Final
First Quarter 2015 - Quarterly Groundwater Monitoring Report Outside Tunnel Wells

Red Hill Bulk Fuel Storage Facility
Joint Base Pearl Harbor-Hickam, Oahu, Hawaii

DOH Facility ID: 9-102271
DOH Release ID: 990051, 010011, 020028, and 140010

March 2015

Department of the Navy
Naval Facilities Engineering Command, Hawaii
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NAVFAC
Naval Facilities Engineering Command
NAVFAC HAWAII

Contract Number N62742-12-D-1853, CTO 0002

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Prepared for:

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Naval Facilities Engineering Command, Hawaii
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Prepared under:

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FINAL
FIRST QUARTER 2015 - QUARTERLY GROUNDWATER MONITORING REPORT
OUTSIDE TUNNEL WELLS
RED HILL BULK FUEL STORAGE FACILITY

Long-Term Groundwater and Soil Vapor Monitoring
Red Hill Bulk Fuel Storage Facility
Joint Base Pearl Harbor-Hickam, Oahu, Hawaii

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ACRONYMS AND ABBREVIATIONS

ACRONYMS/ ABBREVIATIONS	DEFINITION/MEANING
COPC	Contaminant of Potential Concern
DLNR	State of Hawaii Department of Land and Natural Resources
DoD	Department of Defense
DOH	State of Hawaii Department of Health
DON	Department of the Navy
EAL	Environmental Action Level
EPA	Environmental Protection Agency
ESI	Environmental Science International, Inc.
F-76	Marine Diesel Fuel
ID	Identification
JBPHH	Joint Base Pearl Harbor-Hickam
JP-5	Jet Fuel Propellant-5
JP-8	Jet Fuel Propellant-8
LCS	Laboratory Control Sample
LCSD	Laboratory Control Sample Duplicate
LOD	Limit of Detection
LOQ	Limit of Quantitation
µg/L	micrograms per liter
MS	Matrix Spike
MSD	Matrix Spike Duplicate
NAVFAC	Naval Facilities Engineering Command
NAVSUP FLC	Naval Supply Systems Command Fleet Logistics Center
N.D.	Not Detected
PAH	Polycyclic Aromatic Hydrocarbons
PARCCS	Precision, Accuracy, Representativeness, Completeness, Comparability, and Sensitivity
pH	hydrogen activity
QC	Quality Control
RHSF	Red Hill Bulk Fuel Storage Facility
RPD	Relative Percent Difference
SAP	Sampling and Analysis Plan
TCE	Trichloroethylene
TEC	The Environmental Company, Inc.
TPH-d	Total Petroleum Hydrocarbons as diesel
TPH-g	Total Petroleum Hydrocarbons as gasoline
U.S.	United States of America
UST	Underground Storage Tank
VOC	Volatile Organic Compounds
WP	Work Plan

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EXECUTIVE SUMMARY

This quarterly groundwater monitoring report presents the results of the first quarter 2015 groundwater sampling event, conducted on January 26 and 29, 2015, at the outside tunnel wells of the Red Hill Bulk Fuel Storage Facility [RHSF], Joint Base Pearl Harbor-Hickam [JBPHH], Hawaii. The RHSF is located in Halawa Heights on the Island of Oahu. There are 18 active and 2 inactive underground storage tanks [USTs] located at the RHSF. The State of Hawaii Department of Health [DOH] Facility Identification [ID] number is 9-102271. The DOH Release ID numbers are 990051, 010011, 020028, and 140010.

The groundwater sampling was conducted as part of the long-term groundwater and soil vapor monitoring program at the RHSF and concurrent with release response activities initiated at Tank 5 in January 2014, under Naval Facilities Engineering Command [NAVFAC] Contract Number N62742-12-D-1853. The sampling was conducted in accordance with the approved Work Plan [WP]/Sampling and Analysis Plan [SAP] prepared by Environmental Science International, Inc. [ESI].

On January 26 and 29, 2015, ESI personnel collected groundwater samples from three outside tunnel monitoring wells (wells OWDFMW01, HDMW2253-03, and RHMW04). A primary and duplicate groundwater sample were collected from well OWDFMW01. All groundwater samples were analyzed for petroleum constituents. Analytical results were compared to DOH Environmental Action Levels [EALs] for gross contamination and drinking water toxicity. A summary of the analytical results is provided below.

- **HDMW2253-03** – Total petroleum hydrocarbons as diesel fuel [TPH-d] (16 micrograms per liter [µg/L]), was the only analyte detected. The concentration did not exceed the DOH EALs.
- **OWDFMW01** – TPH-d (24 and 16 µg/L) and acetone (13 µg/L in both primary and duplicate samples) were detected in both the primary and duplicate sample. None of the detected concentrations exceeded their respective DOH EALs. TPH-d concentrations in this well have generally been decreasing since an increase in November 2012. Due to the consistently high pH and the presence of acetone in well OWDFMW01, the associated sample data may not accurately represent the conditions of the groundwater at the site.
- **RHMW04** – TPH-d (10 µg/L), was the only analyte detected. The concentration did not exceed the DOH EALs.

Since the wells were last sampled (October 2014), groundwater contaminant concentrations remained at low concentrations and did not change significantly, or were not detected. No contaminants of potential concern [COPCs] were detected in any well at concentrations above the DOH EALs.

Based on a suspected 2014 release at the RHSF and the results of the recent groundwater sampling and analysis, continued groundwater monitoring at the RHSF is recommended. If the TPH-d concentrations significantly increase, the monitoring frequency should be increased to

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monthly, even though wells RHMW04, HDMW2253-03, and OWDFMW01 are not included in the RHSF Groundwater Protection Plan.

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SECTION 1 – INTRODUCTION

This quarterly groundwater monitoring report presents the results of the first quarter 2015 groundwater sampling event conducted on January 26 and 29, 2015, at the outside tunnel wells of the RHSF, JBPHH, Hawaii. The RHSF is located in Halawa Heights on the Island of Oahu. The purpose of the sampling is to (1) assess the condition of groundwater beneath and in the vicinity of the RHSF with respect to chemical constituents associated with jet fuel propellant and marine diesel fuel, and (2) to ensure the Navy remains in compliance with DOH UST release response requirements as described in Hawaii Administrative Rules 11-281 Subchapter 7, Release Response Action (DOH, 2013). The DOH Facility ID number for the RHSF is 9-102271. The DOH Release ID numbers are 990051, 010011, 020028, and 140010.

The groundwater sampling was conducted as part of the long-term groundwater and soil vapor monitoring program at the RHSF, under NAVFAC Contract Number N62742-12-D-1853. The sampling was conducted in accordance with the approved WP/SAP prepared by ESI (ESI, 2012).

1.1 Site Description

The RHSF is located on federal government land (zoned F1 - Military and Federal), located in Halawa Heights, approximately 2.5 miles northeast of Pearl Harbor (Figure 1). It is located on a low ridge on the western edge of the Koolau Mountain Range that divides Halawa Valley from Moanalua Valley. The RHSF is bordered on the north by Halawa Correctional Facility and private businesses, on the southwest by the United States of America [U.S.] Coast Guard reservation, on the south by residential neighborhoods, and on the east by Moanalua Valley. A quarry is located less than a quarter mile away to the northwest. The RHSF occupies 144 acres of land and the majority of the site is at an elevation of approximately 200 to 500 feet above mean sea level.

The RHSF contains 18 active and 2 inactive USTs, which are operated by Naval Supply Systems Command Fleet Logistics Center [NAVSUP FLC] Pearl Harbor (formerly Fleet and Industrial Supply Center). Each UST has a capacity of approximately 12.5 million gallons. The RHSF is located approximately 100 feet above the basal aquifer. The USTs contain Jet Fuel Propellant-5 [JP-5], Jet Fuel Propellant-8 [JP-8], and Marine Diesel Fuel [F-76]. The current status of each of the USTs is summarized in Table 1.1.

Three groundwater monitoring wells (wells RHMW04, HDMW2253-03, and OWDFMW01) are located outside of the RHSF tunnel system (Figure 2). Well HDMW2253-03 is located at the Halawa Correctional Facility (outside the RHSF), well OWDFMW01 is located at the former Oily Waste Disposal Facility near Adit 3, and well RHMW04 is located near the Navy Firing Range . Four groundwater monitoring wells (wells RHMW01, RHMW02, RHMW03, and RHMW05) are located within the RHSF lower access tunnel, and one sampling point (RHMW2254-01) is located at Red Hill Shaft. Monitoring data for the four wells located inside the tunnel and one sampling point at Red Hill Shaft are included in a separate report.

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As noted, monitoring wells RHMW01, RHMW02, RHMW03, and RHMW05 are located inside the underground tunnels. Sampling point RHMW2254-01 is located inside the infiltration gallery of the Department of the Navy [DON] drinking water supply Well 2254-01. DON Well 2254-01 is located approximately 2,400 feet downgradient of the USTs and provides potable water to the JBPHH Water System, which serves approximately 65,200 military customers. NAVFAC Public Works Department operates the infiltration gallery and DON Well 2254-01.

TABLE 1.1
Current Status of the USTs
Red Hill Bulk Fuel Storage Facility
January 2015 Quarterly Monitoring Report

Tank Identification	Fuel Type	Status	Capacity
F-1	None	Inactive	12.5 million gallons
F-2	JP-8	Active	12.5 million gallons
F-3	JP-8	Active	12.5 million gallons
F-4	JP-8	Active	12.5 million gallons
F-5	JP-8	Active	12.5 million gallons
F-6	JP-8	Active	12.5 million gallons
F-7	JP-5	Active	12.5 million gallons
F-8	JP-5	Active	12.5 million gallons
F-9	JP-5	Active	12.5 million gallons
F-10	JP-5	Active	12.5 million gallons
F-11	JP-5	Active	12.5 million gallons
F-12	JP-5	Active	12.5 million gallons
F-13	F-76	Active	12.5 million gallons
F-14	F-76	Active	12.5 million gallons
F-15	F-76	Active	12.5 million gallons
F-16	F-76	Active	12.5 million gallons
F-17	JP-5	Active	12.5 million gallons
F-18	JP-5	Active	12.5 million gallons
F-19	None	Inactive	12.5 million gallons
F-20	JP-5	Active	12.5 million gallons

F-76 Marine Diesel Fuel
JP-5 Jet Fuel Propellant-5
JP-8 Jet Fuel Propellant-8

1.2 Physical Settings

Climatological conditions in the area of the RHSF consist of warm to moderate temperatures and low to moderate rainfall. The RHSF is leeward of the prevailing northeasterly trade winds. The average annual precipitation is approximately 40 inches, which occurs mainly between November and April (State of Hawaii Department of Land and Natural Resources [DLNR], 1986). Annual pan evaporation is approximately 75 inches (DLNR, 1985). Average temperatures range from the low 60's to high 80's (degrees Fahrenheit) (Atlas of Hawaii, 1983).

Oahu consists of the eroded remnants of two shield volcanoes, Waianae and Koolau. The RHSF is located on the southwest flank of the Koolau volcanic shield. Lavas erupted during the shield-building phase of the volcano belong to the *Koolau Volcanic Series* (Stearns and Vaksvik, 1935). Following formation of the Koolau shield, a long period of volcanic quiescence occurred,

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during which the shield was deeply eroded. Following this erosional period, eruptive activity resumed. Lavas and pyroclastic material erupted during this period belong to the *Honolulu Volcanic Series* (Stearns and Vaksvik, 1935).

In the immediate area of the RHSF, Koolau Volcanic Series lavas dominate, although there are consolidated and unconsolidated non-calcareous deposits in the vicinity that consist of alluvium generated during erosion of the Koolau volcanic shield. South-southwest of the RHSF, and in isolated exposures to the west, are pyroclastic deposits formed during eruptions from three Honolulu Volcanic Series vents, Salt Lake, Aliamanu, and Makalapa (Stearns and Vaksvik, 1935). Based on established geology and records of wells drilled at the RHSF (Stearns and Vaksvik, 1938), the RHSF is underlain by Koolau Volcanic Series basalts. The area of the RHSF is classified as *Rock Land*, where 25 to 90% of the land surface is covered by exposed rock and there are only shallow soils (Foote, et al., 1972).

Groundwater in Hawaii exists in two principal aquifer types. The first and most important type, in terms of drinking water resources, is the basal aquifer. The basal aquifer exists as a lens of fresh water floating on and displacing seawater within the pore spaces, fractures, and voids of the basalt that forms the underlying mass of each Hawaiian island. In parts of Oahu, groundwater in the basal aquifer is confined by the overlying caprock and is under pressure. Waters that flow freely to the surface from wells that tap the basal aquifer are referred to as *artesian*.

The second type of aquifer is the caprock aquifer, which consists of various kinds of unconfined and semi-confined groundwater. Commonly, the caprock consists of a thick sequence of nearly impermeable clays, coral, and basalt, that separates the caprock aquifer from the basal aquifer. The impermeable nature of these materials and the artesian nature of the basal aquifer severely restrict the downward migration of groundwater from the upper caprock aquifer. However, in the area of the RHSF, there is no discernible caprock.

Groundwater in the area of the RHSF is part of the *Waimalu Aquifer System* of the *Pearl Harbor Aquifer Sector*. The aquifer is classified as a basal, unconfined, flank-type; and is currently used as a drinking water source. The aquifer is considered fresh, with less than 250 milligrams per liter of chloride, and is considered an irreplaceable resource with a high vulnerability to contamination (Mink and Lau, 1990).

The nearest drinking water supply well is the Red Hill Shaft Well 2254-01, located in the infiltration gallery within the RHSF. The Well 2254-01 is located approximately 2,400 feet downgradient of the USTs (Figure 2).

1.3 BACKGROUND

The RHSF was constructed by the U.S. Government in the early 1940s. Twenty USTs and a series of tunnels were constructed to supply fuel to the Navy. The USTs were constructed of steel and they currently contain JP-5, JP-8, and F-76. Several tanks in the past have stored

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DON special fuel oil, DON distillate, aviation gasoline, and motor gasoline (Environet, 2010). The fueling system is a self-contained underground unit that was installed into native rock comprised primarily of basalt with some interbedded tuffs and breccias (Environet, 2010). Each UST measures approximately 250 feet in height and 100 feet in diameter. The upper domes of the tanks lie at depths varying between 100 feet and 200 feet below ground surface.

In response to increasing concentrations of COPCs in the groundwater monitoring wells within the facility (specifically RHMW02) during the 2008 sampling events, quarterly groundwater monitoring was initiated in 2009 at the outside tunnel wells.

In 2009, groundwater samples were collected from wells RHMW04, OWDFMW01, and HDMW2253-03. Samples were collected in August and October 2009. None of the COPCs were detected at concentrations exceeding the current gross contamination or drinking water toxicity DOH EALs.

In 2010, groundwater samples were collected from wells RHMW04, OWDFMW01, and HDMW2253-03. Samples were collected from well RHMW04 in January and April 2010. Samples were collected from well OWDFMW01 in January, April, and October 2010. Samples were collected from well HDMW2253-03 in January, April, July and October 2010. The COPCs concentrations exceeding current DOH EALs are summarized below.

- **HDMW2253-03** – TPH-d was detected at a concentration above the DOH EALs for gross contamination and drinking water toxicity in January 2010 (The Environmental Company, Inc. [TEC], 2010a).
- **OWDFMW01** – TPH-d was detected at a concentration above the DOH EALs for gross contamination and drinking water toxicity in January and April 2010 (TEC, 2010a; TEC, 2010b).

In 2011, groundwater samples were collected from wells OWDFMW01 and HDMW2253-03. Samples were collected in January, April, July, and October 2011. None of the COPCs were detected at concentrations exceeding the current DOH EALs for gross contamination or drinking water toxicity. In Fall 2011, the DOH EALs were revised. The drinking water toxicity EAL for TPH-d decreased from 210 to 190 µg/L.

In 2012, groundwater samples were collected from wells OWDFMW01 and HDMW2253-03. Samples were collected in January, April, July, and November 2012. TPH-d was detected at a concentration above the DOH EALs in samples collected from wells HDMW2253-03 and OWDFMW01 (Environet, 2012; ESI, 2013a). The COPCs concentrations exceeding current DOH EALs are summarized below.

- **HDMW2253-03** – TPH-d was detected at concentrations above the DOH EALs for gross contamination and drinking water toxicity in April and November 2012.

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- **OWDFMW01** – TPH-d was detected at a concentration above the DOH EALs for gross contamination and drinking water toxicity in April 2012.

In 2013, groundwater samples were collected from wells OWDFMW01 and HDMW2253-03. Samples were collected in January, April, July, and October 2013. TPH-d was detected at a concentration above the DOH EALs in samples collected from wells HDMW2253-03 and OWDFMW01 (ESI, 2013b, 2013c, 2013d, and 2014a). The COPCs concentrations exceeding current DOH EALs are summarized below.

- **HDMW2253-03** – TPH-d was detected at a concentration above the DOH EALs for gross contamination and drinking water toxicity in January 2013.
- **OWDFMW01** – TPH-d was detected at concentrations above the DOH EALs for gross contamination and drinking water toxicity in all four quarters during 2013.

In 2014, groundwater samples were collected from wells OWDFMW01 and HDMW2253-03. Samples were collected in January, April, July, and October 2014. Well RHMW04 was also sampled in July and October 2014. TPH-d was detected at concentrations above the DOH EALs in samples collected from well OWDFMW01 in January and April 2014. TPH-d was also detected at a concentration above the DOH EALs in a sample collected from well HDMW2253-03 in April 2014; however, this was likely an erroneous result due to a switched sample (ESI, 2014c, 2014d, 2014e, and 2015a). The COPCs concentrations exceeding current DOH EALs are summarized below.

- **HDMW2253-03** – TPH-d was detected at a concentration above the DOH EALs for both gross contamination and drinking water toxicity in April 2014. However, as discussed above, this was likely an erroneous result.
- **OWDFMW01** – TPH-d was detected at concentrations above the DOH EALs for gross contamination and drinking water toxicity in April 2014 and above only the EAL for gross contamination in January 2014.

In January 2014, an additional groundwater sampling was conducted at HDMW2253-03 in response to a suspected release from Tank 5. None of the COPC concentrations exceeded the current DOH EALs (ESI, 2014b).

1.3.1 Previous Reports

The following groundwater monitoring reports were previously submitted to the DOH:

1. Groundwater Monitoring Report, August 2009 (submitted September 2009).
2. Groundwater Monitoring Report, October 2009 (submitted December 2009).
3. Groundwater Monitoring Report, January, 2010 (submitted April 2010).
4. Groundwater Monitoring Report, April 2010 (submitted May 2010).

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5. Groundwater Monitoring Report, July 2010 (submitted August 2010).
6. Groundwater Monitoring Report, October 2010 (submitted December 2010).
7. Groundwater Monitoring Report, January 2011 (submitted March 2011).
8. Groundwater Monitoring Report, April 2011 (submitted June 2011).
9. Groundwater Monitoring Report, July 2011 (submitted September 2011).
10. Groundwater Monitoring Report, October 2011 (submitted December 2011).
11. Groundwater Monitoring Report, January 2012 (submitted March 2012).
12. Groundwater Monitoring Report, April 2012 (submitted July 2012).
13. Groundwater Monitoring Report, July 2012 (submitted August 2012).
14. Groundwater Monitoring Report, November 2012 (submitted January 2013).
15. Groundwater Monitoring Report, January 2013 (submitted April 2013).
16. Groundwater Monitoring Report, April 2013 (submitted July 2013).
17. Groundwater Monitoring Report, July 2013 (submitted September 2013).
18. Groundwater Monitoring Report, October 2013 (submitted January 2014).
19. Groundwater Monitoring Report for Additional Sampling of HDMW2253-03, January 2014 (submitted February 2014).
20. Groundwater Monitoring Report, January 2014 (submitted April 2014).
21. Groundwater Monitoring Report, April 2014 (submitted June 2014).
22. Groundwater Monitoring Report, July 2014 (submitted September 2014).
23. Groundwater Monitoring Report, October 2014 (submitted January 2015).

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SECTION 2 – GROUNDWATER SAMPLING

On January 26 and 29, 2015, ESI personnel collected groundwater samples from three monitoring wells (wells OWDFMW01, HDMW2253-03, and RHMW04). A primary and duplicate groundwater sample were collected from well OWDFMW01. The samples were collected in accordance with the 2012 WP/SAP (ESI, 2012). The WP/SAP is consistent with DOH UST release response requirements (DOH, 2000); DON Procedure I-C-3, *Monitoring Well Sampling* (DON, 2007); and the Final RHSF Groundwater Protection Plan (TEC, 2008). Prior to purging and sampling, the depth to groundwater and the depth to the bottom of the wells were measured by ESI using a Geotech oil/water interface probe. The measurements are included in the groundwater sampling logs. No measurable product, sheen, or petroleum hydrocarbon odor was observed in any of the wells.

2.1 GROUNDWATER SAMPLING

Prior to collecting groundwater samples, the monitoring wells were purged of standing water in the well casings. Wells OWDFMW01 and HDMW2253-03 were purged using disposable bailers. Well RHMW04 contains a dedicated bladder pump which was used to purge the well and to collect samples. The monitoring wells were purged at rates of 0.14 to 0.32 liters per minute.

Water quality parameters were monitored on a periodic basis during well purging. The water quality parameters that were measured included hydrogen activity [pH], temperature, conductivity, dissolved oxygen, and oxidation reduction potential. The water quality parameters were evaluated to demonstrate that the natural characteristics of the aquifer formation water were present within the monitoring well before collecting the sample. At least four readings were collected during the purging process. Purging was considered complete when at least three consecutive water quality measurements stabilized within approximately 10%. The readings were recorded on groundwater monitoring logs which are included in Appendix A. The field notes are included in Appendix B.

When the water quality parameters stabilized, groundwater samples were collected from the wells. The disposable bailers or dedicated bladder pump were used to collect the groundwater samples from the monitoring wells. For each monitoring well, the groundwater samples were collected no more than two hours after purging was completed to prevent groundwater interaction with the monitoring well casing and atmosphere. Samples collected for dissolved lead were filtered in the field using a 0.45-micron filter.

All samples were labeled and logged on the Sample Inventory Log, placed in Ziploc™ bags and sealed, custody sealed, sealed with tape, placed in a cooler with wet ice, and logged onto the Chain-of-Custody form. The samples were labeled and logged in accordance with DON Procedure III-E, Record Keeping, Sample Labeling, and Chain-of-Custody Procedures (DON, 2007). All samples were shipped under Chain-of-Custody to the analytical laboratory and analyzed for the COPCs as described in Section 2.2.

2.2 Analytical Results

The samples were analyzed for TPH-d using U.S. Environmental Protection Agency [EPA] Method 8015M, Total Petroleum Hydrocarbons as gasoline [TPH-g] and Volatile Organic Compounds [VOCs] using EPA Method 8260B, Polycyclic Aromatic Hydrocarbons [PAHs] using EPA Method 8270C SIM, and dissolved lead using EPA Method 6020. The analytical results are described below and summarized in Table 2.1. A copy of the laboratory report is included as Appendix C.

- **HDMW2253-03** – TPH-d (16 µg/L), was the only analyte detected. The concentration did not exceed the DOH EALs.
- **OWDFMW01** – TPH-d (24 and 16 µg/L) and acetone (13 µg/L in both primary and duplicate samples) were detected in both the primary and duplicate sample. None of the detected concentrations exceeded their respective DOH EALs.
- **RHMW04** – TPH-d (10 µg/L) was the only analyte detected. The concentration did not exceed the DOH EALs.

2.2.1 Groundwater Contaminant Trends

The historical groundwater contaminant concentration trends for COPCs that exceed the DOH EALs are illustrated in Appendix D. A table of cumulative historical groundwater results is included as Appendix E. A summary of groundwater contaminant trends is provided below.

- **HDMW2253-03** – TPH-d was detected in this well at a concentration below DOH EALs. With the exception of a possibly erroneous result obtained during the event in April 2014, TPH-d concentrations have not exceeded either DOH EAL in well HDMW2253-03 since January 2013.
- **OWDFMW01** – TPH-d was detected in both samples from this well at concentrations below DOH EALs. TPH-d concentrations in this well have been generally decreasing since an increase in November 2012. Concentrations of all other COPCs detected during this round of quarterly sampling were consistent with historical data.
- **RHMW04** – TPH-d was detected in this well at a concentration below DOH EALs. TPH-d had last been detected in well RHMW04 during the July 2014 sampling event, at a concentration below the DOH EALs. TPH-d had never been previously detected in the sampling that took place before April 2010 (although the laboratory reporting limits were significantly higher than the EALs for those results).

2.3 Waste Disposal

The purged groundwater and decontamination water generated during sampling of the wells were placed in a 55-gallon drum along with the purged water and decontamination water from the inside tunnel wells. The drum is currently stored onsite at ADIT 3 on top of a secondary containment spill pallet and covered by a tarp. There is a non-hazardous label affixed to the

drum with all pertinent information relating to its generation. The drum is nearly full and is currently pending disposal.

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TABLE 2.1
Analytical Results for Groundwater Sampling (January 26 and 29, 2015)
Red Hill Bulk Fuel Storage Facility
January 2015 Quarterly Monitoring Report

Method	Chemical	DOH EALs		OWDFMW01 (ES121X)					OWDFMW01 (ES122X) (Dup)					HDMW2253-03 (ES128)					RHMW04 (ES129)				
		Drinking Water Toxicity	Gross Contamination	Results	Q	LOQ	LOD	DL	Results	Q	LOQ	LOD	DL	Results	Q	LOQ	LOD	DL	Results	Q	LOQ	LOD	DL
EPA 8015B	TPH-d	190	100	24	HD,J	25	12	11	16	HD,J	27	14	12	16	HD,J	25	10	2.9	10	HD,J	25	10	2.9
EPA 8260B	TPH-g	100	100	N.D.	U	50	30	26	N.D.	U	50	30	26	N.D.	U	50	30	26	N.D.	N.D.	50	30	26
EPA 8270C SIM	Acenaphthene	370	20	N.D.	U	0.21	0.052	0.028	N.D.	U	0.2	0.051	0.027	N.D.	U	0.21	0.053	0.028	N.D.	U	0.21	0.052	0.028
	Acenaphthylene	240	2,000	N.D.	U	0.21	0.052	0.046	N.D.	U	0.2	0.051	0.045	N.D.	U	0.21	0.053	0.047	N.D.	U	0.21	0.052	0.046
	Anthracene	1,800	22	N.D.	U	0.21	0.052	0.030	N.D.	U	0.2	0.051	0.029	N.D.	U	0.21	0.053	0.031	N.D.	U	0.21	0.052	0.030
	Benzo[a]anthracene	0.092	4.7	N.D.	U	0.21	0.052	0.034	N.D.	U	0.2	0.051	0.033	N.D.	U	0.21	0.053	0.035	N.D.	U	0.21	0.052	0.034
	Benzo[g,h,i]perylene	1,500	0.13	N.D.	U	0.21	0.10	0.085	N.D.	U	0.2	0.10	0.084	N.D.	U	0.21	0.11	0.087	N.D.	U	0.21	0.10	0.085
	Benzo[a]pyrene	0.2	0.81	N.D.	U	0.21	0.052	0.023	N.D.	U	0.2	0.051	0.023	N.D.	U	0.21	0.053	0.024	N.D.	U	0.21	0.052	0.023
	Benzo[b]fluoranthene	0.092	0.75	N.D.	U	0.21	0.052	0.018	N.D.	U	0.2	0.051	0.018	N.D.	U	0.21	0.053	0.019	N.D.	U	0.21	0.052	0.018
	Benzo[k]fluoranthene	0.92	0.4	N.D.	U	0.21	0.052	0.032	N.D.	U	0.2	0.051	0.032	N.D.	U	0.21	0.053	0.033	N.D.	U	0.21	0.052	0.032
	Chrysene	9.2	1	N.D.	U	0.21	0.052	0.026	N.D.	U	0.2	0.051	0.025	N.D.	U	0.21	0.053	0.026	N.D.	U	0.21	0.052	0.026
	Dibenzo[a,h]anthracene[1]	0.0092	0.52	N.D.	U	0.21	0.052	0.049	N.D.	U	0.2	0.051	0.048	N.D.	U	0.21	0.053	0.051	N.D.	U	0.21	0.052	0.049
	Fluoranthene	1,500	130	N.D.	U	0.21	0.052	0.049	N.D.	U	0.2	0.051	0.049	N.D.	U	0.21	0.053	0.050	N.D.	U	0.21	0.052	0.048
	Fluorene	240	950	N.D.	U	0.21	0.052	0.044	N.D.	U	0.2	0.051	0.043	N.D.	U	0.21	0.053	0.045	N.D.	U	0.21	0.052	0.044
	Indeno[1,2,3-cd]pyrene	0.092	0.095	N.D.	U	0.21	0.052	0.022	N.D.	U	0.2	0.051	0.022	N.D.	U	0.21	0.053	0.023	N.D.	U	0.21	0.052	0.022
	1,-Methylnaphthalene	4.7	10	N.D.	U	0.21	0.10	0.054	N.D.	U	0.2	0.10	0.053	N.D.	U	0.21	0.11	0.055	N.D.	U	0.21	0.10	0.053
	2,-Methylnaphthalene	24	10	N.D.	U	0.21	0.052	0.048	N.D.	U	0.2	0.051	0.047	N.D.	U	0.21	0.053	0.049	N.D.	U	0.21	0.052	0.048
	Naphthalene	17	21	N.D.	U	0.21	0.052	0.035	N.D.	U	0.2	0.051	0.035	N.D.	U	0.21	0.053	0.036	N.D.	U	0.21	0.052	0.035
	Phenanthrene	240	410	N.D.	U	0.21	0.052	0.028	N.D.	U	0.2	0.051	0.028	N.D.	U	0.21	0.053	0.029	N.D.	U	0.21	0.052	0.028
	Pyrene	180	68	N.D.	U	0.2	0.052	0.021	N.D.	U	0.2	0.051	0.021	N.D.	U	0.21	0.053	0.022	N.D.	U	0.21	0.052	0.021
EPA 8260B	1,1,1,2-Tetrachloroethane	0.52	50,000	N.D.	U	1.0	0.5	0.40	N.D.	U	1.0	0.5	0.40	N.D.	U	1.0	0.5	0.40	N.D.	U	1.0	0.5	0.40
	1,1,2,2-Tetrachloroethane[1]	0.067	500	N.D.	U	1.0	0.5	0.41	N.D.	U	1.0	0.5	0.41	N.D.	U	1.0	0.5	0.41	N.D.	U	1.0	0.5	0.41
	1,1,1-Trichloroethane	200	970	N.D.	U	5.0	0.5	0.30	N.D.	U	5.0	0.5	0.30	N.D.	U	5.0	0.5	0.30	N.D.	U	5.0	0.5	0.30
	1,1,2-Trichloroethane	5	50,000	N.D.	U	1.0	0.5	0.38	N.D.	U	1.0	0.5	0.38	N.D.	U	1.0	0.5	0.38	N.D.	U	1.0	0.5	0.38
	1,1-Dichloroethane	2.4	50,000	N.D.	U	5.0	0.5	0.28	N.D.	U	5.0	0.5	0.28	N.D.	U	5.0	0.5	0.28	N.D.	U	5.0	0.5	0.28
	1,1-Dichloroethylene	7	1,500	N.D.	U	1.0	0.5	0.43	N.D.	U	1.0	0.5	0.43	N.D.	U	1.0	0.5	0.43	N.D.	U	1.0	0.5	0.43
	1,2,3-Trichloropropane[1]	0.6	50,000	N.D.	U	5.0	1.0	0.64	N.D.	U	5.0	1.0	0.64	N.D.	U	5.0	1.0	0.64	N.D.	U	5.0	1.0	0.64
	1,2,4-Trichlorobenzene	70	3,000	N.D.	U	5.0	1.0	0.5	N.D.	U	5.0	1.0	0.5	N.D.	U	5.0	1.0	0.5	N.D.	U	5.0	1.0	0.5
	1,2-Dibromo-3- chloropropane[1]	0.04	10	N.D.	U	10	2.0	1.2	N.D.	U	10	2.0	1.2	N.D.	U	10	2.0	1.2	N.D.	U	10	2.0	1.2
	1,2-Dibromoethane[1]	0.04	50,000	N.D.	U	1.0	0.5	0.36	N.D.	U	1.0	0.5	0.36	N.D.	U	1.0	0.5	0.36	N.D.	U	1.0	0.5	0.36
	1,2-Dichlorobenzene	600	10	N.D.	U	1.0	0.5	0.46	N.D.	U	1.0	0.5	0.46	N.D.	U	1.0	0.5	0.46	N.D.	U	1.0	0.5	0.46
	1,2-Dichloroethane[1]	0.15	7,000	N.D.	U	1.0	0.5	0.24	N.D.	U	1.0	0.5	0.24	N.D.	U	1.0	0.5	0.24	N.D.	U	1.0	0.5	0.24
	1,2-Dichloropropane	5	10	N.D.	U	5.0	0.5	0.42	N.D.	U	5.0	0.5	0.42	N.D.	U	5.0	0.5	0.42	N.D.	U	5.0	0.5	0.42
	1,3-Dichlorobenzene	180	5	N.D.	U	1.0	0.5	0.4	N.D.	U	1.0	0.5	0.4	N.D.	U	1.0	0.5	0.4	N.D.	U	1.0	0.5	0.4
	1,3-Dichloropropene (total of cis/trans)[1]	0.43	50,000	N.D.	U	1.0	0.5	0.25	N.D.	U	1.0	0.5	0.25	N.D.	U	1.0	0.5	0.25	N.D.	U	1.0	0.5	0.25
	1,4-Dichlorobenzene	75	5	N.D.	U	1.0	0.5	0.43	N.D.	U	1.0	0.5	0.43	N.D.	U	1.0	0.5	0.43	N.D.	U	1.0	0.5	0.43
	Acetone	22,000	20,000	13	J	20	13	6.0	13	J	20	10	6.0	N.D.	U,IJ	20	10	6.0	N.D.	U,IJ	20	10	6.0
	Benzene	5	170	N.D.	U	1.0	0.5	0.14	N.D.	U	1.0	0.5	0.14	N.D.	U	1.0	0.5	0.14	N.D.	U	1.0	0.5	0.14
	Bromodichloromethane[1]	0.12	50,000	N.D.	U	5.0	0.5	0.21	N.D.	U	5.0	0.5	0.21	N.D.	U	5.0	0.5	0.21	N.D.	U	5.0	0.5	0.21
	Bromoform	80	510	N.D.	U	10	1.0	0.50	N.D.	U	10	1.0	0.50	N.D.	U	10	1.0	0.50	N.D.	U	10	1.0	0.50
	Bromomethane	8.7	50,000	N.D.	U,IH	20	5.0	3.9	N.D.	U,IH	20	5.0	3.9	N.D.	U,IH	20	5.0	3.9	N.D.	U,IH	20	5.0	3.9
	Carbon Tetrachloride	5	520	N.D.	U	1.0	0.5	0.23	N.D.	U	1.0	0.5	0.23	N.D.	U	1.0	0.5	0.23	N.D.	U	1.0	0.5	0.23
	Chlorobenzene	100	50	N.D.	U	5.0	0.5	0.17	N.D.	U	5.0	0.5	0.17	N.D.	U	5.0	0.5	0.17	N.D.	U	5.0	0.5	0.17
	Chloroethane	21,000	16	N.D.	U	10	5.0	2.3	N.D.	U	10	5.0	2.3	N.D.	U	10	5.0	2.3	N.D.	U	10	5.0	2.3
	Chloroform	70	2,400	N.D.	U	5.0	0.5	0.46	N.D.	U	5.0	0.5	0.46	N.D.	U	5.0	0.5	0.46	N.D.	U	5.0	0.5	0.46
	Chloromethane[1]	1.8	50,000	N.D.	U	10	2.0	1.8	N.D.	U	10	2.0	1.8	N.D.	U	10	2.0	1.8	N.D.	U	10	2.0	1.8
	cis-1,2-Dichloroethylene	70	50,000	N.D.	U	1.0	0.5	0.48	N.D.	U	1.0	0.5	0.48	N.D.	U	1.0	0.5	0.48	N.D.	U	1.0	0.5	0.48
	Dibromochloromethane[1]	0.16	50,000	N.D.	U	1.0	0.5	0.25	N.D.	U	1.0	0.5	0.25	N.D.	U	1.0	0.5	0.25	N.D.	U	1.0	0.5	0.25
	Ethylbenzene	700	30	N.D.	U	1.0	0.5	0.14	N.D.	U	1.0	0.5	0.14	N.D.	U	1.0	0.5	0.14	N.D.	U	1.0	0.5	0.14
	Hexachlorobutadiene	0.86	6	N.D.	U	1.0	0.5	0.32	N.D.	U	1.0	0.5	0.32	N.D.	U	1.0	0.5	0.32	N.D.	U	1.0	0.5	0.32
	Methyl ethyl ketone (2-Butanone)	7,100	8,400	N.D.	U	10	5.0	2.2	N.D.	U	10	5.0	2.2	N.D.	U	10	5.0	2.2	N.D.	U	10	5.0	2.2
	Methyl isobutyl ketone (4-Methyl-2-Pentanone)	2,000	1300	N.D.	U	10	5.0	4.4	N.D.	U	10	5.0	4.4	N.D.	U	10	5.0	4.4	N.D.	U	10	5.0	4.4
	Methyl tert-butyl Ether	12	5	N.D.	U	1.0	0.5	0.31	N.D.	U	1.0	0.5	0.31	N.D.	U	1.0	0.5	0.31	N.D.	U	1.0	0.5	0.31
	Methylene chloride	4.8	9,100	N.D.	U	5.0	1.0	0.64	N.D.	U	5.0	1.0	0.64	N.D.	U	5.0	1.0	0.64	N.D.	U	5.0	1.0	0.64
	Styrene	100	10	N.D.	U	1.0	0.5	0.17	N.D.	U	1.0	0.5	0.17	N.D.	U	1.0	0.5	0.17	N.D.	U	1.0	0.5	0.17
	Tetrachloroethylene	5	170	N.D.	U	5.0	0.5	0.39	N.D.	U	5.0	0.5	0.39	N.D.	U	5.0	0.5	0.39	N.D.	U	5.0	0.5	0.39
	Toluene	1,000	40	N.D.	U	1.0	0.5	0.24	N.D.	U	1.0	0.5	0.24	N.D.	U	1.0	0.5	0.24	N.D.	U	1.0	0.5	0.24
	trans-1,2- Dichloroethylene	100	260	N.D.	U	1.0	0.5	0.37	N.D.	U	1.0	0.5	0.37	N.D.	U	1.0	0.5	0.37	N.D.	U	1.0	0.5	0.37
	Trichloroethylene	5	310	N.D.	U	1.0	0.5	0.37	N.D.	U	1.0	0.5	0.37	N.D.	U	1.0	0.5	0.37	N.D.	U	1.0	0.5	0.37
	Vinyl chloride	2	3,400	N.D.	U	1.0	0.5	0.30	N.D.	U	1.0	0.5	0.30	N.D.	U	1.0	0.5	0.30	N.D.	U	1.0	0.5	0.30
	Xylenes	10,000	20	N.D.	U	11	1.5	0.23	N.D.	U	11	1.5	0.23	N.D.	U	11	1.5	0.23	N.D.	U	11	1.5	0.23
EPA 6020	Dissolved Lead	15	50,000	N.D.	U	0.5	0.2	0.0898	N.D.	U	0.5	0.2	0.0898	N.D.	U	0.5	0.2	0.0898	N.D.	U	0.5	0.2	0.0898

The data are in micrograms per liter (µg/L).

[1] LOD for this analyte exceeds the DOH EAL

B Analyte was present in the associated method blank.

DOH EALs DOH Tier 1 Environmental Action Levels for groundwater where groundwater is a current drinking water source and surface water is greater than 150 meters from the site (DOH, Fall 2011).

DL Detection Limit or Method Detection Limit (MDL)

EPA Environmental Protection Agency

HD The chromatographic pattern was inconsistent with the profile of the reference fuel standard.

IH Calibration verification recovery is above the control limit for this analyte.

IJ Calibration verification recovery is below the control limit for this analyte.

J Analyte was detected at a concentration below the LOQ and above the DL. Reported value is estimated.

LOQ Limit of Quantitation

LOD Limit of Detection

N.D. Not Detected

Q Qualifiers

TPH-g Total Petroleum Hydrocarbons as gasoline

TPH-d Total Petroleum Hydrocarbons as diesel

U Undetected at DL and is reported as less than the LOD.

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SECTION 3 – DATA QUALITY ASSESSMENT

A data quality assessment, which consists of a review of the overall groundwater sample collection and analysis process, was performed in order to determine whether the analytical data generated met the quality objectives for the project. The data quality assessment was performed in accordance with the approved WP/SAP (ESI, 2012). The field Quality Control [QC] program consisted of standardized sample collection and management procedures, and the collection of field duplicate samples, matrix spike samples, and trip blank samples. The laboratory quality assurance program consisted of the use of standard analytical methods and the preparation and analyses of Matrix Spike [MS]/Matrix Spike Duplicate [MSD] samples, surrogate spikes, blanks, and Laboratory Control Samples [LCSs]/Laboratory Control Sample Duplicates [LCSDs].

3.1 DATA VALIDATION AND 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, Completeness, Comparability, and Sensitivity [PARCCS]. A number of factors may affect the quality of data, including: sample collection methods, sample analysis methods, and adherence to established procedures for sample collection, preservation, management, shipment, and analysis.

Precision

Precision is defined as the reproducibility of replicate measurements. Precision is evaluated by Relative Percentage Difference [RPD] of field duplicate, LCS/LCSD, and MS/MSD results. Field duplicate and MS/MSD samples were collected at a rate of approximately 25% of project samples. Field duplicates were sent to the laboratory along with the primary samples.

The RPDs of detected analytes for the primary and field duplicate samples (ES121X and ES122X) are provided in Table 3.1. An RPD of less than 50% for duplicate pairs is required by the DON *Project Procedures Manual* to be considered acceptable (DON, 2007). For this monitoring event, the RPDs for duplicate sample pairs all met acceptance criteria.

The RPD of 1,1,2,2-tetrachloroethane in the MS/MSD pair (137%) was above the control limit. The high RPD was likely caused by the extremely low recoveries of the analyte from the matrix, with concentrations close to or below the detection limit. Thus, the apparent precision issue was caused by the low bias in the data and is described in the accuracy section.

Several results for acetone were flagged “IJ”, indicating that the calibration verification recovery was below the control limit for this analyte. Results for bromomethane in all samples were flagged “IH”, indicating that the calibration verification recovery was above the control limit for this analyte. Because the concentrations of acetone detected in the samples were well below the DOH EALs, the flag indicating a potential high bias (IH) should not impact data usability. As bromomethane has never been detected in any of the three outside tunnel wells, a potential low bias should not have an effect on data usability.

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 of an analyte in a reference standard or spiked sample. Accuracy limits for surrogates, laboratory control spike, MS, and MSD samples are either prescribed by the Department of Defense [DoD] or established by the individual laboratory. The acceptance criteria for accuracy are dependent on the analytical method and are based on historical laboratory or DoD data.

Between August 2009 and July 2010, naphthalene was analyzed for by both EPA Methods 8260B and 8270C, and beginning in October 2010, only results using EPA Method 8270C were reported. Naphthalene was not detected in groundwater from either well HDMW2253-03 or OWDFMW01 until November 2012 and has never been detected in RHMW04; however, when both methods were used for samples collected from inside well RHMW02, concentrations of naphthalene detected by EPA Method 8260B were generally two to three times higher than those detected by EPA Method 8270C. We assume this is due to the better preservation of VOCs associated with the use of EPA Method 8260B. This suggests that the naphthalene results provided by EPA Method 8270C may be biased low. Naphthalene concentrations in samples collected beginning in October 2010 were analyzed using EPA Method 8270C and results may be biased low. However, naphthalene concentrations in project samples have been orders of magnitude below DOH EALs, and this potential low bias should not affect project decisions.

Results for TPH-d in all samples were flagged “HD.” The laboratory indicated a mismatch between the calibration standard and the TPH-d chromatographic profile. Mismatches of this type are not uncommon, and may indicate decreased accuracy of TPH-d results.

The laboratory indicated that the recovery of bromomethane from the continuing calibration verification sample was above the control limit, suggesting a high bias in the associated results. The analyte was not detected in any of the samples. The inaccuracy did not affect the usability of the data.

The MS and MSD recoveries for 1,1,2,2-tetrachloroethane and the MSD recovery for 1,2,3-trichloropropane were below the control limits. The MSD with low 1,2,3-trichloropropane recovery was not associated with any project samples (i.e., was performed on another client’s sample run within the same analytical batch) and was used by the laboratory for batch control only. Since the recovery of this analyte from the LCS within the same batch was acceptable, the recovery issues did not indicate any negative impact on the quality of the dataset.

In contrast, the recoveries of 1,1,2,2-tetrachloroethane from the MS/MSD performed on a sample (ES121X) collected from well OWDFMW01 were extremely low (0% and 3% respectively). A review of data from past events indicated that the analyte consistently recovered extremely low from MS/MSDs performed on samples collected from this well. Acceptable recovery of the analyte from the LCS confirmed that the issue was restricted to the matrix.

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Since pH values of the groundwater in well OWDFMW01 were high, it was hypothesized that chemical degradation of the base-labile 1,1,2,2-tetrachloroethane spike via base-catalyzed dehydrochlorination to trichloroethylene [TCE] may have been the cause for the failure to efficiently recover the compound from MS/MSD samples. Chemical degradation (via base catalyzed hydrolysis or dehydrochlorination) of other chlorinated analytes on the project target list spiked into the MS/MSD was expected to be slow (on the laboratory analysis time scale) and was not observed. The high recovery of the chemical degradation product of this reaction, TCE, from the MS/MSD supported the suggested explanation. Therefore, the failure to recover 1,1,2,2-tetrachloroethane from the MS/MSDs does not affect the usability of the dataset, since 1,1,2,2-tetrachloroethane would not be able to persist in the groundwater at the pH levels measured and would be detected as its degradation product, TCE (thus resulting in a high bias for TCE). TCE was not detected in the samples and the effect should be restricted to samples with high pH (OWDFMW01 only, in this case). When pH levels drop, the effect is expected to disappear.

The MS and MSD recoveries were above the control limits for acetone; the associated sample results may be biased high. The LCS recovery for acetone was also elevated, indicating that the high bias may have been caused by the analytical system rather than the sample matrix. However, concentrations of acetone were well below the DOH EALs, so a potential high bias should not affect data usability.

All other MS/MSD, LCS, and surrogate spike recoveries were within acceptable recovery limits; the data accuracy for this monitoring event is considered acceptable.

Representativeness

Representativeness is the degree to which data accurately and precisely represents a characteristic of a population, parameter variations at a sampling point, or an environmental condition. Representativeness was achieved by conducting sampling in accordance with the sample collection procedures described in the project WP/SAP, including standardized sample collection methods (ESI, 2012).

Representativeness is also evaluated through the compliance with the standardized sample holding time and sample preservation methods, and through the analysis of blank samples, including method blank and trip blank samples. For this sampling event, all sample holding time and sample preservation were consistent with EPA guidance.

For this sampling event, one trip blank was included in every cooler containing samples for VOC and TPH-g analysis to assess the potential for contamination during sample transport. Two trip blanks were collected. No COPCs were detected in either trip blank. Based on the assessment of the blanks submitted, the groundwater sample data are considered representative of the groundwater quality at the site. A summary of the trip blank results is provided in Table 3.1.

The consistently high pH (10 to 13) observed over several sampling events in well OWDFMW01 is atypical for the groundwater in the area and suggests, along with the presence of acetone,

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that the structural integrity of the well may have been impacted. Consequently, the associated sample data may not accurately represent the conditions of the groundwater at the site.

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 laboratory. No data were rejected for this project, and therefore the completeness goal for this project (90%) was successfully met.

Comparability

Comparability expresses the confidence with which one data set can be compared to another data set. 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. For this monitoring event, the samples were collected using approaches consistent with those in the previous events, and the same analytical methods/procedures were used to measure the concentration of COPCs. Therefore, the results are considered comparable within this data set and with the data collected from previous sampling events. The field and laboratory personnel followed standard operating procedures.

As discussed above, between August 2009 and July 2010, naphthalene was analyzed by both EPA Methods 8260B and 8270C, and beginning in October 2010, only results using EPA Method 8270C were reported. Naphthalene concentrations obtained using EPA Method 8270C may be biased low; however, naphthalene was not detected in groundwater from either well HDMW2253-03 or OWDFMW01 until November 2012 and has never been detected in RHMW04, so comparability with older results should not be a concern. If naphthalene concentrations increase, the low bias associated with Method 8270C should be considered when making project decisions.

All project samples for TPH-g analysis through July 2010 were analyzed by EPA Method 8015; beginning in October 2010, EPA Method 8260B was used. There was no event where both methods were used, and so there is no way to directly compare the results using each method and determine if one method produces biased results. However, there is no reason to believe that using either method should bias the data, and the TPH-g data for all events should be comparable.

Sensitivity

The limits of quantitation [LOQs] are established by the laboratory based on the limits of detection [LODs] or instrument detection limits, historical data, and EPA limits established for the various methods. The LOQs for samples may require adjustment due to matrix interference or if high levels of target analytes necessitate dilution before analysis. Matrix interference and sample dilutions have the effect of decreasing sensitivity and increasing the LOQs. Laboratory LODs and LOQs for several analytes (EPA Methods 8260 and 8270) for this event differed from

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the LODs and LOQs in the WP/SAP because the laboratory updates them quarterly and in some cases, dilution was necessary due to the presence of high concentrations of analytes.

For this event, LODs and LOQs for several analytes were greater than the DOH EALs (as stated in the WP/SAP) and therefore it is not possible to determine whether the analytes are present at concentrations greater than or equal to the DOH EALs. The lack of the required sensitivity should be considered when making project decisions. The affected analytes for this monitoring event are 1,2,3-trichloropropane, 1,2-dibromo-3-chloropropane, 1,2-dibromoethane, 1,2-dichloroethane, 1,3-dichloropropene, bromodichloromethane, chloromethane, dibromochloromethane, 1,1,2,2-tetrachloroethane, and dibenzo[a,h]anthracene. Additionally, the issues with the recovery of 1,1,2,2-tetrachloroethane from the groundwater sample OWDFMW01 have a considerable impact on the detection of the analyte in its unaltered form. However, according to the considerations described in the accuracy section of this document, the analyte, if present in the groundwater at the site, may be detected in the form of its base-catalyzed chemical degradation product TCE. TCE was not detected in the well.

3.2 Data Assessment and Usability Conclusions

The PARCCS criteria were evaluated, and with a few exceptions, all criteria were met. The MS/MSD recoveries of 1,1,2,2-tetrachloroethane were very low and are likely affected by the high pH in well OWDFMW01. This suggests that the high pH causes the chemical degradation of 1,1,2,2-tetrachloroethane in this well. However, given that the degradation product, TCE, was not detected in the well, it is unlikely that 1,1,2,2-tetrachloroethane is a contaminant of concern for well OWDFMW01, and this is unlikely to affect data usability.

Additionally, MS/MSD and LCS recoveries were above the control limits for acetone, suggesting a possible high bias for this COPC. However, concentrations of acetone were well below the DOH EALs, so a potential high bias should not affect data usability.

The LODs and LOQs for several analytes were greater than the DOH EALs. Although none of these analytes have historically been detected, the lack of the required sensitivity should be considered when making project decisions

As discussed above, due to the consistently high pH and the presence of acetone in well OWDFMW01, the associated sample data may not accurately represent the conditions of the groundwater at the site. No issues were identified that should significantly affect data usability for samples from wells HDMW2253-03 and RHMW04, and the data assessment concludes that all data generated during this event for these two wells are usable for their intended purpose.

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TABLE 3.1
Quality Control Results for Groundwater Sampling (January 26 and 29, 2015)
Red Hill Bulk Fuel Storage Facility
January 2015 Quarterly Monitoring Report

Method	Chemical Constituent	DOH EALs		OWDFMW01 (ES121X)					OWDFMW01 (ES122X) (Dup)					RPD Duplicate (%)	ES Trip (1/26/15)					ES Trip (1/29/15)				
		Drinking Water Toxicity	Gross Contamination	Results	Q	LOQ	LOD	DL	Results	Q	LOQ	LOD	DL		Results	Q	LOQ	LOD	DL	Results	Q	LOQ	LOD	DL
EPA 8015B	TPH-d	190	100	24	HD,J	25	12	11	16	HD,J	27	14	12	40.00	-	-	-	-	-	-	-	-	-	-
EPA 8260B	TPH-g	100	100	N.D.	U	50	30	26	N.D.	U	50	30	26	NA	N.D.	U	50	30	26	N.D.	U	50	30	26
EPA 8270C SIM	Acenaphthene	370	20	N.D.	U	0.21	0.052	0.028	N.D.	U	0.2	0.051	0.027	NA	-	-	-	-	-	-	-	-	-	-
	Acenaphthylene	240	2,000	N.D.	U	0.21	0.052	0.046	N.D.	U	0.2	0.051	0.045	NA	-	-	-	-	-	-	-	-	-	-
	Anthracene	1,800	22	N.D.	U	0.21	0.052	0.030	N.D.	U	0.2	0.051	0.029	NA	-	-	-	-	-	-	-	-	-	-
	Benzo[a]anthracene	0.092	4.7	N.D.	U	0.21	0.052	0.034	N.D.	U	0.2	0.051	0.033	NA	-	-	-	-	-	-	-	-	-	-
	Benzo[g,h,i]perylene	1,500	0.13	N.D.	U	0.21	0.10	0.085	N.D.	U	0.2	0.10	0.084	NA	-	-	-	-	-	-	-	-	-	-
	Benzo[a]pyrene	0.2	0.81	N.D.	U	0.21	0.052	0.023	N.D.	U	0.2	0.051	0.023	NA	-	-	-	-	-	-	-	-	-	-
	Benzo[b]fluoranthene	0.092	0.75	N.D.	U	0.21	0.052	0.018	N.D.	U	0.2	0.051	0.018	NA	-	-	-	-	-	-	-	-	-	-
	Benzo[k]fluoranthene	0.92	0.4	N.D.	U	0.21	0.052	0.032	N.D.	U	0.2	0.051	0.032	NA	-	-	-	-	-	-	-	-	-	-
	Chrysene	9.2	1	N.D.	U	0.21	0.052	0.026	N.D.	U	0.2	0.051	0.025	NA	-	-	-	-	-	-	-	-	-	-
	Dibenzo[a,h]anthracene	0.0092	0.52	N.D.	U	0.21	0.052	0.049	N.D.	U	0.2	0.051	0.048	NA	-	-	-	-	-	-	-	-	-	-
	Fluoranthene	1,500	130	N.D.	U	0.21	0.052	0.049	N.D.	U	0.2	0.051	0.049	NA	-	-	-	-	-	-	-	-	-	-
	Fluorene	240	950	N.D.	U	0.21	0.052	0.044	N.D.	U	0.2	0.051	0.043	NA	-	-	-	-	-	-	-	-	-	-
	Indeno[1,2,3-cd]pyrene	0.092	0.095	N.D.	U	0.21	0.052	0.022	N.D.	U	0.2	0.051	0.022	NA	-	-	-	-	-	-	-	-	-	-
	1,-Methylnaphthalene	4.7	10	N.D.	U	0.21	0.10	0.054	N.D.	U	0.2	0.10	0.053	NA	-	-	-	-	-	-	-	-	-	-
	2,-Methylnaphthalene	24	10	N.D.	U	0.21	0.052	0.048	N.D.	U	0.2	0.051	0.047	NA	-	-	-	-	-	-	-	-	-	-
	Naphthalene	17	21	N.D.	U	0.21	0.052	0.035	N.D.	U	0.2	0.051	0.035	NA	-	-	-	-	-	-	-	-	-	-
	Phenanthrene	240	410	N.D.	U	0.21	0.052	0.028	N.D.	U	0.2	0.051	0.028	NA	-	-	-	-	-	-	-	-	-	-
	Pyrene	180	68	N.D.	U	0.2	0.052	0.021	N.D.	U	0.2	0.051	0.021	NA	-	-	-	-	-	-	-	-	-	-
EPA 8260B	1,1,1,2-Tetrachloroethane	0.52	50,000	N.D.	U	1.0	0.5	0.40	N.D.	U	1.0	0.5	0.40	NA	N.D.	U	1.0	0.5	0.40	N.D.	U	1.0	0.5	0.40
	1,1,2,2-Tetrachloroethane	0.067	500	N.D.	U	1.0	0.5	0.41	N.D.	U	1.0	0.5	0.41	NA	N.D.	U	1.0	0.5	0.41	N.D.	U	1.0	0.5	0.41
	1,1,1-Trichloroethane	200	970	N.D.	U	5.0	0.5	0.30	N.D.	U	5.0	0.5	0.30	NA	N.D.	U	5.0	0.5	0.30	N.D.	U	5.0	0.5	0.30
	1,1,2-Trichloroethane	5	50,000	N.D.	U	1.0	0.5	0.38	N.D.	U	1.0	0.5	0.38	NA	N.D.	U	1.0	0.5	0.38	N.D.	U	1.0	0.5	0.38
	1,1-Dichloroethane	2.4	50,000	N.D.	U	5.0	0.5	0.28	N.D.	U	5.0	0.5	0.28	NA	N.D.	U	5.0	0.5	0.28	N.D.	U	5.0	0.5	0.28
	1,1-Dichloroethylene	7	1,500	N.D.	U	1.0	0.5	0.43	N.D.	U	1.0	0.5	0.43	NA	N.D.	U	1.0	0.5	0.43	N.D.	U	1.0	0.5	0.43
	1,2,3-Trichloropropane	0.6	50,000	N.D.	U	5.0	1.0	0.64	N.D.	U	5.0	1.0	0.64	NA	N.D.	U	5.0	1.0	0.64	N.D.	U	5.0	1.0	0.64
	1,2,4-Trichlorobenzene	70	3,000	N.D.	U	5.0	1.0	0.5	N.D.	U	5.0	1.0	0.5	NA	N.D.	U	5.0	1.0	0.5	N.D.	U	5.0	1.0	0.5
	1,2-Dibromo-3- chloropropane	0.04	10	N.D.	U	10	2.0	1.2	N.D.	U	10	2.0	1.2	NA	N.D.	U	10	2.0	1.2	N.D.	U	10	2.0	1.2
	1,2-Dibromoethane	0.04	50,000	N.D.	U	1.0	0.5	0.36	N.D.	U	1.0	0.5	0.36	NA	N.D.	U	1.0	0.5	0.36	N.D.	U	1.0	0.5	0.36
	1,2-Dichlorobenzene	600	10	N.D.	U	1.0	0.5	0.46	N.D.	U	1.0	0.5	0.46	NA	N.D.	U	1.0	0.5	0.46	N.D.	U	1.0	0.5	0.46
	1,2-Dichloroethane	0.15	7,000	N.D.	U	1.0	0.5	0.24	N.D.	U	1.0	0.5	0.24	NA	N.D.	U	1.0	0.5	0.24	N.D.	U	1.0	0.5	0.24
	1,2-Dichloropropane	5	10	N.D.	U	5.0	0.5	0.42	N.D.	U	5.0	0.5	0.42	NA	N.D.	U	5.0	0.5	0.42	N.D.	U	5.0	0.5	0.42
	1,3-Dichlorobenzene	180	5	N.D.	U	1.0	0.5	0.4	N.D.	U	1.0	0.5	0.4	NA	N.D.	U	1.0	0.5	0.4	N.D.	U	1.0	0.5	0.4
	1,3-Dichloropropene (total of cis/trans)	0.43	50,000	N.D.	U	1.0	0.5	0.25	N.D.	U	1.0	0.5	0.25	NA	N.D.	U	1.0	0.5	0.25	N.D.	U	1.0	0.5	0.25
	1,4-Dichlorobenzene	75	5	N.D.	U	1.0	0.5	0.43	N.D.	U	1.0	0.5	0.43	NA	N.D.	U	1.0	0.5	0.43	N.D.	U	1.0	0.5	0.43
	Acetone	22,000	20,000	13	J	20	13	6.0	13	J	20	10	6.0	0.00	N.D.	U	20	10	6.0	N.D.	U,IJ	20	10	6.0
	Benzene	5	170	N.D.	U	1.0	0.5	0.14	N.D.	U	1.0	0.5	0.14	NA	N.D.	U	1.0	0.5	0.14	N.D.	U	1.0	0.5	0.14
	Bromodichloromethane	0.12	50,000	N.D.	U	5.0	0.5	0.21	N.D.	U	5.0	0.5	0.21	NA	N.D.	U	5.0	0.5	0.21	N.D.	U	5.0	0.5	0.21
	Bromoform	80	510	N.D.	U	10	1.0	0.50	N.D.	U	10	1.0	0.50	NA	N.D.	U	10	1.0	0.50	N.D.	U	10	1.0	0.50
	Bromomethane	8.7	50,000	N.D.	U,IH	20	5.0	3.9	N.D.	U,IH	20	5.0	3.9	NA	N.D.	U,IH	20	5.0	3.9	N.D.	U, IH	20	5.0	3.9
	Carbon Tetrachloride	5	520	N.D.	U	1.0	0.5	0.23	N.D.	U	1.0	0.5	0.23	NA	N.D.	U	1.0	0.5	0.23	N.D.	U	1.0	0.5	0.23
	Chlorobenzene	100	50	N.D.	U	5.0	0.5	0.17	N.D.	U	5.0	0.5	0.17	NA	N.D.	U	5.0	0.5	0.17	N.D.	U	5.0	0.5	0.17
	Chloroethane	21,000	16	N.D.	U	10	5.0	2.3	N.D.	U	10	5.0	2.3	NA	N.D.	U	10	5.0	2.3	N.D.	U	10	5.0	2.3
	Chloroform	70	2,400	N.D.	U	5.0	0.5	0.46	N.D.	U	5.0	0.5	0.46	NA	N.D.	U	5.0	0.5	0.46	N.D.	U	5.0	0.5	0.46
	Chloromethane	1.8	50,000	N.D.	U	10	2.0	1.8	N.D.	U	10	2.0	1.8	NA	N.D.	U	10	2.0	1.8	N.D.	U,	10	2.0	1.8
	cis-1,2-Dichloroethylene	70	50,000	N.D.	U	1.0	0.5	0.48	N.D.	U	1.0	0.5	0.48	NA	N.D.	U	1.0	0.5	0.48	N.D.	U	1.0	0.5	0.48
	Dibromochloromethane	0.16	50,000	N.D.	U	1.0	0.5	0.25	N.D.	U	1.0	0.5	0.25	NA	N.D.	U	1.0	0.5	0.25	N.D.	U	1.0	0.5	0.25
	Ethylbenzene	700	30	N.D.	U	1.0	0.5	0.14	N.D.	U	1.0	0.5	0.14	NA	N.D.	U	1.0	0.5	0.14	N.D.	U	1.0	0.5	0.14
	Hexachlorobutadiene	0.86	6	N.D.	U	1.0	0.5	0.32	N.D.	U	1.0	0.5	0.32	NA	N.D.	U	1.0	0.5	0.32	N.D.	U	1.0	0.5	0.32
	Methyl ethyl ketone (2-Butanone)	7,100	8,400	N.D.	U	10	5.0	2.2	N.D.	U	10	5.0	2.2	NA	N.D.	U	10	5.0	2.2	N.D.	U	10	5.0	2.2
	Methyl isobutyl ketone (4-Methyl-2-Pentanone)	2,000	1300	N.D.	U	10	5.0	4.4	N.D.	U	10	5.0	4.4	NA	N.D.	U	10	5.0	4.4	N.D.	U	10	5.0	4.4
	Methyl tert-butyl Ether	12	5	N.D.	U	1.0	0.5	0.31	N.D.	U	1.0	0.5	0.31	NA	N.D.	U	1.0	0.5	0.31	N.D.	U	1.0	0.5	0.31
	Methylene chloride	4.8	9,100	N.D.	U	5.0	1.0	0.64	N.D.	U	5.0	1.0	0.64	NA	N.D.	U	5.0	1.0	0.64	N.D.	U	5.0	1.0	0.64
	Styrene	100	10	N.D.	U	1.0	0.5	0.17	N.D.	U	1.0	0.5	0.17	NA	N.D.	U	1.0	0.5	0.17	N.D.	U	1.0	0.5	0.17
	Tetrachloroethylene	5	170	N.D.	U	5.0	0.5	0.39	N.D.	U	5.0	0.5	0.39	NA	N.D.	U	5.0	0.5	0.39	N.D.	U	5.0	0.5	0.39
	Toluene	1,000	40	N.D.	U	1.0	0.5	0.24	N.D.	U	1.0	0.5	0.24	NA	N.D.	U	1.0	0.5	0.24	N.D.	U	1.0	0.5	0.24
	trans-1,2- Dichloroethylene	100	260	N.D.	U	1.0	0.5	0.37	N.D.	U	1.0	0.5	0.37	NA	N.D.	U	1.0	0.5	0.37	N.D.	U	1.0	0.5	0.37
	Trichloroethylene	5	310	N.D.	U	1.0	0.5	0.37	N.D.	U	1.0	0.5	0.37	NA	N.D.	U	1.0	0.5	0.37	N.D.	U	1.0	0.5	0.37
	Vinyl chloride	2	3,400	N.D.	U	1.0	0.5	0.30	N.D.	U	1.0	0.5	0.30	NA	N.D.	U	1.0	0.5	0.30	N.D.	U	1.0	0.5	0.30
	Xylenes	10,000	20	N.D.	U	11	1.5	0.23	N.D.	U	11	1.5	0.23	NA	N.D.	U	11	1.5	0.23	N.D.	U	11	1.5	0.23
EPA 6020	Dissolved Lead	15	50,000	N.D.	U	0.5	0.2	0.0898	N.D.	U	0.5	0.2	0.0898	NA	-	-	-	-	-	-	-	-	-	-

The data are in micrograms per liter (µg/L).

DOH EALs — DOH Tier 1 Environmental Action Levels for groundwater where groundwater is a current drinking water source and surface water is greater than 150 meters from the site (DOH, Fall 2011).
DL — Detection Limit or Method Detection Limit (MDL)
EPA — Environmental Protection Agency
HD — The chromatographic pattern was inconsistent with the profile of the reference fuel standard.
IH — Calibration verification recovery is above the control limit for this analyte.
IJ — Calibration verification recovery is below the control limit for this analyte.
J — Analyte was detected at a concentration below the LOQ and above the DL. Reported value is estimated.
LOD — Limit of Detection
LOQ — Limit of Quantitation
NA — Both results for duplicate pair were non-detect, no RPD calculations
N.D. — Not Detected
Q — Qualifiers
TPH-g — Total Petroleum Hydrocarbons as gasoline
TPH-d — Total Petroleum Hydrocarbons as diesel
U — Undetected at DL and is reported as less than the LOD.

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SECTION 4 – SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

This quarterly monitoring report presents the results of groundwater sampling conducted on January 26 and 29, 2015, at the RHSF, JBPHH, Hawaii. The RHSF is located in Halawa Heights on the Island of Oahu. The DOH Facility ID number for the RHSF is 9-102271. The DOH Release ID numbers are 990051, 010011, 020028, and 140010.

The groundwater sampling was conducted as part of the long-term groundwater and soil vapor monitoring program at the RHSF, under NAVFAC Contract Number N62742-12-D-1853. The sampling was conducted in accordance with the approved WP/SAP prepared by ESI.

ESI personnel collected groundwater samples from three monitoring wells (wells HDMW2253-03, OWDFMW01, and RHMW04). A primary and duplicate groundwater sample were collected from well OWDFMW01. A summary of the analytical results is provided below.

- **HDMW2253-03** – TPH-d (16 µg/L), was the only analyte detected. The concentration did not exceed the DOH EALs.
- **OWDFMW01** – TPH-d (24 and 16 µg/L) and acetone (13 µg/L in both primary and duplicate samples) were detected in both the primary and duplicate sample. None of the detected concentrations exceeded their respective DOH EALs. As discussed in Section 3, due to the consistently high pH and the presence of acetone in well OWDFMW01, the associated sample data may not accurately represent the conditions of the groundwater at the site.
- **RHMW04** – TPH-d (10 µg/L) was the only analyte detected. The concentration did not exceed the DOH EALs.

Groundwater Contaminant Trends

Historical groundwater contaminant concentration trends of COPCs that exceeded the DOH EALs are presented in Appendix D. A summary of groundwater contaminant trends for the three monitoring wells is provided below.

- **HDMW2253-03** – TPH-d was detected in this well at a concentration below DOH EALs. With the exception of a possibly erroneous result obtained during the event in April 2014, TPH-d concentrations have not exceeded either DOH EAL in well HDMW2253-03 since January 2013.
- **OWDFMW01** – TPH-d was detected in both samples from this well at concentrations below DOH EALs. TPH-d concentrations in this well have generally been decreasing since an increase in November 2012. Concentrations of all other COPCs detected during this round of quarterly sampling were consistent with historical data.
- **RHMW04** – TPH-d was detected in this well at a concentration below DOH EALs. TPH-d had last been detected in well RHMW04 during the July 2014 sampling event, at a concentration below the DOH EALs. TPH-d had never been previously detected in the

sampling that took place before April 2010 (although the laboratory reporting limits were significantly higher than the EALs for those results).

Conclusions and Recommendations

Since the outside wells were last sampled (October 2014), groundwater contaminant concentrations remained at low concentrations and did not change significantly, or were not detected. No COPCs were detected at concentrations above their respective DOH EAsL.

For this event, LODs and LOQs for several analytes were greater than the DOH EALs. However, with the exception of 1,2-dichloroethane, these analytes are not likely to be related to a fuel release, and these elevated LODs and LOQs should not have a significant impact on project objectives.

Acetone has been detected in well OWDFMW01 at low concentrations occasionally since October 2010 and then in every groundwater sampling event since April 2013. The well also has an unnaturally high pH in the range of 10 to 13. As discussed in Section 3, these conditions are likely unrelated to a release from the USTs at RHSF and may be a result of inadequately cured concrete or another condition isolated to the immediate area of the well. This suggests that the associated sample data may not accurately represent the conditions of the groundwater at the site.

Based on a suspected 2014 release at the RHSF and the results of the recent groundwater sampling and analysis, continued groundwater monitoring at the RHSF is recommended. If the TPH-d concentrations significantly increase, the monitoring frequency should be increased to monthly, even though wells RHMW04, HDMW2253-03, and OWDFMW01 are not included in the RHSF Groundwater Protection Plan.

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SECTION 5 – FUTURE WORK

Future work includes the second quarter 2015 groundwater monitoring, which is tentatively scheduled for April 2015. A quarterly groundwater monitoring report will be prepared to document the sampling.

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FIGURES

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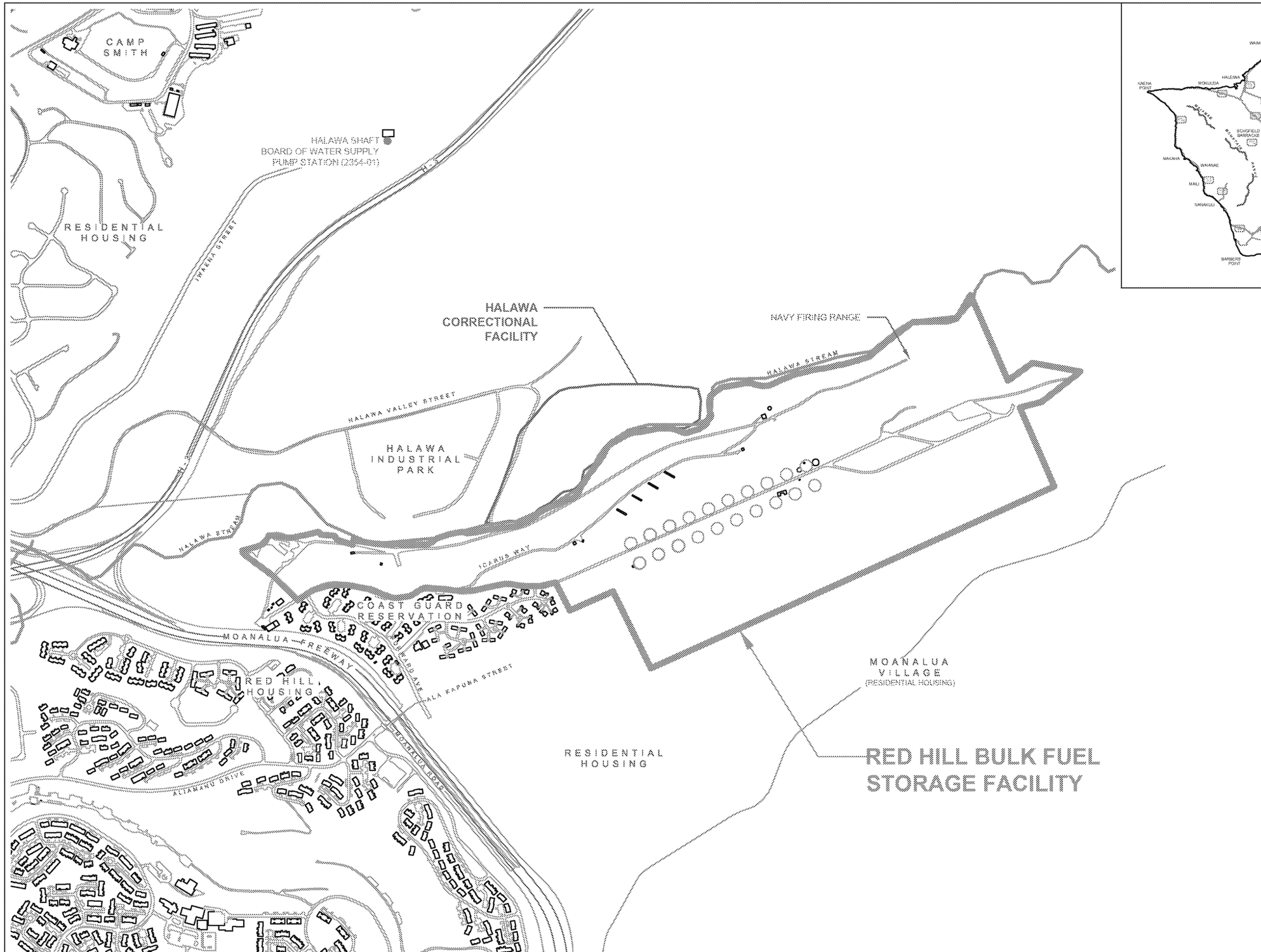

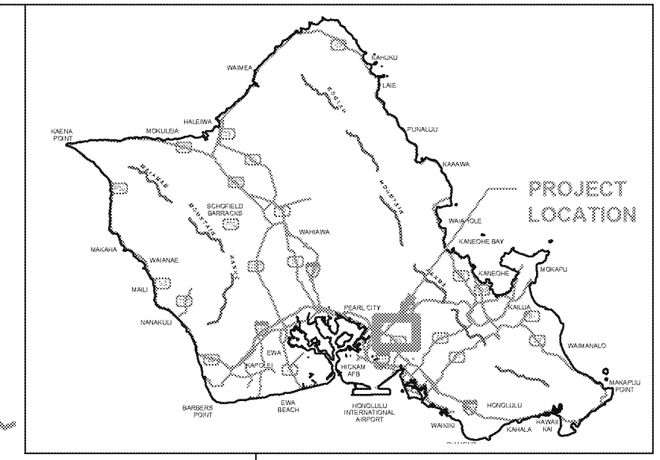

NOTES

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SOURCES

Pearl Harbor Base Map

Navy GIS files

NORTH

GRAPHIC SCALE

900 0 900

Scale in Feet

FIGURE 1

SITE LOCATION

GROUNDWATER MONITORING
RED HILL BULK FUEL STORAGE FACILITY
NAVAL SUPPLY SYSTEM COMMAND (NAVSUP)
FLEET LOGISTICS CENTER
JBPHH, OAHU, HAWAII

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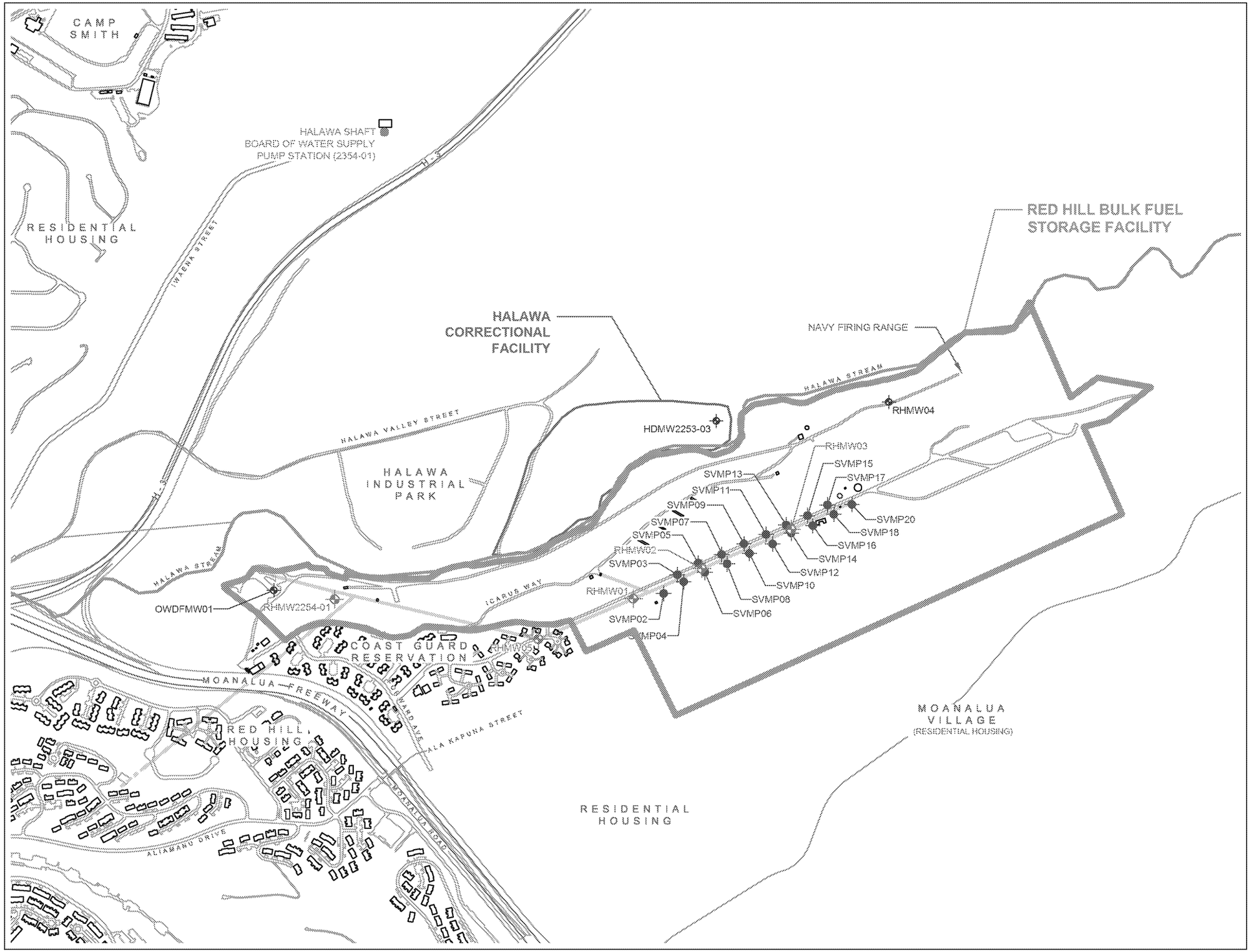

LEGEND

- RED HILL BULK FUEL STORAGE FACILITY
- HALAWA CORRECTIONAL FACILITY
- HALAWA STREAM
- BUILDING
- ROAD
- ABOVEGROUND STORAGE TANK
- WATER TANK
- SOIL VAPOR MONITORING POINT
- GROUNDWATER MONITORING WELL LOCATED INSIDE TUNNEL
- GROUNDWATER MONITORING WELL LOCATED OUTSIDE TUNNEL
- BOARD OF WATER SUPPLY PUMP STATION
- TUNNEL

NOTES

The accuracy of this document is limited to the quality and scale of the source information. This document is not a legal representation of an engineered survey.

SOURCES

Pearl Harbor Base Map

Navy GIS files

NORTH

GRAPHIC SCALE

800 0 800

Scale in Feet

FIGURE 2

SITE LAYOUT

GROUNDWATER MONITORING
RED HILL BULK FUEL STORAGE FACILITY
NAVAL SUPPLY SYSTEM COMMAND (NAVSUP)
FLEET LOGISTICS CENTER
JBPHH, OAHU, HAWAII

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APPENDIX A

Groundwater Sampling Logs

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Groundwater Sampling Log

Well ID: OWDFMW01 Location: Red Hill Bulk Fuel Storage Facility Project No.: 112066

Initial Water Level: 120.54 ft Date: 1/26/2015 Time: 928

Total Depth of Well: 144.74 ft Personnel Involved: Kirk Markle, Jeff Hattemer

Length of Saturated Zone: 24.2 ft Weather Conditions: Hot, sunny

Volume of Water to be Removed: 5.0 L Method of Removal: Disposable Hand Bailer

Water Level After Purging: 120.97 ft Pumping Rate: 0.22 L/min

Well Purge Data:

Time	Volume Removed	pH	Conductivity (mS/cm)	DO (mg/l)	Temperature	Salinity	Redox (ORP) (mV)
935	0.0 L	11.10	2.897	3.28	23.69	-	-33.8
940	1.0 L	11.10	2.973	3.73	23.47	-	-30.4
945	2.0 L	11.19	2.984	0.60	23.49	-	-32.1
950	3.0 L	11.26	2.991	2.82	23.56	-	-42.4
953	4.0 L	11.28	2.984	2.32	23.40	-	-43.4
958	5.0 L	11.26	2.983	2.63	23.55	-	-35.6

Sample Withdrawal Method: Disposable Hand Bailer

Appearance of Sample:

Color: Clear

Turbidity: Low

Sediment: White Particles

Other: None

Laboratory Analysis Parameters and Preservatives: TPH-d - 8015; TPH-g, VOCs - 8260; PAHs - 8270c sim; lead - 6020

Number and Types of Sample Containers: 16 - 40ml VOAs, 6 - 1L amber jar, 4 - 500ml amber jar, 4 - 500ml HDPE

Sample Identification Numbers: ES0121X, ES0121X MS/MSD [1030]; ES122X [1130]

Decontamination Procedures: Triple Rinsed

Notes: YSI did not have salinity parameter

Sampled by: Kirk Markle, Jeff Hattemer

Sampled Delivered to: Calscience Environmental Lab Transporters: FedEx

Date: 1/26/2015 Time: 1300

Capacity of Casing (Gallons/Linear Feet)

2"-0.16• 4"-0.65 • 8"-2.61 • 10"-4.08 • 12"-5.87

App A Out

Groundwater Sampling Log

Well ID: HDMW2253-03 Location: Red Hill Bulk Fuel Storage Facility Project No.: 112066

Initial Water Level: 206.67 ft Date: 1/29/2015 Time: 844

Total Depth of Well: 1575 ft Personnel Involved: Kirk Markle, Jeff Hattemer

Length of Saturated Zone: 1368 ft Weather Conditions: Overcast

Volume of Water to be Removed: 5.0 L Method of Removal: Disposable Hand Bailer

Water Level After Purging: 206.67 ft Pumping Rate: 0.14 L/min

Well Purge Data:

Time	Volume Removed	pH	Conductivity (mS/cm)	DO (mg/l)	Temperature	Salinity	Redox (ORP) (mV)
855	0.0 L	7.00	0.509	8.42	22.20	-	-79.6
904	1.0 L	6.59	0.473	0.03	22.22	-	-60.7
913	2.0 L	6.58	0.472	0.02	22.33	-	-62.8
920	3.0 L	6.54	0.469	0.03	22.31	-	-64.3
924	4.0 L	6.54	0.471	0.02	22.29	-	-55.6
928	5.0 L	6.57	0.469	0.02	22.32	-	-63.8

Sample Withdrawal Method: Disposable Hand Bailer

Appearance of Sample:

Color: Tan

Turbidity: Low

Sediment: Tiny rust flakes

Other: None

Laboratory Analysis Parameters and Preservatives: TPH-d - 8015; TPH-g, VOCs - 8260; PAHs - 8270c sim; lead - 6020

Number and Types of Sample Containers: 6 - 40ml VOAs, 2 - 1L amber jar, 1 - 500ml amber jar, 1 - 250ml HDPE

Sample Identification Numbers: ES128 [0930]

Decontamination Procedures: Triple Rinsed

Notes: YSI did not have salinity parameter.

Sampled by: Kirk Markle, Jeff Hattemer

Sampled Delivered to: Calscience Environmental Lab Transporters: FedEx

Date: 1/29/2015 Time: 1400

Capacity of Casing (Gallons/Linear Feet)

2"-0.16• 4"-0.65 • 8"-2.61 • 10"-4.08 • 12"-5.87

App A Out

Groundwater Sampling Log

Well ID: RHMW04 Location: Red Hill Bulk Fuel Storage Facility Project No.: 114017

Initial Water Level: 293.91 ft Date: 1/29/2015 Time: 1110

Total Depth of Well: 305 ft Personnel Involved: Kirk Markle, Jeff Hattemer

Length of Saturated Zone: 11 ft Weather Conditions: Light Rain

Volume of Water to be Removed: 7.0 L Method of Removal: Dedicated Bladder Pump

Water Level After Purging: 293.88 ft Pumping Rate: 0.32 L/min

Well Purge Data:

Time	Volume Removed	pH	Conductivity (mS/cm)	DO (mg/l)	Temperature	Salinity	Redox (ORP) (mV)
1120	0.0 L	7.80	0.431	7.69	22.89	-	80.6
1124	1.0 L	7.81	0.430	6.76	22.83	-	82.6
1127	2.0 L	7.73	0.426	6.67	22.59	-	91.5
1130	3.0 L	7.68	0.412	6.66	22.29	-	97.7
1133	4.0 L	7.58	0.408	6.74	22.25	-	97.7
1136	5.0 L	7.48	0.408	6.65	22.21	-	98.0
1139	6.0 L	7.46	0.407	6.84	22.20	-	98.3
1142	7.0 L	7.31	0.406	6.81	22.12	-	98.3

Sample Withdrawal Method: Dedicated Bladder Pump

Appearance of Sample:

Color: Clear

Turbidity: None

Sediment: None

Other: None

Laboratory Analysis Parameters and Preservatives: TPH-d - 8015; TPH-g, VOCs - 8260; PAHs - 8270c sim; lead - 6020

Number and Types of Sample Containers: 6 - 40ml VOAs, 2 - 1L amber jar, 1 - 500ml amber jar, 1 - 250ml HDPE

Sample Identification Numbers: ES129 [1215]

Decontamination Procedures: Triple Rinsed

Notes: YSI did not have salinity parameter.

Sampled by: Kirk Markle, Jeff Hattemer

Sampled Delivered to: Calscience Environmental Lab Transporters: FedEx

Date: 1/29/2015 Time: 1400

Capacity of Casing (Gallons/Linear Feet)

2"-0.16• 4"-0.65 • 8"-2.61 • 10"-4.08 • 12"-5.87

App A Out

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APPENDIX B

Field Notes

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Location RHSF Date 12/23/14

Project / Client NAVFAC

1333 SVMP20

S	1183	1231	1262	1262	1227
M	1094	1254	1372	1372	1273
D	1195	1546	1661	1661	1516

1400 Done sampling. Depart Red Hill

JH

12/23/14

Location RHSF Date 1/26/15

Project / Client NAVFAC

Purpose: GW, SV sampling
Personnel: JH, KM
0800 Meet @ RHSF. Calibrate PID (VOC = 10.4 ppm) safety meeting
0830 @ Elevator. Both elevators broken. Call Red Hill main office and they confirm.
0900 Call Chris Lau and Darren Uchima and leave message.
0920 Set up @ OWDFMW01
0928 Gauge OWDFMW01 DTW = 120.54 btoc
1030 Collected samples ES121 & ES121 MS/MSD, & ES122 (labeled as 1130)
1145 Packed samples, dumped IDW water. Bad for hands
1225 Head to Fed Ex
1245 Drop off samples
1300 Pick up nitrogen tank at Air gas.

Location RHSF Date 1/26/15

Project / Client NAVFAC

1350 Back @ office Drop off ice

OH

1/26/15

- tank fittings
- flexible tubing
- bucket lids
- gallon bags

Location RHSF Date 1/27/15

Project / Client NAVFAC

Purpose: GW sampling
Personnel: JA, KM
0800 @ RHSF. Safety meeting
0830 @ Adit 3 pump house
0855 Gauge RHMW2254-01
DTW = 81.37
0903 Begin purge RHMW2254-01
0930 Collected sample ES125
& ES125 UF
1015 Set up @ RHMW05
Leak in air line. Cut
and reattach fittings
Begin purge RHMW05
Collected sample ES124
1205 Set up @ RHMW01
Gauge RHMW01
DTW = 83.63' btoc
Begin purge RHMW01
1300 Collected sample ES120
1410 Depart tunnel and pack
samples.
1430 Done cleaning up. Depart
Red Hill
1500 Dropped off samples @
Fed Ex. JA 1/27/15

Location: RHSF Date: 1/29/15

Project / Client: NAVFAC

Purpose: GW sampling
Weather: Overcast
Personel: JH KM
0810 @ Halawa. Safety meeting
0830 Patrick Casey of DLNR onsite. Check in at prison
0840 @ HDM W2253-03.
0844 Gauge well, DTW= 206.67
0855 Begin ~~gauge~~ purging well
0930 Collected sample ES128
1000 Depart Halawa,
1015 Enter Red Hill to set up @ RHMW04, DTW= 293.91
1040 Moderate to heavy rain.
1120 Begin purging RHMW04
1215 Collected sample ES129.
~~Pack~~ Pack samples, clean up, drop off IDW
1245 Drop off samples @ Fed Ex.
1300 Lunch
1330 Drop off Nitrogen tank @ Air gas
1400 Back to office JH 1/29/15

Location: Date:

Project / Client:

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APPENDIX C

Laboratory Reports

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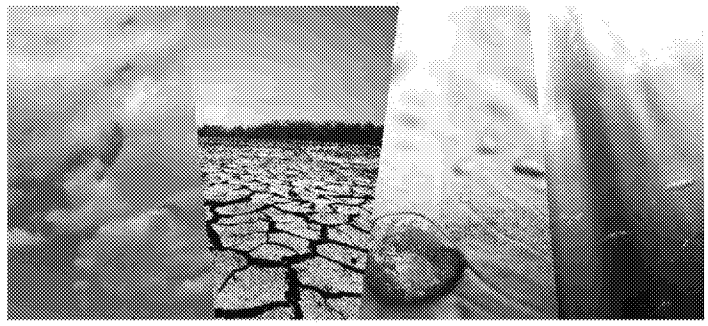
WORK ORDER NUMBER: 15-01-1609

The difference is service



AIR | SOIL | WATER | MARINE CHEMISTRY

Analytical Report For

Client: Environmental Science International, Inc.

Client Project Name: Red Hill LTM 112066

Attention: Jeff Hattemer
354 Uluniu Street, Suite 304
Kailua, HI 96734-2500

Approved for release on 02/03/2015 by:
Terri Chang
Project Manager

ResultLink ▸

Email your PM ▸

Eurofins Calscience, Inc. (Calscience) certifies that the test results provided in this report meet all NELAC requirements for parameters for which accreditation is required or available. Any exceptions to NELAC requirements are noted in the case narrative. The original report of subcontracted analyses, if any, is attached to this report. The results in this report are limited to the sample(s) tested and any reproduction thereof must be made in its entirety. The client or recipient of this report is specifically prohibited from making material changes to said report and, to the extent that such changes are made, Calscience is not responsible, legally or otherwise. The client or recipient agrees to indemnify Calscience for any defense to any litigation which may arise.

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NELAP ID: 03205CA | ACLASS DoD ELAP ID: ADE-1884 (ISO/IEC 17025:2005) | DSDLAC ID: 10109 | SCAQMD ID: 93LA0836

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Work Order Number: 15-01-1609

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Work Order Narrative

Work Order: 15-01-1609 Page 1 of 1

Condition Upon Receipt:

Samples were received under Chain-of-Custody (COC) on 01/27/15. They were assigned to Work Order 15-01-1609.

Unless otherwise noted on the Sample Receiving forms all samples were received in good condition and within the recommended EPA temperature criteria for the methods noted on the COC. The COC and Sample Receiving Documents are integral elements of the analytical report and are presented at the back of the report.

Holding Times:

All samples were analyzed within prescribed holding times (HT) and/or in accordance with the Calscience Sample Acceptance Policy unless otherwise noted in the analytical report and/or comprehensive case narrative, if required.

Any parameter identified in 40CFR Part 136.3 Table II that is designated as "analyze immediately" with a holding time of <= 15 minutes (40CFR-136.3 Table II, footnote 4), is considered a "field" test and the reported results will be qualified as being received outside of the stated holding time unless received at the laboratory within 15 minutes of the collection time.

Quality Control:

All quality control parameters (QC) were within established control limits except where noted in the QC summary forms or described further within this report.

Additional Comments:

Air - Sorbent-extracted air methods (EPA TO-4A, EPA TO-10, EPA TO-13A, EPA TO-17): Analytical results are converted from mass/sample basis to mass/volume basis using client-supplied air volumes.

New York NELAP air certification does not certify for all reported methods and analytes, reference the accredited items here: http://www.calscience.com/PDF/New_York.pdf

Solid - Unless otherwise indicated, solid sample data is reported on a wet weight basis, not corrected for % moisture. All QC results are always reported on a wet weight basis.

The client requested the sample IDs changed to ES121X and ES122X on 01/29/2015 to differentiate the Q1 2015 ID numbers from the ones used for Q4 2014.

Subcontractor Information:

Unless otherwise noted below (or on the subcontract form), no samples were subcontracted.

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Analytical Report

Environmental Science International, Inc.		Date Received:	01/27/15
354 Uluniu Street, Suite 304		Work Order:	15-01-1609
Kailua, HI 96734-2500		Preparation:	EPA 3510C
		Method:	EPA 8015B (M)
		Units:	ug/L
Project: Red Hill LTM 112066			Page 1 of 1

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
ES121X	**15-01-1609-2-H**	**01/26/15 10:30**	**Aqueous**	**GC 46**	**01/28/15**	**01/30/15 10:15**	**150128B14**

Comment(s): - Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	DL	LOD	LOQ	DF	Qualifiers
TPH as Diesel	24	11	12	25	1.00	HD,J

Surrogate	Rec. (%)	Control Limits	Qualifiers
n-Octacosane	93	51-141	

ES122X	**15-01-1609-3-H**	**01/26/15 11:30**	**Aqueous**	**GC 46**	**01/28/15**	**01/30/15 10:31**	**150128B14**

Comment(s): - Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	DL	LOD	LOQ	DF	Qualifiers
TPH as Diesel	16	12	14	27	1.00	HD,J

Surrogate	Rec. (%)	Control Limits	Qualifiers
n-Octacosane	92	51-141	

Method Blank	**099-15-516-236**	**N/A**	**Aqueous**	**GC 46**	**01/28/15**	**01/30/15 06:18**	**150128B14**

Comment(s): - Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	DL	LOD	LOQ	DF	Qualifiers
TPH as Diesel	<12	11	12	25	1.00	U

Surrogate	Rec. (%)	Control Limits	Qualifiers
n-Octacosane	71	51-141	

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Analytical Report

Environmental Science International, Inc.		Date Received:	01/27/15
354 Uluniu Street, Suite 304		Work Order:	15-01-1609
Kailua, HI 96734-2500		Preparation:	EPA 3005A Filt.
		Method:	EPA 6020
		Units:	ug/L
Project: Red Hill LTM 112066			Page 1 of 1

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
ES121X	**15-01-1609-2-R**	**01/26/15 10:30**	**Aqueous**	**ICP/MS 04**	**01/28/15**	**01/28/15 22:17**	**150128L01F**

Comment(s): - Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	DL	LOD	LOQ	DF	Qualifiers
Lead	<0.200	0.0898	0.200	0.500	1.00	U

ES122X	**15-01-1609-3-G**	**01/26/15 11:30**	**Aqueous**	**ICP/MS 04**	**01/28/15**	**01/28/15 22:20**	**150128L01F**

Comment(s): - Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	DL	LOD	LOQ	DF	Qualifiers
Lead	<0.200	0.0898	0.200	0.500	1.00	U

Method Blank	**099-14-497-115**	**N/A**	**Aqueous**	**ICP/MS 04**	**01/28/15**	**01/28/15 21:35**	**150128L01F**

Comment(s): - Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	DL	LOD	LOQ	DF	Qualifiers
Lead	<0.200	0.0898	0.200	0.500	1.00	U

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Analytical Report

Environmental Science International, Inc.		Date Received:	01/27/15
354 Uluniu Street, Suite 304		Work Order:	15-01-1609
Kailua, HI 96734-2500		Preparation:	EPA 3510C
		Method:	EPA 8270C SIM PAHs
		Units:	ug/L
Project: Red Hill LTM 112066			Page 1 of 3

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
ES121X	**15-01-1609-2-Q**	**01/26/15 10:30**	**Aqueous**	**GC/MS AAA**	**01/30/15**	**02/02/15 22:08**	**150130L19**

Comment(s): - Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	DL	LOD	LOQ	DF	Qualifiers
Naphthalene	<0.052	0.035	0.052	0.21	1.00	U
2-Methylnaphthalene	<0.052	0.048	0.052	0.21	1.00	U
1-Methylnaphthalene	<0.10	0.054	0.10	0.21	1.00	U
Acenaphthylene	<0.052	0.046	0.052	0.21	1.00	U
Acenaphthene	<0.052	0.028	0.052	0.21	1.00	U
Fluorene	<0.052	0.044	0.052	0.21	1.00	U
Phenanthrene	<0.052	0.028	0.052	0.21	1.00	U
Anthracene	<0.052	0.030	0.052	0.21	1.00	U
Fluoranthene	<0.052	0.049	0.052	0.21	1.00	U
Pyrene	<0.052	0.021	0.052	0.21	1.00	U
Benzo (a) Anthracene	<0.052	0.034	0.052	0.21	1.00	U
Chrysene	<0.052	0.026	0.052	0.21	1.00	U
Benzo (k) Fluoranthene	<0.052	0.032	0.052	0.21	1.00	U
Benzo (b) Fluoranthene	<0.052	0.018	0.052	0.21	1.00	U
Benzo (a) Pyrene	<0.052	0.023	0.052	0.21	1.00	U
Indeno (1,2,3-c,d) Pyrene	<0.052	0.022	0.052	0.21	1.00	U
Dibenz (a,h) Anthracene	<0.052	0.049	0.052	0.21	1.00	U
Benzo (g,h,i) Perylene	<0.10	0.085	0.10	0.21	1.00	U

Surrogate	Rec. (%)	Control Limits	Qualifiers
Nitrobenzene-d5	74	28-139	
2-Fluorobiphenyl	71	33-144	
p-Terphenyl-d14	75	23-160	

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Analytical Report

Environmental Science International, Inc.		Date Received:	01/27/15
354 Uluniu Street, Suite 304		Work Order:	15-01-1609
Kailua, HI 96734-2500		Preparation:	EPA 3510C
		Method:	EPA 8270C SIM PAHs
		Units:	ug/L
Project: Red Hill LTM 112066			Page 2 of 3

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
ES122X	**15-01-1609-3-J**	**01/26/15 11:30**	**Aqueous**	**GC/MS AAA**	**01/30/15**	**02/02/15 22:28**	**150130L19**

Comment(s): - Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	DL	LOD	LOQ	DF	Qualifiers
Naphthalene	<0.051	0.035	0.051	0.20	1.00	U
2-Methylnaphthalene	<0.051	0.047	0.051	0.20	1.00	U
1-Methylnaphthalene	<0.10	0.053	0.10	0.20	1.00	U
Acenaphthylene	<0.051	0.045	0.051	0.20	1.00	U
Acenaphthene	<0.051	0.027	0.051	0.20	1.00	U
Fluorene	<0.051	0.043	0.051	0.20	1.00	U
Phenanthrene	<0.051	0.028	0.051	0.20	1.00	U
Anthracene	<0.051	0.029	0.051	0.20	1.00	U
Fluoranthene	<0.051	0.048	0.051	0.20	1.00	U
Pyrene	<0.051	0.021	0.051	0.20	1.00	U
Benzo (a) Anthracene	<0.051	0.033	0.051	0.20	1.00	U
Chrysene	<0.051	0.025	0.051	0.20	1.00	U
Benzo (k) Fluoranthene	<0.051	0.032	0.051	0.20	1.00	U
Benzo (b) Fluoranthene	<0.051	0.018	0.051	0.20	1.00	U
Benzo (a) Pyrene	<0.051	0.023	0.051	0.20	1.00	U
Indeno (1,2,3-c,d) Pyrene	<0.051	0.022	0.051	0.20	1.00	U
Dibenz (a,h) Anthracene	<0.051	0.048	0.051	0.20	1.00	U
Benzo (g,h,i) Perylene	<0.10	0.084	0.10	0.20	1.00	U

Surrogate	Rec. (%)	Control Limits	Qualifiers
Nitrobenzene-d5	69	28-139	
2-Fluorobiphenyl	64	33-144	
p-Terphenyl-d14	71	23-160	

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Analytical Report

Environmental Science International, Inc.		Date Received:	01/27/15
354 Uluniu Street, Suite 304		Work Order:	15-01-1609
Kailua, HI 96734-2500		Preparation:	EPA 3510C
		Method:	EPA 8270C SIM PAHs
		Units:	ug/L
Project: Red Hill LTM 112066			Page 3 of 3

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
Method Blank	**099-15-148-80**	**N/A**	**Aqueous**	**GC/MS AAA**	**01/30/15**	**02/02/15 21:28**	**150130L19**

Comment(s): - Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	DL	LOD	LOQ	DF	Qualifiers
Naphthalene	<0.050	0.034	0.050	0.20	1.00	U
2-Methylnaphthalene	<0.050	0.046	0.050	0.20	1.00	U
1-Methylnaphthalene	<0.10	0.052	0.10	0.20	1.00	U
Acenaphthylene	<0.050	0.045	0.050	0.20	1.00	U
Acenaphthene	<0.050	0.027	0.050	0.20	1.00	U
Fluorene	<0.050	0.043	0.050	0.20	1.00	U
Phenanthrene	<0.050	0.027	0.050	0.20	1.00	U
Anthracene	<0.050	0.029	0.050	0.20	1.00	U
Fluoranthene	<0.050	0.047	0.050	0.20	1.00	U
Pyrene	<0.050	0.020	0.050	0.20	1.00	U
Benzo (a) Anthracene	<0.050	0.033	0.050	0.20	1.00	U
Chrysene	<0.050	0.025	0.050	0.20	1.00	U
Benzo (k) Fluoranthene	<0.050	0.031	0.050	0.20	1.00	U
Benzo (b) Fluoranthene	<0.050	0.018	0.050	0.20	1.00	U
Benzo (a) Pyrene	<0.050	0.022	0.050	0.20	1.00	U
Indeno (1,2,3-c,d) Pyrene	<0.050	0.021	0.050	0.20	1.00	U
Dibenz (a,h) Anthracene	<0.050	0.048	0.050	0.20	1.00	U
Benzo (g,h,i) Perylene	<0.10	0.082	0.10	0.20	1.00	U

Surrogate	Rec. (%)	Control Limits	Qualifiers
Nitrobenzene-d5	69	28-139	
2-Fluorobiphenyl	67	33-144	
p-Terphenyl-d14	69	23-160	

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Analytical Report

Environmental Science International, Inc.		Date Received:	01/27/15
354 Uluniu Street, Suite 304		Work Order:	15-01-1609
Kailua, HI 96734-2500		Preparation:	EPA 5030C
		Method:	GC/MS / EPA 8260B
		Units:	ug/L
Project: Red Hill LTM 112066			Page 1 of 8

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
ESTRIP	**15-01-1609-1-A**	**01/26/15 09:30**	**Aqueous**	**GC/MS OO**	**01/29/15**	**01/29/15 18:02**	**150129L018**

Comment(s): - Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	DL	LOD	LOQ	DF	Qualifiers
Acetone	<10	6.0	10	20	1.00	U
Benzene	<0.50	0.14	0.50	1.0	1.00	U
Bromodichloromethane	<0.50	0.21	0.50	5.0	1.00	U
Bromoform	<1.0	0.50	1.0	10	1.00	U
Bromomethane	<5.0	3.9	5.0	20	1.00	U,IH
2-Butanone	<5.0	2.2	5.0	10	1.00	U
Carbon Tetrachloride	<0.50	0.23	0.50	1.0	1.00	U
Chlorobenzene	<0.50	0.17	0.50	5.0	1.00	U
Chloroethane	<5.0	2.3	5.0	10	1.00	U
Chloroform	<0.50	0.46	0.50	5.0	1.00	U
Chloromethane	<2.0	1.8	2.0	10	1.00	U
Dibromochloromethane	<0.50	0.25	0.50	1.0	1.00	U
1,2-Dibromo-3-Chloropropane	<2.0	1.2	2.0	10	1.00	U
1,2-Dibromoethane	<0.50	0.36	0.50	1.0	1.00	U
1,2-Dichlorobenzene	<0.50	0.46	0.50	1.0	1.00	U
1,3-Dichlorobenzene	<0.50	0.40	0.50	1.0	1.00	U
1,4-Dichlorobenzene	<0.50	0.43	0.50	1.0	1.00	U
1,1-Dichloroethane	<0.50	0.28	0.50	5.0	1.00	U
1,2-Dichloroethane	<0.50	0.24	0.50	1.0	1.00	U
1,1-Dichloroethene	<0.50	0.43	0.50	1.0	1.00	U
c-1,2-Dichloroethene	<0.50	0.48	0.50	1.0	1.00	U
t-1,2-Dichloroethene	<0.50	0.37	0.50	1.0	1.00	U
1,2-Dichloropropane	<0.50	0.42	0.50	5.0	1.00	U
c-1,3-Dichloropropene	<0.50	0.25	0.50	1.0	1.00	U
t-1,3-Dichloropropene	<0.50	0.25	0.50	1.0	1.00	U
Ethylbenzene	<0.50	0.14	0.50	1.0	1.00	U
Methylene Chloride	<1.0	0.64	1.0	5.0	1.00	U
4-Methyl-2-Pentanone	<5.0	4.4	5.0	10	1.00	U
Styrene	<0.50	0.17	0.50	1.0	1.00	U
1,1,1,2-Tetrachloroethane	<0.50	0.40	0.50	1.0	1.00	U
1,1,2,2-Tetrachloroethane	<0.50	0.41	0.50	1.0	1.00	U
Tetrachloroethene	<0.50	0.39	0.50	5.0	1.00	U
Toluene	<0.50	0.24	0.50	1.0	1.00	U
1,2,4-Trichlorobenzene	<1.0	0.50	1.0	5.0	1.00	U
1,1,1-Trichloroethane	<0.50	0.30	0.50	5.0	1.00	U
Hexachloro-1,3-Butadiene	<0.50	0.32	0.50	1.0	1.00	U

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Analytical Report

Environmental Science International, Inc.		Date Received:	01/27/15
354 Uluniu Street, Suite 304		Work Order:	15-01-1609
Kailua, HI 96734-2500		Preparation:	EPA 5030C
		Method:	GC/MS / EPA 8260B
		Units:	ug/L
Project: Red Hill LTM 112066			Page 2 of 8

Parameter	Result	DL	LOD	LOQ	DF	Qualifiers
1,1,2-Trichloroethane	<0.50	0.38	0.50	1.0	1.00	U
Trichloroethene	<0.50	0.37	0.50	1.0	1.00	U
1,2,3-Trichloropropane	<1.0	0.64	1.0	5.0	1.00	U
Vinyl Chloride	<0.50	0.30	0.50	1.0	1.00	U
p/m-Xylene	<1.0	0.30	1.0	10	1.00	U
o-Xylene	<0.50	0.23	0.50	1.0	1.00	U
Methyl-t-Butyl Ether (MTBE)	<0.50	0.31	0.50	1.0	1.00	U
Gasoline Range Organics	<30	26	30	50	1.00	U

Surrogate	Rec. (%)	Control Limits	Qualifiers
Dibromofluoromethane	100	80-126	
1,2-Dichloroethane-d4	102	80-134	
Toluene-d8	96	80-120	
Toluene-d8-TPPH	97	88-112	
1,4-Bromofluorobenzene	94	80-120	

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Analytical Report

Environmental Science International, Inc.		Date Received:	01/27/15
354 Uluniu Street, Suite 304		Work Order:	15-01-1609
Kailua, HI 96734-2500		Preparation:	EPA 5030C
		Method:	GC/MS / EPA 8260B
		Units:	ug/L
Project: Red Hill LTM 112066			Page 3 of 8

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
ES121X	**15-01-1609-2-A**	**01/26/15 10:30**	**Aqueous**	**GC/MS OO**	**01/29/15**	**01/29/15 18:56**	**150129L018**

Comment(s): - Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	DL	LOD	LOQ	DF	Qualifiers
Acetone	13	6.0	10	20	1.00	J
Benzene	<0.50	0.14	0.50	1.0	1.00	U
Bromodichloromethane	<0.50	0.21	0.50	5.0	1.00	U
Bromoform	<1.0	0.50	1.0	10	1.00	U
Bromomethane	<5.0	3.9	5.0	20	1.00	U,IH
2-Butanone	<5.0	2.2	5.0	10	1.00	U
Carbon Tetrachloride	<0.50	0.23	0.50	1.0	1.00	U
Chlorobenzene	<0.50	0.17	0.50	5.0	1.00	U
Chloroethane	<5.0	2.3	5.0	10	1.00	U
Chloroform	<0.50	0.46	0.50	5.0	1.00	U
Chloromethane	<2.0	1.8	2.0	10	1.00	U
Dibromochloromethane	<0.50	0.25	0.50	1.0	1.00	U
1,2-Dibromo-3-Chloropropane	<2.0	1.2	2.0	10	1.00	U
1,2-Dibromoethane	<0.50	0.36	0.50	1.0	1.00	U
1,2-Dichlorobenzene	<0.50	0.46	0.50	1.0	1.00	U
1,3-Dichlorobenzene	<0.50	0.40	0.50	1.0	1.00	U
1,4-Dichlorobenzene	<0.50	0.43	0.50	1.0	1.00	U
1,1-Dichloroethane	<0.50	0.28	0.50	5.0	1.00	U
1,2-Dichloroethane	<0.50	0.24	0.50	1.0	1.00	U
1,1-Dichloroethene	<0.50	0.43	0.50	1.0	1.00	U
c-1,2-Dichloroethene	<0.50	0.48	0.50	1.0	1.00	U
t-1,2-Dichloroethene	<0.50	0.37	0.50	1.0	1.00	U
1,2-Dichloropropane	<0.50	0.42	0.50	5.0	1.00	U
c-1,3-Dichloropropene	<0.50	0.25	0.50	1.0	1.00	U
t-1,3-Dichloropropene	<0.50	0.25	0.50	1.0	1.00	U
Ethylbenzene	<0.50	0.14	0.50	1.0	1.00	U
Methylene Chloride	<1.0	0.64	1.0	5.0	1.00	U
4-Methyl-2-Pentanone	<5.0	4.4	5.0	10	1.00	U
Styrene	<0.50	0.17	0.50	1.0	1.00	U
1,1,1,2-Tetrachloroethane	<0.50	0.40	0.50	1.0	1.00	U
1,1,2,2-Tetrachloroethane	<0.50	0.41	0.50	1.0	1.00	U
Tetrachloroethene	<0.50	0.39	0.50	5.0	1.00	U
Toluene	<0.50	0.24	0.50	1.0	1.00	U
1,2,4-Trichlorobenzene	<1.0	0.50	1.0	5.0	1.00	U
1,1,1-Trichloroethane	<0.50	0.30	0.50	5.0	1.00	U
Hexachloro-1,3-Butadiene	<0.50	0.32	0.50	1.0	1.00	U

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Analytical Report

Environmental Science International, Inc.		Date Received:	01/27/15
354 Uluniu Street, Suite 304		Work Order:	15-01-1609
Kailua, HI 96734-2500		Preparation:	EPA 5030C
		Method:	GC/MS / EPA 8260B
		Units:	ug/L
Project: Red Hill LTM 112066			Page 4 of 8

Parameter	Result	DL	LOD	LOQ	DF	Qualifiers
1,1,2-Trichloroethane	<0.50	0.38	0.50	1.0	1.00	U
Trichloroethene	<0.50	0.37	0.50	1.0	1.00	U
1,2,3-Trichloropropane	<1.0	0.64	1.0	5.0	1.00	U
Vinyl Chloride	<0.50	0.30	0.50	1.0	1.00	U
p/m-Xylene	<1.0	0.30	1.0	10	1.00	U
o-Xylene	<0.50	0.23	0.50	1.0	1.00	U
Methyl-t-Butyl Ether (MTBE)	<0.50	0.31	0.50	1.0	1.00	U
Gasoline Range Organics	<30	26	30	50	1.00	U

Surrogate	Rec. (%)	Control Limits	Qualifiers
Dibromofluoromethane	92	80-126	
1,2-Dichloroethane-d4	104	80-134	
Toluene-d8	96	80-120	
Toluene-d8-TPPH	97	88-112	
1,4-Bromofluorobenzene	93	80-120	

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Analytical Report

Environmental Science International, Inc.		Date Received:	01/27/15
354 Uluniu Street, Suite 304		Work Order:	15-01-1609
Kailua, HI 96734-2500		Preparation:	EPA 5030C
		Method:	GC/MS / EPA 8260B
		Units:	ug/L
Project: Red Hill LTM 112066			Page 5 of 8

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
ES122X	**15-01-1609-3-A**	**01/26/15 11:30**	**Aqueous**	**GC/MS OO**	**01/29/15**	**01/29/15 20:42**	**150129L018**

Comment(s): - Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	DL	LOD	LOQ	DF	Qualifiers
Acetone	13	6.0	10	20	1.00	J
Benzene	<0.50	0.14	0.50	1.0	1.00	U
Bromodichloromethane	<0.50	0.21	0.50	5.0	1.00	U
Bromoform	<1.0	0.50	1.0	10	1.00	U
Bromomethane	<5.0	3.9	5.0	20	1.00	U,IH
2-Butanone	<5.0	2.2	5.0	10	1.00	U
Carbon Tetrachloride	<0.50	0.23	0.50	1.0	1.00	U
Chlorobenzene	<0.50	0.17	0.50	5.0	1.00	U
Chloroethane	<5.0	2.3	5.0	10	1.00	U
Chloroform	<0.50	0.46	0.50	5.0	1.00	U
Chloromethane	<2.0	1.8	2.0	10	1.00	U
Dibromochloromethane	<0.50	0.25	0.50	1.0	1.00	U
1,2-Dibromo-3-Chloropropane	<2.0	1.2	2.0	10	1.00	U
1,2-Dibromoethane	<0.50	0.36	0.50	1.0	1.00	U
1,2-Dichlorobenzene	<0.50	0.46	0.50	1.0	1.00	U
1,3-Dichlorobenzene	<0.50	0.40	0.50	1.0	1.00	U
1,4-Dichlorobenzene	<0.50	0.43	0.50	1.0	1.00	U
1,1-Dichloroethane	<0.50	0.28	0.50	5.0	1.00	U
1,2-Dichloroethane	<0.50	0.24	0.50	1.0	1.00	U
1,1-Dichloroethene	<0.50	0.43	0.50	1.0	1.00	U
c-1,2-Dichloroethene	<0.50	0.48	0.50	1.0	1.00	U
t-1,2-Dichloroethene	<0.50	0.37	0.50	1.0	1.00	U
1,2-Dichloropropane	<0.50	0.42	0.50	5.0	1.00	U
c-1,3-Dichloropropene	<0.50	0.25	0.50	1.0	1.00	U
t-1,3-Dichloropropene	<0.50	0.25	0.50	1.0	1.00	U
Ethylbenzene	<0.50	0.14	0.50	1.0	1.00	U
Methylene Chloride	<1.0	0.64	1.0	5.0	1.00	U
4-Methyl-2-Pentanone	<5.0	4.4	5.0	10	1.00	U
Styrene	<0.50	0.17	0.50	1.0	1.00	U
1,1,1,2-Tetrachloroethane	<0.50	0.40	0.50	1.0	1.00	U
1,1,2,2-Tetrachloroethane	<0.50	0.41	0.50	1.0	1.00	U
Tetrachloroethene	<0.50	0.39	0.50	5.0	1.00	U
Toluene	<0.50	0.24	0.50	1.0	1.00	U
1,2,4-Trichlorobenzene	<1.0	0.50	1.0	5.0	1.00	U
1,1,1-Trichloroethane	<0.50	0.30	0.50	5.0	1.00	U
Hexachloro-1,3-Butadiene	<0.50	0.32	0.50	1.0	1.00	U

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Analytical Report

Environmental Science International, Inc.		Date Received:	01/27/15
354 Uluniu Street, Suite 304		Work Order:	15-01-1609
Kailua, HI 96734-2500		Preparation:	EPA 5030C
		Method:	GC/MS / EPA 8260B
		Units:	ug/L
Project: Red Hill LTM 112066			Page 6 of 8

Parameter	Result	DL	LOD	LOQ	DF	Qualifiers
1,1,2-Trichloroethane	<0.50	0.38	0.50	1.0	1.00	U
Trichloroethene	<0.50	0.37	0.50	1.0	1.00	U
1,2,3-Trichloropropane	<1.0	0.64	1.0	5.0	1.00	U
Vinyl Chloride	<0.50	0.30	0.50	1.0	1.00	U
p/m-Xylene	<1.0	0.30	1.0	10	1.00	U
o-Xylene	<0.50	0.23	0.50	1.0	1.00	U
Methyl-t-Butyl Ether (MTBE)	<0.50	0.31	0.50	1.0	1.00	U
Gasoline Range Organics	<30	26	30	50	1.00	U

Surrogate	Rec. (%)	Control Limits	Qualifiers
Dibromofluoromethane	94	80-126	
1,2-Dichloroethane-d4	104	80-134	
Toluene-d8	96	80-120	
Toluene-d8-TPPH	97	88-112	
1,4-Bromofluorobenzene	92	80-120	

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Analytical Report

Environmental Science International, Inc.		Date Received:	01/27/15
354 Uluniu Street, Suite 304		Work Order:	15-01-1609
Kailua, HI 96734-2500		Preparation:	EPA 5030C
		Method:	GC/MS / EPA 8260B
		Units:	ug/L
Project: Red Hill LTM 112066			Page 7 of 8

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
Method Blank	**099-13-057-75**	**N/A**	**Aqueous**	**GC/MS OO**	**01/29/15**	**01/29/15 17:31**	**150129L018**

Comment(s): - Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	DL	LOD	LOQ	DF	Qualifiers
Acetone	<10	6.0	10	20	1.00	U
Benzene	<0.50	0.14	0.50	1.0	1.00	U
Bromodichloromethane	<0.50	0.21	0.50	5.0	1.00	U
Bromoform	<1.0	0.50	1.0	10	1.00	U
Bromomethane	<5.0	3.9	5.0	20	1.00	U
2-Butanone	<5.0	2.2	5.0	10	1.00	U
Carbon Tetrachloride	<0.50	0.23	0.50	1.0	1.00	U
Chlorobenzene	<0.50	0.17	0.50	5.0	1.00	U
Chloroethane	<5.0	2.3	5.0	10	1.00	U
Chloroform	<0.50	0.46	0.50	5.0	1.00	U
Chloromethane	<2.0	1.8	2.0	10	1.00	U
Dibromochloromethane	<0.50	0.25	0.50	1.0	1.00	U
1,2-Dibromo-3-Chloropropane	<2.0	1.2	2.0	10	1.00	U
1,2-Dibromoethane	<0.50	0.36	0.50	1.0	1.00	U
1,2-Dichlorobenzene	<0.50	0.46	0.50	1.0	1.00	U
1,3-Dichlorobenzene	<0.50	0.40	0.50	1.0	1.00	U
1,4-Dichlorobenzene	<0.50	0.43	0.50	1.0	1.00	U
1,1-Dichloroethane	<0.50	0.28	0.50	5.0	1.00	U
1,2-Dichloroethane	<0.50	0.24	0.50	1.0	1.00	U
1,1-Dichloroethene	<0.50	0.43	0.50	1.0	1.00	U
c-1,2-Dichloroethene	<0.50	0.48	0.50	1.0	1.00	U
t-1,2-Dichloroethene	<0.50	0.37	0.50	1.0	1.00	U
1,2-Dichloropropane	<0.50	0.42	0.50	5.0	1.00	U
c-1,3-Dichloropropene	<0.50	0.25	0.50	1.0	1.00	U
t-1,3-Dichloropropene	<0.50	0.25	0.50	1.0	1.00	U
Ethylbenzene	<0.50	0.14	0.50	1.0	1.00	U
Methylene Chloride	<1.0	0.64	1.0	5.0	1.00	U
4-Methyl-2-Pentanone	<5.0	4.4	5.0	10	1.00	U
Styrene	<0.50	0.17	0.50	1.0	1.00	U
1,1,1,2-Tetrachloroethane	<0.50	0.40	0.50	1.0	1.00	U
1,1,2,2-Tetrachloroethane	<0.50	0.41	0.50	1.0	1.00	U
Tetrachloroethene	<0.50	0.39	0.50	5.0	1.00	U
Toluene	<0.50	0.24	0.50	1.0	1.00	U
1,2,4-Trichlorobenzene	<1.0	0.50	1.0	5.0	1.00	U
1,1,1-Trichloroethane	<0.50	0.30	0.50	5.0	1.00	U
Hexachloro-1,3-Butadiene	<0.50	0.32	0.50	1.0	1.00	U

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Analytical Report

Environmental Science International, Inc.		Date Received:	01/27/15
354 Uluniu Street, Suite 304		Work Order:	15-01-1609
Kailua, HI 96734-2500		Preparation:	EPA 5030C
		Method:	GC/MS / EPA 8260B
		Units:	ug/L
Project: Red Hill LTM 112066			Page 8 of 8

Parameter	Result	DL	LOD	LOQ	DF	Qualifiers
1,1,2-Trichloroethane	<0.50	0.38	0.50	1.0	1.00	U
Trichloroethene	<0.50	0.37	0.50	1.0	1.00	U
1,2,3-Trichloropropane	<1.0	0.64	1.0	5.0	1.00	U
Vinyl Chloride	<0.50	0.30	0.50	1.0	1.00	U
p/m-Xylene	<1.0	0.30	1.0	10	1.00	U
o-Xylene	<0.50	0.23	0.50	1.0	1.00	U
Methyl-t-Butyl Ether (MTBE)	<0.50	0.31	0.50	1.0	1.00	U
Gasoline Range Organics	<30	26	30	50	1.00	U

Surrogate	Rec. (%)	Control Limits	Qualifiers
Dibromofluoromethane	99	80-126	
1,2-Dichloroethane-d4	101	80-134	
Toluene-d8	96	80-120	
Toluene-d8-TPPH	98	88-112	
1,4-Bromofluorobenzene	93	80-120	

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Quality Control - Spike/Spike Duplicate

Environmental Science International, Inc.		Date Received:	01/27/15
354 Uluniu Street, Suite 304		Work Order:	15-01-1609
Kailua, HI 96734-2500		Preparation:	EPA 3510C
		Method:	EPA 8015B (M)
Project: Red Hill LTM 112066			Page 1 of 5

Quality Control Sample ID	Type	Matrix	Instrument	Date Prepared	Date Analyzed	MS/MSD Batch Number
ES121X	**Sample**	**Aqueous**	**GC 46**	**01/28/15**	**01/30/15 10:15**	**150128S14**
ES121X	**Matrix Spike**	**Aqueous**	**GC 46**	**01/28/15**	**01/30/15 07:42**	**150128S14**
ES121X	**Matrix Spike Duplicate**	**Aqueous**	**GC 46**	**01/28/15**	**01/30/15 08:00**	**150128S14**

Parameter	Sample Conc.	Spike Added	MS Conc.	MS %Rec.	MSD Conc.	MSD %Rec.	%Rec. CL	RPD	RPD CL	Qualifiers
TPH as Diesel	ND	2000	1590	80	1644	82	55-133	3	0-30	

RPD: Relative Percent Difference. CL: Control Limits

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Quality Control - Spike/Spike Duplicate

Environmental Science International, Inc.		Date Received:	01/27/15
354 Uluniu Street, Suite 304		Work Order:	15-01-1609
Kailua, HI 96734-2500		Preparation:	EPA 3005A Filt.
		Method:	EPA 6020
Project: Red Hill LTM 112066			Page 2 of 5

Quality Control Sample ID	Type	Matrix	Instrument	Date Prepared	Date Analyzed	MS/MSD Batch Number
ES121X	**Sample**	**Aqueous**	**ICP/MS 04**	**01/28/15**	**01/28/15 22:17**	**150128S01**
ES121X	**Matrix Spike**	**Aqueous**	**ICP/MS 04**	**01/28/15**	**01/28/15 21:49**	**150128S01**
ES121X	**Matrix Spike Duplicate**	**Aqueous**	**ICP/MS 04**	**01/28/15**	**01/28/15 21:53**	**150128S01**

Parameter	Sample Conc.	Spike Added	MS Conc.	MS %Rec.	MSD Conc.	MSD %Rec.	%Rec. CL	RPD	RPD CL	Qualifiers
Lead	ND	100.0	98.67	99	96.74	97	80-120	2	0-20	

RPD: Relative Percent Difference. CL: Control Limits

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Quality Control - Spike/Spike Duplicate

Environmental Science International, Inc.		Date Received:	01/27/15
354 Uluniu Street, Suite 304		Work Order:	15-01-1609
Kailua, HI 96734-2500		Preparation:	EPA 3510C
		Method:	EPA 8270C SIM PAHs
Project: Red Hill LTM 112066			Page 3 of 5

Quality Control Sample ID	Type	Matrix	Instrument	Date Prepared	Date Analyzed	MS/MSD Batch Number
ES121X	**Sample**	**Aqueous**	**GC/MS AAA**	**01/30/15**	**02/02/15 22:08**	**150130S19**
ES121X	**Matrix Spike**	**Aqueous**	**GC/MS AAA**	**01/30/15**	**02/02/15 20:48**	**150130S19**
ES121X	**Matrix Spike Duplicate**	**Aqueous**	**GC/MS AAA**	**01/30/15**	**02/03/15 13:38**	**150130S19**

Parameter	Sample Conc.	Spike Added	MS Conc.	MS %Rec.	MSD Conc.	MSD %Rec.	%Rec. CL	RPD	RPD CL	Qualifiers
Naphthalene	ND	2.000	1.752	88	1.824	91	21-133	4	0-25	
2-Methylnaphthalene	ND	2.000	1.713	86	1.802	90	21-140	5	0-25	
1-Methylnaphthalene	ND	2.000	1.745	87	1.792	90	20-140	3	0-25	
Acenaphthylene	ND	2.000	1.756	88	1.756	88	33-145	0	0-25	
Acenaphthene	ND	2.000	1.836	92	1.863	93	49-121	1	0-25	
Fluorene	ND	2.000	1.830	92	1.810	90	59-121	1	0-25	
Phenanthrene	ND	2.000	1.877	94	1.874	94	54-120	0	0-25	
Anthracene	ND	2.000	1.539	77	1.632	82	27-133	6	0-25	
Fluoranthene	ND	2.000	1.853	93	1.820	91	26-137	2	0-25	
Pyrene	ND	2.000	2.018	101	1.897	95	18-168	6	0-25	
Benzo (a) Anthracene	ND	2.000	1.876	94	1.774	89	33-143	6	0-25	
Chrysene	ND	2.000	1.929	96	1.876	94	17-168	3	0-25	
Benzo (k) Fluoranthene	ND	2.000	1.951	98	1.869	93	24-159	4	0-25	
Benzo (b) Fluoranthene	ND	2.000	1.583	79	1.508	75	24-159	5	0-25	
Benzo (a) Pyrene	ND	2.000	1.673	84	1.621	81	17-163	3	0-25	
Indeno (1,2,3-c,d) Pyrene	ND	2.000	1.726	86	1.722	86	10-171	0	0-25	
Dibenz (a,h) Anthracene	ND	2.000	1.811	91	1.796	90	10-219	1	0-25	
Benzo (g,h,i) Perylene	ND	2.000	1.627	81	1.716	86	10-227	5	0-25	

RPD: Relative Percent Difference. CL: Control Limits

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Quality Control - Spike/Spike Duplicate

Environmental Science International, Inc.		Date Received:	01/27/15
354 Uluniu Street, Suite 304		Work Order:	15-01-1609
Kailua, HI 96734-2500		Preparation:	EPA 5030C
		Method:	GC/MS / EPA 8260B
Project: Red Hill LTM 112066			Page 4 of 5

Quality Control Sample ID	Type	Matrix	Instrument	Date Prepared	Date Analyzed	MS/MSD Batch Number
ES121X	**Sample**	**Aqueous**	**GC/MS OO**	**01/29/15**	**01/29/15 18:56**	**150129S039**
ES121X	**Matrix Spike**	**Aqueous**	**GC/MS OO**	**01/29/15**	**01/29/15 19:22**	**150129S039**
ES121X	**Matrix Spike Duplicate**	**Aqueous**	**GC/MS OO**	**01/29/15**	**01/29/15 19:49**	**150129S039**

Parameter	Sample Conc.	Spike Added	MS Conc.	MS %Rec.	MSD Conc.	MSD %Rec.	%Rec. CL	RPD	RPD CL	Qualifiers
Acetone	ND	50.00	101.2	202	106.5	213	40-140	5	0-20	3
Benzene	ND	50.00	44.16	88	44.64	89	80-120	1	0-20	
Bromodichloromethane	ND	50.00	44.82	90	45.91	92	75-120	2	0-20	
Bromoform	ND	50.00	44.29	89	46.61	93	70-130	5	0-20	
Bromomethane	ND	50.00	60.69	121	49.43	99	30-145	20	0-20	
2-Butanone	ND	50.00	61.40	123	65.63	131	30-150	7	0-20	
Carbon Tetrachloride	ND	50.00	39.91	80	41.28	83	65-140	3	0-20	
Chlorobenzene	ND	50.00	47.73	95	48.32	97	80-120	1	0-20	
Chloroethane	ND	50.00	41.79	84	41.02	82	60-135	2	0-20	
Chloroform	ND	50.00	46.18	92	46.34	93	65-135	0	0-20	
Chloromethane	ND	50.00	39.45	79	38.78	78	40-125	2	0-20	
Dibromochloromethane	ND	50.00	48.15	96	50.21	100	60-135	4	0-20	
1,2-Dibromo-3-Chloropropane	ND	50.00	36.92	74	38.82	78	50-130	5	0-20	
1,2-Dibromoethane	ND	50.00	50.57	101	52.07	104	80-120	3	0-20	
1,2-Dichlorobenzene	ND	50.00	47.95	96	48.23	96	70-120	1	0-20	
1,3-Dichlorobenzene	ND	50.00	47.14	94	47.15	94	75-125	0	0-20	
1,4-Dichlorobenzene	ND	50.00	47.60	95	47.53	95	75-125	0	0-20	
1,1-Dichloroethane	ND	50.00	42.07	84	42.56	85	70-135	1	0-20	
1,2-Dichloroethane	ND	50.00	51.51	103	52.61	105	70-130	2	0-20	
1,1-Dichloroethene	ND	50.00	42.04	84	42.35	85	70-130	1	0-20	
c-1,2-Dichloroethene	ND	50.00	44.23	88	45.20	90	70-125	2	0-20	
t-1,2-Dichloroethene	ND	50.00	40.55	81	41.70	83	60-140	3	0-20	
1,2-Dichloropropane	ND	50.00	43.82	88	44.82	90	75-125	2	0-20	
c-1,3-Dichloropropene	ND	50.00	43.03	86	44.24	88	70-130	3	0-20	
t-1,3-Dichloropropene	ND	50.00	41.92	84	43.75	87	55-140	4	0-20	
Ethylbenzene	ND	50.00	45.53	91	46.40	93	75-125	2	0-20	
Methylene Chloride	ND	50.00	41.82	84	42.37	85	55-140	1	0-20	
4-Methyl-2-Pentanone	ND	50.00	44.55	89	47.13	94	60-135	6	0-20	
Styrene	ND	50.00	44.83	90	45.51	91	65-135	1	0-20	
1,1,1,2-Tetrachloroethane	ND	50.00	45.01	90	46.20	92	80-130	3	0-20	
1,1,2,2-Tetrachloroethane	ND	50.00	0.2428	0	1.304	3	65-130	137	0-20	3,4
Tetrachloroethene	ND	50.00	68.54	137	69.48	139	45-150	1	0-20	
Toluene	ND	50.00	44.70	89	45.03	90	75-120	1	0-20	
1,2,4-Trichlorobenzene	ND	50.00	47.30	95	46.60	93	65-135	1	0-20	
1,1,1-Trichloroethane	ND	50.00	42.95	86	43.94	88	65-130	2	0-20	

RPD: Relative Percent Difference. CL: Control Limits

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Quality Control - Spike/Spike Duplicate

Environmental Science International, Inc.		Date Received:	01/27/15
354 Uluniu Street, Suite 304		Work Order:	15-01-1609
Kailua, HI 96734-2500		Preparation:	EPA 5030C
		Method:	GC/MS / EPA 8260B
Project: Red Hill LTM 112066			Page 5 of 5

Parameter	Sample Conc.	Spike Added	MS Conc.	MS %Rec.	MSD Conc.	MSD %Rec.	%Rec. CL	RPD	RPD CL	Qualifiers
Hexachloro-1,3-Butadiene	ND	50.00	46.50	93	46.05	92	50-140	1	0-20	
1,1,2-Trichloroethane	ND	50.00	46.30	93	48.01	96	75-125	4	0-20	
Trichloroethene	ND	50.00	77.69	155	78.02	156	70-125	0	0-20	3
1,2,3-Trichloropropane	ND	50.00	38.71	77	39.92	80	75-125	3	0-20	
Vinyl Chloride	ND	50.00	43.44	87	42.43	85	50-145	2	0-20	
p/m-Xylene	ND	100.0	90.64	91	90.75	91	75-130	0	0-20	
o-Xylene	ND	50.00	45.07	90	45.59	91	80-120	1	0-20	
Methyl-t-Butyl Ether (MTBE)	ND	50.00	43.30	87	45.26	91	65-125	4	0-20	

RPD: Relative Percent Difference. CL: Control Limits

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Quality Control - PDS

Environmental Science International, Inc.		Date Received:	01/27/15
354 Uluniu Street, Suite 304		Work Order:	15-01-1609
Kailua, HI 96734-2500		Preparation:	EPA 3005A Filt.
		Method:	EPA 6020
Project: Red Hill LTM 112066			Page 1 of 1

Quality Control Sample ID	Type	Matrix	Instrument	Date Prepared	Date Analyzed	PDS/PDSD Batch Number
ES121X	**Sample**	**Aqueous**	**ICP/MS 04**	**01/28/15 00:00**	**01/28/15 22:17**	**150128S01**
ES121X	**PDS**	**Aqueous**	**ICP/MS 04**	**01/28/15 00:00**	**01/28/15 21:56**	**150128S01**

Parameter	Sample Conc.	Spike Added	PDS Conc.	PDS %Rec.	%Rec. CL	Qualifiers
Lead	ND	100.0	105.2	105	75-125	

RPD: Relative Percent Difference. CL: Control Limits

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Quality Control - LCS/LCSD

Environmental Science International, Inc.		Date Received:	01/27/15
354 Uluniu Street, Suite 304		Work Order:	15-01-1609
Kailua, HI 96734-2500		Preparation:	EPA 3510C
		Method:	EPA 8015B (M)
Project: Red Hill LTM 112066			Page 1 of 5

Quality Control Sample ID	Type	Matrix	Instrument	Date Prepared	Date Analyzed	LCS/LCSD Batch Number
099-15-516-236	LCS	Aqueous	GC 46	01/28/15	01/30/15 06:35	150128B14
099-15-516-236	LCSD	Aqueous	GC 46	01/28/15	01/30/15 06:51	150128B14

Parameter	Spike Added	LCS Conc.	LCS %Rec.	LCSD Conc.	LCSD %Rec.	%Rec. CL	RPD	RPD CL	Qualifiers
TPH as Diesel	2000	1559	78	1574	79	60-132	1	0-11	

RPD: Relative Percent Difference. CL: Control Limits

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Quality Control - LCS

Environmental Science International, Inc.		Date Received:	01/27/15
354 Uluniu Street, Suite 304		Work Order:	15-01-1609
Kailua, HI 96734-2500		Preparation:	EPA 3005A Filt.
		Method:	EPA 6020
Project: Red Hill LTM 112066			Page 2 of 5

Quality Control Sample ID	Type	Matrix	Instrument	Date Prepared	Date Analyzed	LCS Batch Number
099-14-497-115	**LCS**	**Aqueous**	**ICP/MS 04**	**01/28/15**	**01/28/15 21:39**	**150128L01F**

Parameter	Spike Added	Conc. Recovered	LCS %Rec.	%Rec. CL	Qualifiers
Lead	100.0	101.3	101	80-120	

RPD: Relative Percent Difference. CL: Control Limits

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Quality Control - LCS

Environmental Science International, Inc.		Date Received:	01/27/15
354 Uluniu Street, Suite 304		Work Order:	15-01-1609
Kailua, HI 96734-2500		Preparation:	EPA 3510C
		Method:	EPA 8270C SIM PAHs
Project: Red Hill LTM 112066			Page 3 of 5

Quality Control Sample ID	Type	Matrix	Instrument	Date Prepared	Date Analyzed	LCS Batch Number
099-15-148-80	LCS	Aqueous	GC/MS AAA	01/30/15	02/03/15 03:08	150130L19

Parameter	Spike Added	Conc. Recovered	LCS %Rec.	%Rec. CL	Qualifiers
Naphthalene	2.000	1.510	75	21-133	
2-Methylnaphthalene	2.000	1.537	77	21-140	
1-Methylnaphthalene	2.000	1.528	76	20-140	
Acenaphthylene	2.000	1.458	73	33-145	
Acenaphthene	2.000	1.547	77	55-121	
Fluorene	2.000	1.454	73	59-121	
Phenanthrene	2.000	1.536	77	54-120	
Anthracene	2.000	1.262	63	27-133	
Fluoranthene	2.000	1.595	80	26-137	
Pyrene	2.000	1.784	89	45-129	
Benzo (a) Anthracene	2.000	1.585	79	33-143	
Chrysene	2.000	1.722	86	17-168	
Benzo (k) Fluoranthene	2.000	1.970	98	24-159	
Benzo (b) Fluoranthene	2.000	1.389	69	24-159	
Benzo (a) Pyrene	2.000	1.473	74	17-163	
Indeno (1,2,3-c,d) Pyrene	2.000	1.508	75	25-175	
Dibenz (a,h) Anthracene	2.000	1.577	79	25-175	
Benzo (g,h,i) Perylene	2.000	1.351	68	25-157	

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RPD: Relative Percent Difference. CL: Control Limits

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Quality Control - LCS/LCSD

Environmental Science International, Inc.		Date Received:	01/27/15
354 Uluniu Street, Suite 304		Work Order:	15-01-1609
Kailua, HI 96734-2500		Preparation:	EPA 5030C
		Method:	GC/MS / EPA 8260B
Project: Red Hill LTM 112066			Page 4 of 5

Quality Control Sample ID	Type	Matrix	Instrument	Date Prepared	Date Analyzed	LCS/LCSD Batch Number
099-13-057-75	LCS	Aqueous	GC/MS OO	01/29/15	01/29/15 16:06	150129L018
099-13-057-75	LCSD	Aqueous	GC/MS OO	01/29/15	01/29/15 16:33	150129L018

Parameter	Spike Added	LCS Conc.	LCS %Rec.	LCSD Conc.	LCSD %Rec.	%Rec. CL	RPD	RPD CL	Qualifiers
Acetone	50.00	87.61	175	N/A	N/A	40-140	N/A	0-20	X
Benzene	50.00	46.83	94	N/A	N/A	80-120	N/A	0-20	
Bromodichloromethane	50.00	47.24	94	N/A	N/A	75-120	N/A	0-20	
Bromoform	50.00	46.74	93	N/A	N/A	70-130	N/A	0-20	
Bromomethane	50.00	53.74	107	N/A	N/A	30-145	N/A	0-20	
2-Butanone	50.00	74.86	150	N/A	N/A	30-150	N/A	0-20	
Carbon Tetrachloride	50.00	45.16	90	N/A	N/A	65-140	N/A	0-20	
Chlorobenzene	50.00	49.91	100	N/A	N/A	80-120	N/A	0-20	
Chloroethane	50.00	46.95	94	N/A	N/A	60-135	N/A	0-20	
Chloroform	50.00	48.63	97	N/A	N/A	65-135	N/A	0-20	
Chloromethane	50.00	42.46	85	N/A	N/A	40-125	N/A	0-20	
Dibromochloromethane	50.00	50.11	100	N/A	N/A	60-135	N/A	0-20	
1,2-Dibromo-3-Chloropropane	50.00	39.79	80	N/A	N/A	50-130	N/A	0-20	
1,2-Dibromoethane	50.00	51.49	103	N/A	N/A	80-120	N/A	0-20	
1,2-Dichlorobenzene	50.00	49.75	100	N/A	N/A	70-120	N/A	0-20	
1,3-Dichlorobenzene	50.00	49.91	100	N/A	N/A	75-125	N/A	0-20	
1,4-Dichlorobenzene	50.00	49.48	99	N/A	N/A	75-125	N/A	0-20	
1,1-Dichloroethane	50.00	46.12	92	N/A	N/A	70-135	N/A	0-20	
1,2-Dichloroethane	50.00	52.47	105	N/A	N/A	70-130	N/A	0-20	
1,1-Dichloroethene	50.00	44.94	90	N/A	N/A	70-130	N/A	0-20	
c-1,2-Dichloroethene	50.00	47.74	95	N/A	N/A	70-125	N/A	0-20	
t-1,2-Dichloroethene	50.00	44.53	89	N/A	N/A	60-140	N/A	0-20	
1,2-Dichloropropane	50.00	46.70	93	N/A	N/A	75-125	N/A	0-20	
c-1,3-Dichloropropene	50.00	47.08	94	N/A	N/A	70-130	N/A	0-20	
t-1,3-Dichloropropene	50.00	47.60	95	N/A	N/A	55-140	N/A	0-20	
Ethylbenzene	50.00	48.75	97	N/A	N/A	75-125	N/A	0-20	
Methylene Chloride	50.00	44.38	89	N/A	N/A	55-140	N/A	0-20	
4-Methyl-2-Pentanone	50.00	45.89	92	N/A	N/A	60-135	N/A	0-20	
Styrene	50.00	47.01	94	N/A	N/A	65-135	N/A	0-20	
1,1,1,2-Tetrachloroethane	50.00	48.20	96	N/A	N/A	80-130	N/A	0-20	
1,1,2,2-Tetrachloroethane	50.00	40.07	80	N/A	N/A	65-130	N/A	0-20	
Tetrachloroethene	50.00	57.95	116	N/A	N/A	45-150	N/A	0-20	
Toluene	50.00	46.98	94	N/A	N/A	75-120	N/A	0-20	
1,2,4-Trichlorobenzene	50.00	49.94	100	N/A	N/A	65-135	N/A	0-20	
1,1,1-Trichloroethane	50.00	48.36	97	N/A	N/A	65-130	N/A	0-20	
Hexachloro-1,3-Butadiene	50.00	49.00	98	N/A	N/A	50-140	N/A	0-20	

RPD: Relative Percent Difference. CL: Control Limits

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Quality Control - LCS/LCSD

Environmental Science International, Inc.		Date Received:	01/27/15
354 Uluniu Street, Suite 304		Work Order:	15-01-1609
Kailua, HI 96734-2500		Preparation:	EPA 5030C
		Method:	GC/MS / EPA 8260B
Project: Red Hill LTM 112066			Page 5 of 5

Parameter	Spike Added	LCS Conc.	LCS %Rec.	LCSD Conc.	LCSD %Rec.	%Rec. CL	RPD	RPD CL	Qualifiers
1,1,2-Trichloroethane	50.00	48.87	98	N/A	N/A	75-125	N/A	0-20	
Trichloroethene	50.00	50.10	100	N/A	N/A	70-125	N/A	0-20	
1,2,3-Trichloropropane	50.00	40.04	80	N/A	N/A	75-125	N/A	0-20	
Vinyl Chloride	50.00	47.19	94	N/A	N/A	50-145	N/A	0-20	
p/m-Xylene	100.0	95.89	96	N/A	N/A	75-130	N/A	0-20	
o-Xylene	50.00	47.74	95	N/A	N/A	80-120	N/A	0-20	
Methyl-t-Butyl Ether (MTBE)	50.00	47.26	95	N/A	N/A	65-125	N/A	0-20	
Gasoline Range Organics	1000	1077	108	1121	112	80-120	4	0-20	

RPD: Relative Percent Difference. CL: Control Limits

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Sample Analysis Summary Report

Work Order: 15-01-1609 Page 1 of 1

Method	Extraction	Chemist ID	Instrument	Analytical Location
EPA 6020	EPA 3005A Filt.	776	ICP/MS 04	1
EPA 8015B (M)	EPA 3510C	500	GC 46	1
EPA 8270C SIM PAHs	EPA 3510C	907	GC/MS AAA	1
GC/MS / EPA 8260B	EPA 5030C	849	GC/MS OO	2

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Glossary of Terms and Qualifiers

Work Order: 15-01-1609 Page 1 of 1

Qualifiers	Definition
*	See applicable analysis comment.
<	Less than the indicated value.
>	Greater than the indicated value.
1	Surrogate compound recovery was out of control due to a required sample dilution. Therefore, the sample data was reported without further clarification.
2	Surrogate compound recovery was out of control due to matrix interference. The associated method blank surrogate spike compound was in control and, therefore, the sample data was reported without further clarification.
3	Recovery of the Matrix Spike (MS) or Matrix Spike Duplicate (MSD) compound was out of control due to suspected matrix interference. The associated LCS recovery was in control.
4	The MS/MSD RPD was out of control due to suspected matrix interference.
5	The PDS/PDSD or PES/PESD associated with this batch of samples was out of control due to suspected matrix interference.
6	Surrogate recovery below the acceptance limit.
7	Surrogate recovery above the acceptance limit.
B	Analyte was present in the associated method blank.
BU	Sample analyzed after holding time expired.
BV	Sample received after holding time expired.
DL	The Detection Limit (DL) is the smallest analyte concentration that can be demonstrated to be different from zero or a blank concentration at the 99% level of confidence.
E	Concentration exceeds the calibration range.
ET	Sample was extracted past end of recommended max. holding time.
HD	The chromatographic pattern was inconsistent with the profile of the reference fuel standard.
ICH	Initial calibration verification recovery is above the control limit for this analyte.
ICJ	Initial calibration verification recovery is below the control limit for this analyte.
IH	Calibration verification recovery is above the control limit for this analyte.
IJ	Calibration verification recovery is below the control limit for this analyte.
J	Analyte was detected at a concentration below the LOQ and above the DL. Reported value is estimated.
JA	Analyte positively identified but quantitation is an estimate.
LOD	The Limit of Detection (LOD) is the smallest amount or concentration of a substance that must be present in a sample in order to be detected at 99% confidence level.
LOQ	The Limit of Quantitation (LOQ) is the lowest concentration of a substance that produces a quantitative result within specified limits of precision and bias.
Q	Spike recovery and RPD control limits do not apply resulting from the parameter concentration in the sample exceeding the spike concentration by a factor of four or greater.
SG	The sample extract was subjected to Silica Gel treatment prior to analysis.
U	Undetected at Detection Limit (DL) and is reported as less than the Limit of Detection (LOD).
X	% Recovery and/or RPD out-of-range.
Z	Analyte presence was not confirmed by second column or GC/MS analysis.

Solid - Unless otherwise indicated, solid sample data is reported on a wet weight basis, not corrected for % moisture. All QC results are reported on a wet weight basis.

Any parameter identified in 40CFR Part 136.3 Table II that is designated as "analyze immediately" with a holding time of <= 15 minutes (40CFR-136.3 Table II, footnote 4), is considered a "field" test and the reported results will be qualified as being received outside of the stated holding time unless received at the laboratory within 15 minutes of the collection time.

A calculated total result (Example: Total Pesticides) is the summation of each component concentration and/or, if "J" flags are reported, estimated concentration. Component concentrations showing not detected (ND) are summed into the calculated total result as zero concentrations.

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7440 Lincoln Way, Garden Grove, CA 92841-1427 • (714) 895-5494
For courier service / sample drop off information, contact us26_sales@eurofinsus.com or call us.

CHAIN-OF-CUSTODY RECORD

DATE: 1/26/15
PAGE: 1 OF 1

WO NO. / LAB USE ONLY: **15-01-1609**

LABORATORY CLIENT: ESI
ADDRESS: 354 Uluniu St, Suite 304
CITY: Kailua STATE: HI ZIP: 96734
TEL: 808-261-0740 E-MAIL: jhattemer@esiencei.com, dfeher@esiencei.com

CLIENT PROJECT NAME / NO.: Red Hill LTM 112066
PROJECT CONTACT: Jeff Hattemer
P.O. NO.:
LAB CONTACT OR QUOTE NO.:
GLOBAL ID:
LOG CODE:
SAMPLER(S): (PRINT) Jeff Hattemer

TURNAROUND TIME (Rush surcharges may apply to any TAT not "STANDARD"):
☐ SAME DAY ☐ 24 HR ☐ 48 HR ☐ 72 HR ☐ 5 DAYS ☒ STANDARD

EDD:
☐ COELT EDF ☐ OTHER

SPECIAL INSTRUCTIONS:

REQUESTED ANALYSES

Please check box or fill in blank as needed.

LAB USE ONLY	SAMPLE ID	SAMPLING DATE	SAMPLING TIME	MATRIX	NO. OF CONT.	Unpreserved	Preserved	Field Filtered	TPH(g) ☐ GRO	TPH(d) ☐ DRO	TPH ☐ C6-C36 ☐ C6-C44	TPH ____	BTEX / MTBE ☐ 8260 ☐ ____	VOCs (8260)	Oxygenates (8260)	Prep (5035) ☐ En Core ☐ Terra Core	SVOCs (8270)	Pesticides (8081)	PCBs (8082)	PAHs ☐ 8270 ☒ 8270 SIM	T22 Metals ☐ 6010/747X ☐ 6020/747X	Cr(VI) ☐ 7196 ☐ 7199 ☐ 218.6	Lead (6020)			
1	ESTRIP	1/26/15	0930	water	3		X		X					X												
2	ES121	1/26/15	1030	water	10		X	X	X	X				X						X			X			
~~3~~	ES121MS/MSD	1/26/15	1030	water	10		X	X	X	X				X						X			X			
3	ES122	1/26/15	1130	water	10		X	X	X	X				X						X			X			

Relinquished by: (Signature)	Received by: (Signature/Affiliation)	Date:	Time:
Jeff Hattemer ESI	Fed Ex	1/26/15	1400
		1/27/15	1030

2014-07-01 Revision

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ED_006532_00009885-00088

1609

ORIGIN ID:HNLA

UNITED STATES US

SHIP DATE: 26JAN15
ACTWGT: 57.9 LB
CAD: /POS1525
DIMS: 25x14x13 IN

BILL RECIPIENT

Part # 156297-435 RIT2 05/14

TO SAMPLE CONTROL
CALSCIENCE LABORATORIES
7440 LINCOLN WAY

GARDEN GROVE CA 92841

(714) 895-5494 REF:
INV:
PO: DEPT:

FedEx Express

E

J151015011401uv

TUE - 27 JAN AA
STANDARD OVERNIGHT

TRK# 0200 8059 2709 6799

WZ APVA

92841
CA-US SNA

1609

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WORK ORDER #: 15-01-1609

SAMPLE RECEIPT FORM

Cooler 1 of 1

CLIENT: ESI

DATE: 01/27/15

TEMPERATURE: Thermometer ID: SC4 (Criteria: 0.0 °C – 6.0 °C, not frozen except sediment/tissue)

Temperature 2.4 °C + 0.2 °C (CF) = 2.6 °C ☑ Blank ☐ Sample

☐ Sample(s) outside temperature criteria (PM/APM contacted by: _____)

☐ Sample(s) outside temperature criteria but received on ice/chilled on same day of sampling.

☐ **Received at ambient temperature, placed on ice for transport by Courier.**

Ambient Temperature: ☐ Air ☐ Filter **Checked by:** 15

CUSTODY SEALS INTACT:

☑ Cooler ☐ _____ ☐ No (Not Intact) ☐ Not Present ☐ N/A **Checked by:** 15

☐ Sample ☑ Bag ☐ No (Not Intact) ☐ Not Present **Checked by:** 862

SAMPLE CONDITION:	Yes	No	N/A
Chain-Of-Custody (COC) document(s) received with samples	☑	☐	☐
COC document(s) received complete	☑	☐	☐
☐ Collection date/time, matrix, and/or # of containers logged in based on sample labels.			
☐ No analysis requested. ☐ Not relinquished. ☐ No date/time relinquished.			
Sampler's name indicated on COC	☑	☐	☐
Sample container label(s) consistent with COC	☑	☐	☐
Sample container(s) intact and good condition	☑	☐	☐
Proper containers and sufficient volume for analyses requested	☑	☐	☐
Analyses received within holding time	☑	☐	☐
Aqueous samples received within 15-minute holding time			
☐ pH ☐ Residual Chlorine ☐ Dissolved Sulfides ☐ Dissolved Oxygen	☐	☐	☑
Proper preservation noted on COC or sample container	☑	☐	☐
☑ Unpreserved vials received for Volatiles analysis			
Volatile analysis container(s) free of headspace	☑	☐	☐
Tedlar bag(s) free of condensation	☐	☐	☑

CONTAINER TYPE:

Solid: ☐4ozCGJ ☐8ozCGJ ☐16ozCGJ ☐Sleeve (_____) ☐EnCores® ☑TerraCores® ☐_____

Aqueous: ☐VOA ☑VOAh ☐VOA**na**$_2$ ☐125AGB ☐125AGB**h** ☐125AGB**p** ☑1AGB ☐1AGB**na**$_2$ ☐1AGB**s**

☐500AGB ☑500AGJ ☐500AGJ**s** ☐250AGB ☐250CGB ☐250CGB**s** ☐1PB ☐1PB**na** ☐500PB

☐250PB ☑250PB**n** ☐125PB ☐125PB**znna** ☐100PJ ☐100PJ**na**$_2$ ☐_____ ☐_____ ☐_____

Air: ☐Tedlar® ☐Canister **Other:** ☐_____ **Trip Blank Lot#:** 140908B **Labeled/Checked by:** 862

Container: **C:** Clear **A:** Amber **P:** Plastic **G:** Glass **J:** Jar **B:** Bottle **Z:** Ziploc/Resealable Bag **E:** Envelope **Reviewed by:** 681

Preservative: **h:** HCL **n:** HNO_3 **na**$_2$:$Na_2S_2O_3$ **na:** NaOH **p:** H_3PO_4 **s:** H_2SO_4 **u:** Ultra-pure **znna:** $ZnAc_2$+NaOH **f:** Filtered **Scanned by:** 681

*(-2)(-3)

Terri Chang

From: Domonkos Feher [DFeher@esciencei.com]
Sent: Thursday, January 29, 2015 11:41 AM
To: Terri Chang
Cc: Jeff Hattemer; Ann Dang; Scott Simmons
Subject: 15-01-1715 and 15-01-1609

Terri,

The following Sample ID's have already been used for the Q4 2014 monitoring event:

Sample receipt 15-01-1715:
ES120

Sample receipt 15-01-1609:
ES121 (ES121 MS/MSD)
ES122

Please append an "X" to the Sample IDs in the final report, to differentiate the Q1 2015 ID numbers from the ones used for Q4 2014. The new sample IDs should read:

ES120X

ES121X (ES121X MS/MSD)
ES122X

Please include this email in the COC sections of the final laboratory reports as a record for the sample ID change. Mention the change in the case narratives.

Thank you,

Domonkos Fehér, Ph.D.
Project Chemist
Environmental Science International, Inc.
354 Uluniu Street, Suite 304, Kailua, Hawaii 96734
Cell: (808) 232-1261, Office: (808) 261-0740 ext. 118;
Email: dfeher@esciencei.com

Notify us here to report this email as spam.

RAW DATA SHEET
FOR METHOD: EPA 8015B (M)

WORK ORDER:	**15-01-1609**	ANALYZED BY:	500
INSTRUMENT:	GC 46	D/T ANALYZED:	2015-01-30 10:15
EXTRACTION:	EPA 3510C	REVIEWED BY:	
D/T EXTRACTED:	2015-01-28 00:00	D/T REVIEWED:	

DATA FILE: W:\GC_45_46\DATA\GC46\2015\150129\15012978.D\15012978

 # 2 **CLIENT SAMPLE NUMBER: ES121X**

LCS/MB BATCH:	150128B14	SAMPLE VOLUME / WEIGHT:	DEFAULT: 500.00 ml / ACTUAL: 500.00 ml
MS/MSD BATCH:	150128S14	FINAL VOLUME / WEIGHT:	DEFAULT: 5.00 ml / ACTUAL: 2.50 ml
UNITS:	ug/L	ADJUSTMENT RATIO TO PF:	0.50

COMMENT: Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.

COMPOUND	INI. CONC	DF	CONC	DL	LOD	LOQ	QUAL
TPH as Diesel	4890	1.00	24.5	11	12	25	bJ

==========

Area Percent Report

==========

Data File Name : W:\GC_45_46\DATA\GC46\2015\150129\15012978.D
Page Number : 1
Operator : 610
Instrument : GC 46
Sample Name : 15-01-1609-2

Vial Number : Vial 78
Injection Number : 1
Sequence Line : 78
Instrument Method: C:\Chem32\2\METHODS\ ->

Acquired on : 30 Jan 15 10:15 am
Report Created on: 30 Jan 15 06:49 pm

Analysis Method : 8015B.MTH

Software Revision: Rev. B.03.02 [341] Copyright © Agilent Technologies

Sig. 1 in W:\GC_45_46\DATA\GC46\2015\150129->

Pk	Ret Time	Area	Height	Peak	Width	Response %
1	1.875	0.93	0	VV	0.036	0.107
2	1.914	0.59	0	VV	0.027	0.068
3	1.944	0.35	0	VV	0.021	0.041
4	1.984	0.86	0	VV	0.033	0.098
5	2.005	1.56	0	VV	0.068	0.180
6	2.105	0.47	0	VV	0.028	0.054
7	2.155	2.01	1	VV	0.040	0.232
8	2.210	1.47	0	VV	0.048	0.170
9	2.326	0.28	0	VV	0.031	0.033
10	2.392	0.06	0	VV	0.023	0.007
11	2.445	0.43	0	VV	0.040	0.050
12	2.487	0.16	0	VV	0.020	0.018
13	2.531	0.27	0	VV	0.024	0.031
14	2.565	0.27	0	VV	0.023	0.031
15	2.614	7.26	4	VV	0.026	0.837
16	2.679	0.27	0	VV	0.011	0.031
17	2.705	1.16	0	VV	0.032	0.133
18	2.764	1.16	1	VV	0.015	0.134
19	2.787	4.70	4	VV	0.020	0.541
20	2.825	0.84	0	VV	0.025	0.096
21	2.899	0.85	0	VV	0.034	0.098
22	2.965	0.27	0	VV	0.029	0.031
23	3.021	2.63	2	VV	0.019	0.303
24	3.087	0.41	0	VV	0.021	0.047
25	3.110	0.33	0	VV	0.022	0.038
26	3.150	0.25	0	VV	0.021	0.029
27	3.197	0.76	0	VV	0.027	0.087
28	3.229	0.75	1	VV	0.021	0.086
29	3.268	0.30	0	VV	0.020	0.034
30	3.324	0.14	0	VV	0.016	0.016
31	3.344	0.34	0	VV	0.021	0.039
32	3.382	0.02	0	VV	0.013	0.003
33	3.444	0.28	0	VV	0.030	0.032
34	3.460	0.14	0	VV	0.015	0.016
35	3.487	0.26	0	VV	0.017	0.030
36	3.536	1.39	0	VV	0.052	0.160
37	3.567	0.47	0	VV	0.024	0.054
38	3.609	3.18	2	VV	0.020	0.366
39	3.691	0.60	0	VV	0.029	0.069
40	3.722	0.65	0	VV	0.036	0.074
41	3.788	0.62	0	VV	0.024	0.071
42	3.832	1.66	1	VV	0.019	0.191
43	3.866	0.69	1	VV	0.020	0.080
44	3.916	0.05	0	VV	0.016	0.005
45	3.953	5.00	4	VV	0.019	0.575

Area Percent Report

Data File Name : W:\GC_45_46\DATA\GC46\2015\150129\15012978.D
Page Number : 2
Operator : 610
Instrument : GC 46
Sample Name : 15-01-1609-2

Vial Number : Vial 78
Injection Number : 1
Sequence Line : 78
Instrument Method: C:\Chem32\2\METHODS\ ->

Acquired on : 30 Jan 15 10:15 am
Report Created on: 30 Jan 15 06:49 pm

Analysis Method : 8015B.MTH

Software Revision: Rev. B.03.02 [341] Copyright © Agilent Technologies

Pk	Ret Time	Area	Height	Peak	Width	Response %
46	4.017	0.14	0	VV	0.026	0.016
47	4.049	0.01	0	VV	0.011	0.001
48	4.081	0.07	0	VV	0.024	0.008
49	4.187	1.00	0	VV	0.036	0.115
50	4.215	0.29	0	VV	0.019	0.033
51	4.242	0.42	0	VV	0.025	0.049
52	4.336	1.33	0	VV	0.040	0.153
53	4.354	0.38	0	VV	0.012	0.044
54	4.372	0.95	1	VV	0.025	0.109
55	4.419	1.17	1	VV	0.025	0.135
56	4.430	0.47	1	VV	0.013	0.054
57	4.449	0.75	1	VV	0.017	0.086
58	4.475	0.79	1	VV	0.020	0.091
59	4.528	2.39	1	VV	0.040	0.275
60	4.568	2.27	1	VV	0.036	0.261
61	4.604	1.25	1	VV	0.023	0.144
62	4.659	3.63	1	VV	0.046	0.418
63	4.693	1.17	1	VV	0.018	0.135
64	4.720	2.46	1	VV	0.032	0.284
65	4.745	0.87	1	VV	0.015	0.100
66	4.769	1.66	1	VV	0.024	0.192
67	4.812	8.26	5	VV	0.026	0.951
68	4.887	4.85	2	VV	0.041	0.558
69	4.927	1.97	1	VV	0.027	0.227
70	4.979	4.43	2	VV	0.036	0.511
71	5.025	1.67	1	VV	0.024	0.192
72	5.042	0.68	1	VV	0.011	0.078
73	5.057	1.56	1	VV	0.028	0.179
74	5.096	1.33	1	VV	0.023	0.153
75	5.133	3.33	2	VV	0.030	0.383
76	5.281	769.69	540	VV	0.024	88.635

Total area = 868.39

==========

Area Percent Report

==========

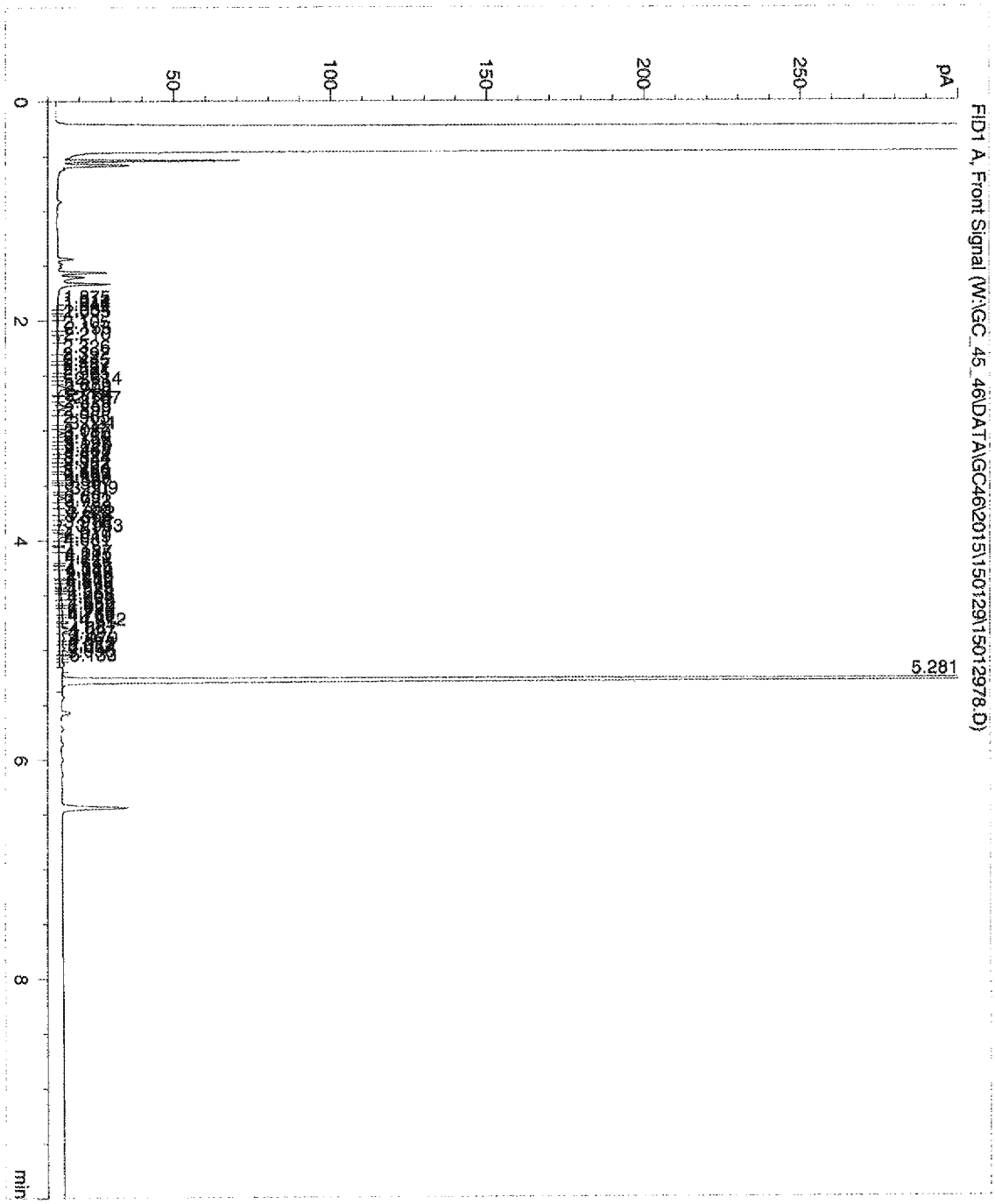
Data File Name : W:\GC_45_46\DATA\GC46\2015\150129\15012978.D
Page Number : 3
Operator : 610
Instrument : GC 46
Sample Name : 15-01-1609-2

Acquired on : 30 Jan 15 10:15 am
Report Created on: 30 Jan 15 06:49 pm

Vial Number : Vial 78
Injection Number : 1
Sequence Line : 78
Instrument Method: C:\Chem32\2\METHODS\ ->

Analysis Method : 8015B.MTH

Software Revision: Rev. B.03.02 [341] Copyright © Agilent Technologies



RAW DATA SHEET
FOR METHOD: EPA 8015B (M)

WORK ORDER:	**15-01-1609**	ANALYZED BY:	500
INSTRUMENT:	GC 46	D/T ANALYZED:	2015-01-30 10:31
EXTRACTION:	EPA 3510C	REVIEWED BY:	
D/T EXTRACTED:	2015-01-28 00:00	D/T REVIEWED:	

DATA FILE: W:\GC_45_46\DATA\GC46\2015\150129\15012979.D\15012979

 # 3 **CLIENT SAMPLE NUMBER: ES122X**

LCS/MB BATCH:	150128B14	SAMPLE VOLUME / WEIGHT:	DEFAULT: 500.00 ml / ACTUAL: 460.00 ml
MS/MSD BATCH:	150128S14	FINAL VOLUME / WEIGHT:	DEFAULT: 5.00 ml / ACTUAL: 2.50 ml
UNITS:	ug/L	ADJUSTMENT RATIO TO PF:	0.54

COMMENT: Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.

COMPOUND	INI. CONC	DF	CONC	DL	LOD	LOQ	QUAL
TPH as Diesel	2930	1.00	15.9	12	14	27	bJ

Area Percent Report

Data File Name : W:\GC_45_46\DATA\GC46\2015\150129\15012979.D
Page Number : 1
Operator : 610
Instrument : GC 46
Sample Name : 15-01-1609-3

Vial Number : Vial 79
Injection Number : 1
Sequence Line : 79
Instrument Method: C:\Chem32\2\METHODS\ ->

Acquired on : 30 Jan 15 10:31 am
Report Created on: 30 Jan 15 06:49 pm

Analysis Method : 8015B.MTH

Software Revision: Rev. B.03.02 [341] Copyright © Agilent Technologies

Sig. 1 in W:\GC_45_46\DATA\GC46\2015\150129->

Pk	Ret Time	Area	Height	Peak	Width	Response %
1	2.008	2.44	0	VV	0.075	0.297
2	2.109	0.46	0	VV	0.030	0.056
3	2.162	1.52	1	VV	0.037	0.185
4	2.200	1.39	0	VV	0.059	0.170
5	2.323	0.28	0	VV	0.034	0.034
6	2.386	0.04	0	VV	0.019	0.005
7	2.415	0.02	0	VV	0.018	0.003
8	2.454	0.26	0	VV	0.037	0.032
9	2.487	0.12	0	VV	0.023	0.015
10	2.532	0.22	0	VV	0.022	0.026
11	2.551	0.06	0	VV	0.011	0.007
12	2.562	0.07	0	VV	0.013	0.008
13	2.614	7.31	4	VV	0.028	0.890
14	2.712	0.93	0	VV	0.036	0.113
15	2.762	1.00	1	VV	0.017	0.122
16	2.786	3.97	3	VV	0.019	0.484
17	2.829	0.49	0	VV	0.024	0.059
18	2.901	0.58	0	VV	0.029	0.071
19	2.964	0.17	0	VV	0.021	0.020
20	3.021	2.26	2	VV	0.019	0.275
21	3.091	0.25	0	VV	0.020	0.031
22	3.110	0.43	0	VV	0.022	0.052
23	3.152	0.18	0	VV	0.022	0.022
24	3.199	0.57	0	VV	0.025	0.069
25	3.229	0.70	1	VV	0.021	0.085
26	3.268	0.27	0	VV	0.017	0.033
27	3.341	0.74	0	VV	0.030	0.090
28	3.380	0.05	0	VV	0.014	0.006
29	3.428	0.41	0	VV	0.030	0.050
30	3.460	0.11	0	VV	0.012	0.014
31	3.488	0.39	0	VV	0.013	0.047
32	3.523	3.02	1	VV	0.039	0.368
33	3.571	1.14	1	VV	0.026	0.139
34	3.607	3.83	3	VV	0.023	0.466
35	3.692	1.08	0	VV	0.035	0.132
36	3.726	0.76	0	VV	0.037	0.092
37	3.791	0.70	0	VV	0.023	0.085
38	3.833	1.66	1	VV	0.020	0.203
39	3.867	1.19	1	VV	0.021	0.145
40	3.923	0.15	0	VV	0.026	0.018
41	3.954	4.67	3	VV	0.021	0.569
42	4.016	0.20	0	VV	0.025	0.024
43	4.082	0.07	0	VV	0.029	0.009
44	4.120	0.00	0	VV	0.006	0.000
45	4.146	0.07	0	VV	0.017	0.008

Area Percent Report

Data File Name : W:\GC_45_46\DATA\GC46\2015\150129\15012979.D
Page Number : 2
Operator : 610
Instrument : GC 46
Sample Name : 15-01-1609-3

Vial Number : Vial 79
Injection Number : 1
Sequence Line : 79
Instrument Method: C:\Chem32\2\METHODS\ ->

Acquired on : 30 Jan 15 10:31 am
Report Created on: 30 Jan 15 06:49 pm

Analysis Method : 8015B.MTH

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Pk	Ret Time	Area	Height	Peak	Width	Response %
46	4.185	1.53	1	VV	0.039	0.187
47	4.291	0.03	0	VV	0.017	0.004
48	4.311	0.03	0	VV	0.014	0.004
49	4.371	0.42	0	VV	0.033	0.051
50	4.424	0.19	0	VV	0.033	0.023
51	4.486	0.01	0	VV	0.016	0.002
52	4.516	0.21	0	VV	0.030	0.026
53	4.585	0.12	0	VV	0.024	0.015
54	4.660	0.97	0	VV	0.034	0.118
55	4.714	0.52	0	VV	0.031	0.063
56	4.769	0.13	0	VV	0.018	0.016
57	4.815	5.03	3	VV	0.026	0.613
58	4.891	0.75	0	VV	0.024	0.091
59	4.928	0.28	0	VV	0.022	0.034
60	4.980	1.50	1	VV	0.024	0.183
61	5.049	0.02	0	VV	0.013	0.003
62	5.073	0.02	0	VV	0.013	0.002
63	5.131	1.10	1	VV	0.022	0.134
64	5.280	762.44	518	VV	0.025	92.806

Total area = 821.54

Area Percent Report

Data File Name : W:\GC_45_46\DATA\GC46\2015\150129\15012979.D
Page Number : 3
Operator : 610
Instrument : GC 46
Sample Name : 15-01-1609-3

Acquired on : 30 Jan 15 10:31 am
Report Created on: 30 Jan 15 06:49 pm

Vial Number : Vial 79
Injection Number : 1
Sequence Line : 79
Instrument Method: C:\Chem32\2\METHODS\ ->

Analysis Method : 8015B.MTH

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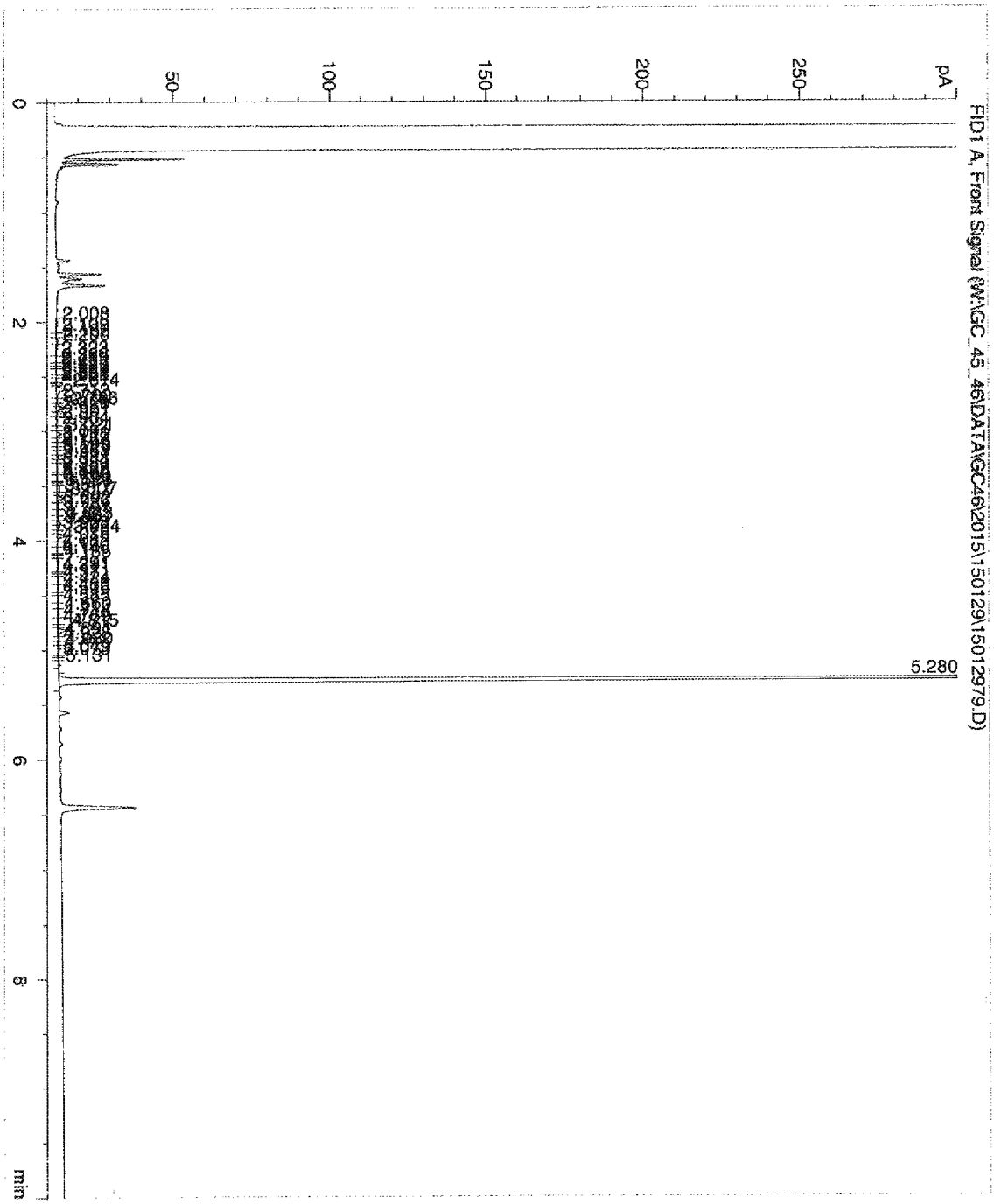


RAW DATA SHEET
FOR METHOD: EPA 8015B (M)

WORK ORDER:	**099-15-516**	ANALYZED BY:	500
INSTRUMENT:	GC 46	D/T ANALYZED:	2015-01-30 06:18
EXTRACTION:	EPA 3510C	REVIEWED BY:	
D/T EXTRACTED:	2015-01-28 00:00	D/T REVIEWED:	

DATA FILE: W:\GC_45_46\DATA\GC46\2015\150129\15012964.D\15012964

 # MB **CLIENT SAMPLE NUMBER: Method Blank**

LCS/MB BATCH:	150128B14	SAMPLE VOLUME / WEIGHT:	DEFAULT: 500.00 ml / ACTUAL: 500.00 ml
MS/MSD BATCH:		FINAL VOLUME / WEIGHT:	DEFAULT: 5.00 ml / ACTUAL: 2.50 ml
UNITS:	ug/L	ADJUSTMENT RATIO TO PF:	0.50

COMMENT:

COMPOUND	INI. CONC	DF	CONC	DL	LOD	LOQ	QUAL
TPH as Diesel	0.000	1.00	ND	11	12	25	

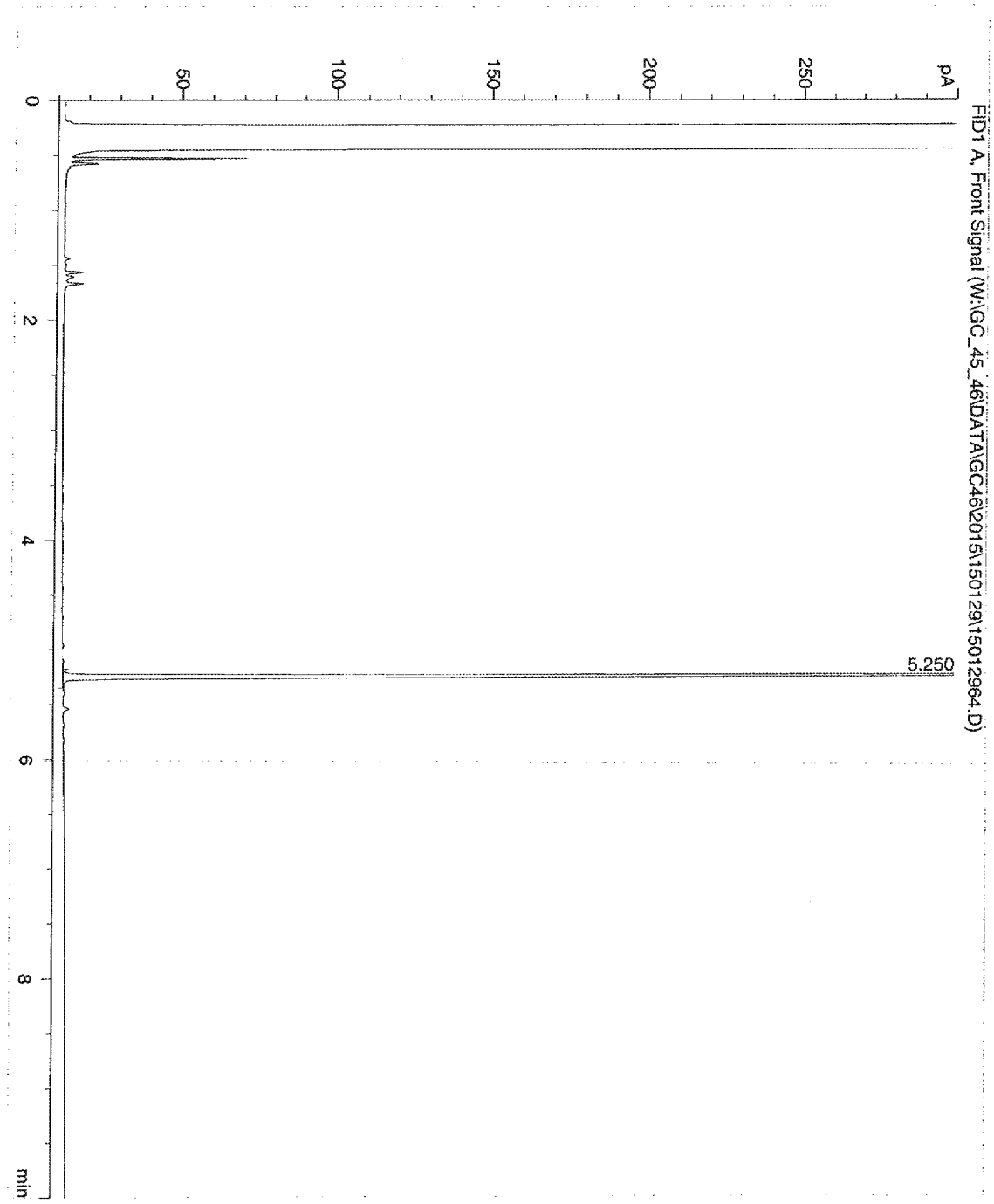
==========

Area Percent Report

==========

ta File Name : W:\GC_45_46\DATA\GC46\2015\150129\15012964.D
ge Number : 2
erator : 610 Vial Number : Vial 64
strument : GC 46 Injection Number : 1
mple Name : MB 15012814/15 Sequence Line : 64
Instrument Method: C:\Chem32\2\METHODS\ ->
quired on : 30 Jan 15 06:18 am
port Created on: 30 Jan 15 10:17 am Analysis Method : 8015B.MTH

ftware Revision: Rev. B.03.02 [341] Copyright © Agilent Technologies



CONTINUING CALIBRATION VERIFICATION QUALITY CONTROL SHEET
FOR METHOD: EPA 8015B (M)

CCV WORK ORDER: **099-15-515-358-6279**
BATCH ID:
INITIAL: 141215I007
CCV: 150129A078
INSTRUMENT: GC 46

DATA FILE: W:\GC_45_46\DATA\GC46\2015\150129\15012962.D\15012962

ANALYZED BY: 500
D/T ANALYZED:
INITIAL: 2014-12-15 15:43
CCV: 2015-01-30 05:44
REVIEWED BY:
D/T REVIEWED:

COMPOUND NAME	COMP TYPE	CALIB MODEL	MIN RF	AVG RF	CCV RF	AMOUNT	CCV CONC	CCV %D	CCV %D CL	STATUS
TPH as Diesel	C	Avg Resp	0.00	0.020	0.023			-13	0-15	PASS

MIN RF: Method Specified Minimum Response Factor

ED_006532_00009885-00102

Area Percent Report

.ta File Name : W:\GC_45_46\DATA\GC46\2015\150129\15012962.D
.ge Number : 4
erator : 610
.strument : GC 46
mple Name : D400 C28 50 L012815D

quired on : 30 Jan 15 05:44 am
port Created on: 30 Jan 15 10:16 am

Vial Number : Vial 62
Injection Number : 1
Sequence Line : 62
Instrument Method: C:\Chem32\2\METHODS\ ->
Analysis Method : 8015B.MTH

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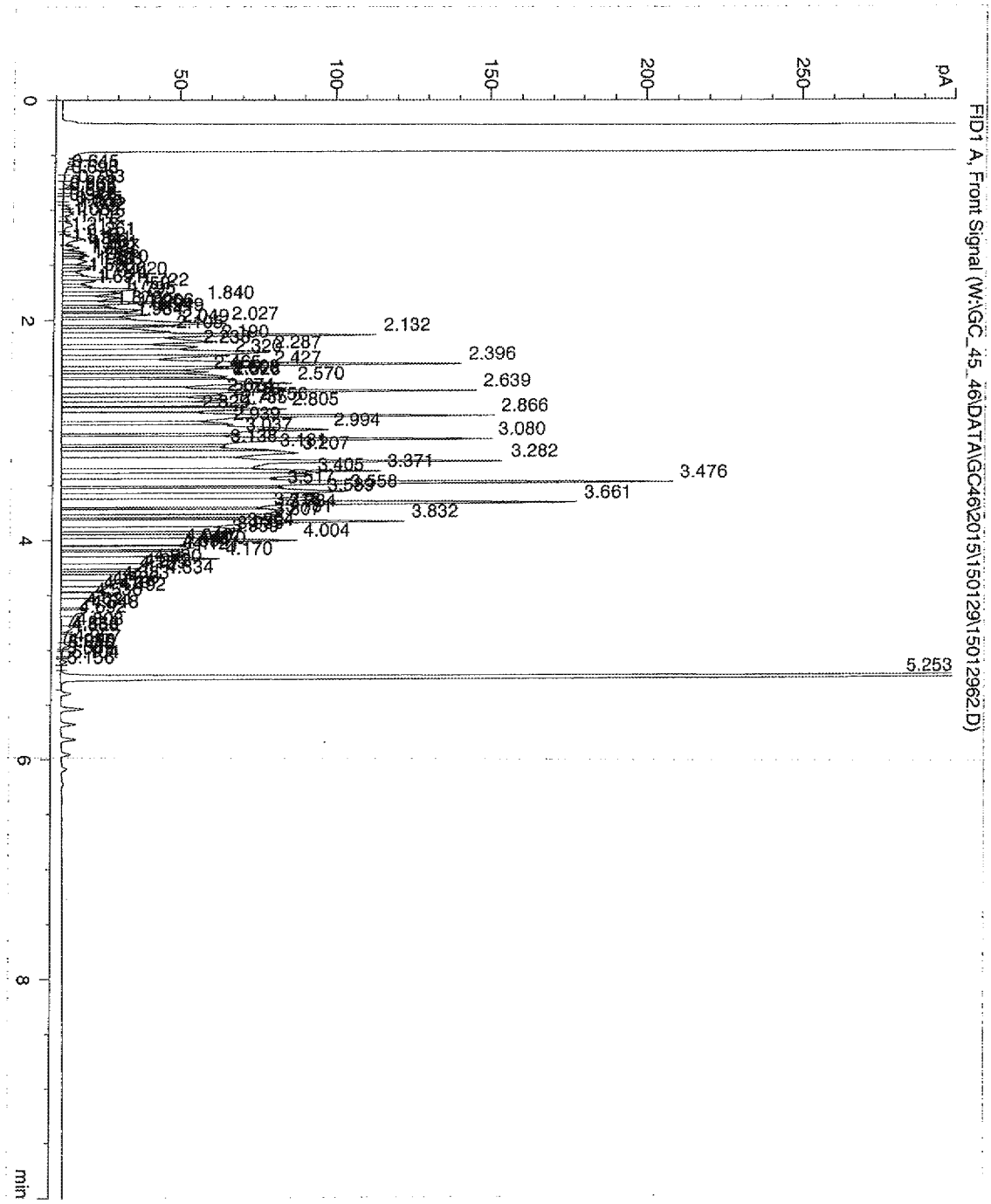

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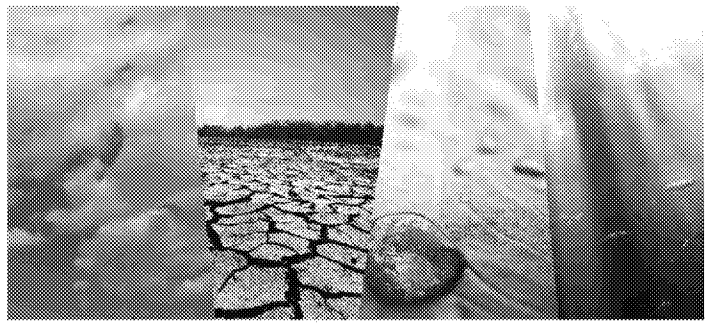
WORK ORDER NUMBER: 15-01-1920

The difference is service



AIR | SOIL | WATER | MARINE CHEMISTRY

Analytical Report For

Client: Environmental Science International, Inc.

Client Project Name: Red Hill LTM 112066

Attention: Jeff Hattemer
354 Uluniu Street, Suite 304
Kailua, HI 96734-2500

Approved for release on 02/06/2015 by:
Terri Chang
Project Manager

ResultLink ▸

Email your PM ▸

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Work Order Number: 15-01-1920

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Work Order Narrative

Work Order: 15-01-1920 Page 1 of 1

Condition Upon Receipt:

Samples were received under Chain-of-Custody (COC) on 01/30/15. They were assigned to Work Order 15-01-1920.

Unless otherwise noted on the Sample Receiving forms all samples were received in good condition and within the recommended EPA temperature criteria for the methods noted on the COC. The COC and Sample Receiving Documents are integral elements of the analytical report and are presented at the back of the report.

Holding Times:

All samples were analyzed within prescribed holding times (HT) and/or in accordance with the Calscience Sample Acceptance Policy unless otherwise noted in the analytical report and/or comprehensive case narrative, if required.

Any parameter identified in 40CFR Part 136.3 Table II that is designated as "analyze immediately" with a holding time of <= 15 minutes (40CFR-136.3 Table II, footnote 4), is considered a "field" test and the reported results will be qualified as being received outside of the stated holding time unless received at the laboratory within 15 minutes of the collection time.

Quality Control:

All quality control parameters (QC) were within established control limits except where noted in the QC summary forms or described further within this report.

Subcontractor Information:

Unless otherwise noted below (or on the subcontract form), no samples were subcontracted.

Additional Comments:

Air - Sorbent-extracted air methods (EPA TO-4A, EPA TO-10, EPA TO-13A, EPA TO-17): Analytical results are converted from mass/sample basis to mass/volume basis using client-supplied air volumes.

Solid - Unless otherwise indicated, solid sample data is reported on a wet weight basis, not corrected for % moisture. All QC results are always reported on a wet weight basis.

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Analytical Report

Environmental Science International, Inc.		Date Received:	01/30/15
354 Uluniu Street, Suite 304		Work Order:	15-01-1920
Kailua, HI 96734-2500		Preparation:	EPA 3510C
		Method:	EPA 8015B (M)
		Units:	ug/L
Project: Red Hill LTM 112066			Page 1 of 1

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
ES128	**15-01-1920-2-H**	**01/29/15 09:30**	**Aqueous**	**GC 45**	**02/02/15**	**02/03/15 04:04**	**150202B09**

Comment(s): - Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.
- TPH as Diesel is quantified in the carbon range C10-C28.

Parameter	Result	DL	LOD	LOQ	DF	Qualifiers
TPH as Diesel	16	2.9	10	25	1.00	HD,J

Surrogate	Rec. (%)	Control Limits	Qualifiers
n-Octacosane	68	51-141	

ES129	**15-01-1920-3-H**	**01/29/15 12:15**	**Aqueous**	**GC 45**	**02/02/15**	**02/03/15 04:24**	**150202B09**

Comment(s): - Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.
- TPH as Diesel is quantified in the carbon range C10-C28.

Parameter	Result	DL	LOD	LOQ	DF	Qualifiers
TPH as Diesel	10	2.9	10	25	1.00	HD,J

Surrogate	Rec. (%)	Control Limits	Qualifiers
n-Octacosane	85	51-141	

Method Blank	**099-15-516-238**	**N/A**	**Aqueous**	**GC 45**	**02/02/15**	**02/03/15 00:43**	**150202B09**

Comment(s): - Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	DL	LOD	LOQ	DF	Qualifiers
TPH as Diesel	<10	2.9	10	25	1.00	U

Surrogate	Rec. (%)	Control Limits	Qualifiers
n-Octacosane	83	51-141	

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Analytical Report

Environmental Science International, Inc.		Date Received:	01/30/15
354 Uluniu Street, Suite 304		Work Order:	15-01-1920
Kailua, HI 96734-2500		Preparation:	EPA 3005A Filt.
		Method:	EPA 6020
		Units:	ug/L
Project: Red Hill LTM 112066			Page 1 of 1

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
ES128	**15-01-1920-2-G**	**01/29/15 09:30**	**Aqueous**	**ICP/MS 03**	**01/30/15**	**01/30/15 18:34**	**150130L03D**

Comment(s): - Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	DL	LOD	LOQ	DF	Qualifiers
Lead	<0.200	0.0898	0.200	0.500	1.00	U

ES129	**15-01-1920-3-G**	**01/29/15 12:15**	**Aqueous**	**ICP/MS 03**	**01/30/15**	**01/30/15 19:09**	**150130L03D**

Comment(s): - Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	DL	LOD	LOQ	DF	Qualifiers
Lead	<0.200	0.0898	0.200	0.500	1.00	U

Method Blank	**099-14-497-117**	**N/A**	**Aqueous**	**ICP/MS 03**	**01/30/15**	**01/30/15 18:02**	**150130L03D**

Comment(s): - Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	DL	LOD	LOQ	DF	Qualifiers
Lead	<0.200	0.0898	0.200	0.500	1.00	U

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Analytical Report

Environmental Science International, Inc.		Date Received:	01/30/15
354 Uluniu Street, Suite 304		Work Order:	15-01-1920
Kailua, HI 96734-2500		Preparation:	EPA 3510C
		Method:	EPA 8270C SIM PAHs
		Units:	ug/L
Project: Red Hill LTM 112066			Page 1 of 3

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
ES128	**15-01-1920-2-I**	**01/29/15 09:30**	**Aqueous**	**GC/MS AAA**	**01/30/15**	**02/02/15 23:48**	**150130L19**

Comment(s): - Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	DL	LOD	LOQ	DF	Qualifiers
Naphthalene	<0.053	0.036	0.053	0.21	1.00	U
2-Methylnaphthalene	<0.053	0.049	0.053	0.21	1.00	U
1-Methylnaphthalene	<0.11	0.055	0.11	0.21	1.00	U
Acenaphthylene	<0.053	0.047	0.053	0.21	1.00	U
Acenaphthene	<0.053	0.028	0.053	0.21	1.00	U
Fluorene	<0.053	0.045	0.053	0.21	1.00	U
Phenanthrene	<0.053	0.029	0.053	0.21	1.00	U
Anthracene	<0.053	0.031	0.053	0.21	1.00	U
Fluoranthene	<0.053	0.050	0.053	0.21	1.00	U
Pyrene	<0.053	0.022	0.053	0.21	1.00	U
Benzo (a) Anthracene	<0.053	0.035	0.053	0.21	1.00	U
Chrysene	<0.053	0.026	0.053	0.21	1.00	U
Benzo (k) Fluoranthene	<0.053	0.033	0.053	0.21	1.00	U
Benzo (b) Fluoranthene	<0.053	0.019	0.053	0.21	1.00	U
Benzo (a) Pyrene	<0.053	0.024	0.053	0.21	1.00	U
Indeno (1,2,3-c,d) Pyrene	<0.053	0.023	0.053	0.21	1.00	U
Dibenz (a,h) Anthracene	<0.053	0.051	0.053	0.21	1.00	U
Benzo (g,h,i) Perylene	<0.11	0.087	0.11	0.21	1.00	U

Surrogate	Rec. (%)	Control Limits	Qualifiers
Nitrobenzene-d5	43	28-139	
2-Fluorobiphenyl	50	33-144	
p-Terphenyl-d14	72	23-160	

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Analytical Report

Environmental Science International, Inc.		Date Received:	01/30/15
354 Uluniu Street, Suite 304		Work Order:	15-01-1920
Kailua, HI 96734-2500		Preparation:	EPA 3510C
		Method:	EPA 8270C SIM PAHs
		Units:	ug/L
Project: Red Hill LTM 112066			Page 2 of 3

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
ES129	**15-01-1920-3-I**	**01/29/15 12:15**	**Aqueous**	**GC/MS AAA**	**01/30/15**	**02/03/15 00:08**	**150130L19**

Comment(s): - Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	DL	LOD	LOQ	DF	Qualifiers
Naphthalene	<0.052	0.035	0.052	0.21	1.00	U
2-Methylnaphthalene	<0.052	0.048	0.052	0.21	1.00	U
1-Methylnaphthalene	<0.10	0.053	0.10	0.21	1.00	U
Acenaphthylene	<0.052	0.046	0.052	0.21	1.00	U
Acenaphthene	<0.052	0.028	0.052	0.21	1.00	U
Fluorene	<0.052	0.044	0.052	0.21	1.00	U
Phenanthrene	<0.052	0.028	0.052	0.21	1.00	U
Anthracene	<0.052	0.030	0.052	0.21	1.00	U
Fluoranthene	<0.052	0.048	0.052	0.21	1.00	U
Pyrene	<0.052	0.021	0.052	0.21	1.00	U
Benzo (a) Anthracene	<0.052	0.034	0.052	0.21	1.00	U
Chrysene	<0.052	0.026	0.052	0.21	1.00	U
Benzo (k) Fluoranthene	<0.052	0.032	0.052	0.21	1.00	U
Benzo (b) Fluoranthene	<0.052	0.018	0.052	0.21	1.00	U
Benzo (a) Pyrene	<0.052	0.023	0.052	0.21	1.00	U
Indeno (1,2,3-c,d) Pyrene	<0.052	0.022	0.052	0.21	1.00	U
Dibenz (a,h) Anthracene	<0.052	0.049	0.052	0.21	1.00	U
Benzo (g,h,i) Perylene	<0.10	0.085	0.10	0.21	1.00	U

Surrogate	Rec. (%)	Control Limits	Qualifiers
Nitrobenzene-d5	40	28-139	
2-Fluorobiphenyl	48	33-144	
p-Terphenyl-d14	57	23-160	

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Analytical Report

Environmental Science International, Inc.		Date Received:	01/30/15
354 Uluniu Street, Suite 304		Work Order:	15-01-1920
Kailua, HI 96734-2500		Preparation:	EPA 3510C
		Method:	EPA 8270C SIM PAHs
		Units:	ug/L
Project: Red Hill LTM 112066			Page 3 of 3

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
Method Blank	**099-15-148-80**	**N/A**	**Aqueous**	**GC/MS AAA**	**01/30/15**	**02/02/15 21:28**	**150130L19**

Comment(s): - Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	DL	LOD	LOQ	DF	Qualifiers
Naphthalene	<0.050	0.034	0.050	0.20	1.00	U
2-Methylnaphthalene	<0.050	0.046	0.050	0.20	1.00	U
1-Methylnaphthalene	<0.10	0.052	0.10	0.20	1.00	U
Acenaphthylene	<0.050	0.045	0.050	0.20	1.00	U
Acenaphthene	<0.050	0.027	0.050	0.20	1.00	U
Fluorene	<0.050	0.043	0.050	0.20	1.00	U
Phenanthrene	<0.050	0.027	0.050	0.20	1.00	U
Anthracene	<0.050	0.029	0.050	0.20	1.00	U
Fluoranthene	<0.050	0.047	0.050	0.20	1.00	U
Pyrene	<0.050	0.020	0.050	0.20	1.00	U
Benzo (a) Anthracene	<0.050	0.033	0.050	0.20	1.00	U
Chrysene	<0.050	0.025	0.050	0.20	1.00	U
Benzo (k) Fluoranthene	<0.050	0.031	0.050	0.20	1.00	U
Benzo (b) Fluoranthene	<0.050	0.018	0.050	0.20	1.00	U
Benzo (a) Pyrene	<0.050	0.022	0.050	0.20	1.00	U
Indeno (1,2,3-c,d) Pyrene	<0.050	0.021	0.050	0.20	1.00	U
Dibenz (a,h) Anthracene	<0.050	0.048	0.050	0.20	1.00	U
Benzo (g,h,i) Perylene	<0.10	0.082	0.10	0.20	1.00	U

Surrogate	Rec. (%)	Control Limits	Qualifiers
Nitrobenzene-d5	69	28-139	
2-Fluorobiphenyl	67	33-144	
p-Terphenyl-d14	69	23-160	

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Analytical Report

Environmental Science International, Inc.		Date Received:	01/30/15
354 Uluniu Street, Suite 304		Work Order:	15-01-1920
Kailua, HI 96734-2500		Preparation:	EPA 5030C
		Method:	GC/MS / EPA 8260B
		Units:	ug/L
Project: Red Hill LTM 112066			Page 1 of 8

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
ESTRIP	**15-01-1920-1-A**	**01/29/15 09:00**	**Aqueous**	**GC/MS OO**	**01/31/15**	**01/31/15 13:44**	**150131L001**

Comment(s): - Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	DL	LOD	LOQ	DF	Qualifiers
Acetone	<10	6.0	10	20	1.00	U,IJ
Benzene	<0.50	0.14	0.50	1.0	1.00	U
Bromodichloromethane	<0.50	0.21	0.50	5.0	1.00	U
Bromoform	<1.0	0.50	1.0	10	1.00	U
Bromomethane	<5.0	3.9	5.0	20	1.00	U,IH
2-Butanone	<5.0	2.2	5.0	10	1.00	U
Carbon Tetrachloride	<0.50	0.23	0.50	1.0	1.00	U
Chlorobenzene	<0.50	0.17	0.50	5.0	1.00	U
Chloroethane	<5.0	2.3	5.0	10	1.00	U
Chloroform	<0.50	0.46	0.50	5.0	1.00	U
Chloromethane	<2.0	1.8	2.0	10	1.00	U
Dibromochloromethane	<0.50	0.25	0.50	1.0	1.00	U
1,2-Dibromo-3-Chloropropane	<2.0	1.2	2.0	10	1.00	U
1,2-Dibromoethane	<0.50	0.36	0.50	1.0	1.00	U
1,2-Dichlorobenzene	<0.50	0.46	0.50	1.0	1.00	U
1,3-Dichlorobenzene	<0.50	0.40	0.50	1.0	1.00	U
1,4-Dichlorobenzene	<0.50	0.43	0.50	1.0	1.00	U
1,1-Dichloroethane	<0.50	0.28	0.50	5.0	1.00	U
1,2-Dichloroethane	<0.50	0.24	0.50	1.0	1.00	U
1,1-Dichloroethene	<0.50	0.43	0.50	1.0	1.00	U
c-1,2-Dichloroethene	<0.50	0.48	0.50	1.0	1.00	U
t-1,2-Dichloroethene	<0.50	0.37	0.50	1.0	1.00	U
1,2-Dichloropropane	<0.50	0.42	0.50	5.0	1.00	U
c-1,3-Dichloropropene	<0.50	0.25	0.50	1.0	1.00	U
t-1,3-Dichloropropene	<0.50	0.25	0.50	1.0	1.00	U
Ethylbenzene	<0.50	0.14	0.50	1.0	1.00	U
Methylene Chloride	<1.0	0.64	1.0	5.0	1.00	U
4-Methyl-2-Pentanone	<5.0	4.4	5.0	10	1.00	U
Styrene	<0.50	0.17	0.50	1.0	1.00	U
1,1,1,2-Tetrachloroethane	<0.50	0.40	0.50	1.0	1.00	U
1,1,2,2-Tetrachloroethane	<0.50	0.41	0.50	1.0	1.00	U
Tetrachloroethene	<0.50	0.39	0.50	5.0	1.00	U
Toluene	<0.50	0.24	0.50	1.0	1.00	U
1,2,4-Trichlorobenzene	<1.0	0.50	1.0	5.0	1.00	U
1,1,1-Trichloroethane	<0.50	0.30	0.50	5.0	1.00	U
Hexachloro-1,3-Butadiene	<0.50	0.32	0.50	1.0	1.00	U

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Analytical Report

Environmental Science International, Inc.		Date Received:	01/30/15
354 Uluniu Street, Suite 304		Work Order:	15-01-1920
Kailua, HI 96734-2500		Preparation:	EPA 5030C
		Method:	GC/MS / EPA 8260B
		Units:	ug/L
Project: Red Hill LTM 112066			Page 2 of 8

Parameter	Result	DL	LOD	LOQ	DF	Qualifiers
1,1,2-Trichloroethane	<0.50	0.38	0.50	1.0	1.00	U
Trichloroethene	<0.50	0.37	0.50	1.0	1.00	U
1,2,3-Trichloropropane	<1.0	0.64	1.0	5.0	1.00	U
Vinyl Chloride	<0.50	0.30	0.50	1.0	1.00	U
p/m-Xylene	<1.0	0.30	1.0	10	1.00	U
o-Xylene	<0.50	0.23	0.50	1.0	1.00	U
Methyl-t-Butyl Ether (MTBE)	<0.50	0.31	0.50	1.0	1.00	U
Gasoline Range Organics	<30	26	30	50	1.00	U

Surrogate	Rec. (%)	Control Limits	Qualifiers
Dibromofluoromethane	105	80-126	
1,2-Dichloroethane-d4	108	80-134	
Toluene-d8	96	80-120	
Toluene-d8-TPPH	98	88-112	
1,4-Bromofluorobenzene	90	80-120	

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Analytical Report

Environmental Science International, Inc.		Date Received:	01/30/15
354 Uluniu Street, Suite 304		Work Order:	15-01-1920
Kailua, HI 96734-2500		Preparation:	EPA 5030C
		Method:	GC/MS / EPA 8260B
		Units:	ug/L
Project: Red Hill LTM 112066			Page 3 of 8

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
ES128	**15-01-1920-2-A**	**01/29/15 09:30**	**Aqueous**	**GC/MS OO**	**01/31/15**	**01/31/15 17:46**	**150131L001**

Comment(s): - Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	DL	LOD	LOQ	DF	Qualifiers
Acetone	<10	6.0	10	20	1.00	U,IJ
Benzene	<0.50	0.14	0.50	1.0	1.00	U
Bromodichloromethane	<0.50	0.21	0.50	5.0	1.00	U
Bromoform	<1.0	0.50	1.0	10	1.00	U
Bromomethane	<5.0	3.9	5.0	20	1.00	U,IH
2-Butanone	<5.0	2.2	5.0	10	1.00	U
Carbon Tetrachloride	<0.50	0.23	0.50	1.0	1.00	U
Chlorobenzene	<0.50	0.17	0.50	5.0	1.00	U
Chloroethane	<5.0	2.3	5.0	10	1.00	U
Chloroform	<0.50	0.46	0.50	5.0	1.00	U
Chloromethane	<2.0	1.8	2.0	10	1.00	U
Dibromochloromethane	<0.50	0.25	0.50	1.0	1.00	U
1,2-Dibromo-3-Chloropropane	<2.0	1.2	2.0	10	1.00	U
1,2-Dibromoethane	<0.50	0.36	0.50	1.0	1.00	U
1,2-Dichlorobenzene	<0.50	0.46	0.50	1.0	1.00	U
1,3-Dichlorobenzene	<0.50	0.40	0.50	1.0	1.00	U
1,4-Dichlorobenzene	<0.50	0.43	0.50	1.0	1.00	U
1,1-Dichloroethane	<0.50	0.28	0.50	5.0	1.00	U
1,2-Dichloroethane	<0.50	0.24	0.50	1.0	1.00	U
1,1-Dichloroethene	<0.50	0.43	0.50	1.0	1.00	U
c-1,2-Dichloroethene	<0.50	0.48	0.50	1.0	1.00	U
t-1,2-Dichloroethene	<0.50	0.37	0.50	1.0	1.00	U
1,2-Dichloropropane	<0.50	0.42	0.50	5.0	1.00	U
c-1,3-Dichloropropene	<0.50	0.25	0.50	1.0	1.00	U
t-1,3-Dichloropropene	<0.50	0.25	0.50	1.0	1.00	U
Ethylbenzene	<0.50	0.14	0.50	1.0	1.00	U
Methylene Chloride	<1.0	0.64	1.0	5.0	1.00	U
4-Methyl-2-Pentanone	<5.0	4.4	5.0	10	1.00	U
Styrene	<0.50	0.17	0.50	1.0	1.00	U
1,1,1,2-Tetrachloroethane	<0.50	0.40	0.50	1.0	1.00	U
1,1,2,2-Tetrachloroethane	<0.50	0.41	0.50	1.0	1.00	U
Tetrachloroethene	<0.50	0.39	0.50	5.0	1.00	U
Toluene	<0.50	0.24	0.50	1.0	1.00	U
1,2,4-Trichlorobenzene	<1.0	0.50	1.0	5.0	1.00	U
1,1,1-Trichloroethane	<0.50	0.30	0.50	5.0	1.00	U
Hexachloro-1,3-Butadiene	<0.50	0.32	0.50	1.0	1.00	U

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Analytical Report

Environmental Science International, Inc.		Date Received:	01/30/15
354 Uluniu Street, Suite 304		Work Order:	15-01-1920
Kailua, HI 96734-2500		Preparation:	EPA 5030C
		Method:	GC/MS / EPA 8260B
		Units:	ug/L
Project: Red Hill LTM 112066			Page 4 of 8

Parameter	Result	DL	LOD	LOQ	DF	Qualifiers
1,1,2-Trichloroethane	<0.50	0.38	0.50	1.0	1.00	U
Trichloroethene	<0.50	0.37	0.50	1.0	1.00	U
1,2,3-Trichloropropane	<1.0	0.64	1.0	5.0	1.00	U
Vinyl Chloride	<0.50	0.30	0.50	1.0	1.00	U
p/m-Xylene	<1.0	0.30	1.0	10	1.00	U
o-Xylene	<0.50	0.23	0.50	1.0	1.00	U
Methyl-t-Butyl Ether (MTBE)	<0.50	0.31	0.50	1.0	1.00	U
Gasoline Range Organics	<30	26	30	50	1.00	U

Surrogate	Rec. (%)	Control Limits	Qualifiers
Dibromofluoromethane	104	80-126	
1,2-Dichloroethane-d4	106	80-134	
Toluene-d8	96	80-120	
Toluene-d8-TPPH	98	88-112	
1,4-Bromofluorobenzene	91	80-120	

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Analytical Report

Environmental Science International, Inc.		Date Received:	01/30/15
354 Uluniu Street, Suite 304		Work Order:	15-01-1920
Kailua, HI 96734-2500		Preparation:	EPA 5030C
		Method:	GC/MS / EPA 8260B
		Units:	ug/L
Project: Red Hill LTM 112066			Page 5 of 8

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
ES129	**15-01-1920-3-A**	**01/29/15 12:15**	**Aqueous**	**GC/MS OO**	**01/31/15**	**01/31/15 18:13**	**150131L001**

Comment(s): - Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	DL	LOD	LOQ	DF	Qualifiers
Acetone	<10	6.0	10	20	1.00	U,IJ
Benzene	<0.50	0.14	0.50	1.0	1.00	U
Bromodichloromethane	<0.50	0.21	0.50	5.0	1.00	U
Bromoform	<1.0	0.50	1.0	10	1.00	U
Bromomethane	<5.0	3.9	5.0	20	1.00	U,IH
2-Butanone	<5.0	2.2	5.0	10	1.00	U
Carbon Tetrachloride	<0.50	0.23	0.50	1.0	1.00	U
Chlorobenzene	<0.50	0.17	0.50	5.0	1.00	U
Chloroethane	<5.0	2.3	5.0	10	1.00	U
Chloroform	<0.50	0.46	0.50	5.0	1.00	U
Chloromethane	<2.0	1.8	2.0	10	1.00	U
Dibromochloromethane	<0.50	0.25	0.50	1.0	1.00	U
1,2-Dibromo-3-Chloropropane	<2.0	1.2	2.0	10	1.00	U
1,2-Dibromoethane	<0.50	0.36	0.50	1.0	1.00	U
1,2-Dichlorobenzene	<0.50	0.46	0.50	1.0	1.00	U
1,3-Dichlorobenzene	<0.50	0.40	0.50	1.0	1.00	U
1,4-Dichlorobenzene	<0.50	0.43	0.50	1.0	1.00	U
1,1-Dichloroethane	<0.50	0.28	0.50	5.0	1.00	U
1,2-Dichloroethane	<0.50	0.24	0.50	1.0	1.00	U
1,1-Dichloroethene	<0.50	0.43	0.50	1.0	1.00	U
c-1,2-Dichloroethene	<0.50	0.48	0.50	1.0	1.00	U
t-1,2-Dichloroethene	<0.50	0.37	0.50	1.0	1.00	U
1,2-Dichloropropane	<0.50	0.42	0.50	5.0	1.00	U
c-1,3-Dichloropropene	<0.50	0.25	0.50	1.0	1.00	U
t-1,3-Dichloropropene	<0.50	0.25	0.50	1.0	1.00	U
Ethylbenzene	<0.50	0.14	0.50	1.0	1.00	U
Methylene Chloride	<1.0	0.64	1.0	5.0	1.00	U
4-Methyl-2-Pentanone	<5.0	4.4	5.0	10	1.00	U
Styrene	<0.50	0.17	0.50	1.0	1.00	U
1,1,1,2-Tetrachloroethane	<0.50	0.40	0.50	1.0	1.00	U
1,1,2,2-Tetrachloroethane	<0.50	0.41	0.50	1.0	1.00	U
Tetrachloroethene	<0.50	0.39	0.50	5.0	1.00	U
Toluene	<0.50	0.24	0.50	1.0	1.00	U
1,2,4-Trichlorobenzene	<1.0	0.50	1.0	5.0	1.00	U
1,1,1-Trichloroethane	<0.50	0.30	0.50	5.0	1.00	U
Hexachloro-1,3-Butadiene	<0.50	0.32	0.50	1.0	1.00	U

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Analytical Report

Environmental Science International, Inc.		Date Received:	01/30/15
354 Uluniu Street, Suite 304		Work Order:	15-01-1920
Kailua, HI 96734-2500		Preparation:	EPA 5030C
		Method:	GC/MS / EPA 8260B
		Units:	ug/L
Project: Red Hill LTM 112066			Page 6 of 8

Parameter	Result	DL	LOD	LOQ	DF	Qualifiers
1,1,2-Trichloroethane	<0.50	0.38	0.50	1.0	1.00	U
Trichloroethene	<0.50	0.37	0.50	1.0	1.00	U
1,2,3-Trichloropropane	<1.0	0.64	1.0	5.0	1.00	U
Vinyl Chloride	<0.50	0.30	0.50	1.0	1.00	U
p/m-Xylene	<1.0	0.30	1.0	10	1.00	U
o-Xylene	<0.50	0.23	0.50	1.0	1.00	U
Methyl-t-Butyl Ether (MTBE)	<0.50	0.31	0.50	1.0	1.00	U
Gasoline Range Organics	<30	26	30	50	1.00	U

Surrogate	Rec. (%)	Control Limits	Qualifiers
Dibromofluoromethane	103	80-126	
1,2-Dichloroethane-d4	106	80-134	
Toluene-d8	96	80-120	
Toluene-d8-TPPH	98	88-112	
1,4-Bromofluorobenzene	91	80-120	

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Analytical Report

Environmental Science International, Inc.		Date Received:	01/30/15
354 Uluniu Street, Suite 304		Work Order:	15-01-1920
Kailua, HI 96734-2500		Preparation:	EPA 5030C
		Method:	GC/MS / EPA 8260B
		Units:	ug/L
Project: Red Hill LTM 112066			Page 7 of 8

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
Method Blank	**099-13-057-76**	**N/A**	**Aqueous**	**GC/MS OO**	**01/31/15**	**01/31/15 13:10**	**150131L001**

Comment(s): - Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	DL	LOD	LOQ	DF	Qualifiers
Acetone	<10	6.0	10	20	1.00	U
Benzene	<0.50	0.14	0.50	1.0	1.00	U
Bromodichloromethane	<0.50	0.21	0.50	5.0	1.00	U
Bromoform	<1.0	0.50	1.0	10	1.00	U
Bromomethane	<5.0	3.9	5.0	20	1.00	U
2-Butanone	<5.0	2.2	5.0	10	1.00	U
Carbon Tetrachloride	<0.50	0.23	0.50	1.0	1.00	U
Chlorobenzene	<0.50	0.17	0.50	5.0	1.00	U
Chloroethane	<5.0	2.3	5.0	10	1.00	U
Chloroform	<0.50	0.46	0.50	5.0	1.00	U
Chloromethane	<2.0	1.8	2.0	10	1.00	U
Dibromochloromethane	<0.50	0.25	0.50	1.0	1.00	U
1,2-Dibromo-3-Chloropropane	<2.0	1.2	2.0	10	1.00	U
1,2-Dibromoethane	<0.50	0.36	0.50	1.0	1.00	U
1,2-Dichlorobenzene	<0.50	0.46	0.50	1.0	1.00	U
1,3-Dichlorobenzene	<0.50	0.40	0.50	1.0	1.00	U
1,4-Dichlorobenzene	<0.50	0.43	0.50	1.0	1.00	U
1,1-Dichloroethane	<0.50	0.28	0.50	5.0	1.00	U
1,2-Dichloroethane	<0.50	0.24	0.50	1.0	1.00	U
1,1-Dichloroethene	<0.50	0.43	0.50	1.0	1.00	U
c-1,2-Dichloroethene	<0.50	0.48	0.50	1.0	1.00	U
t-1,2-Dichloroethene	<0.50	0.37	0.50	1.0	1.00	U
1,2-Dichloropropane	<0.50	0.42	0.50	5.0	1.00	U
c-1,3-Dichloropropene	<0.50	0.25	0.50	1.0	1.00	U
t-1,3-Dichloropropene	<0.50	0.25	0.50	1.0	1.00	U
Ethylbenzene	<0.50	0.14	0.50	1.0	1.00	U
Methylene Chloride	<1.0	0.64	1.0	5.0	1.00	U
4-Methyl-2-Pentanone	<5.0	4.4	5.0	10	1.00	U
Styrene	<0.50	0.17	0.50	1.0	1.00	U
1,1,1,2-Tetrachloroethane	<0.50	0.40	0.50	1.0	1.00	U
1,1,2,2-Tetrachloroethane	<0.50	0.41	0.50	1.0	1.00	U
Tetrachloroethene	<0.50	0.39	0.50	5.0	1.00	U
Toluene	<0.50	0.24	0.50	1.0	1.00	U
1,2,4-Trichlorobenzene	<1.0	0.50	1.0	5.0	1.00	U
1,1,1-Trichloroethane	<0.50	0.30	0.50	5.0	1.00	U
Hexachloro-1,3-Butadiene	<0.50	0.32	0.50	1.0	1.00	U

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Analytical Report

Environmental Science International, Inc.		Date Received:	01/30/15
354 Uluniu Street, Suite 304		Work Order:	15-01-1920
Kailua, HI 96734-2500		Preparation:	EPA 5030C
		Method:	GC/MS / EPA 8260B
		Units:	ug/L
Project: Red Hill LTM 112066			Page 8 of 8

Parameter	Result	DL	LOD	LOQ	DF	Qualifiers
1,1,2-Trichloroethane	<0.50	0.38	0.50	1.0	1.00	U
Trichloroethene	<0.50	0.37	0.50	1.0	1.00	U
1,2,3-Trichloropropane	<1.0	0.64	1.0	5.0	1.00	U
Vinyl Chloride	<0.50	0.30	0.50	1.0	1.00	U
p/m-Xylene	<1.0	0.30	1.0	10	1.00	U
o-Xylene	<0.50	0.23	0.50	1.0	1.00	U
Methyl-t-Butyl Ether (MTBE)	<0.50	0.31	0.50	1.0	1.00	U
Gasoline Range Organics	<30	26	30	50	1.00	U

Surrogate	Rec. (%)	Control Limits	Qualifiers
Dibromofluoromethane	102	80-126	
1,2-Dichloroethane-d4	103	80-134	
Toluene-d8	97	80-120	
Toluene-d8-TPPH	99	88-112	
1,4-Bromofluorobenzene	92	80-120	

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Quality Control - Spike/Spike Duplicate

Environmental Science International, Inc.		Date Received:	01/30/15
354 Uluniu Street, Suite 304		Work Order:	15-01-1920
Kailua, HI 96734-2500		Preparation:	EPA 3510C
		Method:	EPA 8015B (M)
Project: Red Hill LTM 112066			Page 1 of 5

Quality Control Sample ID	Type	Matrix	Instrument	Date Prepared	Date Analyzed	MS/MSD Batch Number
15-01-1810-2	**Sample**	**Aqueous**	**GC 45**	**02/02/15**	**02/03/15 03:03**	**150202S09**
15-01-1810-2	**Matrix Spike**	**Aqueous**	**GC 45**	**02/02/15**	**02/03/15 02:23**	**150202S09**
15-01-1810-2	**Matrix Spike Duplicate**	**Aqueous**	**GC 45**	**02/02/15**	**02/03/15 02:43**	**150202S09**

Parameter	Sample Conc.	Spike Added	MS Conc.	MS %Rec.	MSD Conc.	MSD %Rec.	%Rec. CL	RPD	RPD CL	Qualifiers
TPH as Diesel	1101	2000	2835	87	2958	93	55-133	4	0-30	

RPD: Relative Percent Difference. CL: Control Limits

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Quality Control - Spike/Spike Duplicate

Environmental Science International, Inc.		Date Received:	01/30/15
354 Uluniu Street, Suite 304		Work Order:	15-01-1920
Kailua, HI 96734-2500		Preparation:	EPA 3005A Filt.
		Method:	EPA 6020
Project: Red Hill LTM 112066			Page 2 of 5

Quality Control Sample ID	Type	Matrix	Instrument	Date Prepared	Date Analyzed	MS/MSD Batch Number
ES128	**Sample**	**Aqueous**	**ICP/MS 03**	**01/30/15**	**01/30/15 18:34**	**150130S03**
ES128	**Matrix Spike**	**Aqueous**	**ICP/MS 03**	**01/30/15**	**01/30/15 18:08**	**150130S03**
ES128	**Matrix Spike Duplicate**	**Aqueous**	**ICP/MS 03**	**01/30/15**	**01/30/15 18:12**	**150130S03**

Parameter	Sample Conc.	Spike Added	MS Conc.	MS %Rec.	MSD Conc.	MSD %Rec.	%Rec. CL	RPD	RPD CL	Qualifiers
Lead	ND	100.0	99.12	99	103.1	103	80-120	4	0-20	

RPD: Relative Percent Difference. CL: Control Limits

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Quality Control - Spike/Spike Duplicate

Environmental Science International, Inc.		Date Received:	01/30/15
354 Uluniu Street, Suite 304		Work Order:	15-01-1920
Kailua, HI 96734-2500		Preparation:	EPA 3510C
		Method:	EPA 8270C SIM PAHs
Project: Red Hill LTM 112066			Page 3 of 5

Quality Control Sample ID	Type	Matrix	Instrument	Date Prepared	Date Analyzed	MS/MSD Batch Number
15-01-1609-2	**Sample**	**Aqueous**	**GC/MS AAA**	**01/30/15**	**02/02/15 22:08**	**150130S19**
15-01-1609-2	**Matrix Spike**	**Aqueous**	**GC/MS AAA**	**01/30/15**	**02/02/15 20:48**	**150130S19**
15-01-1609-2	**Matrix Spike Duplicate**	**Aqueous**	**GC/MS AAA**	**01/30/15**	**02/03/15 13:38**	**150130S19**

Parameter	Sample Conc.	Spike Added	MS Conc.	MS %Rec.	MSD Conc.	MSD %Rec.	%Rec. CL	RPD	RPD CL	Qualifiers
Naphthalene	ND	2.000	1.752	88	1.824	91	21-133	4	0-25	
2-Methylnaphthalene	ND	2.000	1.713	86	1.802	90	21-140	5	0-25	
1-Methylnaphthalene	ND	2.000	1.745	87	1.792	90	20-140	3	0-25	
Acenaphthylene	ND	2.000	1.756	88	1.756	88	33-145	0	0-25	
Acenaphthene	ND	2.000	1.836	92	1.863	93	49-121	1	0-25	
Fluorene	ND	2.000	1.830	92	1.810	90	59-121	1	0-25	
Phenanthrene	ND	2.000	1.877	94	1.874	94	54-120	0	0-25	
Anthracene	ND	2.000	1.539	77	1.632	82	27-133	6	0-25	
Fluoranthene	ND	2.000	1.853	93	1.820	91	26-137	2	0-25	
Pyrene	ND	2.000	2.018	101	1.897	95	18-168	6	0-25	
Benzo (a) Anthracene	ND	2.000	1.876	94	1.774	89	33-143	6	0-25	
Chrysene	ND	2.000	1.929	96	1.876	94	17-168	3	0-25	
Benzo (k) Fluoranthene	ND	2.000	1.951	98	1.869	93	24-159	4	0-25	
Benzo (b) Fluoranthene	ND	2.000	1.583	79	1.508	75	24-159	5	0-25	
Benzo (a) Pyrene	ND	2.000	1.673	84	1.621	81	17-163	3	0-25	
Indeno (1,2,3-c,d) Pyrene	ND	2.000	1.726	86	1.722	86	10-171	0	0-25	
Dibenz (a,h) Anthracene	ND	2.000	1.811	91	1.796	90	10-219	1	0-25	
Benzo (g,h,i) Perylene	ND	2.000	1.627	81	1.716	86	10-227	5	0-25	

RPD: Relative Percent Difference. CL: Control Limits

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Quality Control - Spike/Spike Duplicate

Environmental Science International, Inc.		Date Received:	01/30/15
354 Uluniu Street, Suite 304		Work Order:	15-01-1920
Kailua, HI 96734-2500		Preparation:	EPA 5030C
		Method:	GC/MS / EPA 8260B
Project: Red Hill LTM 112066			Page 4 of 5

Quality Control Sample ID	Type	Matrix	Instrument	Date Prepared	Date Analyzed	MS/MSD Batch Number
15-01-1810-2	**Sample**	**Aqueous**	**GC/MS OO**	**01/31/15**	**01/31/15 14:38**	**150131S001**
15-01-1810-2	**Matrix Spike**	**Aqueous**	**GC/MS OO**	**01/31/15**	**01/31/15 15:05**	**150131S001**
15-01-1810-2	**Matrix Spike Duplicate**	**Aqueous**	**GC/MS OO**	**01/31/15**	**01/31/15 15:31**	**150131S001**

Parameter	Sample Conc.	Spike Added	MS Conc.	MS %Rec.	MSD Conc.	MSD %Rec.	%Rec. CL	RPD	RPD CL	Qualifiers
Acetone	ND	50.00	65.98	132	63.42	127	40-140	4	0-20	
Benzene	ND	50.00	43.74	87	43.62	87	80-120	0	0-20	
Bromodichloromethane	ND	50.00	44.53	89	44.71	89	75-120	0	0-20	
Bromoform	ND	50.00	43.49	87	44.63	89	70-130	3	0-20	
Bromomethane	ND	50.00	59.65	119	53.85	108	30-145	10	0-20	
2-Butanone	ND	50.00	53.01	106	51.20	102	30-150	3	0-20	
Carbon Tetrachloride	ND	50.00	40.25	80	40.78	82	65-140	1	0-20	
Chlorobenzene	ND	50.00	46.77	94	46.50	93	80-120	1	0-20	
Chloroethane	ND	50.00	39.98	80	41.50	83	60-135	4	0-20	
Chloroform	ND	50.00	45.37	91	45.16	90	65-135	0	0-20	
Chloromethane	ND	50.00	37.73	75	39.18	78	40-125	4	0-20	
Dibromochloromethane	ND	50.00	48.10	96	47.60	95	60-135	1	0-20	
1,2-Dibromo-3-Chloropropane	ND	50.00	40.53	81	39.34	79	50-130	3	0-20	
1,2-Dibromoethane	ND	50.00	49.12	98	48.98	98	80-120	0	0-20	
1,2-Dichlorobenzene	ND	50.00	47.05	94	46.53	93	70-120	1	0-20	
1,3-Dichlorobenzene	ND	50.00	46.08	92	45.62	91	75-125	1	0-20	
1,4-Dichlorobenzene	ND	50.00	46.22	92	45.85	92	75-125	1	0-20	
1,1-Dichloroethane	ND	50.00	42.14	84	42.19	84	70-135	0	0-20	
1,2-Dichloroethane	ND	50.00	50.52	101	49.45	99	70-130	2	0-20	
1,1-Dichloroethene	ND	50.00	39.86	80	40.36	81	70-130	1	0-20	
c-1,2-Dichloroethene	ND	50.00	44.04	88	43.78	88	70-125	1	0-20	
t-1,2-Dichloroethene	ND	50.00	39.54	79	39.99	80	60-140	1	0-20	
1,2-Dichloropropane	ND	50.00	43.81	88	43.85	88	75-125	0	0-20	
c-1,3-Dichloropropene	ND	50.00	43.26	87	43.00	86	70-130	1	0-20	
t-1,3-Dichloropropene	ND	50.00	40.98	82	41.61	83	55-140	2	0-20	
Ethylbenzene	ND	50.00	45.15	90	44.90	90	75-125	1	0-20	
Methylene Chloride	ND	50.00	41.05	82	41.07	82	55-140	0	0-20	
4-Methyl-2-Pentanone	ND	50.00	43.39	87	42.42	85	60-135	2	0-20	
Styrene	ND	50.00	44.39	89	43.61	87	65-135	2	0-20	
1,1,1,2-Tetrachloroethane	ND	50.00	44.95	90	45.50	91	80-130	1	0-20	
1,1,2,2-Tetrachloroethane	ND	50.00	41.23	82	41.67	83	65-130	1	0-20	
Tetrachloroethene	ND	50.00	55.26	111	54.04	108	45-150	2	0-20	
Toluene	ND	50.00	44.30	89	43.48	87	75-120	2	0-20	
1,2,4-Trichlorobenzene	ND	50.00	47.52	95	46.31	93	65-135	3	0-20	
1,1,1-Trichloroethane	ND	50.00	42.47	85	42.76	86	65-130	1	0-20	

RPD: Relative Percent Difference. CL: Control Limits

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Quality Control - Spike/Spike Duplicate

Environmental Science International, Inc.		Date Received:	01/30/15
354 Uluniu Street, Suite 304		Work Order:	15-01-1920
Kailua, HI 96734-2500		Preparation:	EPA 5030C
		Method:	GC/MS / EPA 8260B
Project: Red Hill LTM 112066			Page 5 of 5

Parameter	Sample Conc.	Spike Added	MS Conc.	MS %Rec.	MSD Conc.	MSD %Rec.	%Rec. CL	RPD	RPD CL	Qualifiers
Hexachloro-1,3-Butadiene	ND	50.00	46.89	94	46.45	93	50-140	1	0-20	
1,1,2-Trichloroethane	ND	50.00	46.89	94	47.41	95	75-125	1	0-20	
Trichloroethene	ND	50.00	44.46	89	43.96	88	70-125	1	0-20	
1,2,3-Trichloropropane	ND	50.00	38.07	76	37.07	74	75-125	3	0-20	3
Vinyl Chloride	ND	50.00	40.78	82	41.96	84	50-145	3	0-20	
p/m-Xylene	ND	100.0	89.32	89	88.22	88	75-130	1	0-20	
o-Xylene	ND	50.00	44.60	89	44.47	89	80-120	0	0-20	
Methyl-t-Butyl Ether (MTBE)	ND	50.00	41.69	83	42.71	85	65-125	2	0-20	

RPD: Relative Percent Difference. CL: Control Limits

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Quality Control - PDS

Environmental Science International, Inc.		Date Received:	01/30/15
354 Uluniu Street, Suite 304		Work Order:	15-01-1920
Kailua, HI 96734-2500		Preparation:	EPA 3005A Filt.
		Method:	EPA 6020
Project: Red Hill LTM 112066			Page 1 of 1

Quality Control Sample ID	Type	Matrix	Instrument	Date Prepared	Date Analyzed	PDS/PDSD Batch Number
ES128	Sample	Aqueous	ICP/MS 03	01/30/15 00:00	01/30/15 18:34	150130S03
ES128	PDS	Aqueous	ICP/MS 03	01/30/15 00:00	01/30/15 19:06	150130S03

Parameter	Sample Conc.	Spike Added	PDS Conc.	PDS %Rec.	%Rec. CL	Qualifiers
Lead	ND	100.0	108.1	108	75-125	

RPD: Relative Percent Difference. CL: Control Limits

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Quality Control - LCS/LCSD

Environmental Science International, Inc.		Date Received:	01/30/15
354 Uluniu Street, Suite 304		Work Order:	15-01-1920
Kailua, HI 96734-2500		Preparation:	EPA 3510C
		Method:	EPA 8015B (M)
Project: Red Hill LTM 112066			Page 1 of 5

Quality Control Sample ID	Type	Matrix	Instrument	Date Prepared	Date Analyzed	LCS/LCSD Batch Number
099-15-516-238	LCS	Aqueous	GC 45	02/02/15	02/03/15 01:03	150202B09
099-15-516-238	LCSD	Aqueous	GC 45	02/02/15	02/03/15 01:23	150202B09

Parameter	Spike Added	LCS Conc.	LCS %Rec.	LCSD Conc.	LCSD %Rec.	%Rec. CL	RPD	RPD CL	Qualifiers
TPH as Diesel	2000	1897	95	1893	95	60-132	0	0-11	

RPD: Relative Percent Difference. CL: Control Limits

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Quality Control - LCS

Environmental Science International, Inc.		Date Received:	01/30/15
354 Uluniu Street, Suite 304		Work Order:	15-01-1920
Kailua, HI 96734-2500		Preparation:	EPA 3005A Filt.
		Method:	EPA 6020
Project: Red Hill LTM 112066			Page 2 of 5

Quality Control Sample ID	Type	Matrix	Instrument	Date Prepared	Date Analyzed	LCS Batch Number
099-14-497-117	**LCS**	**Aqueous**	**ICP/MS 03**	**01/30/15**	**01/30/15 18:05**	**150130L03D**

Parameter	Spike Added	Conc. Recovered	LCS %Rec.	%Rec. CL	Qualifiers
Lead	100.0	101.2	101	80-120	

RPD: Relative Percent Difference. CL: Control Limits

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Quality Control - LCS

Environmental Science International, Inc.		Date Received:	01/30/15
354 Uluniu Street, Suite 304		Work Order:	15-01-1920
Kailua, HI 96734-2500		Preparation:	EPA 3510C
		Method:	EPA 8270C SIM PAHs
Project: Red Hill LTM 112066			Page 3 of 5

Quality Control Sample ID	Type	Matrix	Instrument	Date Prepared	Date Analyzed	LCS Batch Number
099-15-148-80	LCS	Aqueous	GC/MS AAA	01/30/15	02/03/15 03:08	150130L19

Parameter	Spike Added	Conc. Recovered	LCS %Rec.	%Rec. CL	Qualifiers
Naphthalene	2.000	1.510	75	21-133	
2-Methylnaphthalene	2.000	1.537	77	21-140	
1-Methylnaphthalene	2.000	1.528	76	20-140	
Acenaphthylene	2.000	1.458	73	33-145	
Acenaphthene	2.000	1.547	77	55-121	
Fluorene	2.000	1.454	73	59-121	
Phenanthrene	2.000	1.536	77	54-120	
Anthracene	2.000	1.262	63	27-133	
Fluoranthene	2.000	1.595	80	26-137	
Pyrene	2.000	1.784	89	45-129	
Benzo (a) Anthracene	2.000	1.585	79	33-143	
Chrysene	2.000	1.722	86	17-168	
Benzo (k) Fluoranthene	2.000	1.970	98	24-159	
Benzo (b) Fluoranthene	2.000	1.389	69	24-159	
Benzo (a) Pyrene	2.000	1.473	74	17-163	
Indeno (1,2,3-c,d) Pyrene	2.000	1.508	75	25-175	
Dibenz (a,h) Anthracene	2.000	1.577	79	25-175	
Benzo (g,h,i) Perylene	2.000	1.351	68	25-157	

RPD: Relative Percent Difference. CL: Control Limits

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Quality Control - LCS/LCSD

Environmental Science International, Inc.		Date Received:	01/30/15
354 Uluniu Street, Suite 304		Work Order:	15-01-1920
Kailua, HI 96734-2500		Preparation:	EPA 5030C
		Method:	GC/MS / EPA 8260B
Project: Red Hill LTM 112066			Page 4 of 5

Quality Control Sample ID	Type	Matrix	Instrument	Date Prepared	Date Analyzed	LCS/LCSD Batch Number
099-13-057-76	LCS	Aqueous	GC/MS OO	01/31/15	01/31/15 11:51	150131L001
099-13-057-76	LCSD	Aqueous	GC/MS OO	01/31/15	01/31/15 12:11	150131L001

Parameter	Spike Added	LCS Conc.	LCS %Rec.	LCSD Conc.	LCSD %Rec.	%Rec. CL	RPD	RPD CL	Qualifiers
Acetone	50.00	82.13	164	N/A	N/A	40-140	N/A	0-20	X
Benzene	50.00	47.93	96	N/A	N/A	80-120	N/A	0-20	
Bromodichloromethane	50.00	48.08	96	N/A	N/A	75-120	N/A	0-20	
Bromoform	50.00	46.64	93	N/A	N/A	70-130	N/A	0-20	
Bromomethane	50.00	53.01	106	N/A	N/A	30-145	N/A	0-20	
2-Butanone	50.00	62.76	126	N/A	N/A	30-150	N/A	0-20	
Carbon Tetrachloride	50.00	45.54	91	N/A	N/A	65-140	N/A	0-20	
Chlorobenzene	50.00	51.78	104	N/A	N/A	80-120	N/A	0-20	
Chloroethane	50.00	44.69	89	N/A	N/A	60-135	N/A	0-20	
Chloroform	50.00	48.16	96	N/A	N/A	65-135	N/A	0-20	
Chloromethane	50.00	42.87	86	N/A	N/A	40-125	N/A	0-20	
Dibromochloromethane	50.00	51.24	102	N/A	N/A	60-135	N/A	0-20	
1,2-Dibromo-3-Chloropropane	50.00	38.87	78	N/A	N/A	50-130	N/A	0-20	
1,2-Dibromoethane	50.00	50.90	102	N/A	N/A	80-120	N/A	0-20	
1,2-Dichlorobenzene	50.00	51.42	103	N/A	N/A	70-120	N/A	0-20	
1,3-Dichlorobenzene	50.00	51.65	103	N/A	N/A	75-125	N/A	0-20	
1,4-Dichlorobenzene	50.00	51.48	103	N/A	N/A	75-125	N/A	0-20	
1,1-Dichloroethane	50.00	44.96	90	N/A	N/A	70-135	N/A	0-20	
1,2-Dichloroethane	50.00	53.05	106	N/A	N/A	70-130	N/A	0-20	
1,1-Dichloroethene	50.00	44.07	88	N/A	N/A	70-130	N/A	0-20	
c-1,2-Dichloroethene	50.00	47.25	95	N/A	N/A	70-125	N/A	0-20	
t-1,2-Dichloroethene	50.00	43.09	86	N/A	N/A	60-140	N/A	0-20	
1,2-Dichloropropane	50.00	46.41	93	N/A	N/A	75-125	N/A	0-20	
c-1,3-Dichloropropene	50.00	46.07	92	N/A	N/A	70-130	N/A	0-20	
t-1,3-Dichloropropene	50.00	45.03	90	N/A	N/A	55-140	N/A	0-20	
Ethylbenzene	50.00	49.99	100	N/A	N/A	75-125	N/A	0-20	
Methylene Chloride	50.00	44.21	88	N/A	N/A	55-140	N/A	0-20	
4-Methyl-2-Pentanone	50.00	43.41	87	N/A	N/A	60-135	N/A	0-20	
Styrene	50.00	48.69	97	N/A	N/A	65-135	N/A	0-20	
1,1,1,2-Tetrachloroethane	50.00	48.98	98	N/A	N/A	80-130	N/A	0-20	
1,1,2,2-Tetrachloroethane	50.00	41.18	82	N/A	N/A	65-130	N/A	0-20	
Tetrachloroethene	50.00	61.86	124	N/A	N/A	45-150	N/A	0-20	
Toluene	50.00	48.40	97	N/A	N/A	75-120	N/A	0-20	
1,2,4-Trichlorobenzene	50.00	50.89	102	N/A	N/A	65-135	N/A	0-20	
1,1,1-Trichloroethane	50.00	46.72	93	N/A	N/A	65-130	N/A	0-20	
Hexachloro-1,3-Butadiene	50.00	52.10	104	N/A	N/A	50-140	N/A	0-20	

RPD: Relative Percent Difference. CL: Control Limits

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Quality Control - LCS/LCSD

Environmental Science International, Inc.		Date Received:	01/30/15
354 Uluniu Street, Suite 304		Work Order:	15-01-1920
Kailua, HI 96734-2500		Preparation:	EPA 5030C
		Method:	GC/MS / EPA 8260B
Project: Red Hill LTM 112066			Page 5 of 5

Parameter	Spike Added	LCS Conc.	LCS %Rec.	LCSD Conc.	LCSD %Rec.	%Rec. CL	RPD	RPD CL	Qualifiers
1,1,2-Trichloroethane	50.00	48.92	98	N/A	N/A	75-125	N/A	0-20	
Trichloroethene	50.00	49.55	99	N/A	N/A	70-125	N/A	0-20	
1,2,3-Trichloropropane	50.00	39.93	80	N/A	N/A	75-125	N/A	0-20	
Vinyl Chloride	50.00	46.46	93	N/A	N/A	50-145	N/A	0-20	
p/m-Xylene	100.0	99.55	100	N/A	N/A	75-130	N/A	0-20	
o-Xylene	50.00	49.14	98	N/A	N/A	80-120	N/A	0-20	
Methyl-t-Butyl Ether (MTBE)	50.00	41.61	83	N/A	N/A	65-125	N/A	0-20	
Gasoline Range Organics	1000	1097	110	1105	111	80-120	1	0-20	

RPD: Relative Percent Difference. CL: Control Limits

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Sample Analysis Summary Report

Work Order: 15-01-1920 Page 1 of 1

Method	Extraction	Chemist ID	Instrument	Analytical Location
EPA 6020	EPA 3005A Filt.	776	ICP/MS 03	1
EPA 8015B (M)	EPA 3510C	960	GC 45	1
EPA 8270C SIM PAHs	EPA 3510C	907	GC/MS AAA	1
GC/MS / EPA 8260B	EPA 5030C	849	GC/MS OO	2

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Glossary of Terms and Qualifiers

Work Order: 15-01-1920 Page 1 of 1

Qualifiers	Definition
*	See applicable analysis comment.
<	Less than the indicated value.
>	Greater than the indicated value.
1	Surrogate compound recovery was out of control due to a required sample dilution. Therefore, the sample data was reported without further clarification.
2	Surrogate compound recovery was out of control due to matrix interference. The associated method blank surrogate spike compound was in control and, therefore, the sample data was reported without further clarification.
3	Recovery of the Matrix Spike (MS) or Matrix Spike Duplicate (MSD) compound was out of control due to suspected matrix interference. The associated LCS recovery was in control.
4	The MS/MSD RPD was out of control due to suspected matrix interference.
5	The PDS/PDSD or PES/PESD associated with this batch of samples was out of control due to suspected matrix interference.
6	Surrogate recovery below the acceptance limit.
7	Surrogate recovery above the acceptance limit.
B	Analyte was present in the associated method blank.
BU	Sample analyzed after holding time expired.
BV	Sample received after holding time expired.
DL	The Detection Limit (DL) is the smallest analyte concentration that can be demonstrated to be different from zero or a blank concentration at the 99% level of confidence.
E	Concentration exceeds the calibration range.
ET	Sample was extracted past end of recommended max. holding time.
HD	The chromatographic pattern was inconsistent with the profile of the reference fuel standard.
ICH	Initial calibration verification recovery is above the control limit for this analyte.
ICJ	Initial calibration verification recovery is below the control limit for this analyte.
IH	Calibration verification recovery is above the control limit for this analyte.
IJ	Calibration verification recovery is below the control limit for this analyte.
J	Analyte was detected at a concentration below the LOQ and above the DL. Reported value is estimated.
JA	Analyte positively identified but quantitation is an estimate.
LOD	The Limit of Detection (LOD) is the smallest amount or concentration of a substance that must be present in a sample in order to be detected at 99% confidence level.
LOQ	The Limit of Quantitation (LOQ) is the lowest concentration of a substance that produces a quantitative result within specified limits of precision and bias.
Q	Spike recovery and RPD control limits do not apply resulting from the parameter concentration in the sample exceeding the spike concentration by a factor of four or greater.
SG	The sample extract was subjected to Silica Gel treatment prior to analysis.
U	Undetected at Detection Limit (DL) and is reported as less than the Limit of Detection (LOD).
X	% Recovery and/or RPD out-of-range.
Z	Analyte presence was not confirmed by second column or GC/MS analysis.

Solid - Unless otherwise indicated, solid sample data is reported on a wet weight basis, not corrected for % moisture. All QC results are reported on a wet weight basis.

Any parameter identified in 40CFR Part 136.3 Table II that is designated as "analyze immediately" with a holding time of <= 15 minutes (40CFR-136.3 Table II, footnote 4), is considered a "field" test and the reported results will be qualified as being received outside of the stated holding time unless received at the laboratory within 15 minutes of the collection time.

A calculated total result (Example: Total Pesticides) is the summation of each component concentration and/or, if "J" flags are reported, estimated concentration. Component concentrations showing not detected (ND) are summed into the calculated total result as zero concentrations.

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7440 Lincoln Way, Garden Grove, CA 92841-1427 • (714) 895-5494
For courier service / sample drop off information, contact us26_sales@eurofinsus.com or call us.

CHAIN-OF-CUSTODY RECORD

DATE: 1/29/15
PAGE: 1 OF 1

WO NO. / LAB USE ONLY: **15-01-1920**

LABORATORY CLIENT: ESI
ADDRESS: 354 Uluniu St. Suite 304
CITY: Kailua STATE: HI ZIP: 96734
TEL: (808) 261-0740 E-MAIL: jhattemer@escienceci.com, dfeher@escienceci.com

CLIENT PROJECT NAME / NO.: Red Hill LTM 112066 / 114017
P.O. NO.:
PROJECT CONTACT: Jeff Hattemer
LAB CONTACT OR QUOTE NO.:
GLOBAL ID:
LOG CODE:
SAMPLER(S): (PRINT) Jeff Hattemer

TURNAROUND TIME (Rush surcharges may apply to any TAT not "STANDARD"):
☐ SAME DAY ☐ 24 HR ☐ 48 HR ☐ 72 HR ☐ 5 DAYS ☒ STANDARD

EDD:
☐ COELT EDF ☐ OTHER

SPECIAL INSTRUCTIONS:
Regular (full) GW monitoring analyte list

REQUESTED ANALYSES
Please check box or fill in blank as needed.

LAB USE ONLY	SAMPLE ID	SAMPLING DATE	SAMPLING TIME	MATRIX	NO. OF CONT.	Unpreserved	Preserved	Field Filtered	☒ TPH(g) ☐ ~~GRO~~ (8260)	☒ TPH(d) ☐ ~~DRO~~ (8015)	TPH ☐ C6-C36 ☐ C6-C44	TPH ____	BTEX / MTBE ☐ 8260 ☐ ____	VOCs (8260)	Oxygenates (8260)	Prep (5035) ☐ En Core ☐ Terra Core	SVOCs (8270)	Pesticides (8081)	PCBs (8082)	PAHs ☐ 8270 ☒ 8270 SIM	T22 Metals ☐ 6010/747X ☐ 6020/747X	Cr(VI) ☐ 7196 ☐ 7199 ☐ 218.6	Lead (6020)			
1	ESTRIP	1/29/15	0900	water	3		X		X					X												
2	ES 128	1/29/15	0930	water	10		X	X	X	X				X						X			X			
3	ES 129	1/29/15	1215	water	10		X	X	X	X				X						X			X			

Relinquished by: (Signature)	Received by: (Signature/Affiliation)	Date:	Time:
Jeff Hattemer		1/29/15	1400
		1/30/15	1000

2014-07-01 Revision

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ED_006532_00009885-00133

1920

ORIGIN ID:HNLA (808) 261-0740
ESI

354 ULUNIU ST STE 304

KAILUA, HI 967342532
UNITED STATES US

SHIP DATE: 29JAN15
ACTWGT: 53.3 LB
CAD: /POS1525
DIMS: 25x14x14 IN

BILL SENDER

TO SAMPLE CONTROL
CALSCIENCE LABORTORIES
7440 LINCOLN WAY

GARDEN GROVE CA 92841
(714) 895-5494 REF:
INV:
PO: DEPT:

FedEx Express

J151016011401ev

FRI - 30 JAN AA
STANDARD OVERNIGHT

TRK# 0200 8047 9172 2472

WZ APVA

92841
CA-US SNA

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WORK ORDER #: 15-01-0920

SAMPLE RECEIPT FORM

Cooler 1 of 1

CLIENT: ESI

DATE: 01/30/15

TEMPERATURE: Thermometer ID: SC4 (Criteria: 0.0 °C – 6.0 °C, not frozen except sediment/tissue)

Temperature 2.1 °C + 0.2 °C (CF) = 2.3 °C ☑ Blank ☐ Sample

☐ Sample(s) outside temperature criteria (PM/APM contacted by: _____)

☐ Sample(s) outside temperature criteria but received on ice/chilled on same day of sampling.

☐ **Received at ambient temperature, placed on ice for transport by Courier.**

Ambient Temperature: ☐ Air ☐ Filter **Checked by:** 15

CUSTODY SEALS INTACT:

☑ Cooler ☐ _____ ☐ No (Not Intact) ☐ Not Present ☐ N/A **Checked by:** 15

☐ Sample ☐ _____ ☐ No (Not Intact) ☑ Not Present **Checked by:** 862

SAMPLE CONDITION:	Yes	No	N/A
Chain-Of-Custody (COC) document(s) received with samples	☑	☐	☐
COC document(s) received complete	☑	☐	☐
☐ Collection date/time, matrix, and/or # of containers logged in based on sample labels.			
☐ No analysis requested. ☐ Not relinquished. ☐ No date/time relinquished.			
Sampler's name indicated on COC	☑	☐	☐
Sample container label(s) consistent with COC	☑	☐	☐
Sample container(s) intact and good condition	☑	☐	☐
Proper containers and sufficient volume for analyses requested	☑	☐	☐
Analyses received within holding time	☑	☐	☐
Aqueous samples received within 15-minute holding time			
☐ pH ☐ Residual Chlorine ☐ Dissolved Sulfides ☐ Dissolved Oxygen	☐	☐	☑
Proper preservation noted on COC or sample container	☑	☐	☐
☑ Unpreserved vials received for Volatiles analysis			
Volatile analysis container(s) free of headspace	☑	☐	☐
Tedlar bag(s) free of condensation	☐	☐	☑

CONTAINER TYPE:

Solid: ☐4ozCGJ ☐8ozCGJ ☐16ozCGJ ☐Sleeve (_____) ☐EnCores® ☐TerraCores® ☐_____

Aqueous: ☑VOA (6) ☑VOAh (3) ☐VOA**na$_2$** ☐125AGB ☐125AGB**h** ☐125AGB**p** ☑1AGB (2) ☐1AGB**na$_2$** ☐1AGB**s**

☐500AGB ☑500AGJ ☐500AGJ**s** ☐250AGB ☐250CGB ☐250CGB**s** ☐1PB ☐1PB**na** ☐500PB

☐250PB ☑250PB**n** ☐125PB ☐125PB**znna** ☐100PJ ☐100PJ**na$_2$** ☐_____ ☐_____ ☐_____

Air: ☐Tedlar® ☐Canister **Other:** ☐_____ **Trip Blank Lot#:** 140908B **Labeled/Checked by:** 862

Container: **C:** Clear **A:** Amber **P:** Plastic **G:** Glass **J:** Jar **B:** Bottle **Z:** Ziploc/Resealable Bag **E:** Envelope **Reviewed by:** 681

Preservative: **h:** HCL **n:** HNO_3 **na$_2$:** $Na_2S_2O_3$ **na:** NaOH **p:** H_3PO_4 **s:** H_2SO_4 **u:** Ultra-pure **znna:** $ZnAc_2$+NaOH **f:** Filtered **Scanned by:** 681

SOP T100_090 (06/02/14)

RAW DATA SHEET
FOR METHOD: EPA 8015B (M)

WORK ORDER:	**15-01-1920**	ANALYZED BY:	960
INSTRUMENT:	GC 45	D/T ANALYZED:	2015-02-03 04:04
EXTRACTION:	EPA 3510C	REVIEWED BY:	
D/T EXTRACTED:	2015-02-02 00:00	D/T REVIEWED:	

DATA FILE: W:\GC_45\GC 45 DATA\2015\150202\15020255.D\15020255

 # 2 **CLIENT SAMPLE NUMBER: ES128**

LCS/MB BATCH:	150202B09	SAMPLE VOLUME / WEIGHT:	DEFAULT: 500.00 ml / ACTUAL: 500.00 ml
MS/MSD BATCH:	150202S09	FINAL VOLUME / WEIGHT:	DEFAULT: 5.00 ml / ACTUAL: 2.50 ml
UNITS:	ug/L	ADJUSTMENT RATIO TO PF:	0.50

COMMENT: Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, a qualified with a "J" flag. TPH as Diesel is quantified in the carbon range C10-C28.

COMPOUND	INI. CONC	DF	CONC	DL	LOD	LOQ	QUAL
TPH as Diesel	3210	1.00	16.1	2.9	10	25	bJ

Area Percent Report

Data File Name : W:\GC_45\GC 45 DATA\2015\150202\15020255.D
Page Number : 1
Operator :
Instrument : GC 45
Sample Name : 15-01-1920-2

Vial Number : Vial 55
Injection Number : 1
Sequence Line : 55
Instrument Method: C:\CHEM32\1\METHODS\ ->

Acquired on : 03 Feb 15 04:04 am
Report Created on: 03 Feb 15 03:37 pm

Analysis Method : 8015B.MTH

Software Revision: Rev. B.03.02 [341] Copyright © Agilent Technologies

Sig. 1 in W:\GC_45\GC 45 DATA\2015\150202\ ->

Pk	Ret Time	Area	Height	Peak	Width	Response %
1	5.333	600.16	403	BB	0.024	100.000
2	0.000	0.00	0		0.000	0.000

Total area = 600.16
0.00

==========

Area Percent Report

==========

Data File Name : W:\GC_45\GC 45 DATA\2015\150202\15020255.D
Page Number : 2
Operator :
Instrument : GC 45
Sample Name : 15-01-1920-2

Acquired on : 03 Feb 15 04:04 am
Report Created on: 03 Feb 15 03:37 pm

Vial Number : Vial 55
Injection Number : 1
Sequence Line : 55
Instrument Method: C:\CHEM32\1\METHODS\ ->
Analysis Method : 8015B.MTH

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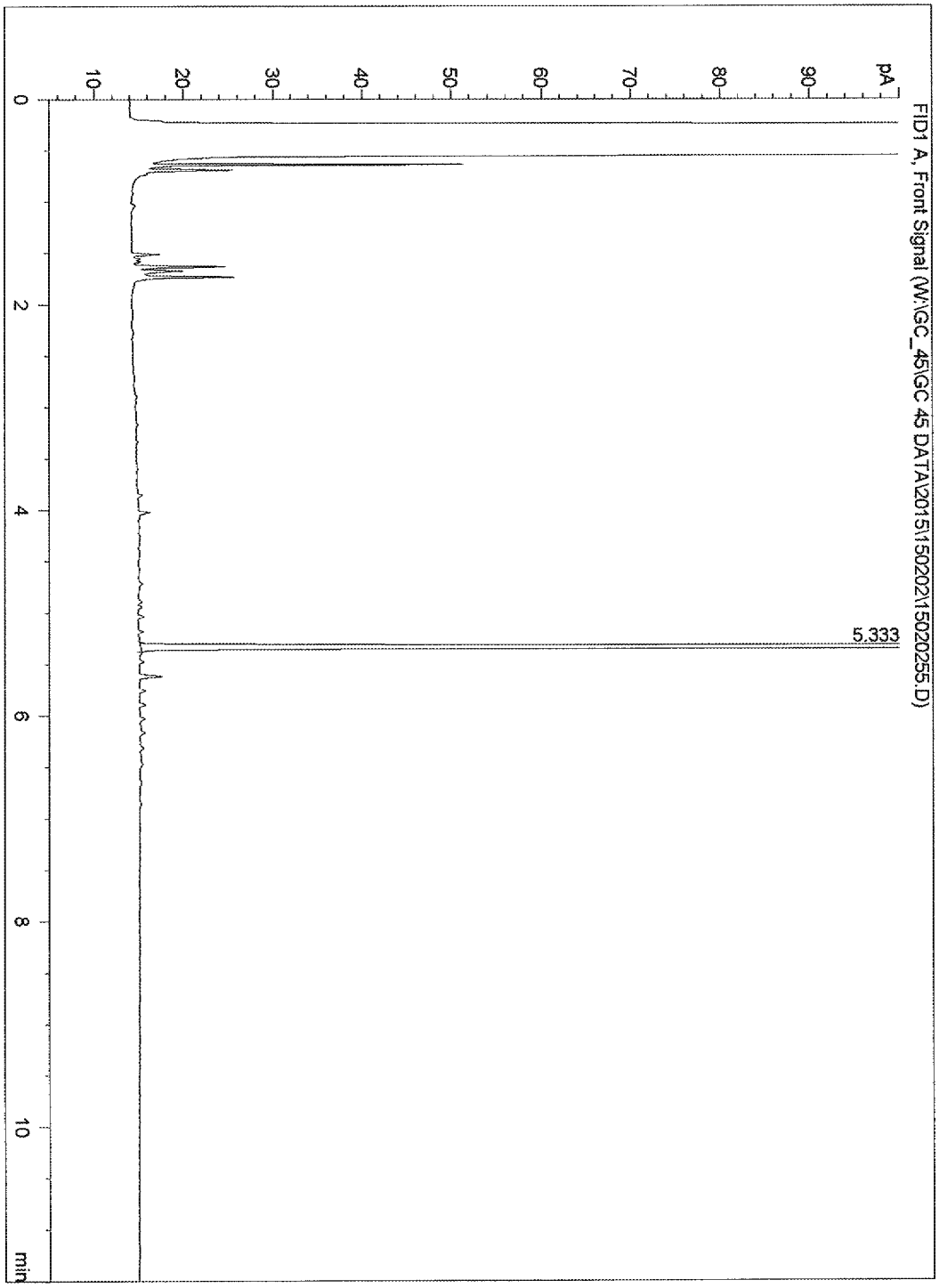

Area Percent Report

Data File Name : W:\GC_45\GC 45 DATA\2015\150202\15020255.D
Page Number : 1
Operator : 682
Instrument : GC 45
Sample Name : 15-01-1920-2

Vial Number : Vial 55
Injection Number : 1
Sequence Line : 55
Instrument Method: C:\CHEM32\1\METHODS\ ->

Acquired on : 03 Feb 15 04:04 am
Report Created on: 03 Feb 15 03:34 pm

Analysis Method : 8015B.MTH

Software Revision: Rev. B.03.02 [341] Copyright © Agilent Technologies

Sig. 1 in W:\GC_45\GC 45 DATA\2015\150202\ ->

Pk	Ret Time	Area	Height	Peak	Width	Response %
1	2.267	0.65	0	VV	0.036	0.099
2	2.316	0.09	0	VV	0.015	0.013
3	2.380	0.26	0	VV	0.025	0.039
4	2.420	0.26	0	VV	0.029	0.039
5	2.460	0.11	0	VV	0.015	0.017
6	2.479	0.11	0	VV	0.017	0.017
7	2.501	0.12	0	VV	0.017	0.018
8	2.530	0.15	0	VV	0.019	0.022
9	2.556	0.11	0	VV	0.020	0.017
10	2.605	0.25	0	VV	0.022	0.037
11	2.633	0.24	0	VV	0.022	0.036
12	2.704	0.73	0	VV	0.040	0.110
13	2.738	0.51	0	VV	0.034	0.077
14	2.808	0.30	0	VV	0.029	0.046
15	2.827	0.18	0	VV	0.014	0.027
16	2.894	1.84	0	VV	0.049	0.277
17	2.956	0.95	0	VV	0.039	0.144
18	2.997	0.53	0	VV	0.026	0.080
19	3.065	1.21	0	VV	0.043	0.183
20	3.095	0.73	0	VV	0.032	0.110
21	3.169	2.00	0	VV	0.051	0.303
22	3.233	0.67	0	VV	0.030	0.101
23	3.254	0.42	0	VV	0.017	0.063
24	3.275	0.59	0	VV	0.023	0.090
25	3.334	1.43	0	VV	0.041	0.217
26	3.378	0.41	0	VV	0.021	0.062
27	3.408	0.76	0	VV	0.027	0.115
28	3.447	0.65	0	VV	0.027	0.099
29	3.496	0.61	0	VV	0.027	0.092
30	3.515	0.26	0	VV	0.014	0.039
31	3.563	0.94	0	VV	0.034	0.143
32	3.605	1.20	0	VV	0.040	0.181
33	3.675	1.39	0	VV	0.048	0.210
34	3.732	0.78	0	VV	0.032	0.118
35	3.779	0.68	0	VV	0.028	0.103
36	3.854	2.97	1	VV	0.042	0.450
37	3.914	0.86	0	VV	0.028	0.131

==========

Area Percent Report

==========

Data File Name : W:\GC_45\GC 45 DATA\2015\150202\15020255.D
Page Number : 2
Operator : 682
Instrument : GC 45
Sample Name : 15-01-1920-2

Vial Number : Vial 55
Injection Number : 1
Sequence Line : 55
Instrument Method: C:\CHEM32\1\METHODS\ ->

Acquired on : 03 Feb 15 04:04 am
Report Created on: 03 Feb 15 03:34 pm

Analysis Method : 8015B.MTH

Software Revision: Rev. B.03.02 [341] Copyright © Agilent Technologies

Pk	Ret Time	Area	Height	Peak	Width	Response %
38	3.987	1.89	0	VV	0.049	0.286
39	4.024	3.69	2	VV	0.030	0.558
40	4.083	0.89	1	VV	0.024	0.135
41	4.130	1.31	0	VV	0.037	0.198
42	4.165	0.54	0	VV	0.019	0.081
43	4.183	0.84	0	VB	0.025	0.127
44	4.216	0.54	0	BV	0.018	0.081
45	4.255	1.22	1	VV	0.029	0.184
46	4.284	1.08	1	VV	0.027	0.163
47	4.332	0.86	0	VV	0.031	0.130
48	4.351	0.56	0	VV	0.021	0.085
49	4.412	1.71	0	VV	0.044	0.259
50	4.447	0.85	0	VV	0.026	0.129
51	4.483	0.49	0	VV	0.022	0.074
52	4.507	0.36	0	VV	0.018	0.054
53	4.528	0.48	0	VV	0.018	0.073
54	4.576	1.54	0	VV	0.049	0.233
55	4.618	0.52	0	VV	0.020	0.079
56	4.644	0.35	0	VV	0.018	0.052
57	4.717	3.05	1	VV	0.053	0.461
58	4.786	0.72	0	VV	0.029	0.109
59	4.834	0.55	0	VV	0.033	0.084
60	4.890	1.55	1	VV	0.034	0.235
61	4.943	1.22	1	VV	0.030	0.184
62	4.979	0.28	0	VB	0.020	0.043
63	5.037	1.58	1	BV	0.029	0.239
64	5.106	0.43	0	VV	0.029	0.066
65	5.130	0.32	0	VV	0.024	0.048
66	5.184	1.27	1	VV	0.026	0.193
67	5.217	0.20	0	VV	0.013	0.030
68	5.237	0.34	0	VV	0.019	0.051
69	5.255	0.33	0	VV	0.017	0.051
70	5.333	604.06	403	VV	0.024	91.305

Total area = 661.59

Area Percent Report

Data File Name : W:\GC_45\GC 45 DATA\2015\150202\15020255.D
Page Number : 3
Operator : 682
Instrument : GC 45
Sample Name : 15-01-1920-2

Vial Number : Vial 55
Injection Number : 1
Sequence Line : 55
Instrument Method: C:\CHEM32\1\METHODS\ ->

Acquired on : 03 Feb 15 04:04 am
Report Created on: 03 Feb 15 03:34 pm

Analysis Method : 8015B.MTH

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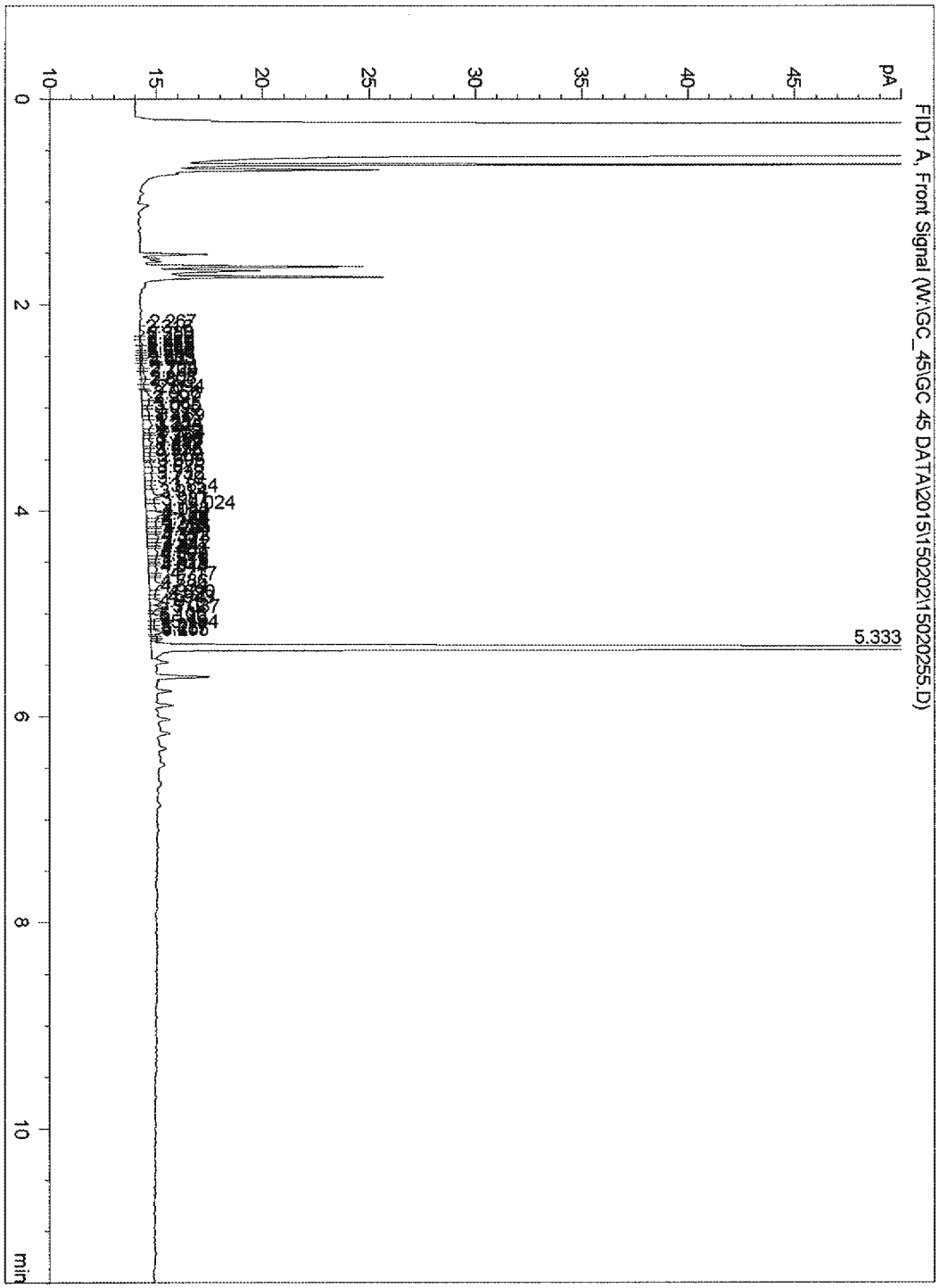

RAW DATA SHEET
FOR METHOD: EPA 8015B (M)

WORK ORDER:	**15-01-1920**	ANALYZED BY:	960
INSTRUMENT:	GC 45	D/T ANALYZED:	2015-02-03 04:24
EXTRACTION:	EPA 3510C	REVIEWED BY:	
D/T EXTRACTED:	2015-02-02 00:00	D/T REVIEWED:	

DATA FILE: W:\GC_45\GC 45 DATA\2015\150202\15020256.D\15020256

 # 3 **CLIENT SAMPLE NUMBER: ES129**

LCS/MB BATCH:	150202B09	SAMPLE VOLUME / WEIGHT:	DEFAULT: 500.00 ml / ACTUAL: 500.00 ml
MS/MSD BATCH:	150202S09	FINAL VOLUME / WEIGHT:	DEFAULT: 5.00 ml / ACTUAL: 2.50 ml
UNITS:	ug/L	ADJUSTMENT RATIO TO PF:	0.50

COMMENT: Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, a qualified with a "J" flag. TPH as Diesel is quantified in the carbon range C10-C28.

COMPOUND	INI. CONC	DF	CONC	DL	LOD	LOQ	QUAL
TPH as Diesel	2020	1.00	10.1	2.9	10	25	bJ

Area Percent Report

Data File Name : W:\GC_45\GC 45 DATA\2015\150202\15020256.D
Page Number : 1
Operator : 682
Instrument : GC 45
Sample Name : 15-01-1920-3

Vial Number : Vial 56
Injection Number : 1
Sequence Line : 56
Instrument Method: C:\CHEM32\1\METHODS\ ->

Acquired on : 03 Feb 15 04:24 am
Report Created on: 03 Feb 15 03:34 pm

Analysis Method : 8015B.MTH

Software Revision: Rev. B.03.02 [341] Copyright © Agilent Technologies

Sig. 1 in W:\GC_45\GC 45 DATA\2015\150202\ ->

Pk	Ret Time	Area	Height	Peak	Width	Response %
1	2.630	0.34	0	VV	0.034	0.043
2	2.691	0.51	0	VV	0.037	0.065
3	2.739	0.46	0	VV	0.045	0.058
4	2.789	0.09	0	VV	0.014	0.012
5	2.817	0.14	0	VV	0.022	0.018
6	2.854	0.28	0	VV	0.021	0.035
7	2.897	1.00	0	VV	0.045	0.127
8	2.955	0.94	0	VV	0.050	0.119
9	3.093	1.22	0	VV	0.061	0.154
10	3.171	1.03	0	VV	0.042	0.130
11	3.196	0.39	0	VV	0.022	0.049
12	3.251	0.54	0	VV	0.033	0.069
13	3.300	0.62	0	VV	0.027	0.078
14	3.335	0.61	0	VV	0.022	0.077
15	3.360	1.23	1	VV	0.025	0.155
16	3.408	0.57	0	VV	0.028	0.072
17	3.449	0.45	0	VV	0.029	0.057
18	3.500	0.62	0	VV	0.034	0.079
19	3.556	0.64	0	VV	0.029	0.081
20	3.578	0.40	0	VV	0.020	0.051
21	3.613	0.54	0	VV	0.027	0.068
22	3.648	0.98	0	VV	0.051	0.124
23	3.738	0.62	0	VV	0.031	0.078
24	3.782	0.88	0	VV	0.039	0.111
25	3.822	0.32	0	VV	0.019	0.040
26	3.860	1.12	0	VV	0.034	0.141
27	3.952	1.31	0	VV	0.041	0.165
28	3.983	0.90	0	VV	0.031	0.114
29	4.027	3.02	1	VV	0.029	0.382
30	4.087	1.10	0	VV	0.030	0.139
31	4.139	0.84	0	VV	0.028	0.106
32	4.165	0.59	0	VV	0.023	0.075
33	4.259	2.12	0	VV	0.058	0.267
34	4.294	0.72	0	VV	0.024	0.091
35	4.321	0.73	0	VV	0.029	0.092
36	4.354	0.94	0	VV	0.033	0.119
37	4.416	1.69	0	VV	0.048	0.214

==========

Area Percent Report

==========

Data File Name : W:\GC_45\GC 45 DATA\2015\150202\15020256.D
Page Number : 2
Operator : 682
Instrument : GC 45
Sample Name : 15-01-1920-3

Vial Number : Vial 56
Injection Number : 1
Sequence Line : 56
Instrument Method: C:\CHEM32\1\METHODS\ ->

Acquired on : 03 Feb 15 04:24 am
Report Created on: 03 Feb 15 03:34 pm

Analysis Method : 8015B.MTH

Software Revision: Rev. B.03.02 [341] Copyright © Agilent Technologies

Pk	Ret Time	Area	Height	Peak	Width	Response %
38	4.488	0.80	0	VV	0.037	0.102
39	4.525	0.51	0	VV	0.031	0.064
40	4.582	0.97	0	VV	0.041	0.123
41	4.623	0.57	0	VV	0.032	0.072
42	4.662	0.32	0	VV	0.021	0.041
43	4.720	1.58	1	VV	0.032	0.200
44	4.764	0.96	0	VV	0.048	0.122
45	4.842	0.40	0	VV	0.030	0.051
46	4.898	1.16	1	VV	0.030	0.147
47	4.950	0.81	0	VV	0.026	0.102
48	5.340	752.28	512	VV	0.023	95.118

Total area = 790.88

==========

Area Percent Report

==========

Data File Name : W:\GC_45\GC 45 DATA\2015\150202\15020256.D
Page Number : 3
Operator : 682
Instrument : GC 45
Sample Name : 15-01-1920-3

Acquired on : 03 Feb 15 04:24 am
Report Created on: 03 Feb 15 03:34 pm

Vial Number : Vial 56
Injection Number : 1
Sequence Line : 56
Instrument Method: C:\CHEM32\1\METHODS\ ->
Analysis Method : 8015B.MTH

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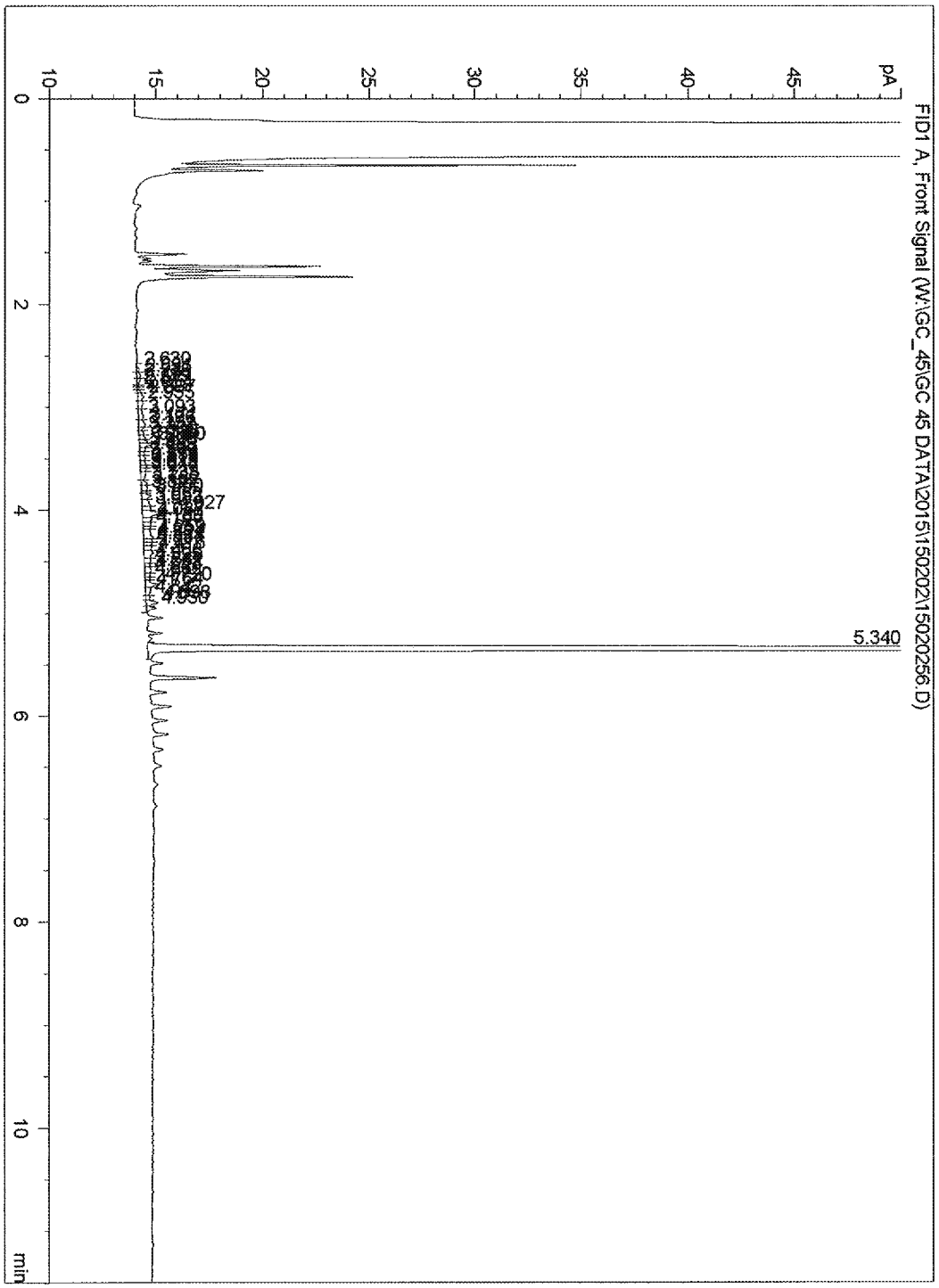

RAW DATA SHEET
FOR METHOD: EPA 8015B (M)

WORK ORDER:	**099-15-516**	ANALYZED BY:	960
INSTRUMENT:	GC 45	D/T ANALYZED:	2015-02-03 00:43
EXTRACTION:	EPA 3510C	REVIEWED BY:	607
D/T EXTRACTED:	2015-02-02 00:00	D/T REVIEWED:	2015-02-05 15:53

DATA FILE: W:\GC_45\GC 45 DATA\2015\150202\15020245.D\15020245

 # MB **CLIENT SAMPLE NUMBER: Method Blank**

LCS/MB BATCH:	150202B09	SAMPLE VOLUME / WEIGHT:	DEFAULT: 500.00 ml / ACTUAL: 500.00 ml
MS/MSD BATCH:		FINAL VOLUME / WEIGHT:	DEFAULT: 5.00 ml / ACTUAL: 2.50 ml
UNITS:	ug/L	ADJUSTMENT RATIO TO PF:	0.50

COMMENT:

COMPOUND	INI. CONC	DF	CONC	DL	LOD	LOQ	QUAL
TPH as Diesel	0.000	1.00	ND	2.9	10	25	

Area Percent Report

Data File Name	: W:\GC_45\GC 45 DATA\2015\150202\15020245.D		
Page Number	: 2		
Operator	: 682	Vial Number	: Vial 45
Instrument	: GC 45	Injection Number	: 1
Sample Name	: MB 15020209/10/11	Sequence Line	: 45
		Instrument Method	: C:\CHEM32\1\METHODS\ ->
Acquired on	: 03 Feb 15 00:43 am		
Report Created on	: 03 Feb 15 03:32 pm	Analysis Method	: 8015B.MTH

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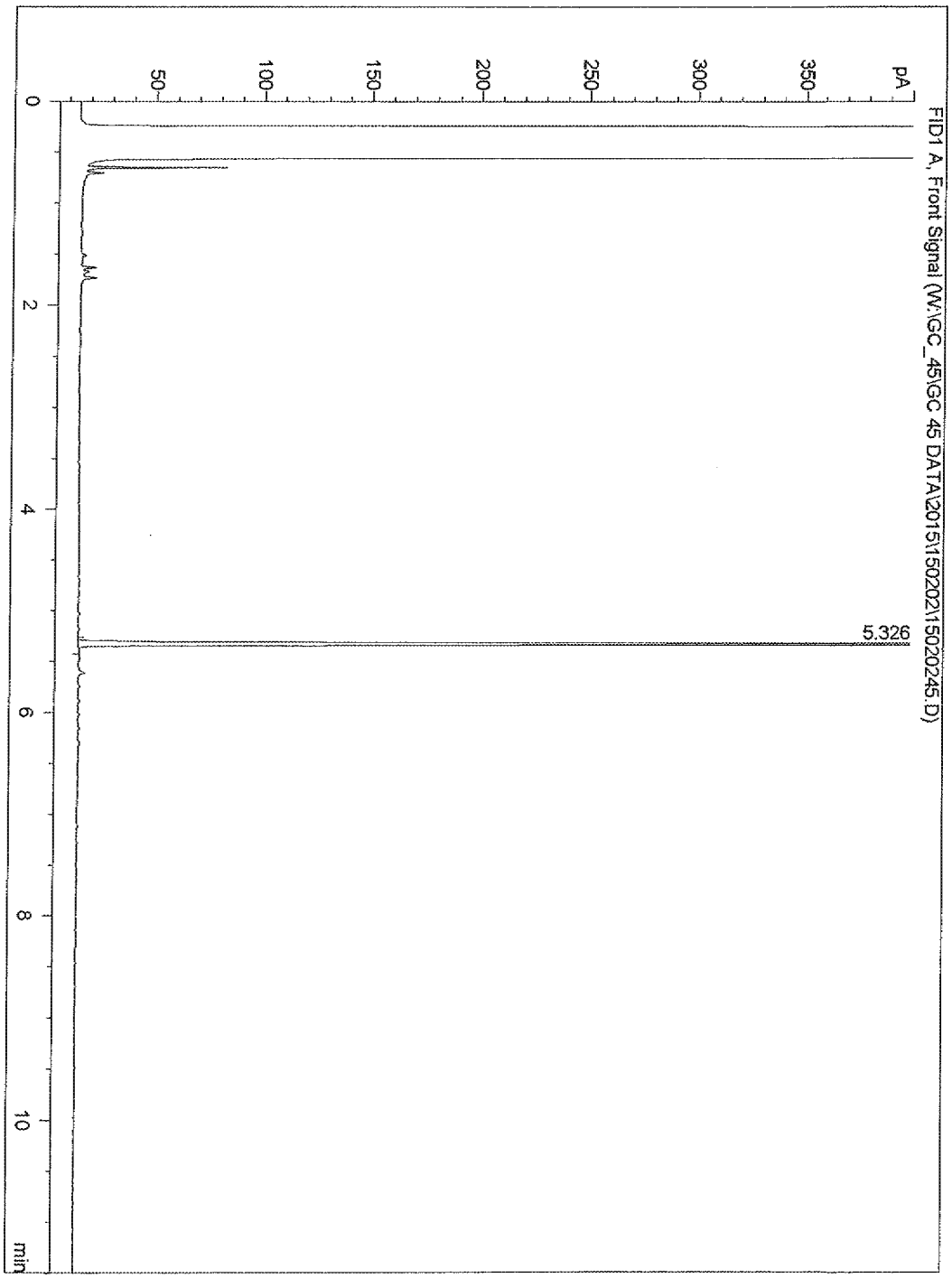


CONTINUING CALIBRATION VERIFICATION QUALITY CONTROL SHEET
FOR METHOD: EPA 8015B (M)

CCV WORK ORDER: **099-15-515-363-6279**
BATCH ID:
INITIAL: 150202I018
CCV: 150202A090
INSTRUMENT: GC 45

DATA FILE: W:\GC_45\GC 45 DATA\2015\150202\15020243.D\15020243

ANALYZED BY: 960
D/T ANALYZED:
INITIAL: 2015-02-02 11:34
CCV: 2015-02-03 00:03
REVIEWED BY: 607
D/T REVIEWED: 2015-02-05 15:53

COMPOUND NAME	COMP TYPE	CALIB MODEL	MIN RF	AVG RF	CCV RF	AMOUNT	CCV CONC	CCV %D	CCV %D CL	STATUS
TPH as Diesel	C	Avg Resp	0.00	0.019	0.019			1	0-15	PASS

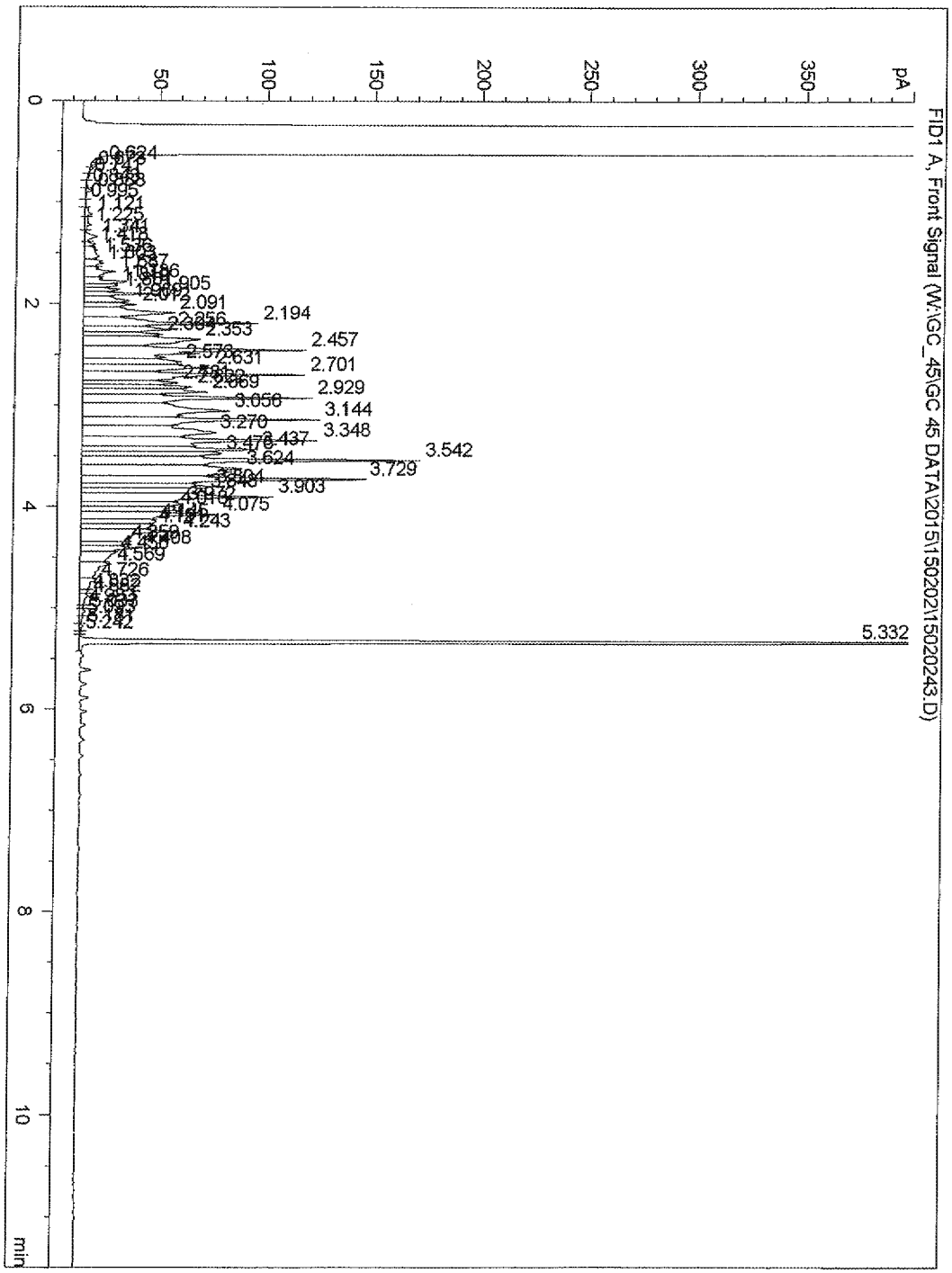
MIN RF: Method Specified Minimum Response Factor

ED_006532_00009885-00148

Area Percent Report

Data File Name	: W:\GC_45\GC 45 DATA\2015\150202\15020243.D		
Page Number	: 3		
Operator	: 682	Vial Number	: Vial 43
Instrument	: GC 45	Injection Number	: 1
Sample Name	: D400 C28 50 L012815D	Sequence Line	: 43
		Instrument Method	: C:\CHEM32\1\METHODS\ ->
Acquired on	: 03 Feb 15 00:03 am		
Report Created on	: 03 Feb 15 03:32 pm	Analysis Method	: 8015B.MTH

Software Revision: Rev. B.03.02 [341] Copyright © Agilent Technologies



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APPENDIX D

Historical Groundwater Exceedance Trends

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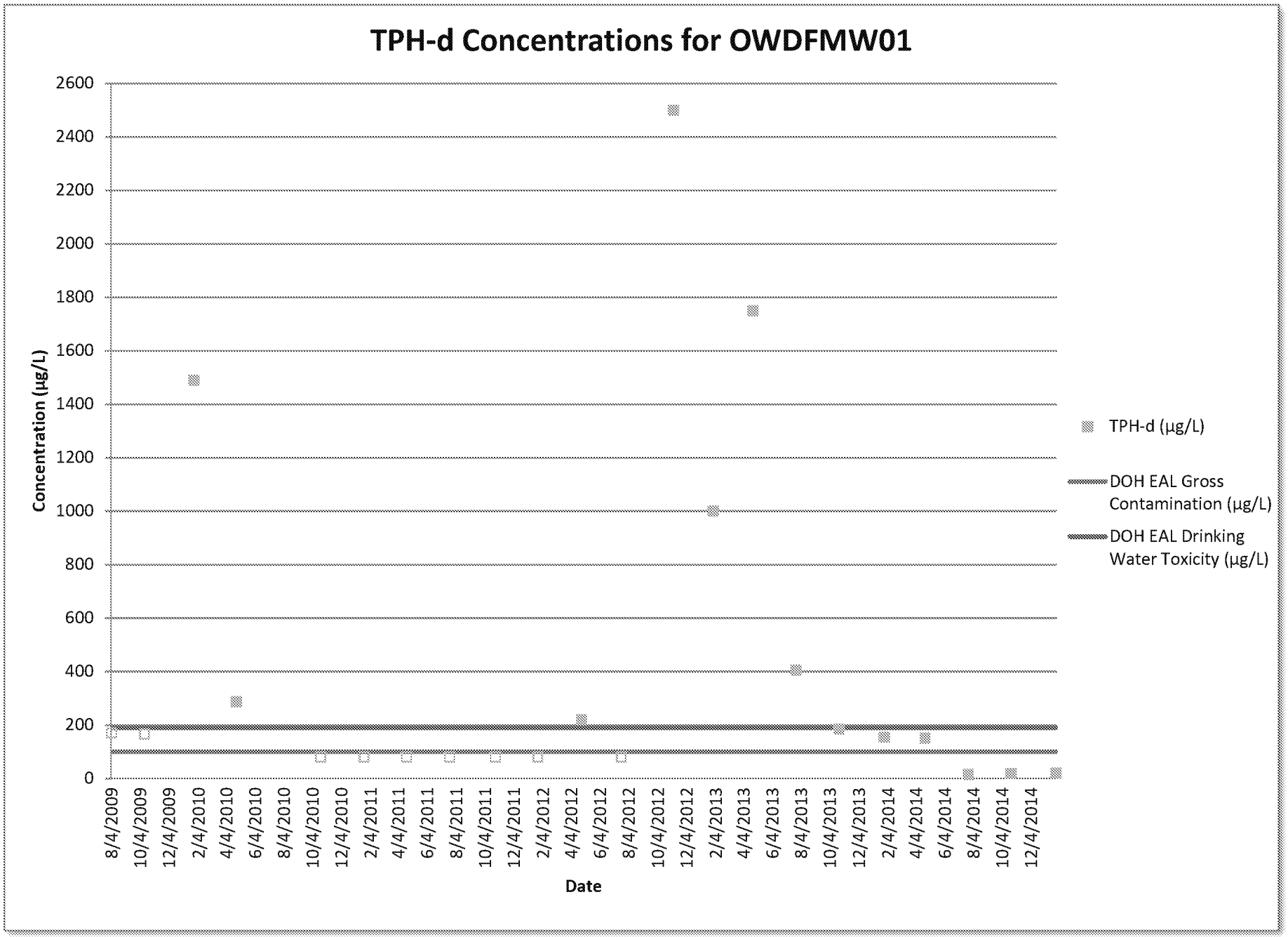

Data points for 10/21/2010 through 1/24/2012 and 11/07/2012 through 7/24/2014 are the average of the primary and duplicate samples.
Unfilled boxes indicate non-detections. Method detection limits (MDLs) are shown for 2009, and limits of detection (LODs) are shown from January 2010 on.

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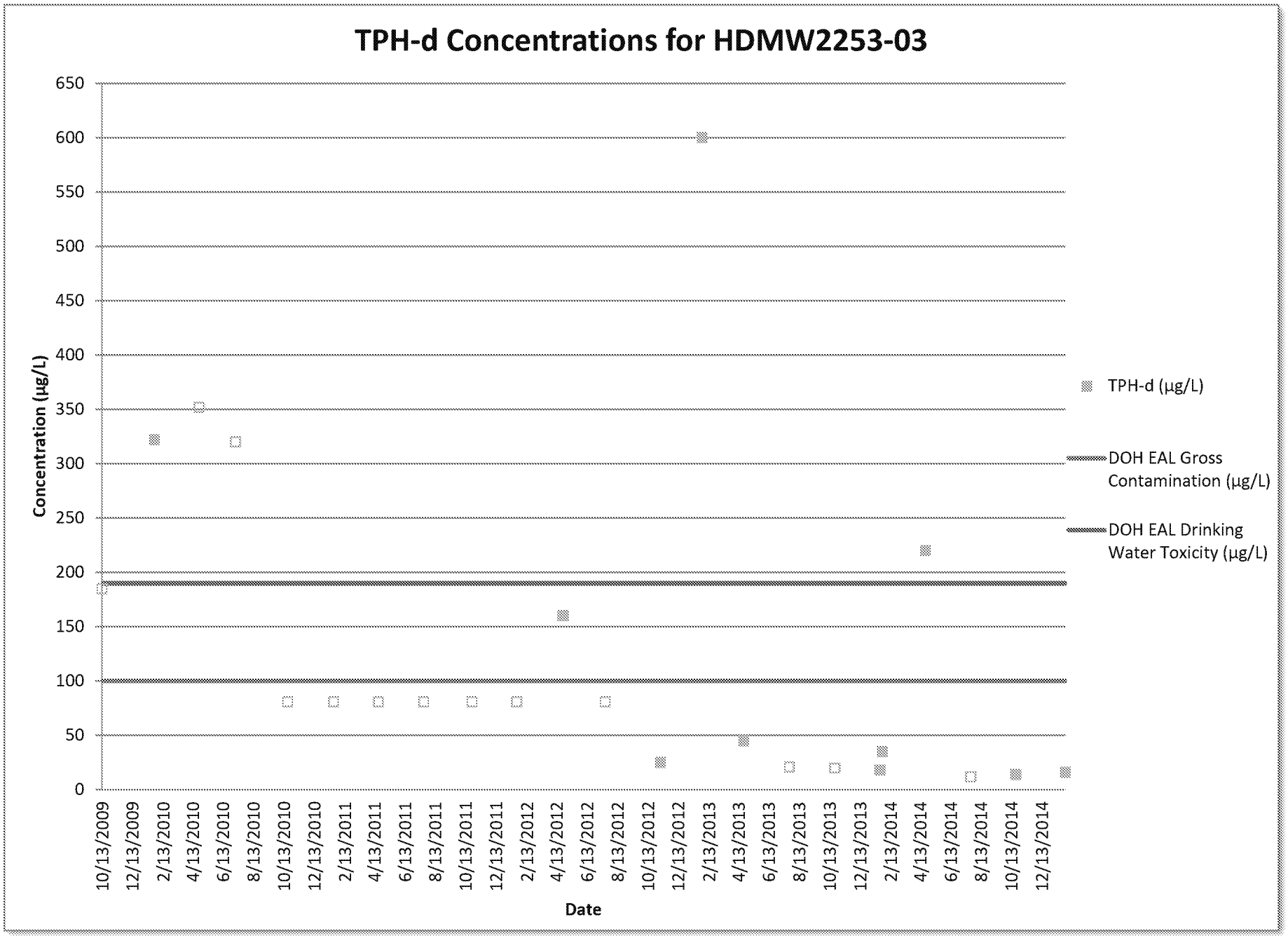

Unfilled boxes indicate non-detections. MDLs are shown for 2009, and LODs are shown from January 2010 on.

4/23/2014 - A review of the chromatograms and historical data concluded the TPH-d subsample for HDMW2253-03 and the duplicate sample for OWDFMW-01 were likely switched during this event. The TPH-d concentration for the OWDFMW-01 duplicate sample was 32 ug/L.

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APPENDIX E

Cumulative Groundwater Results
(included on attached CD)

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