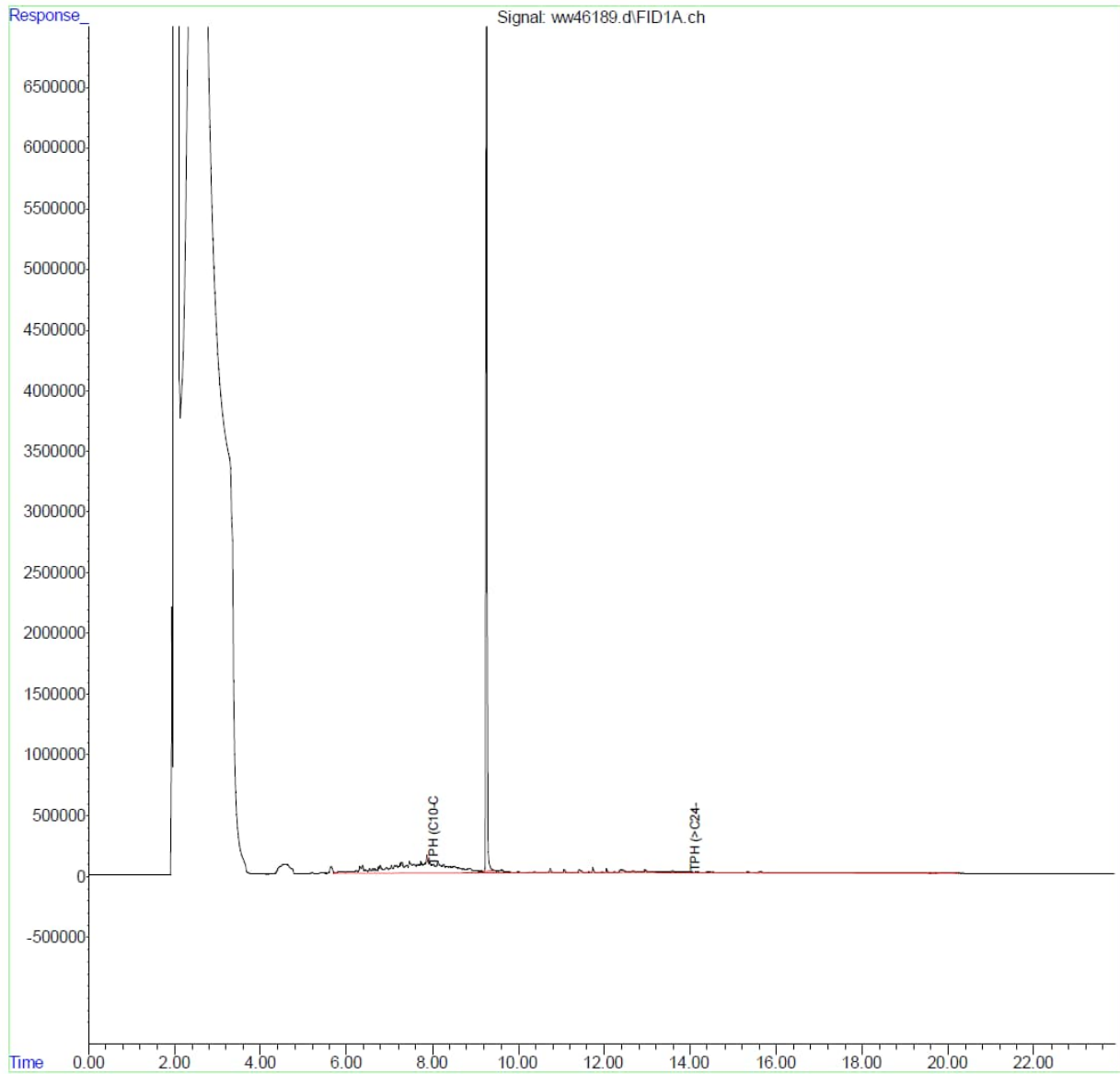


Results (ug/L): TPH-d SGC (C10 to C24) <100 U

TPH-o SGC (C24 to C40) <170 U

Quant Time: Mar 21 13:54:55 2024
Quant Method : C:\msdchem\2\methods\DRO_ORO2_091523_.M
Quant Title : TPH by SW846 8015C
QLast Update : Fri Sep 15 10:20:15 2023
Response via : Initial Calibration

Volume Inj. :
Signal Phase : DB-5
Signal Info : 0.25 mm



Location: RHMW01R Sample ID: RHMW01R-WGFD01LF-2403

Sample Date: 3/13/2024

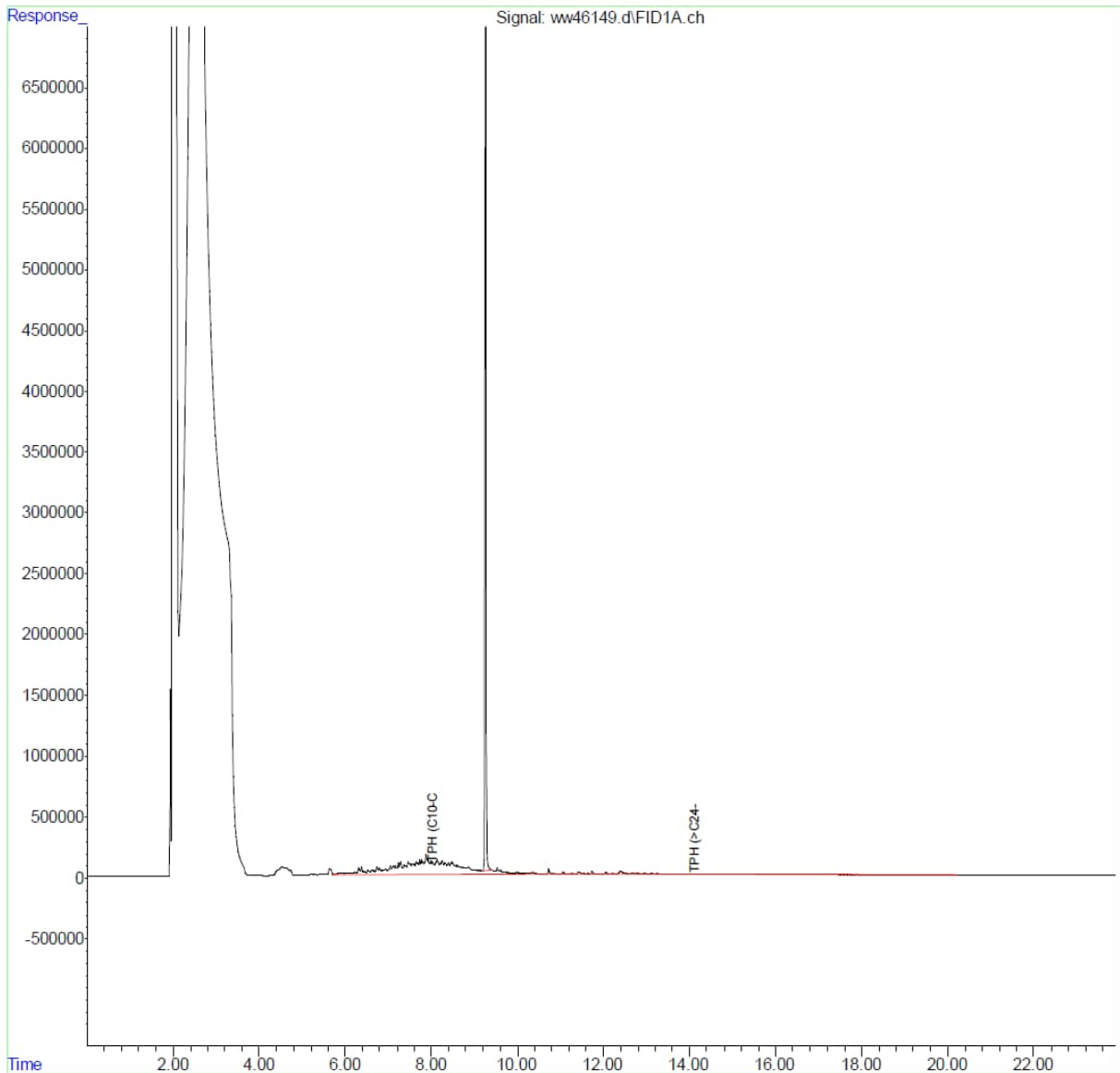
Lab: SGS

Results (ug/L): TPH-d (C10 to C24) 106 J

TPH-o (C24 to C40) <170 U

Quant Time: Mar 19 15:40:31 2024
Quant Method : C:\msdchem\2\methods\DRO_ORO2_091523_.M
Quant Title : TPH by SW846 8015C
QLast Update : Fri Sep 15 10:20:15 2023
Response via : Initial Calibration

Volume Inj. :
Signal Phase : DB-5
Signal Info : 0.25 mm

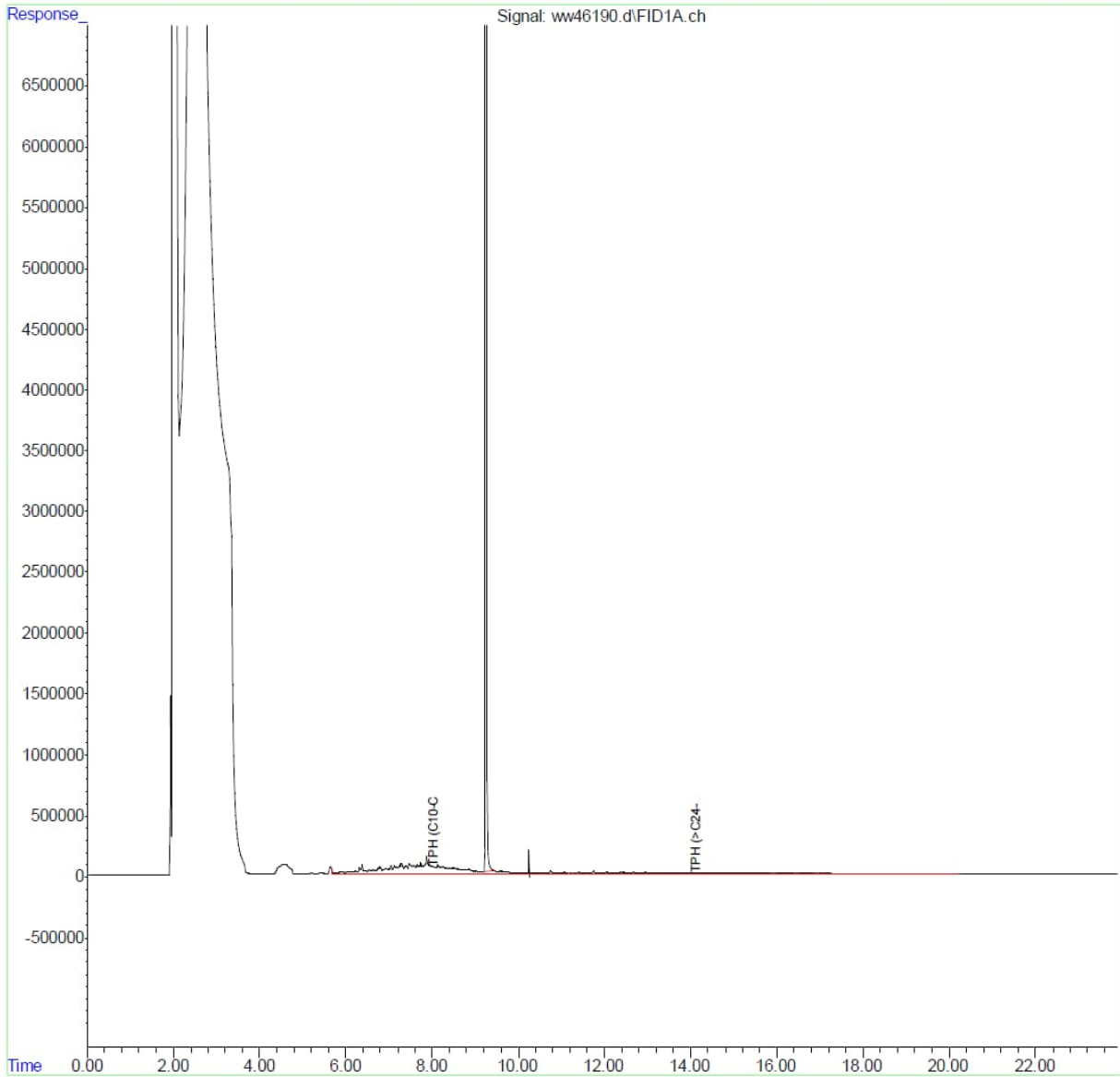


Results (ug/L): TPH-d SGC (C10 to C24) <100

TPH-o SGC (C24 to C40) <170 U

Quant Time: Mar 21 14:22:33 2024
Quant Method : C:\msdchem\2\methods\DRO_ORO2_091523_.M
Quant Title : TPH by SW846 8015C
QLast Update : Fri Sep 15 10:20:15 2023
Response via : Initial Calibration

Volume Inj. :
Signal Phase : DB-5
Signal Info : 0.25 mm



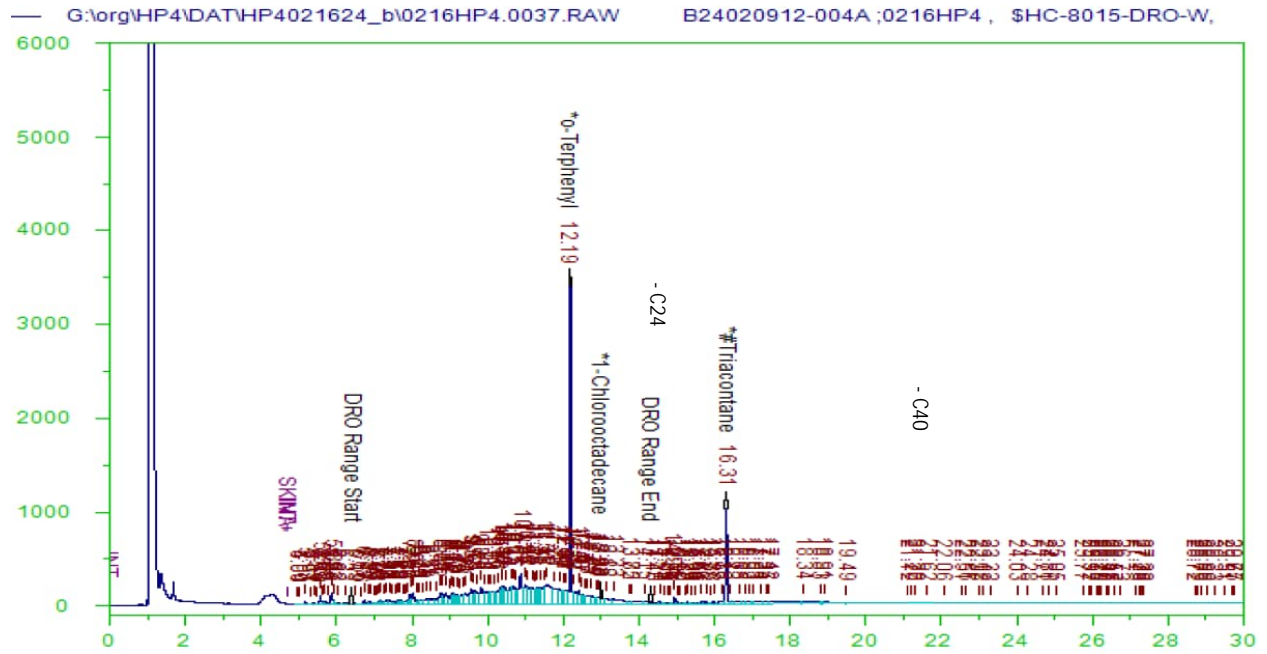
Location: RHMW02 Sample ID: RHMW02-WGN01LF-2402

Sample Date: 2/13/2024

Lab: Energy

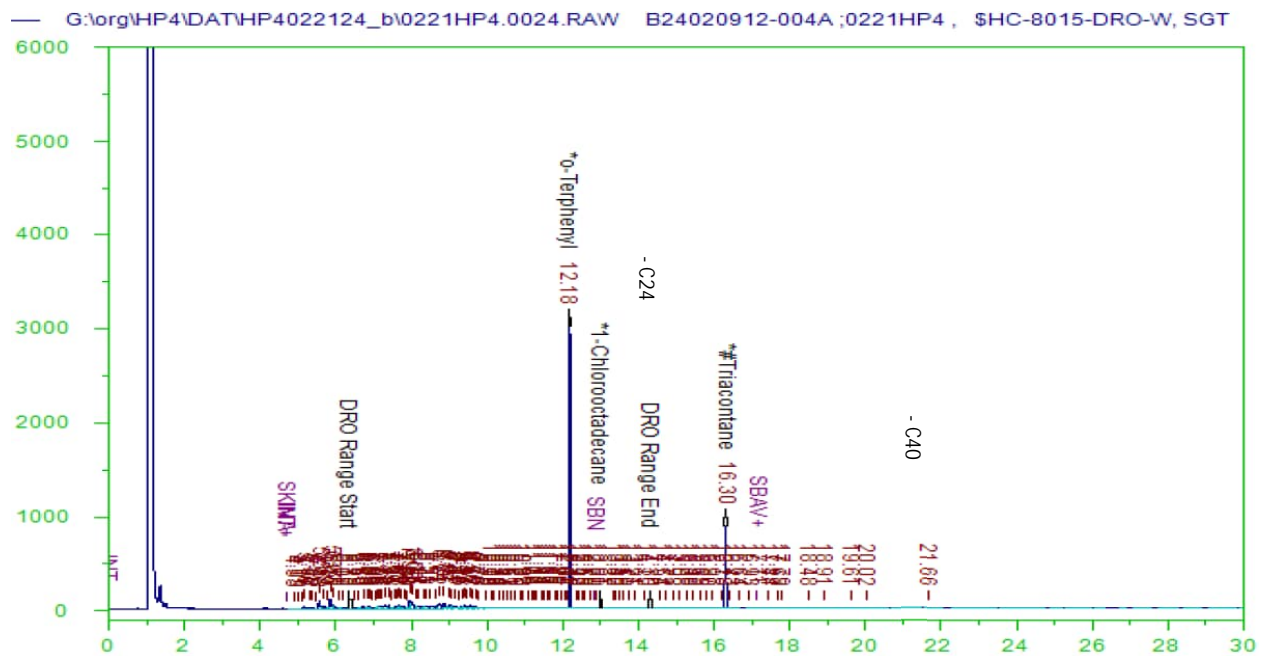
Results (ug/L): TPH-d (C10 to C24) 1210

TPH-o (C24 to C40) 298 J



Results (ug/L): TPH-d SGC (C10 to C24) 124 J

TPH-o SGC (C24 to C40) <143 U



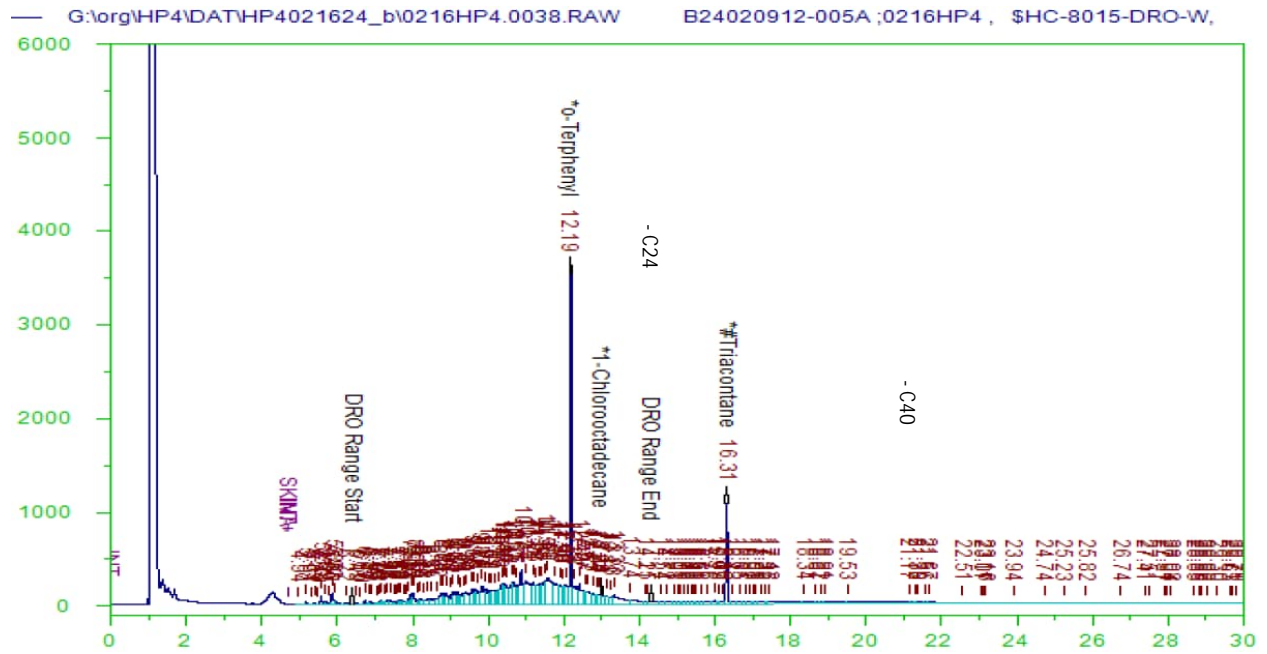
Location: RHMW02 Sample ID: RHMW02-WGFD01LF-2402

Sample Date: 2/13/2024

Lab: Energy

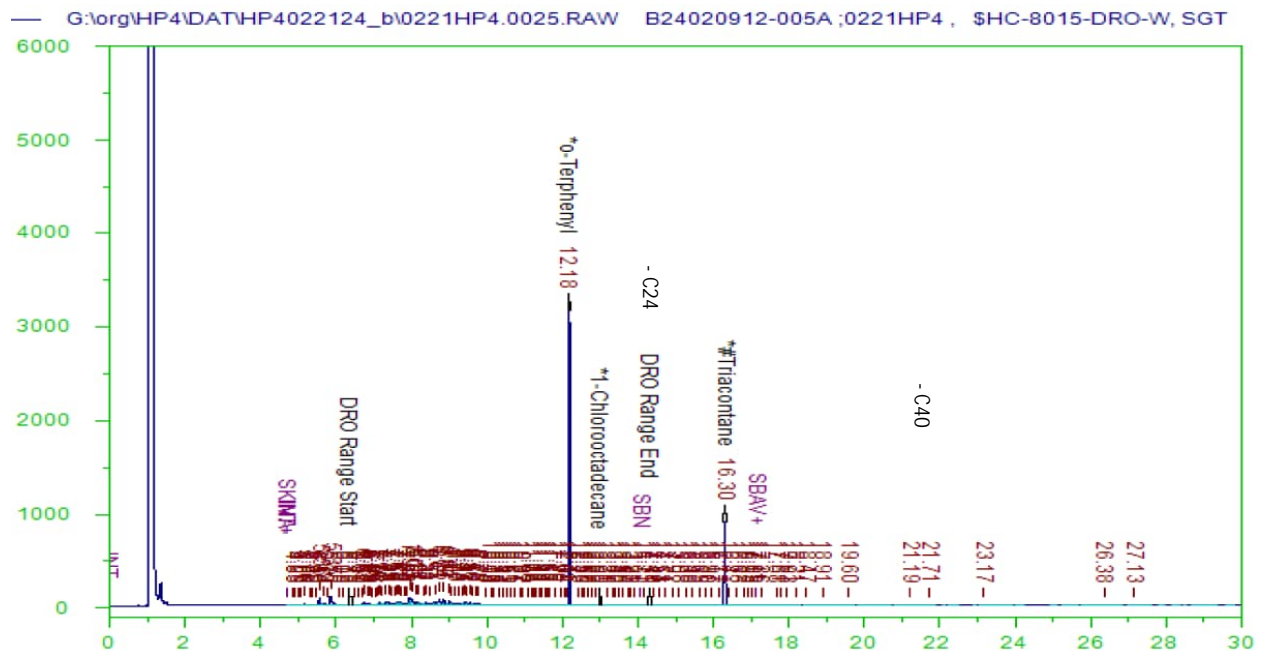
Results (ug/L): TPH-d (C10 to C24) 1460

TPH-o (C24 to C40) 313



Results (ug/L): TPH-d SGC (C10 to C24) 137 J

TPH-o SGC (C24 to C40) <141 U



Location: RHMW02 Sample ID: RHMW02-WGN01LF-2402

Sample Date: 2/13/2024

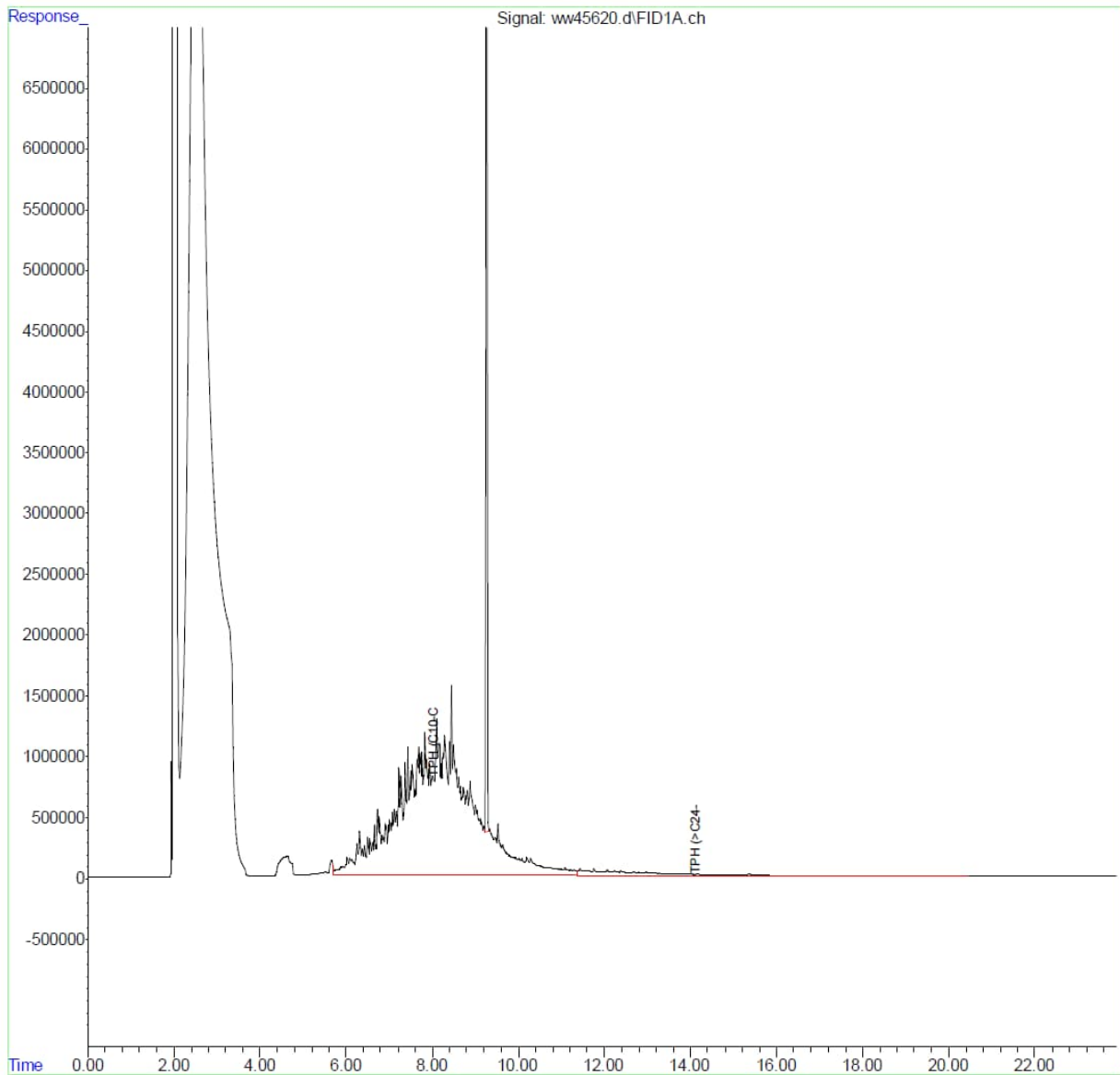
Lab: SGS

Results (ug/L): TPH-d (C10 to C24) 981

TPH-o (C24 to C40) <160 U

Quant Time: Feb 19 10:41:43 2024
Quant Method : C:\msdchem\2\methods\DRO_ORO2_091523_.M
Quant Title : TPH by SW846 8015C
QLast Update : Fri Sep 15 10:20:15 2023
Response via : Initial Calibration

Volume Inj. :
Signal Phase : DB-5
Signal Info : 0.25 mm

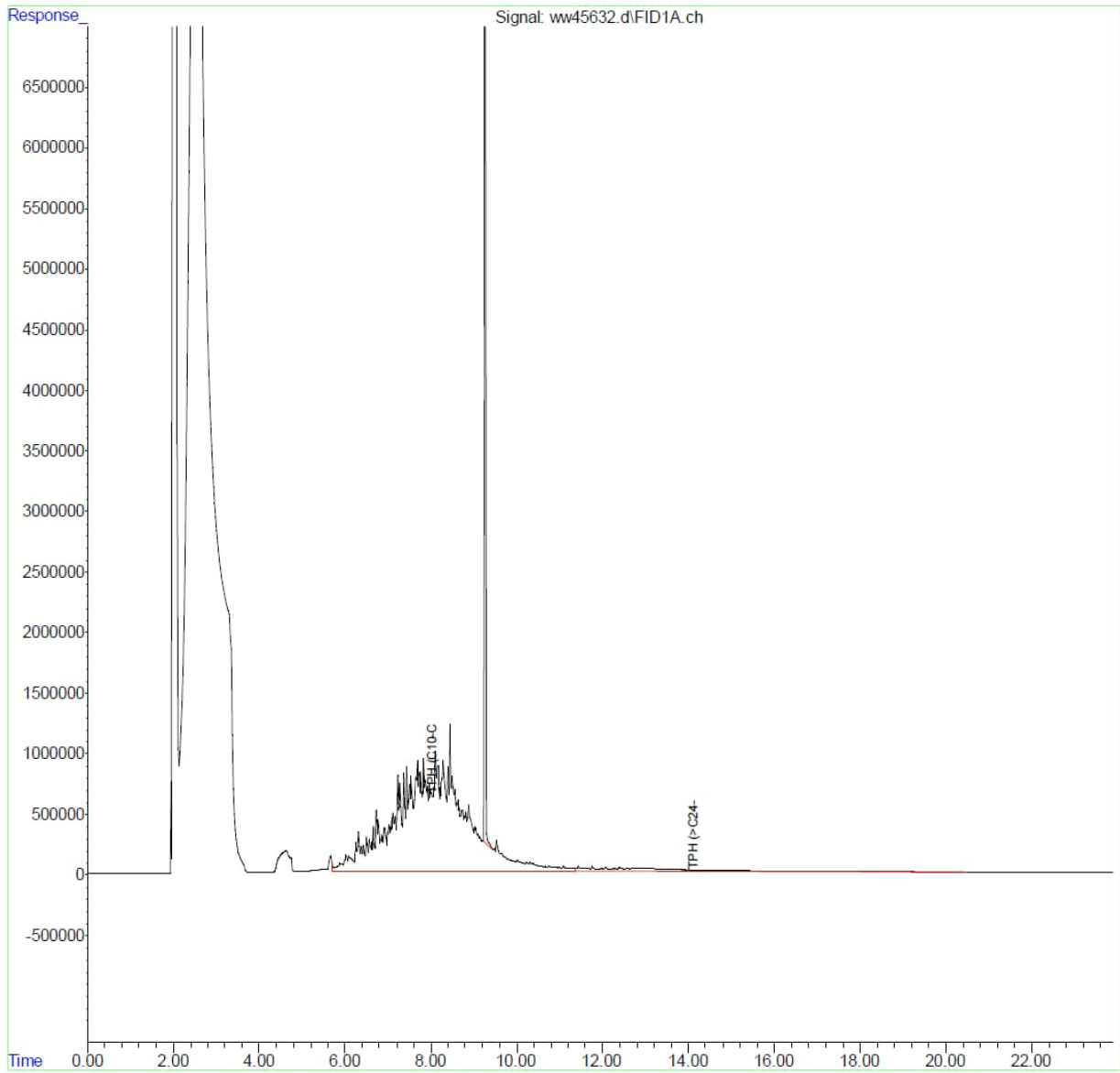


Results (ug/L): TPH-d SGC (C10 to C24) 766

TPH-o SGC (C24 to C40) <160 U

Quant Time: Feb 19 17:10:45 2024
Quant Method : C:\msdchem\2\methods\DRO_ORO2_091523_.M
Quant Title : TPH by SW846 8015C
QLast Update : Fri Sep 15 10:20:15 2023
Response via : Initial Calibration

Volume Inj. :
Signal Phase : DB-5
Signal Info : 0.25 mm



Location: RHMW02 Sample ID: RHMW02-WGFD01LF-2402
Lab: SGS

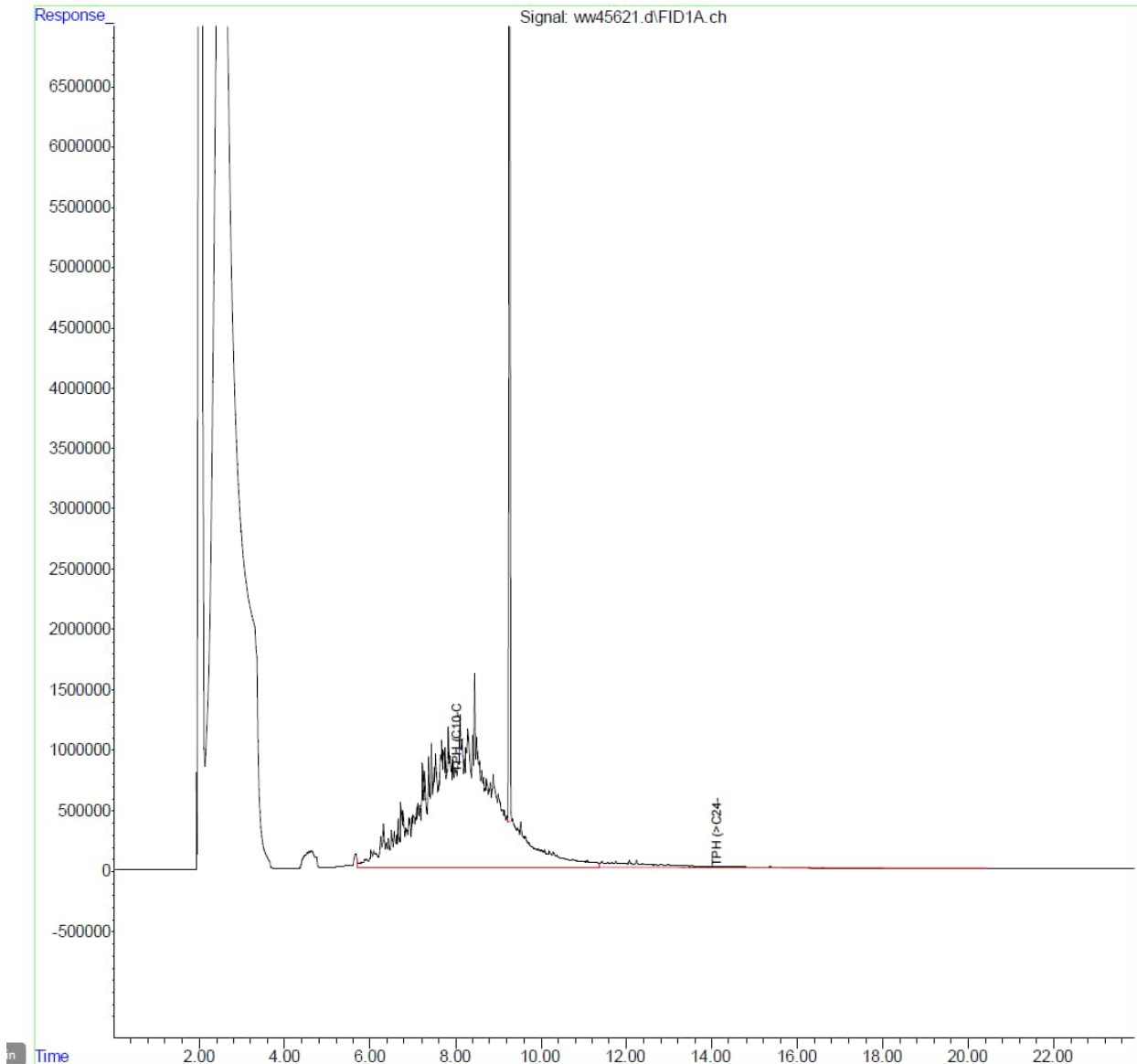
Sample Date: 2/13/2024

Results (ug/L): TPH-d (C10 to C24) 1030

TPH-o (C24 to C40) <170 U

Quant Time: Feb 19 10:42:44 2024
Quant Method : C:\msdchem\2\methods\DRO_ORO2_091523_.M
Quant Title : TPH by SW846 8015C
QLast Update : Fri Sep 15 10:20:15 2023
Response via : Initial Calibration

Volume Inj. :
Signal Phase : DB-5
Signal Info : 0.25 mm

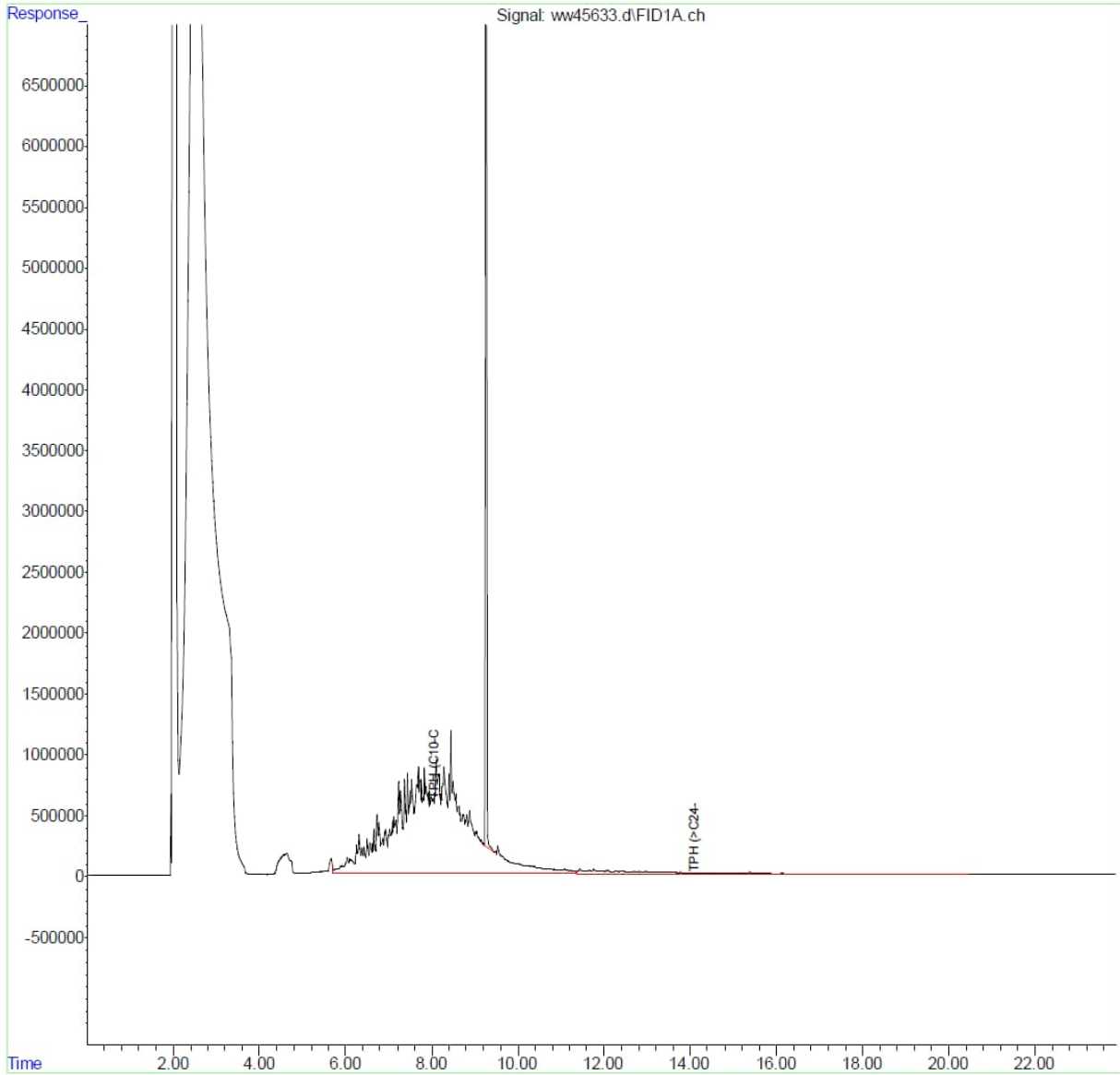


Results (ug/L): TPH-d SGC (C10 to C24) 751

TPH-o SGC (C24 to C40) <170 U

Quant Time: Feb 20 09:11:03 2024
Quant Method : C:\msdchem\2\methods\DRO_ORO2_091523_.M
Quant Title : TPH by SW846 8015C
QLast Update : Fri Sep 15 10:20:15 2023
Response via : Initial Calibration

Volume Inj. :
Signal Phase : DB-5
Signal Info : 0.25 mm



Location: RHMW02
Lab: SGS

Sample ID: RHMW02-WGN01LF-2403

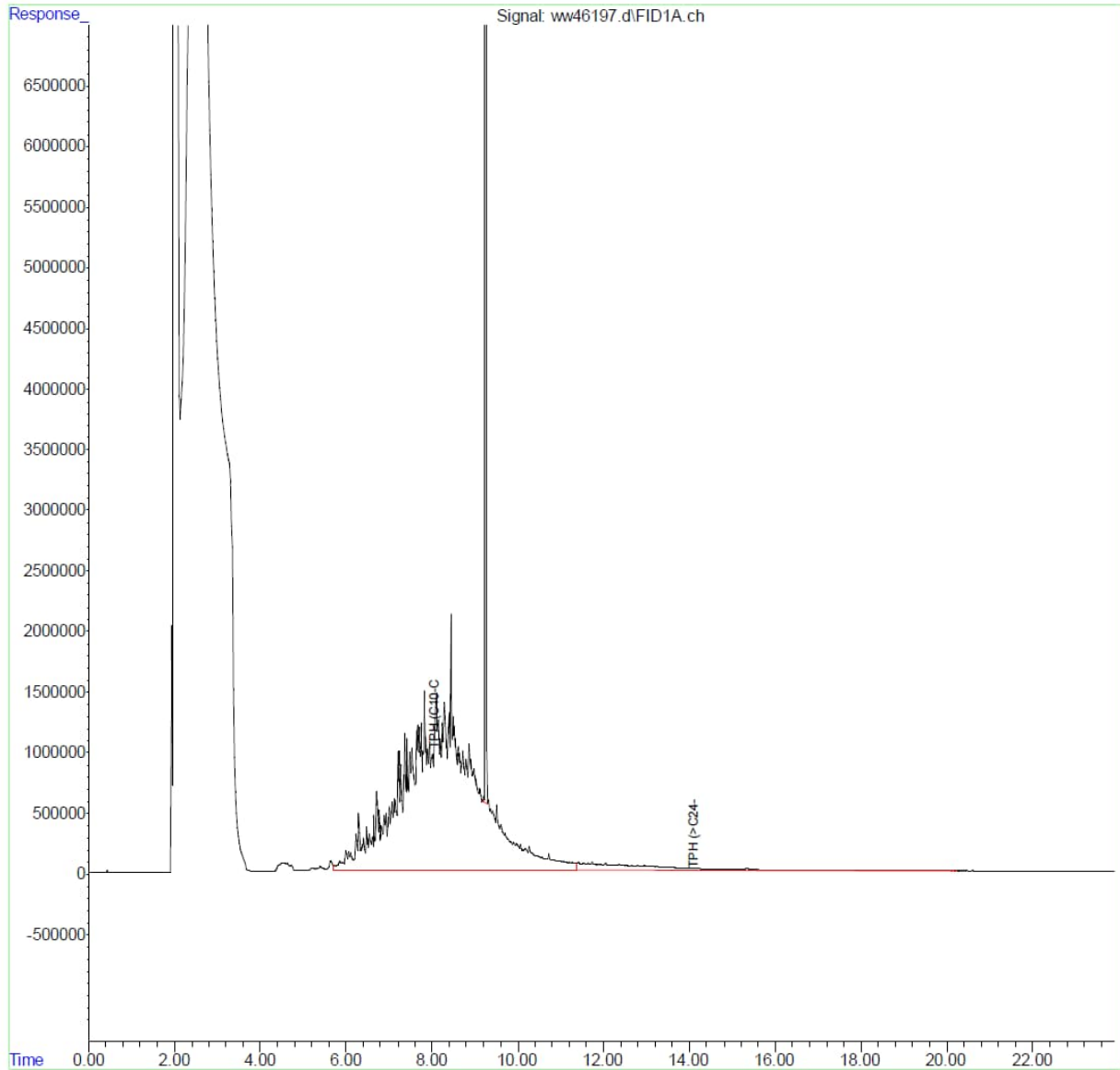
Sample Date: 3/15/2024

Results (ug/L): TPH-d (C10 to C24) 1270

TPH-o (C24 to C40) <170 U

Quant Time: Mar 22 09:32:45 2024
Quant Method : C:\msdchem\2\methods\DRO_ORO2_091523_.M
Quant Title : TPH by SW846 8015C
QLast Update : Fri Sep 15 10:20:15 2023
Response via : Initial Calibration

Volume Inj. :
Signal Phase : DB-5
Signal Info : 0.25 mm

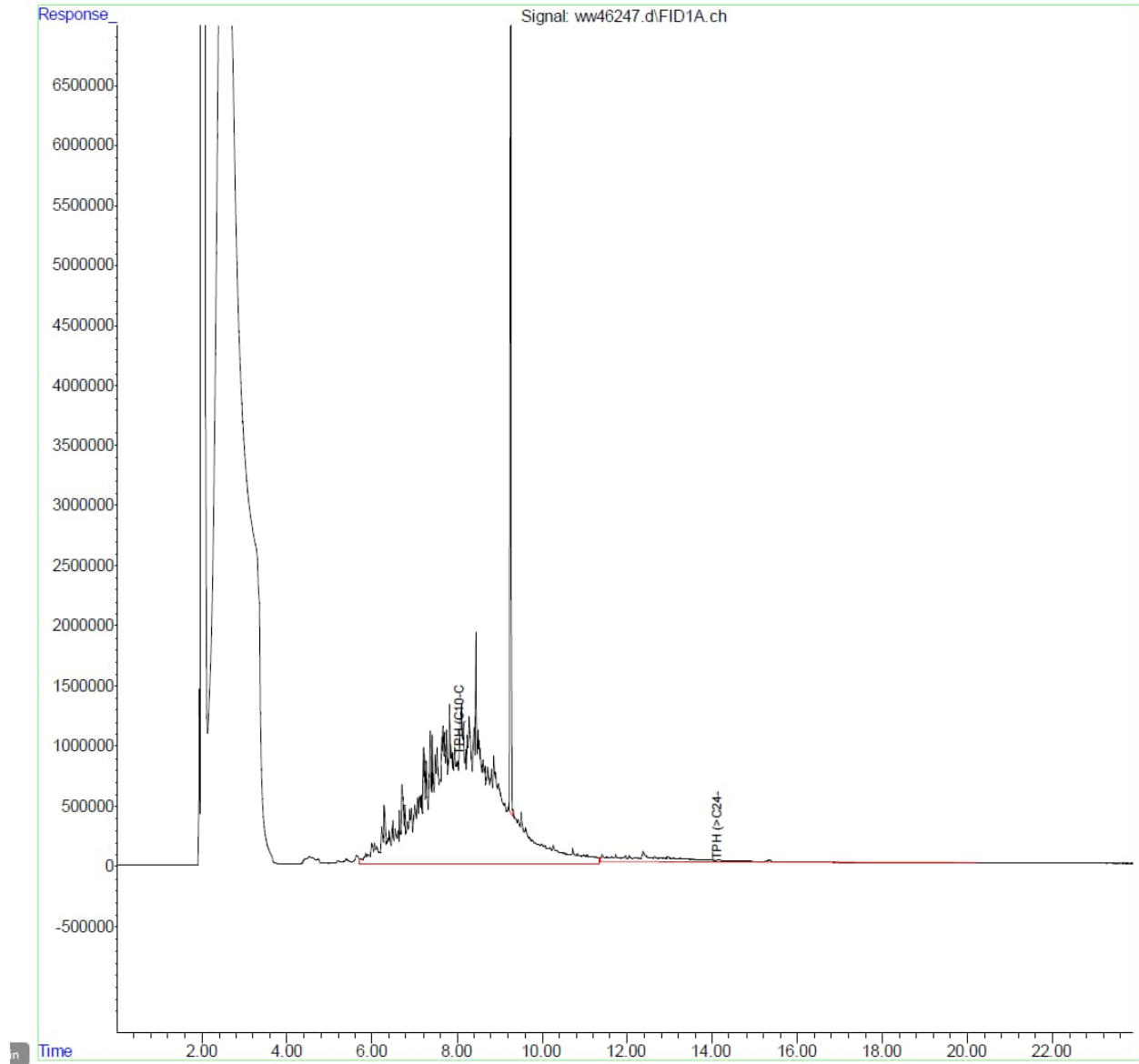


Results (ug/L): TPH-d SGC (C10 to C24) 1110

TPH-o SGC (C24 to C40) <170 U

Quant Time: Mar 25 12:08:03 2024
Quant Method : C:\msdchem\2\methods\DRO_ORO2_091523_.M
Quant Title : TPH by SW846 8015C
QLast Update : Fri Sep 15 10:20:15 2023
Response via : Initial Calibration

Volume Inj. :
Signal Phase : DB-5
Signal Info : 0.25 mm



Location: RHMW02 Sample ID: RHMW02-WGFD01LF-2403
Lab: SGS

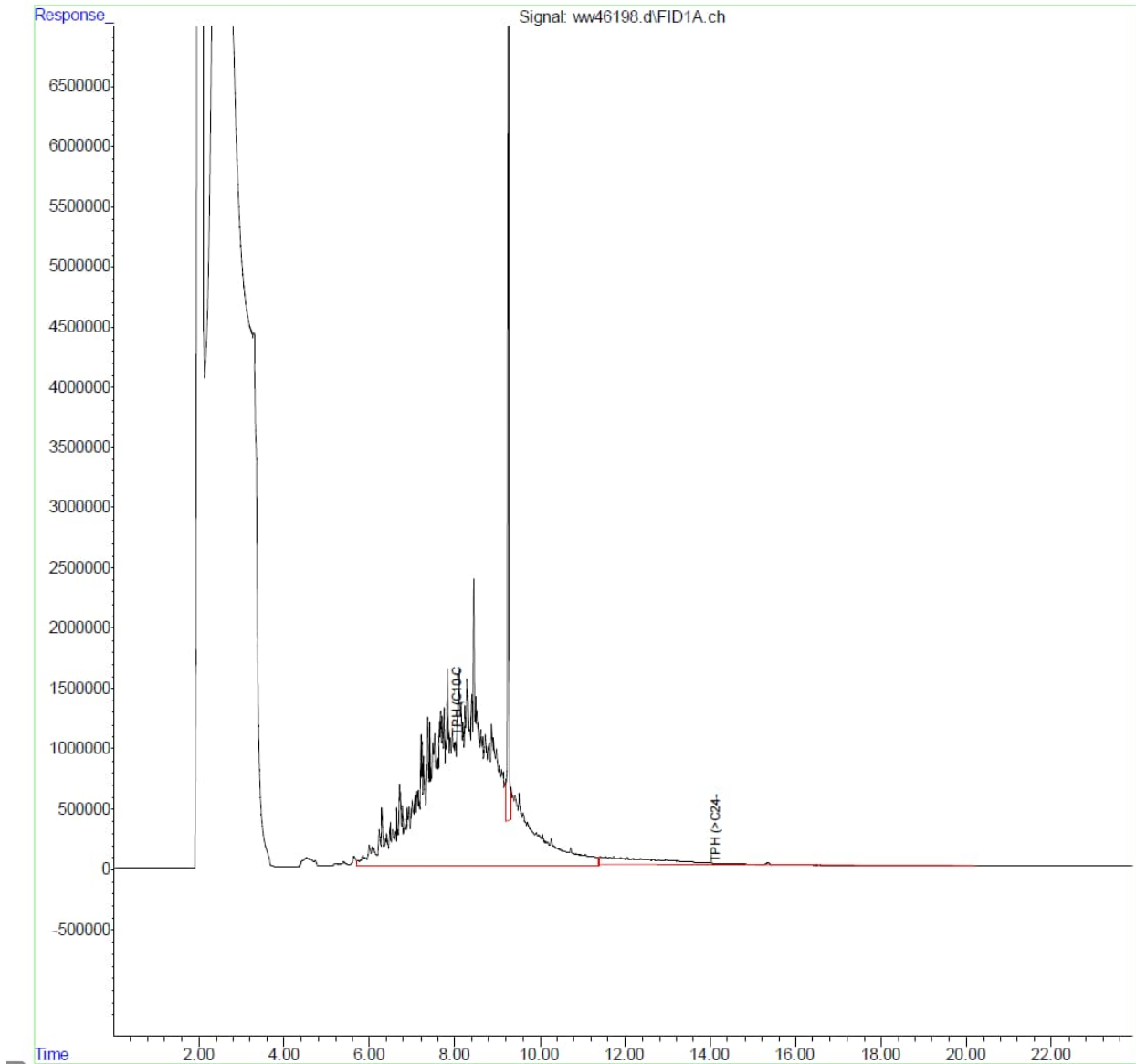
Sample Date: 3/15/2024

Results (ug/L): TPH-d (C10 to C24) 1380

TPH-o (C24 to C40) 88.4 J

Quant Time: Mar 22 11:25:57 2024
Quant Method : C:\msdchem\2\methods\DRO_ORO2_091523_.M
Quant Title : TPH by SW846 8015C
QLast Update : Fri Sep 15 10:20:15 2023
Response via : Initial Calibration

Volume Inj. :
Signal Phase : DB-5
Signal Info : 0.25 mm

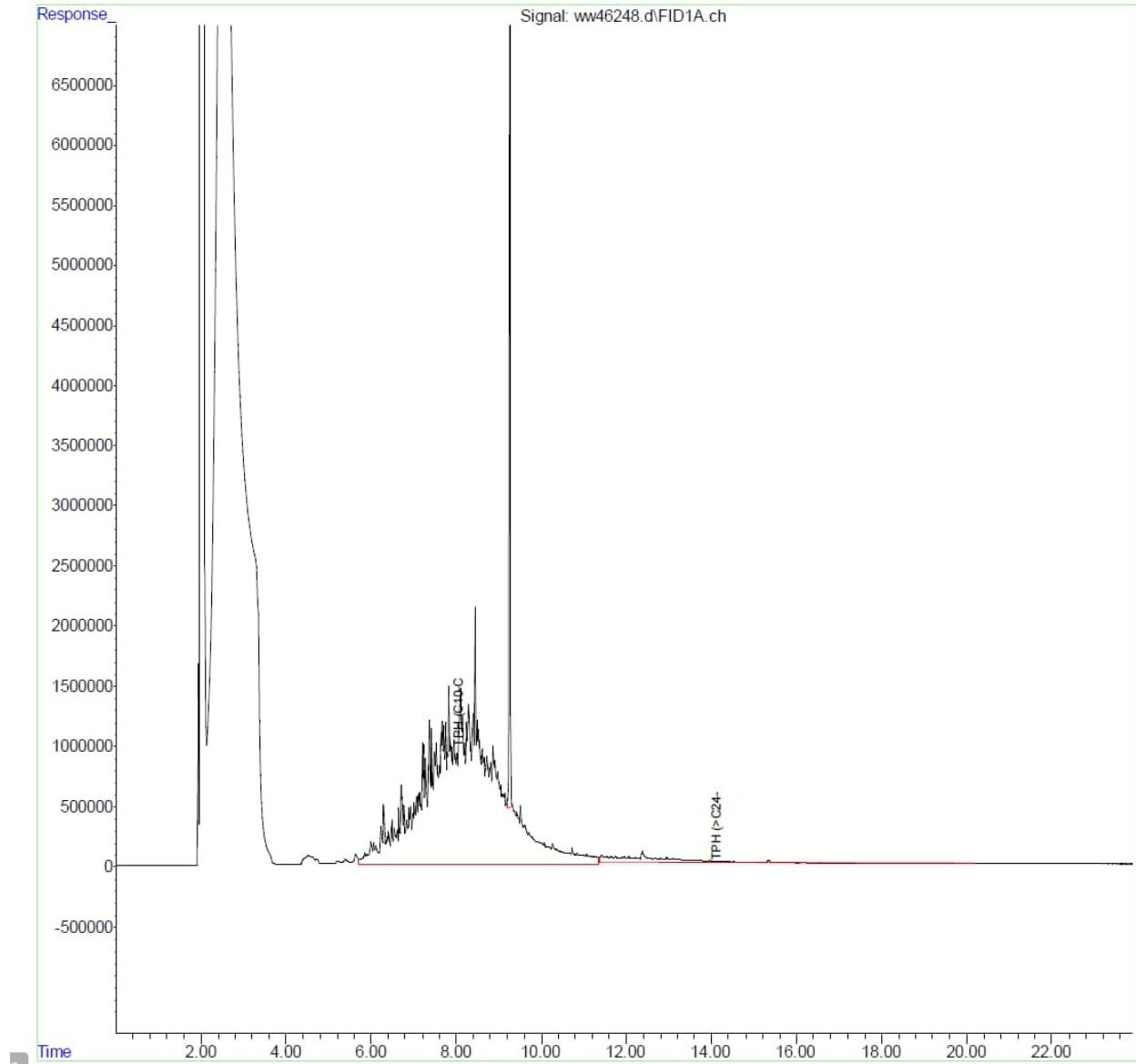


Results (ug/L): TPH-d SGC (C10 to C24) 1200

TPH-o SGC (C24 to C40) <170 U

Quant Time: Mar 25 12:08:27 2024
Quant Method : C:\msdchem\2\methods\DRO_ORO2_091523_.M
Quant Title : TPH by SW846 8015C
QLast Update : Fri Sep 15 10:20:15 2023
Response via : Initial Calibration

Volume Inj. :
Signal Phase : DB-5
Signal Info : 0.25 mm



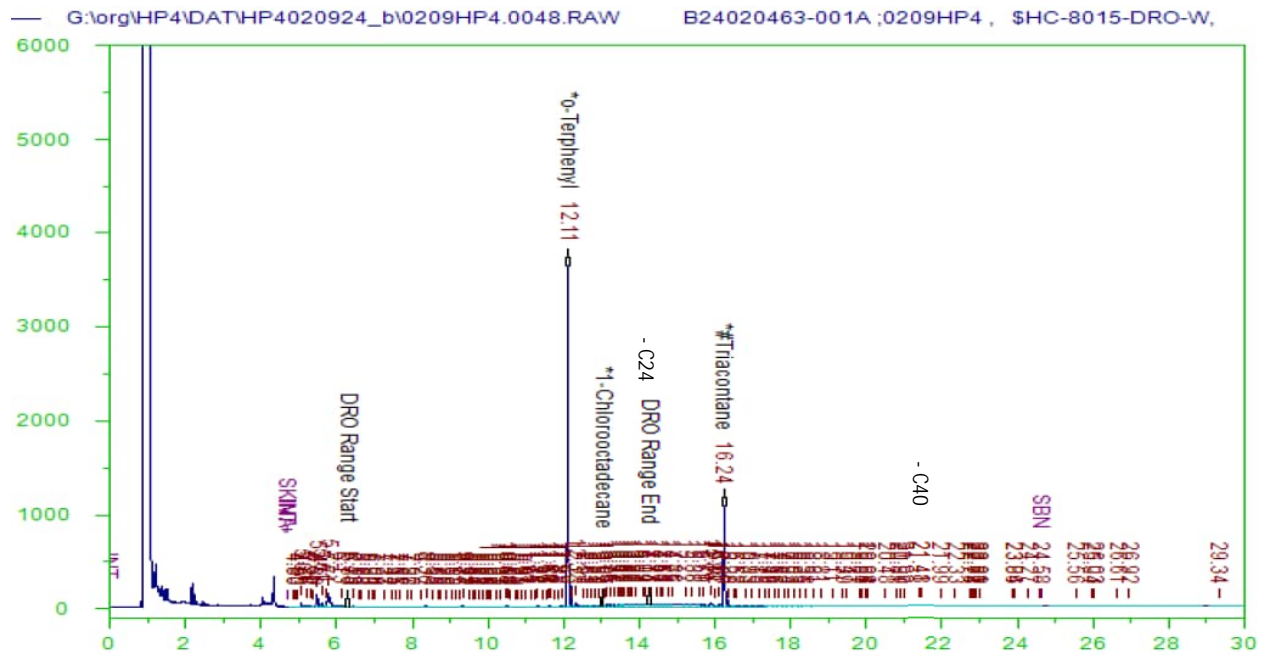
Location: RHMW03 Sample ID: RHMW03-WGN01LF-2402

Sample Date: 2/6/2024

Lab: Energy

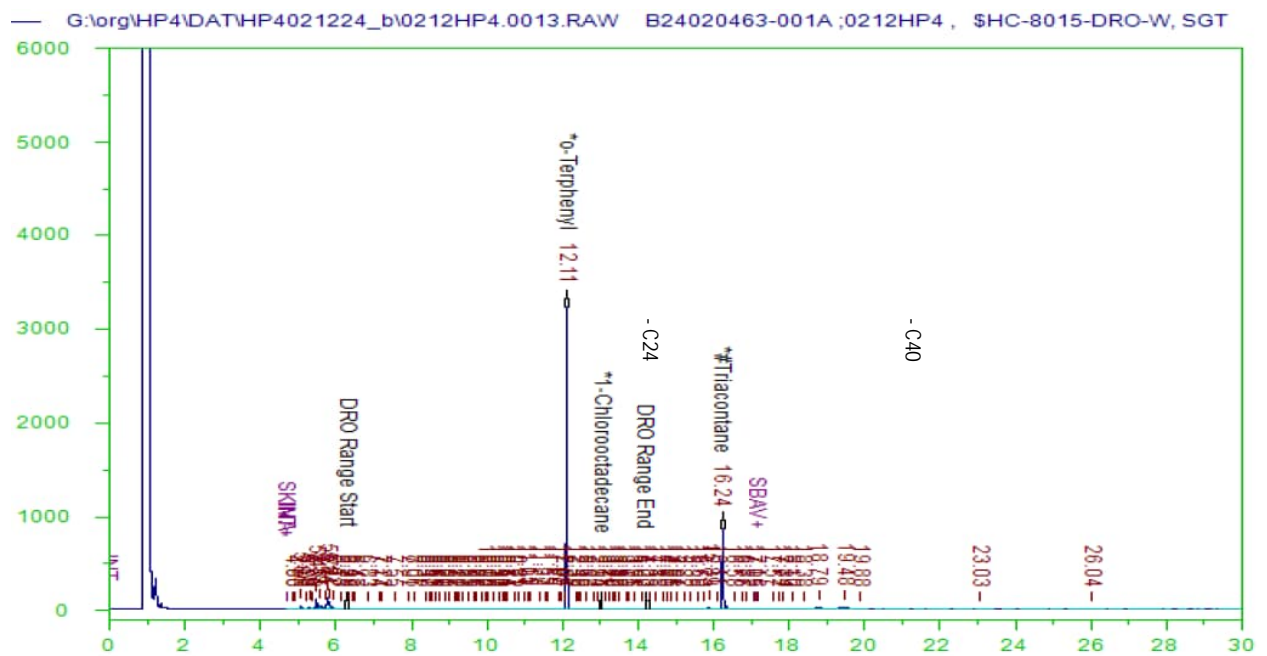
Results (ug/L): TPH-d (C10 to C24) <141 U

TPH-o (C24 to C40) 184 J+



Results (ug/L): TPH-d SGC (C10 to C24) <141 U

TPH-o SGC (C24 to C40) <141 U

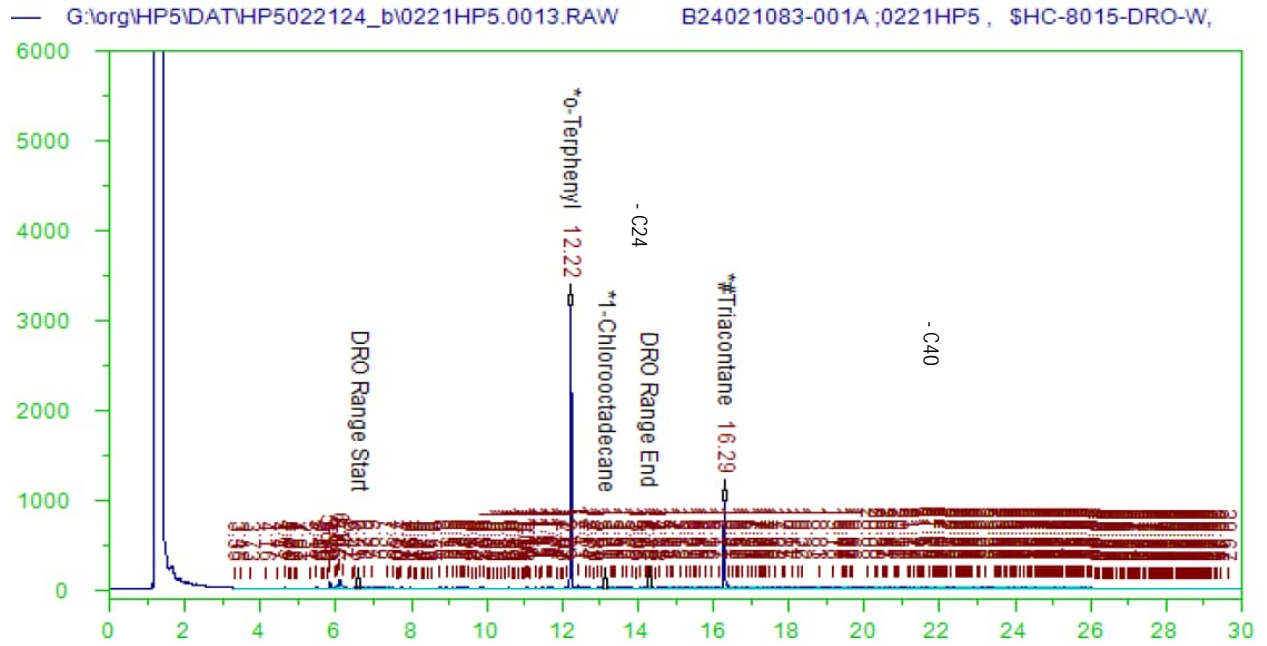


Location: RHMW18 Sample ID: RHMW18-WGN01LF-2402
Lab: Energy

Sample Date: 2/15/2024

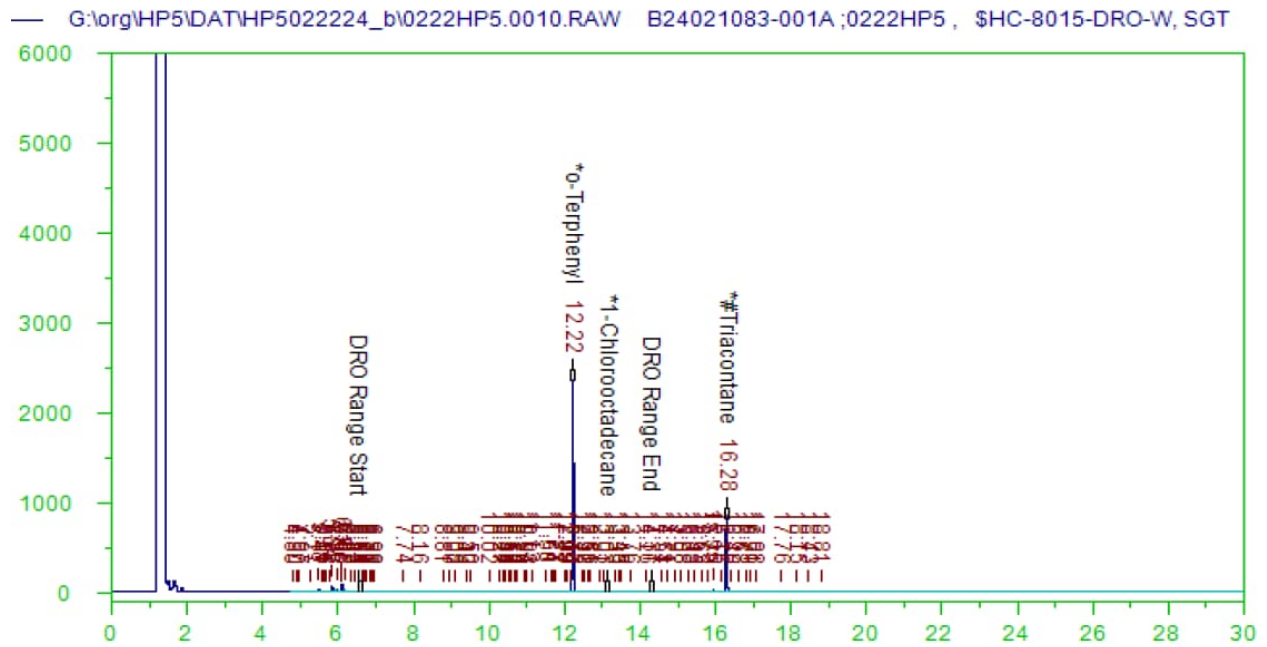
Results (ug/L): TPH-d (C10 to C24) 98 J

TPH-o (C24 to C40) 145 J



Results (ug/L): TPH-d SGC (C10 to C24) <141 U

TPH-o SGC (C24 to C40) <189 U

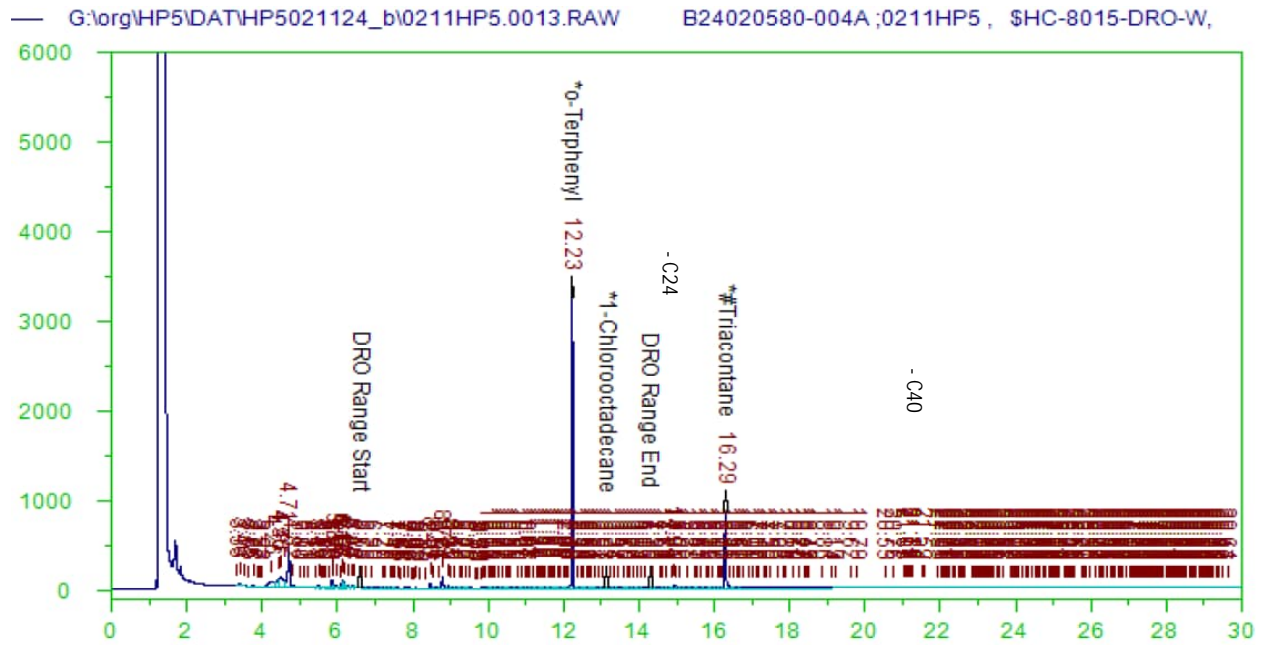


Location: RHMW19 Sample ID: RHMW19-WGN01LF-2402
Lab: Energy

Sample Date: 2/7/2024

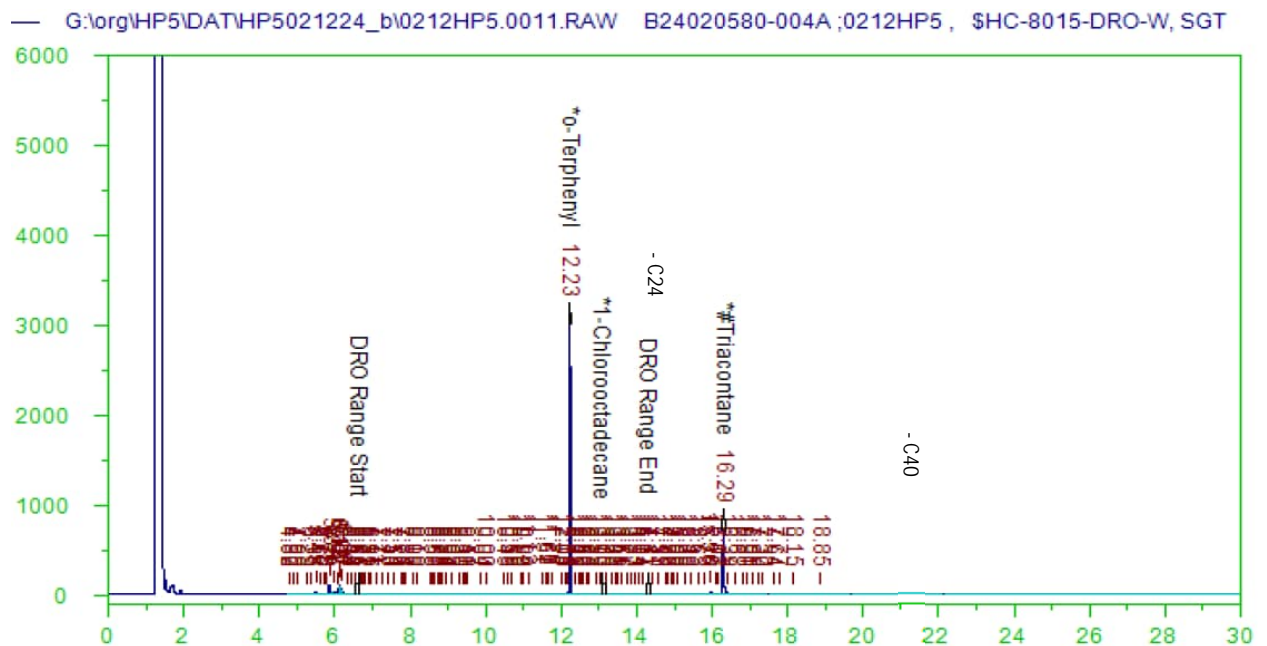
Results (ug/L): TPH-d (C10 to C24) 89.2 J

TPH-o (C24 to C40) 186 J



Results (ug/L): TPH-d SGC (C10 to C24) <141 U

TPH-o SGC (C24 to C40) <189 U



Location: RHP04B

Sample ID: RHP04B-WGN01LF-2402

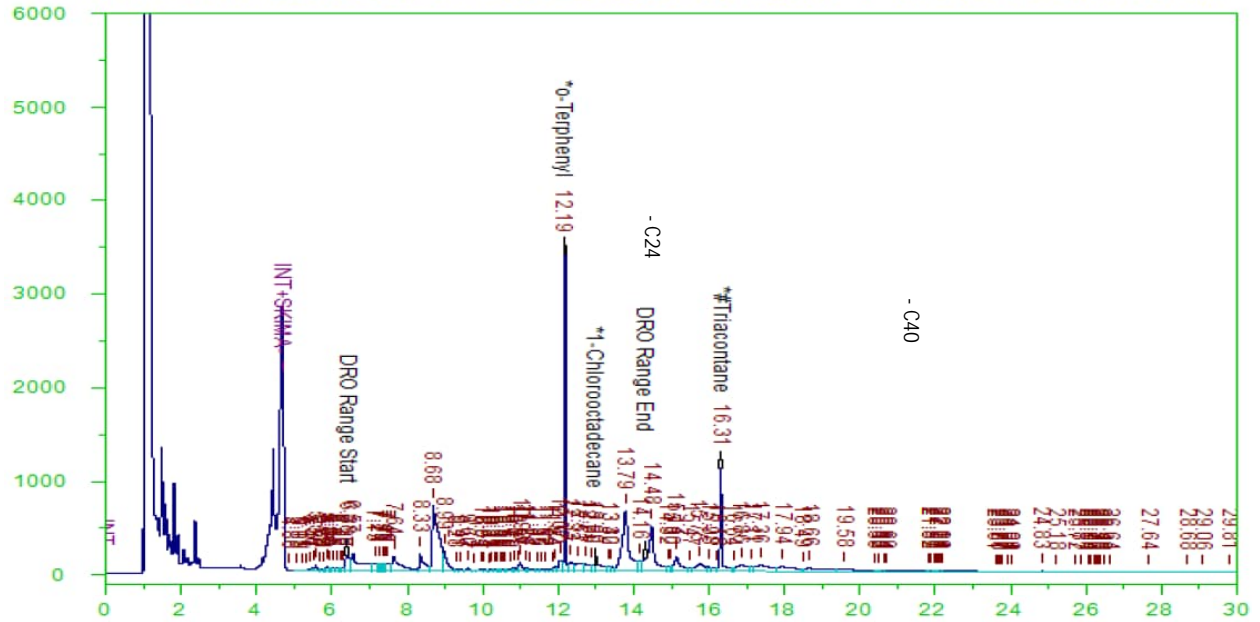
Sample Date: 2/14/2024

Lab: Energy

Results (ug/L): TPH-d (C10 to C24) 1170

TPH-o (C24 to C40) 777

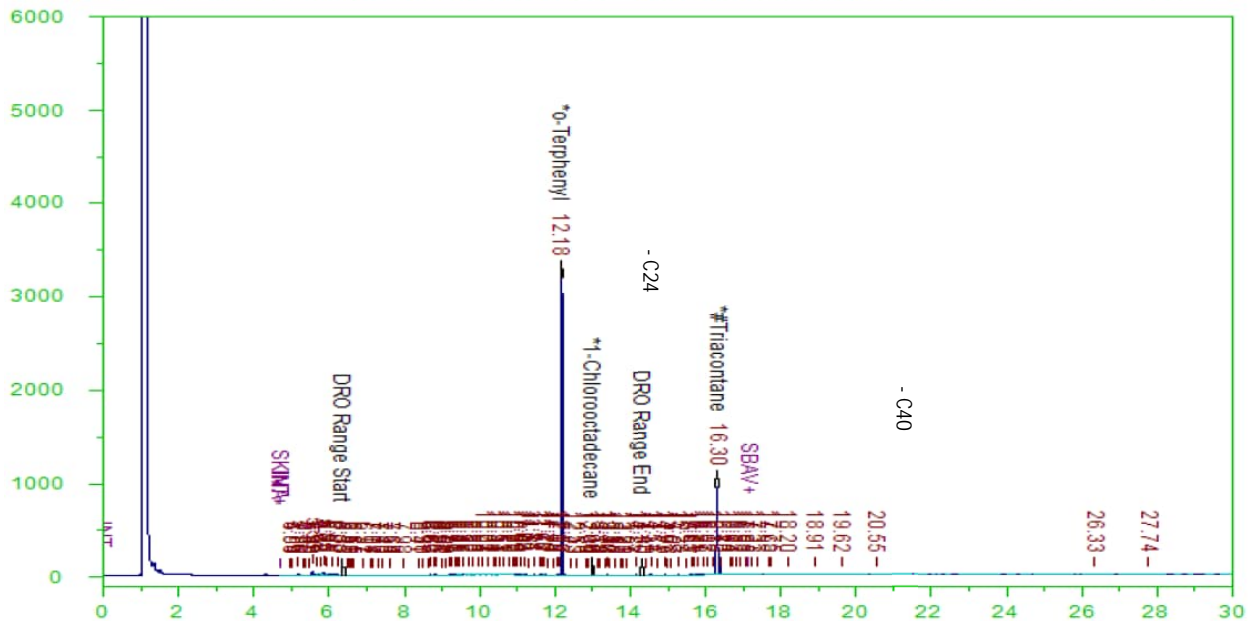
G:\org\HP4\DAT\HP4021624_b\0216HP4.0031.B24020997-004A;0216HP4, \$HC-8015-DRO-W, RR to verify



Results (ug/L): TPH-d SGC (C10 to C24) <141 U

TPH-o SGC (C24 to C40) <141 U

G:\org\HP4\DAT\HP4022124_b\0221HP4.0027.RAW B24020997-004A;0221HP4, \$HC-8015-DRO-W, SGT



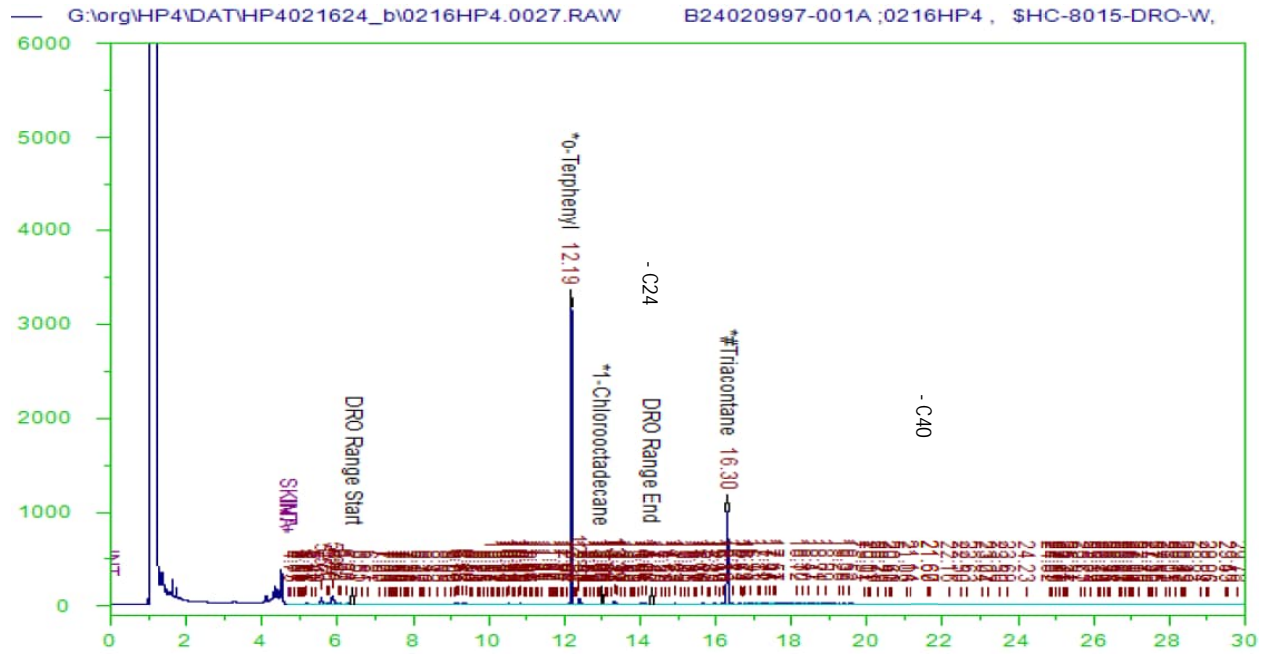
Location: RHP04C
Lab: Energy

Sample ID: RHP04C-WGN01LF-2402

Sample Date: 2/14/2024

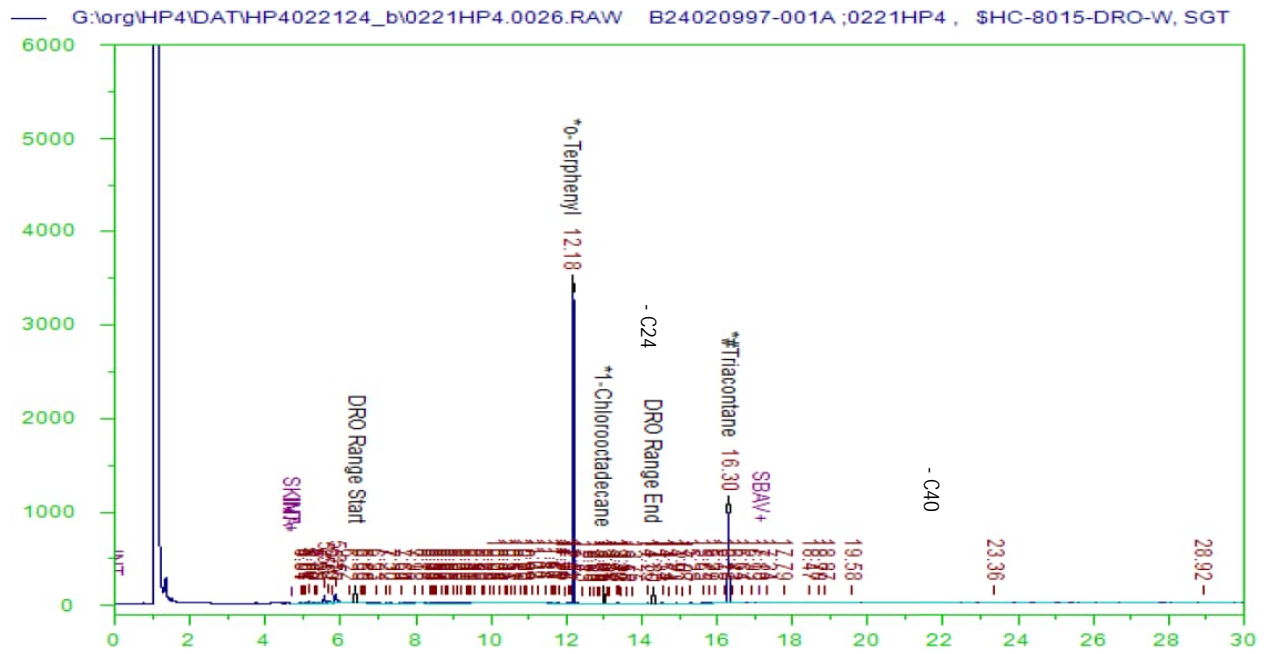
Results (ug/L): TPH-d (C10 to C24) 51.4 J

TPH-o (C24 to C40) 90.6 J



Results (ug/L): TPH-d SGC (C10 to C24) <146 U

TPH-o SGC (C24 to C40) <146 U



Location: RHP08

Sample ID: RHP08-WGN01LF-2403

Sample Date: 3/18/2024

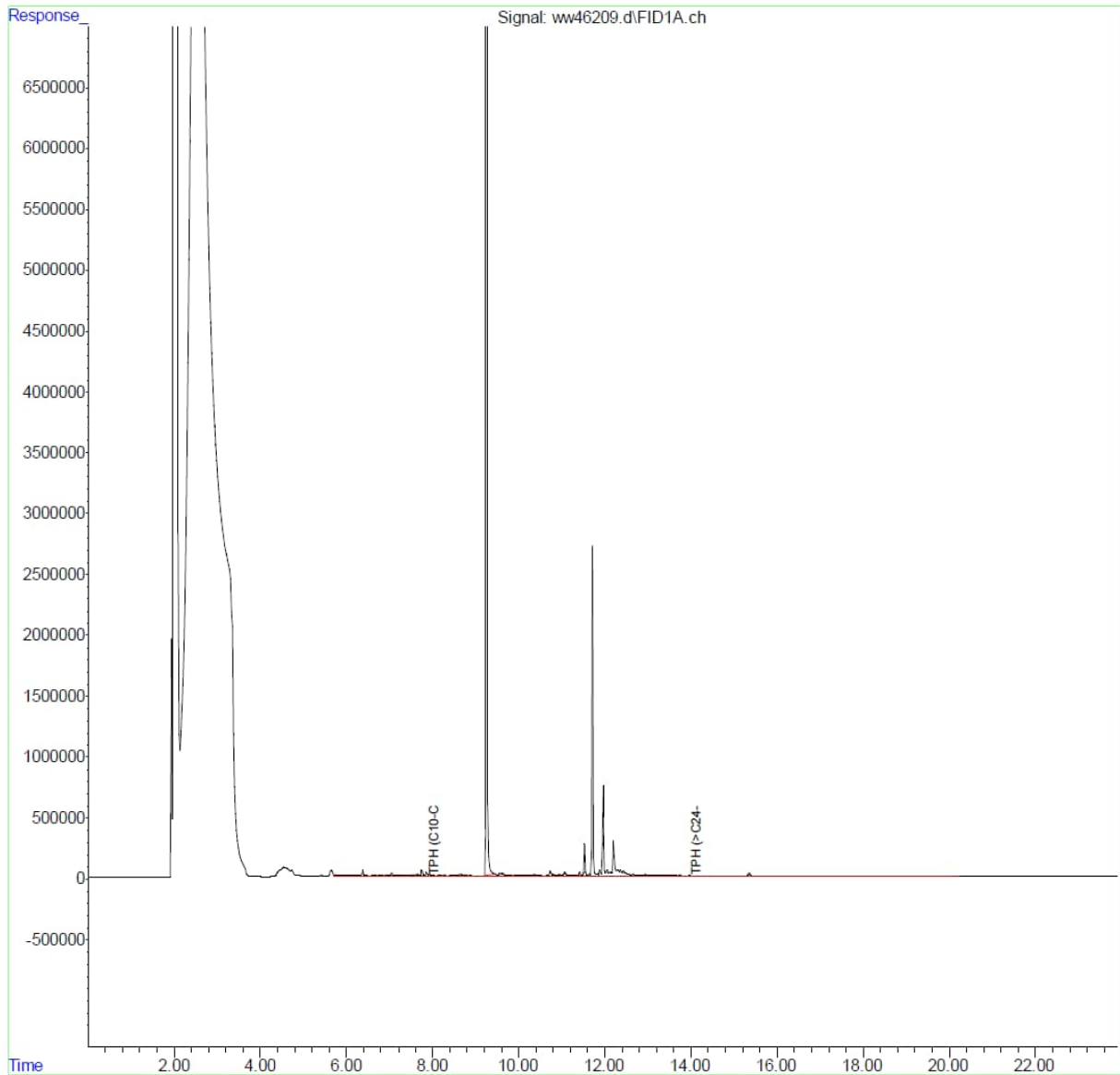
Lab: SGS

Results (ug/L): TPH-d (C10 to C24) <100 U

TPH-o (C24 to C40) 91.5 J

Quant Time: Mar 22 09:12:30 2024
Quant Method : C:\msdchem\2\methods\DRO_ORO2_091523_.M
Quant Title : TPH by SW846 8015C
QLast Update : Fri Sep 15 10:20:15 2023
Response via : Initial Calibration

Volume Inj. :
Signal Phase : DB-5
Signal Info : 0.25 mm

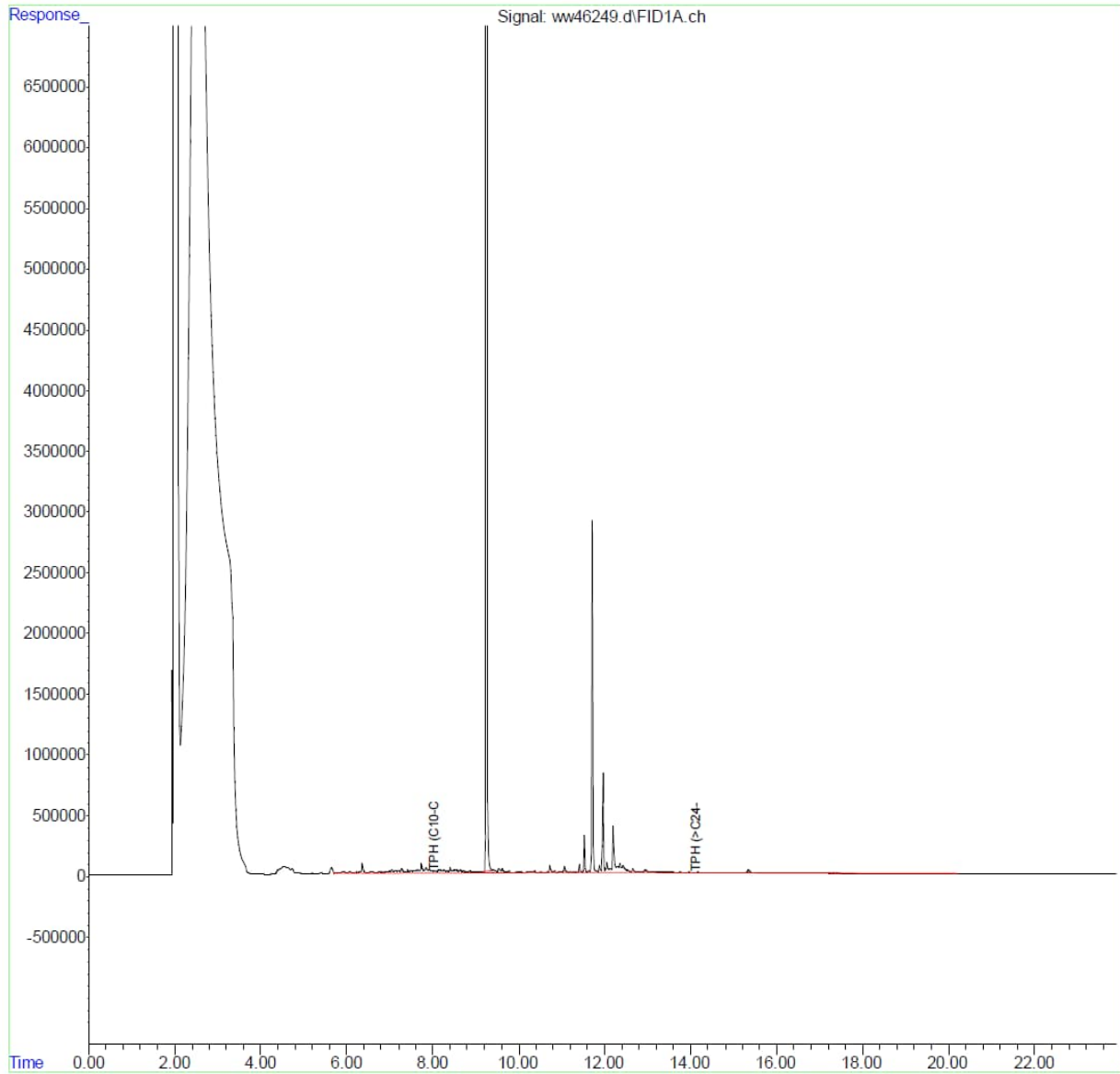


Results (ug/L): TPH-d SGC (C10 to C24) <100 U

TPH-o SGC (C24 to C40) 111 J

Quant Time: Mar 25 09:47:01 2024
Quant Method : C:\msdchem\2\methods\DRO_ORO2_091523_.M
Quant Title : TPH by SW846 8015C
QLast Update : Fri Sep 15 10:20:15 2023
Response via : Initial Calibration

Volume Inj. :
Signal Phase : DB-5
Signal Info : 0.25 mm



Location: NMW26

Sample ID: NMW26-WGN02LF-2401

Sample Date: 2/2/2024

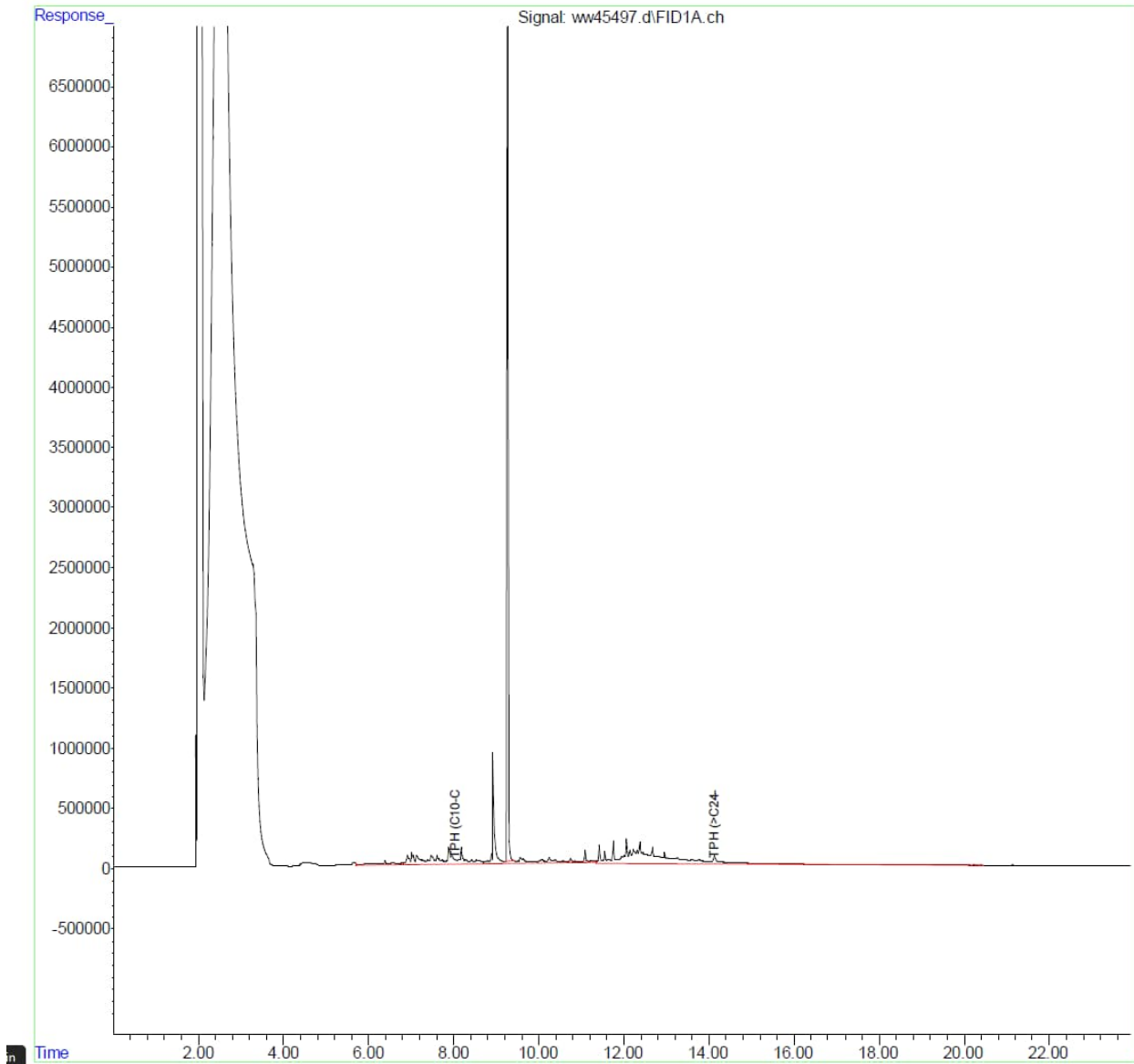
Lab: SGS

Results (ug/L): TPH-d (C10 to C24) <100 U

TPH-o (C24 to C40) 121 J

Quant Time: Feb 05 16:55:07 2024
Quant Method : C:\msdchem\2\methods\DRO_ORO2_091523_.M
Quant Title : TPH by SW846 8015C
QLast Update : Fri Sep 15 10:20:15 2023
Response via : Initial Calibration

Volume Inj. :
Signal Phase : DB-5
Signal Info : 0.25 mm

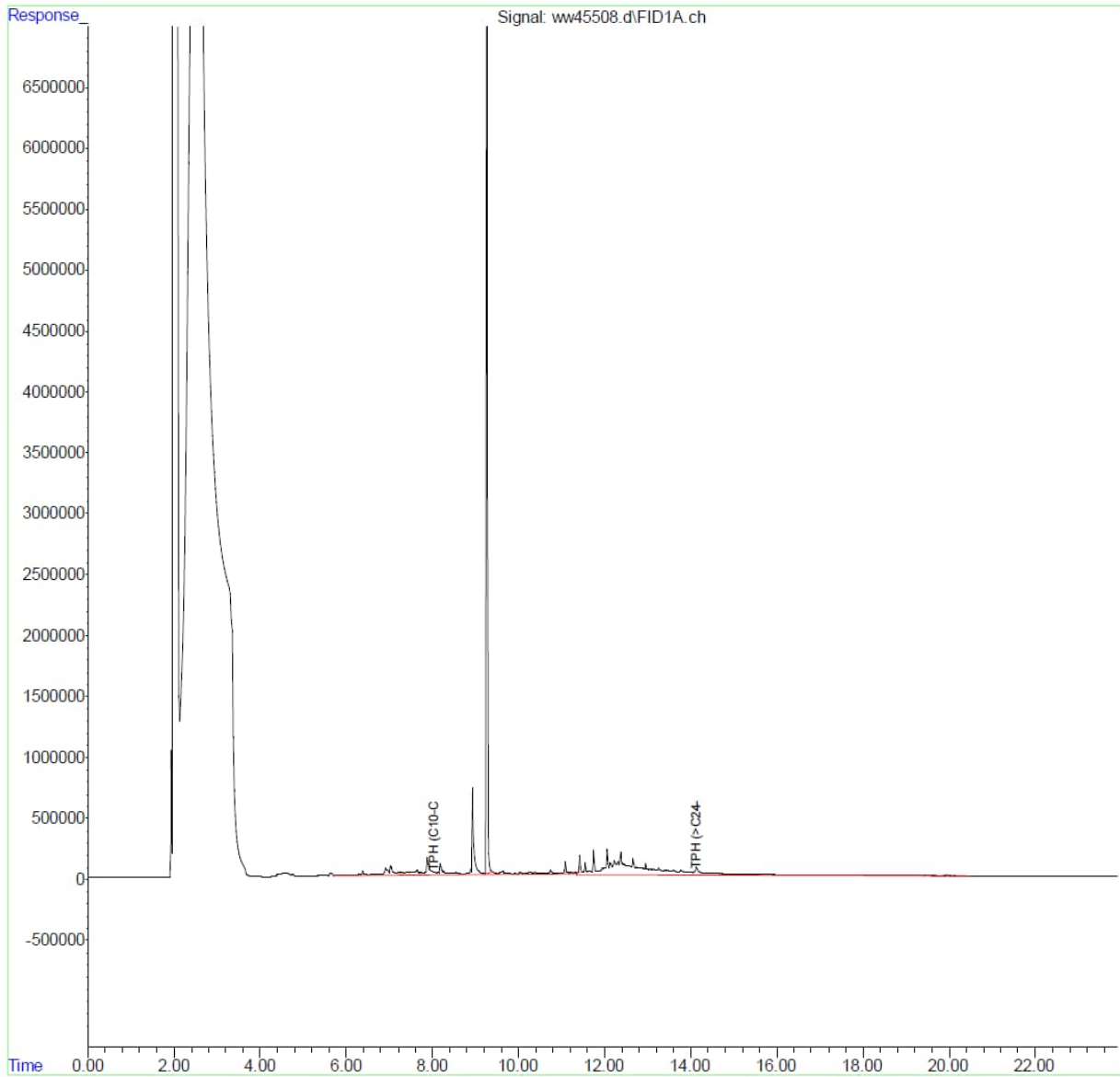


Results (ug/L): TPH-d SGC (C10 to C24) <100 U

TPH-o SGC (C24 to C40) 111 J

Quant Time: Feb 06 15:19:40 2024
Quant Method : C:\msdchem\2\methods\DRO_ORO2_091523_.M
Quant Title : TPH by SW846 8015C
QLast Update : Fri Sep 15 10:20:15 2023
Response via : Initial Calibration

Volume Inj. :
Signal Phase : DB-5
Signal Info : 0.25 mm



Location: NMW26

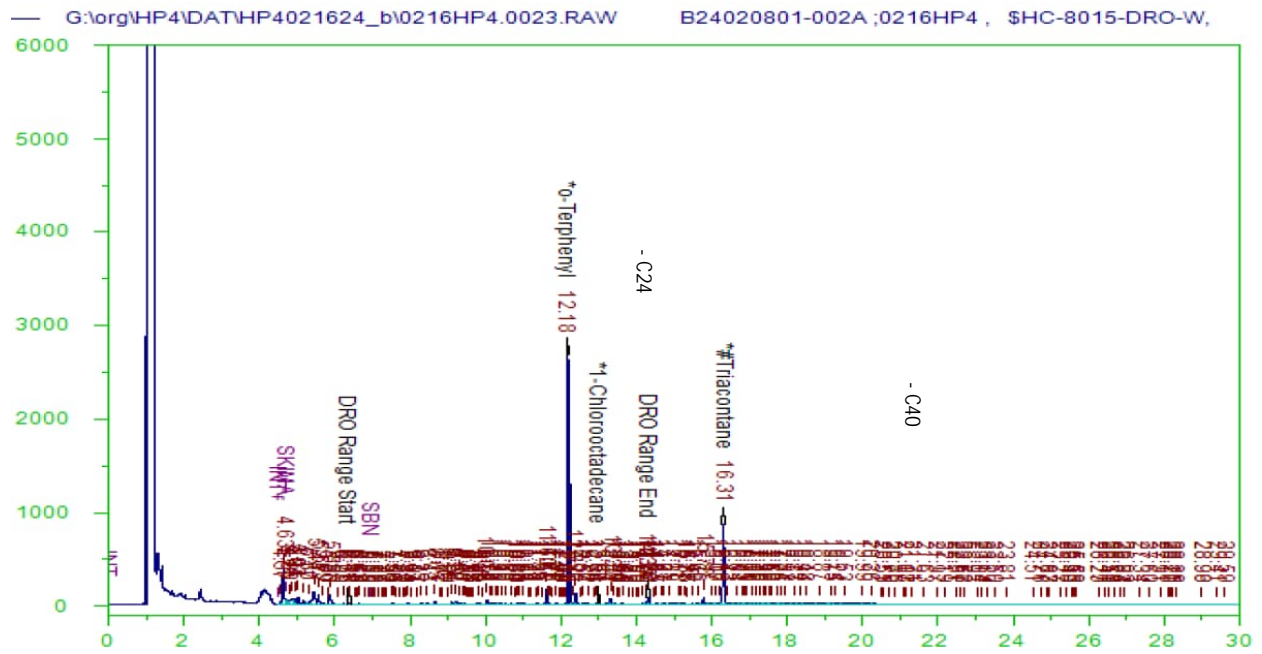
Sample ID: NMW26-WGN01LF-2402

Sample Date: 2/12/2024

Lab: Energy

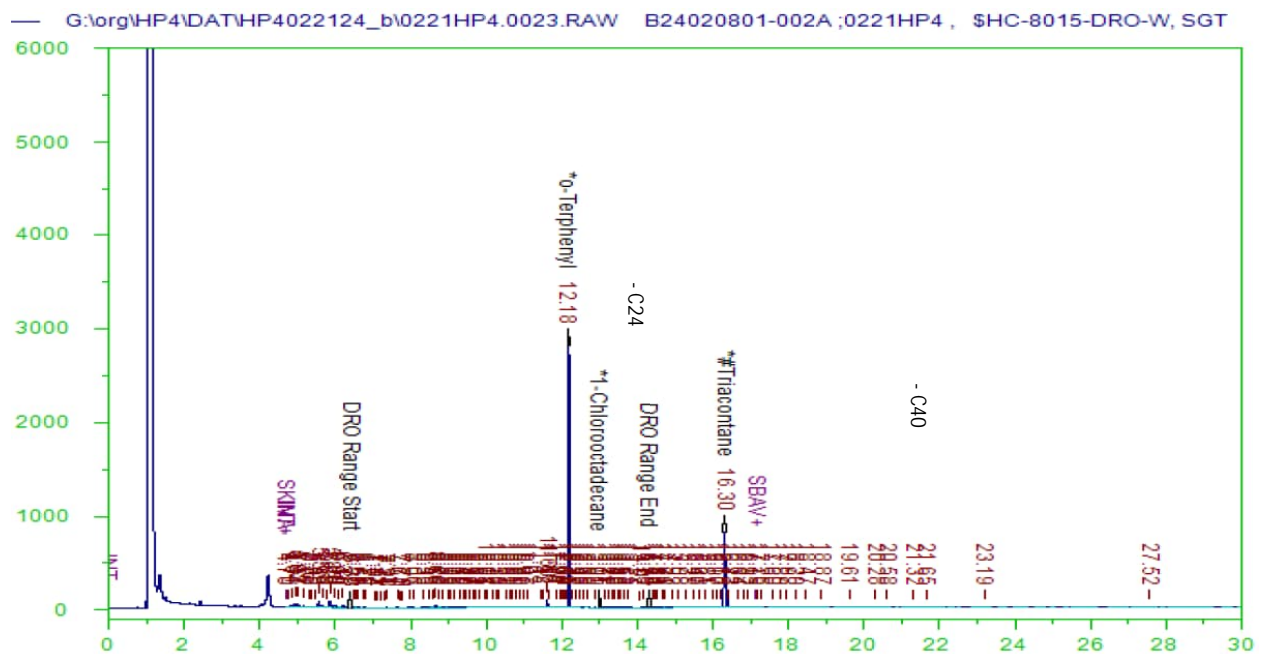
Results (ug/L): TPH-d (C10 to C24) 104 J

TPH-o (C24 to C40) 117 J



Results (ug/L): TPH-d SGC (C10 to C24) <141 U

TPH-o SGC (C24 to C40) <141 U



Method Blank Associated with SDG FC13080

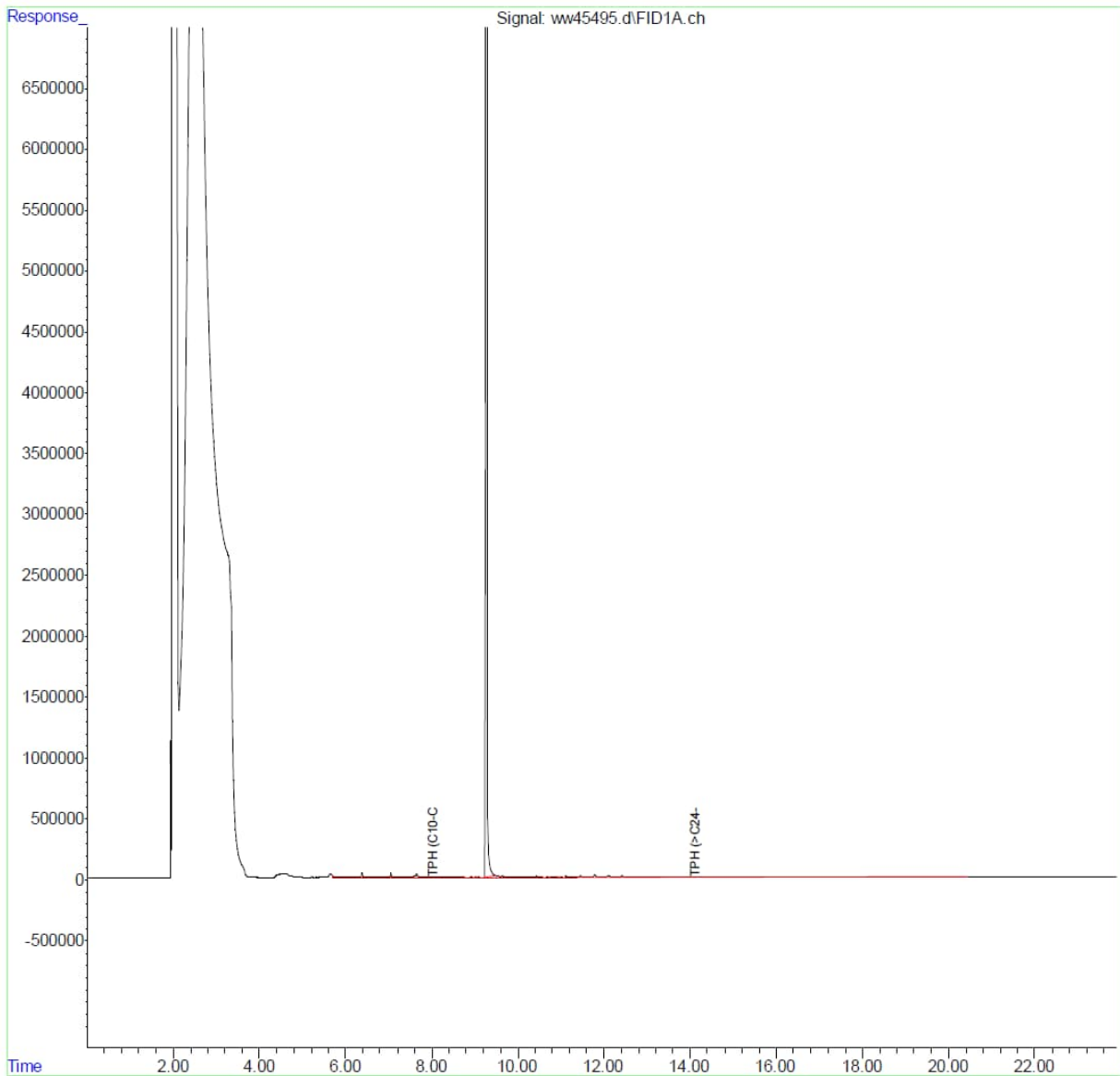
Sample ID: NMW26-WGN02LF-2401

Sample Date: 2/2/2024

Lab: SGS

Quant Time: Feb 05 15:48:28 2024
Quant Method : C:\msdchem\2\methods\DRO_ORO2_091523_.M
Quant Title : TPH by SW846 8015C
QLast Update : Fri Sep 15 10:20:15 2023
Response via : Initial Calibration

Volume Inj. :
Signal Phase : DB-5
Signal Info : 0.25 mm

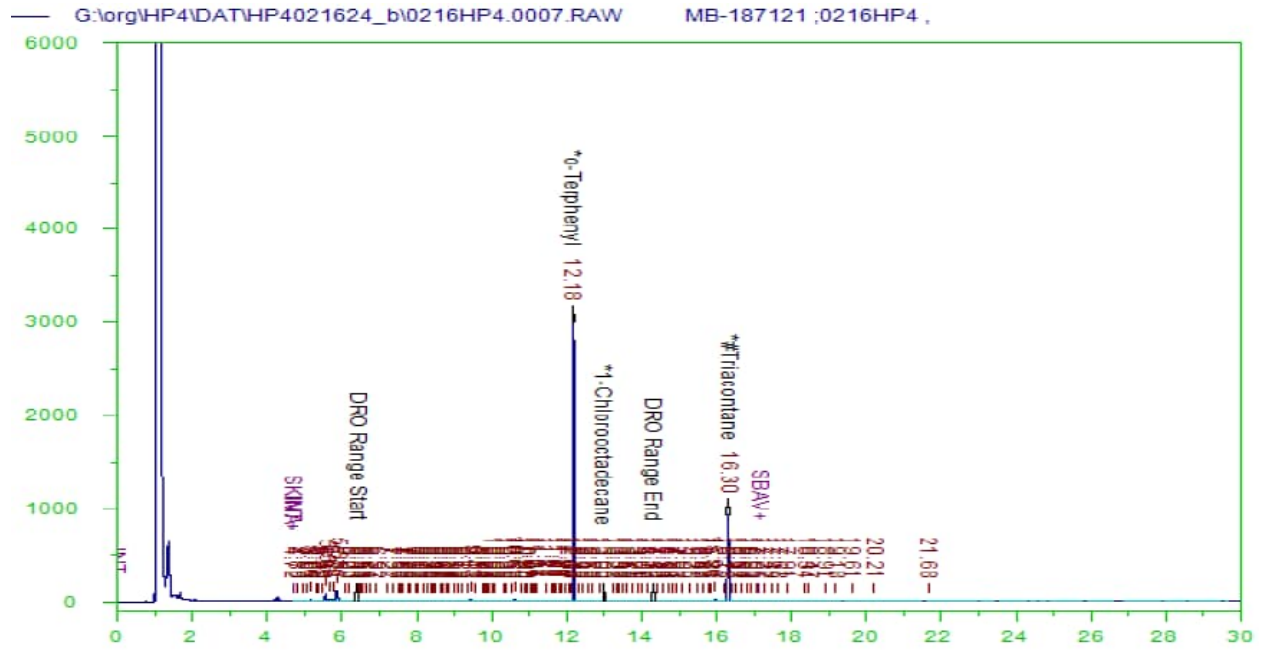


Method Blank Associated with SDG B24020463

Sample ID: RHMW03-WGN01LF-2402

Sample Date: 2/6/2024

Lab: Energy

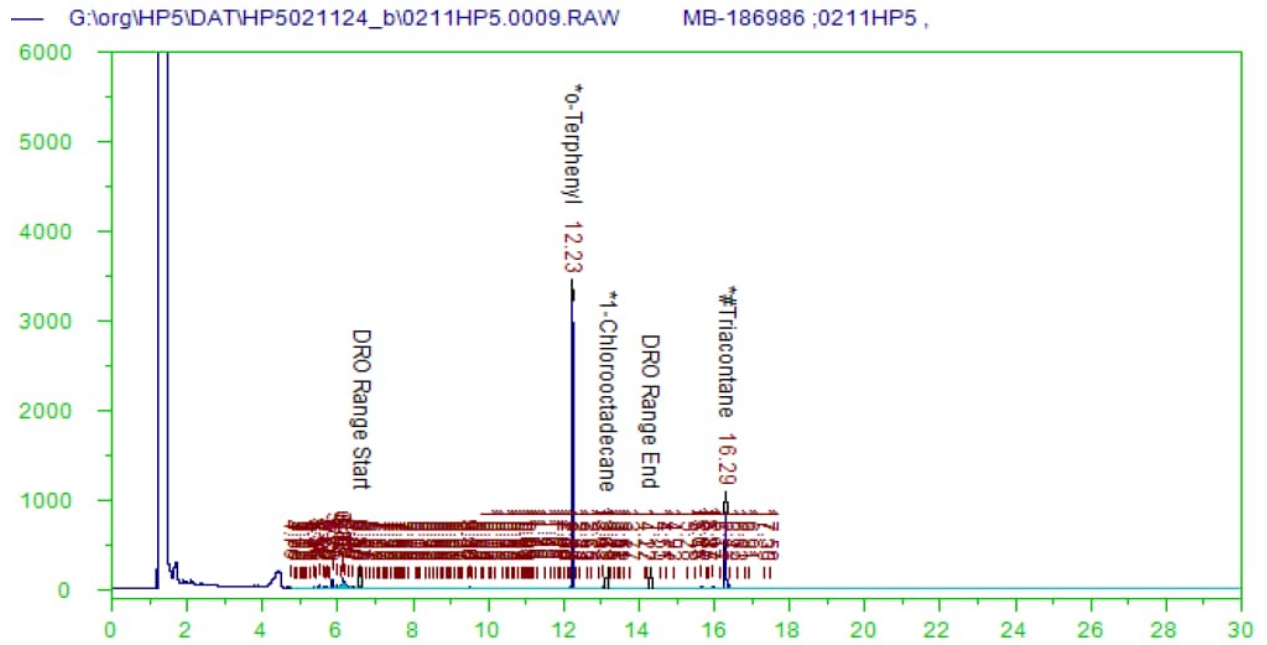


Method Blank Associated with SDG B24020580

Sample ID: RHMW19-WGN01LF-2402

Sample Date: 2/7/2024

Lab: Energy

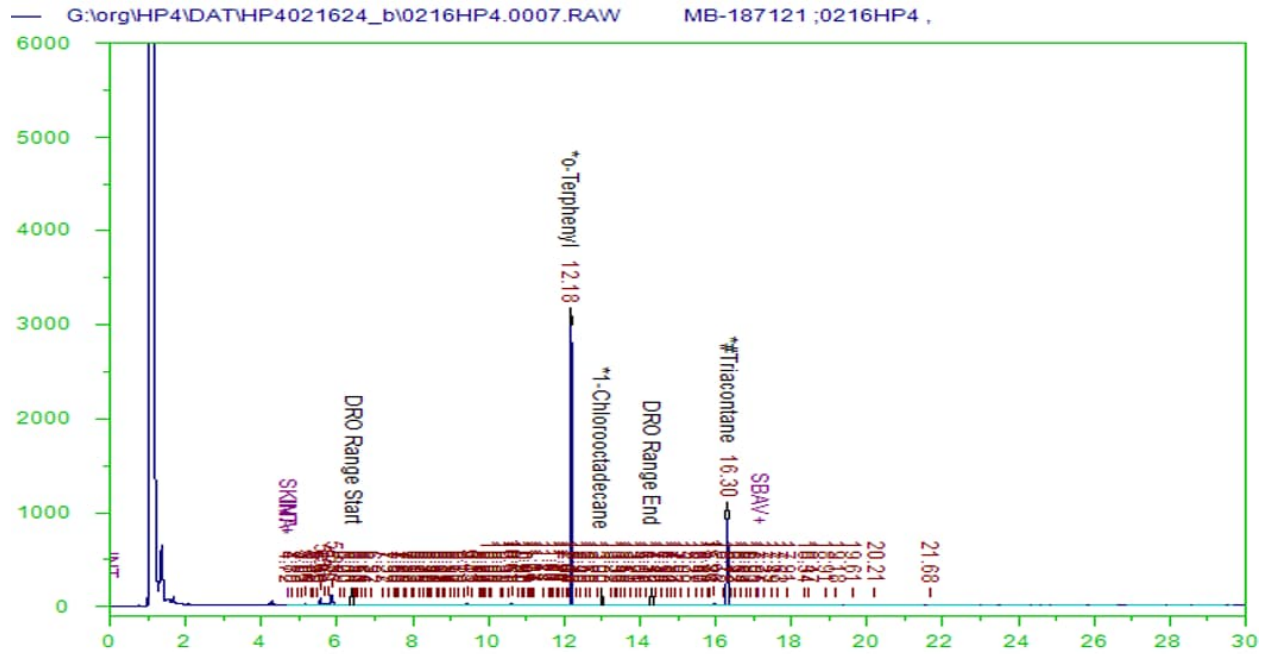


Method Blank Associated with SDG B24020801

Sample ID: NMW26-WGN01LF-2402

Sample Date: 2/12/2024

Lab: Energy



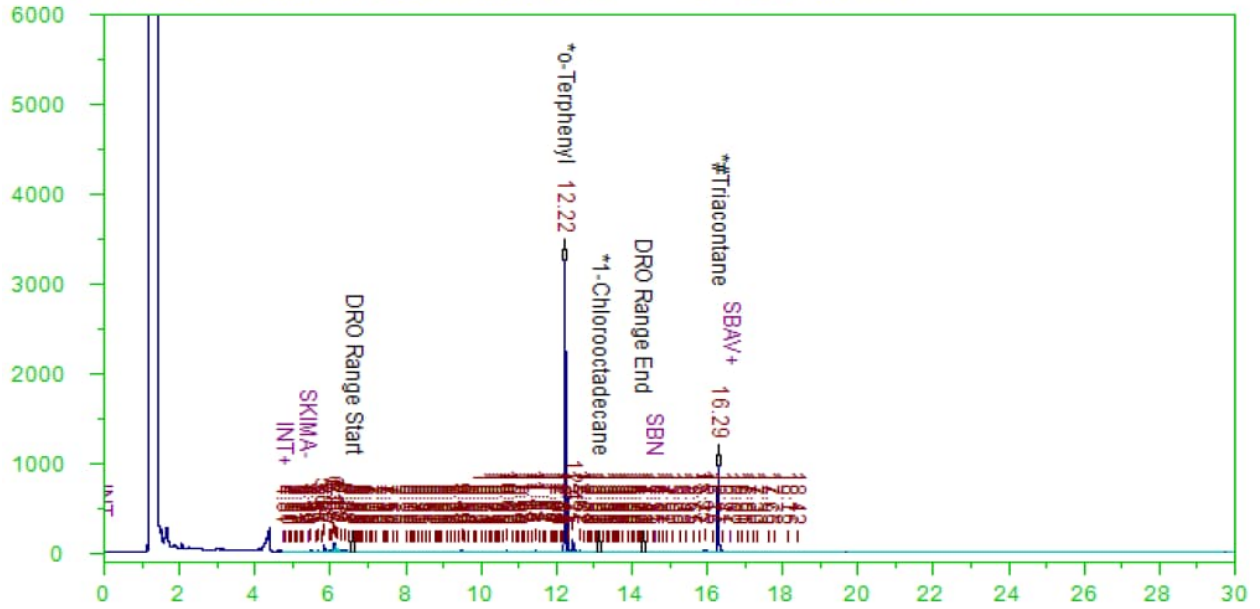
Method Blank Associated with SDG B24020912

Sample ID: RHMW02-WGN01LF-2402, RHMW02-WGFD01LF-2402

Sample Date: 2/13/2024

Lab: Energy

— G:\org\HP5\DAT\HP5022124_b\0221HP5.0012.RAW MB-187213 ;0221HP5 ,



Method Blank Associated with SDG FC13371

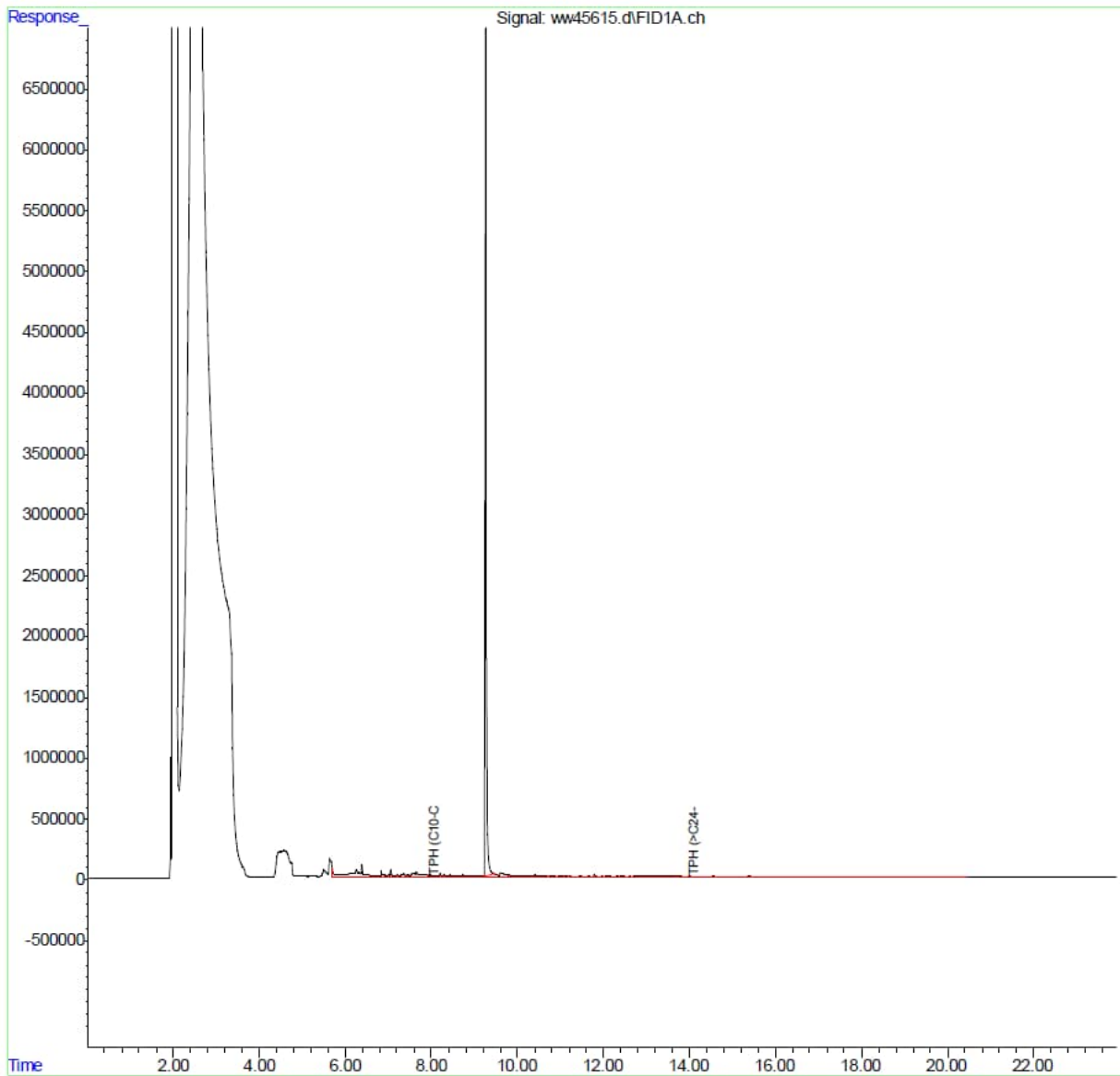
Sample ID: RHMW02-WGN01LF-2402, RHMW02-WGFD01LF-2402

Sample Date: 2/13/2024

Lab: SGS

Quant Time: Feb 19 10:35:56 2024
Quant Method : C:\msdchem\2\methods\DRO_ORO2_091523_.M
Quant Title : TPH by SW846 8015C
QLast Update : Fri Sep 15 10:20:15 2023
Response via : Initial Calibration

Volume Inj. :
Signal Phase : DB-5
Signal Info : 0.25 mm

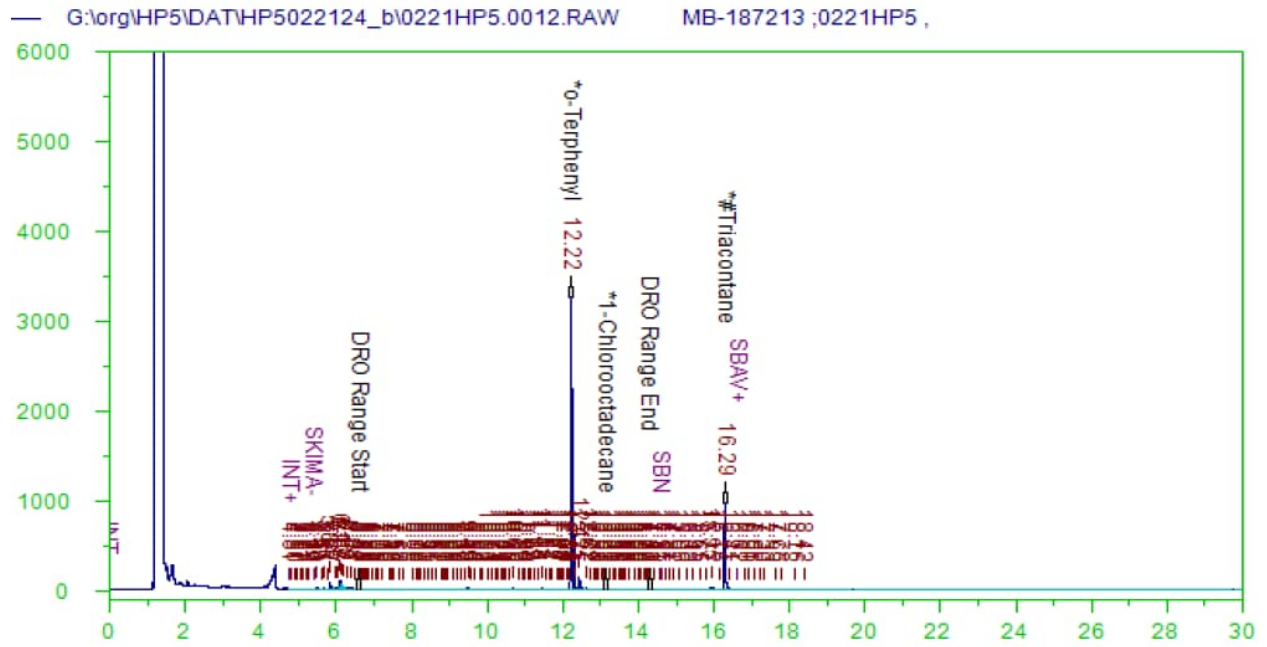


Method Blank Associated with SDG B24020997

Sample ID: RHP04C-WGN01LF-2402, RHP04B-WGN01LF-2402

Sample Date: 2/14/2024

Lab: Energy

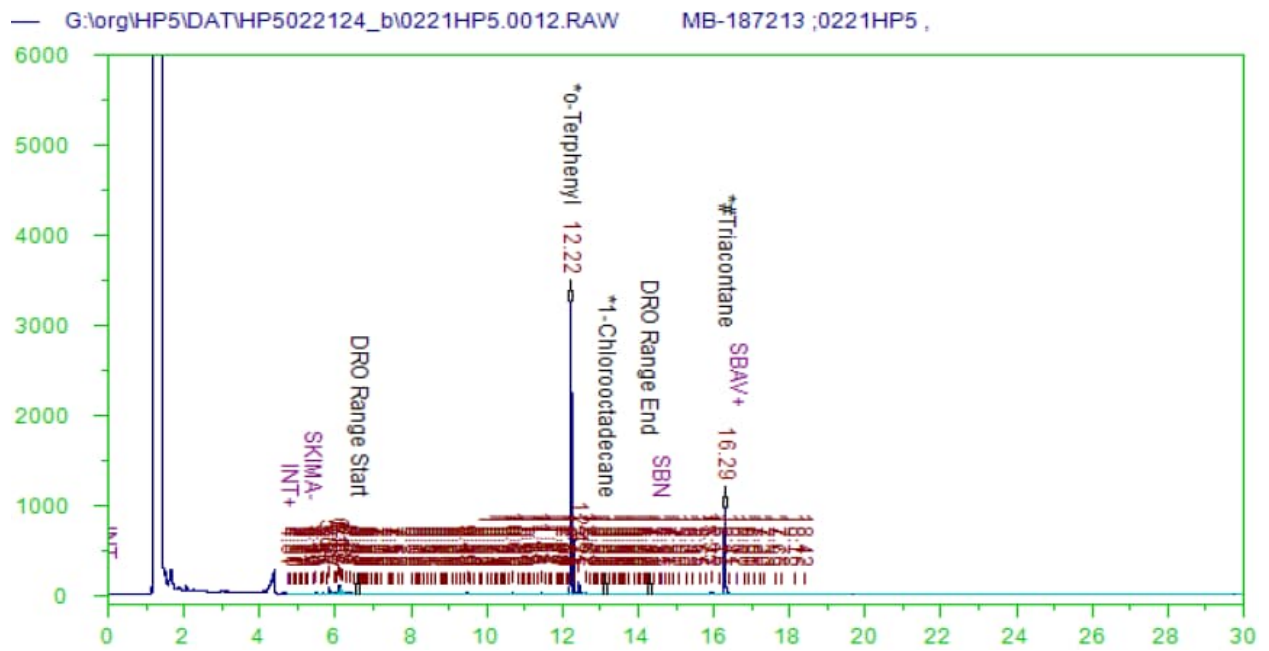


Method Blank Associated with SDG B24021083

Sample ID: RHMW18-WGN01LF-2402

Sample Date: 2/15/2024

Lab: Energy



Method Blank Associated with SDG FC13462

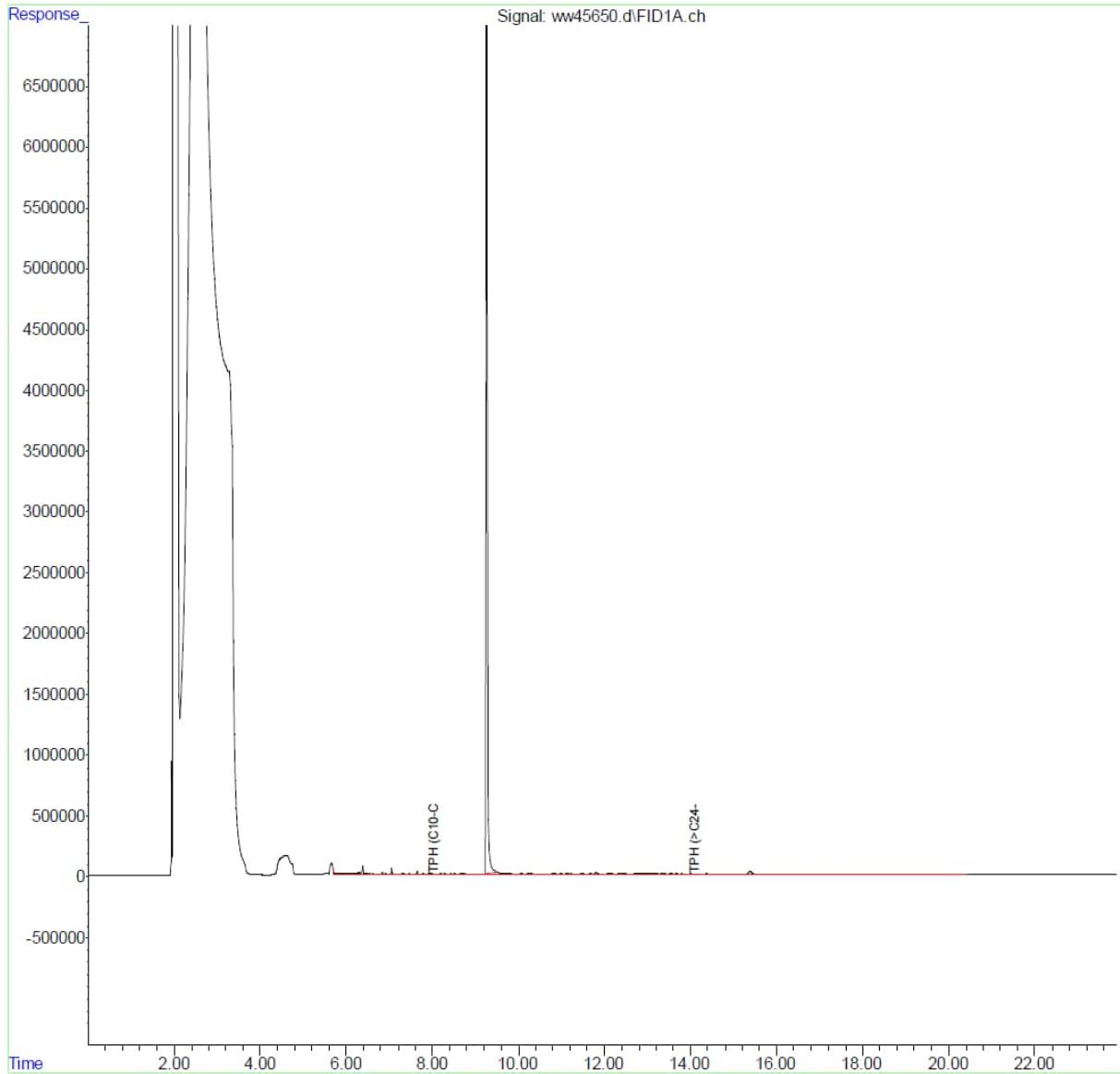
Sample ID: RHMW01R-WGFD01LF-2402

Sample Date: 2/16/2024

Lab: SGS

Quant Time: Feb 20 13:38:58 2024
Quant Method : C:\msdchem\2\methods\DRO_ORO2_091523_.M
Quant Title : TPH by SW846 8015C
QLast Update : Fri Sep 15 10:20:15 2023
Response via : Initial Calibration

Volume Inj. :
Signal Phase : DB-5
Signal Info : 0.25 mm

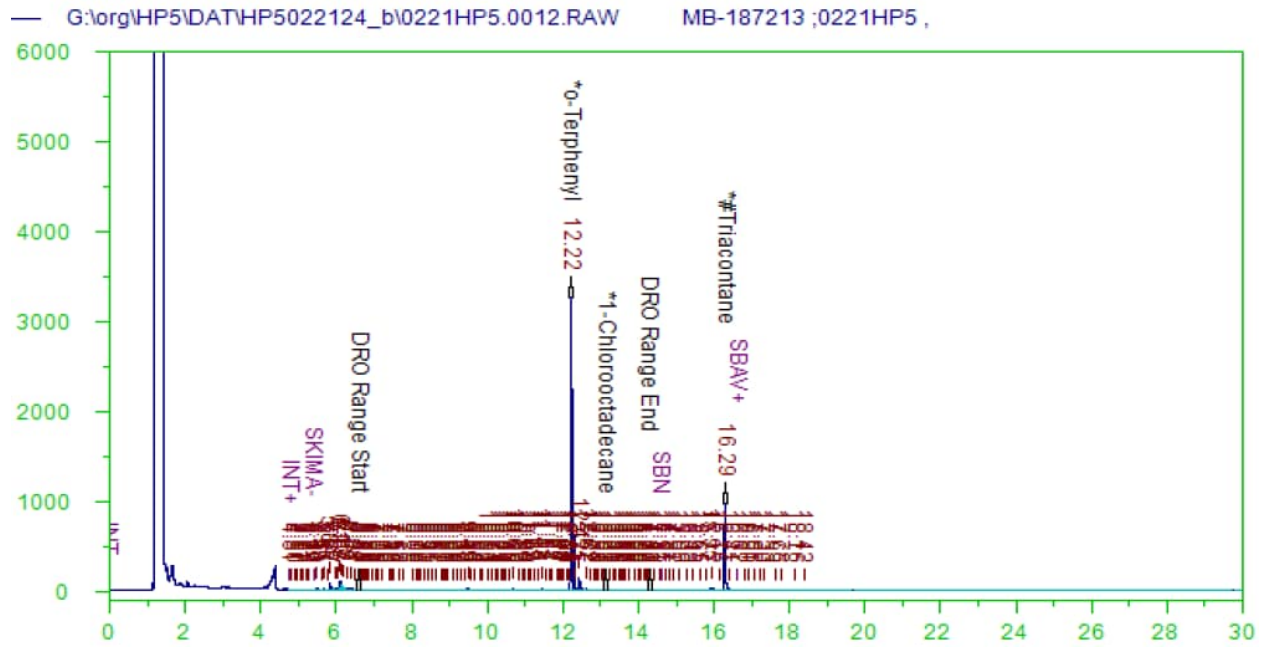


Method Blank Associated with SDG B24021107

Sample ID: RHMW01R-WGN01LF-2402, RHMW01R-WGFD01LF-2402

Sample Date: 2/16/2024

Lab: Energy



Method Blank Associated with SDG FC14092

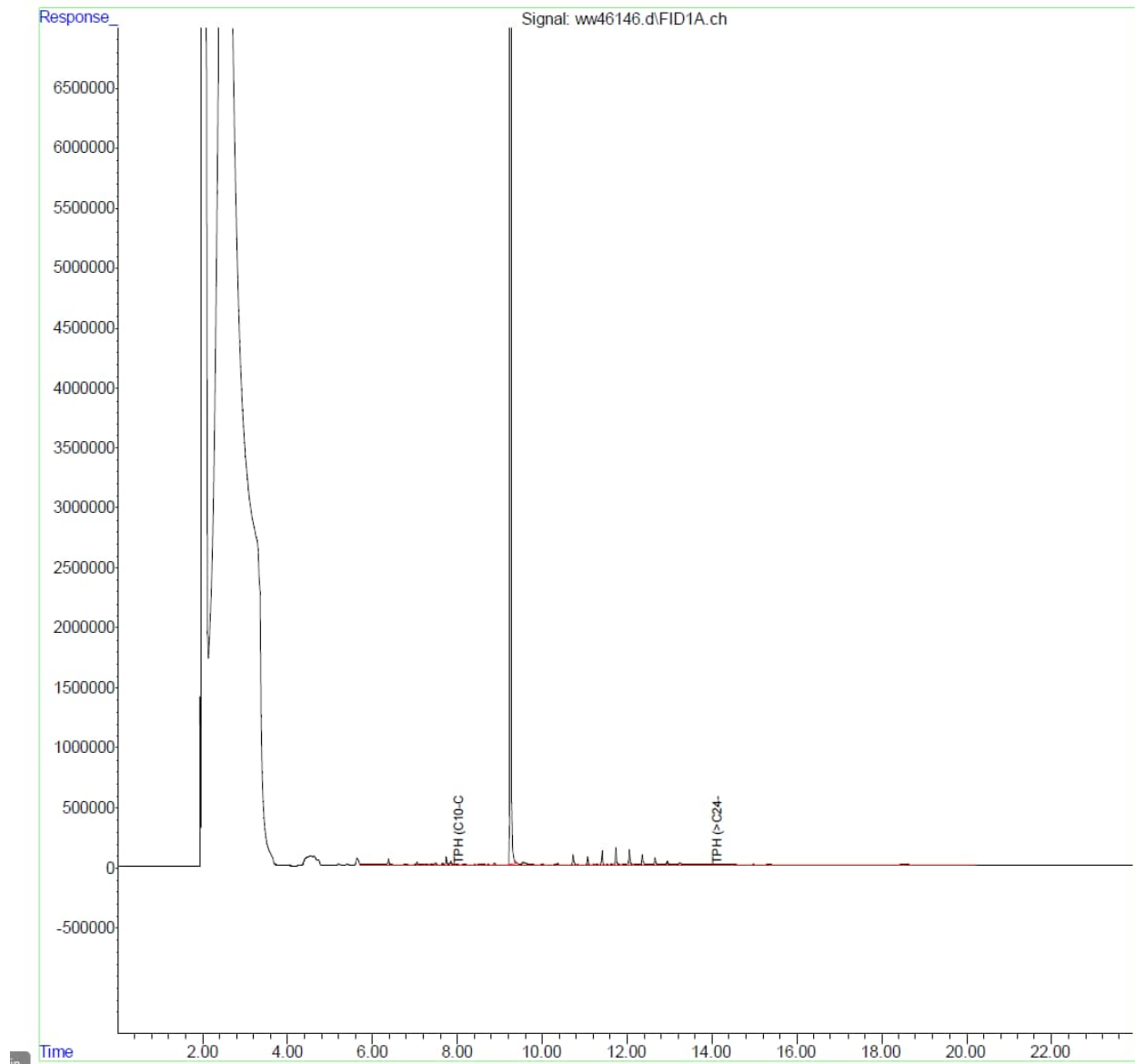
Sample ID: RHMW01R-WGN01LF-2403, RHMW01R-WGFD01LF-2403

Sample Date: 3/13/2024

Lab: SGS

Quant Time: Mar 19 14:05:51 2024
Quant Method : C:\msdchem\2\methods\DRO_ORO2_091523_.M
Quant Title : TPH by SW846 8015C
QLast Update : Fri Sep 15 10:20:15 2023
Response via : Initial Calibration

Volume Inj. :
Signal Phase : DB-5
Signal Info : 0.25 mm



Method Blank Associated with SDG FC14139

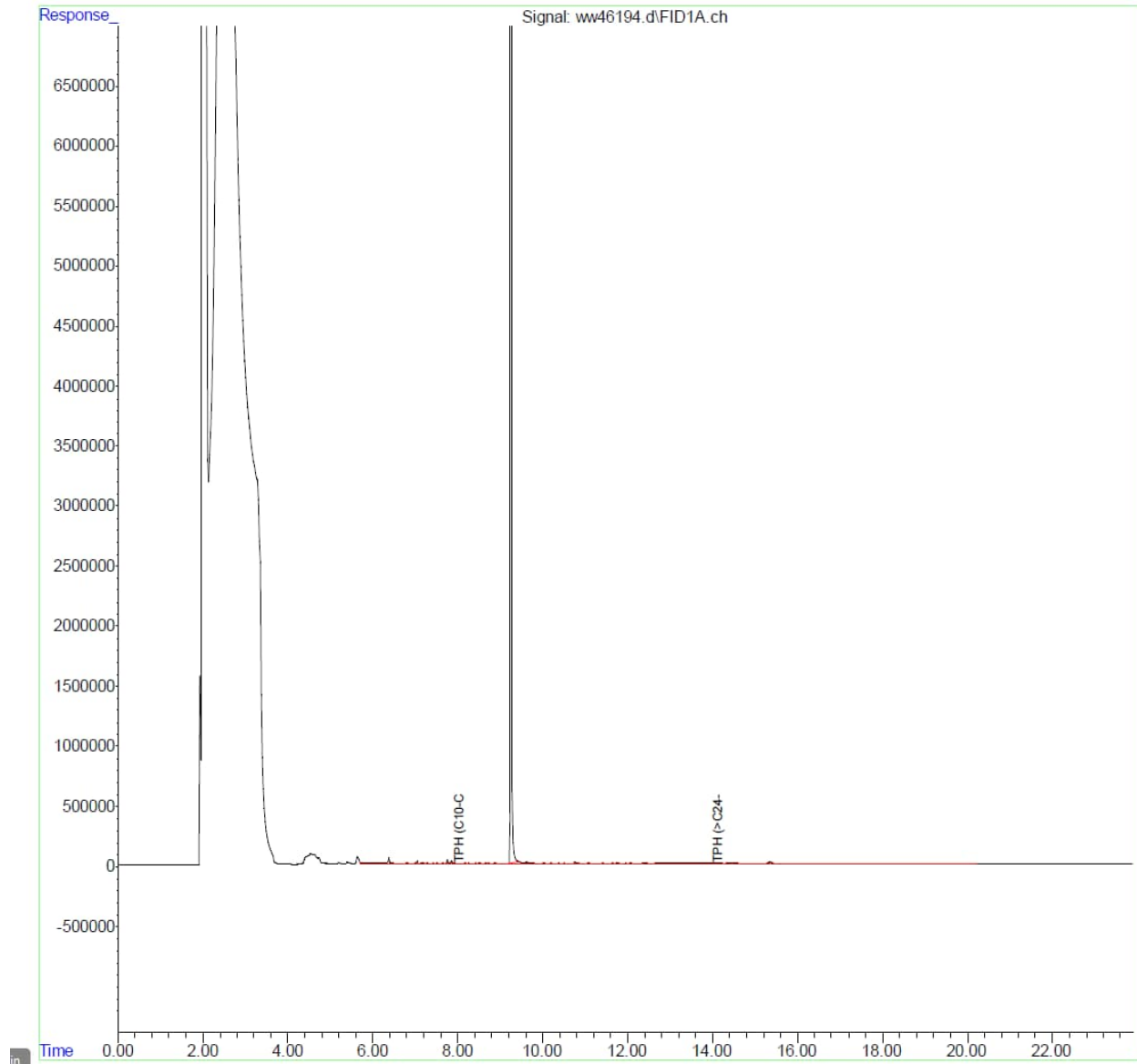
Sample ID: RHMW02-WGN01LF-2403, RHMW02-WGFD01LF-2403

Sample Date: 3/15/2024

Lab: SGS

Quant Time: Mar 22 09:12:01 2024
Quant Method : C:\msdchem\2\methods\DRO_ORO2_091523_.M
Quant Title : TPH by SW846 8015C
QLast Update : Fri Sep 15 10:20:15 2023
Response via : Initial Calibration

Volume Inj. :
Signal Phase : DB-5
Signal Info : 0.25 mm



Method Blank Associated with SDG FC14185

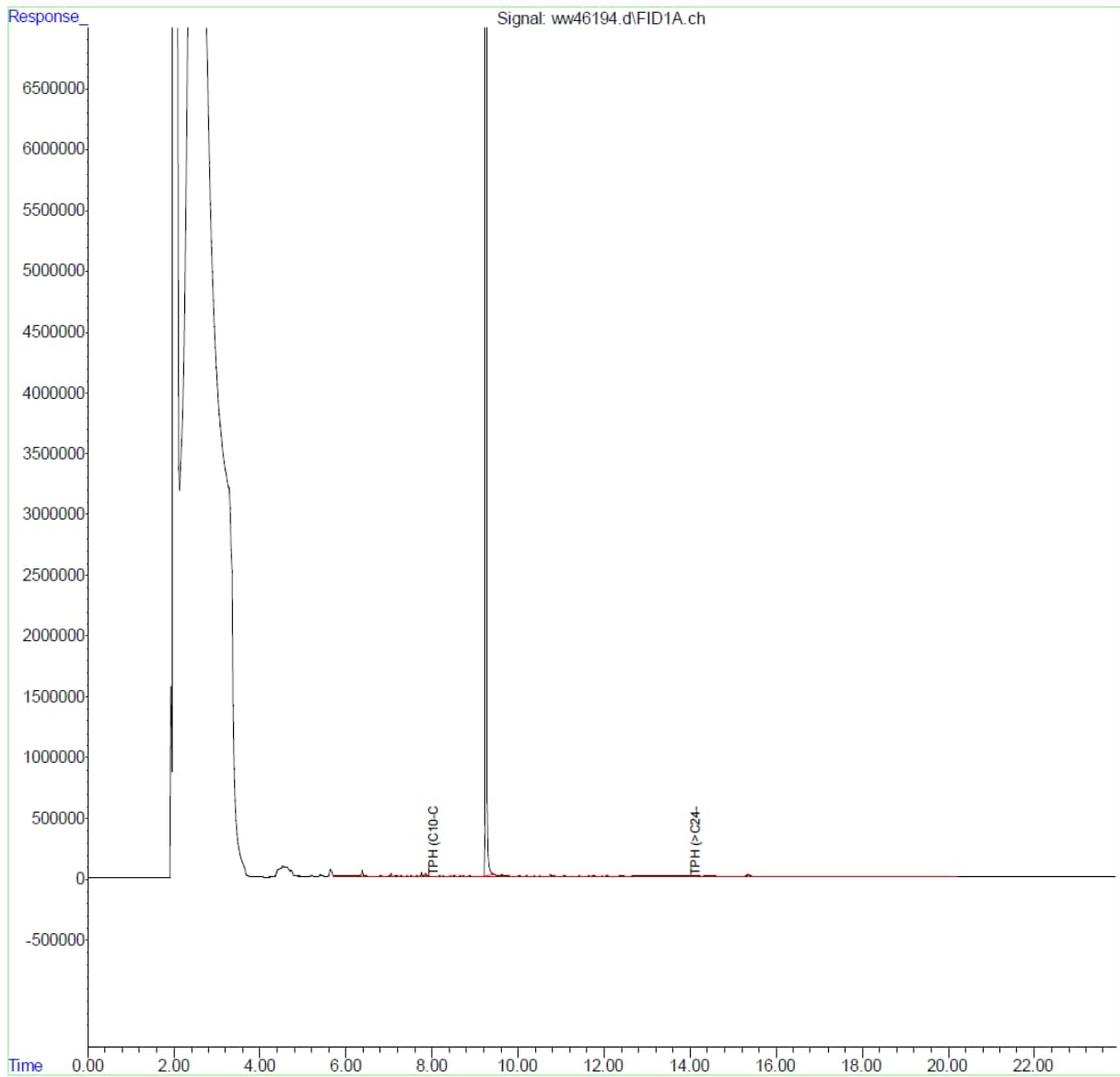
Sample ID: RHP08-WGN01LF-2403

Sample Date: 3/18/2024

Lab: SGS

Quant Time: Mar 22 09:12:01 2024
Quant Method : C:\msdchem\2\methods\DRO_ORO2_091523_.M
Quant Title : TPH by SW846 8015C
QLast Update : Fri Sep 15 10:20:15 2023
Response via : Initial Calibration

Volume Inj. :
Signal Phase : DB-5
Signal Info : 0.25 mm



Appendix B.5 – Natural Attenuation Parameters

Appendix B.5.1: Natural Attenuation Parameter Analytical Results, Current Reporting Period

Location	RHMW2254-01	NMW24	NMW25	NMW26	NMW30	NMW32	NMW33	NMW34
COC ID	RHMW2254-01-WGN01LF-2402	NMW24-WGN01LF-2402	NMW25-WGN01LF-2402	NMW26-WGN01LF-2402	NMW30-WGN01LF-2402	NMW32-WGN01LF-2402	NMW33-WGN01LF-2402	NMW34-WGN01LF-2403
Collection Date	2/13/2024	2/14/2024	2/14/2024	2/12/2024	2/15/2024	2/15/2024	2/15/2024	3/19/2024
Sample Type	N	N	N	N	N	N	N	N
FD Parent Sample	—	—	—	—	—	—	—	—
Analyte	Result	Result	Result	Result	Result	Result	Result	Result
Natural Attenuation Parameters								
Methane	<0.25 U	<0.25 U	<0.25 U	0.21 J	263	0.54	<0.25 U	—
Iron, Ion (Fe2+)	<0.32 U	<0.32 U	<0.32 U	<0.32 U	<0.32 U	<0.32 U	<0.32 U	<0.32 U
Nitrate (as N)	0.57	0.77	5.5	<0.12 U	0.27	2.7	4.6	—
Nitrate (as NO3 anion) ^c	2.52	3.41	24.35	—	1.20	11.95	20.36	—
Sulfate (as SO ₄)	19	19	95	17	20	55	52	—
Chloride (as Cl)	120	73	210	30	110	150	250	—
Nitrogen, Nitrate-Nitrite	<0.12 U	<0.12 U	0.31 J+	<0.12 U	<0.12 U	0.14 J+	0.29 J+	—
Alkalinity, Bicarbonate	63	130	220	110	110	220	240	—
Alkalinity, Carbonate (as CO ₃)	<7 U	<7 U	<7 U	<7 U	<7 U	<7 U	<7 U	—
Alkalinity, Total (as CaCO ₃)	63	130	220	110	110	220	240	—
Total Organic Carbon	356 J	345 J	814 J	3110	747 J	798 J	428 J	<750 U
Dissolved Organic Carbon	381 J	739 J	867 J	3300	775 J	1320	835 J	779 J+
General Chemistry								
Bromide	—	—	—	<0.24 U	—	—	—	—
Fluoride	—	—	—	0.17 J	—	—	—	—
Dissolved Silica	—	—	—	41	—	—	—	72 J
Total Silica	—	—	—	41	—	—	—	71 J
Total Calcium	—	—	—	22000	—	—	—	—
Total Magnesium	—	—	—	13000 J	—	—	—	—
Total Manganese	—	—	—	92 J	—	—	—	—
Total Potassium	—	—	—	5200	—	—	—	—
Total Sodium	—	—	—	38000	—	—	—	—
Field Parameters								
Total Dissolved Solids	387.5	378.8	916.87	216.21	415.8	683.24	914.7	451.1
pH	7.5	7	6.97	7.58	7.4	7.19	7.5	6.7
Specific Conductivity	0.60	0.58	1.41	0.33	0.64	1.05	1.41	0.69
Dissolved Oxygen	8.2	5.95	7.92	0.96	0.47	5.99	6.6	5.56
Turbidity	0.1	0.7	1.14	7.1	2.88	0.44	0.6	0.4
Temperature	22.2	25.8	26.82	25.3	25.04	26.2	25.72	25.4
ORP	212.6	247.3	260.6	245.92	59.6	232.6	230.84	290.8
Salinity	0.3	0.3	0.7	0.16	0.3	0.5	0.71	0.34

Appendix B.5.1: Natural Attenuation Parameter Analytical Results, Current Reporting Period (cont'd)

Location	RHMW01R	RHMW02	RHMW03	RHMW04	RHMW05	RHMW06	RHMW08
COC ID	RHMW01R-WGN01LF-2402	RHMW02-WGN01LF-2402	RHMW03-WGN01LF-2402	RHMW04-WGN01LF-2402	RHMW05-WGN01LF-2402	RHMW06-WGN01LF-2402	RHMW08-WGN01LF-2402
Collection Date	2/16/2024	2/13/2024	2/6/2024	2/12/2024	2/16/2024	2/5/2024	2/5/2024
Sample Type	N	N	N	N	N	N	N
FD Parent Sample	—	—	—	—	—	—	—
Analyte	Result	Result	Result	Result	Result	Result	Result
Natural Attenuation Parameters							
Methane	335	2350	0.21 J	<0.25 U	<0.25 U	<0.25 U	<0.25 U
Iron, Ion (Fe2+)	0.43 J	1.4	<0.32 U	<0.32 U	<0.32 U	<0.32 U	<0.32 U
Nitrate (as N)	<0.12 U	<0.12 U	1.7	0.5	0.39	0.62	0.84
Nitrate (as NO3 anion) ^c	—	—	7.53	2.21	1.73	2.74	3.72
Sulfate (as SO ₄)	5.6	5.1	46	10	11	87	25
Chloride (as Cl)	39	39	43	71	53	400	120
Nitrogen, Nitrate-Nitrite	0.12 R	<0.12 U	0.13 J+	<0.12 U	<0.12 U	0.55	0.73
Alkalinity, Bicarbonate	76	160	270	77	64	110	110
Alkalinity, Carbonate (as CO ₃)	<7 U	<7 U	<7 U	<7 U	<7 U	<7 U	<7 U
Alkalinity, Total (as CaCO ₃)	76	160	270	77	64	110	110
Total Organic Carbon	652 J	3710	1270 J+	339 J	347 J	370 J	564 J
Dissolved Organic Carbon	810 J	3150	1360 J+	409 J	999 J	520 J	800 J
General Chemistry							
Bromide	—	—	—	—	—	—	—
Fluoride	—	—	—	—	—	—	—
Dissolved Silica	—	—	—	—	—	—	—
Total Silica	—	—	—	—	—	—	—
Total Calcium	—	—	—	—	—	—	—
Total Magnesium	—	—	—	—	—	—	—
Total Manganese	—	—	—	—	—	—	—
Total Potassium	—	—	—	—	—	—	—
Total Sodium	—	—	—	—	—	—	—
Field Parameters							
Total Dissolved Solids	185.36	298.3	485.8	265.9	209.16	1056.3	408.79
pH	6.91	6.6	6.73	7.3	7.23	7	7.96
Specific Conductivity	0.29	0.46	0.75	0.41	0.32	1.63	0.63
Dissolved Oxygen	0.13	0.08	0.5	8.68	7.76	6.73	3.5
Turbidity	0.11	0.1	0.67	0.2	0.1	0.08	0.57
Temperature	23.41	24.5	27.03	22.4	22.6	24.91	24.8
ORP	-20.63	-67.2	147.3	244.96	247.24	211	136.2
Salinity	0.14	0.2	0.4	0.2	0.15	0.8	0.3

Appendix B.5.1: Natural Attenuation Parameter Analytical Results, Current Reporting Period (cont'd)

Location	RHMW09	RHMW10	RHMW11-05	RHMW12A	RHMW13-04	RHMW14-03	RHMW15-05
COC ID	RHMW09-WGN01LF-2402	RHMW10-WGN01LF-2402	RHMW11-05-WGN01G-2402	RHMW12A-WGN01LF-2402	RHMW13-04-WGN01G-2402	RHMW14-03-WGN01G-2402	RHMW15-05-WGN01G-2402
Collection Date	2/7/2024	2/7/2024	2/7/2024	2/12/2024	2/16/2024	2/7/2024	2/5/2024
Sample Type	N	N	N	N	N	N	N
FD Parent Sample	—	—	—	—	—	—	—
Analyte	Result	Result	Result	Result	Result	Result	Result
Natural Attenuation Parameters							
Methane	<0.25 U	<0.25 U	0.42 J	<0.25 U	<0.25 U	<0.25 U	<0.25 U
Iron, Ion (Fe2+)	<0.32 U	<0.32 U	<0.32 U	<0.32 U	<0.32 U	<0.32 U	<0.32 U
Nitrate (as N)	0.5	0.48	<0.12 U	0.33	0.35	0.48	0.42
Nitrate (as NO3 anion) ^c	2.21	2.12	—	1.46	1.55	2.12	1.86
Sulfate (as SO ₄)	9.3	7	12	8.1	6.8	8.2	9.1
Chloride (as Cl)	56	43	55	51	48	46	55
Nitrogen, Nitrate-Nitrite	<0.12 U	<0.12 U	<0.12 U	<0.12 U	<0.12 U	<0.12 U	0.37
Alkalinity, Bicarbonate	61	68	110	62	75	59	64
Alkalinity, Carbonate (as CO ₃)	<7 U	<7 U	<7 U	<7 U	<7 U	<7 U	<7 U
Alkalinity, Total (as CaCO ₃)	61	68	110	62	75	59	64
Total Organic Carbon	<750 U	<750 U	<750 U	305 J	349 J	<750 U	420 J
Dissolved Organic Carbon	<750 U	<750 U	772 J+	395 J	675 J	<750 U	499 J
General Chemistry							
Bromide	—	—	—	—	—	—	—
Fluoride	—	—	—	—	—	—	—
Dissolved Silica	—	—	—	—	—	—	—
Total Silica	—	—	—	—	—	—	—
Total Calcium	—	—	—	—	—	—	—
Total Magnesium	—	—	—	—	—	—	—
Total Manganese	—	—	—	—	—	—	—
Total Potassium	—	—	—	—	—	—	—
Total Sodium	—	—	—	—	—	—	—
Field Parameters							
Total Dissolved Solids	198.2	206.3	283.8	198.9	230.1	199.2	215.5
pH	7.4	7.4	8.1	8.3	7.7	7.9	7.8
Specific Conductivity	0.30	0.32	0.44	0.31	0.35	0.31	0.33
Dissolved Oxygen	8.57	8.53	1.6	6.91	4.27	2.78	1.92
Turbidity	0.11	0	0.3	0.85	0	0.14	0.7
Temperature	23.92	23.2	25.4	25.98	24.8	24.92	28.7
ORP	273.7	298.26	8.99	192.3	207.22	209	185.29
Salinity	0.15	0.15	0.21	0.2	0.17	0.2	0.16

Appendix B.5.1: Natural Attenuation Parameter Analytical Results, Current Reporting Period (cont'd)

Location	RHMW16	RHMW17	RHMW18	RHMW19	RHMW20	RHP01	RHP02	RHP03
COC ID	RHMW16-WGN01LF-2402	RHMW17-WGN01LF-2402	RHMW18-WGN01LF-2402	RHMW19-WGN01LF-2402	RHMW20-WGN01LF-2402	RHP01-WGN01LF-2402	RHP02-WGN01LF-2402	RHP03-WGN01LF-2402
Collection Date	2/5/2024	2/9/2024	2/15/2024	2/7/2024	2/9/2024	2/8/2024	2/8/2024	2/8/2024
Sample Type	N	N	N	N	N	N	N	N
FD Parent Sample	—	—	—	—	—	—	—	—
Analyte	Result	Result	Result	Result	Result	Result	Result	Result
Natural Attenuation Parameters								
Methane	<0.25 U	0.22 J	<0.25 U	0.25 J	0.19 J	0.18 J	0.26 J	<0.25 U
Iron, Ion (Fe2+)	<0.32 U	<0.32 U	<0.32 U	<0.32 U	<0.32 U	<0.32 U	<0.32 U	<0.32 U
Nitrate (as N)	0.39	0.2	<0.12 U	0.44	0.22	0.84	0.66	0.89
Nitrate (as NO3 anion) ^c	1.73	0.89	—	1.95	0.97	3.72	2.92	3.94
Sulfate (as SO ₄)	10	14	11	7	59	94 J-	60	35
Chloride (as Cl)	73	44	39	43	490	67	72	180
Nitrogen, Nitrate-Nitrite	0.32	<0.12 U	0.31 J+	0.12 R	<0.12 U	<0.12 U	<0.12 U	<0.12 U
Alkalinity, Bicarbonate	52	100	62	71	90	95	170	140
Alkalinity, Carbonate (as CO ₃)	<7 U	<7 U	50	<7 U	<7 U	<7 U	<7 U	<7 U
Alkalinity, Total (as CaCO ₃)	52	100	110	71	90	95	170	140
Total Organic Carbon	318 J	373 J	1000	<750 U	380 J	705 J	827 J	493 J
Dissolved Organic Carbon	363 J	379 J	988 J	<750 U	630 J	992 J	882 J	725 J
General Chemistry								
Bromide	—	—	—	—	—	—	—	—
Fluoride	—	—	—	—	—	—	—	—
Dissolved Silica	—	—	—	—	—	—	—	—
Total Silica	—	—	—	—	—	—	—	—
Total Calcium	—	—	—	—	—	—	—	—
Total Magnesium	—	—	—	—	—	—	—	—
Total Manganese	—	—	—	—	—	—	—	—
Total Potassium	—	—	—	—	—	—	—	—
Total Sodium	—	—	—	—	—	—	—	—
Field Parameters								
Total Dissolved Solids	222.8	230	220.6	171.3	1236.7	432	489.7	674.7
pH	8	7.4	9.1	7.6	7.1	6.9	6.9	7.3
Specific Conductivity	0.34	0.35	0.34	0.26	1.90	0.66	0.75	1.04
Dissolved Oxygen	8.67	4.4	0.69	8.62	5.96	6.78	7.75	4.7
Turbidity	0.22	0.29	0.15	0.89	0	0.06	0	0
Temperature	25.28	24.06	24.47	25.19	24.4	23.95	24.66	24.57
ORP	216.8	260.7	164.36	252.98	127.8	278.8	302	255.7
Salinity	0.2	0.2	0.16	0.13	1	0.3	0.4	0.5

Appendix B.5.1: Natural Attenuation Parameter Analytical Results, Current Reporting Period (cont'd)

Location	RHP04A	RHP04B	RHP04C	RHP05	RHP06	RHP07	RHP08	HDMW2253-03
COC ID	RHP04A-WGN01LF-2402	RHP04B-WGN01LF-2402	RHP04C-WGN01LF-2402	RHP05-WGN01LF-2402	RHP06-WGN01LF-2402	RHP07-WGN01LF-2402	RHP08-WGN01LF-2402	HDMW2253-03-WGN01LF-2402
Collection Date	2/9/2024	2/14/2024	2/14/2024	2/8/2024	2/8/2024	2/6/2024	2/7/2024	2/9/2024
Sample Type	N	N	N	N	N	N	N	N
FD Parent Sample	—	—	—	—	—	—	—	—
Analyte	Result	Result	Result	Result	Result	Result	Result	Result
Natural Attenuation Parameters								
Methane	<0.25 U	2.3	0.69	<0.25 U	<0.25 U	<0.25 U	<0.25 U	1.5
Iron, Ion (Fe2+)	<0.32 U	0.16 J	<0.32 U	<0.32 U	<0.32 U	<0.32 U	<0.32 U	0.62 J
Nitrate (as N)	0.6	0.03 J	0.13 J	1.7	1.9	1	1.1	0.25
Nitrate (as NO3 anion) ^c	2.66	0.13	0.58	7.53	8.41	4.43	4.87	1.11
Sulfate (as SO ₄)	42	32	78	38	82	37	30	27
Chloride (as Cl)	170	88	330	160	180	80	120	83
Nitrogen, Nitrate-Nitrite	<0.12 U	<0.12 U	<0.12 U	0.23 J+	0.18 J+	<0.12 U	<0.12 U	0.12 R
Alkalinity, Bicarbonate	130	98	76	120	74	110	78	57
Alkalinity, Carbonate (as CO ₃)	<7 U	<7 U	<7 U	<7 U	<7 U	<7 U	<7 U	<7 U
Alkalinity, Total (as CaCO ₃)	130	98	76	120	74	110	78	57
Total Organic Carbon	534 J	3230	1250	531 J	748 J	760 J+	<750 U	263 J
Dissolved Organic Carbon	812 J	2980	1290	740 J	766 J	857 J+	<750 U	327 J
General Chemistry								
Bromide	—	—	—	—	—	—	—	—
Fluoride	—	—	—	—	—	—	—	—
Dissolved Silica	—	—	—	—	—	—	—	—
Total Silica	—	—	—	—	—	—	—	—
Total Calcium	—	—	—	—	—	—	—	—
Total Magnesium	—	—	—	—	—	—	—	—
Total Manganese	—	—	—	—	—	—	—	—
Total Potassium	—	—	—	—	—	—	—	—
Total Sodium	—	—	—	—	—	—	—	—
Field Parameters								
Total Dissolved Solids	626.8	381.8	937.3	593.36	617.2	387.5	447.5	307.32
pH	7.3	7.9	7.5	7.13	6.9	7.2	7.7	6.44
Specific Conductivity	0.96	0.59	1.44	0.91	0.95	0.60	0.69	0.47
Dissolved Oxygen	3.93	0.17	0.37	6.18	7.28	7.76	6.65	0.36
Turbidity	0	0.18	0.26	0.8	0.6	0.43	8.5	28.88
Temperature	24.76	25.25	25.69	25.8	24.8	23.1	25.2	23.24
ORP	246.3	-124.8	115.4	252.67	228.2	236.8	263.9	62.77
Salinity	0.5	0.3	0.7	0.45	0.5	0.3	0.3	0.23

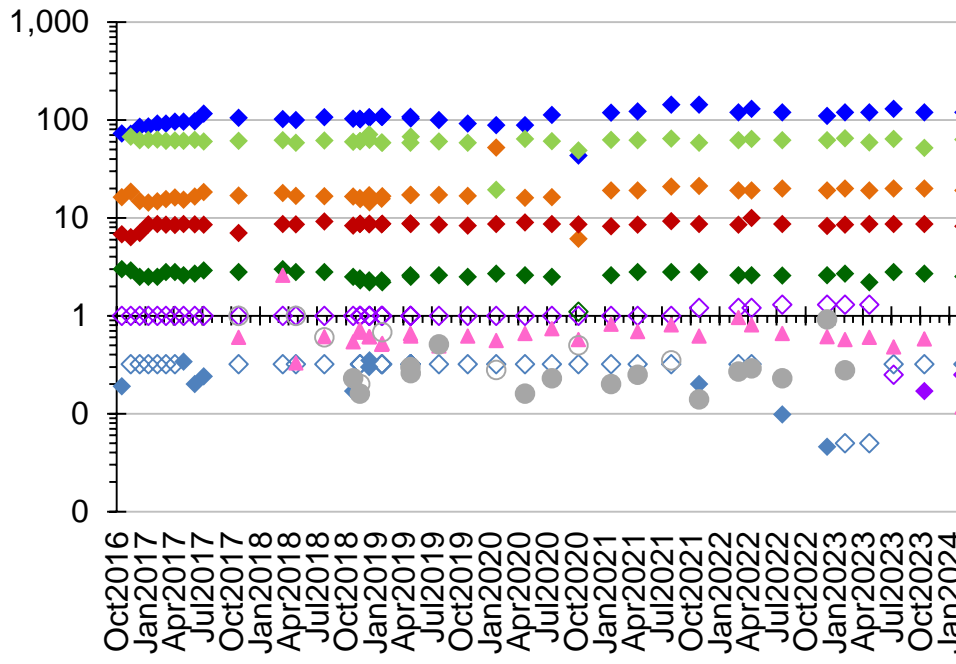
Appendix B.5.1: Natural Attenuation Parameter Analytical Results, Current Reporting Period (cont'd)

Location
COC ID
Collection Date
Sample Type
FD Parent Sample
Analyte
Natural Attenuation Parameters
Methane
Iron, Ion (Fe2+)
Nitrate (as N)
Nitrate (as NO3 anion) ^c
Sulfate (as SO ₄)
Chloride (as Cl)
Nitrogen, Nitrate-Nitrite
Alkalinity, Bicarbonate
Alkalinity, Carbonate (as CO ₃)
Alkalinity, Total (as CaCO ₃)
Total Organic Carbon
Dissolved Organic Carbon
General Chemistry
Bromide
Fluoride
Dissolved Silica
Total Silica
Total Calcium
Total Magnesium
Total Manganese
Total Potassium
Total Sodium
Field Parameters
Total Dissolved Solids
pH
Specific Conductivity
Dissolved Oxygen
Turbidity
Temperature
ORP
Salinity

Notes:
Bold text indicates detected value.
Bold and shaded text indicates analyte exceeds the screening criterion.
— = not analyzed or not applicable
°C = degrees Celsius
µg/L = microgram per liter
CAS = Chemical Abstracts Service
COC = chain-of-custody
ID = identification
J = estimated value
J- = estimated value, low bias
J+ = estimated value, high bias
mg/L = milligram per liter
mS/cm = millisiemens per centimeter
mV = millivolt
NTU = nephelometric turbidity unit
N = normal (primary) sample
no. = number
ppm = parts per million
PSU= practical salinity unit
QC = quality control
U = nondetect value
R = Rejected
SSRBL = Site-Specific Risk-Based Level
TB = trip blank
TPH-g = total petroleum hydrocarbons-gasoline range organics
TPH-d = total petroleum hydrocarbons-diesel range organics
TPH-o = total petroleum hydrocarbons-residual range organics (i.e., TPH-oil)
^a SSRBL applies to RHMW01, RHMW02, and RHMW03.
^b For EPA 8015 TPH-d and TPH-o, analysis of silica gel cleanup extract was performed on samples with TPH-d and/or TPH-o
^c Nitrate as N result converted to nitrate as NO3 anion by multiplying nitrate result by a factor of 4.4268 (CalEPA 2011).

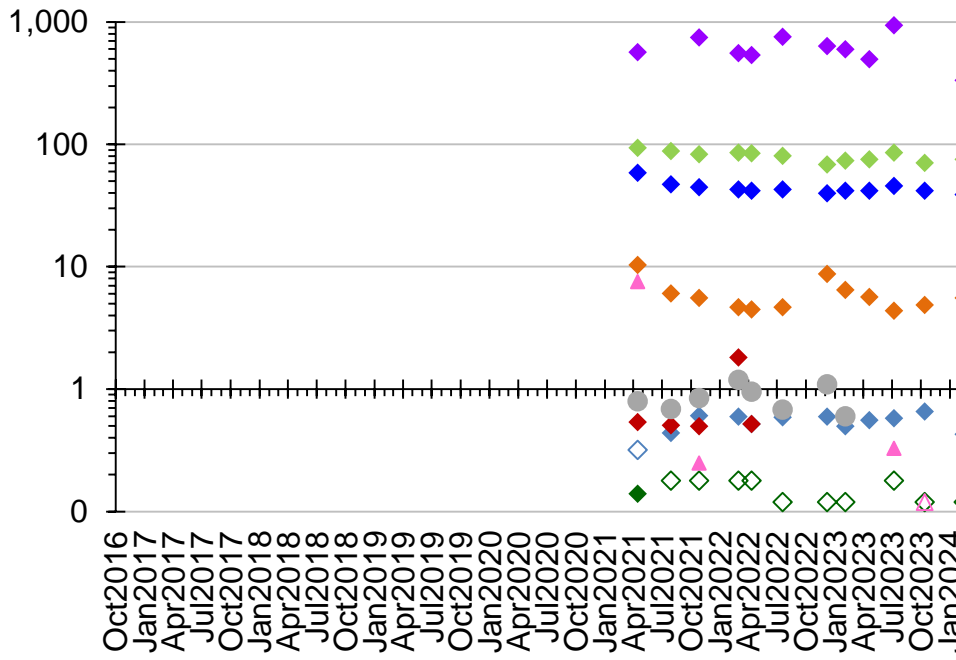
Appendix B.5.2: Cumulative Natural Attenuation Parameter Graphs

**RHMW2254-01
NAPs**



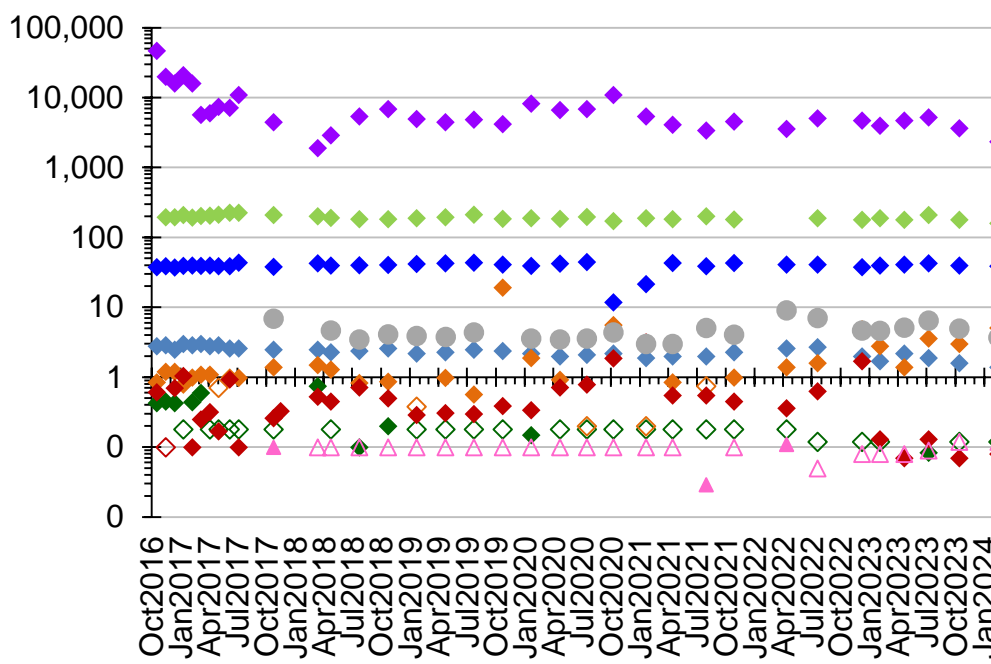
- ◆ Methane (D)
- ◇ Methane (ND)
- ◆ Ferrous Iron (D)
- ◇ Ferrous Iron (ND)
- ◆ Nitrate (D)
- ◇ Nitrate (ND)
- ◆ Sulfate (D)
- ◇ Sulfate (ND)
- ◆ Chloride (D)
- ◇ Chloride (ND)
- ◆ DO (D)
- ◇ DO (ND)
- ◆ Alkalinity, Total (D)
- ◇ Alkalinity, Total (ND)
- ◆ Nitrate-Nitrite (D)
- ◇ Nitrate-Nitrite (ND)
- TOC (D)
- TOC (ND)

RHMW01R NAPs



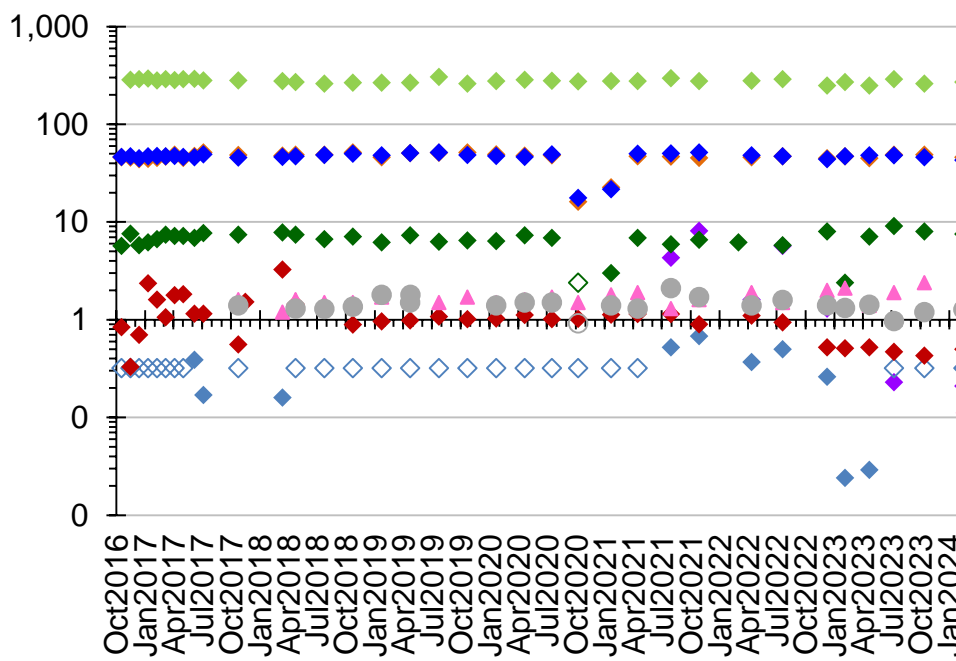
- ◆ Methane (D)
- ◇ Methane (ND)
- ◆ Ferrous Iron (D)
- ◇ Ferrous Iron (ND)
- ◆ Nitrate (D)
- ◇ Nitrate (ND)
- ◆ Sulfate (D)
- ◇ Sulfate (ND)
- ◆ Chloride (D)
- ◇ Chloride (ND)
- ◆ DO (D)
- ◇ DO (ND)
- ◆ Alkalinity, Total (D)
- ◇ Alkalinity, Total (ND)
- ◆ Nitrate-Nitrite (D)
- ◇ Nitrate-Nitrite (ND)
- TOC (D)
- TOC (ND)

RHMW02 NAPs



- ◆ Methane (D)
- ◇ Methane (ND)
- ◆ Ferrous Iron (D)
- ◇ Ferrous Iron (ND)
- ◆ Nitrate (D)
- ◇ Nitrate (ND)
- ◆ Sulfate (D)
- ◇ Sulfate (ND)
- ◆ Chloride (D)
- ◇ Chloride (ND)
- ◆ DO (D)
- ◇ DO (ND)
- ◆ Alkalinity, Total (D)
- ◇ Alkalinity, Total (ND)
- ◆ Nitrate-Nitrite (D)
- ◇ Nitrate-Nitrite (ND)
- TOC (D)
- TOC (ND)

RHMW03 NAPs

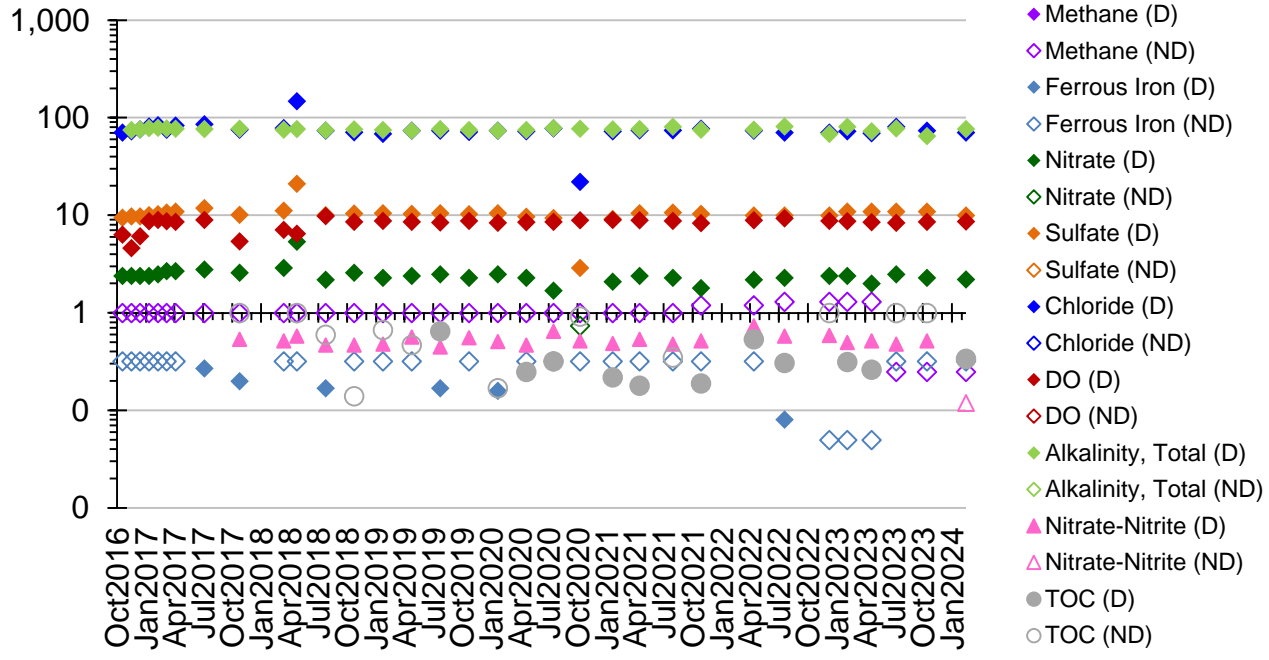


- ◆ Methane (D)
- ◇ Methane (ND)
- ◆ Ferrous Iron (D)
- ◇ Ferrous Iron (ND)
- ◆ Nitrate (D)
- ◇ Nitrate (ND)
- ◆ Sulfate (D)
- ◇ Sulfate (ND)
- ◆ Chloride (D)
- ◇ Chloride (ND)
- ◆ DO (D)
- ◇ DO (ND)
- ◆ Alkalinity, Total (D)
- ◇ Alkalinity, Total (ND)
- ◆ Nitrate-Nitrite (D)
- ◇ Nitrate-Nitrite (ND)
- TOC (D)
- TOC (ND)

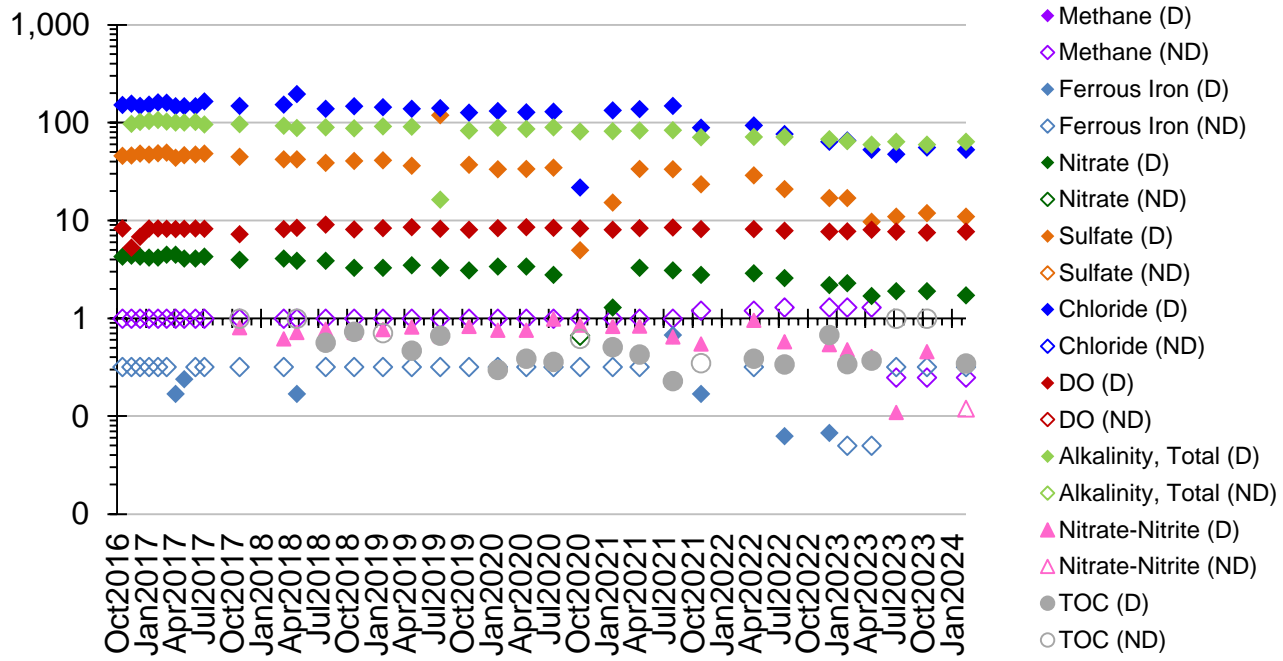
Methane results in micrograms per liter (µg/L or parts per billion).
All other results in milligrams per liter (mg/L or parts per million).

Appendix B.5.2: Cumulative Natural Attenuation Parameter Graphs (cont'd)

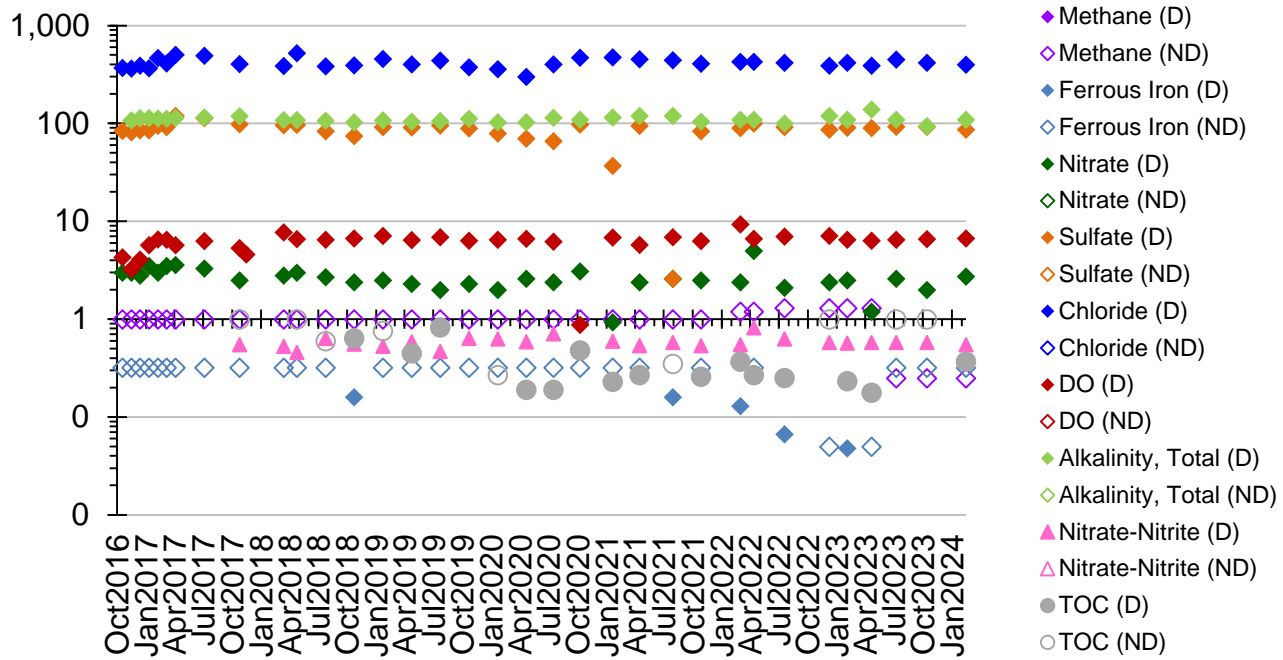
RHMW04 NAPs



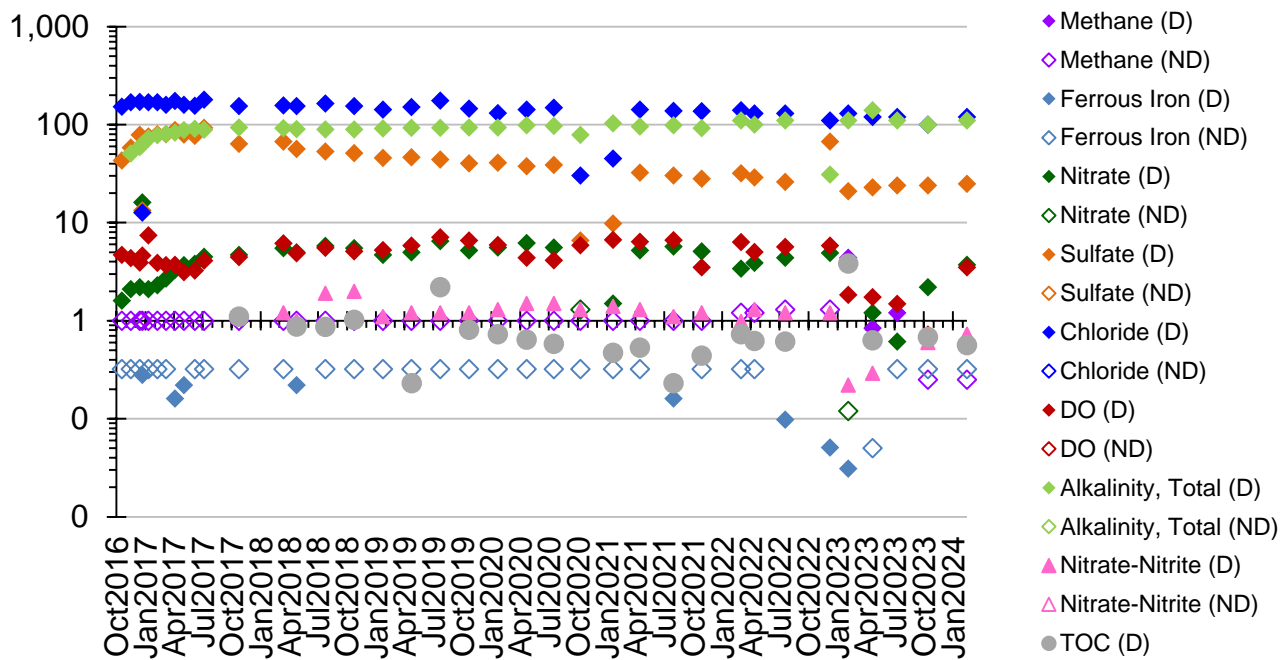
RHMW05 NAPs



RHMW06 NAPs



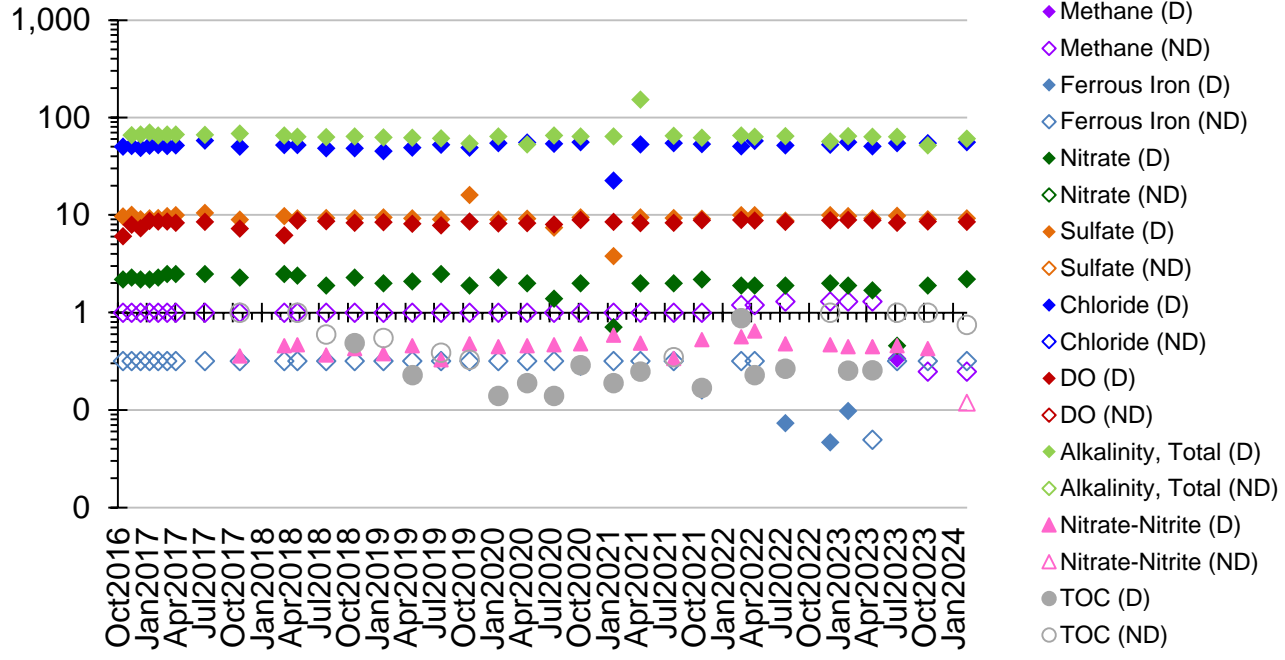
RHMW08 NAPs



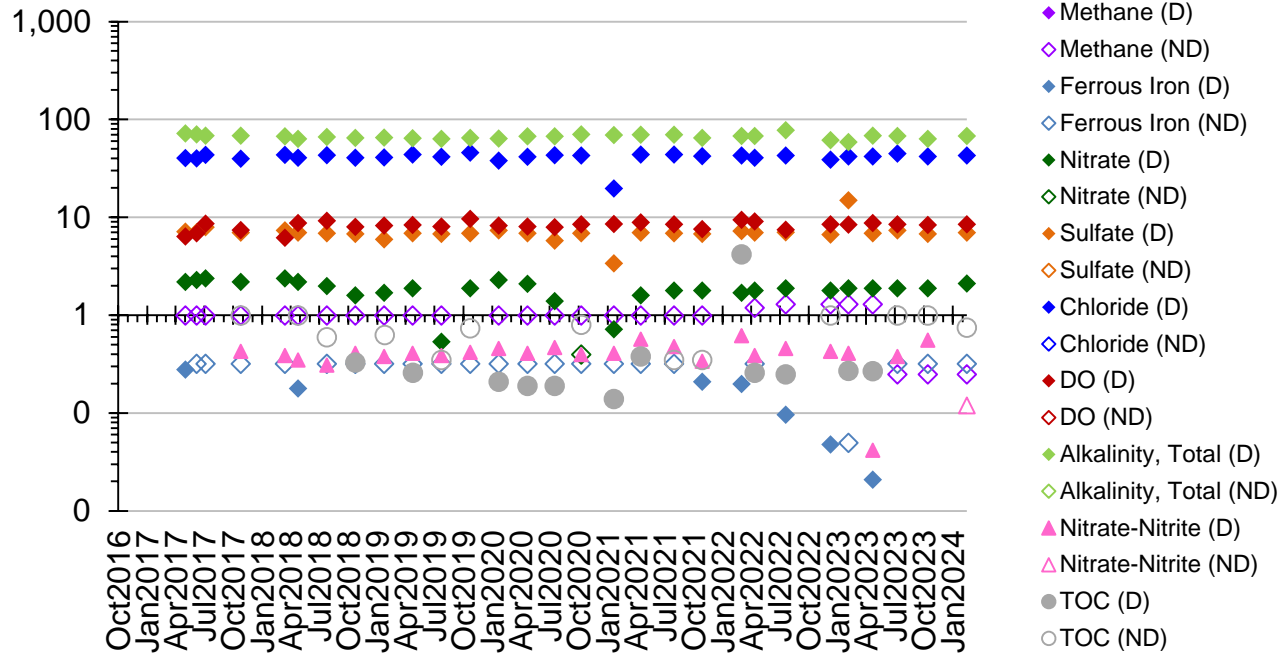
Methane results in micrograms per liter (µg/L or parts per billion).
All other results in milligrams per liter (mg/L or parts per million).

Appendix B.5.2: Cumulative Natural Attenuation Parameter Graphs (cont'd)

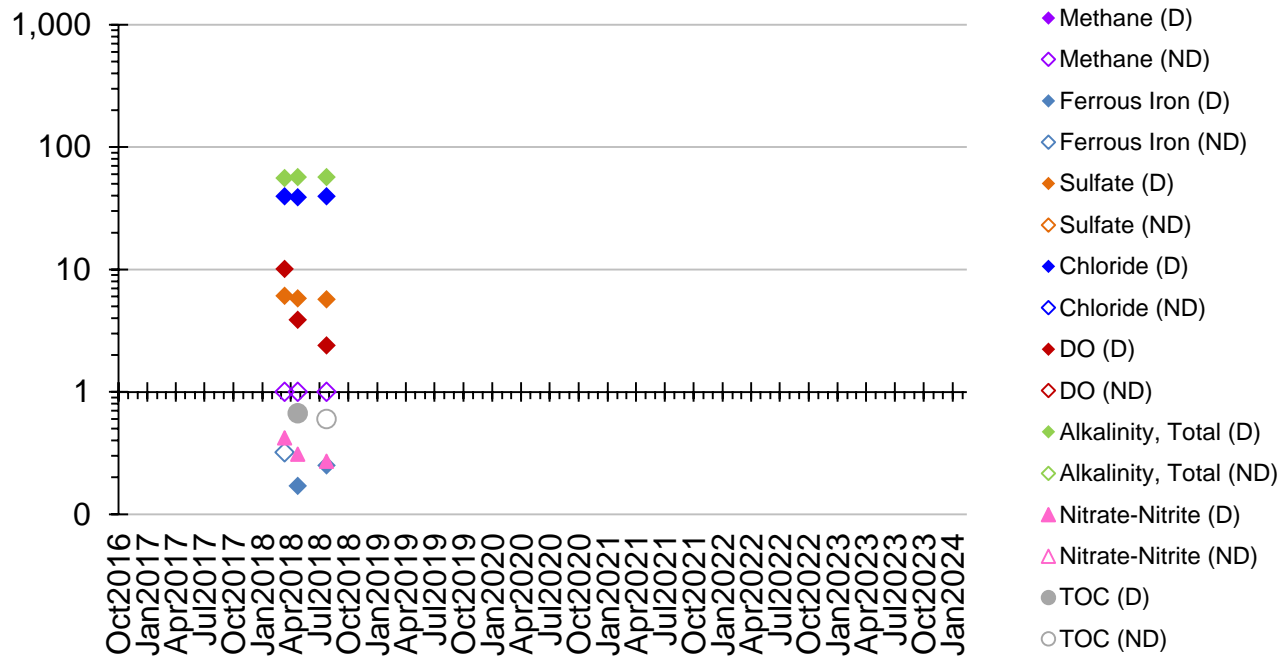
RHMW09 NAPs



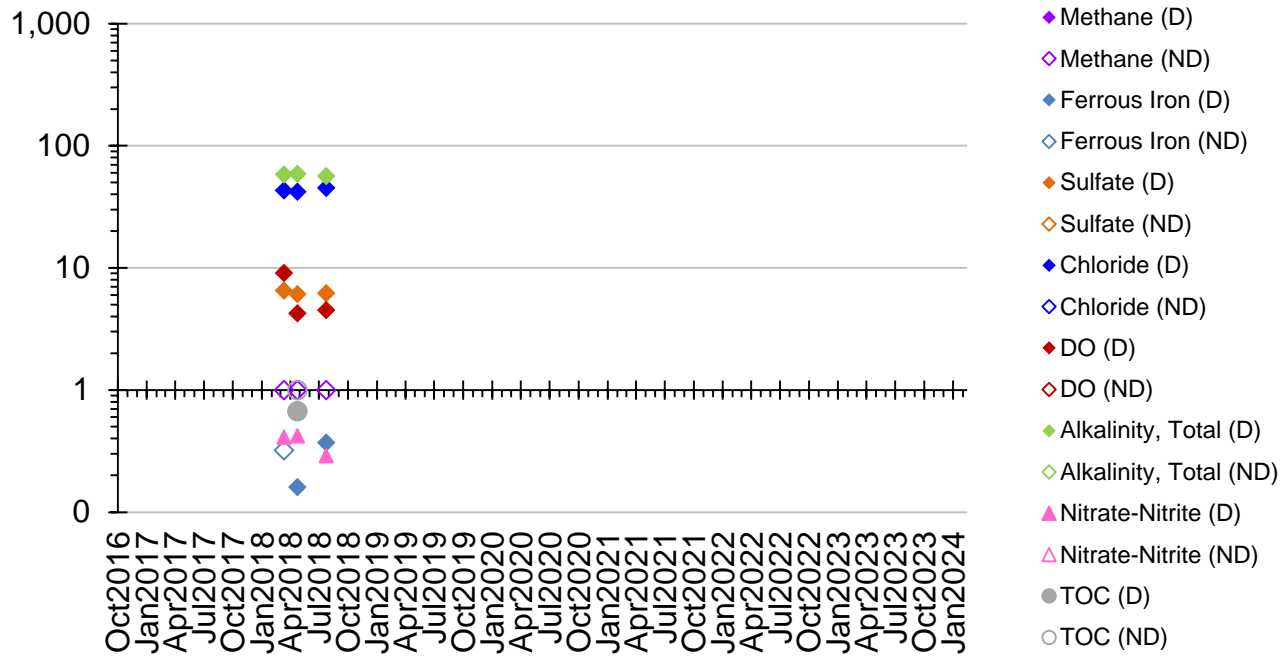
RHMW10 NAPs



RHMW11 Zone 1 NAPs



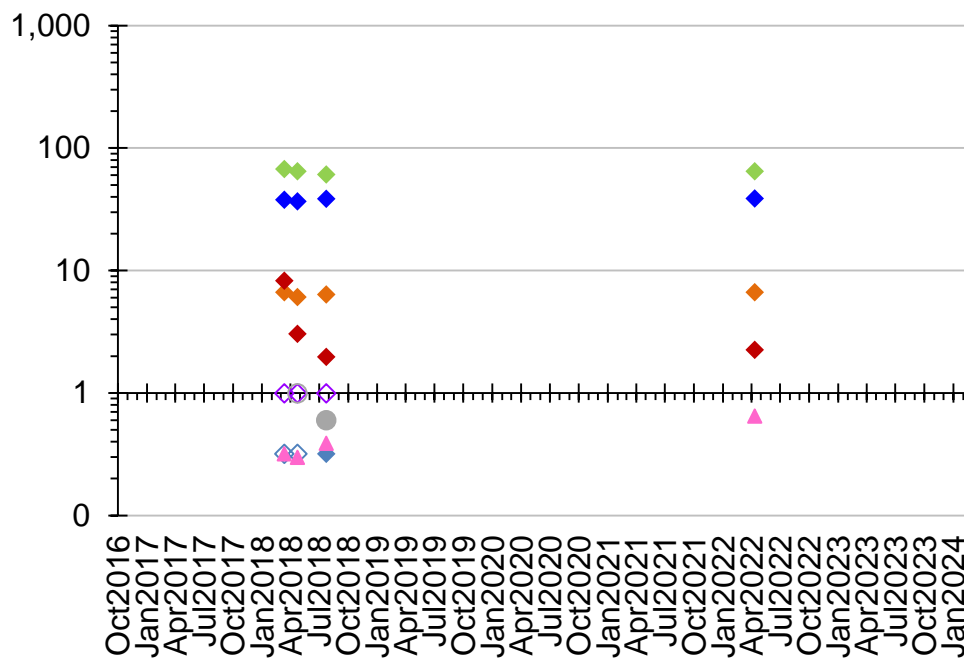
RHMW11 Zone 2 NAPs



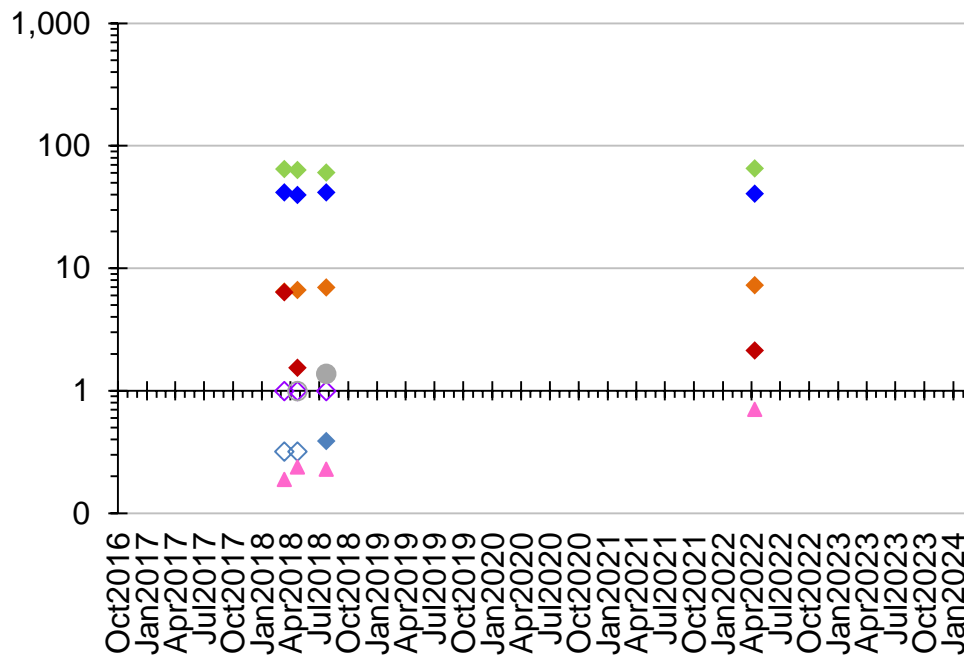
Methane results in micrograms per liter (µg/L or parts per billion).
All other results in milligrams per liter (mg/L or parts per million).

Appendix B.5.2: Cumulative Natural Attenuation Parameter Graphs (cont'd)

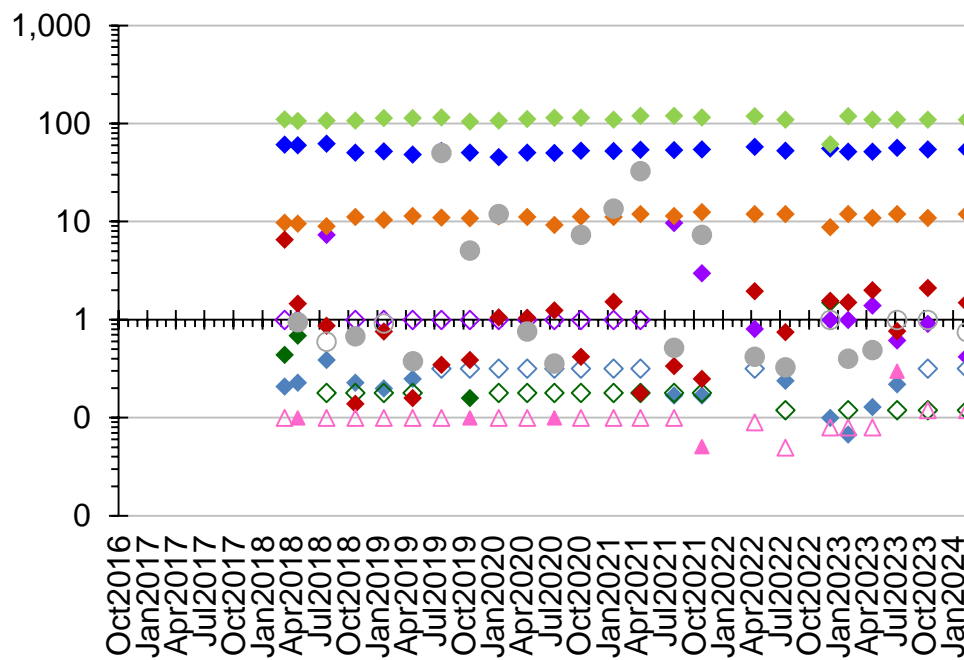
**RHMW11 Zone 3
NAPs**



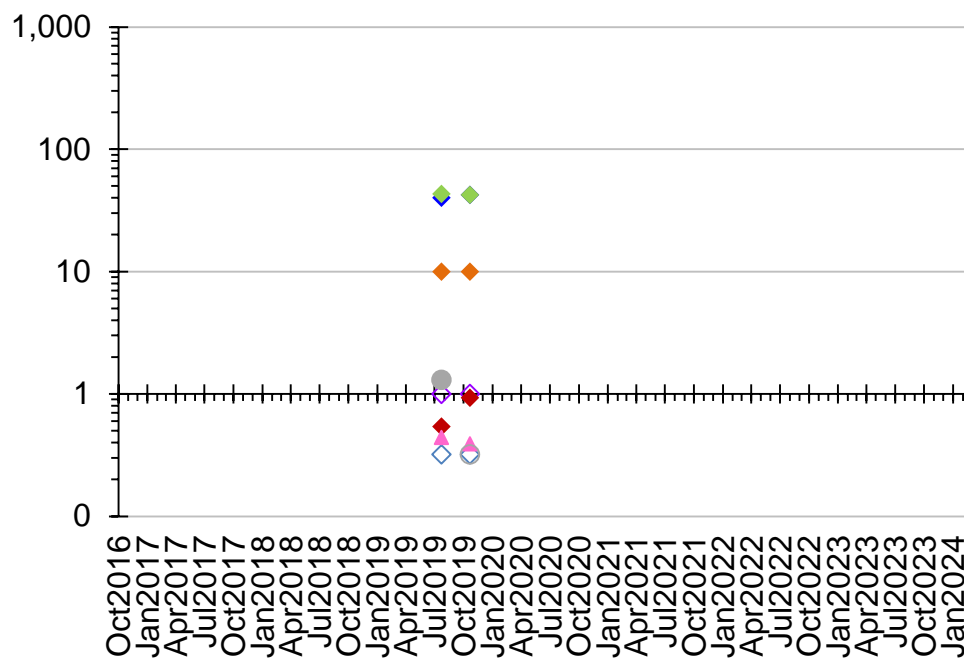
**RHMW11 Zone 4
NAPs**



**RHMW11 Zone 5
NAPs**



**RHMW11 Zone 7
NAPs**



- ◆ Methane (D)
- ◇ Methane (ND)
- ◆ Ferrous Iron (D)
- ◇ Ferrous Iron (ND)
- ◆ Sulfate (D)
- ◇ Sulfate (ND)
- ◆ Chloride (D)
- ◇ Chloride (ND)
- ◆ DO (D)
- ◇ DO (ND)
- ◆ Alkalinity, Total (D)
- ◇ Alkalinity, Total (ND)
- ▲ Nitrate-Nitrite (D)
- ◇ Nitrate-Nitrite (ND)
- TOC (D)
- TOC (ND)

- ◆ Methane (D)
- ◇ Methane (ND)
- ◆ Ferrous Iron (D)
- ◇ Ferrous Iron (ND)
- ◆ Sulfate (D)
- ◇ Sulfate (ND)
- ◆ Chloride (D)
- ◇ Chloride (ND)
- ◆ DO (D)
- ◇ DO (ND)
- ◆ Alkalinity, Total (D)
- ◇ Alkalinity, Total (ND)
- ▲ Nitrate-Nitrite (D)
- ◇ Nitrate-Nitrite (ND)
- TOC (D)
- TOC (ND)

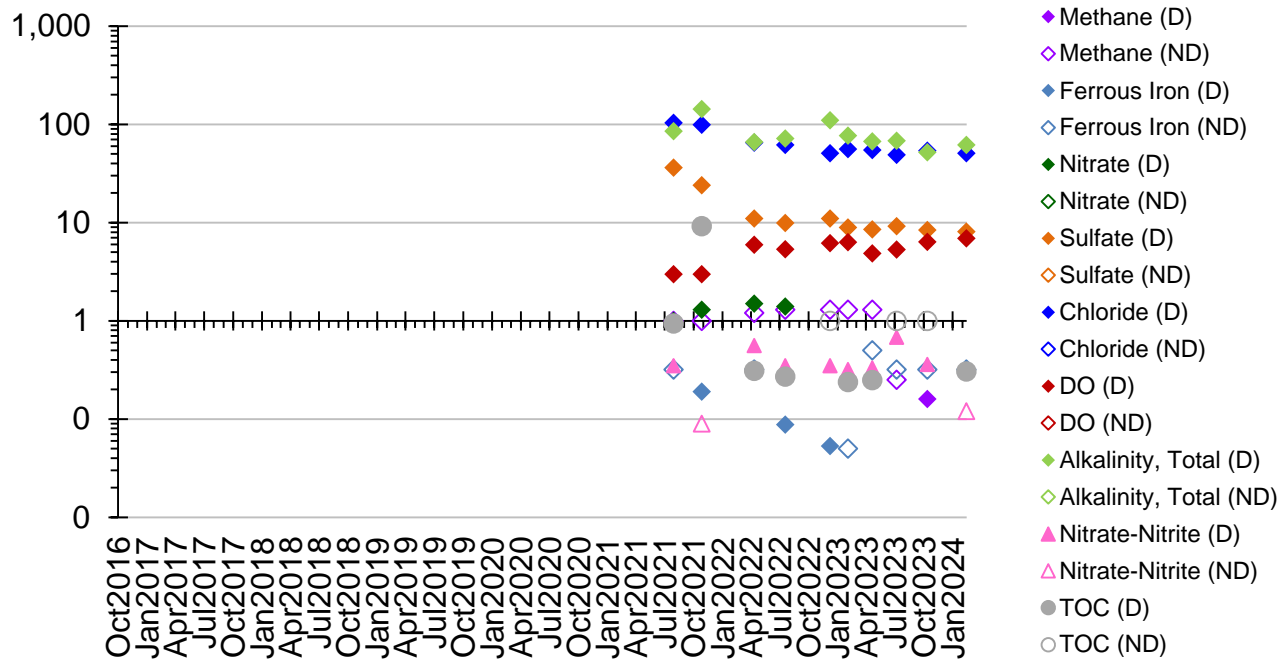
- ◆ Methane (D)
- ◇ Methane (ND)
- ◆ Ferrous Iron (D)
- ◇ Ferrous Iron (ND)
- ◆ Nitrate (D)
- ◇ Nitrate (ND)
- ◆ Sulfate (D)
- ◇ Sulfate (ND)
- ◆ Chloride (D)
- ◇ Chloride (ND)
- ◆ DO (D)
- ◇ DO (ND)
- ◆ Alkalinity, Total (D)
- ◇ Alkalinity, Total (ND)
- ▲ Nitrate-Nitrite (D)
- ◇ Nitrate-Nitrite (ND)
- TOC (D)
- TOC (ND)

- ◆ Methane (D)
- ◇ Methane (ND)
- ◆ Ferrous Iron (D)
- ◇ Ferrous Iron (ND)
- ◆ Sulfate (D)
- ◇ Sulfate (ND)
- ◆ Chloride (D)
- ◇ Chloride (ND)
- ◆ DO (D)
- ◇ DO (ND)
- ◆ Alkalinity, Total (D)
- ◇ Alkalinity, Total (ND)
- ▲ Nitrate-Nitrite (D)
- ◇ Nitrate-Nitrite (ND)
- TOC (D)
- TOC (ND)

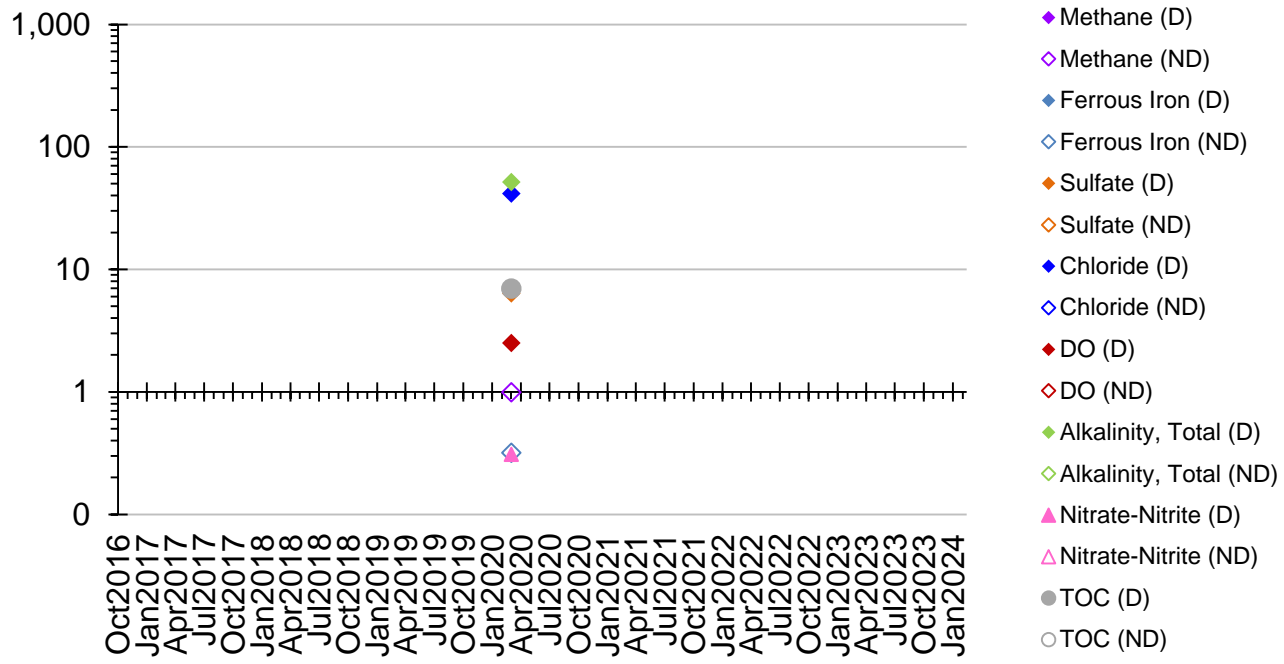
Methane results in micrograms per liter (µg/L or parts per billion).
All other results in milligrams per liter (mg/L or parts per million).

Appendix B.5.2: Cumulative Natural Attenuation Parameter Graphs (cont'd)

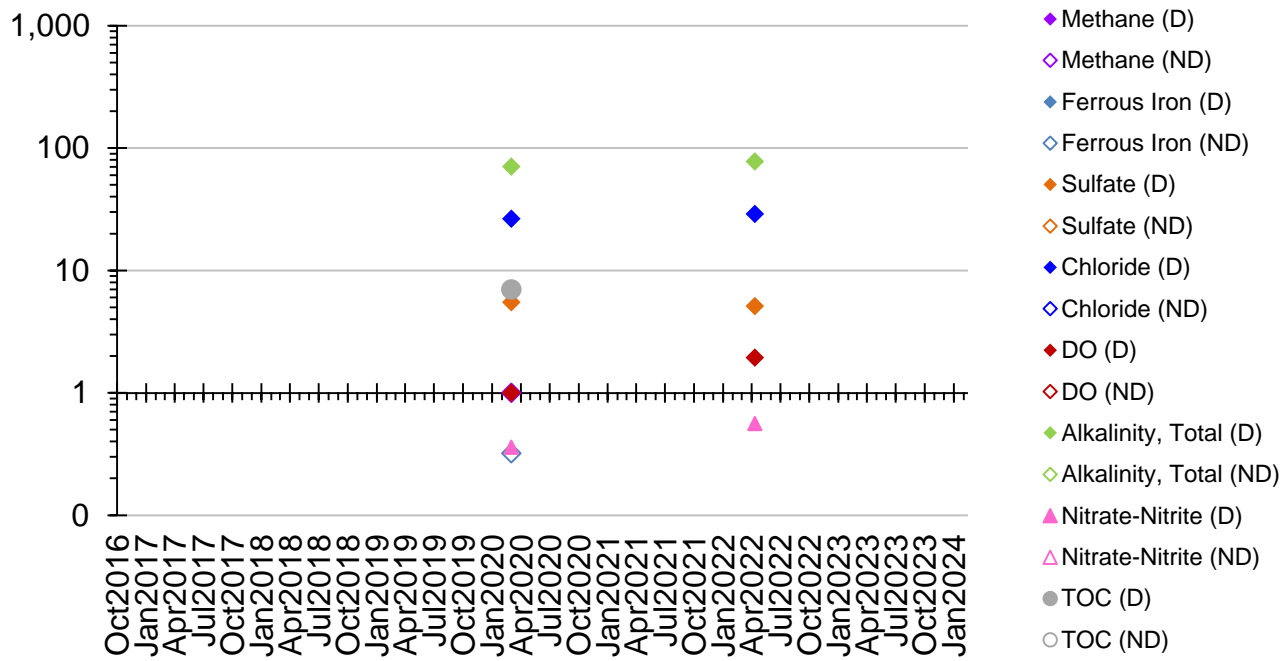
RHMW12A NAPs



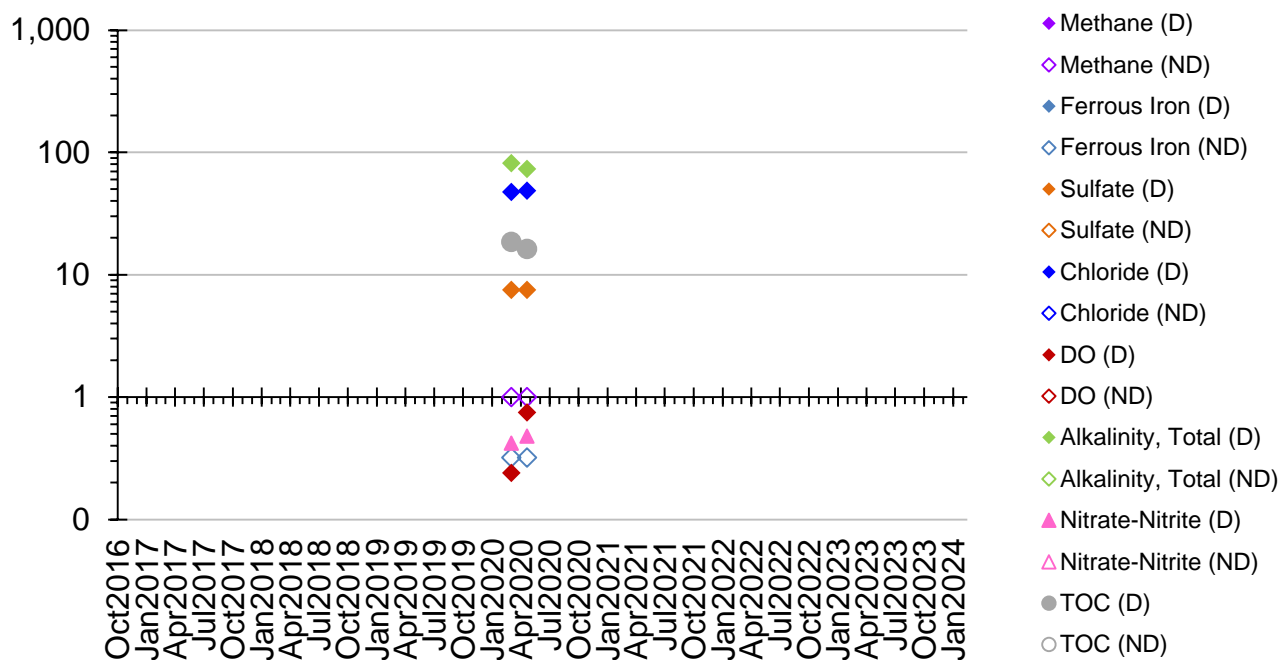
RHMW13 Zone 1 NAPs



RHMW13 Zone 2 NAPs



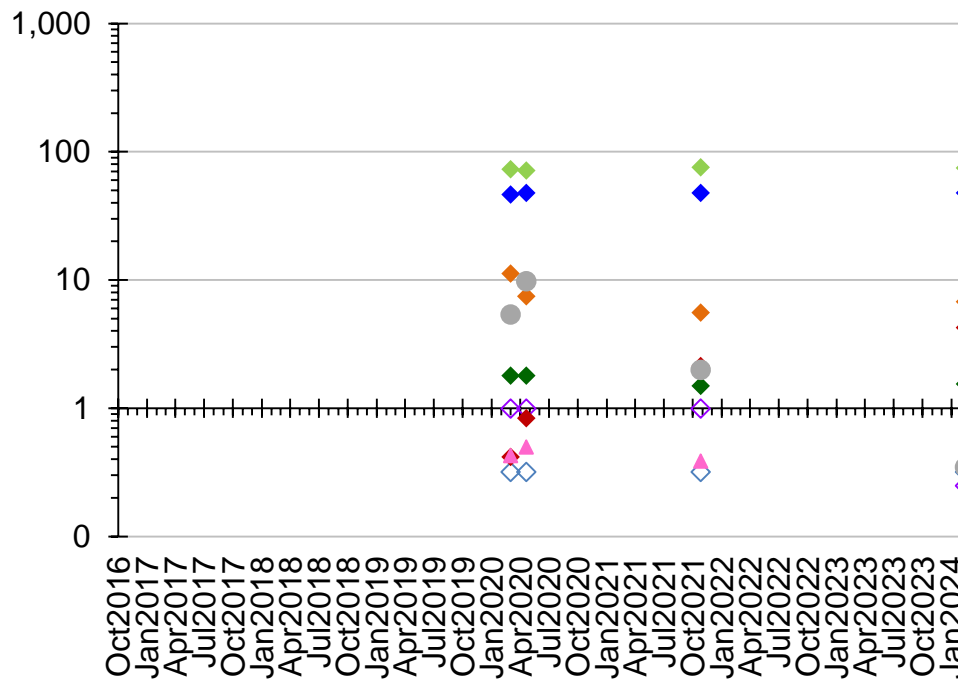
RHMW13 Zone 3 NAPs



Methane results in micrograms per liter (µg/L or parts per billion).
All other results in milligrams per liter (mg/L or parts per million).

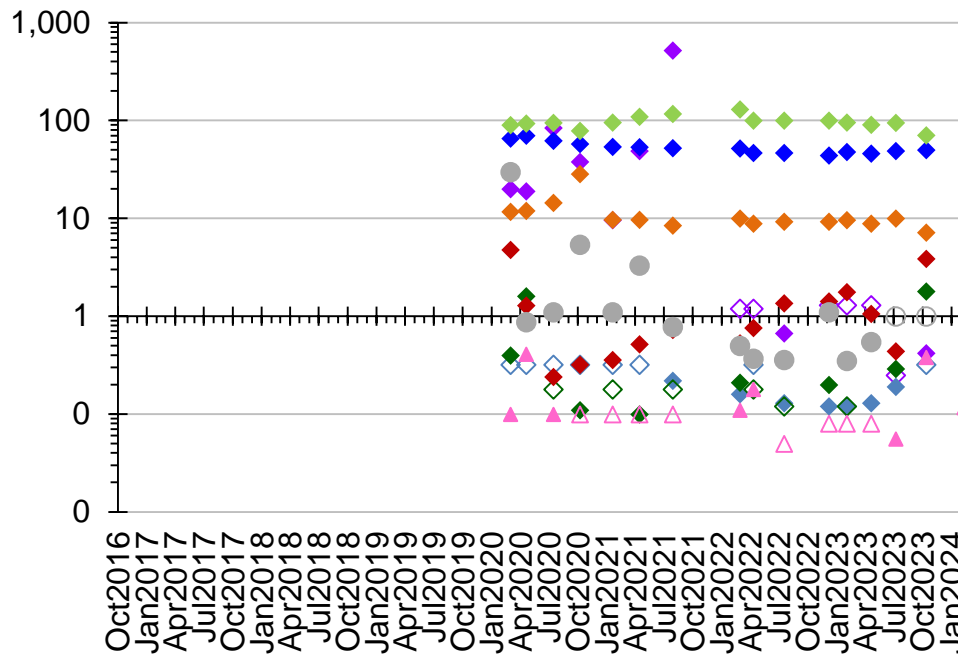
Appendix B.5.2: Cumulative Natural Attenuation Parameter Graphs (cont'd)

**RHMW13 Zone 4
NAPs**



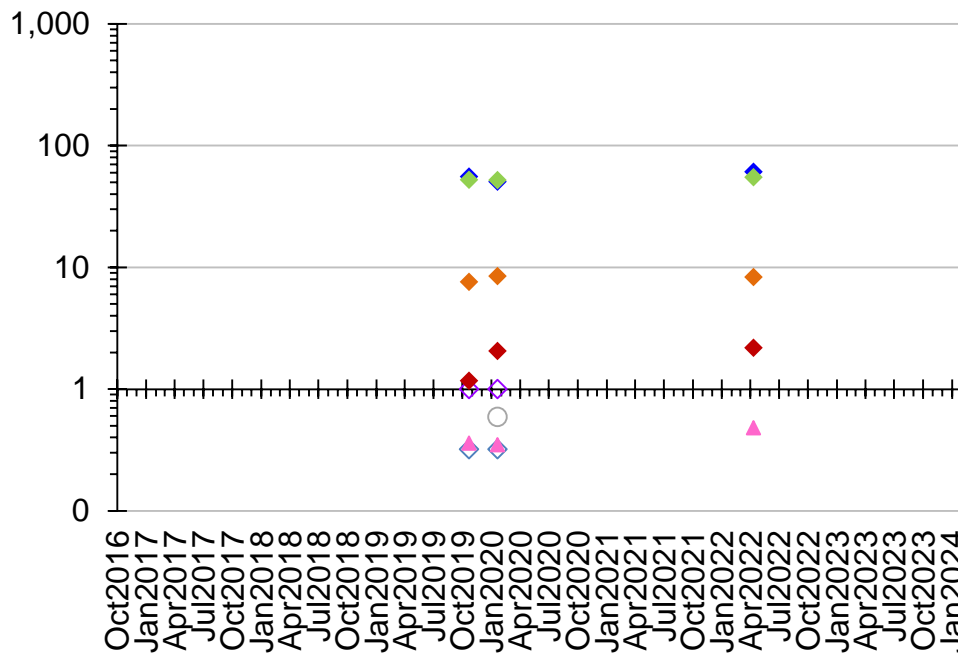
- ◆ Methane (D)
- ◇ Methane (ND)
- ◆ Ferrous Iron (D)
- ◇ Ferrous Iron (ND)
- ◆ Nitrate (D)
- ◇ Nitrate (ND)
- ◆ Sulfate (D)
- ◇ Sulfate (ND)
- ◆ Chloride (D)
- ◇ Chloride (ND)
- ◆ DO (D)
- ◇ DO (ND)
- ◆ Alkalinity, Total (D)
- ◇ Alkalinity, Total (ND)
- ◆ Nitrate-Nitrite (D)
- ◇ Nitrate-Nitrite (ND)
- TOC (D)
- TOC (ND)

**RHMW13 Zone 5
NAPs**



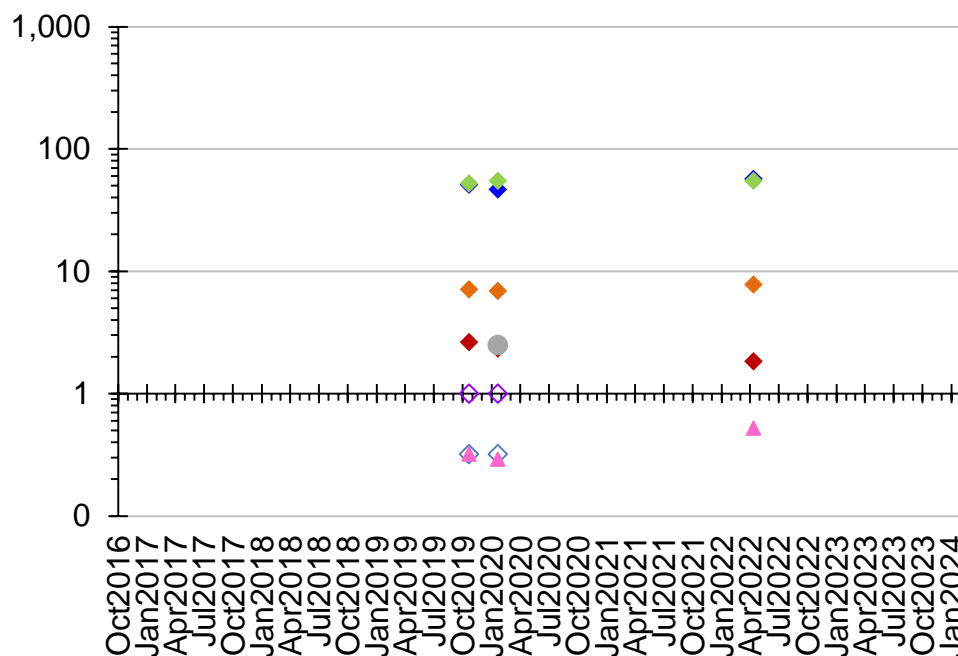
- ◆ Methane (D)
- ◇ Methane (ND)
- ◆ Ferrous Iron (D)
- ◇ Ferrous Iron (ND)
- ◆ Nitrate (D)
- ◇ Nitrate (ND)
- ◆ Sulfate (D)
- ◇ Sulfate (ND)
- ◆ Chloride (D)
- ◇ Chloride (ND)
- ◆ DO (D)
- ◇ DO (ND)
- ◆ Alkalinity, Total (D)
- ◇ Alkalinity, Total (ND)
- ◆ Nitrate-Nitrite (D)
- ◇ Nitrate-Nitrite (ND)
- TOC (D)
- TOC (ND)

**RHMW14 Zone 1
NAPs**



- ◆ Methane (D)
- ◇ Methane (ND)
- ◆ Ferrous Iron (D)
- ◇ Ferrous Iron (ND)
- ◆ Sulfate (D)
- ◇ Sulfate (ND)
- ◆ Chloride (D)
- ◇ Chloride (ND)
- ◆ DO (D)
- ◇ DO (ND)
- ◆ Alkalinity, Total (D)
- ◇ Alkalinity, Total (ND)
- ◆ Nitrate-Nitrite (D)
- ◇ Nitrate-Nitrite (ND)
- TOC (D)
- TOC (ND)

**RHMW14 Zone 2
NAPs**

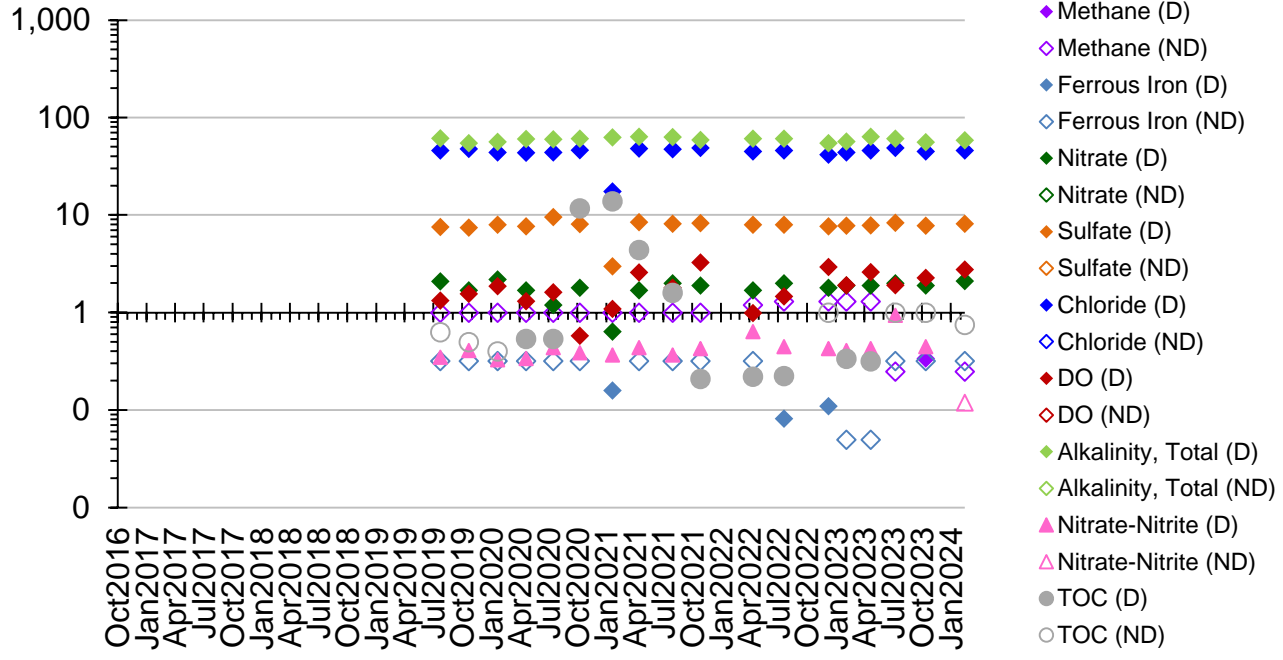


- ◆ Methane (D)
- ◇ Methane (ND)
- ◆ Ferrous Iron (D)
- ◇ Ferrous Iron (ND)
- ◆ Sulfate (D)
- ◇ Sulfate (ND)
- ◆ Chloride (D)
- ◇ Chloride (ND)
- ◆ DO (D)
- ◇ DO (ND)
- ◆ Alkalinity, Total (D)
- ◇ Alkalinity, Total (ND)
- ◆ Nitrate-Nitrite (D)
- ◇ Nitrate-Nitrite (ND)
- TOC (D)
- TOC (ND)

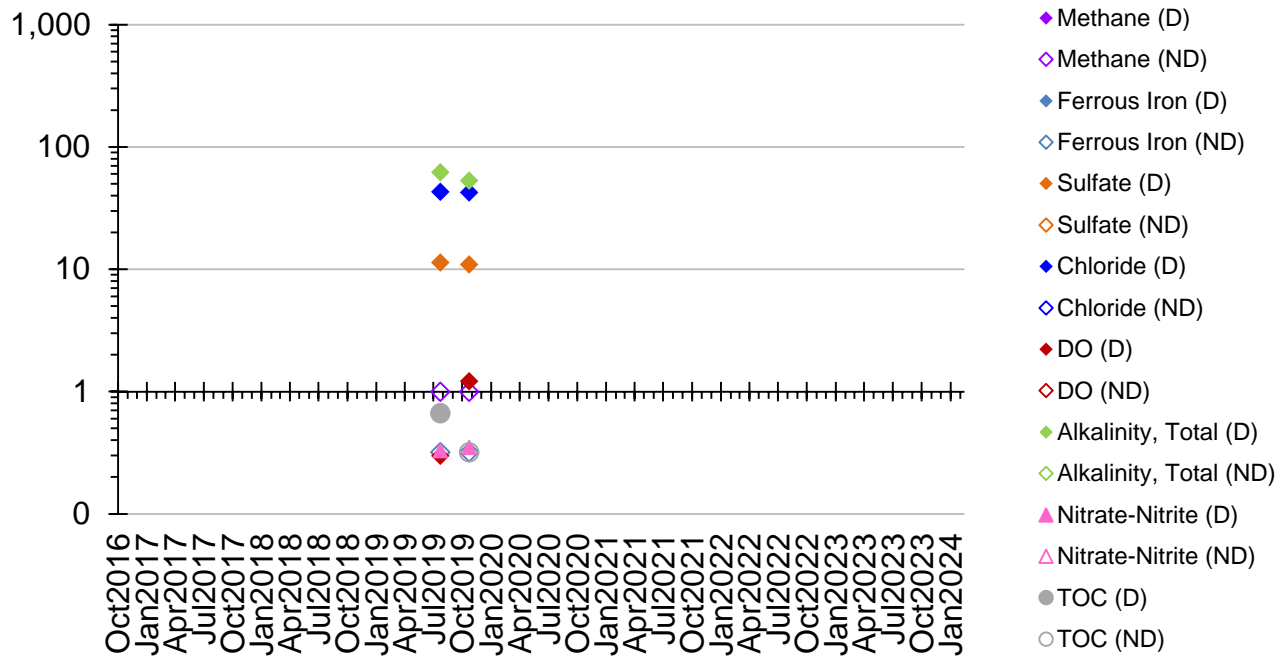
Methane results in micrograms per liter (µg/L or parts per billion).
All other results in milligrams per liter (mg/L or parts per million).

Appendix B.5.2: Cumulative Natural Attenuation Parameter Graphs (cont'd)

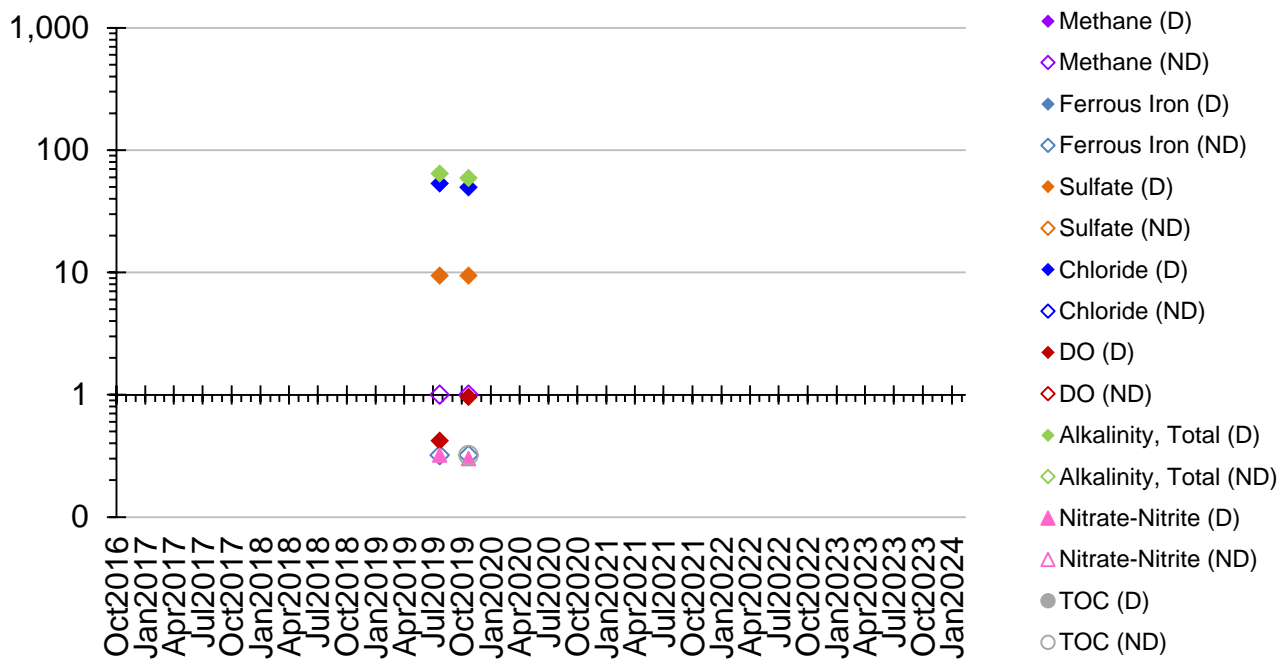
RHMW14 Zone 3
NAPs



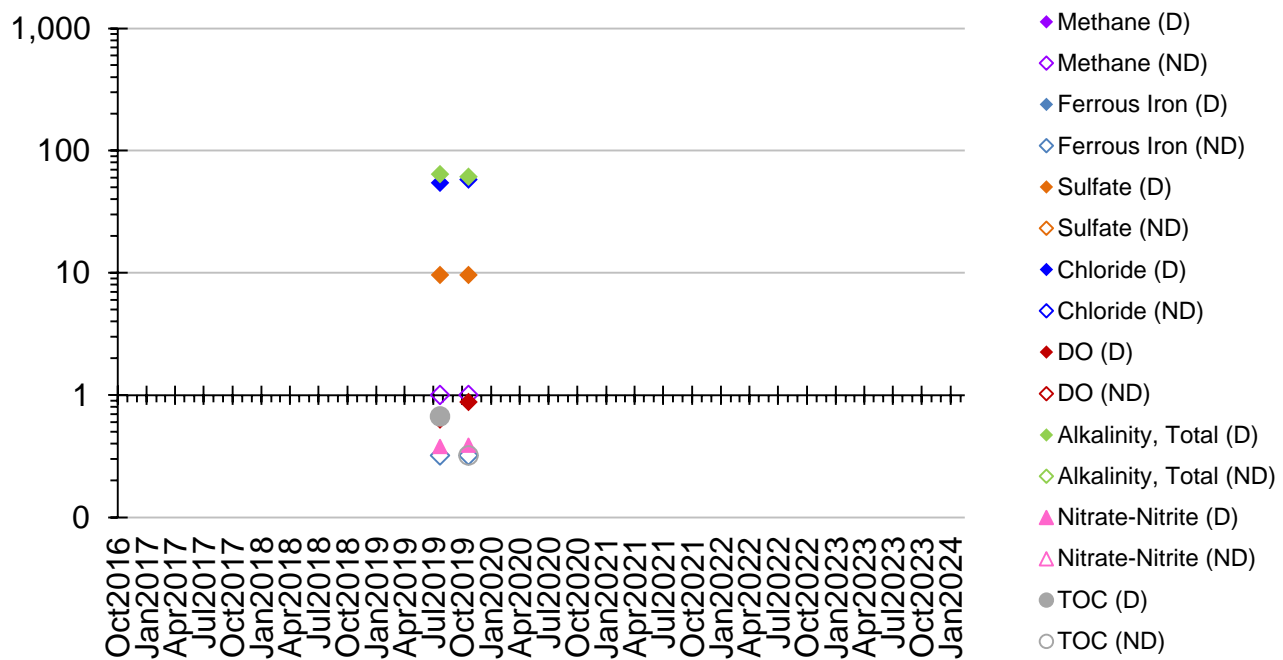
RHMW14 Zone 4
NAPs



RHMW14 Zone 5
NAPs



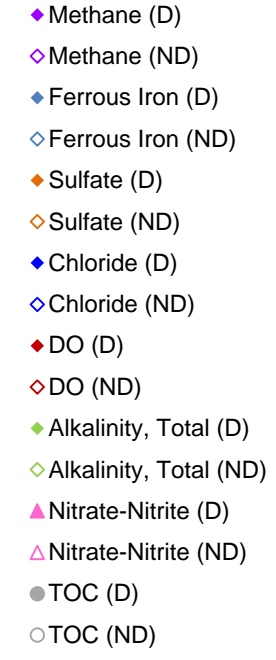
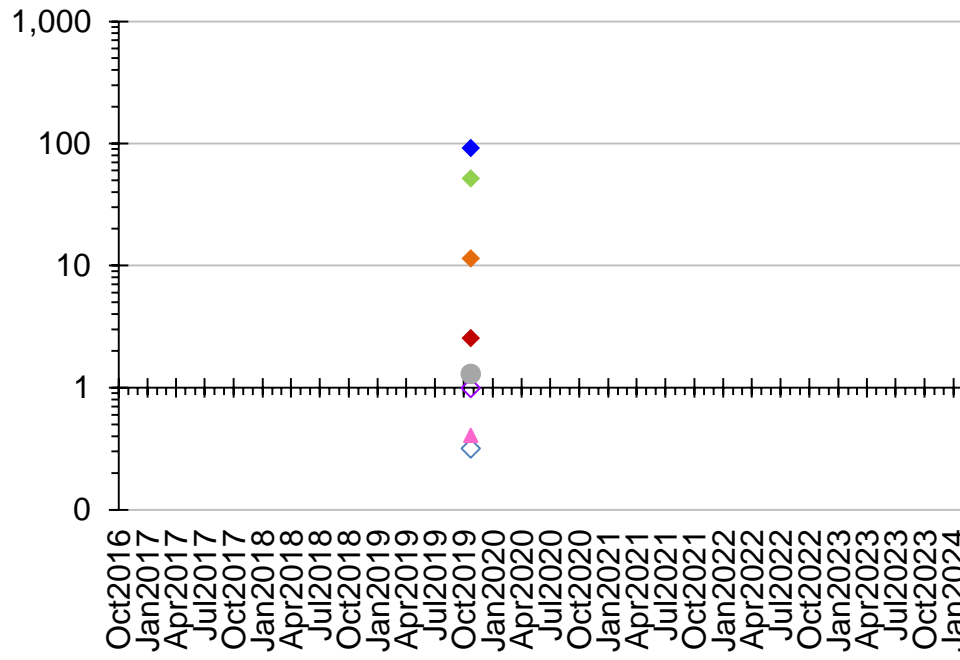
RHMW14 Zone 7
NAPs



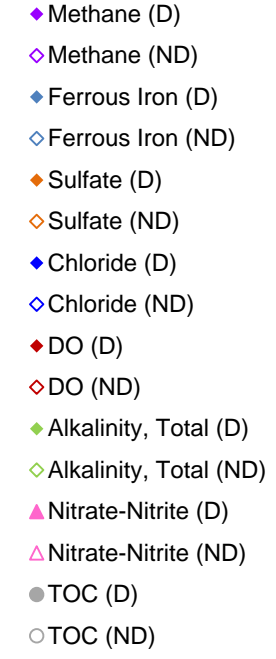
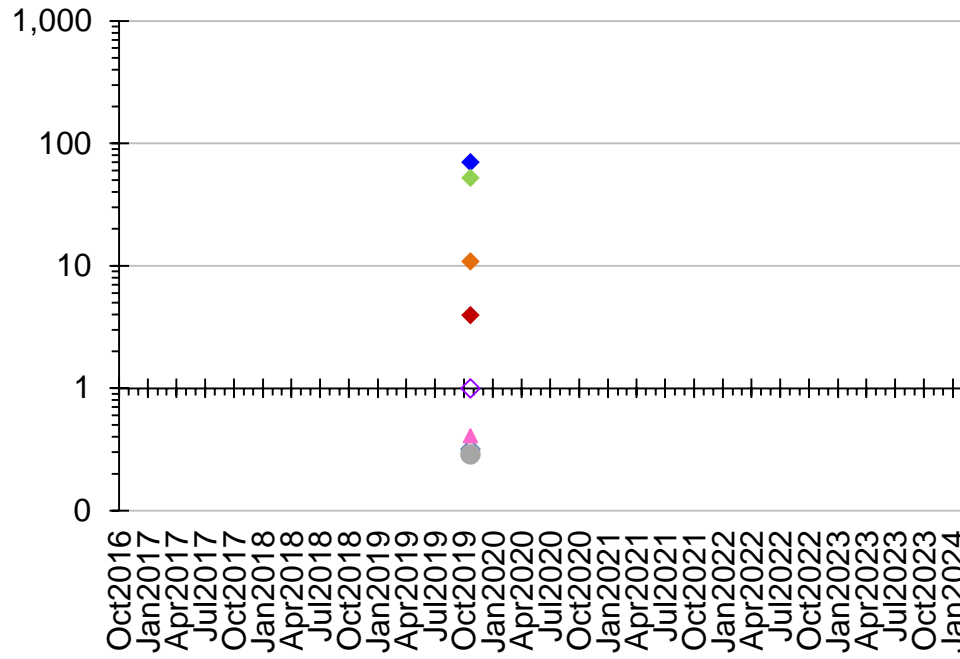
Methane results in micrograms per liter (µg/L or parts per billion).
All other results in milligrams per liter (mg/L or parts per million).

Appendix B.5.2: Cumulative Natural Attenuation Parameter Graphs (cont'd)

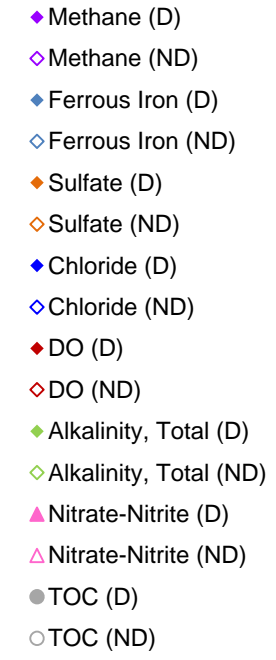
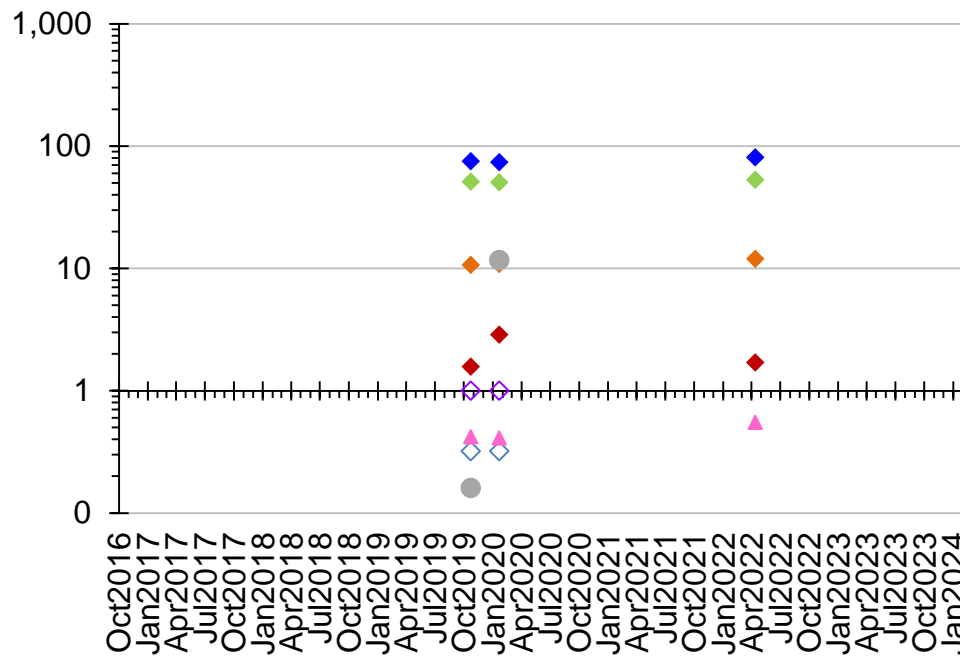
**RHMW15 Zone 1
NAPs**



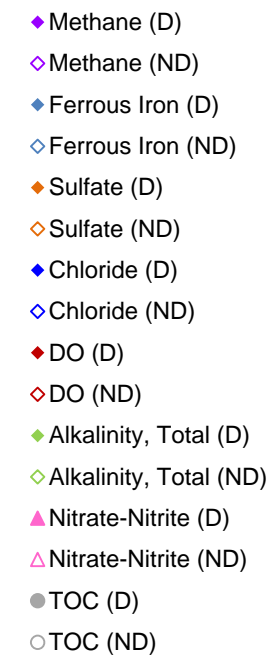
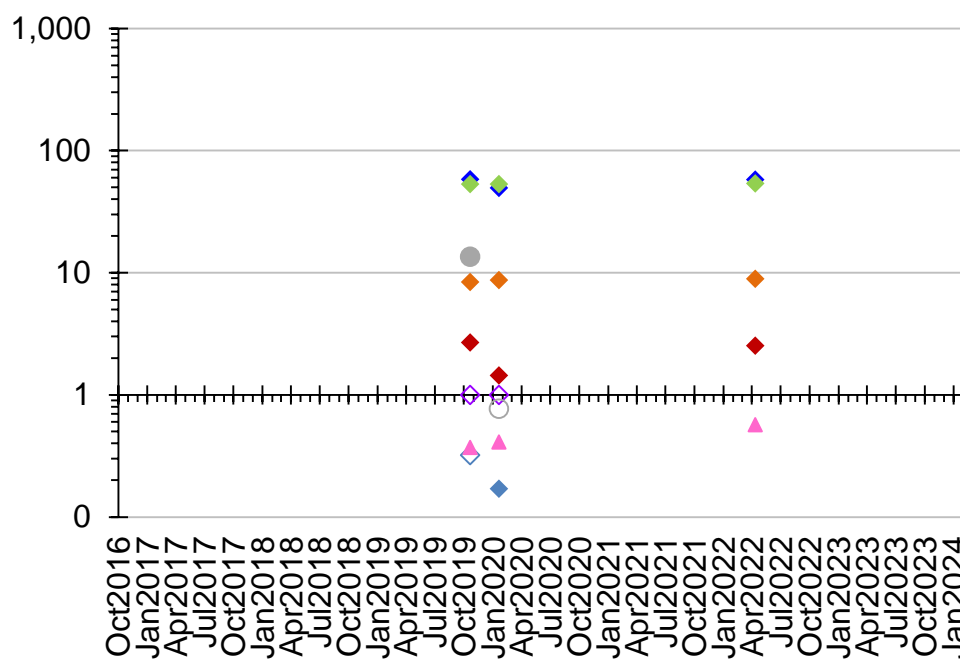
**RHMW15 Zone 2
NAPs**



**RHMW15 Zone 3
NAPs**



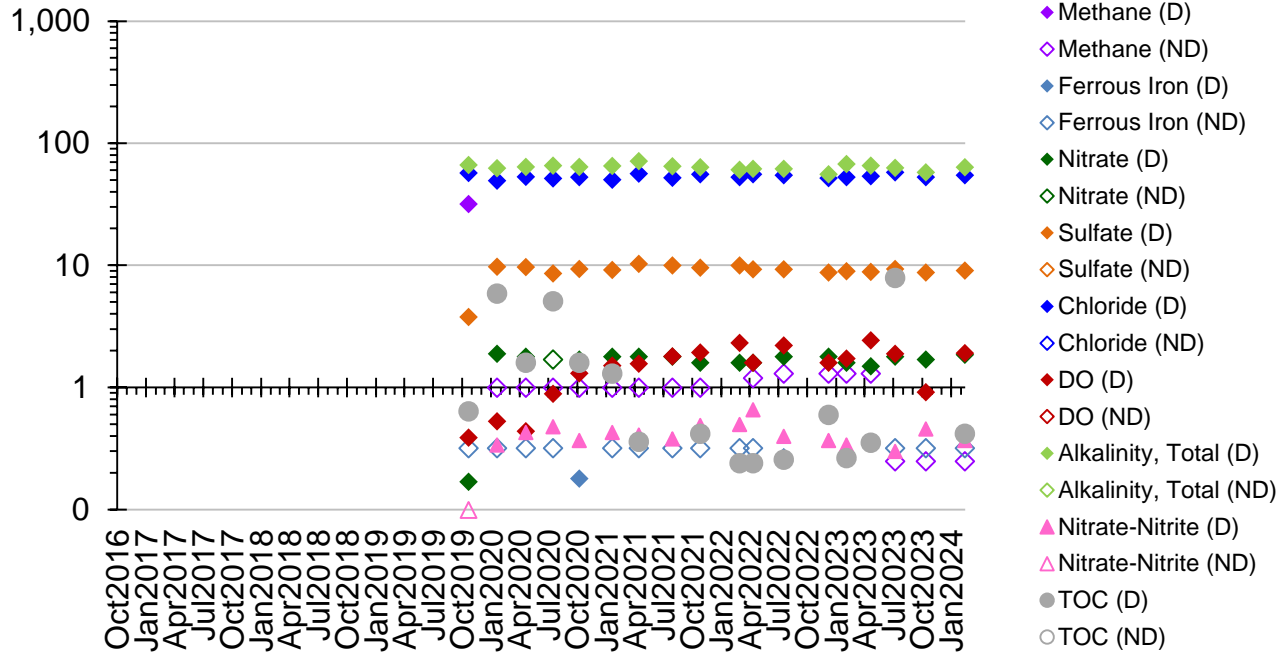
**RHMW15 Zone 4
NAPs**



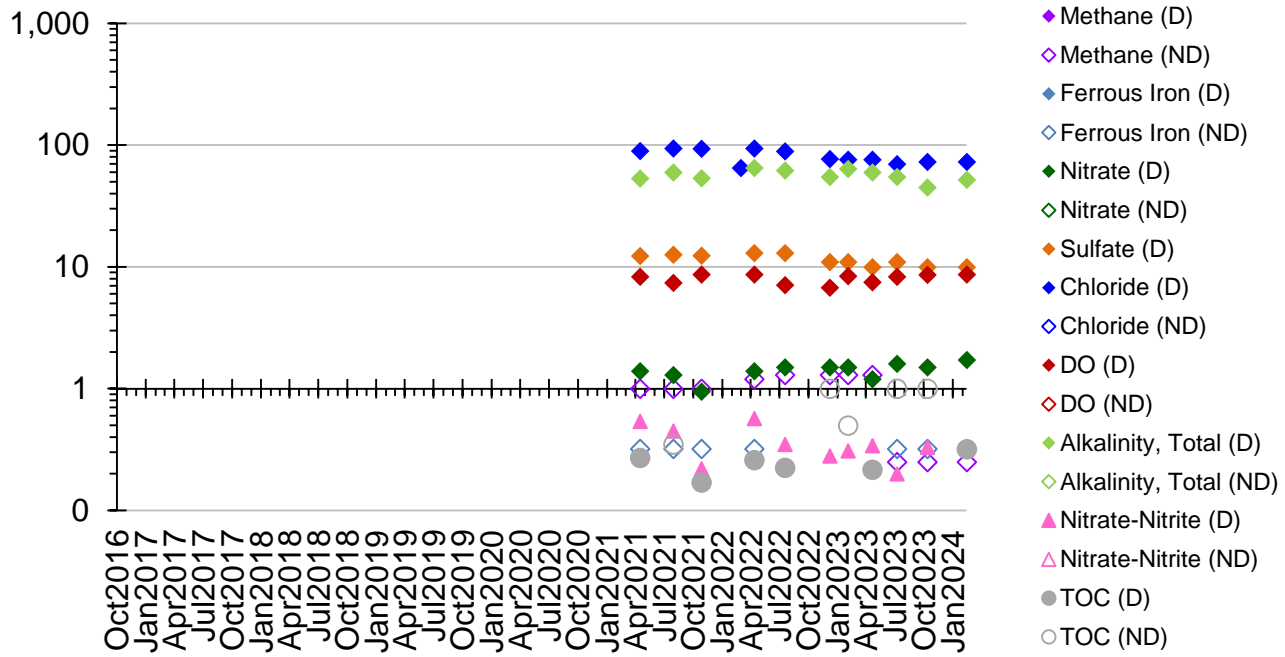
Methane results in micrograms per liter (µg/L or parts per billion).
All other results in milligrams per liter (mg/L or parts per million).

Appendix B.5.2: Cumulative Natural Attenuation Parameter Graphs (cont'd)

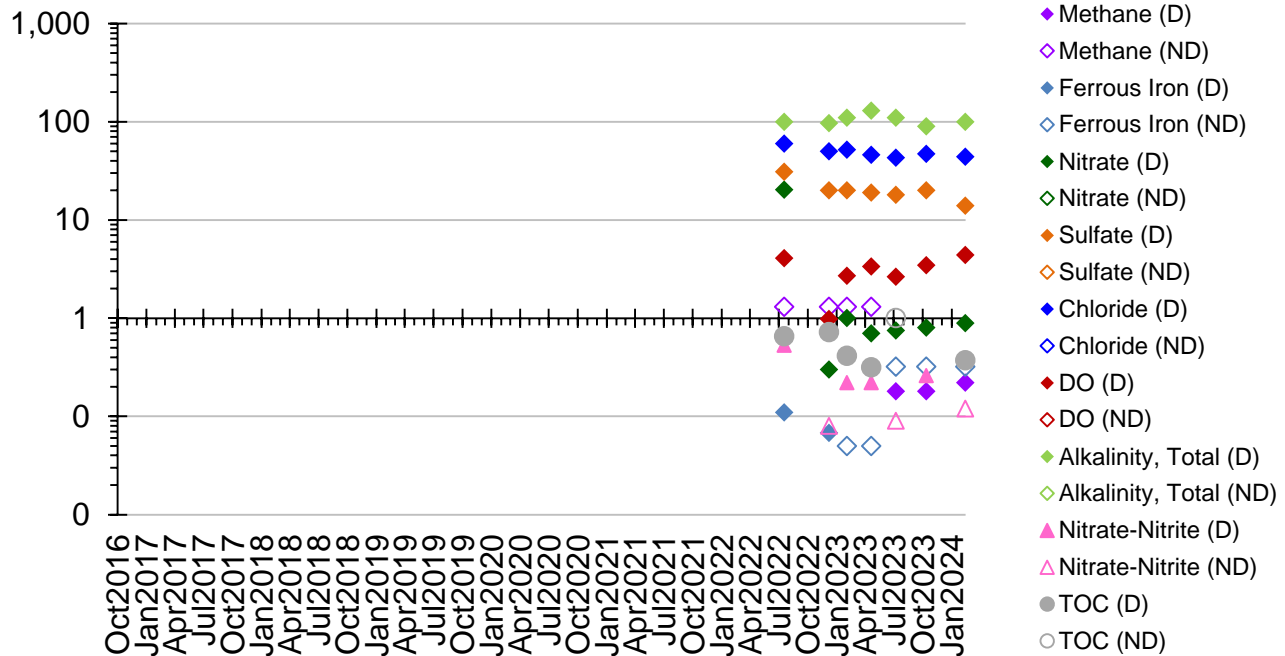
RHMW15 Zone 5 NAPs



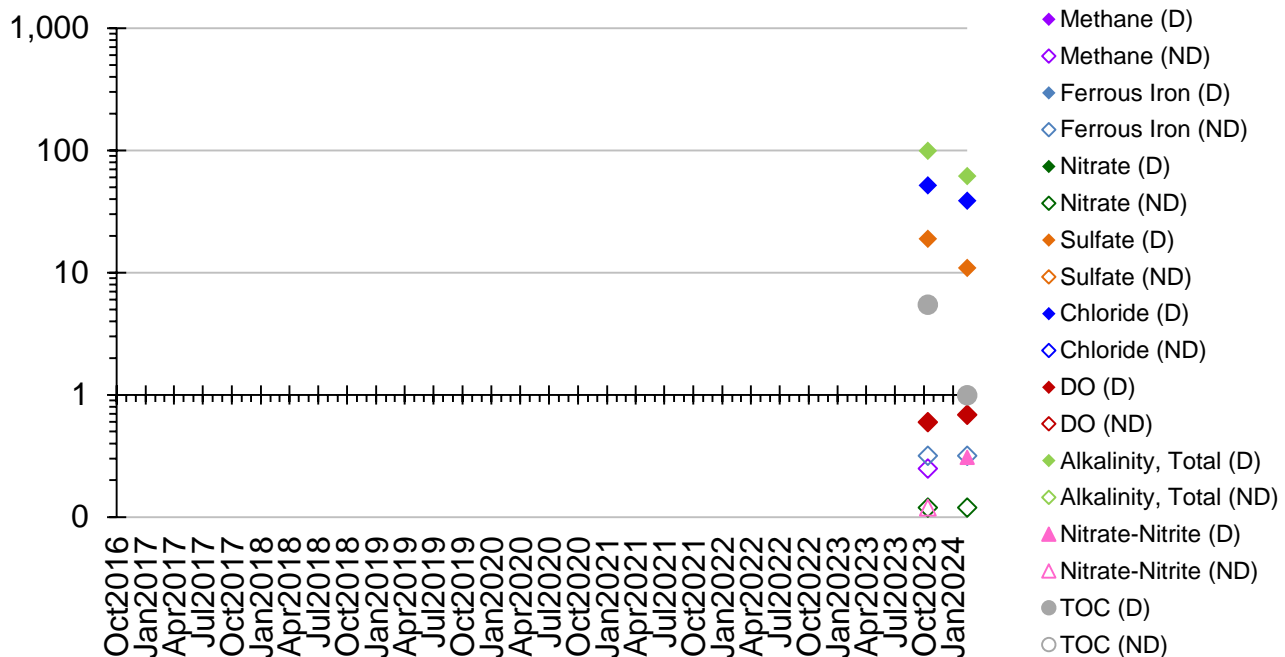
RHMW16 NAPs



RHMW17 NAPs



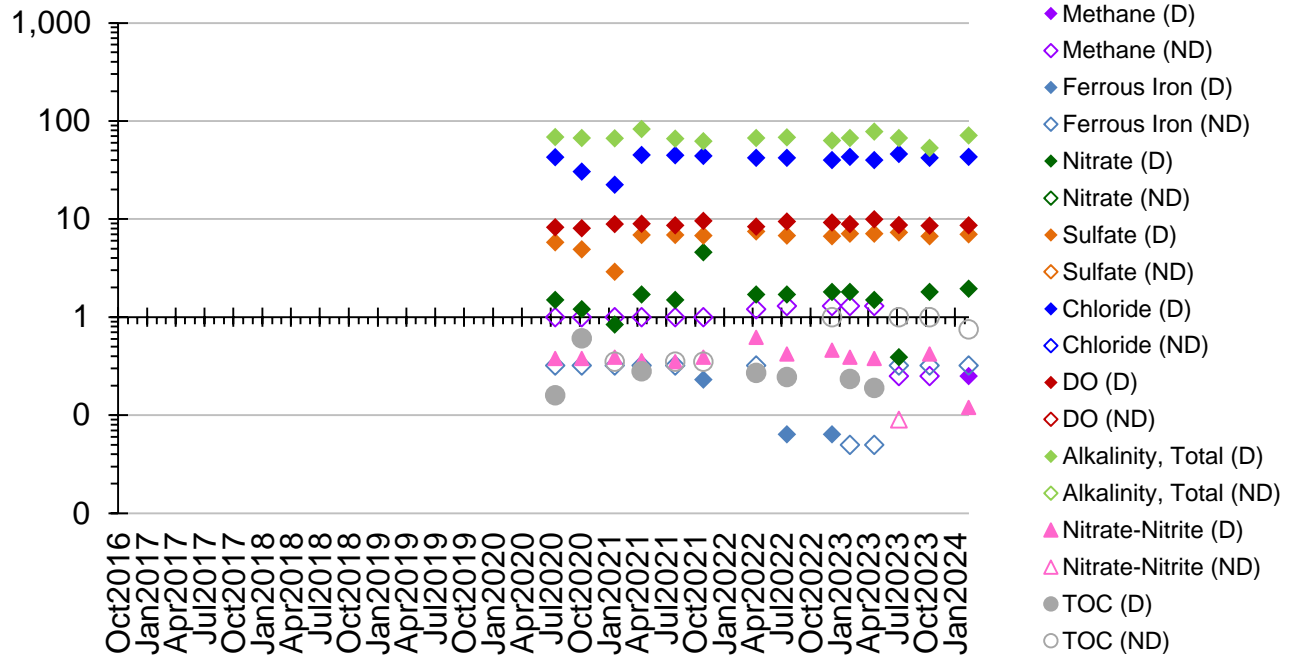
RHMW18 NAPs



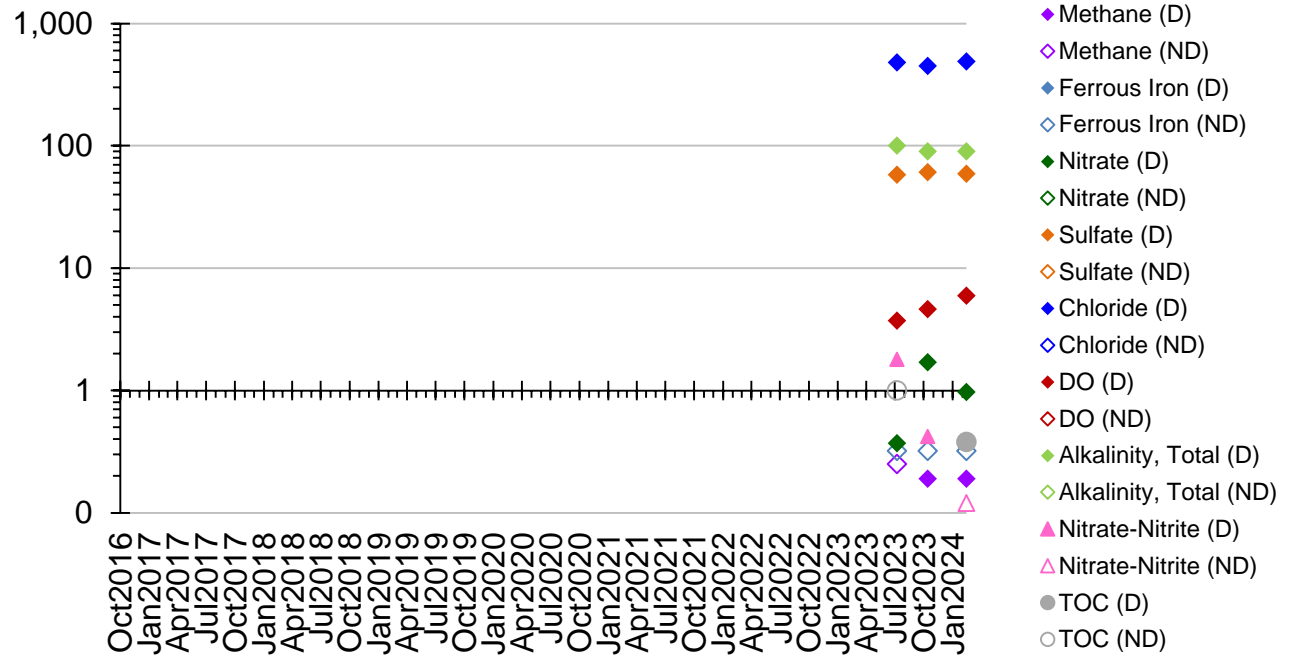
Methane results in micrograms per liter (µg/L or parts per billion).
All other results in milligrams per liter (mg/L or parts per million).

Appendix B.5.2: Cumulative Natural Attenuation Parameter Graphs (cont'd)

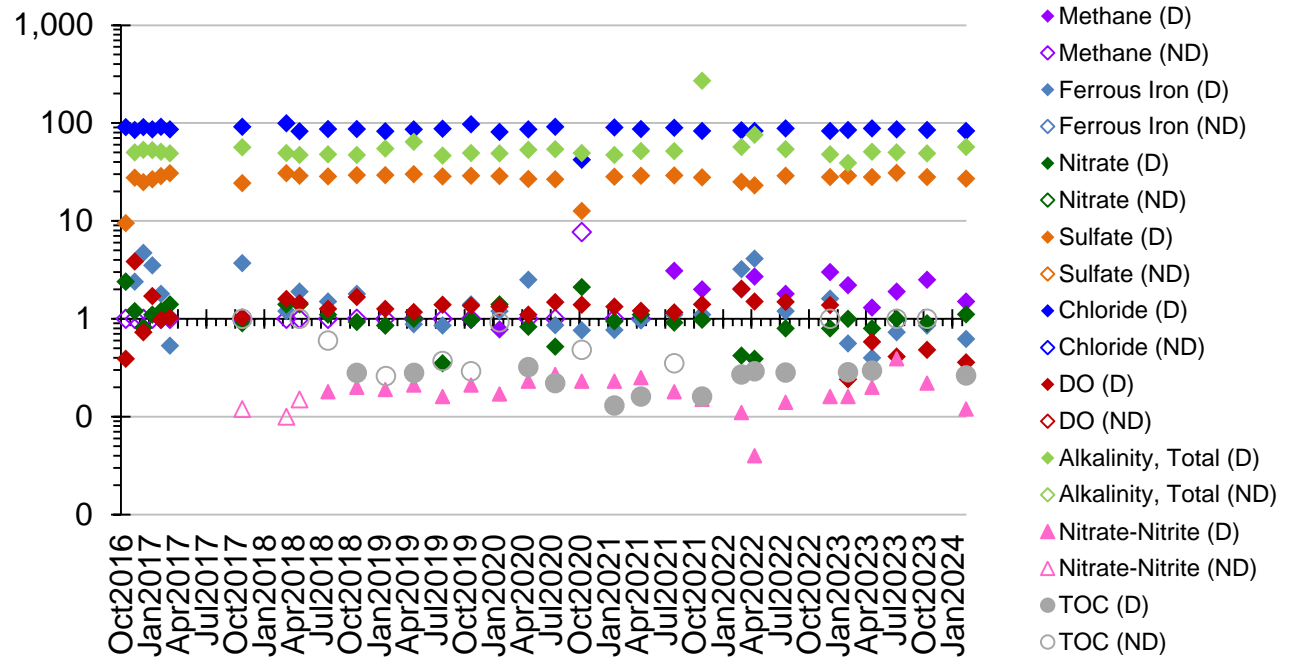
RHMW19 NAPs



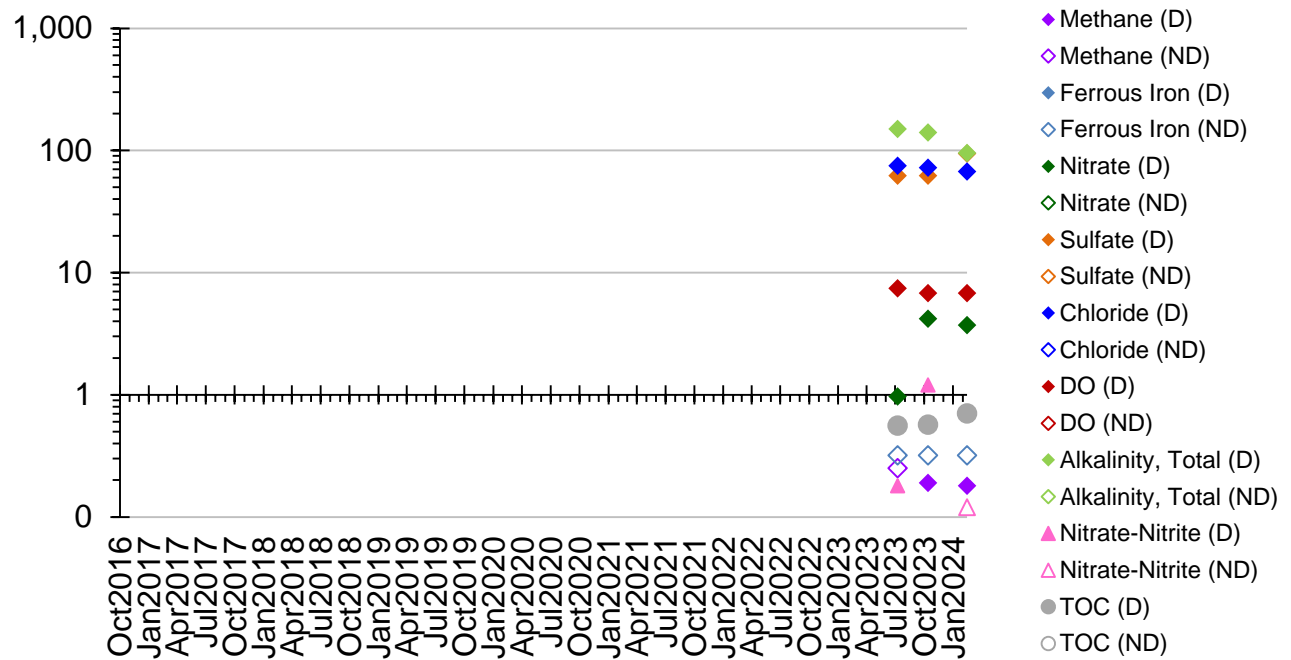
RHMW20 NAPs



HDMW2253-03 NAPs



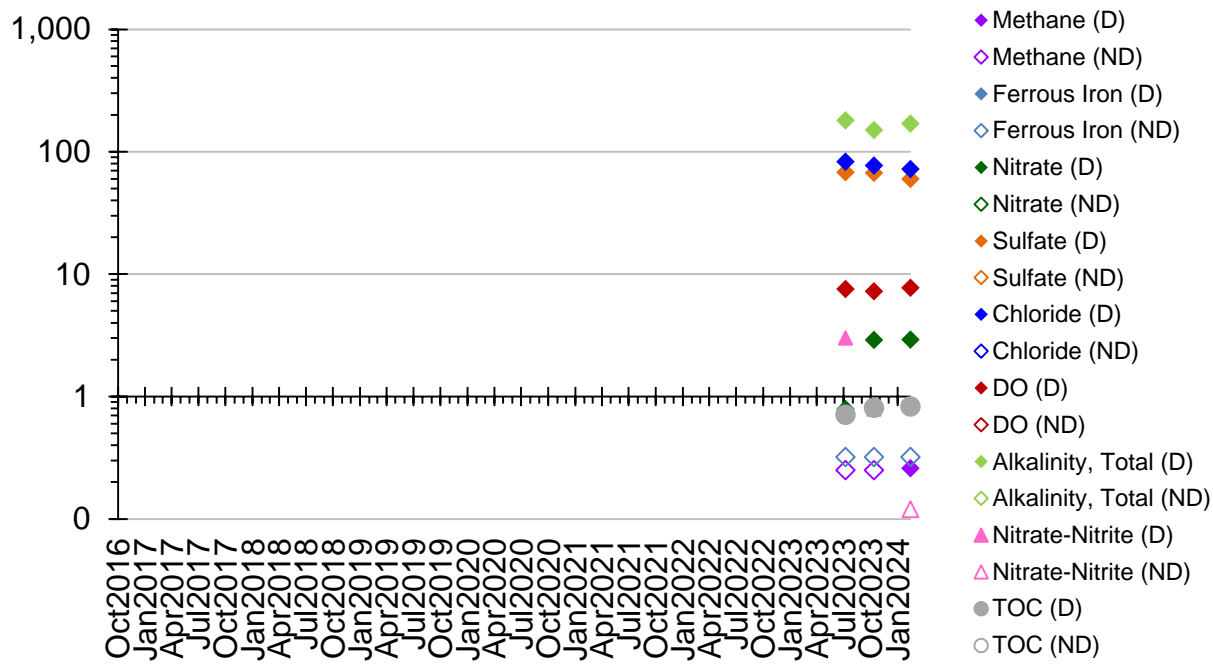
RHP01 NAPs



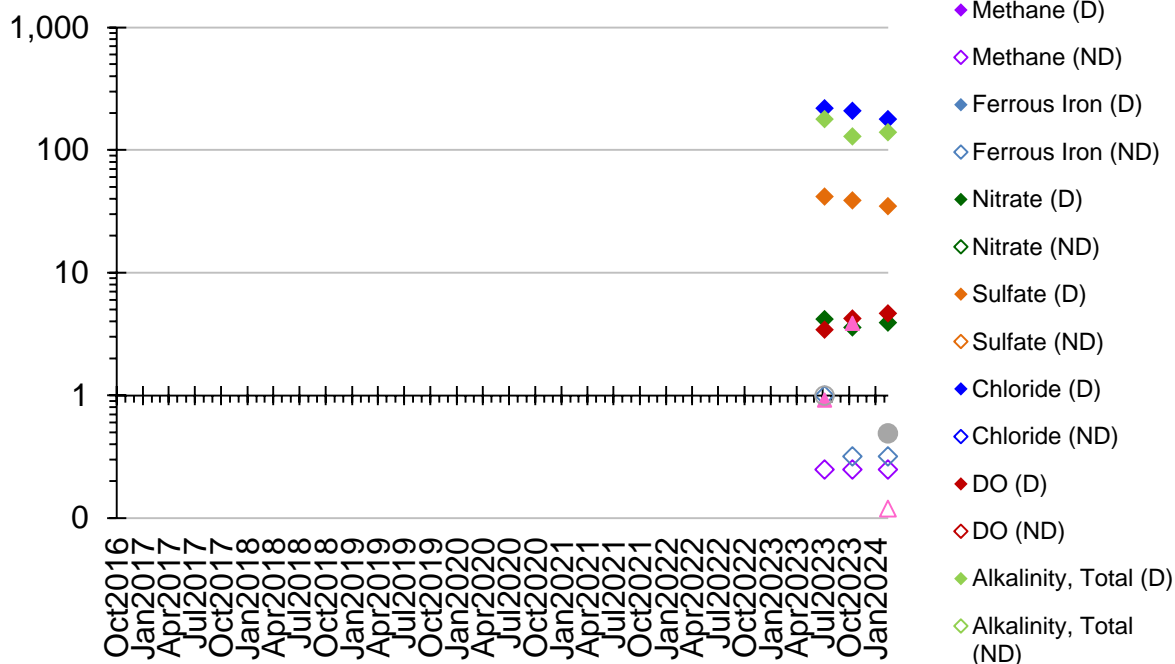
Methane results in micrograms per liter (µg/L or parts per billion).
All other results in milligrams per liter (mg/L or parts per million).

Appendix B.5.2: Cumulative Natural Attenuation Parameter Graphs (cont'd)

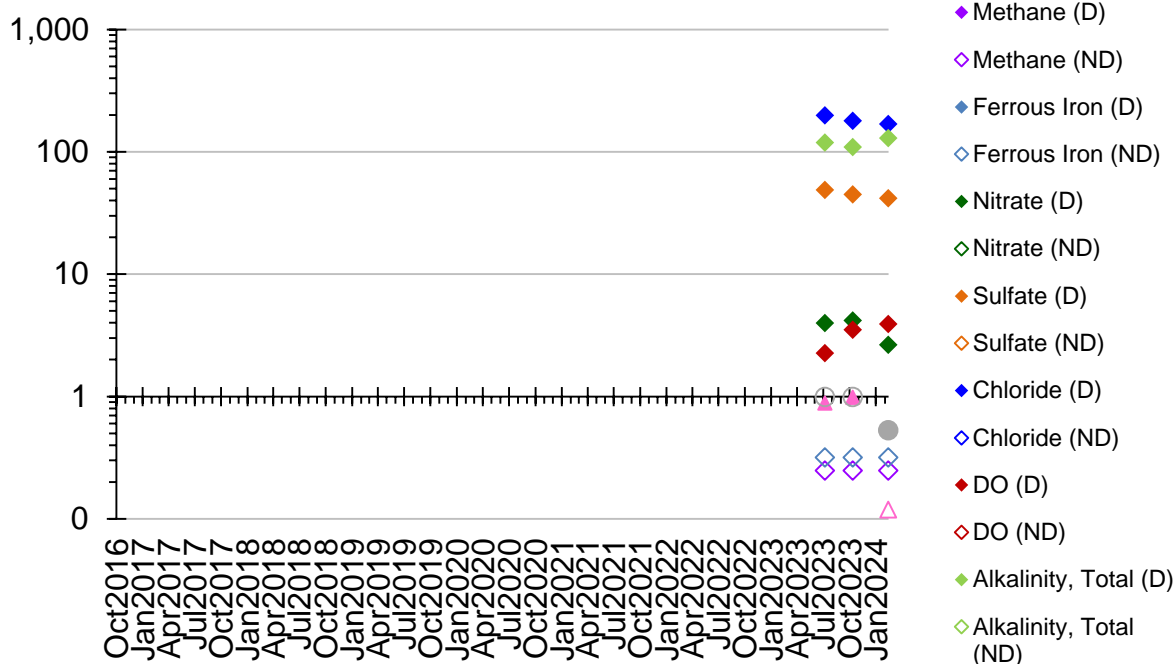
RHP02 NAPs



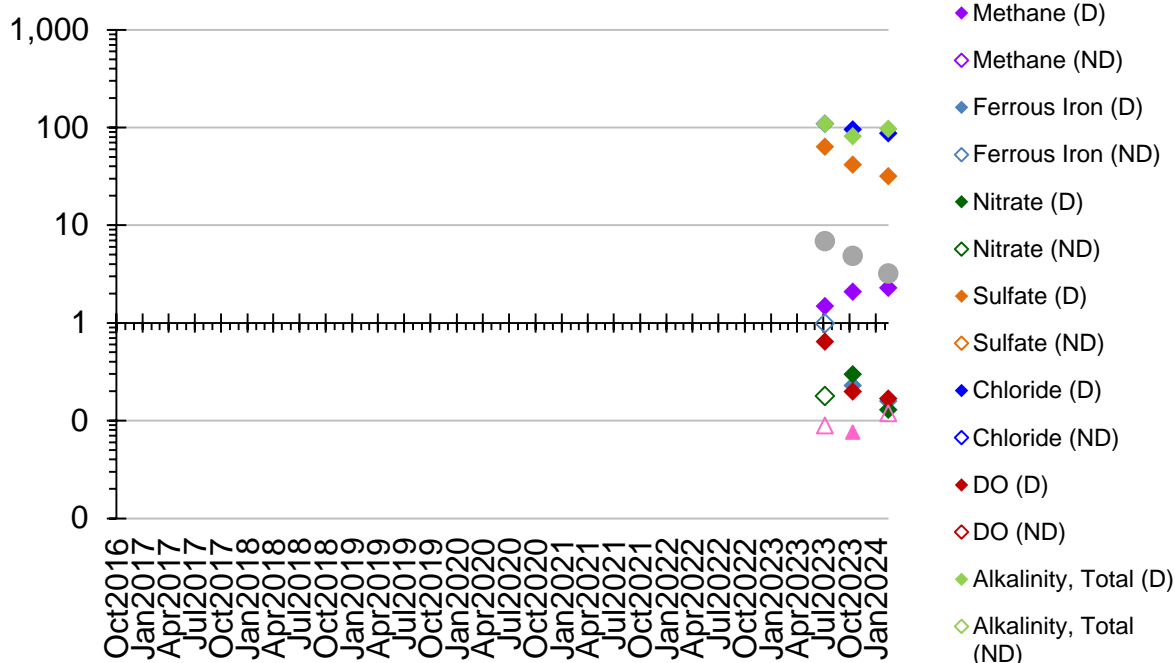
RHP03 NAPs



RHP04A NAPs



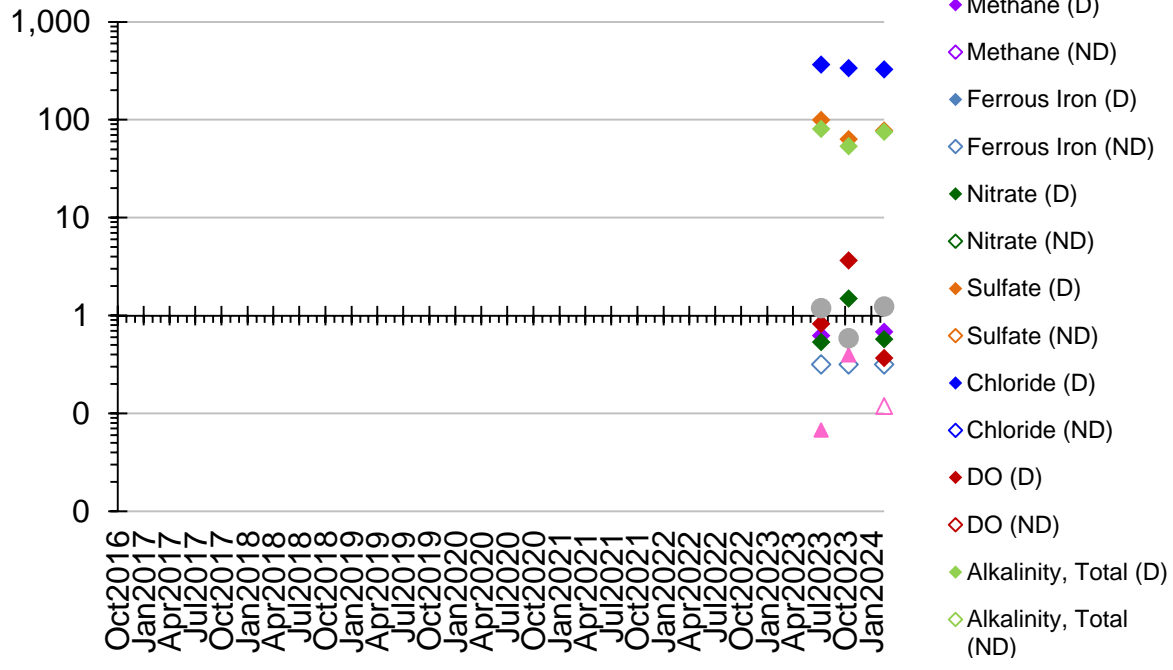
RHP04B NAPs



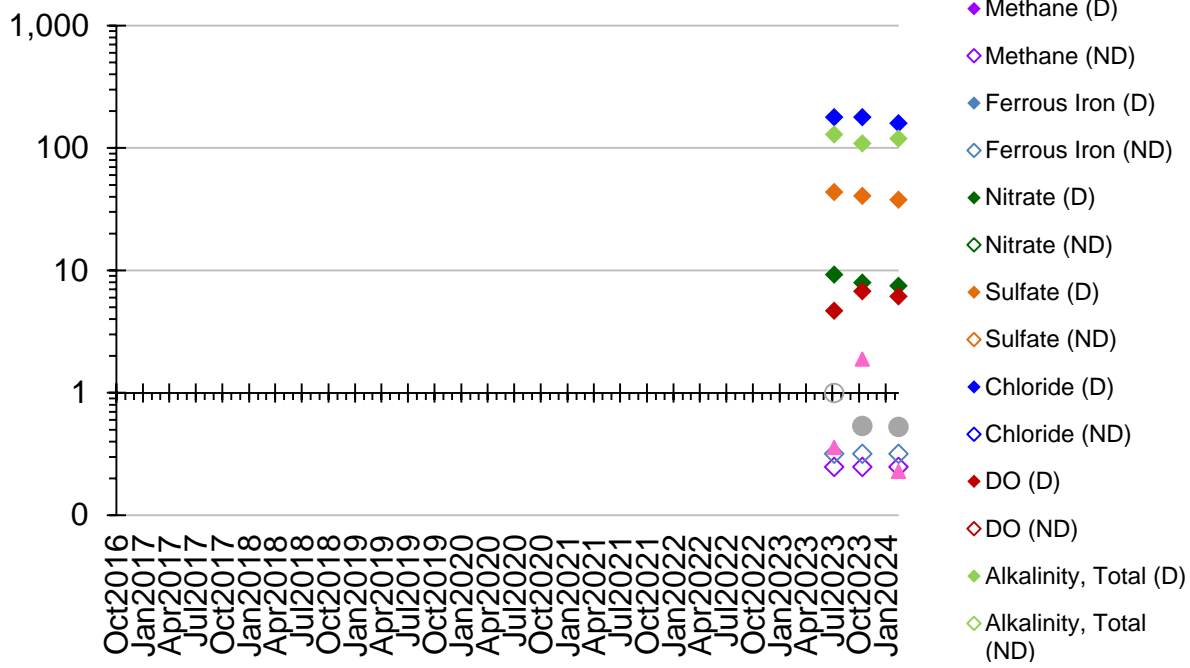
Methane results in micrograms per liter (µg/L or parts per billion).
All other results in milligrams per liter (mg/L or parts per million).

Appendix B.5.2: Cumulative Natural Attenuation Parameter Graphs (cont'd)

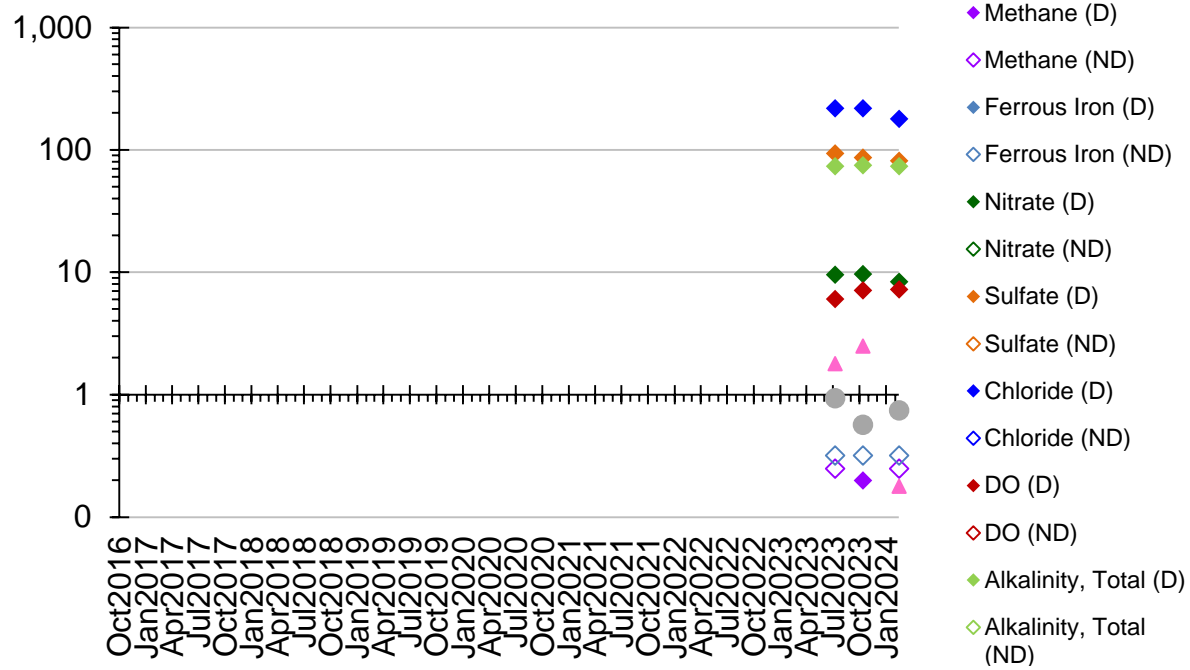
RHP04C NAPs



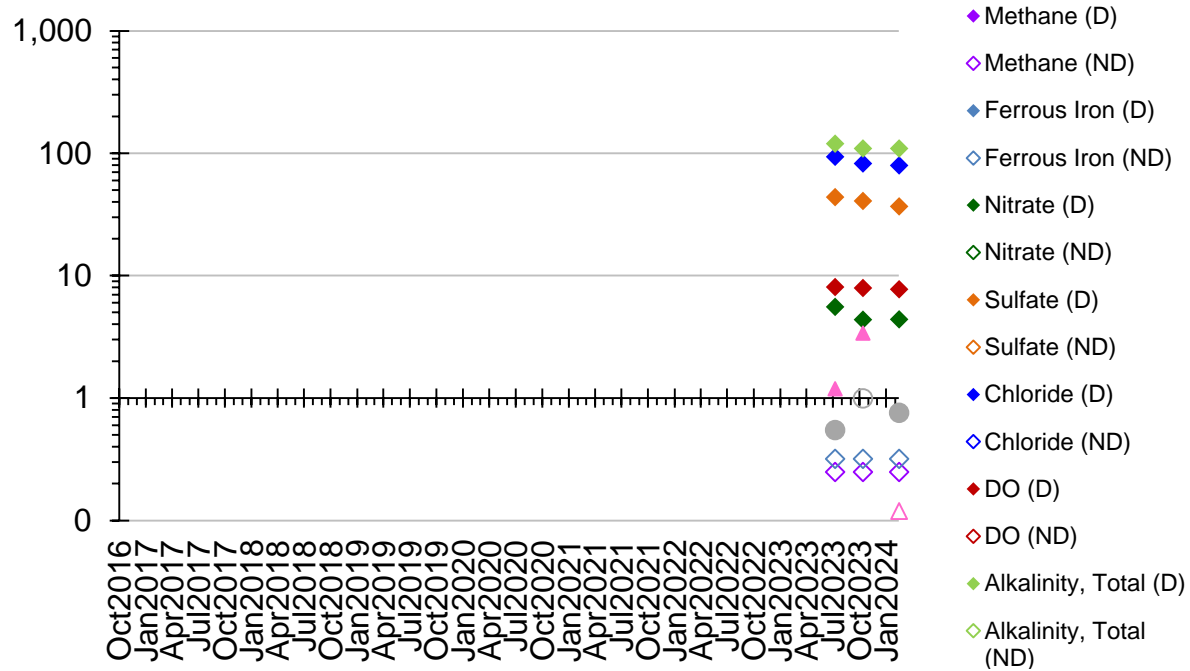
RHP05 NAPs



RHP06 NAPs



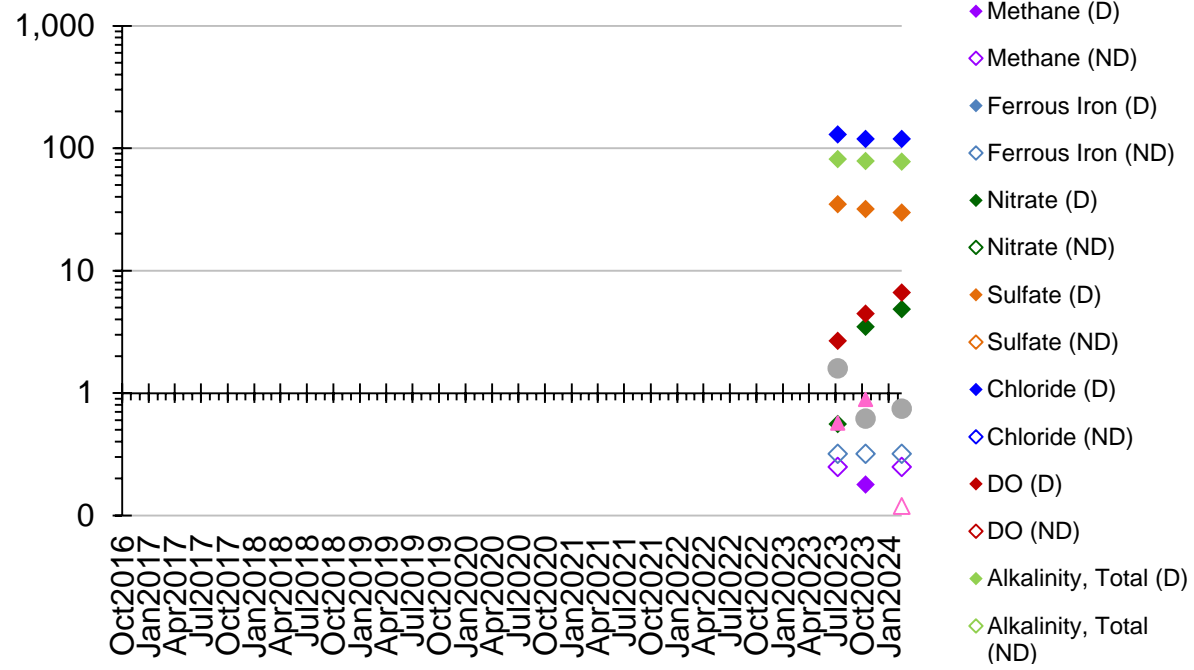
RHP07 NAPs



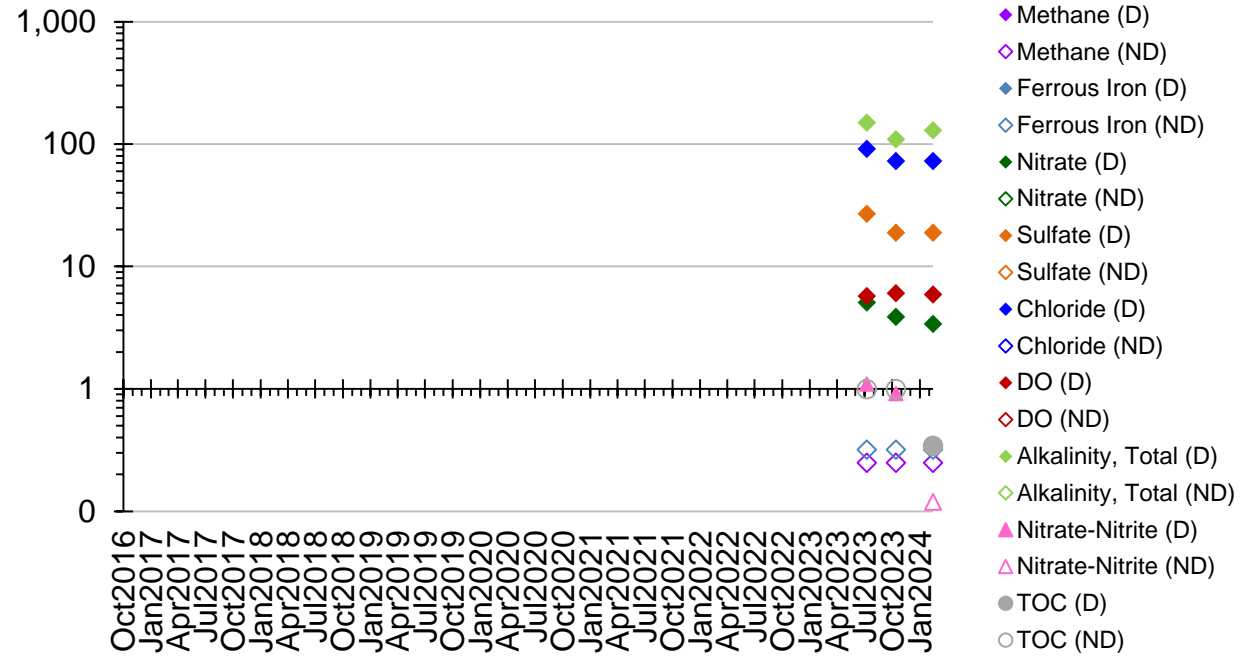
Methane results in micrograms per liter (µg/L or parts per billion).
All other results in milligrams per liter (mg/L or parts per million).

Appendix B.5.2: Cumulative Natural Attenuation Parameter Graphs (cont'd)

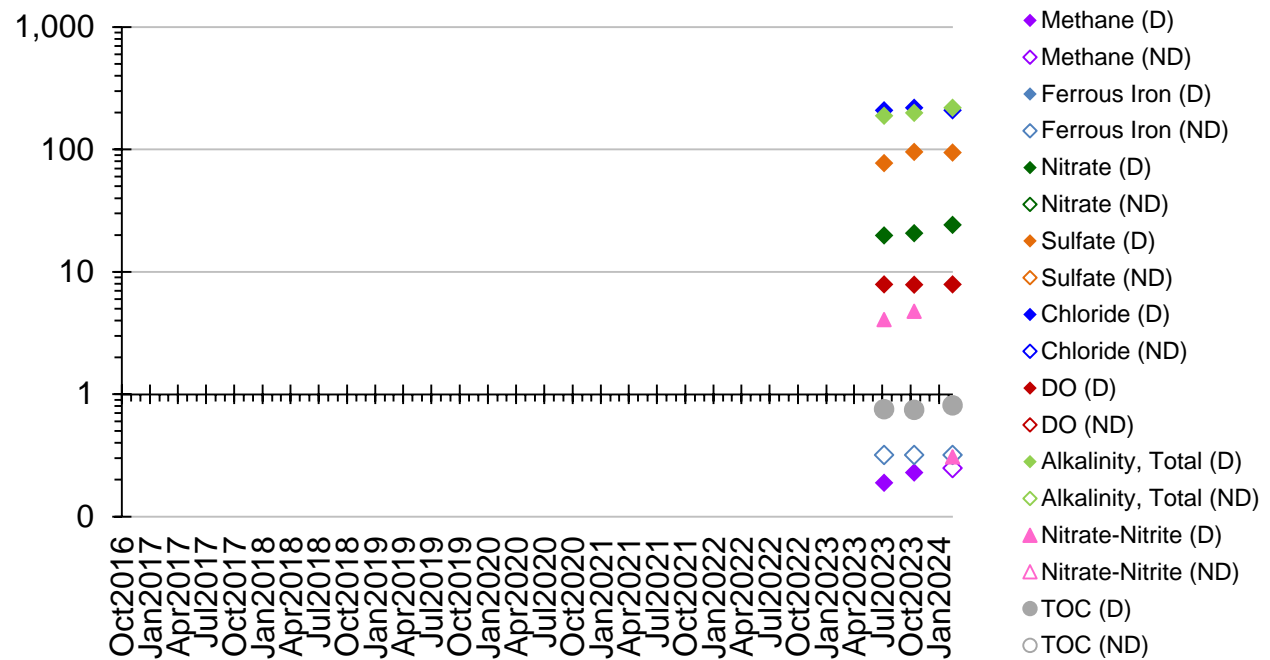
RHP08 NAPs



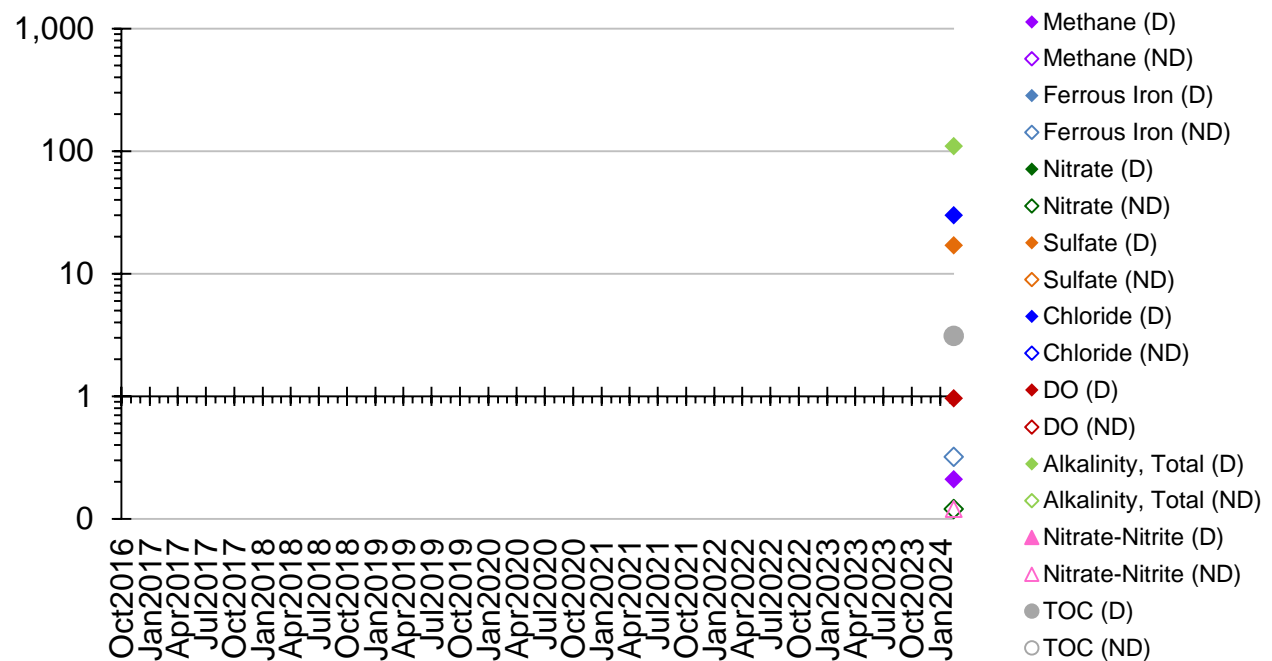
NMW24 NAPs



NMW25 NAPs



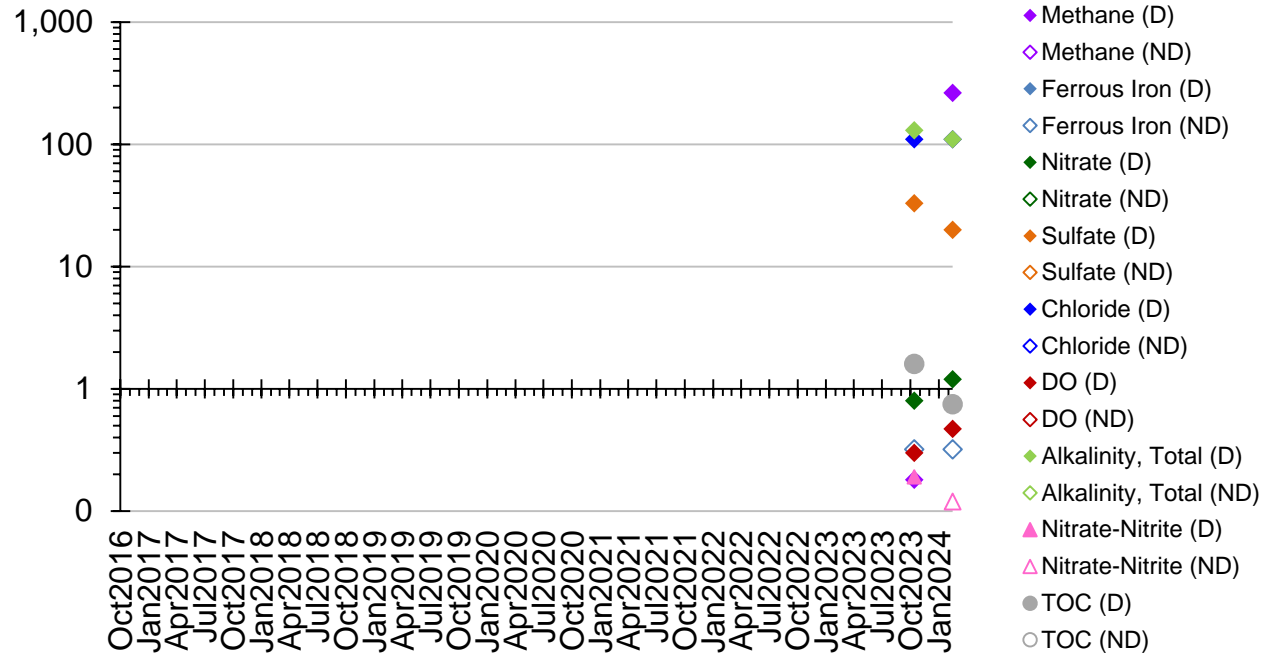
NMW26 NAPs



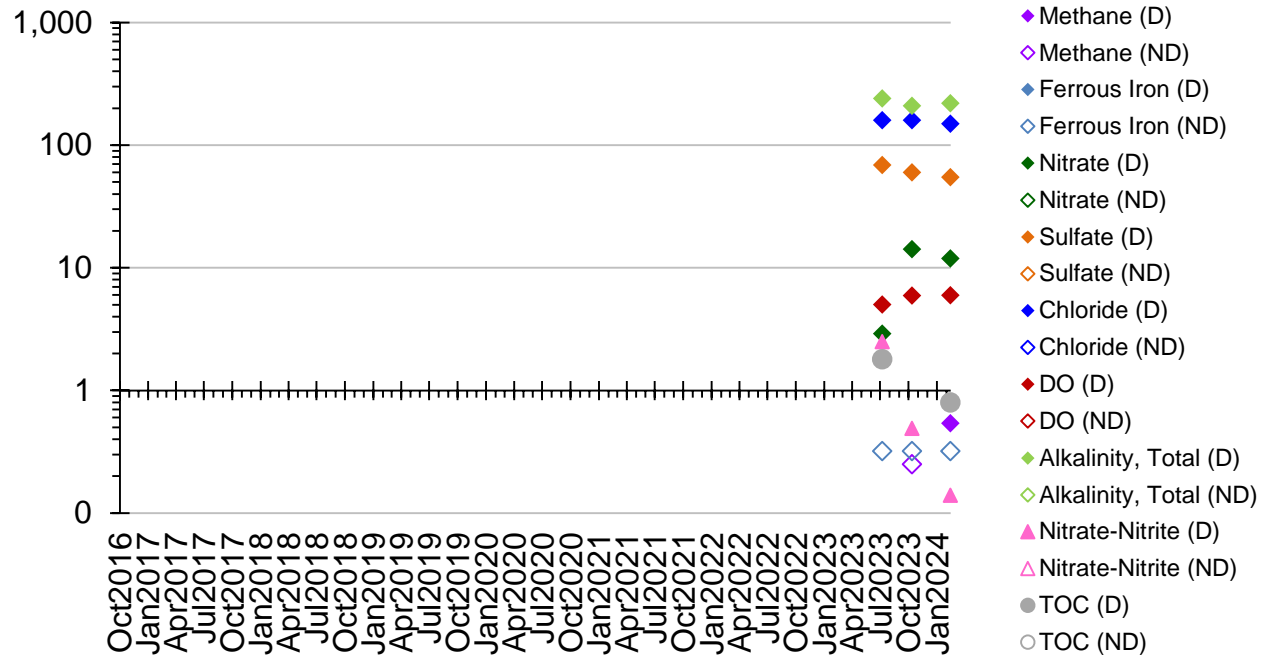
Methane results in micrograms per liter (µg/L or parts per billion).
All other results in milligrams per liter (mg/L or parts per million).

Appendix B.5.2: Cumulative Natural Attenuation Parameter Graphs (cont'd)

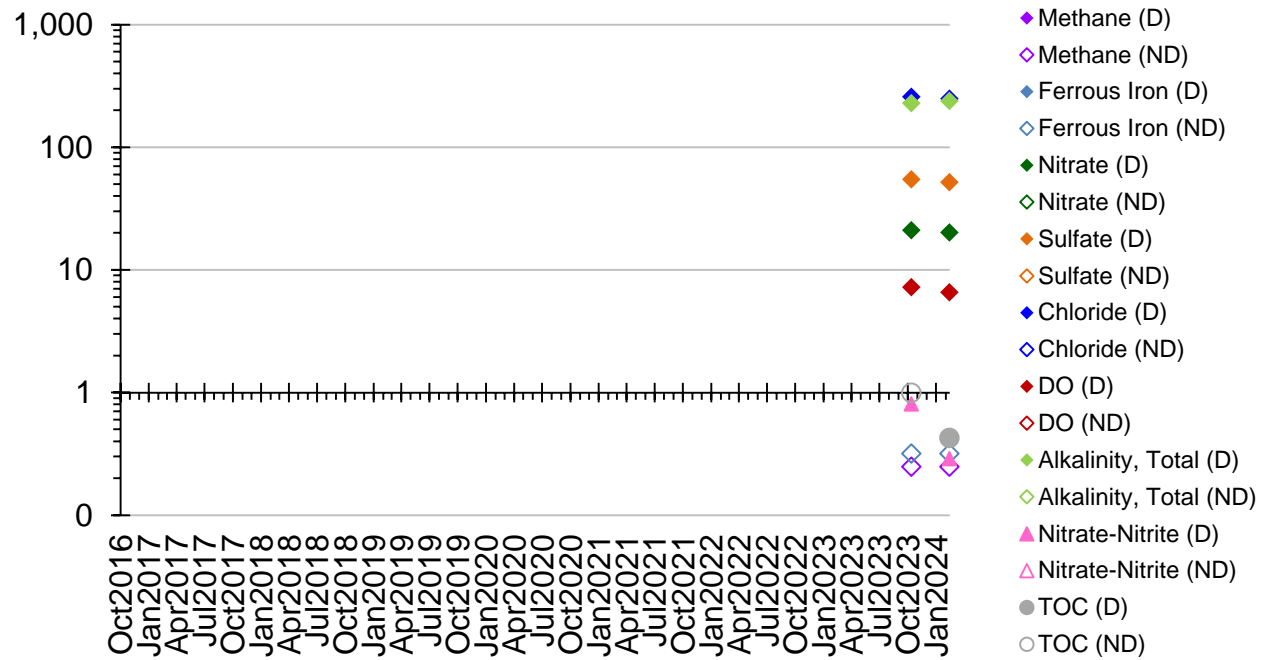
NMW30 NAPs



NMW32 NAPs



NMW33 NAPs

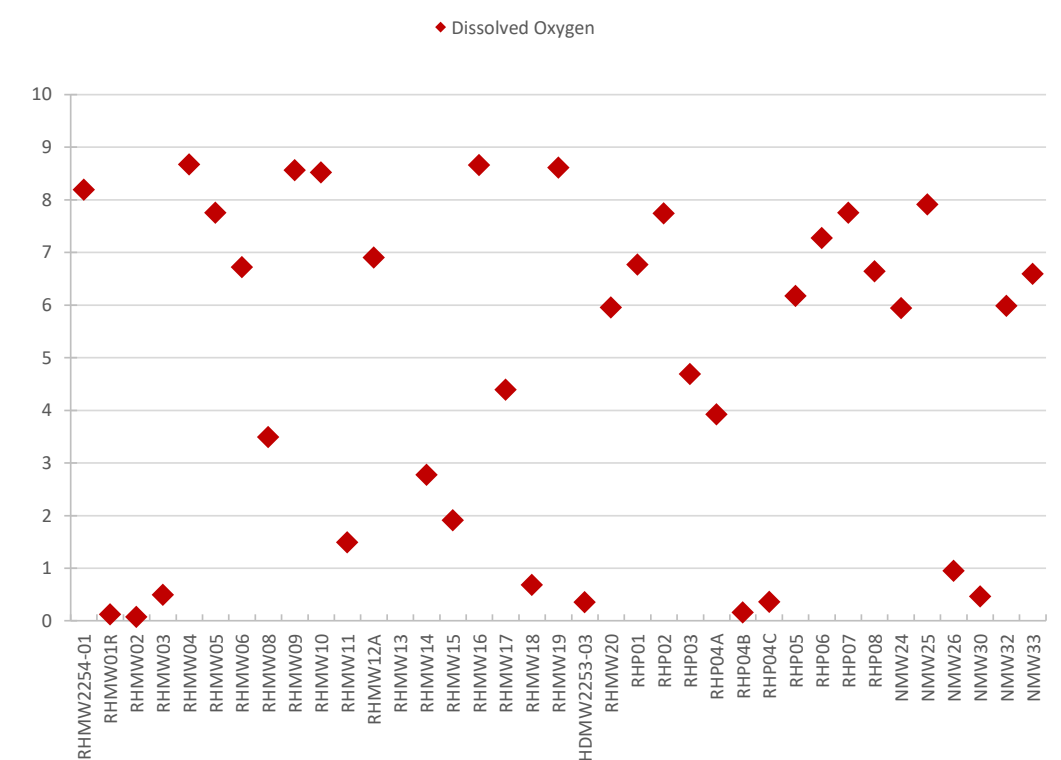
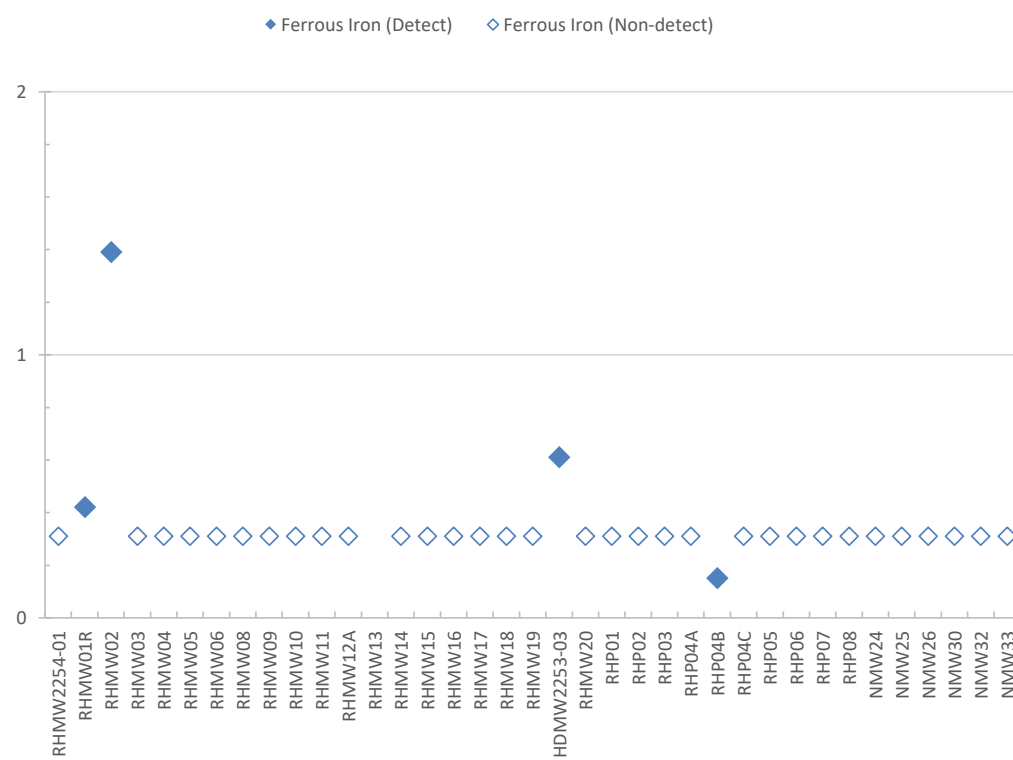
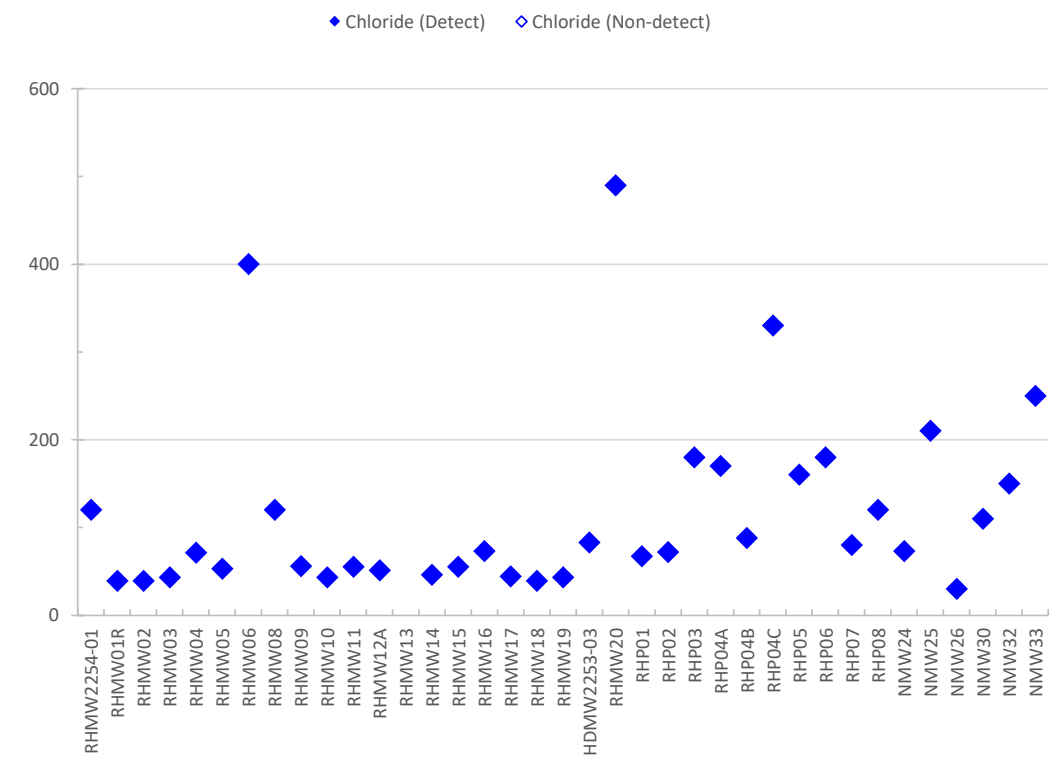
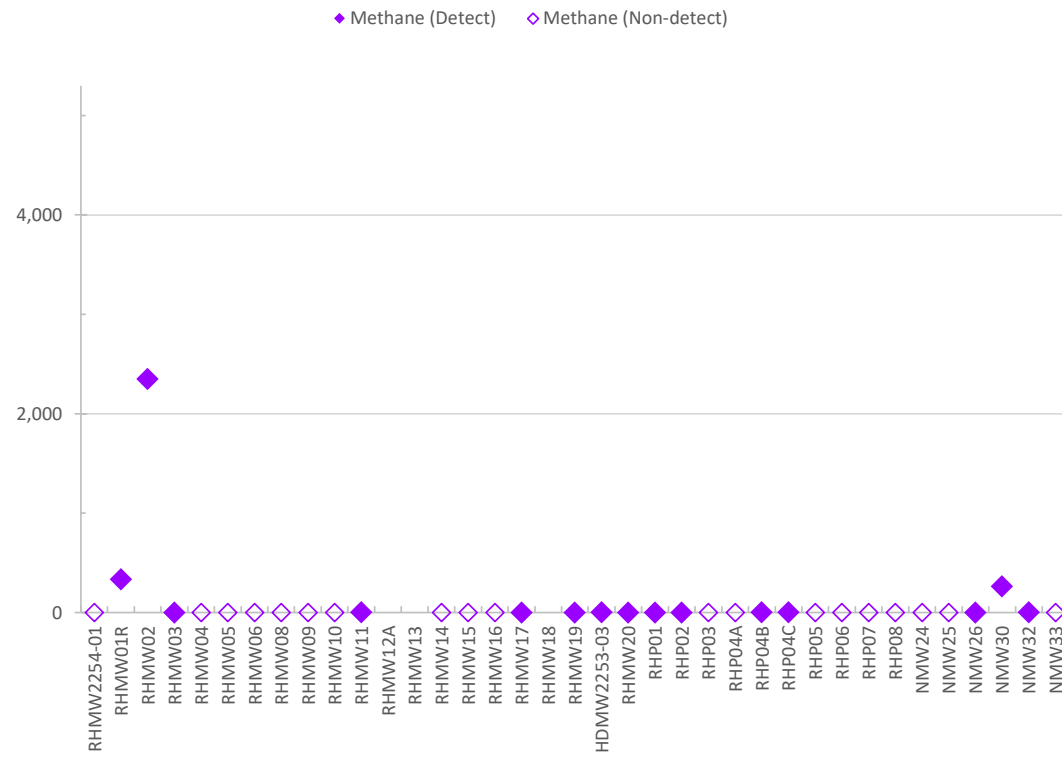


NMW34 NAPs

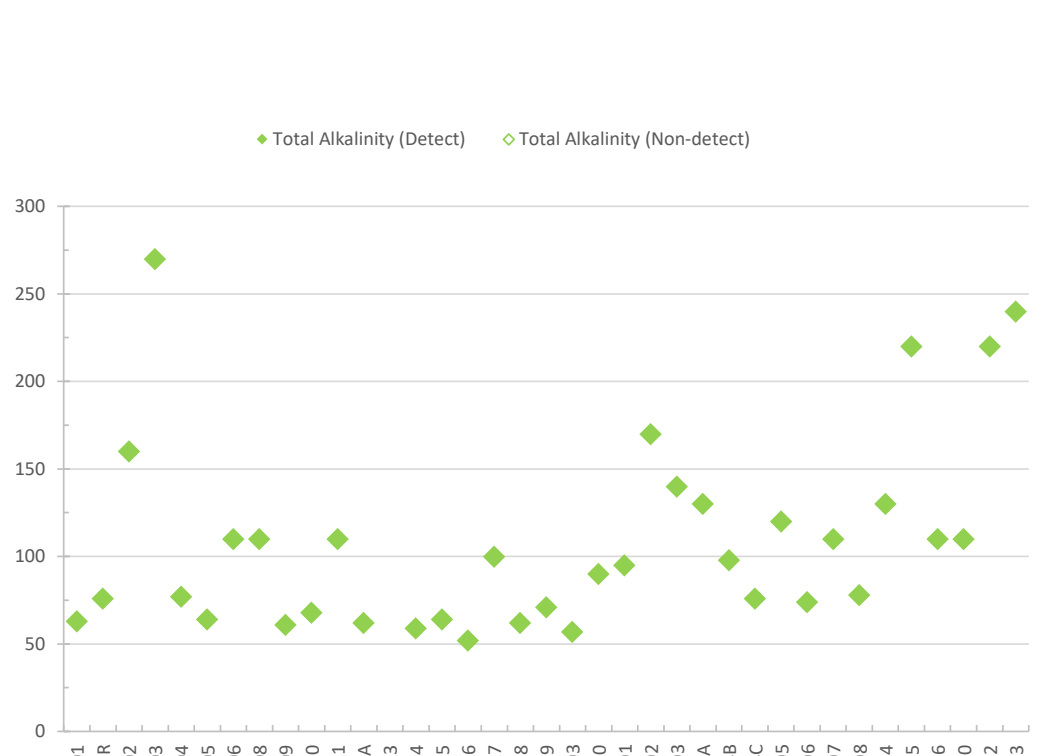
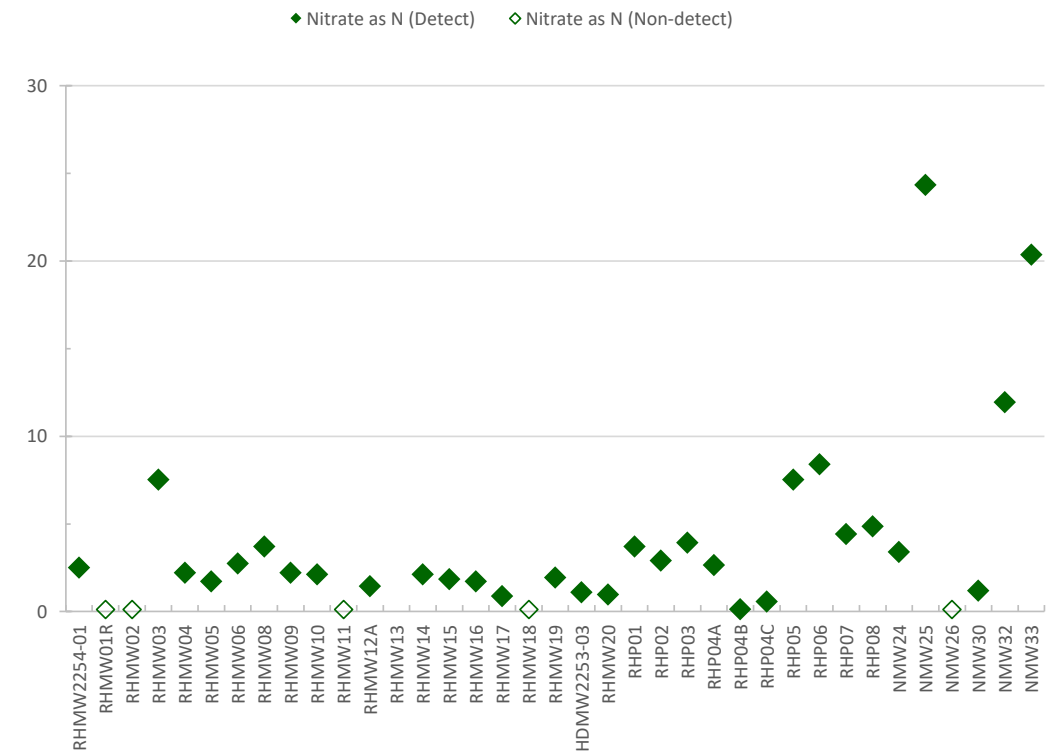
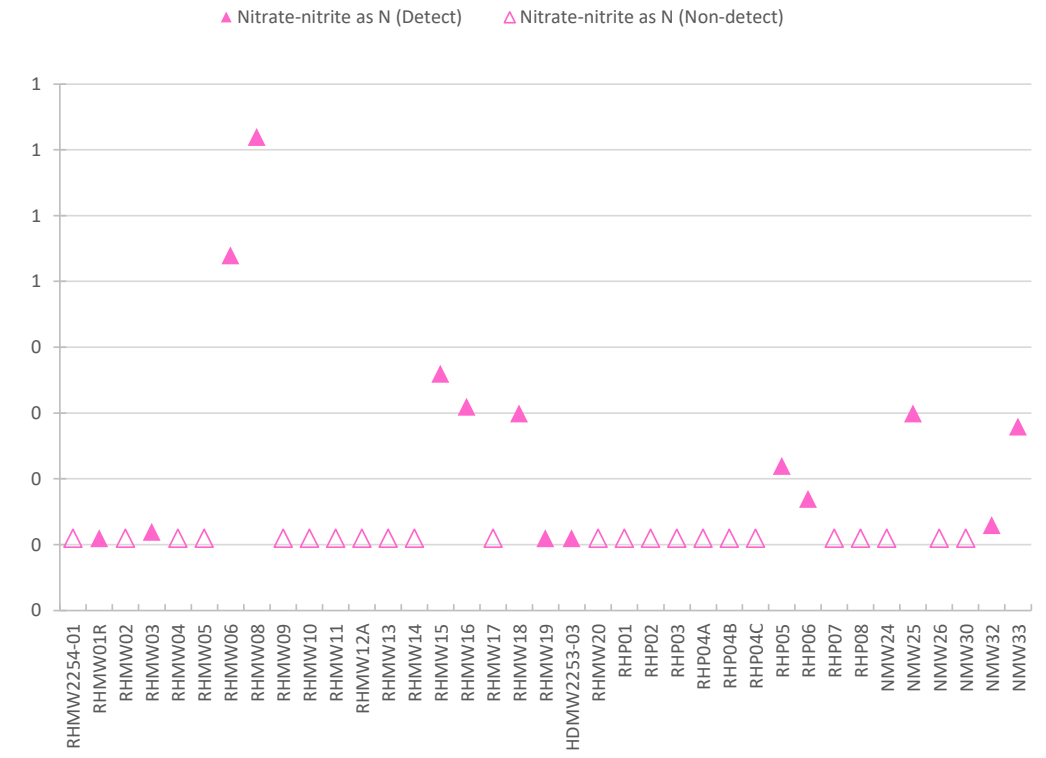
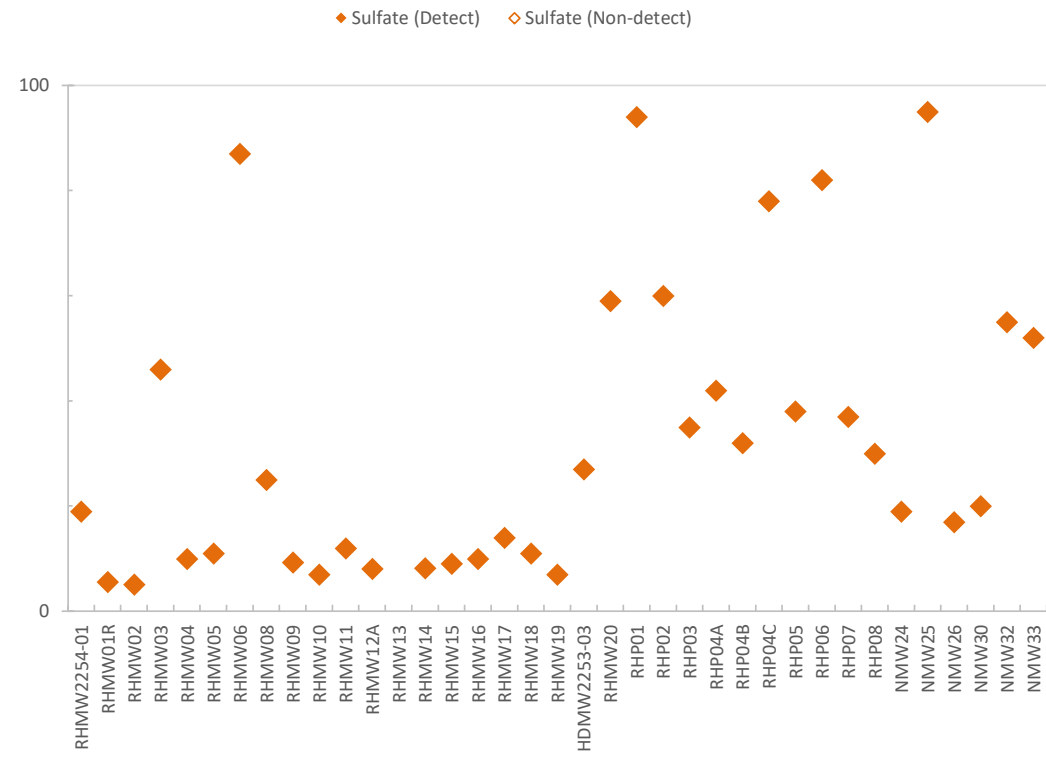


Methane results in micrograms per liter (µg/L or parts per billion).
All other results in milligrams per liter (mg/L or parts per million).

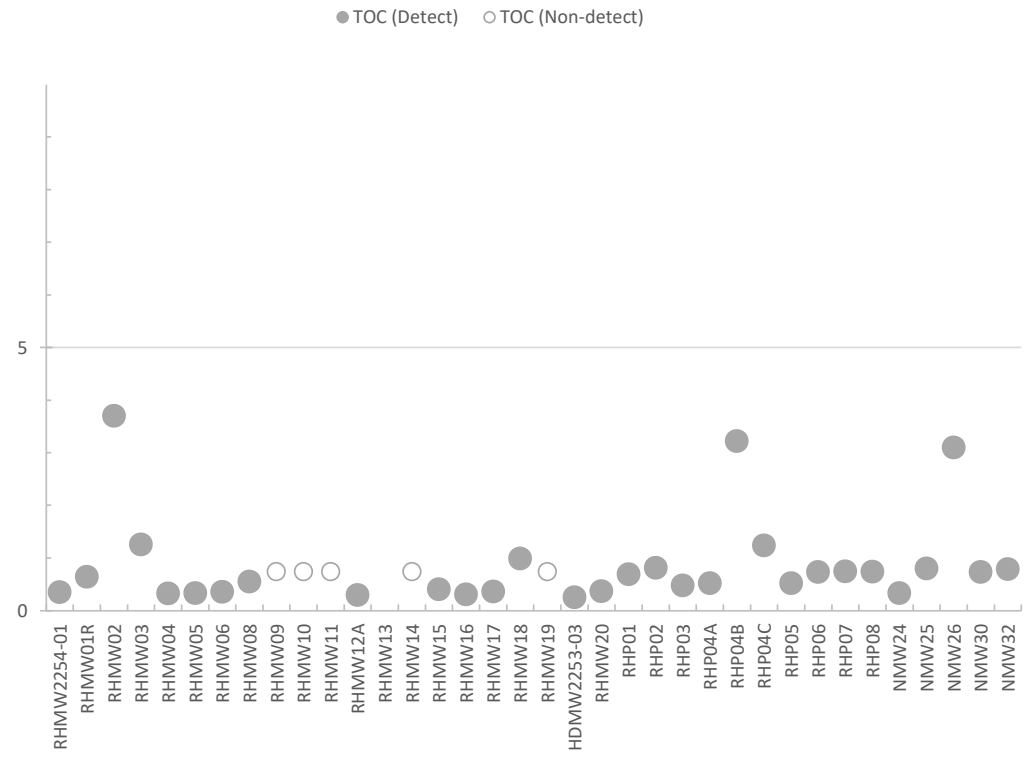
Appendix B.5.3: Natural Attenuation Parameter Graphs, Current Reporting Period



Appendix B.5.3: Natural Attenuation Parameter Graphs, Current Reporting Period (cont'd)



Appendix B.5.3: Natural Attenuation Parameter Graphs, Current Reporting Period (cont'd)



Appendix C – Index of Soil Vapor Analytical Data

Files listed in this appendix are available for download from the JBPHH Red Hill Bulk Fuel Storage Facility Environmental Data Management System (EDMS) at <https://synectics.net>. Appendix E provides database navigation tips.

Below-Tank Sampling Locations:

- Laboratory Report, SDG 499763, Level 4, January 2024
- Laboratory Report, SDG 502429, Level 4, February 2024
- Laboratory Report, SDG 504397, Level 4, March 2024

Appendix D – Index of Groundwater Analytical Data

Files listed in this appendix are available for download from the JBPHH Red Hill Bulk Fuel Storage Facility Environmental Data Management System (EDMS) at <https://synectics.net>. Appendix E provides database navigation tips.

- Table D-1: Index of Analytical Laboratory Reports and Data Validation Reports, by Sample Collection Date

Appendix E – EDMS Navigation

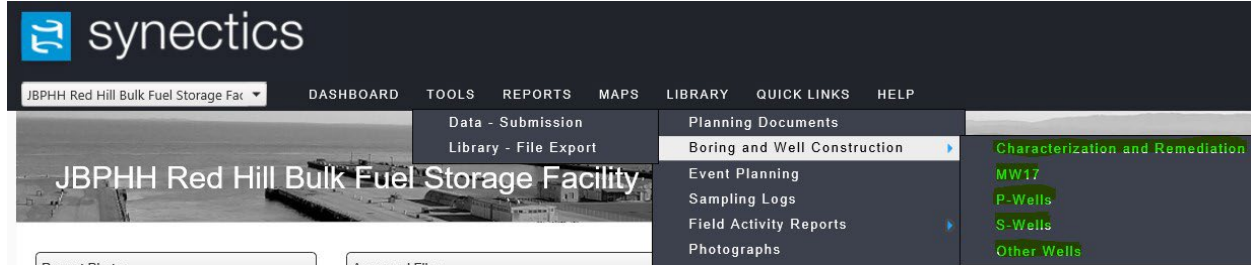
Detailed data referenced in this Quarterly Release Response Report are provided in the JBPHH Red Hill Bulk Fuel Storage Facility Environmental Data Management System (EDMS) at <https://synectics.net>.

Navigation tips for accessing the following data in EDMS are provided below:

- Boring and Well Construction Logs
- Groundwater Quality Parameter Data
- Characterization and Remediation Data
- Characterization and Remediation Analytical Laboratory Reports
- Soil Vapor Analytical Laboratory Reports – Below-Tank Sampling Locations
- Soil Vapor Data – Below-Tank Sampling Locations
- Soil Vapor Analytical Laboratory Reports – Adit 3 Tunnel Sampling Locations
- Groundwater Analytical Laboratory Reports
- Data Validation Reports
- Data Validation Qualifier Tables
- Environmental Data Report Tables

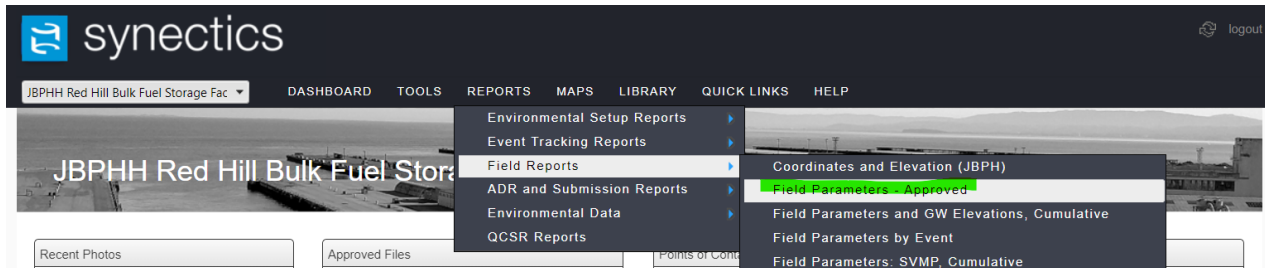
Boring and Well Construction Logs. Approved boring and well construction logs can be accessed through Library → Boring and Well Construction:

- Boring and Well Construction Subcategories: Characterization and Remediation, MW17 (RHMW17), P-Wells (Delineation), S-Wells (Sentinel), and Other Wells (NOI and GW LTM).

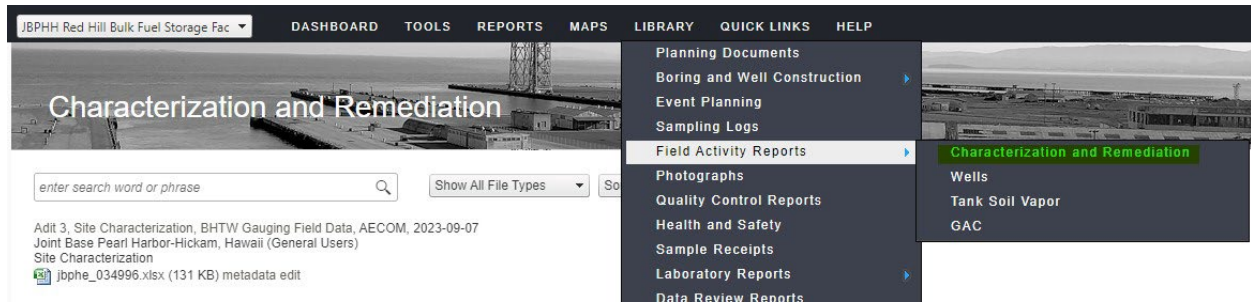


Groundwater Quality Parameter Data. Approved groundwater quality parameter data can be accessed through Reports → Field Reports → Field Parameters – Approved:

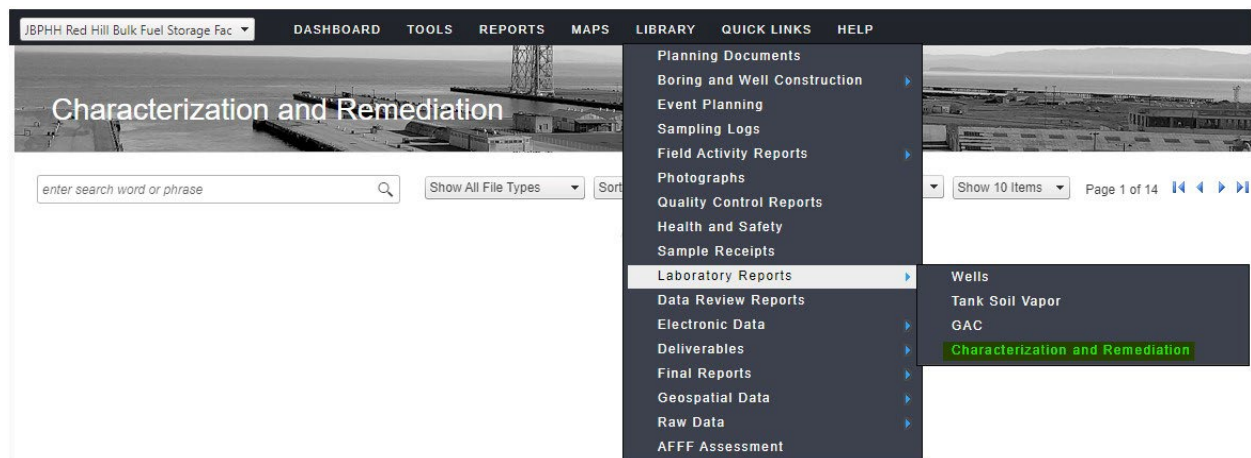
- NOI data are stored under RHS Recovery and Monitoring.
- Delineation and Sentinel Well data are stored under JBPHH Site Characterization.
- Consolidated Groundwater Program data are stored under RH Consolidated Groundwater Project.
- Long Term Groundwater Program data are stored under RH Long Term Groundwater Project.



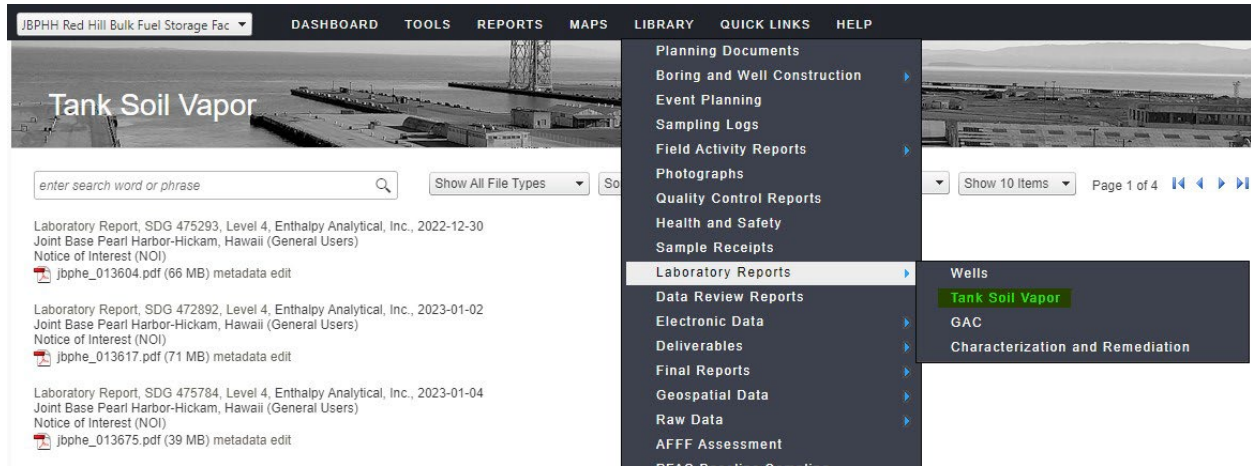
Characterization and Remediation Data. Approved characterization and remediation raw data can be accessed through Library → Field Activity Reports → Characterization and Remediation.



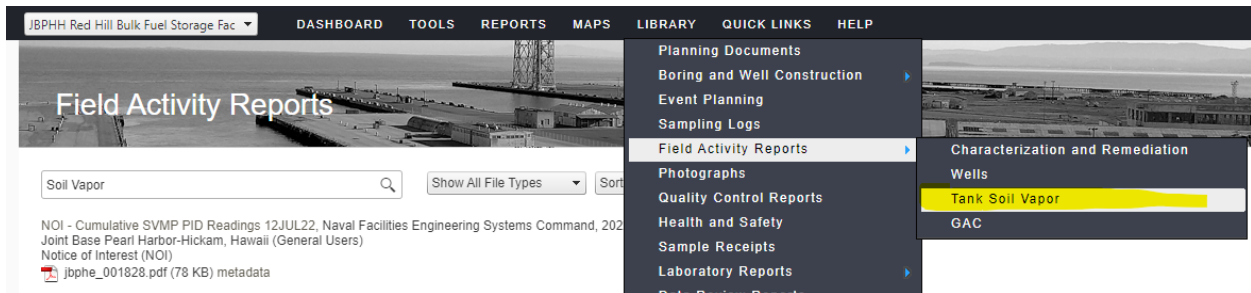
Characterization and Remediation Analytical Laboratory Reports. Approved characterization analytical laboratory reports can be accessed through Library → Laboratory Reports → Characterization and Remediation.



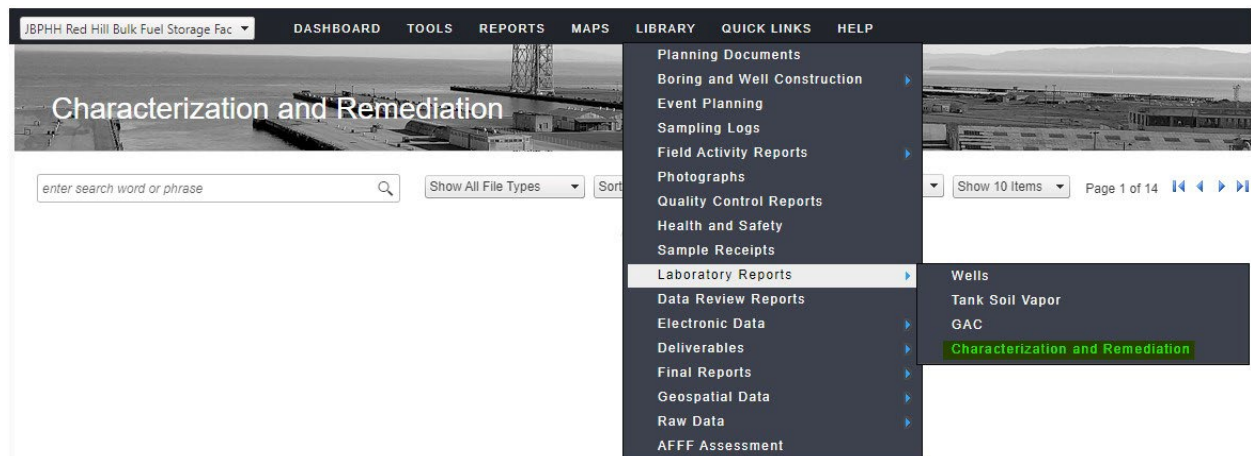
Soil Vapor Analytical Laboratory Reports – Below Tank Sampling Locations. Approved soil vapor monitoring analytical laboratory reports for below tank locations can be accessed through Library → Laboratory Reports → Tank Soil Vapor.



Soil Vapor Data– Below Tank Sampling Locations. Cumulative soil vapor data can be accessed through Library → Field Activity Reports → Tank Soil Vapor.

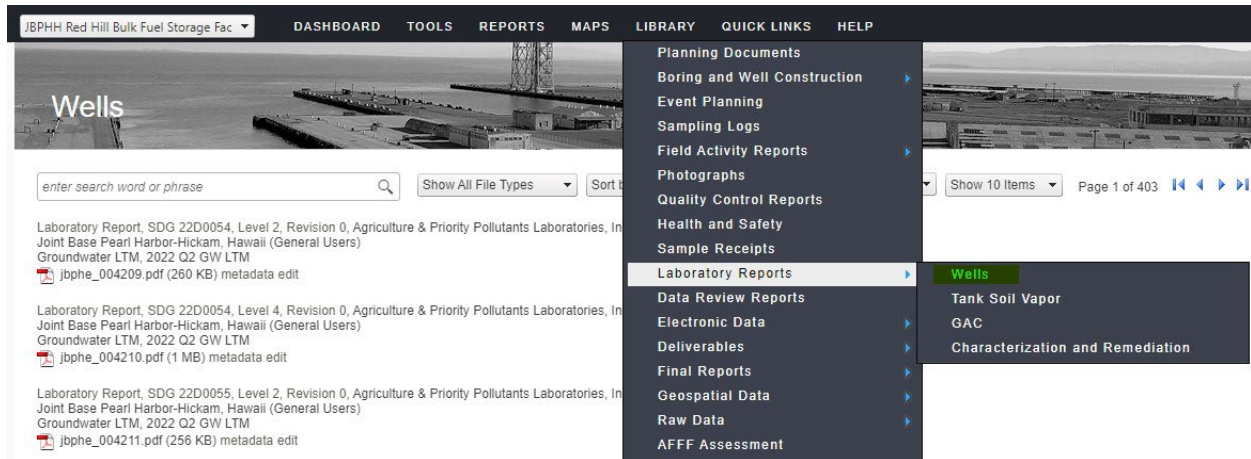


Soil Vapor Analytical Laboratory Reports – Adit 3 Tunnel Sampling Locations. Approved soil vapor monitoring analytical laboratory reports for Adit 3 Tunnel sampling locations can be accessed through Library → Laboratory Reports → Characterization and Remediation.



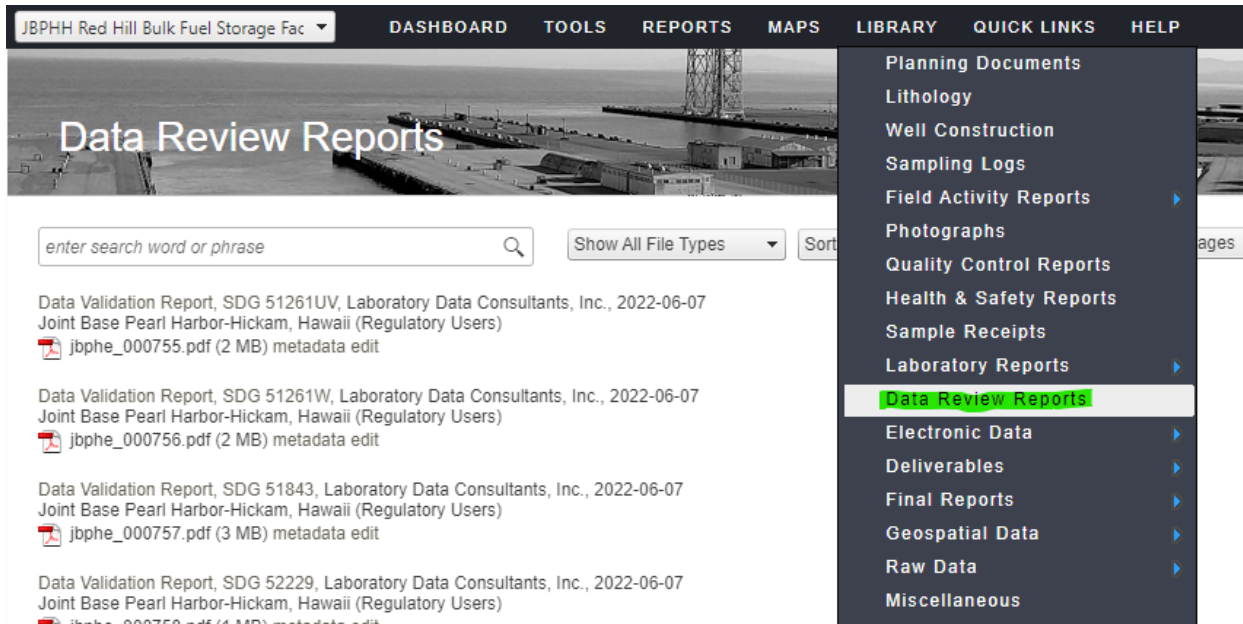
Groundwater Analytical Laboratory Reports. Approved groundwater monitoring analytical laboratory reports can be accessed through Library → Laboratory Reports:

- Laboratory Reports Subcategories: Wells → Coverage for Level 2 and Level 4 laboratory reports are Notice of Interest (NOI), P-Wells (Delineation), S-Wells (Sentinel), Groundwater LTM, and Consolidated Groundwater Program.



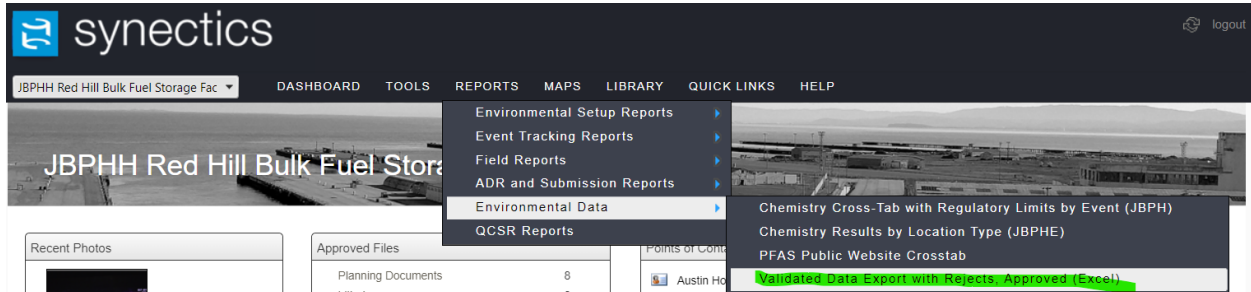
Data Validation Reports. Data validation reports can be accessed through Library → Data Review Reports:

- Coverage for data validation reports are Notice of Interest (NOI), P-Wells (Delineation), S-Wells (Sentinel), Groundwater LTM, and Consolidated Groundwater Program.



Data Validation Qualifier Tables. Qualified validation results for groundwater data for this reporting period can be accessed through Reports → Environmental Data → Validated Data Export with Rejects, Approved (Excel):

- NOI data are stored under RHS Recovery and Monitoring.
- Delineation and Sentinel Well data are stored under JBPHH Site Characterization.
- Consolidated Groundwater Program data are stored under RH Consolidated Groundwater Project.
- Long Term Groundwater Program data are stored under RH Long Term Groundwater Project.



Environmental Data Report Tables. Validated results for soil, groundwater, and soil vapor can be accessed through Reports → Environmental Data → Chemistry Cross-Tab with Regulatory Limits by Event (JBPH) or Chemistry Results by Location Type (JBPHE).

- Characterization and Remediation data are stored under JBPHH Site Characterization, and event(s) of interest can be selected from the drop-down menu.

