Final
First Quarter 2015 - Quarterly Groundwater Monitoring Report Inside 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
400 Marshall Road
JBPHH HI 96860-3139

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

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Prepared for:

Department of the Navy
Naval Facilities Engineering Command, Hawaii
400 Marshall Road
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Prepared under:

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FINAL
FIRST QUARTER 2015 - QUARTERLY GROUNDWATER MONITORING REPORT
INSIDE 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

Prepared for:
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ACRONYMS AND ABBREVIATIONS

ACRONYMS/ ABBREVIATIONS	DEFINITION/MEANING
bgs	below ground surface
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
PAH	Polycyclic Aromatic Hydrocarbons
PARCCS	Precision, Accuracy, Representativeness, Completeness, Comparability, and Sensitivity
pH	hydrogen activity
RHSF	Red Hill Bulk Fuel Storage Facility
RPD	Relative Percent Difference
SAP	Sampling and Analysis Plan
SSRBL	Site-Specific Risk-Based Level
TEC	The Environmental Company, Inc.
TPH	Total Petroleum Hydrocarbons
TPH-d	Total Petroleum Hydrocarbons as diesel fuel
TPH-g	Total Petroleum Hydrocarbons as gasoline
U.S.	United States of America
UST	Underground Storage Tank
VOC	Volatile Organic Compound
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 27 and 28, 2015, at 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 2012 Work Plan [WP]/Sampling and Analysis Plan [SAP] prepared by Environmental Science International, Inc. [ESI].

On January 27 and 28, 2015, ESI personnel collected groundwater samples from four monitoring wells at the RHSF (wells RHMW01, RHMW02, RHMW03, and RHMW05) and one sampling point at Red Hill Shaft (RHMW2254-01). A primary and duplicate sample were collected from well RHMW02. A summary of the analytical results is provided below.

- **RHMW01** – Total Petroleum Hydrocarbons as diesel fuel [TPH-d] (33 micrograms per liter [µg/L]) and lead (0.631 µg/L) were the only analytes detected. The concentrations did not exceed the DOH Environmental Action Level [EAL] or the site-specific risk-based level [SSRBL] of 4,500 µg/L for Total Petroleum Hydrocarbons [TPH]. TPH-d concentrations in this well have shown an overall decreasing trend from a high of 1,500 µg/L in February 2005.
- **RHMW02** – TPH-d (1,100 and 1,700 µg/L), Total Petroleum Hydrocarbons as gasoline [TPH-g] (54 and 59 µg/L), xylenes (0.35 µg/L in both primary and duplicate samples), acenaphthene (0.59 and 0.55 µg/L), ethylbenzene (0.16 and 0.17 µg/L), fluorene (0.30 and 0.22 µg/L), 1-methylnaphthalene (34 and 25 µg/L), 2-methylnaphthalene (7.6 and 2.7 µg/L), and naphthalene (90 and 63 µg/L) were detected. TPH-d was detected at concentrations above the DOH EALs for both drinking water toxicity and gross contamination, but below half the SSRBL. The polycyclic aromatic hydrocarbons [PAHs] 1-methylnaphthalene and naphthalene were detected at concentrations above the DOH EALs for both drinking water toxicity and gross contamination. The concentrations of TPH-d, 1-methylnaphthalene, 2-methylnaphthalene, and naphthalene decreased from the previous sampling event in October 2014.
- **RHMW03** – TPH-d (39 µg/L) was the only analyte detected. The concentration did not exceed the DOH EALs or the SSRBL.
- **RHMW05** – None of the chemical constituents analyzed for were detected at a concentration at or above the limit of detection [LOD].

- **RHMW2254-01** – None of the chemical constituents analyzed for were detected at a concentration at or above the LOD.

During this quarterly event, the concentrations of TPH-d, 1-methylnaphthalene, and naphthalene in RHMW02 exceeded the DOH EALs for both gross contamination and drinking water toxicity. The concentration of TPH-d in RHMW01 decreased from the previous event in October 2014 to a concentration below the DOH EALs. Groundwater contaminant concentrations in RHMW03, RHMW05, and RHMW2254-01 remained at low concentrations and did not change significantly from the previous event, or were not detected.

Concentrations of 1-methylnaphthalene, 2-methylnaphthalene, and naphthalene in RHMW02 had shown an increasing trend between March and October 2014; however, concentrations of these three analytes and TPH-d all decreased since the previous event in October 2014. All other analytical results were generally consistent with historical data.

Based on the groundwater monitoring results and the reported release at Tank 5 in January 2014, continued groundwater monitoring at the wells inside the RHSF tunnel is recommended. The next quarterly event is tentatively scheduled for April 2015.

SECTION 1 – INTRODUCTION

This quarterly groundwater monitoring report presents the results of the first quarter 2015 groundwater sampling conducted on January 27 and 28, 2015, at the RHSF, JBPHH. 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 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 Chapter 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 that 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 the USTs are summarized in Table 1.1.

Four groundwater monitoring wells (wells RHMW01, RHMW02, RHMW03, and RHMW05) and one sampling point at Red Hill Shaft (RHMW2254-01) are located within the RHSF lower access tunnel (Figure 2). Three groundwater monitoring wells (wells HDMW2253-03, OWDFMW01, and RHMW04) are located outside of the RHSF tunnel system. Monitoring data for the three wells located outside the tunnel are included in a separate report.

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. The 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 SETTING

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, 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 25-90% 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 DON Well 2254-01, located in the infiltration gallery within the RHSF lower tunnel. The DON Well 2254-01 is located approximately 2,400 feet hydraulically and topographically 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. The USTs were constructed of steel, and in the past have stored DON special fuel oil, DON distillate, aviation gasoline, and motor gasoline (Environet, 2010). The tanks currently contain JP-5, JP-8, and F-76. 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 a depth varying between 100 feet and 200 feet below ground surface [bgs].

In 1998, Earth Tech conducted a Phase II Remedial Investigation/Feasibility Study for the Oily Waste Disposal Facility located within the RHSF. The study included the installation of well OWDFMW01 (which was originally MW08) (Earth Tech, 1999).

In February 2001, the DON installed groundwater monitoring well RHMW01 to monitor for contamination in the basal aquifer beneath the RHSF. Well RHMW01 was installed approximately 100 feet below grade within the lower access tunnel. The depth to water was measured at 86 feet below the tunnel floor at the time of the well completion. In February 2001, a groundwater sample was collected from the well. TPH and total lead were detected in the sample. Total lead was detected at a concentration above the DOH Tier 1 groundwater action level of 5.6 µg/L (The Environmental Company, Inc. [TEC], 2009; DOH, 2000).

In 2005, the RHSF groundwater monitoring program was initiated. It involved routine groundwater sampling of well RHMW01 and sampling point RHMW2254-01. Samples were collected in February, June, September, and December of 2005. Lead was detected at concentrations above the DOH Tier 1 action level of 5.6 µg/L in samples collected in February and June. The samples collected in February and June were not filtered prior to analysis, whereas the samples collected in September and December were filtered prior to analysis. Since the samples collected in February and June were not filtered prior to analysis, the lead results were not considered appropriate for a risk assessment (TEC, 2008).

Between June and September 2005, TEC installed three additional groundwater monitoring wells (wells RHMW02, RHMW03, and RHMW04) (TEC, 2008). Well RHMW04 was installed hydraulically upgradient of the USTs to provide background geochemistry information for water moving through the basal aquifer beneath the RHSF. Wells RHMW02 and RHMW03 were installed approximately 125 feet below grade within the RHSF lower tunnel and well RHMW04 was installed to a depth of approximately 300 feet bgs outside of the RHSF tunnels. In September 2005, groundwater samples were collected from the three newly installed groundwater monitoring wells (wells RHMW02, RHMW03, and RHMW04) along with the existing well RHMW01 and sampling point RHMW2254-01. The contaminants of potential concern [COPCs] with concentrations exceeding current DOH EALs are summarized below.

- **RHMW01** – TPH-d was detected at concentrations above the DOH EALs.
- **RHMW02** – TPH-g, TPH-d, naphthalene, trichloroethylene, 1-methylnaphthalene, and 2-methylnaphthalene were detected at concentrations above their respective DOH EAL.
- **RHMW03** – TPH-d was detected at concentrations above the DOH EALs.

In 2006, TEC installed dedicated sampling pumps in the four wells (wells RHWM01, RHWM02, RHMW03, and RHWM04) and one sampling point (RHMW2254-01). In July and December of 2006, groundwater samples were collected from the four wells and the sampling point. The COPCs with concentrations exceeding current DOH EALs are summarized below.

- **RHMW01** – TPH-d and naphthalene were detected at concentrations above their respective DOH EAL.
- **RHMW02** – TPH-g, TPH-d, and naphthalene were detected at concentrations above their respective DOH EAL.
- **RHMW03** – TPH-d was detected at concentrations above the DOH EALs.

In 2007, SSRBLs were established for TPH (4,500 µg/L) and benzene (750 µg/L) based on the solubility in water of JP-5 and JP-8 (TEC, 2007). Groundwater samples were collected from wells RHWM01, RHWM02, and RHMW03, and sampling point RHMW2254-01. Samples were collected in March, June, and September of 2007. The COPCs with concentrations exceeding current DOH EALs are summarized below.

- **RHMW01** – TPH-d was detected at concentrations above the DOH EALs, but below the SSRBL.
- **RHMW02** – TPH-g, TPH-d, naphthalene, 1-methylnaphthalene, and 2-methylnaphthalene were detected at concentrations above their respective DOH EAL. The TPH-d concentrations were below the SSRBL.
- **RHMW03** – TPH-d was detected at concentrations above the DOH EALs, but below the SSRBL.

In 2008, groundwater samples were collected from wells RHWM01, RHWM02, and RHMW03, and sampling point RHMW2254-01. Samples were collected in January, April, July, and October of 2008. The COPCs with concentrations exceeding current DOH EALs are summarized below. In addition, a groundwater protection plan (TEC, 2008) was prepared.

- **RHMW01** – TPH-d was detected at concentrations above the DOH EALs, but below the SSRBL.
- **RHMW02** – TPH-d, naphthalene, 1-methylnaphthalene, and 2-methylnaphthalene were detected at concentrations above their respective DOH EAL. The TPH-d concentrations detected in October 2008 were also above the SSRBL.

- **RHMW03** – TPH-d was detected at concentrations above the DOH EALs, but below the SSRBL.

In April 2009, groundwater monitoring well RHMW05 was installed downgradient of the USTs, within the lower access tunnel between RHMW01 and RHMW2254-01. It was installed to identify the extent of contamination hydraulically downgradient of the USTs. Well RHMW05 was added to the quarterly groundwater sampling program. In 2009, quarterly groundwater samples were collected from wells RHWM01, RHWM02, RHMW03, and RHMW05, and sampling point RHMW2254-01. Samples were collected in February, May, July, and October of 2009. The COPCs with concentrations exceeding current DOH EALs are summarized below. In addition, the Groundwater Protection Plan was revised to include well RHMW05.

- **RHMW01** – TPH-d and 1-methylnaphthalene were detected at concentrations above their respective DOH EAL. The TPH-d concentrations were below the SSRBL.
- **RHMW02** – TPH-d, naphthalene, 1-methylnaphthalene, and 2-methylnaphthalene were detected at concentrations above their respective DOH EAL. The TPH-d concentrations were below the SSRBL.
- **RHMW03** – TPH-d was detected at a concentration above the DOH EALs, but below the SSRBL.
- **RHMW05** – TPH-d was detected at a concentration above the DOH EALs, but below the SSRBL.

In 2010, groundwater samples were collected from wells RHWM01, RHWM02, RHMW03, and RHMW05, and sampling point RHMW2254-01. Samples were collected in January, April, July, and October. The COPCs with concentrations exceeding current DOH EALs are summarized below.

- **RHMW01** – TPH-d was detected at concentrations above the DOH EALs, but below the SSRBL.
- **RHMW02** – TPH-g, TPH-d, naphthalene, and 1-methylnaphthalene were detected at concentrations above their respective DOH EAL. The TPH-d concentrations were below the SSRBL.
- **RHMW03** – TPH-d was detected at a concentration above the DOH EALs, but below the SSRBL.
- **RHMW05** – TPH-d was detected at a concentration above the DOH EALs, but below the SSRBL.

In 2011, quarterly groundwater samples were collected from wells RHWM01, RHWM02, RHMW03, and RHMW05, and sampling point RHMW2254-01. Samples were collected in January, April, July, and October. In a Fall 2011 update, the DOH EALs were revised. The drinking water toxicity EAL for TPH-d decreased from 210 to 190 µg/L (DOH, 2011). The COPCs with concentrations exceeding current DOH EALs are summarized below.

- **RHMW01** – TPH-d was detected at concentrations above the DOH EALs, but below the SSRBL.
- **RHMW02** – TPH-d, naphthalene, indeno[1,2,3-cd]pyrene, and 1-methylnaphthalene were detected at concentrations above their respective DOH EAL. The TPH-d concentrations were below the SSRBL.

In 2012, quarterly groundwater samples were collected from wells RHWM01, RHWM02, RHMW03, and RHMW05, and sampling point RHMW2254-01. Samples were collected in February, April, July, and November. The COPCs with concentrations exceeding current DOH EALs are summarized below.

- **RHMW01** – TPH-d was detected at concentrations above the DOH EALs, but below the SSRBL.
- **RHMW02** – TPH-d, TPH-g, naphthalene, 1-methylnaphthalene, and 2-methylnaphthalene were detected at concentrations above their respective DOH EAL. The TPH-d concentrations were below the SSRBL.

In 2013, quarterly groundwater samples were collected from wells RHWM01, RHWM02, RHMW03, and RHMW05, and sampling point RHMW2254-01. Samples were collected in January, April, July, and October. The COPCs with concentrations exceeding current DOH EALs are summarized below.

- **RHMW01** – TPH-d was detected at concentrations above the DOH EALs, but below the SSRBL.
- **RHMW02** – TPH-d, TPH-g, naphthalene, 1-methylnaphthalene, and 2-methylnaphthalene were detected at concentrations above their respective DOH EAL. The TPH-d concentrations were below the SSRBL.

In 2014, quarterly groundwater samples were collected from wells RHWM01, RHWM02, RHMW03, and RHMW05, and sampling point RHMW2254-01. Samples were collected in January, April, July, and October. The COPCs with concentrations exceeding current DOH EALs are summarized below.

- **RHMW01** – TPH-d was detected at concentrations above the DOH EALs, but below the SSRBL.
- **RHMW02** – TPH-d, naphthalene, 1-methylnaphthalene, and 2-methylnaphthalene were detected at concentrations above their respective DOH EAL. The TPH-d concentrations were below the SSRBL.

Between January and June 2014, additional groundwater sampling was conducted at wells RHMW01, RHMW02, RHMW05, and sampling point RHMW2254-01 in response to a reported

release from Tank 5. The COPCs with concentrations exceeding current DOH EALs are summarized below.

- **RHMW01** – TPH-d was detected at concentrations above the DOH EALs, but below the SSRBL.
- **RHMW02** – TPH-d, 1-methylnaphthalene, and naphthalene were detected at concentrations above their respective DOH EAL. The TPH-d concentrations were below the SSRBL.

1.3.1 Previous Reports

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

1. Groundwater Sampling Report, First Quarter 2005 (submitted April 2005).
2. Groundwater Sampling Report, Second Quarter 2005 (submitted August 2005).
3. Groundwater Sampling Report, Third Quarter 2005 (submitted November 2005).
4. Groundwater Sampling Report, Fourth Quarter 2005 (submitted February 2006).
5. Groundwater Monitoring Results, July 2006 (submitted September 2006).
6. Groundwater Monitoring Results, December 2006 (submitted January 2007).
7. Groundwater Monitoring Results, March 2007 (submitted May 2007).
8. Groundwater Monitoring Results, June 2007 (submitted August 2007).
9. Groundwater Monitoring Results, September 2007 (submitted October 2007).
10. Groundwater Monitoring Report, January 2008 (submitted March 2008).
11. Groundwater Monitoring Report, April 2008 (submitted May 2008).
12. Groundwater Monitoring Report, July 2008 (submitted October 2008).
13. Groundwater Monitoring Report, October and December 2008 (submitted February 2009).
14. Groundwater Monitoring Report, February 2009 (submitted May 2009).
15. Groundwater Monitoring Report, May 2009 (submitted July 2009).
16. Groundwater Monitoring Report, July 2009 (submitted September 2009).
17. Groundwater Monitoring Report, October 2009 (submitted December 2009).
18. Groundwater Monitoring Report, January, February, and March 2010 (submitted April 2010).
19. Groundwater Monitoring Report, April 2010 (submitted May 2010).
20. Groundwater Monitoring Report, July 2010 (submitted August 2010).
21. Groundwater Monitoring Report, October 2010 (submitted December 2010).
22. Groundwater Monitoring Report, January 2011 (submitted March 2011).
23. Groundwater Monitoring Report, April 2011 (submitted June 2011).

24. Groundwater Monitoring Report, July 2011 (submitted September 2011).
25. Groundwater Monitoring Report, October 2011 (submitted December 2011).
26. Groundwater Monitoring Report, January-February 2012 (submitted March 2012).
27. Groundwater Monitoring Report, April 2012 (Submitted July 2012).
28. Groundwater Monitoring Report, October 2012 (Submitted January 2013).
29. Groundwater Monitoring Report, January 2013 (Submitted April 2013).
30. Groundwater Monitoring Report, April 2013 (Submitted July 2013).
31. Groundwater Monitoring Report, July 2013 (Submitted September 2013).
32. Groundwater Monitoring Report, October 2013 (Submitted January 2014).
33. Groundwater Sampling Report for Additional Sampling, January 2014 (submitted January 2014).
34. Groundwater Monitoring Report, January 2014 (Submitted April 2014).
35. Groundwater Sampling Report for Tank 5 Release Response on March 5 and 6, 2014 (submitted March 2014).
36. Groundwater Sampling Report for Tank 5 Release Response on March 10, 2014 (submitted March 2014).
37. Groundwater Sampling Report for Tank 5 Release Response on March 25 and 26, 2014 (submitted April 2014).
38. Groundwater Sampling Report for Tank 5 Release Response on April 7, 2014 (submitted April 2014).
39. Groundwater Monitoring Report, April 2014 (Submitted June 2014).
40. Groundwater Sampling Report for Tank 5 Release Response on May 27 and 28, 2014 (submitted June 2014).
41. Groundwater Sampling Report for Tank 5 Release Response on June 23 and 24, 2014 (submitted July 2014).
42. Groundwater Monitoring Report, July 2014 (Submitted September 2014).
43. Groundwater Monitoring Report, October 2014 (Submitted January 2015).

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SECTION 2 – GROUNDWATER SAMPLING

On January 27 and 28, 2015, ESI personnel collected groundwater samples from four monitoring wells at the RHSF (wells RHMW01, RHMW02, RHMW03, and RHMW05) and one sampling point at Red Hill Shaft (RHMW2254-01). The samples were collected in accordance with the 2012 WP/SAP. 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 RHSF Final Groundwater Protection Plan (TEC, 2008). Prior to purging and sampling, the depth to groundwater and the depth to the bottoms of the wells were measured using a Geotech oil/water interface probe. No measurable product, sheen, or petroleum hydrocarbon odor was detected 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. Each well contains a dedicated bladder pump which was used to purge the well and to collect samples. To operate the pump, a portable air compressor with an in-line filter was connected to a QED MP50 MicroPurge® Basics Controller box, which was then connected to the pump. The compressor was turned on to power the pump and the controller was used to adjust the pumping rate to less than one liter of water 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 assess whether the natural characteristics of the aquifer formation water were present within the monitoring wells before collecting the samples. 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. The groundwater monitoring logs are included in Appendix A. In addition, field notes were taken to document the sampling event. The field notes are included in Appendix B.

When the water quality parameters stabilized, groundwater samples were collected from the wells using the bladder pumps. The groundwater samples were collected no more than two hours after purging was completed to decrease groundwater interaction with the monitoring well casing and atmosphere. Prior to collecting the sample, the water level in the monitoring wells was measured and recorded to ensure that excessive drawn down had not occurred. The groundwater samples were collected at flow rates of approximately 0.17 to 0.5 liters per minute. Samples collected for dissolved lead analysis were filtered in the field using new, 0.45-micron filters.

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, TPH-g and volatile organic compounds [VOCs] using EPA Method 8260B, PAHs using EPA Method 8270C SIM, dissolved lead using EPA Method 6020, and total lead using EPA Method 200.8. The sample collected from sampling point RHMW2254-01 was analyzed for total lead (unfiltered) as the sampling point is a drinking water supply infiltration shaft. A copy of the laboratory report is included as Appendix C.

Analytical results were compared to the DOH EALs for drinking water toxicity and gross contamination. Analytical results for wells RHMW01, RHMW02, RHMW03, and RHMW05 were also compared to the SSRBLs for TPH (4,500 µg/L) and benzene (750 µg/L), established in the RHSF Final Groundwater Protection Plan (TEC, 2008). The results of the first quarter groundwater sampling event are summarized in Table 2.1 and described below.

- **RHMW01** – TPH-d (33 µg/L) and lead (0.0631 µg/L) were the only analytes detected. The concentrations did not exceed the DOH EALs or the SSRBL.
- **RHMW02** – TPH-d (1,100 and 1,700 µg/L), TPH-g (54 and 59 µg/L), xylenes (0.35 µg/L in both primary and duplicate samples), acenaphthene (0.59 and 0.55 µg/L), ethylbenzene (0.16 and 0.17 µg/L), fluorene (0.30 and 0.22 µg/L), 1-methylnaphthalene (34 and 25 µg/L), 2-methylnaphthalene (7.6 and 2.7 µg/L), and naphthalene (90 and 63 µg/L) were detected in both the primary and duplicate samples collected. TPH-d, 1-methylnaphthalene, and naphthalene were detected at concentrations above their respective DOH EALs for both drinking water toxicity and gross contamination. However, the TPH-d concentrations did not exceed the SSRBL.
- **RHMW03** – TPH-d (39 µg/L) was the only analyte detected. The concentration did not exceed the DOH EALs or the SSRBL.
- **RHMW05** – None of the chemical constituents analyzed for were detected at a concentration at or above the LOD.
- **RHMW2254-01** – None of the chemical constituents analyzed for were detected at a concentration at or above the LOD.

2.3 GROUNDWATER CONTAMINANT TRENDS

The historical groundwater contaminant concentration trends for COPCs that exceeded the DOH EALs or SSRBLs 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.

- **RHMW01** – COPCs detected during this round of quarterly sampling are consistent with the historical data for RHMW01. TPH-d has historically been detected at concentrations above the DOH EAL for both drinking water toxicity and gross contamination. TPH-d concentrations have shown an overall decreasing trend from a high of 1,500 µg/L in February 2005.
- **RHMW02** – COPCs detected during this round of quarterly sampling are consistent with the historical data for RHMW02. TPH-g, TPH-d, 1-methylnaphthalene, 2-methylnaphthalene, and naphthalene have historically been detected at concentrations above the DOH EALs. During the January 2015 event, concentrations of TPH-d, 1-methylnaphthalene, 2-methylnaphthalene, and naphthalene decreased from the previous event in October 2014, with the concentrations of 2-methylnaphthalene decreasing to levels below the DOH EALs. The concentrations of TPH-g remained below the DOH EALs for gross contamination and drinking water toxicity and were comparable to the concentrations detected during the previous event. Trichloroethylene was detected once in RHMW02 in September 2005 in the primary sample at a concentration above the DOH EAL for drinking water toxicity; however, trichloroethylene was not detected in the duplicate sample, and this may have been an anomalous result.
- **RHMW03** – COPCs detected during this round of quarterly sampling are consistent with the historical data for RHMW03. TPH-d has historically been detected at concentrations above the DOH EALs; however, it has not been detected at concentrations above the DOH EALs since October 2010.
- **RHMW05** – COPCs detected during this round of quarterly sampling are consistent with the historical data for RHMW05. TPH-d has historically been detected in RHMW05 at concentrations above the DOH EAL for both drinking water toxicity and gross contamination; however, it has not been detected at concentrations above the DOH EALs since January 2010.
- **RHMW2254-01** – COPCs detected during this round of quarterly sampling are consistent with the historical data for RHMW2254-01. Although the method reporting limits for TPH-d exceeded one or both DOH EALs for drinking water toxicity and gross contamination between May 2009 and July 2010, TPH-d was last detected in RHMW2254-01 at a concentration above the DOH EAL for gross contamination in January 2008.

2.4 WASTE DISPOSAL

The purged groundwater and decontamination water generated during sampling of the inside tunnel were placed in a 55-gallon drum along with the purged water and decontamination water from the outside 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 awaiting disposal.

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TABLE 2.1
Analytical Results for Groundwater Sampling (January 27 and 28, 2015)
Red Hill Bulk Fuel Storage Facility
January 2015 Quarterly Monitoring Report

Method	Chemical	DOH EALs		RHMW2254-01 (ES125)					RHWM01 (ES120X)					RHMW02 (ES126)					RHWM03 (ES123)					RHMW05 (ES124)				
		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	Results	Q	LOQ	LOD	DL
EPA 8015B	TPH-d	190	100	N.D.	U	25	12	11	**33**	HD	25	12	11	**1,100**	HD	25	10	2.9	39	HD	25	10	2.9	N.D.	U	26	13	12
EPA 8260B	TPH-g	100	100	N.D.	U	50	30	26	N.D.	U	50	30	26	54		50	30	26	N.D.	U	50	30	26	N.D.	U	50	30	26
EPA 8270C	Acenaphthene	370	20	N.D.	U	0.20	0.050	0.027	N.D.	U	0.22	0.054	0.029	0.59		0.20	0.050	0.027	N.D.	U	0.19	0.048	0.026	N.D.	U	0.19	0.048	0.026
	Acenaphthylene	240	2,000	N.D.	U	0.20	0.050	0.044	N.D.	U	0.22	0.054	0.048	N.D.	U	0.20	0.050	0.044	N.D.	U	0.19	0.048	0.043	N.D.	U	0.19	0.048	0.043
	Anthracene	1,800	22	N.D.	U	0.20	0.050	0.029	N.D.	U	0.22	0.054	0.031	N.D.	U	0.20	0.050	0.029	N.D.	U	0.19	0.048	0.028	N.D.	U	0.19	0.048	0.028
	Benzo[a]anthracene	0.092	4.7	N.D.	U	0.20	0.050	0.033	N.D.	U	0.22	0.054	0.035	N.D.	U	0.20	0.050	0.032	N.D.	U	0.19	0.048	0.032	N.D.	U	0.19	0.048	0.031
	Benzo[g,h,i]perylene	1,500	0.13	N.D.	U	0.20	0.10	0.082	N.D.	U	0.22	0.11	0.089	N.D.	U	0.20	0.099	0.081	N.D.	U	0.19	0.097	0.079	N.D.	U	0.19	0.096	0.079
	Benzo[a]pyrene	0.2	0.81	N.D.	U	0.20	0.050	0.022	N.D.	U	0.22	0.054	0.024	N.D.	U	0.20	0.050	0.022	N.D.	U	0.19	0.048	0.022	N.D.	U	0.19	0.048	0.021
	Benzo[b]fluoranthene	0.092	0.75	N.D.	U	0.20	0.050	0.018	N.D.	U	0.22	0.054	0.019	N.D.	U	0.20	0.050	0.017	N.D.	U	0.19	0.048	0.017	N.D.	U	0.19	0.048	0.017
	Benzo[k]fluoranthene	0.92	0.4	N.D.	U	0.20	0.050	0.031	N.D.	U	0.22	0.054	0.034	N.D.	U	0.20	0.050	0.031	N.D.	U	0.19	0.048	0.030	N.D.	U	0.19	0.048	0.030
	Chrysene	9.2	1	N.D.	U	0.20	0.050	0.025	N.D.	U	0.22	0.054	0.027	N.D.	U	0.20	0.050	0.025	N.D.	U	0.19	0.048	0.024	N.D.	U	0.19	0.048	0.024
	Dibenzo[a,h]anthracene[1]	0.0092	0.52	N.D.	U	0.20	0.050	0.047	N.D.	U	0.22	0.054	0.052	N.D.	U	0.20	0.050	0.047	N.D.	U	0.19	0.048	0.046	N.D.	U	0.19	0.048	0.046
	Fluoranthene	1,500	130	N.D.	U	0.20	0.050	0.047	N.D.	U	0.22	0.054	0.051	N.D.	U	0.20	0.050	0.046	N.D.	U	0.19	0.048	0.045	N.D.	U	0.19	0.048	0.045
	Fluorene	240	950	N.D.	U	0.20	0.050	0.042	N.D.	U	0.22	0.054	0.046	0.30		0.20	0.050	0.042	N.D.	U	0.19	0.048	0.041	N.D.	U	0.19	0.048	0.041
	Indeno[1,2,3-cd]pyrene	0.092	0.095	N.D.	U	0.20	0.050	0.021	N.D.	U	0.22	0.054	0.023	N.D.	U	0.20	0.050	0.021	N.D.	U	0.19	0.048	0.020	N.D.	U	0.19	0.048	0.020
	1-Methylnaphthalene	4.7	10	N.D.	U	0.20	0.10	0.051	N.D.	U	0.22	0.11	0.056	**34**		2.0	0.99	0.51	N.D.	U	0.19	0.097	0.050	N.D.	U	0.19	0.096	0.050
	2-Methylnaphthalene	24	10	N.D.	U	0.20	0.050	0.046	N.D.	U	0.22	0.054	0.050	7.6	**J**	0.20	0.050	0.046	N.D.	U	0.19	0.048	0.045	N.D.	U	0.19	0.048	0.045
	Naphthalene	17	21	N.D.	U	0.20	0.050	0.034	N.D.	U	0.22	0.054	0.037	**90**		2.0	0.50	0.34	N.D.	U	0.19	0.048	0.033	N.D.	U	0.19	0.048	0.033
	Phenanthrene	240	410	N.D.	U	0.20	0.050	0.027	N.D.	U	0.22	0.054	0.029	N.D.	U	0.20	0.050	0.027	N.D.	U	0.19	0.048	0.026	N.D.	U	0.19	0.048	0.026
	Pyrene	180	68	N.D.	U	0.20	0.050	0.020	N.D.	U	0.22	0.054	0.022	N.D.	U	0.20	0.050	0.020	N.D.	U	0.19	0.048	0.020	N.D.	U	0.19	0.048	0.020
EPA 8260B	1,1,1,2-Tetrachloroethane	0.52	50,000	N.D.	U	1	0.5	0.4	N.D.	U	1	0.5	0.4	N.D.	U	1	0.5	0.4	N.D.	U	1	0.5	0.4	N.D.	U	1	0.5	0.4
	1,1,2,2-Tetrachloroethane[1]	0.067	500	N.D.	U	1	0.5	0.41	N.D.	U	1	0.5	0.41	N.D.	U	1	0.5	0.41	N.D.	U	1	0.5	0.41	N.D.	U	1	0.5	0.41
	1,1,1-Trichloroethane	200	970	N.D.	U	5	0.5	0.3	N.D.	U	5	0.5	0.3	N.D.	U	5	0.5	0.3	N.D.	U	5	0.5	0.3	N.D.	U	5	0.5	0.3
	1,1,2-Trichloroethane	5	50,000	N.D.	U	1	0.5	0.38	N.D.	U	1	0.5	0.38	N.D.	U	1	0.5	0.38	N.D.	U	1	0.5	0.38	N.D.	U	1	0.5	0.38
	1,1-Dichloroethane	2.4	50,000	N.D.	U	5	0.5	0.28	N.D.	U	5	0.5	0.28	N.D.	U	5	0.5	0.28	N.D.	U	5	0.5	0.28	N.D.	U	5	0.5	0.28
	1,1-Dichloroethylene	7	1,500	N.D.	U	1	0.5	0.43	N.D.	U	1	0.5	0.43	N.D.	U	1	0.5	0.43	N.D.	U	1	0.5	0.43	N.D.	U	1	0.5	0.43
	1,2,3-Trichloropropane[1]	0.6	50,000	N.D.	U	5	1	0.64	N.D.	U	5	1	0.64	N.D.	U	5	1	0.64	N.D.	U	5	1	0.64	N.D.	U	5	1	0.64
	1,2,4-Trichlorobenzene	70	3,000	N.D.	U	5	1	0.5	N.D.	U	5	1	0.5	N.D.	U	5	1	0.5	N.D.	U	5	1	0.5	N.D.	U	5	1	0.5
	1,2-Dibromo-3- chloropropane[1]	0.04	10	N.D.	U	10	2	1.2	N.D.	U	10	2	1.2	N.D.	U	10	2	1.2	N.D.	U	10	2	1.2	N.D.	U	10	2	1.2
	1,2-Dibromoethane[1]	0.04	50,000	N.D.	U	1	0.5	0.24	N.D.	U	1	0.5	0.24	N.D.	U	1	0.5	0.24	N.D.	U	1	0.5	0.24	N.D.	U	1	0.5	0.24
	1,2-Dichlorobenzene	600	10	N.D.	U	1	0.5	0.46	N.D.	U	1	0.5	0.46	N.D.	U	1	0.5	0.46	N.D.	U	1	0.5	0.46	N.D.	U	1	0.5	0.46
	1,2-Dichloroethane[1]	0.15	7,000	N.D.	U	1	0.5	0.24	N.D.	U	1	0.5	0.24	N.D.	U	1	0.5	0.24	N.D.	U	1	0.5	0.24	N.D.	U	1	0.5	0.24
	1,2-Dichloropropane	5	10	N.D.	U	5	0.5	0.42	N.D.	U	5	0.5	0.42	N.D.	U	5	0.5	0.42	N.D.	U	5	0.5	0.42	N.D.	U	5	0.5	0.42
	1,3-Dichlorobenzene	180	5	N.D.	U	1	0.5	0.4	N.D.	U	1	0.5	0.4	N.D.	U	1	0.5	0.4	N.D.	U	1	0.5	0.4	N.D.	U	1	0.5	0.4
	1,3-Dichloropropene (total of cis/trans)[1]	0.43	50,000	N.D.	U	1	0.5	0.25	N.D.	U	1	0.5	0.25	N.D.	U	1	0.5	0.25	N.D.	U	1	0.5	0.25	N.D.	U	1	0.5	0.25
	1,4-Dichlorobenzene	75	5	N.D.	U	1	0.5	0.43	N.D.	U	1	0.5	0.43	N.D.	U	1	0.5	0.43	N.D.	U	1	0.5	0.43	N.D.	U	1	0.5	0.43
	Acetone	22,000	20,000	N.D.	U	20	10	6	N.D.	U	20	10	6	N.D.	U,IJ	20	10	6	N.D.	U,IJ	20	10	6	N.D.	U	20	10	6
	Benzene	5	170	N.D.	U	1	0.5	0.14	N.D.	U	1	0.5	0.14	N.D.	U	1	0.5	0.14	N.D.	U	1	0.5	0.14	N.D.	U	1	0.5	0.14
	Bromodichloromethane[1]	0.12	50,000	N.D.	U	5	0.5	0.21	N.D.	U	5	0.5	0.21	N.D.	U	5	0.5	0.21	N.D.	U	5	0.5	0.21	N.D.	U	5	0.5	0.21
	Bromoform	80	510	N.D.	U	10	1	0.5	N.D.	U	10	1	0.5	N.D.	U	10	1	0.5	N.D.	U	10	1	0.5	N.D.	U	10	1	0.5
	Bromomethane	8.7	50,000	N.D.	U,IH	20	5	3.9	N.D.	U,IH	20	5	3.9	N.D.	U,IH	20	5	3.9	N.D.	U,IH	20	5	3.9	N.D.	U,IH	20	5	3.9
	Carbon Tetrachloride	5	520	N.D.	U	1	0.5	0.23	N.D.	U	1	0.5	0.23	N.D.	U	1	0.5	0.23	N.D.	U	1	0.5	0.23	N.D.	U	1	0.5	0.23
	Chlorobenzene	100	50	N.D.	U	5	0.5	0.17	N.D.	U	5	0.5	0.17	N.D.	U	5	0.5	0.17	N.D.	U	5	0.5	0.17	N.D.	U	5	0.5	0.17
	Chloroethane	21,000	16	N.D.	U	10	5	2.3	N.D.	U	10	5	2.3	N.D.	U	10	5	2.3	N.D.	U	10	5	2.3	N.D.	U	10	5	2.3
	Chloroform	70	2,400	N.D.	U	5	0.5	0.46	N.D.	U	5	0.5	0.46	N.D.	U	5	0.5	0.46	N.D.	U	5	0.5	0.46	N.D.	U	5	0.5	0.46
	Chloromethane[1]	1.8	50,000	N.D.	U	10	2	1.8	N.D.	U	10	2	1.8	N.D.	U	10	2	1.8	N.D.	U	10	2	1.8	N.D.	U	10	2	1.8
	cis-1,2-Dichloroethylene	70	50,000	N.D.	U	1	0.5	0.48	N.D.	U	1	0.5	0.48	N.D.	U	1	0.5	0.48	N.D.	U	1	0.5	0.48	N.D.	U	1	0.5	0.48
	Dibromochloromethane[1]	0.16	50,000	N.D.	U	1	0.5	0.25	N.D.	U	1	0.5	0.25	N.D.	U	1	0.5	0.25	N.D.	U	1	0.5	0.25	N.D.	U	1	0.5	0.25
	Ethylbenzene	700	30	N.D.	U	1	0.5	0.14	N.D.	U	1	0.5	0.14	0.16	J	1	0.5	0.14	N.D.	U	1	0.5	0.14	N.D.	U	1	0.5	0.14
	Hexachlorobutadiene	0.86	6	N.D.	U	1	0.5	0.32	N.D.	U	1	0.5	0.32	N.D.	U	1	0.5	0.32	N.D.	U	1	0.5	0.32	N.D.	U	1	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	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	N.D.	U	10	5.0	4.4
	Methyl tert-butyl Ether	12	5	N.D.	U	1	0.5	0.31	N.D.	U	1	0.5	0.31	N.D.	U	1	0.5	0.31	N.D.	U	1	0.5	0.31	N.D.	U	1	0.5	0.31
	Methylene chloride	4.8	9,100	N.D.	U	5	1.0	0.64	N.D.	U	5	1.0	0.64	N.D.	U	5	1.0	0.64	N.D.	U	5	1.0	0.64	N.D.	U	5	1.0	0.64
	Styrene	100	10	N.D.	U	1	0.5	0.17	N.D.	U	1	0.5	0.17	N.D.	U	1	0.5	0.17	N.D.	U	1	0.5	0.17	N.D.	U	1	0.5	0.17
	Tetrachloroethylene	5	170	N.D.	U	5	0.5	0.39	N.D.	U	5	0.5	0.39	N.D.	U	5	0.5	0.39	N.D.	U	5	0.5	0.39	N.D.	U	5	0.5	0.39
	Toluene	1,000	40	N.D.	U	1	0.5	0.24	N.D.	U	1	0.5	0.24	N.D.	U	1	0.5	0.24	N.D.	U	1	0.5	0.24	N.D.	U	1	0.5	0.24
	trans-1,2- Dichloroethylene	100	260	N.D.	U	1	0.5	0.37	N.D.	U	1	0.5	0.37	N.D.	U	1	0.5	0.37	N.D.	U	1	0.5	0.37	N.D.	U	1	0.5	0.37
	Trichloroethylene	5	310	N.D.	U	1	0.5	0.37	N.D.	U	1	0.5	0.37	N.D.	U	1	0.5	0.37	N.D.	U	1	0.5	0.37	N.D.	U	1	0.5	0.37
	Vinyl chloride	2	3,400	N.D.	U	1	0.5	0.3	N.D.	U	1	0.5	0.3	N.D.	U	1	0.5	0.3	N.D.	U	1	0.5	0.3	N.D.	U	1	0.5	0.3
	Xylenes	10,000	20	N.D.	U	11	1.5	0.23	N.D.	U	1	0.5	0.23	0.35	J	1	0.5	0.23	N.D.	U	1	0.5	0.23	N.D.	U	11	1.5	0.23
EPA 6020	Dissolved Lead	15	50,000	-	-	-	-	-	0.631		1	0.2	0.0898	N.D.	U	1	0.2	0.0898	N.D.	U	1	0.2	0.0898	N.D.	U	0.5	0.2	0.0898
EPA 200.8	Total Lead	15	50,000	N.D.	U	1.0	-	0.0898	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

The data are in micrograms per liter (µg/L). Shaded values exceeded the DOH EALs.

[1] LOD for this analyte exceeds the DOH EAL

\- Not Analyzed

* This sample was analyzed by EPA Method 200.8 and therefore does not have an LOD

DL Detection Limit or Method Detection Limit (MDL)

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).

EPA Environmental Protection Agency

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.

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

N.D. Not Detected

Q Qualifiers

TPH-d Total Petroleum Hydrocarbons as diesel

TPH-g Total Petroleum Hydrocarbons as gasoline

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 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 duplicates, LCS/LCSD, and MS/MSD results. Field duplicate and MS/MSD samples were collected at a rate of approximately 10% of primary 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 (ES126 and ES127) are provided in Table 3.1. A precision of less than 50% for duplicate pairs is required by the DON Project Procedures Manual to be considered acceptable (DON, 2007). All duplicate RPDs were below the acceptable maximum, except for 2-methylnaphthalene (95%). Both 2-methylnaphthalene results were flagged “J” to indicate a lack of precision. 2-Methylnaphthalene results for both samples were below the DOH EALs but have been detected at concentrations above DOH EALs during previous events. Judged solely by the magnitude of the imprecision associated with the samples it is unlikely that the actual concentration of 2-methylnaphthalene in the RHMW02 samples collected during the first quarter 2015 event exceeded the EALs (gross contamination:10 µg/l; or drinking water toxicity: 24 µg/l). However, the imprecision is evaluated in the context of additional errors that may have a negative impact on data quality and the ability to use the data for decision making. The potential low bias in the data described in the accuracy section below is one of these additional errors. 2-Methylnaphthalene was not detected in any other sample analyzed in the course of the January 2015 sampling event; and because the LOQs associated with these results (non-detections) were sufficiently low, the negative impact of the lack of precision on data usability (for non-detections) was negligible.

Similarly, the RPD for 1,1,2,2-tetrachloroethane in the MS/MSD was out of control indicating a negative impact on precision due to matrix effects. Although 1,1,2,2-tetrachloroethane was not detected in any samples, the LOQs and LODs for this analyte already exceed the EAL (for drinking water toxicity). Thus, the additional error may have a negative impact on the ability to identify potential contamination with this analyte at concentrations close to the LODs. However, the analyte was not detected previously in any of the samples at levels above the detection limit. When the datum is considered in the context of all previous data obtained in the course of the LTM project, the additional impact on project decision making due to the lack of precision in the current datum is insignificant. RPDs for MS/MSD and LCS/LCSD pairs for all other analytes were within the control limits, and the data precision is considered acceptable.

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 July 2006 and July 2010, naphthalene was analyzed by both EPA Methods 8260B and 8270C, and both results were reported. In September 2005 and in all data beginning in October 2010, only results using EPA Method 8270C were reported. Naphthalene has historically only been detected at concentrations above the DOH EALs in well RHMW02. In this well, concentrations of naphthalene detected in each sample 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. Since March 2014, naphthalene concentrations in RHMW02 have exceeded DOH EALs for both gross contamination and drinking water toxicity. Therefore, a low bias is unlikely to affect project decisions.

Results for TPH-d in samples ES120X, ES123, ES126, and ES127 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. Even though chromatograms are not part of the standard laboratory package, ESI was able to review the chromatograms from RHMW02 dating back to October 2012. The chromatograms of groundwater samples from RHMW02 did not significantly differ between each event, and did not match a standard chromatogram of JP-8 in water.

The MS and MSD recoveries were above the control limits for acetone and trichloroethene and the associated sample results may be biased high; however, neither of these analytes were detected in any samples. The MS and MSD recoveries were below the control limits for 1,1,2,2-tetrachloroethane, 1,2,3-trichloropropane, naphthalene, 1-methylnaphthalene, and

2-methylnaphthalene. 1,1,2,2-Tetrachloroethane and 1,2,3-trichloropropane have not historically been detected in the wells. However, the LOQs and LODs of both compounds exceed the EALs (for drinking water toxicity), with additional issues of low precision for 1,1,2,2-tetrachloroethane data thus potentially increasing the range (between EAL and LOQs) of concentrations at which the compounds may be present in samples at a concentration above the EALs but not detected. Naphthalene, 1-methylnaphthalene, and 2-methylnaphthalene concentrations for ES126, the primary sample on which the MS/MSD were performed, were significantly higher than the added spike concentration, which prevented an accurate evaluation of the MS/MSD recovery for these analytes.

An air bubble was present in one of the VOA containers for sample ES124. However, this VOA container was not used in sample analysis, and this does not affect data usability.

The surrogate spike recovery for nitrobenzene-d5 in samples ES126 and ES127 was below the control limits (0%) for naphthalene and 1-methylnaphthalene results. This is likely a result of the sample dilution, since nitrobenzene-d5 was in control for the PAH results from undiluted sample runs. However, surrogate recoveries for PAH results were generally low (mostly <70%), indicating that a slight low bias may be associated with the data. All other MS/MSD, LCS/LCSD, and surrogate spike recoveries were within acceptable recovery limits; therefore, the data accuracy for this monitoring event is considered acceptable with the exceptions noted above.

Representativeness

Representativeness is the degree that 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 times 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 analytes were detected in either trip blank. Based on the assessment of representativeness, the groundwater sample data are considered representative of the groundwater quality on site. The trip blank results are provided in Table 3.1.

Completeness

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

laboratory. 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.

As noted above, between July 2006 and July 2010, naphthalene was analyzed for using both EPA Methods 8260B and 8270C, and in September 2005 and between October 2010 and the most recent event, only results using EPA Method 8270C were reported. In general, EPA Method 8260B resulted in higher, and as discussed above, likely more accurate, results than EPA Method 8270C. However, for the sake of comparability with results from recent events, EPA Method 8270C was used for naphthalene analysis in this event. Consequently, 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; consequently, there is no way to directly compare the results obtained by method and to assess potential bias. 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.

Other than the naphthalene bias discussed above, no issues with comparability were identified. The results are considered comparable within this data set and with the data collected from recent sampling events.

Sensitivity

The limits of quantitation [LOQs] are established by the laboratory based on the LODs or instrument detection limits, historical data, and EPA limits established for the various methods. The LOQs for samples may require adjustment by the laboratory 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 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), negatively impacting the ability to detect analytes at concentrations greater than the DOH EALs but below the LODs. 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. Additional uncertainty associated with the data may reduce the capability of detecting these compounds at concentrations between the LODs and the EALs even further. Issues with accuracy and precision for these data that may have contributed to decreased sensitivity are discussed in their respective sections.

3.2 DATA ASSESSMENT AND USABILITY CONCLUSIONS

The PARCCS criteria were evaluated, and with a few exceptions, all criteria were met. Based on the high RPD of 2-methlynaphthelene results in duplicate samples ES126 and ES127, it is possible that there may be lower precision in the 2-methylnaphthalene results. This decreased precision should be kept in mind when comparing 2-methylnaphthalene results from this sampling event to those of previous events. During this event, Well RHMW02 is the only well where 2-methylnaphthalene was detected at concentrations near the DOH EAL. Because concentrations of 1-methylnaphthalene and naphthalene were detected at concentrations above DOH EALs during this event, the lower precision of 2-methylnaphthalene results should not significantly affect project decisions.

The surrogate spike recovery for nitrobenzene-d5 was below the control limits for naphthalene and 1-methylnaphthalene results, and the surrogate recoveries for other PAH results were generally low (mostly <70%), indicating that a slight low bias may be associated with the PAH data. However, all PAHs except 2-methylnaphthalene (discussed above) were either not detected, detected at concentrations well below DOH EALs, or detected at concentrations above DOH EALs. Since no PAHs were detected at concentrations slightly below DOH EALs, it is unlikely that a slight low bias would have an impact on project decisions.

Additionally, LODs and LOQs for several analytes were greater than the DOH EALs. These analytes have not historically been detected in any of the wells, and with the exception of 1,2-dichloroethane, are not likely to be related to a fuel release. Therefore, the lack of required sensitivity should not have a significant impact on project decisions.

Other than these issues, the data assessment concludes that all data generated during this event are usable for the intended purpose.

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TABLE 3.1
Quality Control Results for Groundwater Sampling (January 27 and 28, 2015)
Red Hill Bulk Fuel Storage Facility
January 2015 Quarterly Monitoring Report

Method	Chemical Constituent	DOH EALs		RHMW02 (ES126)					RHMW02 (ES127) (DUP)					RPD Duplicate (%)	ES Trip (1/27/2015)					ES Trip (1/28/2015)				
		Drinking Water Toxicity	Gross Contamination	Result	Q	LOQ	LOD	DL	Result	Q	LOQ	LOD	DL		Result	Q	LOQ	LOD	DL	Result	Q	LOQ	LOD	DL
EPA 8015B	TPH-d	190	100	**1,100**	HD	25	10	2.9	**1,700**	HD	25	10	2.9	42.86	-	-	-	-	-	-	-	-	-	-
EPA 8260B	TPH-g	100	100	54		50	30	26	59		50	30	26	8.85	N.D.	U	50	30	26	N.D.	U	50	30	26
EPA 8270C	Acenaphthene	370	20	0.59		0.20	0.050	0.027	0.55		0.20	0.049	0.026	7.02	-	-	-	-	-	-	-	-	-	-
	Acenaphthylene	240	2,000	N.D.	U	0.20	0.050	0.044	N.D.	U	0.20	0.049	0.044	NA	-	-	-	-	-	-	-	-	-	-
	Anthracene	1,800	22	N.D.	U	0.20	0.050	0.029	N.D.	U	0.20	0.049	0.028	NA	-	-	-	-	-	-	-	-	-	-
	Benzo[a]anthracene	0.092	4.7	N.D.	U	0.20	0.050	0.032	N.D.	U	0.20	0.049	0.032	NA	-	-	-	-	-	-	-	-	-	-
	Benzo[g,h,i]perylene	1,500	0.13	N.D.	U	0.20	0.099	0.081	N.D.	U	0.20	0.098	0.080	NA	-	-	-	-	-	-	-	-	-	-
	Benzo[a]pyrene	0.2	0.81	N.D.	U	0.20	0.050	0.022	N.D.	U	0.20	0.049	0.022	NA	-	-	-	-	-	-	-	-	-	-
	Benzo[b]fluoranthene	0.092	0.75	N.D.	U	0.20	0.050	0.017	N.D.	U	0.20	0.049	0.017	NA	-	-	-	-	-	-	-	-	-	-
	Benzo[k]fluoranthene	0.92	0.4	N.D.	U	0.20	0.050	0.031	N.D.	U	0.20	0.049	0.030	NA	-	-	-	-	-	-	-	-	-	-
	Chrysene	9.2	1	N.D.	U	0.20	0.050	0.025	N.D.	U	0.20	0.049	0.024	NA	-	-	-	-	-	-	-	-	-	-
	Dibenzo[a,h]anthracene	0.0092	0.52	N.D.	U	0.20	0.050	0.047	N.D.	U	0.20	0.049	0.047	NA	-	-	-	-	-	-	-	-	-	-
	Fluoranthene	1,500	130	N.D.	U	0.20	0.050	0.046	N.D.	U	0.20	0.049	0.046	NA	-	-	-	-	-	-	-	-	-	-
	Fluorene	240	950	0.30		0.20	0.050	0.042	0.22		0.20	0.049	0.042	30.77	-	-	-	-	-	-	-	-	-	-
	Indeno[1,2,3-cd]pyrene	0.092	0.095	N.D.	U	0.20	0.050	0.021	N.D.	U	0.20	0.049	0.021	NA	-	-	-	-	-	-	-	-	-	-
	1-Methylnaphthalene	4.7	10	**34**		2.0	0.99	0.51	**25**		2.0	0.98	0.51	30.51	-	-	-	-	-	-	-	-	-	-
	2-Methylnaphthalene	24	10	7.6	J	0.20	0.050	0.046	2.7	**J**	0.20	0.049	0.046	95.15	-	-	-	-	-	-	-	-	-	-
	Naphthalene	17	21	**90**		2.0	0.50	0.34	**63**		2.0	0.49	0.33	35.29	-	-	-	-	-	-	-	-	-	-
	Phenanthrene	240	410	N.D.	U	0.20	0.050	0.027	N.D.	U	0.20	0.049	0.027	NA	-	-	-	-	-	-	-	-	-	-
	Pyrene	180	68	N.D.	U	0.20	0.050	0.020	N.D.	U	0.20	0.049	0.020	NA	-	-	-	-	-	-	-	-	-	-
EPA 8260B	1,1,1,2-Tetrachloroethane	0.52	50,000	N.D.	U	1	0.5	0.4	N.D.	U	1	0.5	0.4	NA	N.D.	U	1	0.5	0.4	N.D.	U	1	0.5	0.4
	1,1,2,2-Tetrachloroethane	0.067	500	N.D.	U	1	0.5	0.41	N.D.	U	1	0.5	0.41	NA	N.D.	U	1	0.5	0.41	N.D.	U	1	0.5	0.41
	1,1,1-Trichloroethane	200	970	N.D.	U	5	0.5	0.3	N.D.	U	5	0.5	0.3	NA	N.D.	U	5	0.5	0.3	N.D.	U	5	0.5	0.3
	1,1,2-Trichloroethane	5	50,000	N.D.	U	1	0.5	0.38	N.D.	U	1	0.5	0.38	NA	N.D.	U	1	0.5	0.38	N.D.	U	1	0.5	0.38
	1,1-Dichloroethane	2.4	50,000	N.D.	U	5	0.5	0.28	N.D.	U	5	0.5	0.28	NA	N.D.	U	5	0.5	0.28	N.D.	U	5	0.5	0.28
	1,1-Dichloroethylene	7	1,500	N.D.	U	1	0.5	0.43	N.D.	U	1	0.5	0.43	NA	N.D.	U	1	0.5	0.43	N.D.	U	1	0.5	0.43
	1,2,3-Trichloropropane	0.6	50,000	N.D.	U	5	1	0.64	N.D.	U	5	1	0.64	NA	N.D.	U	5	1	0.64	N.D.	U	5	1	0.64
	1,2,4-Trichlorobenzene	70	3,000	N.D.	U	5	1	0.5	N.D.	U	5	1	0.5	NA	N.D.	U	5	1	0.5	N.D.	U	5	1	0.5
	1,2-Dibromo-3- chloropropane	0.04	10	N.D.	U	10	2	1.2	N.D.	U	10	2	1.2	NA	N.D.	U	10	2	1.2	N.D.	U	10	2	1.2
	1,2-Dibromoethane	0.04	50,000	N.D.	U	1	0.5	0.24	N.D.	U	1	0.5	0.24	NA	N.D.	U	1	0.5	0.24	N.D.	U	1	0.5	0.24
	1,2-Dichlorobenzene	600	10	N.D.	U	1	0.5	0.46	N.D.	U	1	0.5	0.46	NA	N.D.	U	1	0.5	0.46	N.D.	U	1	0.5	0.46
	1,2-Dichloroethane	0.15	7,000	N.D.	U	1	0.5	0.24	N.D.	U	1	0.5	0.24	NA	N.D.	U	1	0.5	0.24	N.D.	U	1	0.5	0.24
	1,2-Dichloropropane	5	10	N.D.	U	5	0.5	0.42	N.D.	U	5	0.5	0.42	NA	N.D.	U	5	0.5	0.42	N.D.	U	5	0.5	0.42
	1,3-Dichlorobenzene	180	5	N.D.	U	1	0.5	0.4	N.D.	U	1	0.5	0.4	NA	N.D.	U	1	0.5	0.4	N.D.	U	1	0.5	0.4
	1,3-Dichloropropene (total of cis/trans)	0.43	50,000	N.D.	U	1	0.5	0.25	N.D.	U	1	0.5	0.25	NA	N.D.	U	1	0.5	0.25	N.D.	U	1	0.5	0.25
	1,4-Dichlorobenzene	75	5	N.D.	U	1	0.5	0.43	N.D.	U	1	0.5	0.43	NA	N.D.	U	1	0.5	0.43	N.D.	U	1	0.5	0.43
	Acetone	22,000	20,000	N.D.	U,IJ	20	10	6	N.D.	U,IJ	20	10	6	NA	N.D.	U	20	10	6	N.D.	U,IJ	20	10	6
	Benzene	5	170	N.D.	U	1	0.5	0.14	N.D.	U	1	0.5	0.14	NA	N.D.	U	1	0.5	0.14	N.D.	U	1	0.5	0.14
	Bromodichloromethane	0.12	50,000	N.D.	U	5	0.5	0.21	N.D.	U	5	0.5	0.21	NA	N.D.	U	5	0.5	0.21	N.D.	U	5	0.5	0.21
	Bromoform	80	510	N.D.	U	10	1	0.5	N.D.	U	10	1	0.5	NA	N.D.	U	10	1	0.5	N.D.	U	10	1	0.5
	Bromomethane	8.7	50,000	N.D.	U,IH	20	5	3.9	N.D.	U,IH	20	5	3.9	NA	N.D.	U,IH	20	5	3.9	N.D.	U,IH	20	5	3.9
	Carbon Tetrachloride	5	520	N.D.	U	1	0.5	0.23	N.D.	U	1	0.5	0.23	NA	N.D.	U	1	0.5	0.23	N.D.	U	1	0.5	0.23
	Chlorobenzene	100	50	N.D.	U	5	0.5	0.17	N.D.	U	5	0.5	0.17	NA	N.D.	U	5	0.5	0.17	N.D.	U	5	0.5	0.17
	Chloroethane	21,000	16	N.D.	U	10	5	2.3	N.D.	U	10	5	2.3	NA	N.D.	U	10	5	2.3	N.D.	U	10	5	2.3
	Chloroform	70	2,400	N.D.	U	5	0.5	0.46	N.D.	U	5	0.5	0.46	NA	N.D.	U	5	0.5	0.46	N.D.	U	5	0.5	0.46
	Chloromethane	1.8	50,000	N.D.	U	10	2	1.8	N.D.	U	10	2	1.8	NA	N.D.	U	10	2	1.8	N.D.	U	10	2	1.8
	cis-1,2-Dichloroethylene	70	50,000	N.D.	U	1	0.5	0.48	N.D.	U	1	0.5	0.48	NA	N.D.	U	1	0.5	0.48	N.D.	U	1	0.5	0.48
	Dibromochloromethane	0.16	50,000	N.D.	U	1	0.5	0.25	N.D.	U	1	0.5	0.25	NA	N.D.	U	1	0.5	0.25	N.D.	U	1	0.5	0.25
	Ethylbenzene	700	30	0.16	J	1	0.5	0.14	0.17	J	1	0.5	0.14	6.06	N.D.	U	1	0.5	0.14	N.D.	U	1	0.5	0.14
	Hexachlorobutadiene	0.86	6	N.D.	U	1	0.5	0.32	N.D.	U	1	0.5	0.32	NA	N.D.	U	1	0.5	0.32	N.D.	U	1	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	0.5	0.31	N.D.	U	1	0.5	0.31	NA	N.D.	U	1	0.5	0.31	N.D.	U	1	0.5	0.31
	Methylene chloride	4.8	9,100	N.D.	U	5	1.0	0.64	N.D.	U	5	1.0	0.64	NA	N.D.	U	5	1.0	0.64	N.D.	U	5	1.0	0.64
	Styrene	100	10	N.D.	U	1	0.5	0.17	N.D.	U	1	0.5	0.17	NA	N.D.	U	1	0.5	0.17	N.D.	U	1	0.5	0.17
	Tetrachloroethylene	5	170	N.D.	U	5	0.5	0.39	N.D.	U	5	0.5	0.39	NA	N.D.	U	5	0.5	0.39	N.D.	U	5	0.5	0.39
	Toluene	1,000	40	N.D.	U	1	0.5	0.24	N.D.	U	1	0.5	0.24	NA	N.D.	U	1	0.5	0.24	N.D.	U	1	0.5	0.24
	trans-1,2- Dichloroethylene	100	260	N.D.	U	1	0.5	0.37	N.D.	U	1	0.5	0.37	NA	N.D.	U	1	0.5	0.37	N.D.	U	1	0.5	0.37
	Trichloroethylene	5	310	N.D.	U	1	0.5	0.37	N.D.	U	1	0.5	0.37	NA	N.D.	U	1	0.5	0.37	N.D.	U	1	0.5	0.37
	Vinyl chloride	2	3,400	N.D.	U	1	0.5	0.3	N.D.	U	1	0.5	0.3	NA	N.D.	U	1	0.5	0.3	N.D.	U	1	0.5	0.3
	Xylenes	10,000	20	0.35	J	1	0.5	0.23	0.35	J	1	0.5	0.23	0.00	N.D.	U	11	1.5	0.23	N.D.	U	11	1.5	0.23
EPA 6020	Lead	15	50,000	N.D.	U	1	0.2	0.0898	N.D.	U	1	0.2	0.0898	NA	-	-	-	-	-	-	-	-	-	-

The data are in micrograms per liter (µg/L). Shaded values exceeded the DOH EALs.

- Not Analyzed
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.
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.
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

On January 27 and 28, 2015, ESI personnel collected groundwater samples from four monitoring wells at the RHSF (wells RHMW01, RHMW02, RHMW03, and RHMW05) and one sampling point at Red Hill Shaft (RHMW2254-01).

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. A summary of the analytical results is provided below.

- **RHMW01** – TPH-d (33 µg/L) and lead (0.0631 µg/L) were the only analytes detected. The concentrations did not exceed the DOH EALs or the SSRBL.
- **RHMW02** – TPH-d (1,100 and 1,700 µg/L), TPH-g (54 and 59 µg/L), xylenes (0.35 and 0.35 µg/L), acenaphthene (0.59 and 0.55 µg/L), ethylbenzene (0.16 and 0.17 µg/L), fluorene (0.30 and 0.22 µg/L), 1-methylnaphthalene (34 and 25 µg/L), 2-methylnaphthalene (7.6 and 2.7 µg/L), and naphthalene (90 and 63 µg/L) were detected in both the primary and duplicate samples collected. TPH-d, 1-methylnaphthalene, and naphthalene were detected at concentrations above their respective DOH EALs for both drinking water toxicity and gross contamination. However, the TPH-d concentrations did not exceed the SSRBL.
- **RHMW03** – TPH-d (39 µg/L) was the only analyte detected. The concentration did not exceed the DOH EALs or the SSRBL.
- **RHMW05** – None of the chemical constituents analyzed for were detected at a concentration at or above the LOD.
- **RHMW2254-01** – None of the chemical constituents analyzed for were detected at a concentration at or above the LOD.

Groundwater Contaminant Trends

- **RHMW01** – COPCs detected during this round of quarterly sampling are consistent with the historical data for RHMW01. TPH-d has historically been detected at concentrations above the DOH EAL for both drinking water toxicity and gross contamination. TPH-d concentrations continue to show an overall decreasing trend from a high of 1,500 µg/L in February 2005.
- **RHMW02** – COPCs detected during this round of quarterly sampling are generally consistent with the historical data for RHMW02. TPH-g, TPH-d, 1-methylnaphthalene, 2-methylnaphthalene, and naphthalene have historically been detected at concentrations above the DOH EALs. During the January 2015 event, concentrations of TPH-d, 1-methylnaphthalene, 2-methylnaphthalene, and naphthalene decreased from the previous event in October 2014, with the concentrations of 2-methylnaphthalene decreasing to levels below the DOH EALs. The concentrations of TPH-g remained below the DOH EALs for gross contamination and drinking water toxicity and were comparable to the concentrations

detected during the previous event. Trichloroethylene was detected once in RHMW02 in September 2005 in the primary sample at a concentration above the DOH EAL for drinking water toxicity; however, trichloroethylene was not detected in the duplicate sample, and this may have been an anomalous result.

- **RHMW03** – COPCs detected during this round of quarterly sampling are consistent with the historical data for RHMW03. TPH-d has historically been detected at concentrations above the DOH EALs; however, it has not been detected at concentrations above the DOH EALs since October 2010.
- **RHMW05** – COPCs detected during this round of quarterly sampling are consistent with the historical data for RHMW05. TPH-d has historically been detected in RHMW05 at concentrations above the DOH EALs for both drinking water toxicity and gross contamination; however, it has not been detected at concentrations above the DOH EALs since January 2010.
- **RHMW2254-01** – COPCs detected during this round of quarterly sampling are consistent with the historical data for RHMW2254-01. Although the method reporting limits for TPH-d exceeded one or both DOH EALs for drinking water toxicity and gross contamination between May 2009 and July 2010, TPH-d was last detected in RHMW2254-01 at a concentration above the DOH EAL for gross contamination in January 2008.

Conclusions and Recommendations

During the sampling event conducted on January 27 and 28, 2015, TPH-d, 1-methylnaphthalene, and naphthalene in RHMW02 were detected at concentrations exceeding the DOH EALs. The concentration of TPH-d in RHMW01 decreased from the previous event in October 2014 to a concentration below the DOH EALs. Groundwater contaminant concentrations in RHMW03, RHMW05, and RHMW2254-01 remained at low concentrations and did not change significantly from the previous event, or were not detected.

Concentrations of 1-methylnaphthalene, 2-methylnaphthalene, and naphthalene in RHMW02 had shown an increasing trend between March and October 2014; however, concentrations of these three analytes and TPH-d all decreased since the previous event in October 2014. All other analytical results were generally consistent with historical data.

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.

Based on the groundwater monitoring results and the reported release at Tank 5 in January 2014, continued groundwater monitoring at the wells inside the RHSF tunnel is recommended.

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 event.

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FIGURES

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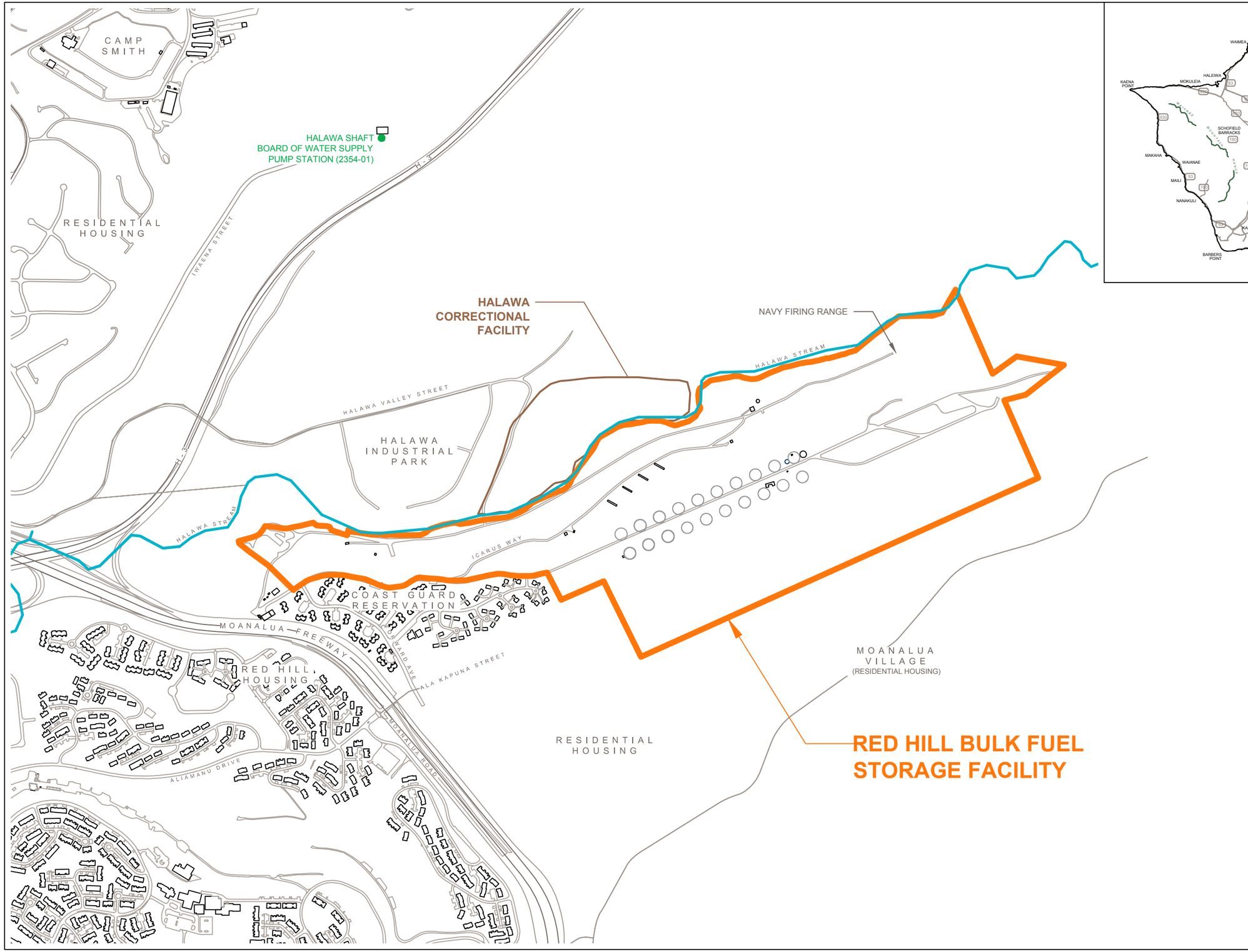

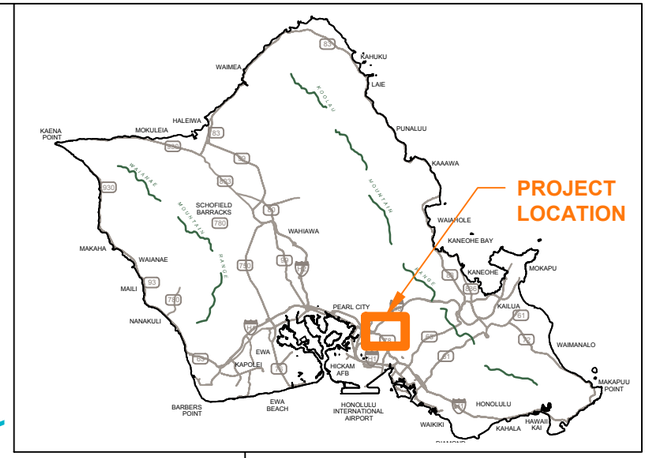

NOTES

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

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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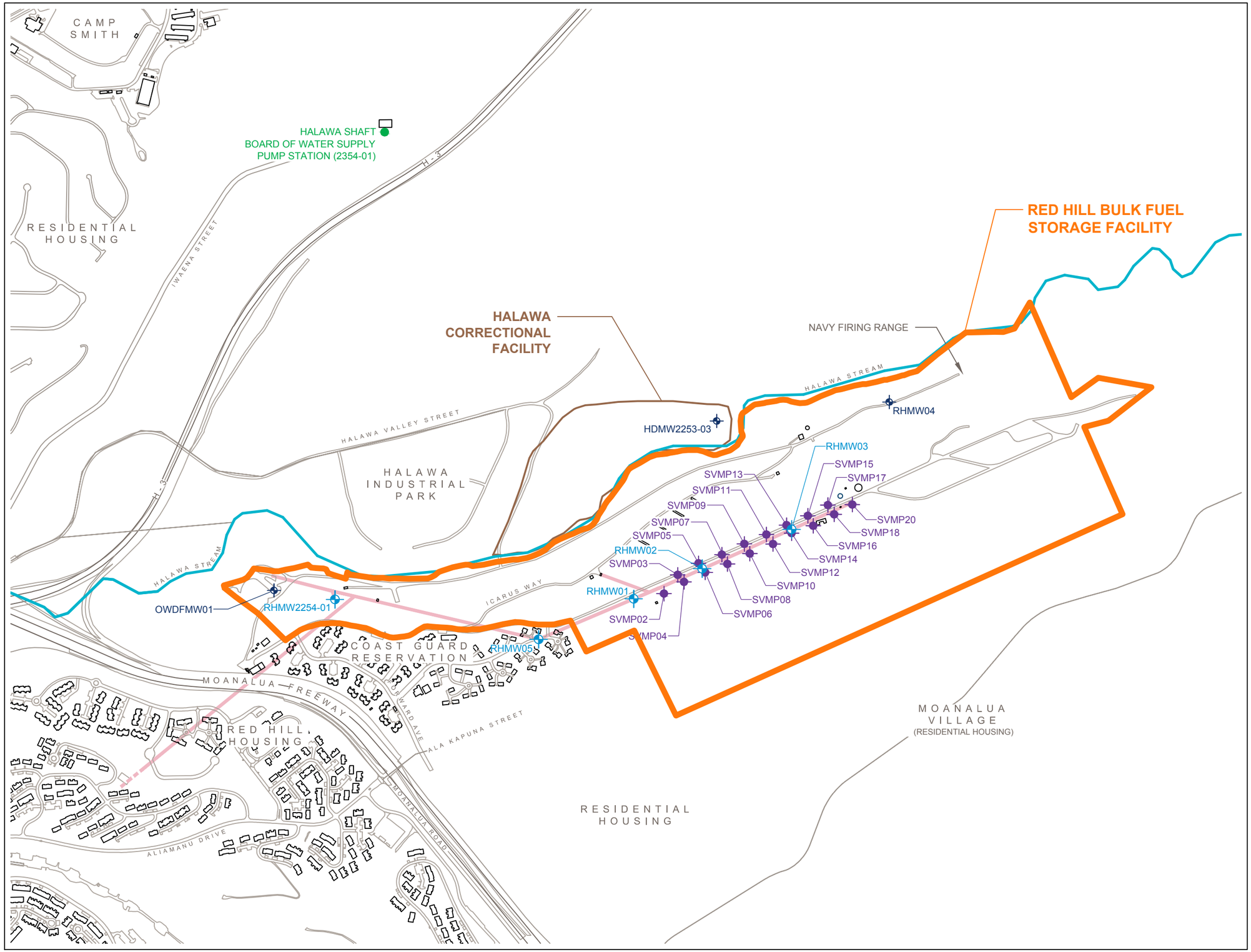

LEGEND

- 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

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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: RHMW01 Location: Red Hill Bulk Fuel Storage Facility Project No.: 112066

Initial Water Level: 83.63 ft Date: 1/27/2015 Time: 1205

Total Depth of Well: 97.35 ft Personnel Involved: Kirk Markle, Jeff Hattemer

Length of Saturated Zone: 13.72 ft Weather Conditions: Not applicable – well is located indoors

Volume of Water to be Removed: 2.5 L Method of Removal: Bladder Pump

Water Level After Purging: 83.63 ft Pumping Rate: 0.10 L/min

Well Purge Data:

Time	Volume Removed	pH	Conductivity (mS/cm)	DO (mg/l)	Temperature	Salinity	Redox (ORP) (mV)
1220	0.0 L	7.74	0.322	8.96	24.67	-	-29.9
1224	0.5 L	7.27	0.318	4.67	24.31	-	-62.2
1226	1.0 L	7.07	0.317	2.56	24.19	-	-72.2
1230	1.5 L	6.99	0.318	2.32	24.10	-	-73.5
1238	2.0 L	6.90	0.319	2.29	24.04	-	-75.7
1245	2.5 L	6.90	0.320	2.39	24.27	-	-72.8

Sample Withdrawal Method: 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: ES120X [1300]

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: 1/27/2015 Time: 1500

Capacity of Casing (Gallons/Linear Feet)

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

Groundwater Sampling Log

Well ID: RHMW02 Location: Red Hill Bulk Fuel Storage Facility Project No.: 112066

Initial Water Level: 86.35 ft Date: 1/28/2015 Time: 955

Total Depth of Well: 92.91 ft Personnel Involved: Justin Lam, Jeff Hattemer

Length of Saturated Zone: 6.56 ft Weather Conditions: Not applicable – well is located indoors

Volume of Water to be Removed: 5.0 L Method of Removal: Bladder Pump

Water Level After Purging: 86.81 ft Pumping Rate: 0.31 L/min

Well Purge Data:

Time	Volume Removed	pH	Conductivity (mS/cm)	DO (mg/l)	Temperature	Salinity	Redox (ORP) (mV)
1009	0.0 L	7.17	0.554	4.47	24.94	-	-61.0
1012	1.0 L	7.08	0.552	1.51	24.12	-	-105.4
1015	2.0 L	6.98	0.553	1.40	23.85	-	-113.1
1019	3.0 L	6.96	0.557	1.34	23.77	-	-116.7
1022	4.0 L	6.96	0.562	1.30	23.76	-	-119.1
1025	5.0 L	6.96	0.563	1.28	23.76	-	-119.8

Sample Withdrawal Method: Bladder Pump

Appearance of Sample:

Color: Clear

Turbidity: Low

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: 16 - 40ml VOAs, 6 - 1L amber jar, 4 - 500ml amber jar, 4 - 500ml HDPE

Sample Identification Numbers: ES126 [1035], ES127 MS/MSD [1035], ES127 (Dup) [1130]

Decontamination Procedures: Triple Rinsed

Notes: YSI did not have salinity parameter.

Sampled by: Justin Lam, Jeff Hattemer

Sampled Delivered to: Calscience Environmental Lab Transporters: FedEx

Date: 1/28/2015 Time: 1500

Capacity of Casing (Gallons/Linear Feet)

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

Groundwater Sampling Log

Well ID: RHMW03 Location: Red Hill Bulk Fuel Storage Facility Project No.: 112066

Initial Water Level: 102.63 ft Date: 1/28/2015 Time: 855

Total Depth of Well: 110.12 ft Personnel Involved: Justin Lam, Jeff Hattemer

Length of Saturated Zone: 7.49 ft Weather Conditions: Not applicable – well is located indoors

Volume of Water to be Removed: 4.0 L Method of Removal: Bladder Pump

Water Level After Purging: 102.93 ft Pumping Rate: 0.31 L/min

Well Purge Data:

Time	Volume Removed	pH	Conductivity (mS/cm)	DO (mg/l)	Temperature	Salinity	Redox (ORP) (mV)
905	0.0 L	7.13	0.775	3.93	27.18	-	67.3
908	1.0 L	6.98	0.791	2.41	26.67	-	91.4
911	2.0 L	6.97	0.790	2.23	26.65	-	92.7
915	3.0 L	6.96	0.788	2.18	26.70	-	95.4
918	4.0 L	6.95	0.787	2.16	26.71	-	95.7

Sample Withdrawal Method: Bladder Pump

Appearance of Sample:

Color: Clear

Turbidity: Low

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: ES123 [0930]

Decontamination Procedures: Triple Rinsed

Notes: YSI did not have salinity parameter.

Sampled by: Justin Lam, Jeff Hattemer

Sampled Delivered to: Calscience Environmental Lab Transporters: FedEx

Date: 1/28/2015 Time: 1500

Capacity of Casing (Gallons/Linear Feet)

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

Groundwater Sampling Log

Well ID: RHMW05 Location: Red Hill Bulk Fuel Storage Facility Project No.: 112066

Initial Water Level: 83.03 ft Date: 1/27/2015 Time: 1050

Total Depth of Well: Unable to Measure Personnel Involved: Kirk Markle, Jeff Hattemer

Length of Saturated Zone: Unknown Weather Conditions: Not applicable – well is located indoors

Volume of Water to be Removed: 6.0 L Method of Removal: Bladder Pump

Water Level After Purging: 83.03 ft Pumping Rate: 0.35 L/min

Well Purge Data:

Time	Volume Removed	pH	Conductivity (mS/cm)	DO (mg/l)	Temperature	Salinity	Redox (ORP) (mV)
1055	0.0 L	7.88	0.870	13.07	24.27	-	96.2
1057	1.0 L	7.90	0.926	7.16	23.08	-	95.4
1059	2.0 L	7.87	0.926	7.56	23.49	-	96.5
1105	3.0 L	7.77	0.927	7.71	23.89	-	98.3
1107	4.0 L	7.71	0.927	7.72	23.33	-	99.3
1110	5.0 L	7.69	0.924	7.71	23.16	-	99.1
1112	6.0 L	7.71	0.923	7.70	23.08	-	99.4

Sample Withdrawal Method: 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 - 1L HDPE

Sample Identification Numbers: ES124 [1115]

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: 1/27/2015 Time: 1500

Capacity of Casing (Gallons/Linear Feet)

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

Groundwater Sampling Log

Well ID: RHMW2254-01 Location: Red Hill Bulk Fuel Storage Facility Project No.: 112066

Initial Water Level: 81.37 ft Date: 1/27/2015 Time: 855

Total Depth of Well: Not applicable Personnel Involved: Kirk Markle, Jeff Hattemer

Length of Saturated Zone: Not applicable Weather Conditions: Not applicable – well is located indoors

Volume of Water to be Removed: 6.0 L Method of Removal: Bladder Pump

Water Level After Purging: 81.37 ft Pumping Rate: 0.50 L/min

Well Purge Data:

Time	Volume Removed	pH	Conductivity (mS/cm)	DO (mg/l)	Temperature	Salinity	Redox (ORP) (mV)
903	0.0 L	8.36	0.594	8.85	21.67	-	45.1
905	1.0 L	8.15	0.593	8.42	21.42	-	53.5
907	2.0 L	7.91	0.593	8.38	21.46	-	70.0
909	3.0 L	7.87	0.592	8.24	21.47	-	75.1
911	4.0 L	7.84	0.592	8.14	21.47	-	78.3
913	5.0 L	7.80	0.592	8.01	21.45	-	82.1
915	6.0 L	7.78	0.592	8.16	21.44	-	82.4

Sample Withdrawal Method: Bladder Pump

Appearance of Sample:

Color: Clear

Turbidity: Clear

Sediment: None

Other: None

Laboratory Analysis Parameters and Preservatives: TPH-d - 8015; TPH-g, VOCs - 8260; PAHs - 8270c sim; lead - 200.8

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

Sample Identification Numbers: ES125 [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: 1/27/2015 Time: 1500

Capacity of Casing (Gallons/Linear Feet)

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

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APPENDIX B

Field Notes

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Location RHSF Date 1/26/15

Project / Client NAVFAC

1350 Back @ office Drop off ice

JH

1/26/15

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

95

Location RHSF Date 1/27/15

Project / Client NAVFAC

Purpose: GW sampling

Personnel: JH, 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 DF

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: Begin purge RHMW01

1300 Collected sample ES120

1410 Depart tunnel and pack samples.

1430 Done cleaning up. Depart Red Hill

1500 Dropped Fed Ex. GX. SP

samples @ JH 1/27/15

Location RHSF Date 1/28/15

Project / Client NAVFAC

Purpose: SV, GW sampling
Personnel: JH, JL
0745 @ Red Hill, Calibrate PID, Safety meeting
0800 Enter @ Adit 3.
0850 @ RHMW03, C
0855 Gauge RHMW03, DTW = 102.63
0905 Begin purge RHMW03
0930 Collected sample ES123.
0950 @ RHMW02.
0955 Gauge RHMW02. DTW = 86.35
1009 Begin purge RHMW02
1035 Collected sample ES126, ES126MS/MSD, ES127 (labeled as 1130)
1345 Out of tunnel
1415 Done cleaning up, packing up, and dumping IDW. Depart site
1430 Drop off samples at Fed Ex.
1445 Back to office.

JH 1/28/15

Location RHSF Date 1/28/15

Project / Client NAVFAC

0928 SVMP20

S	72	112	109	112	101
M	75	80	54	80	72
D	80	60	89	89	80

0930 SVMP18

S	1032	1156	1263	1263	1179
D	1410	1757	1941	1941	1762

0938 SVMP17

S	161	167	176	176	170
M	187	207	193	219	202
D	225	279	311	311	282

1000 SVMP16

S	60	54	69	69	63
M	14	20	20	23	19
D	46	49	60	60	54

1013 SVMP15

S	63	66	51	66	62
M	mist	blocked	No sample		
D	43	80	80	80	71

1022 SVMP14

S	49	28	49	43	44
M	34	11	17	34	24
D	80	83	89	89	85

98

Location RHSF Date 1/28/15

Project / Client NAVFAC

1032	SVMP13				
S	60	103	75	103	85
M	54	66	72	72	66
D	69	54	89	87	75
1047	SVMP12				
S	17	11	14	17	15
M	5	60	57	60	46
D	40	40	86	86	63
1058	SVMP11				
S					
M	100	100	95	100	99
D	Deep	bivalved.	No	sample.	
1110	SVMP10				
S	43	40	51	57	46
D	75	84	72	91	74
1119	SVMP09				
S	43	34	34	51	41
M	28	31	57	57	43
D	46	63	115	124	87
1130	SVMP08				
S	69	54	83	90	74
M	170	253	259	265	234
D	51	57	34	57	50

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Location RHSF Date 1/28/15

Project / Client NAVFAC

1143	SVMP07				
S	164	216	225	225	208
M	109	106	106	111	108
D	17.3	21.1	21.3	21.4	ppm 15.0
1156	SVMP06				
S	1821	1996	2163	2224	2051
M	464	484	481	499	482
1207	SVMP05				
S	81.5	93.6	100.3	116 ppm	97.9
M	125	186	188	190 ppm	172
D	193	210	213	217 ppm	208
1225	SVMP04				
S	13.0	14.6	15.6	15.9 ppm	14.8
M	11.9	13.4	14.0	14.4 ppm	13.4
D	12.5	14.9	15.7	15.9 ppm	14.8
1236	SVMP03				
S	6901	7953	8423	8871	8037
M	9673	10.3	10.6	10.6 ppm	10.3
D	7311	7859	8565	8565	8075
1249	SVMP02				
S	3467	3796	3914	4053	3808
M	1895	2135	2285	2285	2150
D	2189	2611	2660	2660	2530

SH 1/28/15

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APPENDIX C

Laboratory Reports

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WORK ORDER NUMBER: 15-01-1715

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 02/04/2015 by:
Terri Chang
Project Manager

ResultLink

Email your PM

ACCREDITED IN ACCORDANCE WITH nelac

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Contents

Client Project Name: Red Hill LTM 112066
Work Order Number: 15-01-1715

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Work Order Narrative

Work Order: 15-01-1715 Page 1 of 1

Condition Upon Receipt:

Samples were received under Chain-of-Custody (COC) on 01/28/15. They were assigned to Work Order 15-01-1715.

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 ID changed to ES120X 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.
354 Uluniu Street, Suite 304
Kailua, HI 96734-2500

Project: Red Hill LTM 112066

Date Received: 01/28/15
Work Order: 15-01-1715
Preparation: EPA 3510C
Method: EPA 8015B (M)
Units: ug/L

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
ES125	**15-01-1715-2-G**	**01/27/15 09:30**	**Aqueous**	**GC 45**	**01/29/15**	**01/30/15 10:49**	**150129B23A**

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	<12	11	12	25	1.00	U

Surrogate	Rec. (%)	Control Limits	Qualifiers
n-Octacosane	77	51-141	

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
ES124	**15-01-1715-4-H**	**01/27/15 11:15**	**Aqueous**	**GC 45**	**01/29/15**	**01/30/15 11:06**	**150129B23A**

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	<13	12	13	26	1.00	U

Surrogate	Rec. (%)	Control Limits	Qualifiers
n-Octacosane	74	51-141	

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
ES120X	**15-01-1715-5-H**	**01/27/15 13:00**	**Aqueous**	**GC 45**	**01/29/15**	**01/30/15 11:24**	**150129B23A**

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	33	11	12	25	1.00	HD

Surrogate	Rec. (%)	Control Limits	Qualifiers
n-Octacosane	78	51-141	

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
Method Blank	**099-15-516-237**	**N/A**	**Aqueous**	**GC 45**	**01/29/15**	**01/30/15 05:03**	**150129B23A**

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.
354 Uluniu Street, Suite 304
Kailua, HI 96734-2500

Project: Red Hill LTM 112066

Date Received: 01/28/15
Work Order: 15-01-1715
Preparation: EPA 3005A Filt.
Method: EPA 6020
Units: ug/L

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
ES124	**15-01-1715-4-G**	**01/27/15 11:15**	**Aqueous**	**ICP/MS 03**	**01/29/15**	**01/29/15 22:50**	**150129L08F**

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

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
ES120X	**15-01-1715-5-G**	**01/27/15 13:00**	**Aqueous**	**ICP/MS 03**	**01/29/15**	**01/29/15 22:54**	**150129L08F**

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	0.631	0.0898	0.200	0.500	1.00	

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
Method Blank	**099-14-497-116**	**N/A**	**Aqueous**	**ICP/MS 03**	**01/29/15**	**01/29/15 22:28**	**150129L08F**

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.
354 Uluniu Street, Suite 304
Kailua, HI 96734-2500

Date Received: 01/28/15
Work Order: 15-01-1715
Preparation: EPA 3510C
Method: EPA 8270C SIM PAHs
Units: ug/L

Project: Red Hill LTM 112066

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
ES125	**15-01-1715-2-I**	**01/27/15 09:30**	**Aqueous**	**GC/MS AAA**	**01/30/15**	**02/03/15 00:28**	**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	0.051	0.10	0.20	1.00	U
Acenaphthylene	<0.050	0.044	0.050	0.20	1.00	U
Acenaphthene	<0.050	0.027	0.050	0.20	1.00	U
Fluorene	<0.050	0.042	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	0.047	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	60	28-139	
2-Fluorobiphenyl	56	33-144	
p-Terphenyl-d14	63	23-160	

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Analytical Report

Environmental Science International, Inc.
354 Uluniu Street, Suite 304
Kailua, HI 96734-2500

Date Received: 01/28/15
Work Order: 15-01-1715
Preparation: EPA 3510C
Method: EPA 8270C SIM PAHs
Units: ug/L

Project: Red Hill LTM 112066

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
ES124	**15-01-1715-4-I**	**01/27/15 11:15**	**Aqueous**	**GC/MS AAA**	**01/30/15**	**02/03/15 00:48**	**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	<0.048	0.033	0.048	0.19	1.00	U
2-Methylnaphthalene	<0.048	0.045	0.048	0.19	1.00	U
1-Methylnaphthalene	<0.096	0.050	0.096	0.19	1.00	U
Acenaphthylene	<0.048	0.043	0.048	0.19	1.00	U
Acenaphthene	<0.048	0.026	0.048	0.19	1.00	U
Fluorene	<0.048	0.041	0.048	0.19	1.00	U
Phenanthrene	<0.048	0.026	0.048	0.19	1.00	U
Anthracene	<0.048	0.028	0.048	0.19	1.00	U
Fluoranthene	<0.048	0.045	0.048	0.19	1.00	U
Pyrene	<0.048	0.020	0.048	0.19	1.00	U
Benzo (a) Anthracene	<0.048	0.031	0.048	0.19	1.00	U
Chrysene	<0.048	0.024	0.048	0.19	1.00	U
Benzo (k) Fluoranthene	<0.048	0.030	0.048	0.19	1.00	U
Benzo (b) Fluoranthene	<0.048	0.017	0.048	0.19	1.00	U
Benzo (a) Pyrene	<0.048	0.021	0.048	0.19	1.00	U
Indeno (1,2,3-c,d) Pyrene	<0.048	0.020	0.048	0.19	1.00	U
Dibenz (a,h) Anthracene	<0.048	0.046	0.048	0.19	1.00	U
Benzo (g,h,i) Perylene	<0.096	0.079	0.096	0.19	1.00	U

Surrogate	Rec. (%)	Control Limits	Qualifiers
Nitrobenzene-d5	61	28-139	
2-Fluorobiphenyl	61	33-144	
p-Terphenyl-d14	67	23-160	

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Analytical Report

Environmental Science International, Inc.
354 Uluniu Street, Suite 304
Kailua, HI 96734-2500

Date Received: 01/28/15
Work Order: 15-01-1715
Preparation: EPA 3510C
Method: EPA 8270C SIM PAHs
Units: ug/L

Project: Red Hill LTM 112066

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
ES120X	**15-01-1715-5-J**	**01/27/15 13:00**	**Aqueous**	**GC/MS AAA**	**01/30/15**	**02/03/15 01:08**	**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	<0.054	0.037	0.054	0.22	1.00	U
2-Methylnaphthalene	<0.054	0.050	0.054	0.22	1.00	U
1-Methylnaphthalene	<0.11	0.056	0.11	0.22	1.00	U
Acenaphthylene	<0.054	0.048	0.054	0.22	1.00	U
Acenaphthene	<0.054	0.029	0.054	0.22	1.00	U
Fluorene	<0.054	0.046	0.054	0.22	1.00	U
Phenanthrene	<0.054	0.029	0.054	0.22	1.00	U
Anthracene	<0.054	0.031	0.054	0.22	1.00	U
Fluoranthene	<0.054	0.051	0.054	0.22	1.00	U
Pyrene	<0.054	0.022	0.054	0.22	1.00	U
Benzo (a) Anthracene	<0.054	0.035	0.054	0.22	1.00	U
Chrysene	<0.054	0.027	0.054	0.22	1.00	U
Benzo (k) Fluoranthene	<0.054	0.034	0.054	0.22	1.00	U
Benzo (b) Fluoranthene	<0.054	0.019	0.054	0.22	1.00	U
Benzo (a) Pyrene	<0.054	0.024	0.054	0.22	1.00	U
Indeno (1,2,3-c,d) Pyrene	<0.054	0.023	0.054	0.22	1.00	U
Dibenz (a,h) Anthracene	<0.054	0.052	0.054	0.22	1.00	U
Benzo (g,h,i) Perylene	<0.11	0.089	0.11	0.22	1.00	U

Surrogate	Rec. (%)	Control Limits	Qualifiers
Nitrobenzene-d5	51	28-139	
2-Fluorobiphenyl	54	33-144	
p-Terphenyl-d14	60	23-160	

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Analytical Report

Environmental Science International, Inc.
354 Uluniu Street, Suite 304
Kailua, HI 96734-2500

Date Received: 01/28/15
Work Order: 15-01-1715
Preparation: EPA 3510C
Method: EPA 8270C SIM PAHs
Units: ug/L

Project: Red Hill LTM 112066

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.
354 Uluniu Street, Suite 304
Kailua, HI 96734-2500

Date Received: 01/28/15
Work Order: 15-01-1715
Preparation: EPA 5030C
Method: GC/MS / EPA 8260B
Units: ug/L

Project: Red Hill LTM 112066

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
ESTRIP	**15-01-1715-1-A**	**01/27/15 09:00**	**Aqueous**	**GC/MS OO**	**01/29/15**	**01/29/15 18:29**	**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.
354 Uluniu Street, Suite 304
Kailua, HI 96734-2500

Date Received: 01/28/15
Work Order: 15-01-1715
Preparation: EPA 5030C
Method: GC/MS / EPA 8260B
Units: ug/L

Project: Red Hill LTM 112066

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	101	80-126	
1,2-Dichloroethane-d4	105	80-134	
Toluene-d8	97	80-120	
Toluene-d8-TPPH	98	88-112	
1,4-Bromofluorobenzene	92	80-120	

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Analytical Report

Environmental Science International, Inc.
354 Uluniu Street, Suite 304
Kailua, HI 96734-2500

Date Received: 01/28/15
Work Order: 15-01-1715
Preparation: EPA 5030C
Method: GC/MS / EPA 8260B
Units: ug/L

Project: Red Hill LTM 112066

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
ES125	**15-01-1715-2-A**	**01/27/15 09:30**	**Aqueous**	**GC/MS OO**	**01/29/15**	**01/29/15 21:09**	**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.
354 Uluniu Street, Suite 304
Kailua, HI 96734-2500

Date Received: 01/28/15
Work Order: 15-01-1715
Preparation: EPA 5030C
Method: GC/MS / EPA 8260B
Units: ug/L

Project: Red Hill LTM 112066

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	101	80-126	
1,2-Dichloroethane-d4	105	80-134	
Toluene-d8	96	80-120	
Toluene-d8-TPPH	98	88-112	
1,4-Bromofluorobenzene	92	80-120	

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Analytical Report

Environmental Science International, Inc.
354 Uluniu Street, Suite 304
Kailua, HI 96734-2500

Date Received: 01/28/15
Work Order: 15-01-1715
Preparation: EPA 5030C
Method: GC/MS / EPA 8260B
Units: ug/L

Project: Red Hill LTM 112066

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
ES124	**15-01-1715-4-A**	**01/27/15 11:15**	**Aqueous**	**GC/MS OO**	**01/29/15**	**01/29/15 21:36**	**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.
354 Uluniu Street, Suite 304
Kailua, HI 96734-2500

Date Received: 01/28/15
Work Order: 15-01-1715
Preparation: EPA 5030C
Method: GC/MS / EPA 8260B
Units: ug/L

Project: Red Hill LTM 112066

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	105	80-134	
Toluene-d8	96	80-120	
Toluene-d8-TPPH	97	88-112	
1,4-Bromofluorobenzene	91	80-120	

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Analytical Report

Environmental Science International, Inc.
354 Uluniu Street, Suite 304
Kailua, HI 96734-2500

Date Received: 01/28/15
Work Order: 15-01-1715
Preparation: EPA 5030C
Method: GC/MS / EPA 8260B
Units: ug/L

Project: Red Hill LTM 112066

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
ES120X	**15-01-1715-5-A**	**01/27/15 13:00**	**Aqueous**	**GC/MS OO**	**01/29/15**	**01/29/15 22:03**	**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.
354 Uluniu Street, Suite 304
Kailua, HI 96734-2500

Date Received: 01/28/15
Work Order: 15-01-1715
Preparation: EPA 5030C
Method: GC/MS / EPA 8260B
Units: ug/L

Project: Red Hill LTM 112066

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	106	80-134	
Toluene-d8	97	80-120	
Toluene-d8-TPPH	98	88-112	
1,4-Bromofluorobenzene	92	80-120	

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Analytical Report

Environmental Science International, Inc.
354 Uluniu Street, Suite 304
Kailua, HI 96734-2500

Date Received: 01/28/15
Work Order: 15-01-1715
Preparation: EPA 5030C
Method: GC/MS / EPA 8260B
Units: ug/L

Project: Red Hill LTM 112066

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.
354 Uluniu Street, Suite 304
Kailua, HI 96734-2500

Date Received: 01/28/15
Work Order: 15-01-1715
Preparation: EPA 5030C
Method: GC/MS / EPA 8260B
Units: ug/L

Project: Red Hill LTM 112066

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.
354 Uluniu Street, Suite 304
Kailua, HI 96734-2500

Project: Red Hill LTM 112066

Date Received: 01/28/15
Work Order: 15-01-1715
Preparation: EPA 3005A Filt.
Method: EPA 6020

Quality Control Sample ID	Type	Matrix	Instrument	Date Prepared	Date Analyzed	MS/MSD Batch Number
ES124	**Sample**	**Aqueous**	**ICP/MS 03**	**01/29/15**	**01/29/15 22:50**	**150129S08**
ES124	**Matrix Spike**	**Aqueous**	**ICP/MS 03**	**01/29/15**	**01/29/15 22:34**	**150129S08**
ES124	**Matrix Spike Duplicate**	**Aqueous**	**ICP/MS 03**	**01/29/15**	**01/29/15 22:37**	**150129S08**

Parameter	Sample Conc.	Spike Added	MS Conc.	MS %Rec.	MSD Conc.	MSD %Rec.	%Rec. CL	RPD	RPD CL	Qualifiers
Lead	ND	100.0	109.8	110	107.5	107	80-120	2	0-20	

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RPD: Relative Percent Difference. CL: Control Limits

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Quality Control - Spike/Spike Duplicate

Environmental Science International, Inc.		Date Received:	01/28/15
354 Uluniu Street, Suite 304		Work Order:	15-01-1715
Kailua, HI 96734-2500		Preparation:	EPA 3510C
		Method:	EPA 8270C SIM PAHs
Project: Red Hill LTM 112066			Page 2 of 4

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	

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RPD: Relative Percent Difference. CL: Control Limits

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Quality Control - Spike/Spike Duplicate

Environmental Science International, Inc.
354 Uluniu Street, Suite 304
Kailua, HI 96734-2500

Project: Red Hill LTM 112066

Date Received: 01/28/15
Work Order: 15-01-1715
Preparation: EPA 5030C
Method: GC/MS / EPA 8260B
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Quality Control Sample ID	Type	Matrix	Instrument	Date Prepared	Date Analyzed	MS/MSD Batch Number
15-01-1609-2	**Sample**	**Aqueous**	**GC/MS OO**	**01/29/15**	**01/29/15 18:56**	**150129S039**
15-01-1609-2	**Matrix Spike**	**Aqueous**	**GC/MS OO**	**01/29/15**	**01/29/15 19:22**	**150129S039**
15-01-1609-2	**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:	01/28/15
354 Uluniu Street, Suite 304	Work Order:	15-01-1715
Kailua, HI 96734-2500	Preparation:	EPA 5030C
	Method:	GC/MS / EPA 8260B
Project: Red Hill LTM 112066		Page 4 of 4

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	

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RPD: Relative Percent Difference. CL: Control Limits

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Quality Control - PDS

Environmental Science International, Inc.		Date Received:	01/28/15
354 Uluniu Street, Suite 304		Work Order:	15-01-1715
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
ES124	**Sample**	**Aqueous**	**ICP/MS 03**	**01/29/15 00:00**	**01/29/15 22:50**	**150129S08**
ES124	**PDS**	**Aqueous**	**ICP/MS 03**	**01/29/15 00:00**	**01/29/15 22:40**	**150129S08**

Parameter	Sample Conc.	Spike Added	PDS Conc.	PDS %Rec.	%Rec. CL	Qualifiers
Lead	ND	100.0	111.4	111	75-125	

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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: 01/28/15
354 Uluniu Street, Suite 304	Work Order: 15-01-1715
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
099-15-516-237	**LCS**	**Aqueous**	**GC 45**	**01/29/15**	**01/30/15 05:20**	**150129B23A**
099-15-516-237	**LCSD**	**Aqueous**	**GC 45**	**01/29/15**	**01/30/15 05:38**	**150129B23A**

Parameter	Spike Added	LCS Conc.	LCS %Rec.	LCSD Conc.	LCSD %Rec.	%Rec. CL	RPD	RPD CL	Qualifiers
TPH as Diesel	2000	1741	87	1692	85	60-132	3	0-11	

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RPD: Relative Percent Difference. CL: Control Limits

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Quality Control - LCS

Environmental Science International, Inc.		Date Received:	01/28/15
354 Uluniu Street, Suite 304		Work Order:	15-01-1715
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
099-14-497-116	**LCS**	**Aqueous**	**ICP/MS 03**	**01/29/15**	**01/29/15 22:31**	**150129L08F**

Parameter	Spike Added	Conc. Recovered	LCS %Rec.	%Rec. CL	Qualifiers
Lead	100.0	104.5	105	80-120	

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RPD: Relative Percent Difference. CL: Control Limits

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Quality Control - LCS

Environmental Science International, Inc.		Date Received:	01/28/15
354 Uluniu Street, Suite 304		Work Order:	15-01-1715
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.
354 Uluniu Street, Suite 304
Kailua, HI 96734-2500

Project: Red Hill LTM 112066

Date Received: 01/28/15
Work Order: 15-01-1715
Preparation: EPA 5030C
Method: GC/MS / EPA 8260B
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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:	01/28/15
354 Uluniu Street, Suite 304		Work Order:	15-01-1715
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	

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RPD: Relative Percent Difference. CL: Control Limits

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Sample Analysis Summary Report

Work Order: 15-01-1715 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	682	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: 15-01-1715 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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For courier service / sample drop off information, contact us26_sales@eurofinsus.com or call us.

CHAIN-OF-CUSTODY RECORD

WO NO. / LAB USE ONLY: **15-01-1715**

DATE: 1/27/15

PAGE: 1 OF 1

LABORATORY CLIENT: ESI	CLIENT PROJECT NAME / NO.: Red Hill LTM 112066
ADDRESS: 354 Uluniu St., Suite 304	P.O. NO.:
CITY: Kailua STATE: HI ZIP: 96734	PROJECT CONTACT: Jeff Hattemer
TEL: 808-261-0740 E-MAIL: jhattemer@esciencei.com, dfeher@esciencei.com	LAB CONTACT OR QUOTE NO.:
GLOBAL ID:	LOG CODE:
	SAMPLER(S): (PRINT)

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 (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 ☐ 218.6	Lead (6010)	Lead (200.8)		
1	ES TRIP	1/27/15	0900	Water	3		X		X	X				X										X		
2	ES 125	1/27/15	0930	water	4	X			X	X				X						X						
3	ES 125 UF	1/27/15	0930	water	1		X																X	X		
4	ES 124	1/27/15	1115	water	10		X	X	X	X				X						X			X			
5	ES 120	1/27/15	1300	water	10		X	X	X	X				X						X			X			

Relinquished by: (Signature) Jeff Hattemer	Received by: (Signature/Affiliation) Fed Ex	Date: 1/27/15	Time: 1500
Relinquished by: (Signature)	Received by: (Signature/Affiliation)	Date: 1/28/15	Time: 1020
Relinquished by: (Signature)	Received by: (Signature/Affiliation)	Date:	Time:

2014-07-01 Revision

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1715

ORIGIN ID:HNLA (714) 895-5494
CALSCIENCE ENVIRONMENTAL LAB
7440 LINCOLN WAY
GARDEN GROVE, CA 928411427
UNITED STATES US

SHIP DATE: 27JAN15
ACTWGT: 55.6 LB
CAD: /POS1525
DIMS: 23x15x14 IN
BILL SENDER

TO SAMPLE CONTROL
CALSCIENCE LABORTORIES
7440 LINCOLN WAY

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

FedEx Express

TRK# 0200 8059 2709 6788

WED - 28 JAN AA
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92841
CA-US SNA

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WORK ORDER #: 15-01-1715

SAMPLE ANOMALY FORM

SAMPLES - CONTAINERS & LABELS:

Comments:

- ☐ **Sample(s) NOT RECEIVED but listed on COC**
- ☐ **Sample(s) received but NOT LISTED on COC**
- ☐ **Holding time expired** – list sample ID(s) and test
- ☐ **Insufficient quantities for analysis** – list test
- ☐ **Improper container(s) used** – list test
- ☐ **Improper preservative used** – list test
- ☐ **No preservative noted on COC or label** – list test & notify lab
- ☐ **Sample labels illegible** – note test/container type
- ☐ **Sample label(s) do not match COC** – Note in comments
  - ☐ **Sample ID**
  - ☐ **Date and/or Time Collected**
  - ☐ **Project Information**
  - ☐ **# of Container(s)**
  - ☐ **Analysis**
- ☐ **Sample container(s) compromised** – Note in comments
  - ☐ **Water present in sample container**
  - ☐ **Broken**
- ☐ **Sample container(s) not labeled**
- ☐ **Air sample container(s) compromised** – Note in comments
  - ☐ **Flat**
  - ☐ **Very low in volume**
  - ☐ **Leaking (Not transferred - duplicate bag submitted)**
  - ☐ **Leaking (transferred into Calscience Tedlar® Bag*)**
  - ☐ **Leaking (transferred into Client's Tedlar® Bag*)**
- ☐ **Other:** _____

HEADSPACE – Containers with Bubble > 6mm or ¼ inch:

Sample #	Container ID(s)	# of Vials Received	Sample #	Container ID(s)	# of Vials Received	Sample #	Container ID(s)	# of Cont. received	Analysis
4	T	6							

Comments: _____

*Transferred at Client's request.

Initial / Date: BG 01/28/15

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WORK ORDER #: 15-01-1715

SAMPLE RECEIPT FORM

Cooler 1 of 1

CLIENT: ESI

DATE: 01/28/15

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

Temperature 2.7 °C + 0.2 °C (CF) = 2.9 °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:** LS

CUSTODY SEALS INTACT:

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

☑ Sample ☐_____ ☐ No (Not Intact) ☐ Not Present **Checked by:** 659

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	☒ 659 1/28/15	☑	☐
Tedlar bag(s) free of condensation	☐	☐	☑

CONTAINER TYPE:

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

Aqueous: ☑6 VOA ☑3 (-1) VOAh ☐VOA**na₂** ☐125AGB ☐125AGB**h** ☐125AGB**p** ☑2 1AGB ☐1AGB**na₂** ☐1AGB**s**

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

☐250PB ☑250PB**n** ☐125PB ☐125PB**znna** ☐100PJ ☐100PJ**na₂** ☑250PBn ☐_____ ☐_____

Air: ☐Tedlar® ☐Canister **Other:** ☐_____ **Trip Blank Lot#:** 1409088 **Labeled/Checked by:** 659

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 **na₂:**$Na_2S_2O_3$ **na:** NaOH **p:** H_3PO_4 **s:** H_2SO_4 **u:** Ultra-pure **znna:** $ZnAc_2$+NaOH **f:** Filtered **Scanned by:** 681

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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

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Supplemental Report 1

WORK ORDER NUMBER: 15-01-1715

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 02/04/2015 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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Contents

Client Project Name: Red Hill LTM 112066
Work Order Number: 15-01-1715

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Work Order Narrative

Work Order: 15-01-1715 Page 1 of 1

Condition Upon Receipt:

Samples were received under Chain-of-Custody (COC) on 01/28/15. They were assigned to Work Order 15-01-1715.

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.

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.
354 Uluniu Street, Suite 304
Kailua, HI 96734-2500

Project: Red Hill LTM 112066

Date Received: 01/28/15
Work Order: 15-01-1715
Preparation: N/A
Method: EPA 200.8
Units: ug/L

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
ES125UF	**15-01-1715-3-A**	**01/27/15 09:30**	**Aqueous**	**ICP/MS 03**	**01/29/15**	**01/30/15 00:35**	**150129L07**

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	RL	MDL	DF	Qualifiers
Lead	<0.0898	1.00	0.0898	1.00	U

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
Method Blank	**099-16-094-697**	**N/A**	**Aqueous**	**ICP/MS 03**	**01/29/15**	**01/29/15 23:29**	**150129L07**

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	RL	MDL	DF	Qualifiers
Lead	<0.0898	1.00	0.0898	1.00	U

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RL: Reporting Limit. DF: Dilution Factor. MDL: Method Detection Limit.

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Quality Control - Spike/Spike Duplicate

Environmental Science International, Inc.
354 Uluniu Street, Suite 304
Kailua, HI 96734-2500

Project: Red Hill LTM 112066

Date Received: 01/28/15
Work Order: 15-01-1715
Preparation: N/A
Method: EPA 200.8

Quality Control Sample ID	Type	Matrix	Instrument	Date Prepared	Date Analyzed	MS/MSD Batch Number
ES125UF	**Sample**	**Aqueous**	**ICP/MS 03**	**01/29/15**	**01/30/15 00:35**	**150129S07**
ES125UF	**Matrix Spike**	**Aqueous**	**ICP/MS 03**	**01/29/15**	**01/30/15 00:18**	**150129S07**
ES125UF	**Matrix Spike Duplicate**	**Aqueous**	**ICP/MS 03**	**01/29/15**	**01/30/15 00:22**	**150129S07**

Parameter	Sample Conc.	Spike Added	MS Conc.	MS %Rec.	MSD Conc.	MSD %Rec.	%Rec. CL	RPD	RPD CL	Qualifiers
Lead	ND	100.0	111.0	111	110.1	110	80-120	1	0-20	

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RPD: Relative Percent Difference. CL: Control Limits

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Quality Control - LCS

Environmental Science International, Inc.		Date Received:	01/28/15
354 Uluniu Street, Suite 304		Work Order:	15-01-1715
Kailua, HI 96734-2500		Preparation:	N/A
		Method:	EPA 200.8
Project: Red Hill LTM 112066			Page 1 of 1

Quality Control Sample ID	Type	Matrix	Instrument	Date Prepared	Date Analyzed	LCS Batch Number
099-16-094-697	**LCS**	**Aqueous**	**ICP/MS 03**	**01/29/15**	**01/29/15 23:59**	**150129L07**

Parameter	Spike Added	Conc. Recovered	LCS %Rec.	%Rec. CL	Qualifiers
Lead	100.0	103.9	104	80-120	

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RPD: Relative Percent Difference. CL: Control Limits

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Sample Analysis Summary Report

Work Order: 15-01-1715 Page 1 of 1

Method	Extraction	Chemist ID	Instrument	Analytical Location
EPA 200.8	N/A	776	ICP/MS 03	1

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Glossary of Terms and Qualifiers

Work Order: 15-01-1715 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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For courier service / sample drop off information, contact us26_sales@eurofinsus.com or call us.

CHAIN-OF-CUSTODY RECORD

WO NO. / LAB USE ONLY: **15-01-1715**

DATE: 1/27/15

PAGE: 1 OF 1

LABORATORY CLIENT: ESI	CLIENT PROJECT NAME / NO.: Red Hill LTM 112066
ADDRESS: 354 Uluniu St., Suite 304	P.O. NO.:
CITY: Kailua STATE: HI ZIP: 96734	PROJECT CONTACT: Jeff Hattemer
TEL: 808-261-0740 E-MAIL: jhattemer@esciencei.com, dfeher@esciencei.com	LAB CONTACT OR QUOTE NO.:
GLOBAL ID:	LOG CODE:
	SAMPLER(S): (PRINT)

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 (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 ☐ 218.6	Lead (6010)	Lead (200.8)		
1	ES TRIP	1/27/15	0900	Water	3		X		X	X				X										X		
2	ES 125	1/27/15	0930	water	4	X			X	X				X						X						
3	ES 125 UF	1/27/15	0930	water	1		X																X	X		
4	ES 124	1/27/15	1115	water	10		X	X	X	X				X						X			X			
5	ES 120	1/27/15	1300	water	10		X	X	X	X				X						X			X			

Relinquished by: (Signature) Jeff Hattemer	Received by: (Signature/Affiliation) Fed Ex	Date: 1/27/15	Time: 1500
Relinquished by: (Signature)	Received by: (Signature/Affiliation)	Date: 1/28/15	Time: 1020
Relinquished by: (Signature)	Received by: (Signature/Affiliation)	Date:	Time:

2014-07-01 Revision

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1715

ORIGIN ID:HNLA (714) 895-5494
CALSCIENCE ENVIRONMENTAL LAB
7440 LINCOLN WAY
GARDEN GROVE, CA 928411427
UNITED STATES US

SHIP DATE: 27JAN15
ACTWGT: 55.6 LB
CAD: /POS1525
DIMS: 23x15x14 IN
BILL SENDER

TO SAMPLE CONTROL
CALSCIENCE LABORTORIES
7440 LINCOLN WAY

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

FedEx Express

TRK# 0200 8059 2709 6788

WED - 28 JAN AA
STANDARD OVERNIGHT

WZ APVA

92841
CA-US SNA

Open End of FedEx Pouch Here

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WORK ORDER #: 15-01-1715

SAMPLE ANOMALY FORM

SAMPLES - CONTAINERS & LABELS:

Comments:

- ☐ **Sample(s) NOT RECEIVED but listed on COC**
- ☐ **Sample(s) received but NOT LISTED on COC**
- ☐ **Holding time expired** – list sample ID(s) and test
- ☐ **Insufficient quantities for analysis** – list test
- ☐ **Improper container(s) used** – list test
- ☐ **Improper preservative used** – list test
- ☐ **No preservative noted on COC or label** – list test & notify lab
- ☐ **Sample labels illegible** – note test/container type
- ☐ **Sample label(s) do not match COC** – Note in comments
  - ☐ **Sample ID**
  - ☐ **Date and/or Time Collected**
  - ☐ **Project Information**
  - ☐ **# of Container(s)**
  - ☐ **Analysis**
- ☐ **Sample container(s) compromised** – Note in comments
  - ☐ **Water present in sample container**
  - ☐ **Broken**
- ☐ **Sample container(s) not labeled**
- ☐ **Air sample container(s) compromised** – Note in comments
  - ☐ **Flat**
  - ☐ **Very low in volume**
  - ☐ **Leaking (Not transferred - duplicate bag submitted)**
  - ☐ **Leaking (transferred into Calscience Tedlar® Bag*)**
  - ☐ **Leaking (transferred into Client's Tedlar® Bag*)**
- ☐ **Other:** _____

HEADSPACE – Containers with Bubble > 6mm or ¼ inch:

Sample #	Container ID(s)	# of Vials Received	Sample #	Container ID(s)	# of Vials Received	Sample #	Container ID(s)	# of Cont. received	Analysis
4	T	6							

Comments: _____

*Transferred at Client's request.

Initial / Date: BT 01/28/15

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WORK ORDER #: 15-01-1715

SAMPLE RECEIPT FORM

Cooler 1 of 1

CLIENT: ESI

DATE: 01/28/15

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

Temperature 2.7 °C + 0.2 °C (CF) = 2.9 °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:** LS

CUSTODY SEALS INTACT:

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

☑ Sample ☐_____ ☐ No (Not Intact) ☐ Not Present **Checked by:** 659

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	☒ 659 1/28/15	☑	☐
Tedlar bag(s) free of condensation	☐	☐	☑

CONTAINER TYPE:

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

Aqueous: ☑6 VOA ☑3 (-1) VOAh ☐VOA**na$_2$** ☐125AGB ☐125AGB**h** ☐125AGB**p** ☑2 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$_2$** ☑250PBn ☐_____ ☐_____

Air: ☐Tedlar® ☐Canister **Other:** ☐_____ **Trip Blank Lot#:** 1409088 **Labeled/Checked by:** 659

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

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

WORK ORDER:	**15-01-1715**	ANALYZED BY:	682
INSTRUMENT:	GC 45	D/T ANALYZED:	2015-01-30 11:24
EXTRACTION:	EPA 3510C	REVIEWED BY:	
D/T EXTRACTED:	2015-01-29 00:00	D/T REVIEWED:	

DATA FILE: W:\GC_45\GC 45 DATA\2015\150129\15012974.D\15012974

 # 5 **CLIENT SAMPLE NUMBER: ES120X**

LCS/MB BATCH:	150129B23A	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: 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.

COMPOUND	INI. CONC	DF	CONC	DL	LOD	LOQ	QUAL
TPH as Diesel	6540	1.00	32.7	11	12	25	b

Area Percent Report

Data File Name : W:\GC_45\GC 45 DATA\2015\150129\15012974.D
Page Number : 1
Operator :
Instrument : GC 45
Sample Name : 15-01-1715-5

Vial Number : Vial 74
Injection Number : 1
Sequence Line : 74
Instrument Method: C:\CHEM32\1\METHODS\ ->

Acquired on : 30 Jan 15 11:24 am
Report Created on: 02 Feb 15 10:24 am

Analysis Method : 8015B.MTH

Sig. 1 in W:\GC_45\GC 45 DATA\2015\150129\ ->

Pk	Ret Time	Area	Height	Peak	Width	Response %
1	2.102	0.19	0	BV	0.046	0.028
2	2.184	0.54	0	VV	0.027	0.078
3	2.237	3.13	1	VV	0.043	0.455
4	2.361	1.20	1	VV	0.033	0.174
5	2.426	2.25	1	VV	0.034	0.326
6	2.518	4.19	1	VV	0.055	0.609
7	2.635	7.01	1	VV	0.079	1.018
8	2.769	13.33	3	VV	0.065	1.937
9	2.900	17.13	3	VV	0.063	2.488
10	2.940	7.71	3	VV	0.038	1.120
11	3.006	4.98	2	VV	0.036	0.724
12	3.056	3.97	2	VV	0.032	0.577
13	3.090	3.99	2	VV	0.030	0.580
14	3.141	14.00	2	VV	0.101	2.034
15	3.363	15.19	2	VV	0.086	2.207
16	3.497	2.40	1	VV	0.036	0.349
17	3.591	5.12	1	VV	0.066	0.744
18	3.647	3.56	1	VV	0.055	0.517
19	3.728	4.11	1	VV	0.059	0.598
20	3.862	2.21	1	VV	0.038	0.322
21	3.934	2.36	0	VV	0.059	0.343
22	4.030	3.98	1	VB	0.042	0.578
23	5.327	565.69	292	VV	0.032	82.193

Total area = 688.24

==========

Area Percent Report

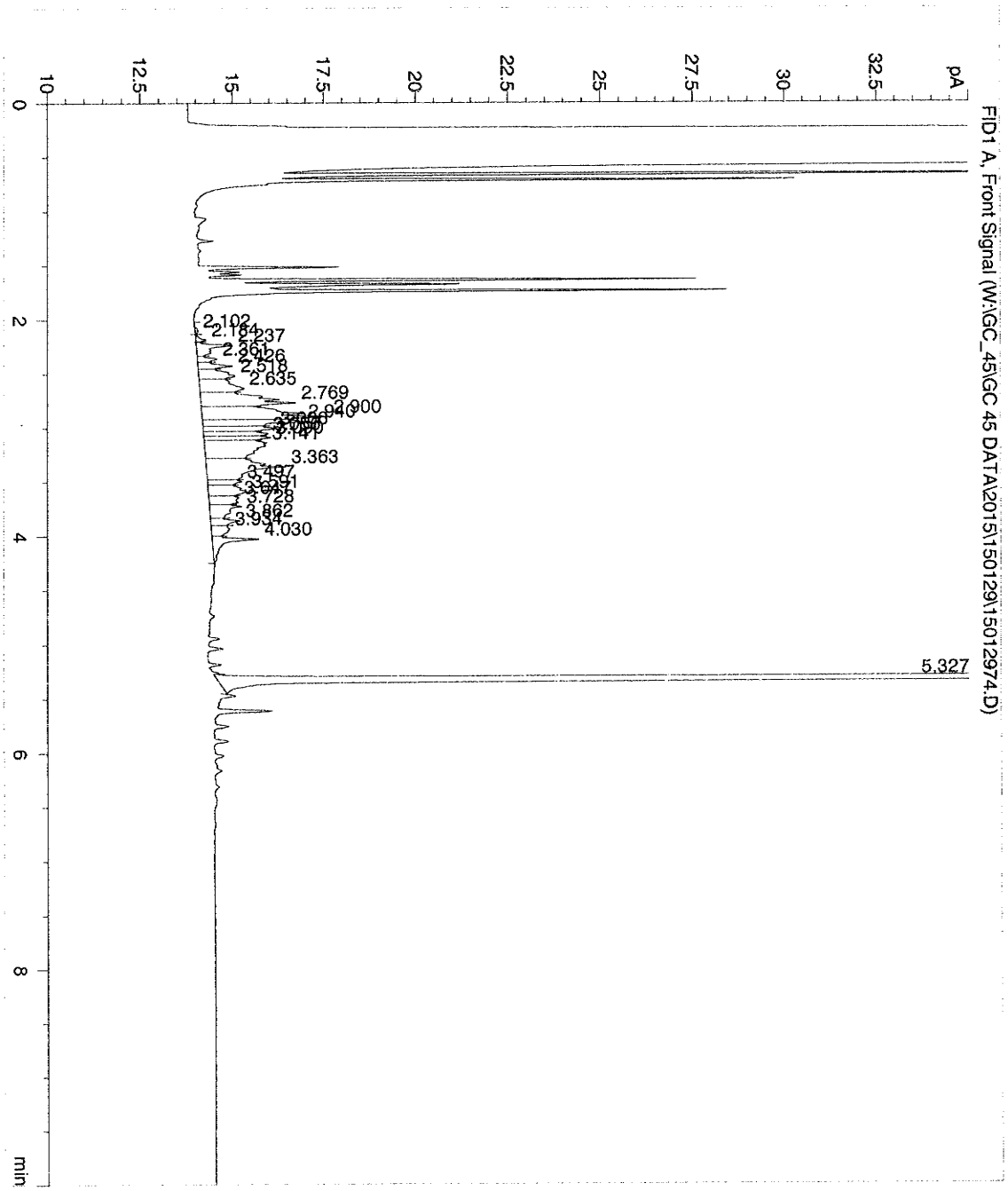
==========

Data File Name : W:\GC_45\GC 45 DATA\2015\150129\15012974.D
Page Number : 2
Operator :
Instrument : GC 45
Sample Name : 15-01-1715-5

Acquired on : 30 Jan 15 11:24 am
Report Created on: 02 Feb 15 10:24 am

Vial Number : Vial 74
Injection Number : 1
Sequence Line : 74
Instrument Method: C:\CHEM32\1\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:	**099-15-516**	ANALYZED BY:	682
INSTRUMENT:	GC 45	D/T ANALYZED:	2015-01-30 05:03
EXTRACTION:	EPA 3510C	REVIEWED BY:	
D/T EXTRACTED:	2015-01-29 00:00	D/T REVIEWED:	

DATA FILE: W:\GC_45\GC 45 DATA\2015\150129\15012952.D\15012952

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

LCS/MB BATCH:	150129B23A	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

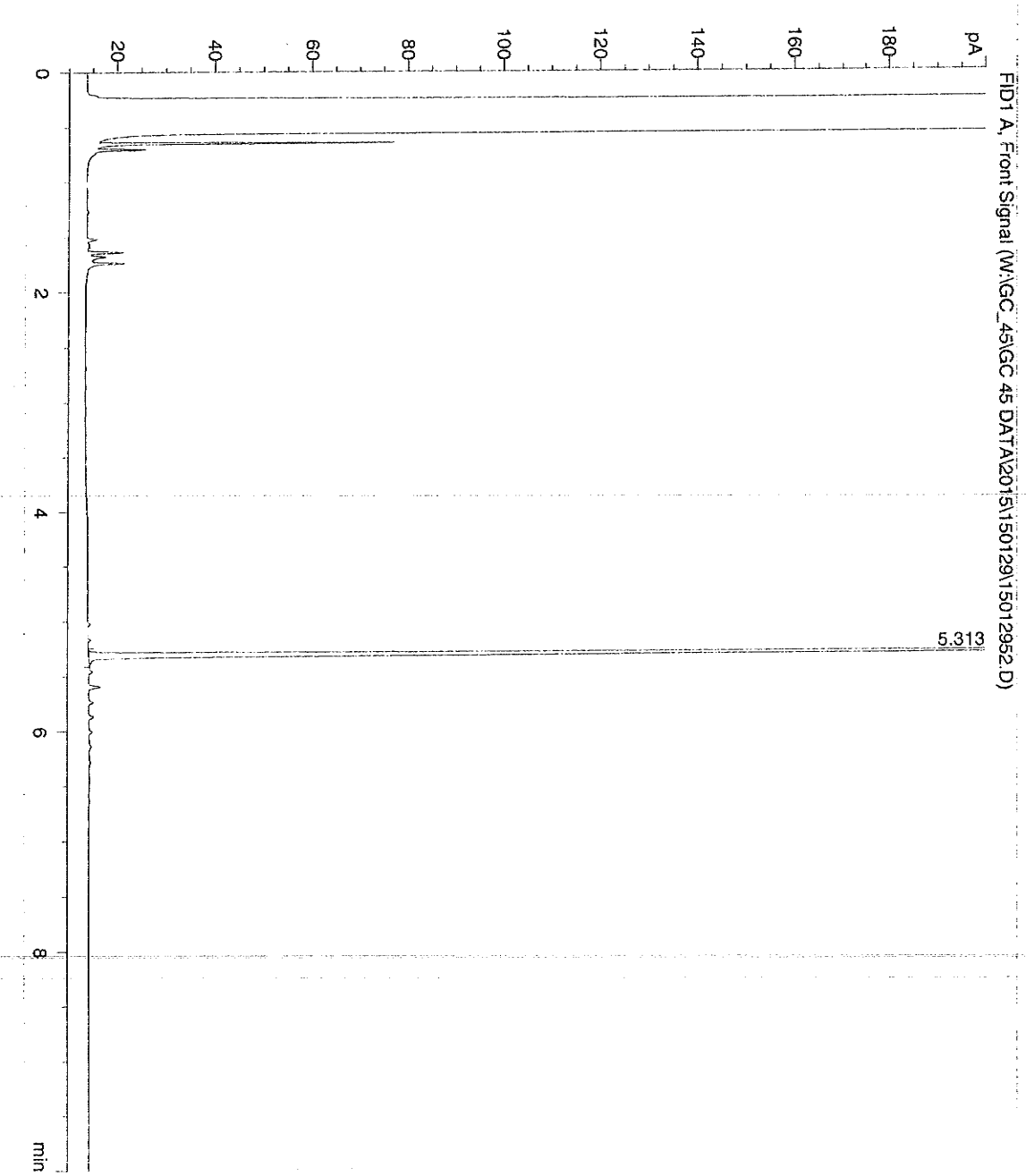
ata File Name : W:\GC_45\GC 45 DATA\2015\150129\15012952.D
age Number : 2
perator :
nstrument : GC 45
ample Name : MB 15012923/24

cquired on : 30 Jan 15 05:03 am
eport Created on: 30 Jan 15 07:35 pm

Vial Number : Vial 52
Injection Number : 1
Sequence Line : 52
Instrument Method: C:\CHEM32\1\METHODS\ ->

Analysis Method : 8015B.MTH

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



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

CCV WORK ORDER: **099-15-515-361-6279**
BATCH ID:
INITIAL: 150119I007
CCV: 150129A127
INSTRUMENT: GC 45

DATA FILE: W:\GC_45\GC 45 DATA\2015\150129\15012950.D\15012950

ANALYZED BY: 682
D/T ANALYZED:
INITIAL: 2015-01-19 18:09
CCV: 2015-01-30 04:28
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	0.019	0.021			-11	0-15	PASS

MIN RF: Method Specified Minimum Response Factor

Area Percent Report

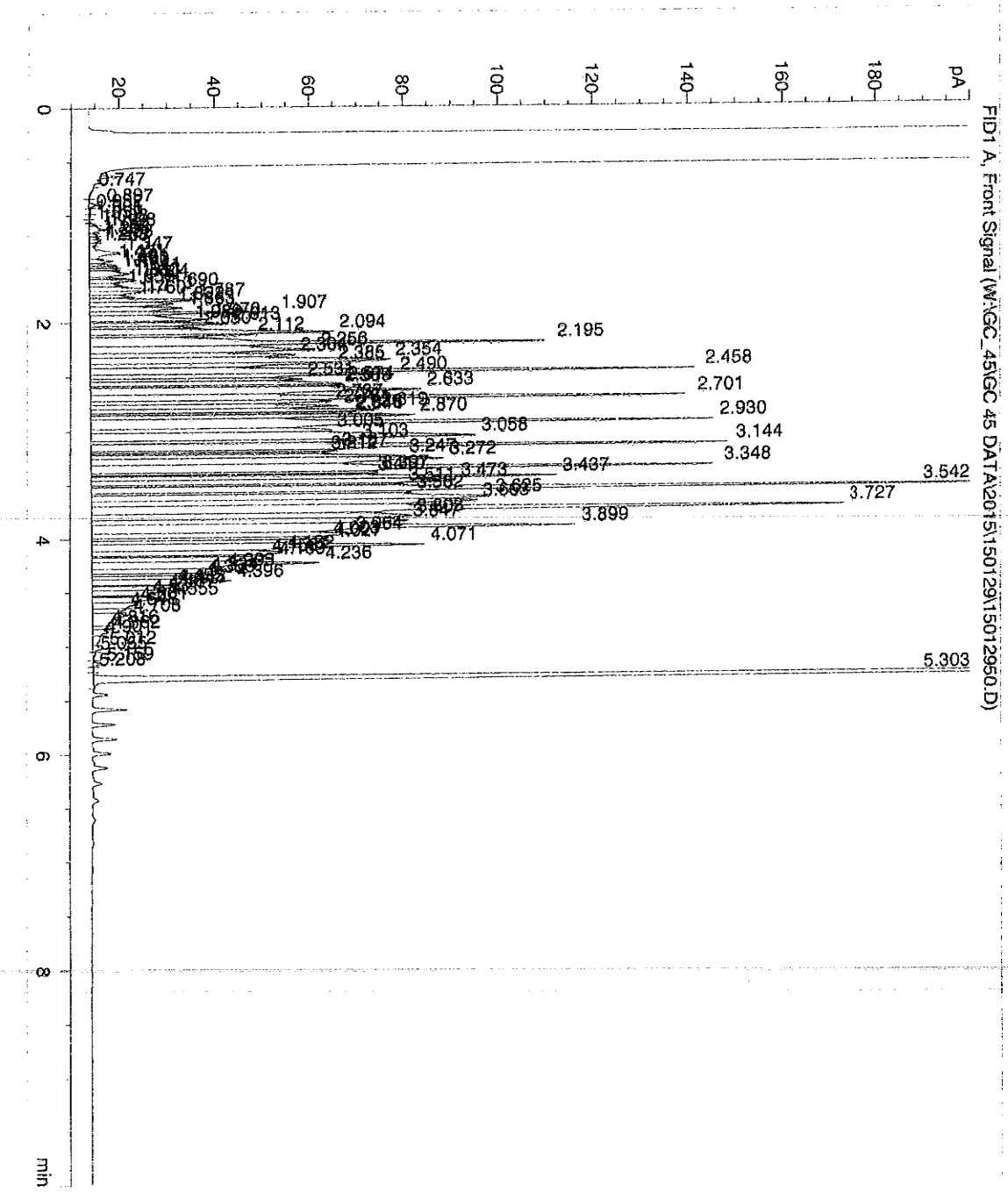
Data File Name : W:\GC_45\GC 45 DATA\2015\150129\15012950.D
Page Number : 4
Operator :
Instrument : GC 45
Sample Name : D400 C28 50 L012815D

Acquired on : 30 Jan 15 04:28 am
Report Created on: 30 Jan 15 07:35 pm

Vial Number : Vial 50
Injection Number : 1
Sequence Line : 50
Instrument Method: C:\CHEM32\1\METHODS\ ->

Analysis Method : 8015B.MTH

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



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WORK ORDER NUMBER: 15-01-1810

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 02/05/2015 by:
Terri Chang
Project Manager

ResultLink

Email your PM

ACCREDITED IN ACCORDANCE WITH nelac

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Client Project Name: Red Hill LTM 112066
Work Order Number: 15-01-1810

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Work Order Narrative

Work Order: 15-01-1810 Page 1 of 1

Condition Upon Receipt:

Samples were received under Chain-of-Custody (COC) on 01/29/15. They were assigned to Work Order 15-01-1810.

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.

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.
354 Uluniu Street, Suite 304
Kailua, HI 96734-2500

Project: Red Hill LTM 112066

Date Received: 01/29/15
Work Order: 15-01-1810
Preparation: EPA 3510C
Method: EPA 8015B (M)
Units: ug/L

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
ES126	**15-01-1810-2-K**	**01/28/15 10:35**	**Aqueous**	**GC 45**	**02/02/15**	**02/03/15 03:03**	**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	1100	2.9	10	25	1.00	HD

Surrogate	Rec. (%)	Control Limits	Qualifiers
n-Octacosane	70	51-141	

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
ES127	**15-01-1810-3-I**	**01/28/15 11:30**	**Aqueous**	**GC 45**	**02/02/15**	**02/03/15 03:24**	**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	1700	2.9	10	25	1.00	HD

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

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
ES123	**15-01-1810-4-I**	**01/28/15 09:30**	**Aqueous**	**GC 45**	**02/02/15**	**02/03/15 03:44**	**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	39	2.9	10	25	1.00	HD

Surrogate	Rec. (%)	Control Limits	Qualifiers
n-Octacosane	64	51-141	

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
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.
354 Uluniu Street, Suite 304
Kailua, HI 96734-2500

Project: Red Hill LTM 112066

Date Received: 01/29/15
Work Order: 15-01-1810
Preparation: EPA 3005A Filt.
Method: EPA 6020
Units: ug/L

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
ES126	**15-01-1810-2-R**	**01/28/15 10:35**	**Aqueous**	**ICP/MS 04**	**02/03/15**	**02/03/15 20:52**	**150203LA3D**

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

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
ES127	**15-01-1810-3-J**	**01/28/15 11:30**	**Aqueous**	**ICP/MS 04**	**02/03/15**	**02/03/15 20:54**	**150203LA3D**

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

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
ES123	**15-01-1810-4-G**	**01/28/15 09:30**	**Aqueous**	**ICP/MS 04**	**02/03/15**	**02/03/15 20:56**	**150203LA3D**

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

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
Method Blank	**099-14-497-118**	**N/A**	**Aqueous**	**ICP/MS 04**	**02/03/15**	**02/03/15 20:40**	**150203LA3D**

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.
354 Uluniu Street, Suite 304
Kailua, HI 96734-2500

Date Received: 01/29/15
Work Order: 15-01-1810
Preparation: EPA 3510C
Method: EPA 8270C SIM PAHs
Units: ug/L

Project: Red Hill LTM 112066

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
ES126	**15-01-1810-2-N**	**01/28/15 10:35**	**Aqueous**	**GC/MS AAA**	**01/30/15**	**02/02/15 22:48**	**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
2-Methylnaphthalene	7.6	0.046	0.050	0.20	1.00	
Acenaphthylene	<0.050	0.044	0.050	0.20	1.00	U
Acenaphthene	0.59	0.027	0.050	0.20	1.00	
Fluorene	0.30	0.042	0.050	0.20	1.00	
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	0.046	0.050	0.20	1.00	U
Pyrene	<0.050	0.020	0.050	0.20	1.00	U
Benzo (a) Anthracene	<0.050	0.032	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	0.017	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	0.047	0.050	0.20	1.00	U
Benzo (g,h,i) Perylene	<0.099	0.081	0.099	0.20	1.00	U

Surrogate	Rec. (%)	Control Limits	Qualifiers
Nitrobenzene-d5	90	28-139	
2-Fluorobiphenyl	68	33-144	
p-Terphenyl-d14	66	23-160	

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
ES126	**15-01-1810-2-N**	**01/28/15 10:35**	**Aqueous**	**GC/MS AAA**	**01/30/15**	**02/03/15 16:18**	**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	90	0.34	0.50	2.0	10.0	
1-Methylnaphthalene	34	0.51	0.99	2.0	10.0	

Surrogate	Rec. (%)	Control Limits	Qualifiers
Nitrobenzene-d5	0	28-139	1,2,6
2-Fluorobiphenyl	64	33-144	
p-Terphenyl-d14	69	23-160	

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Analytical Report

Environmental Science International, Inc.		Date Received:	01/29/15
354 Uluniu Street, Suite 304		Work Order:	15-01-1810
Kailua, HI 96734-2500		Preparation:	EPA 3510C
		Method:	EPA 8270C SIM PAHs
		Units:	ug/L
Project: Red Hill LTM 112066			Page 2 of 4

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
ES127	**15-01-1810-3-H**	**01/28/15 11:30**	**Aqueous**	**GC/MS AAA**	**01/30/15**	**02/02/15 23:08**	**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
2-Methylnaphthalene	2.7	0.046	0.049	0.20	1.00	
Acenaphthylene	<0.049	0.044	0.049	0.20	1.00	U
Acenaphthene	0.55	0.026	0.049	0.20	1.00	
Fluorene	0.22	0.042	0.049	0.20	1.00	
Phenanthrene	<0.049	0.027	0.049	0.20	1.00	U
Anthracene	<0.049	0.028	0.049	0.20	1.00	U
Fluoranthene	<0.049	0.046	0.049	0.20	1.00	U
Pyrene	<0.049	0.020	0.049	0.20	1.00	U
Benzo (a) Anthracene	<0.049	0.032	0.049	0.20	1.00	U
Chrysene	<0.049	0.024	0.049	0.20	1.00	U
Benzo (k) Fluoranthene	<0.049	0.030	0.049	0.20	1.00	U
Benzo (b) Fluoranthene	<0.049	0.017	0.049	0.20	1.00	U
Benzo (a) Pyrene	<0.049	0.022	0.049	0.20	1.00	U
Indeno (1,2,3-c,d) Pyrene	<0.049	0.021	0.049	0.20	1.00	U
Dibenz (a,h) Anthracene	<0.049	0.047	0.049	0.20	1.00	U
Benzo (g,h,i) Perylene	<0.098	0.080	0.098	0.20	1.00	U

Surrogate	Rec. (%)	Control Limits	Qualifiers
Nitrobenzene-d5	61	28-139	
2-Fluorobiphenyl	58	33-144	
p-Terphenyl-d14	61	23-160	

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
ES127	**15-01-1810-3-H**	**01/28/15 11:30**	**Aqueous**	**GC/MS AAA**	**01/30/15**	**02/03/15 16:38**	**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	63	0.33	0.49	2.0	10.0	
1-Methylnaphthalene	25	0.51	0.98	2.0	10.0	

Surrogate	Rec. (%)	Control Limits	Qualifiers
Nitrobenzene-d5	0	28-139	1,2,6
2-Fluorobiphenyl	50	33-144	
p-Terphenyl-d14	56	23-160	

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Analytical Report

Environmental Science International, Inc.
354 Uluniu Street, Suite 304
Kailua, HI 96734-2500

Date Received: 01/29/15
Work Order: 15-01-1810
Preparation: EPA 3510C
Method: EPA 8270C SIM PAHs
Units: ug/L

Project: Red Hill LTM 112066

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
ES123	**15-01-1810-4-J**	**01/28/15 09:30**	**Aqueous**	**GC/MS AAA**	**01/30/15**	**02/02/15 23:28**	**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	<0.048	0.033	0.048	0.19	1.00	U
2-Methylnaphthalene	<0.048	0.045	0.048	0.19	1.00	U
1-Methylnaphthalene	<0.097	0.050	0.097	0.19	1.00	U
Acenaphthylene	<0.048	0.043	0.048	0.19	1.00	U
Acenaphthene	<0.048	0.026	0.048	0.19	1.00	U
Fluorene	<0.048	0.041	0.048	0.19	1.00	U
Phenanthrene	<0.048	0.026	0.048	0.19	1.00	U
Anthracene	<0.048	0.028	0.048	0.19	1.00	U
Fluoranthene	<0.048	0.045	0.048	0.19	1.00	U
Pyrene	<0.048	0.020	0.048	0.19	1.00	U
Benzo (a) Anthracene	<0.048	0.032	0.048	0.19	1.00	U
Chrysene	<0.048	0.024	0.048	0.19	1.00	U
Benzo (k) Fluoranthene	<0.048	0.030	0.048	0.19	1.00	U
Benzo (b) Fluoranthene	<0.048	0.017	0.048	0.19	1.00	U
Benzo (a) Pyrene	<0.048	0.022	0.048	0.19	1.00	U
Indeno (1,2,3-c,d) Pyrene	<0.048	0.020	0.048	0.19	1.00	U
Dibenz (a,h) Anthracene	<0.048	0.046	0.048	0.19	1.00	U
Benzo (g,h,i) Perylene	<0.097	0.079	0.097	0.19	1.00	U

Surrogate	Rec. (%)	Control Limits	Qualifiers
Nitrobenzene-d5	50	28-139	
2-Fluorobiphenyl	55	33-144	
p-Terphenyl-d14	67	23-160	

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Analytical Report

Environmental Science International, Inc.
354 Uluniu Street, Suite 304
Kailua, HI 96734-2500

Date Received: 01/29/15
Work Order: 15-01-1810
Preparation: EPA 3510C
Method: EPA 8270C SIM PAHs
Units: ug/L

Project: Red Hill LTM 112066

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.
354 Uluniu Street, Suite 304
Kailua, HI 96734-2500

Date Received: 01/29/15
Work Order: 15-01-1810
Preparation: EPA 5030C
Method: GC/MS / EPA 8260B
Units: ug/L

Project: Red Hill LTM 112066

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
ESTRIP	**15-01-1810-1-A**	**01/28/15 09:00**	**Aqueous**	**GC/MS OO**	**01/31/15**	**01/31/15 14:11**	**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.
354 Uluniu Street, Suite 304
Kailua, HI 96734-2500

Date Received: 01/29/15
Work Order: 15-01-1810
Preparation: EPA 5030C
Method: GC/MS / EPA 8260B
Units: ug/L

Project: Red Hill LTM 112066

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	105	80-134	
Toluene-d8	97	80-120	
Toluene-d8-TPPH	98	88-112	
1,4-Bromofluorobenzene	90	80-120	

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Analytical Report

Environmental Science International, Inc.
354 Uluniu Street, Suite 304
Kailua, HI 96734-2500

Date Received: 01/29/15
Work Order: 15-01-1810
Preparation: EPA 5030C
Method: GC/MS / EPA 8260B
Units: ug/L

Project: Red Hill LTM 112066

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
ES126	**15-01-1810-2-A**	**01/28/15 10:35**	**Aqueous**	**GC/MS OO**	**01/31/15**	**01/31/15 14:38**	**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	0.16	0.14	0.50	1.0	1.00	J
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.
354 Uluniu Street, Suite 304
Kailua, HI 96734-2500

Date Received: 01/29/15
Work Order: 15-01-1810
Preparation: EPA 5030C
Method: GC/MS / EPA 8260B
Units: ug/L

Project: Red Hill LTM 112066

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	0.35	0.23	0.50	1.0	1.00	J
Methyl-t-Butyl Ether (MTBE)	<0.50	0.31	0.50	1.0	1.00	U
Gasoline Range Organics	54	26	30	50	1.00	

Surrogate	Rec. (%)	Control Limits	Qualifiers
Dibromofluoromethane	104	80-126	
1,2-Dichloroethane-d4	107	80-134	
Toluene-d8	97	80-120	
Toluene-d8-TPPH	98	88-112	
1,4-Bromofluorobenzene	93	80-120	

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Analytical Report

Environmental Science International, Inc.
354 Uluniu Street, Suite 304
Kailua, HI 96734-2500

Date Received: 01/29/15
Work Order: 15-01-1810
Preparation: EPA 5030C
Method: GC/MS / EPA 8260B
Units: ug/L

Project: Red Hill LTM 112066

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
ES127	**15-01-1810-3-A**	**01/28/15 11:30**	**Aqueous**	**GC/MS OO**	**01/31/15**	**01/31/15 16:52**	**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	0.17	0.14	0.50	1.0	1.00	J
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.
354 Uluniu Street, Suite 304
Kailua, HI 96734-2500

Date Received: 01/29/15
Work Order: 15-01-1810
Preparation: EPA 5030C
Method: GC/MS / EPA 8260B
Units: ug/L

Project: Red Hill LTM 112066

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	0.35	0.23	0.50	1.0	1.00	J
Methyl-t-Butyl Ether (MTBE)	<0.50	0.31	0.50	1.0	1.00	U
Gasoline Range Organics	59	26	30	50	1.00	

Surrogate	Rec. (%)	Control Limits	Qualifiers
Dibromofluoromethane	102	80-126	
1,2-Dichloroethane-d4	106	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.
354 Uluniu Street, Suite 304
Kailua, HI 96734-2500

Date Received: 01/29/15
Work Order: 15-01-1810
Preparation: EPA 5030C
Method: GC/MS / EPA 8260B
Units: ug/L

Project: Red Hill LTM 112066

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
ES123	**15-01-1810-4-A**	**01/28/15 09:30**	**Aqueous**	**GC/MS OO**	**01/31/15**	**01/31/15 17:19**	**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.
354 Uluniu Street, Suite 304
Kailua, HI 96734-2500

Date Received: 01/29/15
Work Order: 15-01-1810
Preparation: EPA 5030C
Method: GC/MS / EPA 8260B
Units: ug/L

Project: Red Hill LTM 112066

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	103	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.
354 Uluniu Street, Suite 304
Kailua, HI 96734-2500

Date Received: 01/29/15
Work Order: 15-01-1810
Preparation: EPA 5030C
Method: GC/MS / EPA 8260B
Units: ug/L

Project: Red Hill LTM 112066

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.
354 Uluniu Street, Suite 304
Kailua, HI 96734-2500

Date Received: 01/29/15
Work Order: 15-01-1810
Preparation: EPA 5030C
Method: GC/MS / EPA 8260B
Units: ug/L

Project: Red Hill LTM 112066

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:	01/29/15
354 Uluniu Street, Suite 304	Work Order:	15-01-1810
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
ES126	**Sample**	**Aqueous**	**GC 45**	**02/02/15**	**02/03/15 03:03**	**150202S09**
ES126	**Matrix Spike**	**Aqueous**	**GC 45**	**02/02/15**	**02/03/15 02:23**	**150202S09**
ES126	**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	

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RPD: Relative Percent Difference. CL: Control Limits

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Quality Control - Spike/Spike Duplicate

Environmental Science International, Inc.	Date Received:	01/29/15
354 Uluniu Street, Suite 304	Work Order:	15-01-1810
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
ES126	**Sample**	**Aqueous**	**ICP/MS 04**	**02/03/15**	**02/03/15 20:52**	**150203SA3**
ES126	**Matrix Spike**	**Aqueous**	**ICP/MS 04**	**02/03/15**	**02/03/15 20:44**	**150203SA3**
ES126	**Matrix Spike Duplicate**	**Aqueous**	**ICP/MS 04**	**02/03/15**	**02/03/15 20:46**	**150203SA3**

Parameter	Sample Conc.	Spike Added	MS Conc.	MS %Rec.	MSD Conc.	MSD %Rec.	%Rec. CL	RPD	RPD CL	Qualifiers
Lead	ND	100.0	99.87	100	103.6	104	80-120	4	0-20	

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RPD: Relative Percent Difference. CL: Control Limits

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Quality Control - Spike/Spike Duplicate

Environmental Science International, Inc.		Date Received:	01/29/15
354 Uluniu Street, Suite 304		Work Order:	15-01-1810
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
ES126	**Sample**	**Aqueous**	**GC/MS AAA**	**01/30/15**	**02/03/15 16:18**	**150130S19A**
ES126	**Matrix Spike**	**Aqueous**	**GC/MS AAA**	**01/30/15**	**02/02/15 20:07**	**150130S19A**
ES126	**Matrix Spike Duplicate**	**Aqueous**	**GC/MS AAA**	**01/30/15**	**02/02/15 20:28**	**150130S19A**

Parameter	Sample Conc.	Spike Added	MS Conc.	MS %Rec.	MSD Conc.	MSD %Rec.	%Rec. CL	RPD	RPD CL	Qualifiers
Naphthalene	89.96	2.000	83.41	0	72.55	0	21-133	14	0-25	3
2-Methylnaphthalene	7.590	2.000	4.948	0	5.156	0	21-140	4	0-25	3
1-Methylnaphthalene	34.15	2.000	28.85	0	25.83	0	20-140	11	0-25	3
Acenaphthylene	ND	2.000	1.563	78	1.498	75	33-145	4	0-25	
Acenaphthene	0.5935	2.000	2.018	71	1.843	62	49-121	9	0-25	
Fluorene	0.2969	2.000	1.704	70	1.568	64	59-121	8	0-25	
Phenanthrene	ND	2.000	1.611	81	1.556	78	54-120	3	0-25	
Anthracene	ND	2.000	1.320	66	1.240	62	27-133	6	0-25	
Fluoranthene	ND	2.000	1.451	73	1.374	69	26-137	5	0-25	
Pyrene	ND	2.000	1.468	73	1.444	72	18-168	2	0-25	
Benzo (a) Anthracene	ND	2.000	1.409	70	1.328	66	33-143	6	0-25	
Chrysene	ND	2.000	1.471	74	1.401	70	17-168	5	0-25	
Benzo (k) Fluoranthene	ND	2.000	1.556	78	1.356	68	24-159	14	0-25	
Benzo (b) Fluoranthene	ND	2.000	1.200	60	1.070	54	24-159	11	0-25	
Benzo (a) Pyrene	ND	2.000	1.293	65	1.207	60	17-163	7	0-25	
Indeno (1,2,3-c,d) Pyrene	ND	2.000	1.330	66	1.261	63	10-171	5	0-25	
Dibenz (a,h) Anthracene	ND	2.000	1.381	69	1.271	64	10-219	8	0-25	
Benzo (g,h,i) Perylene	ND	2.000	1.264	63	1.348	67	10-227	6	0-25	

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RPD: Relative Percent Difference. CL: Control Limits

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Quality Control - Spike/Spike Duplicate

Environmental Science International, Inc.		Date Received:	01/29/15
354 Uluniu Street, Suite 304		Work Order:	15-01-1810
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
ES126	**Sample**	**Aqueous**	**GC/MS OO**	**01/31/15**	**01/31/15 14:38**	**150131S001**
ES126	**Matrix Spike**	**Aqueous**	**GC/MS OO**	**01/31/15**	**01/31/15 15:05**	**150131S001**
ES126	**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:	01/29/15
354 Uluniu Street, Suite 304	Work Order:	15-01-1810
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	

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RPD: Relative Percent Difference. CL: Control Limits

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Quality Control - PDS

Environmental Science International, Inc.		Date Received:	01/29/15
354 Uluniu Street, Suite 304		Work Order:	15-01-1810
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
ES126	**Sample**	**Aqueous**	**ICP/MS 04**	**02/03/15 00:00**	**02/03/15 20:52**	**150203SA3**
ES126	**PDS**	**Aqueous**	**ICP/MS 04**	**02/03/15 00:00**	**02/03/15 20:48**	**150203SA3**

Parameter	Sample Conc.	Spike Added	PDS Conc.	PDS %Rec.	%Rec. CL	Qualifiers
Lead	ND	100.0	98.15	98	75-125	

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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:	01/29/15
354 Uluniu Street, Suite 304		Work Order:	15-01-1810
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:	01/29/15
354 Uluniu Street, Suite 304		Work Order:	15-01-1810
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
099-14-497-118	**LCS**	**Aqueous**	**ICP/MS 04**	**02/03/15**	**02/03/15 20:42**	**150203LA3D**

Parameter	Spike Added	Conc. Recovered	LCS %Rec.	%Rec. CL	Qualifiers
Lead	100.0	96.03	96	80-120	

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RPD: Relative Percent Difference. CL: Control Limits

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Quality Control - LCS

Environmental Science International, Inc.		Date Received:	01/29/15
354 Uluniu Street, Suite 304		Work Order:	15-01-1810
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.
354 Uluniu Street, Suite 304
Kailua, HI 96734-2500

Project: Red Hill LTM 112066

Date Received: 01/29/15
Work Order: 15-01-1810
Preparation: EPA 5030C
Method: GC/MS / EPA 8260B
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:	01/29/15
354 Uluniu Street, Suite 304		Work Order:	15-01-1810
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	

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RPD: Relative Percent Difference. CL: Control Limits

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Sample Analysis Summary Report

Work Order: 15-01-1810 Page 1 of 1

Method	Extraction	Chemist ID	Instrument	Analytical Location
EPA 6020	EPA 3005A Filt.	598	ICP/MS 04	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: 15-01-1810 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

WO NO. / LAB USE ONLY: **15-01-1810**

DATE: 1/28/15

PAGE: 1 OF 1

LABORATORY CLIENT: ESI

ADDRESS: 354 Uluhiu St., Suite 304

CITY: Kailua STATE: HI ZIP: 96734

TEL: 808-261-0740 E-MAIL: jhattemer@esciencei.com, dfehor@esciencei.com

CLIENT PROJECT NAME / NO.: Red Hill LTM 112066

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	1/28/15	0900	water	3		X		X					X												
2	ES126	1/28/15	~~0930~~ 1035	water	10		X	X	X	X				X							X			X			
	ES126 MS/MSD	1/28/15	1035	water	10		X	X	X	X				X							X			X			
3	ES127	1/28/15	1130	water	10		X	X	X	X				X							X			X			
4	ES123	1/28/15	0930	water	10		X	X	X	X				X							X			X			

Relinquished by: (Signature) Jeff Hattemer	Received by: (Signature/Affiliation)	Date: 1/28/15	Time: 1430
Relinquished by: (Signature)	Received by: (Signature/Affiliation)	Date:	Time:
Relinquished by: (Signature)	Received by: (Signature/Affiliation)	Date: 1/29/15	Time: 1000

2014-07-01 Revision

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ORIGIN ID:HNLA

UNITED STATES US

SHIP DATE: 28JAN15
ACTWGT: 52.4 LB
CAD: /POS1525
DIMS: 24x15x13 IN

BILL RECIPIENT

TO SMPLE CONTROL
CALSCIENCE LABORTORIES
7440 LINCOLN WAY

GARDEN GROVE CA 92841

(714) 895-5494 REF:

INV:

PO: DEPT:

FedEx Express

J151015011401uv

1 of 2

TRK# 0200 8059 2709 6814

MASTER

WZ APVA

THU - 29 JAN AA
STANDARD OVERNIGHT

92841
CA-US SNA

1510

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ORIGIN ID:HNLA

SHIP DATE: 28JAN15
ACTWGT: 51.3 LB
CAD: /POS1525
DIMS: 24x15x13 IN

BILL RECIPIENT

UNITED STATES US

TO SMPLE CONTROL
CALSCIENCE LABORTORIES
7440 LINCOLN WAY

GARDEN GROVE CA 92841

(714) 895-6494 REF:

INV:
PO: DEPT:

FedEx
Express

2 of 2

MPS# 0681 7801 7093 8910

Mstr# 8059 2709 6814 0200

THU - 29 JAN AA
STANDARD OVERNIGHT

WZ APVA

92841
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WORK ORDER #: 15-01-1810

SAMPLE RECEIPT FORM

Cooler 1 of 1

CLIENT: ESI

DATE: 01/29/15

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

Temperature 2.7 °C + 0.2 °C (CF) = 2.9 °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:** LS

CUSTODY SEALS INTACT:

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

☑ Sample ☐ _____ ☐ No (Not Intact) ☑ Not Present **Checked by:** 977

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 (-1) ☐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:** 977/→

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

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eurofins | Calscience

WORK ORDER #: 15-01-1810

SAMPLE RECEIPT FORM

Cooler 1 of 1

CLIENT: EST

DATE: 01/30/15

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

Temperature 2.9 °C + 0.2 °C (CF) = 3.1 °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: 977

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 ☐VOA**h** ☐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#:**_____ **Labeled/Checked by:** 977

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

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

WORK ORDER:	**15-01-1810**	ANALYZED BY:	960
INSTRUMENT:	GC 45	D/T ANALYZED:	2015-02-03 03:03
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\15020252.D\15020252

 # 2 **CLIENT SAMPLE NUMBER: ES126**

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, are 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	220000	1.00	1100	2.9	10	25	b

Area Percent Report

Data File Name : W:\GC_45\GC 45 DATA\2015\150202\15020252.D
Page Number : 1
Operator :
Instrument : GC 45
Sample Name : 15-01-1810-2

Vial Number : Vial 52
Injection Number : 1
Sequence Line : 52
Instrument Method: C:\CHEM32\1\METHODS\ ->

Acquired on : 03 Feb 15 03:03 am
Report Created on: 03 Feb 15 03:36 pm

Analysis Method : 8015B.MTH

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

Pk	Ret Time	Area	Height	Peak	Width	Response %
1	5.334	621.38	439	BB	0.022	100.000
2	0.000	0.00	0		0.000	0.000

Total area = 621.38
0.00

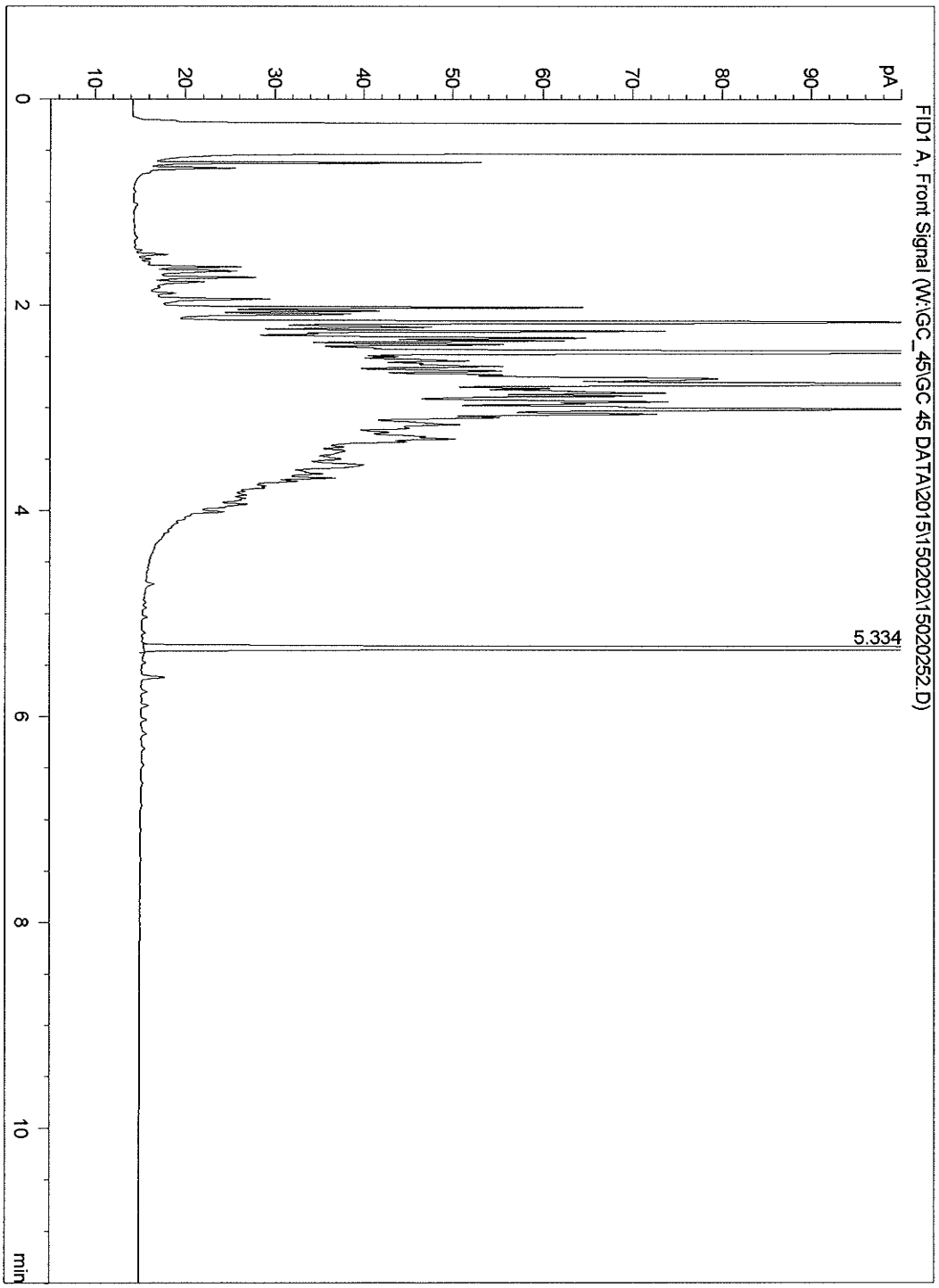
Area Percent Report

Data File Name : W:\GC_45\GC 45 DATA\2015\150202\15020252.D
Page Number : 2
Operator :
Instrument : GC 45
Sample Name : 15-01-1810-2

Vial Number : Vial 52
Injection Number : 1
Sequence Line : 52
Instrument Method: C:\CHEM32\1\METHODS\ ->

Acquired on : 03 Feb 15 03:03 am
Report Created on: 03 Feb 15 03:36 pm

Analysis Method : 8015B.MTH



Area Percent Report

Data File Name : W:\GC_45\GC 45 DATA\2015\150202\15020252.D
Page Number : 1
Operator : 682
Instrument : GC 45
Sample Name : 15-01-1810-2
Vial Number : Vial 52
Injection Number : 1
Sequence Line : 52
Instrument Method: C:\CHEM32\1\METHODS\ ->
Acquired on : 03 Feb 15 03:03 am
Report Created on: 03 Feb 15 03:33 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	1.941	30.25	15	VV	0.029	0.626
2	2.022	61.89	50	VV	0.020	1.281
3	2.056	73.99	27	VV	0.035	1.531
4	2.164	169.21	96	VV	0.028	3.502
5	2.212	54.13	33	VV	0.024	1.120
6	2.252	103.98	59	VV	0.026	2.152
7	2.317	149.21	50	VV	0.041	3.088
8	2.381	67.99	41	VV	0.023	1.407
9	2.451	531.93	328	VV	0.024	11.008
10	2.539	80.44	37	VV	0.033	1.665
11	2.593	123.19	41	VV	0.041	2.549
12	2.638	84.03	41	VV	0.030	1.739
13	2.714	239.73	65	VV	0.053	4.961
14	2.766	280.11	144	VV	0.029	5.797
15	2.851	308.45	59	VV	0.065	6.383
16	2.939	173.99	60	VV	0.039	3.601
17	3.010	250.52	102	VV	0.035	5.184
18	3.058	201.49	58	VV	0.045	4.170
19	3.161	182.10	36	VV	0.065	3.768
20	3.238	54.84	28	VV	0.027	1.135
21	3.301	196.53	36	VV	0.068	4.067
22	3.379	43.41	23	VV	0.026	0.898
23	3.420	94.19	23	VV	0.053	1.949
24	3.497	70.89	23	VV	0.043	1.467
25	3.558	113.87	25	VV	0.067	2.357
26	3.641	62.78	21	VV	0.040	1.299
27	3.684	86.14	22	VV	0.050	1.783
28	3.764	65.73	15	VV	0.056	1.360
29	3.848	24.41	12	VV	0.027	0.505
30	3.882	37.99	12	VV	0.041	0.786
31	3.941	42.34	12	VV	0.046	0.876
32	4.013	117.83	10	VV	0.147	2.438
33	4.713	11.50	2	VV	0.079	0.238
34	4.892	2.55	1	VV	0.038	0.053
35	4.943	3.39	1	VV	0.047	0.070
36	5.036	5.04	1	VV	0.060	0.104
37	5.186	2.58	1	VV	0.040	0.053

Area Percent Report

Data File Name : W:\GC_45\GC 45 DATA\2015\150202\15020252.D
Page Number : 2
Operator : 682
Instrument : GC 45
Sample Name : 15-01-1810-2
Acquired on : 03 Feb 15 03:03 am
Report Created on: 03 Feb 15 03:33 pm
Vial Number : Vial 52
Injection Number : 1
Sequence Line : 52
Instrument Method: C:\CHEM32\1\METHODS\ ->
Analysis Method : 8015B.MTH

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Pk	Ret Time	Area	Height	Peak	Width	Response %
38	5.238	1.68	1	VV	0.041	0.035
39	5.333	627.84	440	VV	0.024	12.993

Total area = 4832.19

==========

Area Percent Report

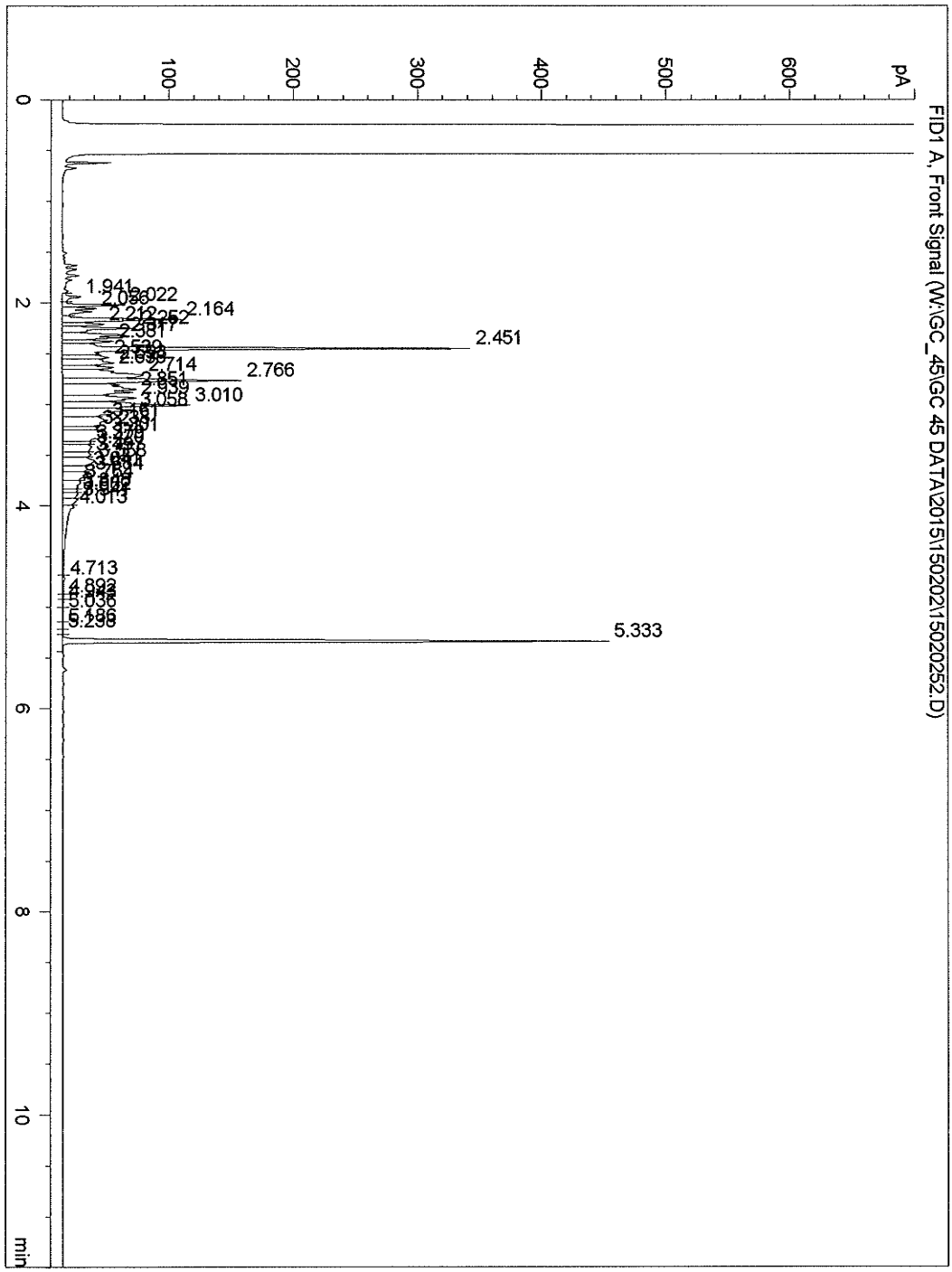
==========

Data File Name : W:\GC_45\GC 45 DATA\2015\150202\15020252.D
Page Number : 3
Operator : 682
Instrument : GC 45
Sample Name : 15-01-1810-2

Vial Number : Vial 52
Injection Number : 1
Sequence Line : 52
Instrument Method: C:\CHEM32\1\METHODS\ ->

Acquired on : 03 Feb 15 03:03 am
Report Created on: 03 Feb 15 03:33 pm

Analysis Method : 8015B.MTH



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

WORK ORDER:	**15-01-1810**	ANALYZED BY:	960
INSTRUMENT:	GC 45	D/T ANALYZED:	2015-02-03 03:24
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\15020253.D\15020253

 # 3 **CLIENT SAMPLE NUMBER: ES127**

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, are 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	330000	1.00	1650	2.9	10	25	b

Area Percent Report

Data File Name : W:\GC_45\GC 45 DATA\2015\150202\15020253.D
Page Number : 1
Operator :
Instrument : GC 45
Sample Name : 15-01-1810-3
Acquired on : 03 Feb 15 03:24 am
Report Created on: 03 Feb 15 03:36 pm

Vial Number : Vial 53
Injection Number : 1
Sequence Line : 53
Instrument Method: C:\CHEM32\1\METHODS\ ->
Analysis Method : 8015B.MTH

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

Pk	Ret Time	Area	Height	Peak	Width	Response %
1	5.330	823.29	588	BB	0.021	100.000
2	0.000	0.00	0		0.000	0.000

Total area = 823.29
0.00

==========

Area Percent Report

==========

Data File Name : W:\GC_45\GC 45 DATA\2015\150202\15020253.D
Page Number : 2
Operator :
Instrument : GC 45
Sample Name : 15-01-1810-3

Acquired on : 03 Feb 15 03:24 am
Report Created on: 03 Feb 15 03:36 pm

Vial Number : Vial 53
Injection Number : 1
Sequence Line : 53
Instrument Method: C:\CHEM32\1\METHODS\ ->
Analysis Method : 8015B.MTH

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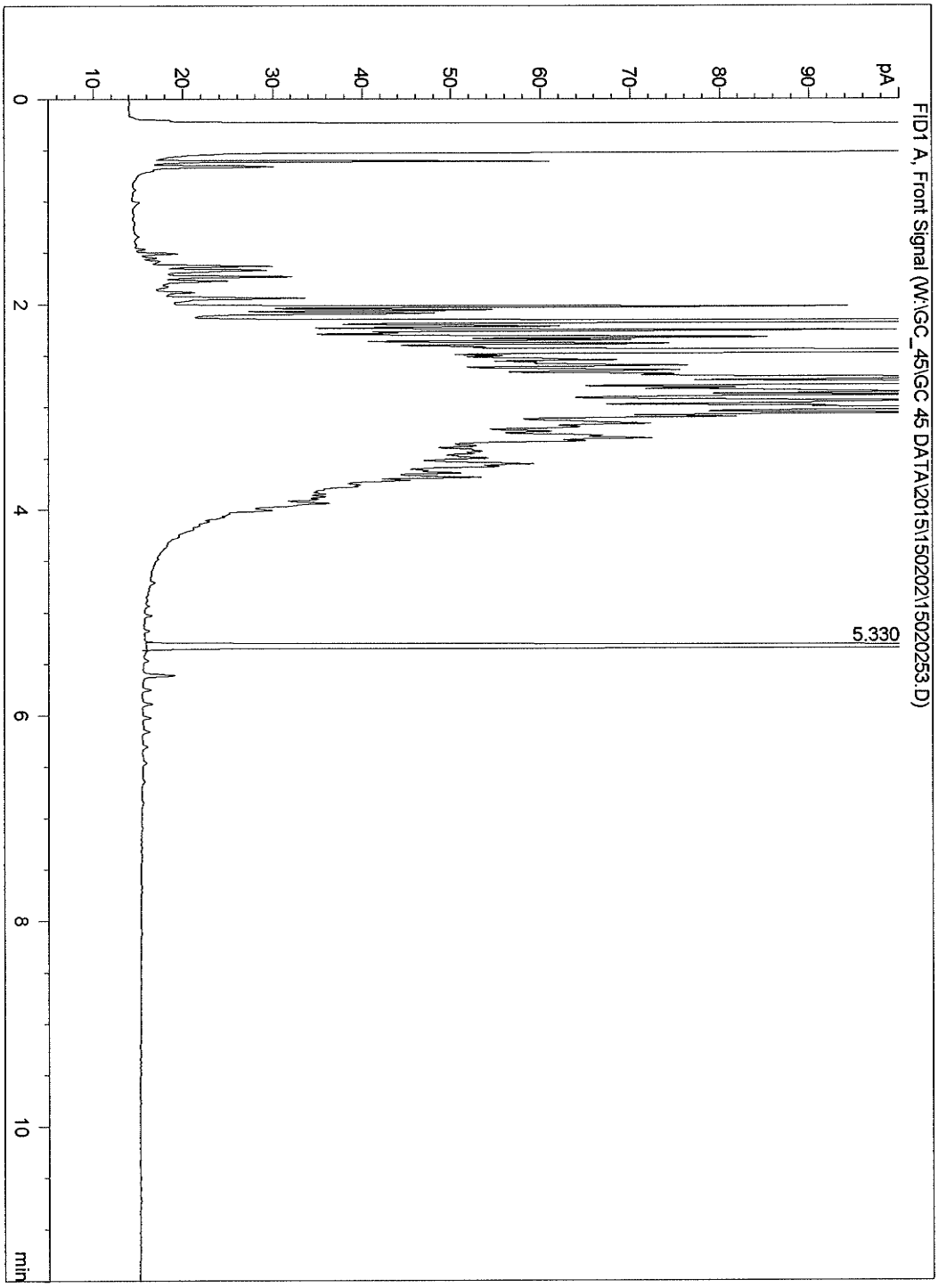


Area Percent Report

Data File Name : W:\GC_45\GC 45 DATA\2015\150202\15020253.D
Page Number : 1
Operator : 682
Instrument : GC 45
Sample Name : 15-01-1810-3

Vial Number : Vial 53
Injection Number : 1
Sequence Line : 53
Instrument Method: C:\CHEM32\1\METHODS\ ->

Acquired on : 03 Feb 15 03:24 am
Report Created on: 03 Feb 15 03:33 pm

Analysis Method : 8015B.MTH

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

Pk	Ret Time	Area	Height	Peak	Width	Response %
1	1.941	38.91	19	VV	0.029	0.545
2	2.021	139.02	80	VV	0.025	1.947
3	2.086	56.47	34	VV	0.024	0.791
4	2.165	242.37	135	VV	0.029	3.394
5	2.212	75.92	48	VV	0.024	1.063
6	2.251	147.24	86	VV	0.025	2.062
7	2.317	196.66	71	VV	0.038	2.754
8	2.381	97.69	60	VV	0.023	1.368
9	2.451	685.03	451	VV	0.024	9.592
10	2.539	162.78	54	VV	0.043	2.279
11	2.593	176.48	62	VV	0.038	2.471
12	2.638	127.59	61	VV	0.030	1.787
13	2.714	329.70	94	VV	0.050	4.617
14	2.766	386.94	193	VV	0.029	5.418
15	2.851	475.58	92	VV	0.064	6.660
16	2.939	264.81	93	VV	0.039	3.708
17	3.010	367.87	158	VV	0.032	5.151
18	3.057	314.31	90	VV	0.047	4.401
19	3.159	289.92	58	VV	0.065	4.060
20	3.237	90.15	47	VV	0.028	1.262
21	3.300	309.70	58	VV	0.068	4.337
22	3.377	76.47	38	VV	0.028	1.071
23	3.429	162.98	39	VV	0.053	2.282
24	3.496	114.48	39	VV	0.040	1.603
25	3.554	193.72	45	VV	0.057	2.713
26	3.641	105.07	36	VV	0.039	1.471
27	3.684	373.51	39	VV	0.118	5.230
28	3.939	74.80	22	VV	0.045	1.047
29	4.007	196.88	15	VV	0.157	2.757
30	4.711	15.09	2	VV	0.097	0.211
31	4.884	3.55	1	VV	0.047	0.050
32	4.938	4.38	1	VV	0.046	0.061
33	5.032	6.89	2	VV	0.058	0.097
34	5.181	4.24	1	VV	0.045	0.059
35	5.329	834.08	590	VV	0.023	11.680

Total area =

Area Percent Report

Data File Name : W:\GC_45\GC 45 DATA\2015\150202\15020253.D
Page Number : 2
Operator : 682
Instrument : GC 45
Sample Name : 15-01-1810-3

Acquired on : 03 Feb 15 03:24 am
Report Created on: 03 Feb 15 03:33 pm

Vial Number : Vial 53
Injection Number : 1
Sequence Line : 53
Instrument Method: C:\CHEM32\1\METHODS\ ->

Analysis Method : 8015B.MTH

7141.30

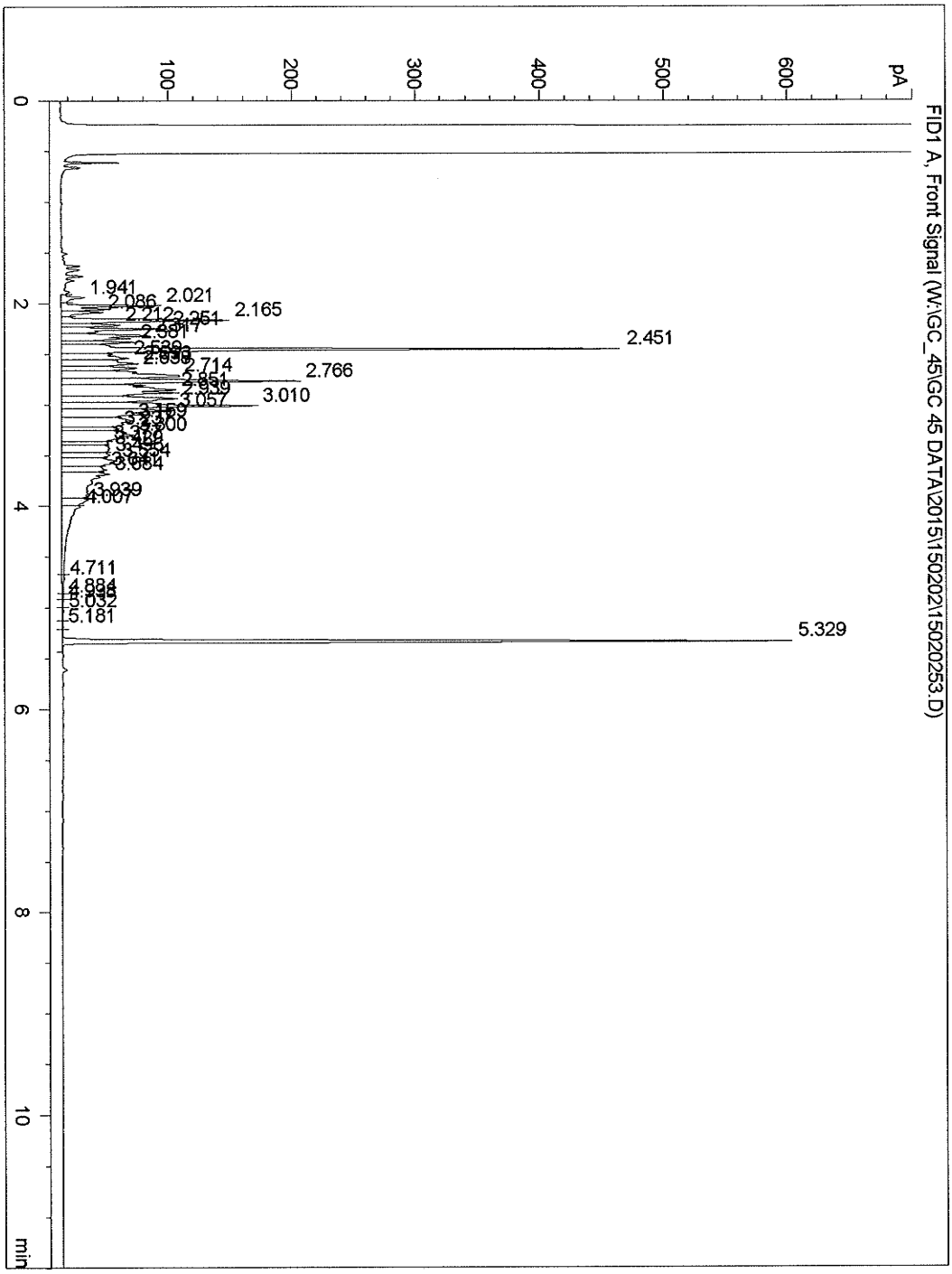
Area Percent Report

Data File Name : W:\GC_45\GC 45 DATA\2015\150202\15020253.D
Page Number : 3
Operator : 682
Instrument : GC 45
Sample Name : 15-01-1810-3

Acquired on : 03 Feb 15 03:24 am
Report Created on: 03 Feb 15 03:33 pm

Vial Number : Vial 53
Injection Number : 1
Sequence Line : 53
Instrument Method: C:\CHEM32\1\METHODS\ ->
Analysis Method : 8015B.MTH

Software Revision: Rev. B.03.02 [341]



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

WORK ORDER:	**15-01-1810**	ANALYZED BY:	960
INSTRUMENT:	GC 45	D/T ANALYZED:	2015-02-03 03:44
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\15020254.D\15020254

 # 4 **CLIENT SAMPLE NUMBER: ES123**

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, are 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	7750	1.00	38.7	2.9	10	25	b

Area Percent Report

Data File Name : W:\GC_45\GC 45 DATA\2015\150202\15020254.D
Page Number : 1
Operator :
Instrument : GC 45
Sample Name : 15-01-1810-4

Acquired on : 03 Feb 15 03:44 am
Report Created on: 03 Feb 15 03:36 pm

Vial Number : Vial 54
Injection Number : 1
Sequence Line : 54
Instrument Method: C:\CHEM32\1\METHODS\ ->
Analysis Method : 8015B.MTH

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

Pk	Ret Time	Area	Height	Peak	Width	Response %
1	5.337	571.96	386	BB	0.023	100.000
2	0.000	0.00	0		0.000	0.000

Total area = 571.96
0.00

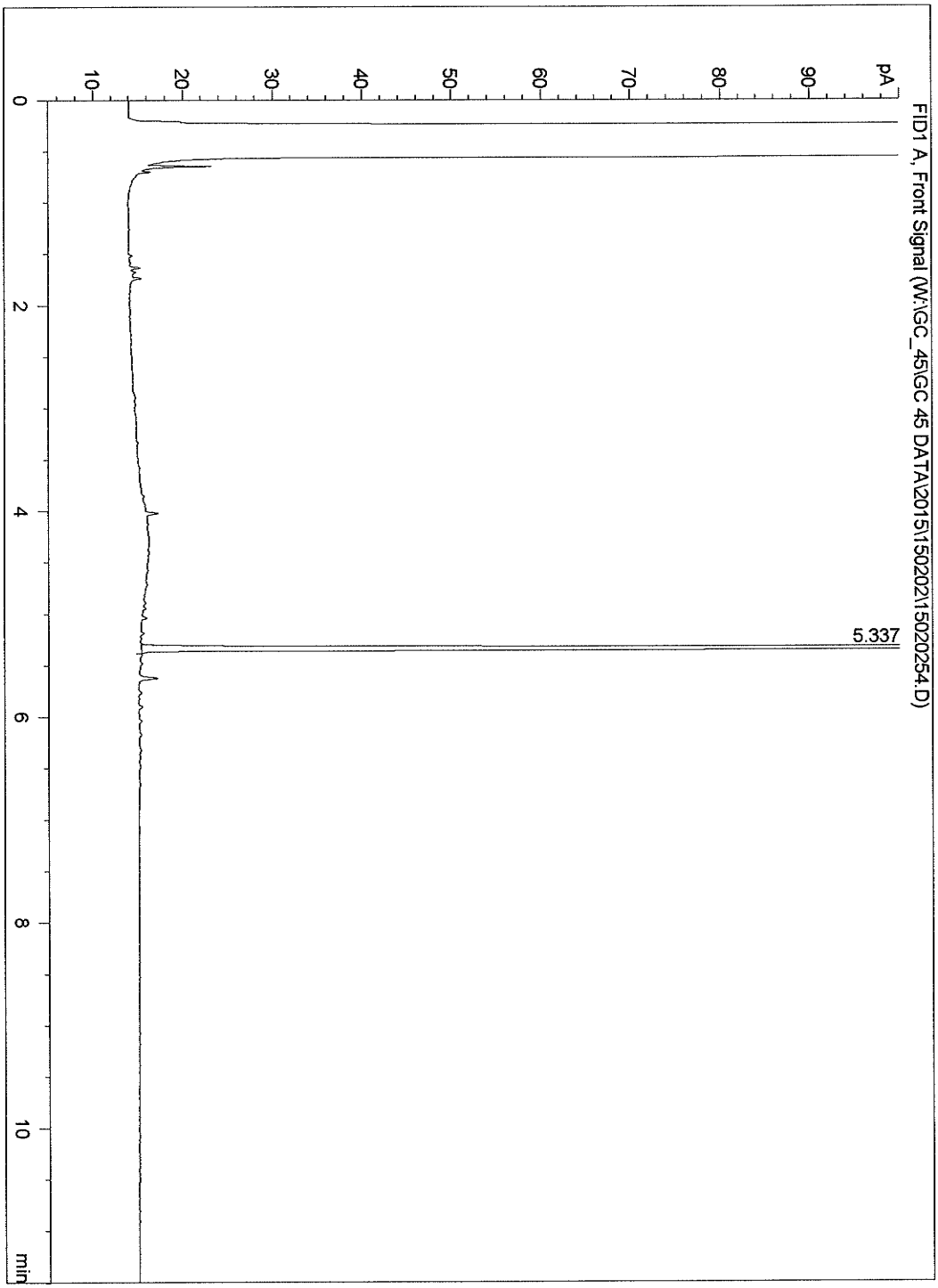
Area Percent Report

Data File Name : W:\GC_45\GC 45 DATA\2015\150202\15020254.D
Page Number : 2
Operator :
Instrument : GC 45
Sample Name : 15-01-1810-4

Vial Number : Vial 54
Injection Number : 1
Sequence Line : 54
Instrument Method: C:\CHEM32\1\METHODS\ ->

Acquired on : 03 Feb 15 03:44 am
Report Created on: 03 Feb 15 03:36 pm

Analysis Method : 8015B.MTH



Area Percent Report

Data File Name : W:\GC_45\GC 45 DATA\2015\150202\15020254.D
Page Number : 1
Operator : 682
Instrument : GC 45
Sample Name : 15-01-1810-4

Vial Number : Vial 54
Injection Number : 1
Sequence Line : 54
Instrument Method: C:\CHEM32\1\METHODS\ ->

Acquired on : 03 Feb 15 03:44 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	2.361	0.67	0	BV	0.071	0.093
2	2.753	2.93	0	VV	0.184	0.407
3	2.896	2.31	0	VV	0.066	0.321
4	2.964	1.47	0	VV	0.053	0.204
5	3.167	5.22	1	VV	0.123	0.724
6	3.333	6.09	1	VV	0.110	0.845
7	3.499	4.24	1	VV	0.088	0.589
8	3.857	17.23	1	VV	0.166	2.394
9	4.023	15.81	3	VV	0.073	2.195
10	4.302	29.63	2	VV	0.215	4.115
11	4.408	13.29	2	VV	0.106	1.845
12	4.580	11.66	1	VV	0.097	1.619
13	4.715	13.16	1	VB	0.123	1.828
14	4.895	3.66	1	BV	0.043	0.508
15	4.946	4.49	1	VV	0.051	0.623
16	5.039	6.60	1	VV	0.068	0.916
17	5.189	3.94	1	VV	0.059	0.547
18	5.337	577.68	386	VV	0.024	80.226

Total area = 720.06

==========

Area Percent Report

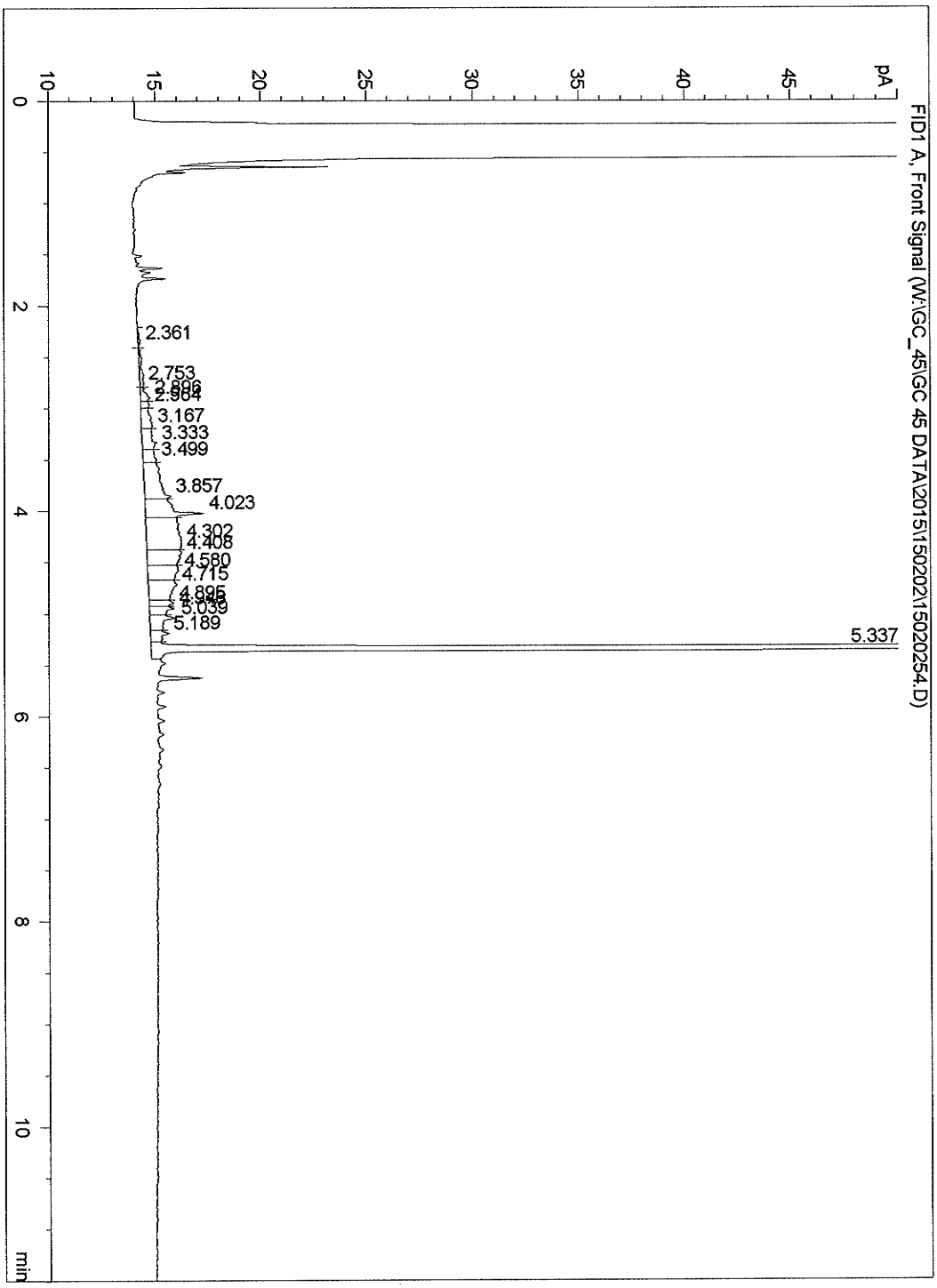
==========

Data File Name : W:\GC_45\GC 45 DATA\2015\150202\15020254.D
Page Number : 2
Operator : 682
Instrument : GC 45
Sample Name : 15-01-1810-4

Acquired on : 03 Feb 15 03:44 am
Report Created on: 03 Feb 15 03:34 pm

Vial Number : Vial 54
Injection Number : 1
Sequence Line : 54
Instrument Method: C:\CHEM32\1\METHODS\ ->

Analysis Method : 8015B.MTH



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:	
D/T EXTRACTED:	2015-02-02 00:00	D/T REVIEWED:	

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:

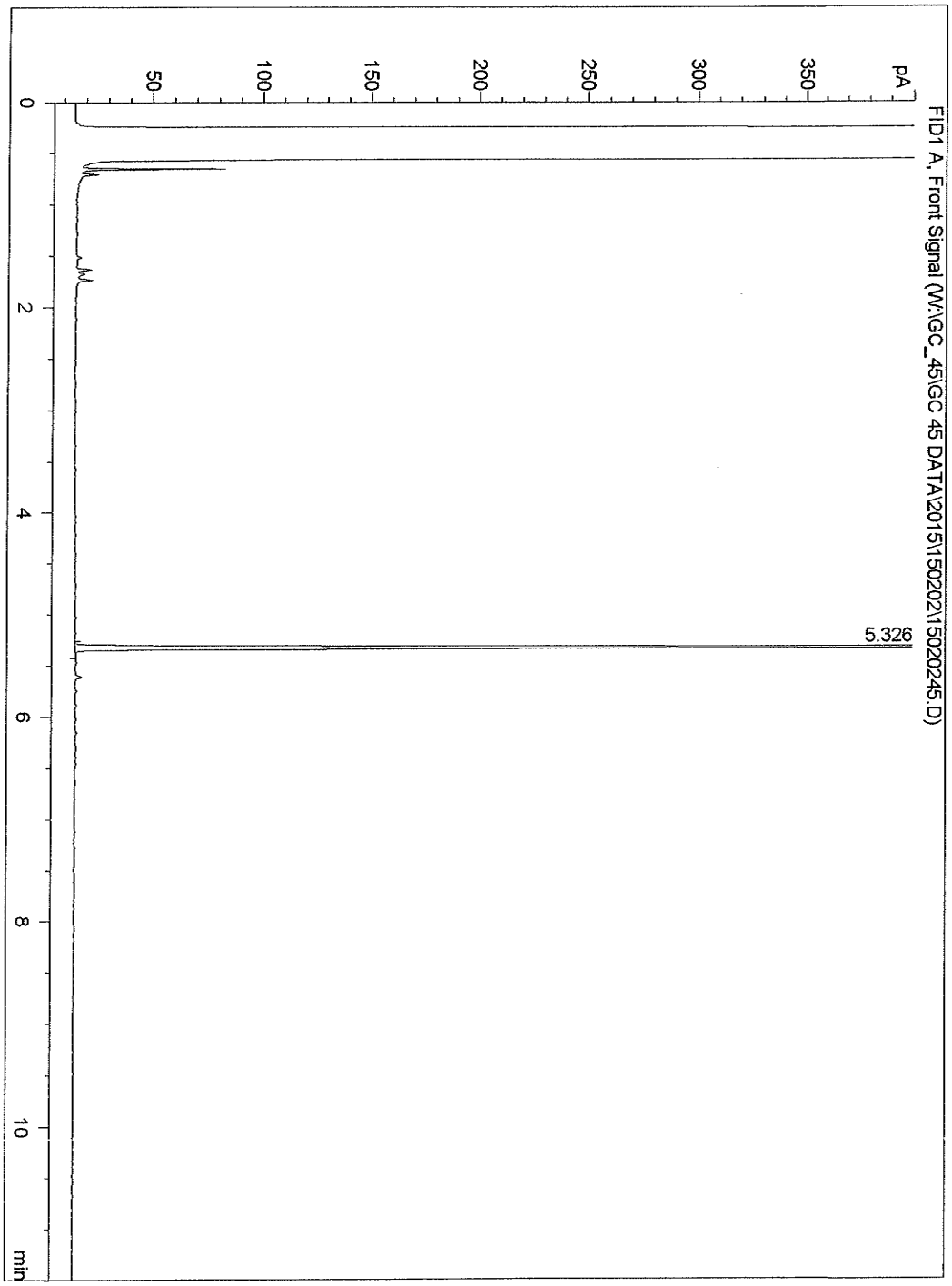
COMPOUND	INI. CONC	DF	CONC	DL	LOD	LOQ	QUAL
TPH as Diesel	0.000	1.00	ND	2.9	10	25	

Area Percent Report

Data File Name : W:\GC_45\GC 45 DATA\2015\150202\15020245.D
Page Number : 2
Operator : 682
Instrument : GC 45
Sample Name : MB 15020209/10/11

Acquired on : 03 Feb 15 00:43 am
Report Created on: 03 Feb 15 03:32 pm

Vial Number : Vial 45
Injection Number : 1
Sequence Line : 45
Instrument Method: C:\CHEM32\1\METHODS\ ->
Analysis Method : 8015B.MTH



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:

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	0.019	0.019			1	0-15	PASS

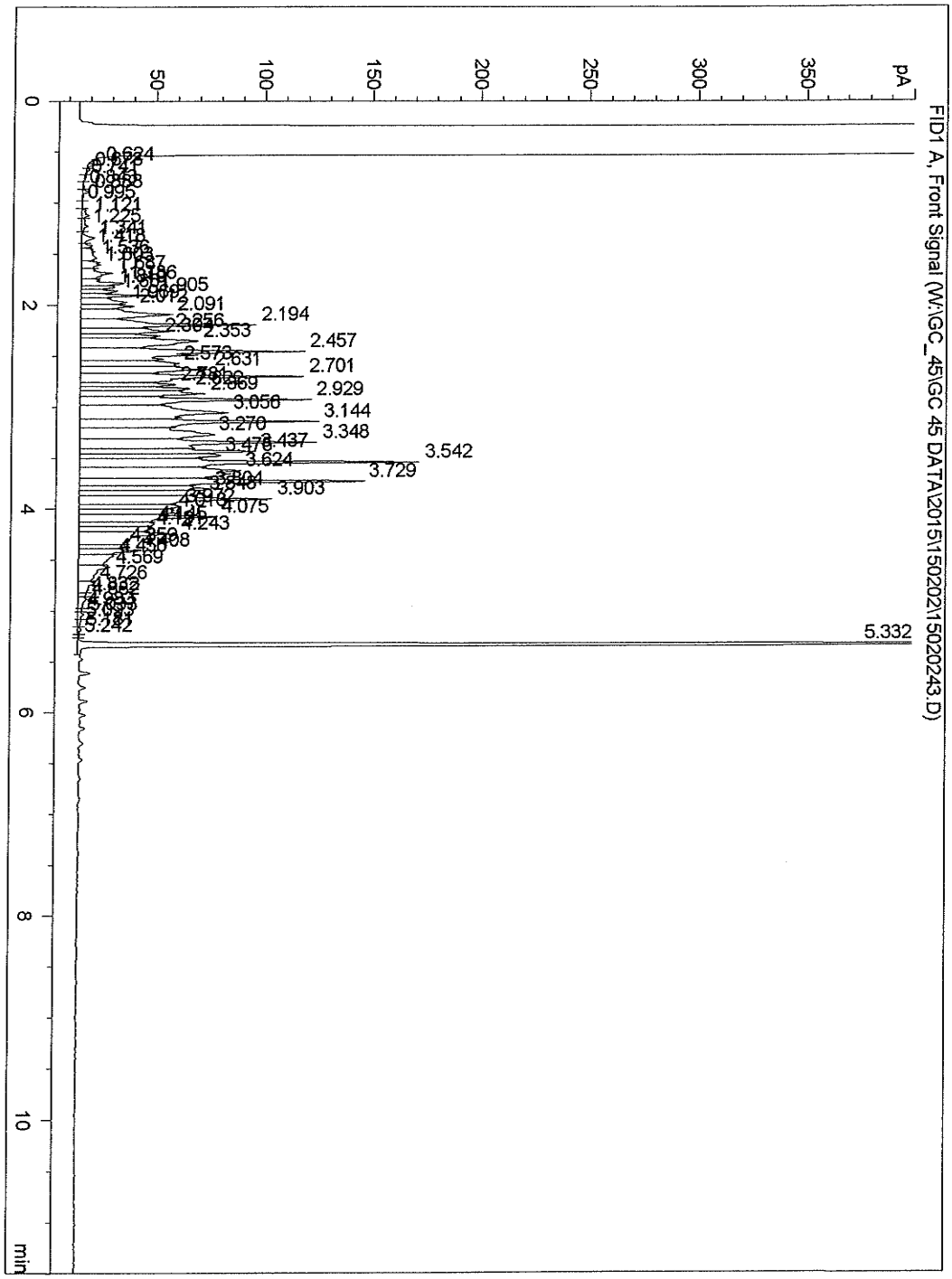
MIN RF: Method Specified Minimum Response Factor

Area Percent Report

Data File Name : W:\GC_45\GC 45 DATA\2015\150202\15020243.D
Page Number : 3
Operator : 682
Instrument : GC 45
Sample Name : D400 C28 50 L012815D

Acquired on : 03 Feb 15 00:03 am
Report Created on: 03 Feb 15 03:32 pm

Vial Number : Vial 43
Injection Number : 1
Sequence Line : 43
Instrument Method: C:\CHEM32\1\METHODS\ ->
Analysis Method : 8015B.MTH



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APPENDIX D

Historical Groundwater Exceedance Trends

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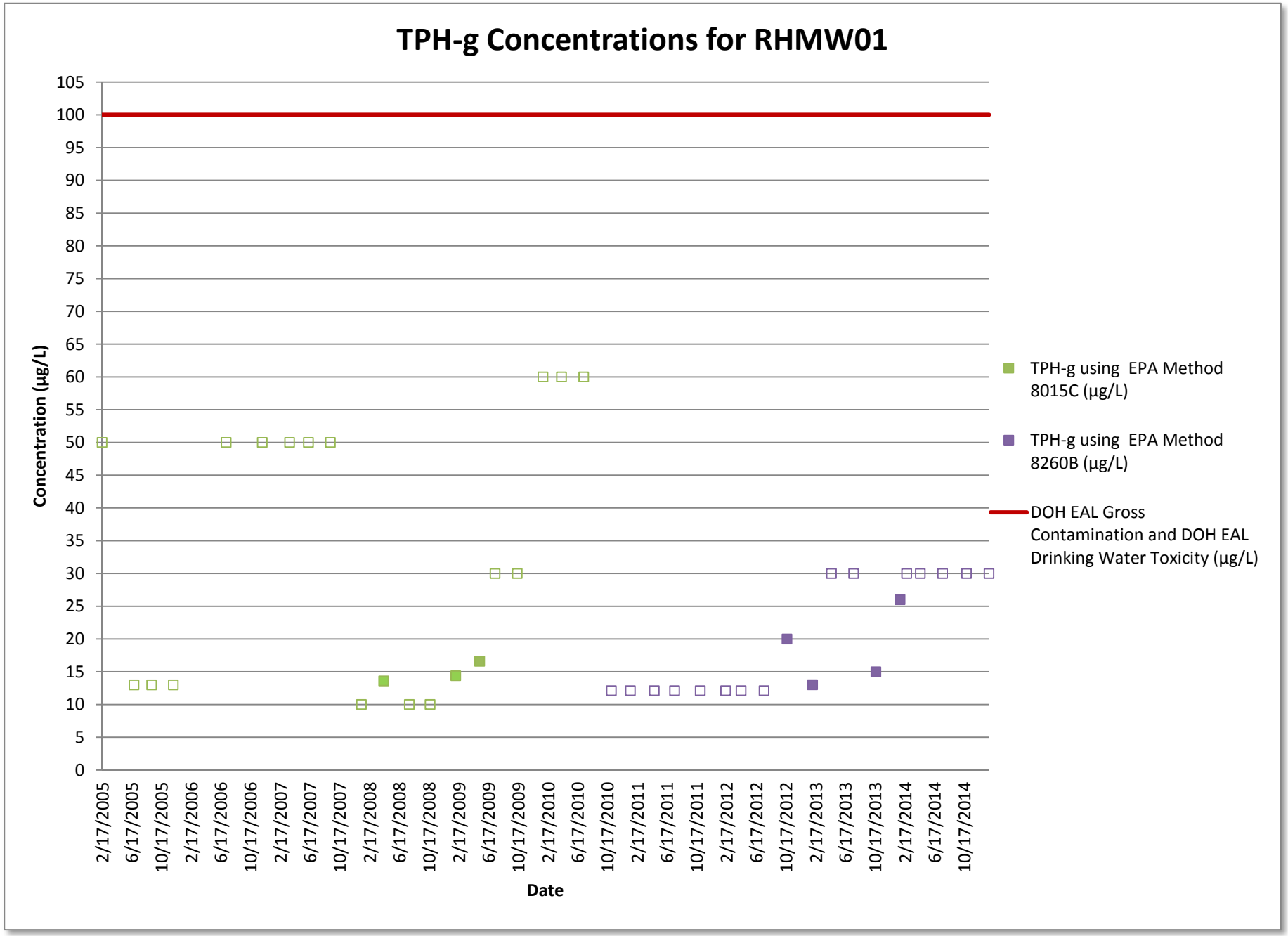

Data points for 2/17/2005 through 9/8/2005 and 12/6/2005 are the average of the primary and duplicate samples.
Possible laboratory contamination for 10/22/2012, 10/21/2013, and 1/28/2014 sampling events.
Unfilled boxes indicate non-detections. Method reporting limits (MRLs) are shown for February 2005, method detection limits (MDLs) are shown for June 2005 through October 2009, and limits of detection (LODs) are shown from January 2010 on.

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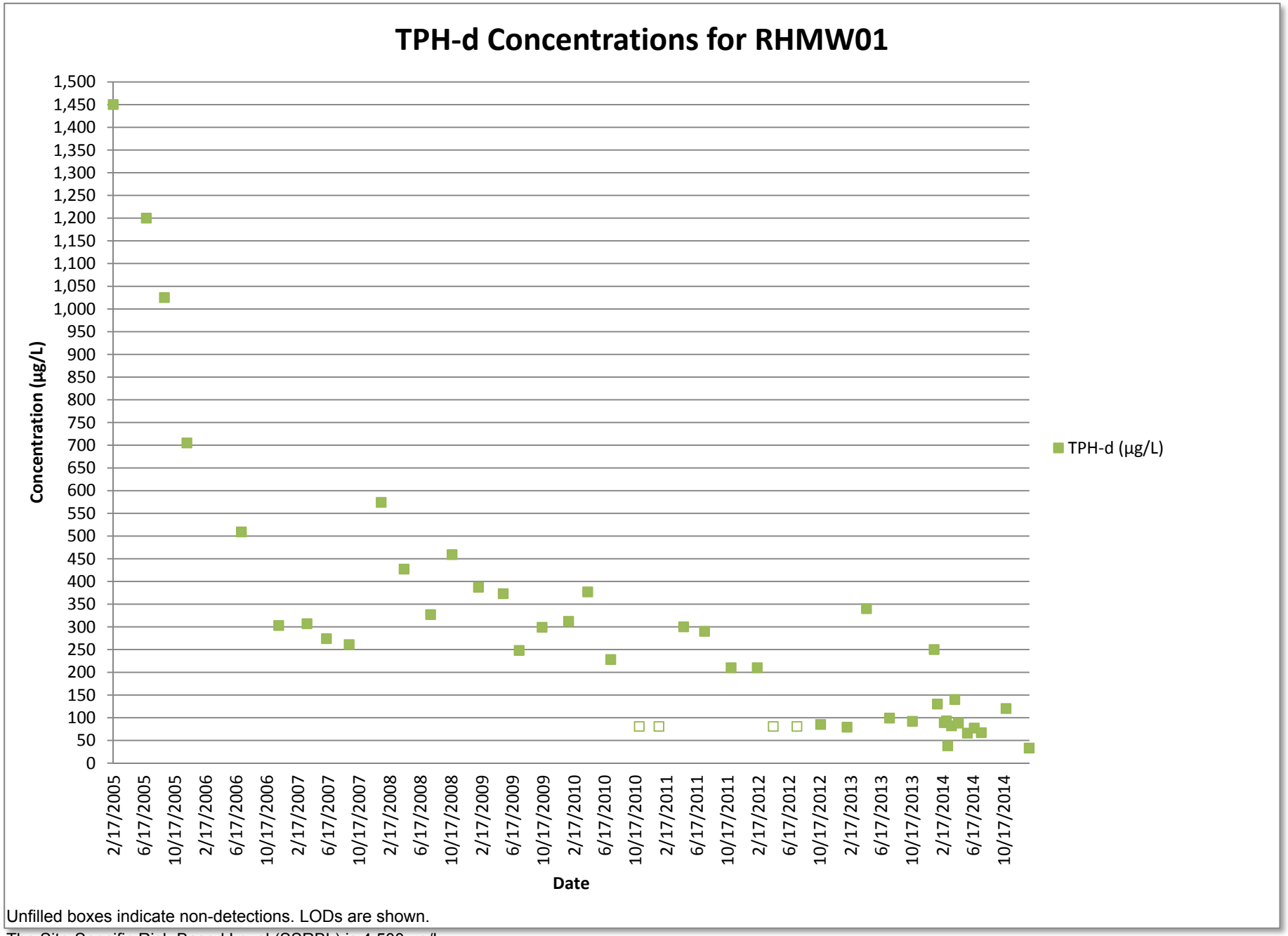

Unfilled boxes indicate non-detections. LODs are shown.

The Site-Specific Risk-Based Level (SSRBL) is 4,500 µg/L.

Numerous sample results had a chromatographic pattern that did not match the calibration standard. The relatively high TPH-d values may not necessarily be indicative that there is diesel fuel or other petroleum products in the well.

Data points for 2/17/2005 through 9/8/2005 and 12/6/2005 are the average of the primary and duplicate samples.

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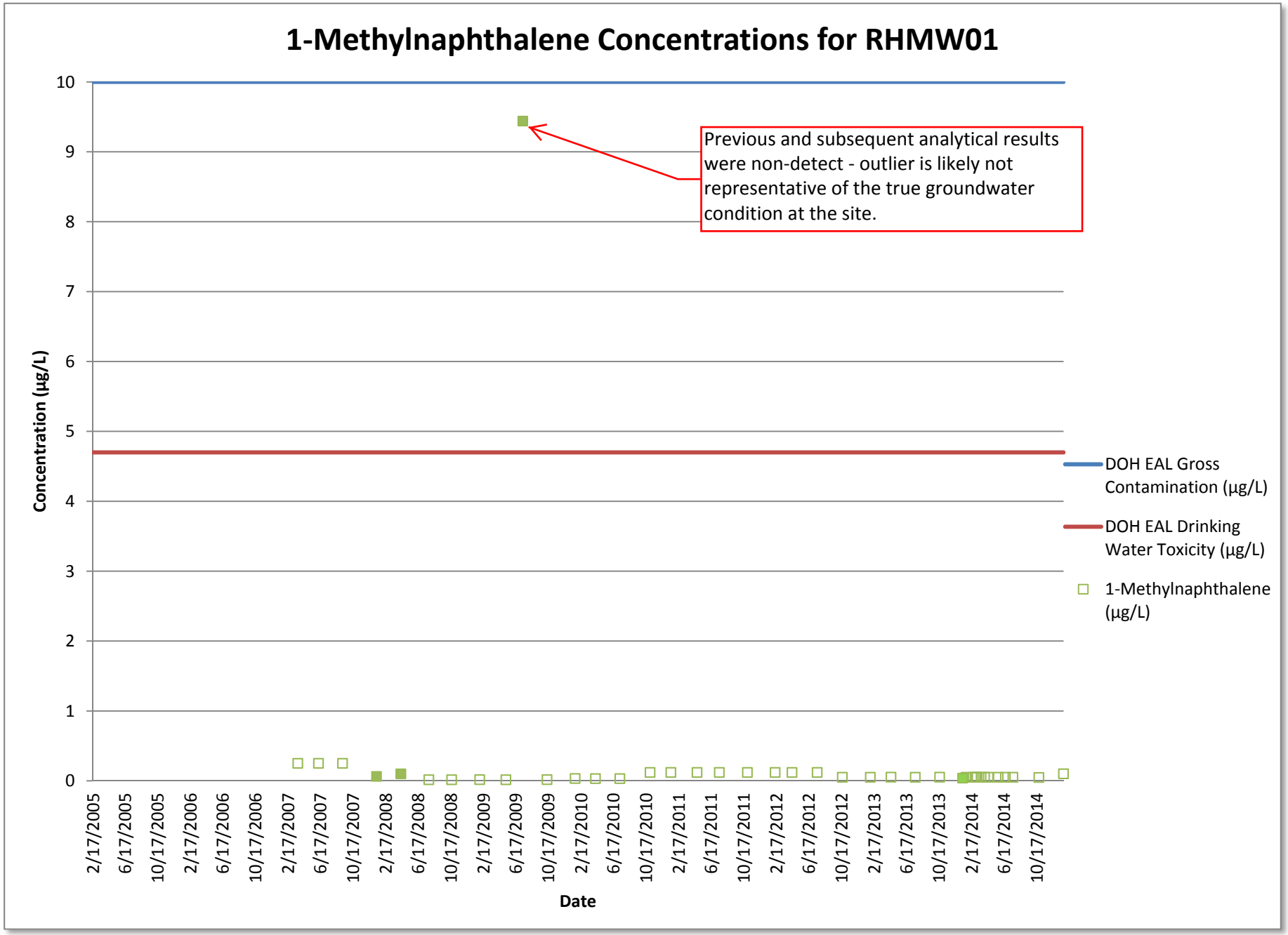

Unfilled boxes indicate non-detections. MDLs are shown for June 2005 through October 2009, and LODs are shown from January 2010 on.

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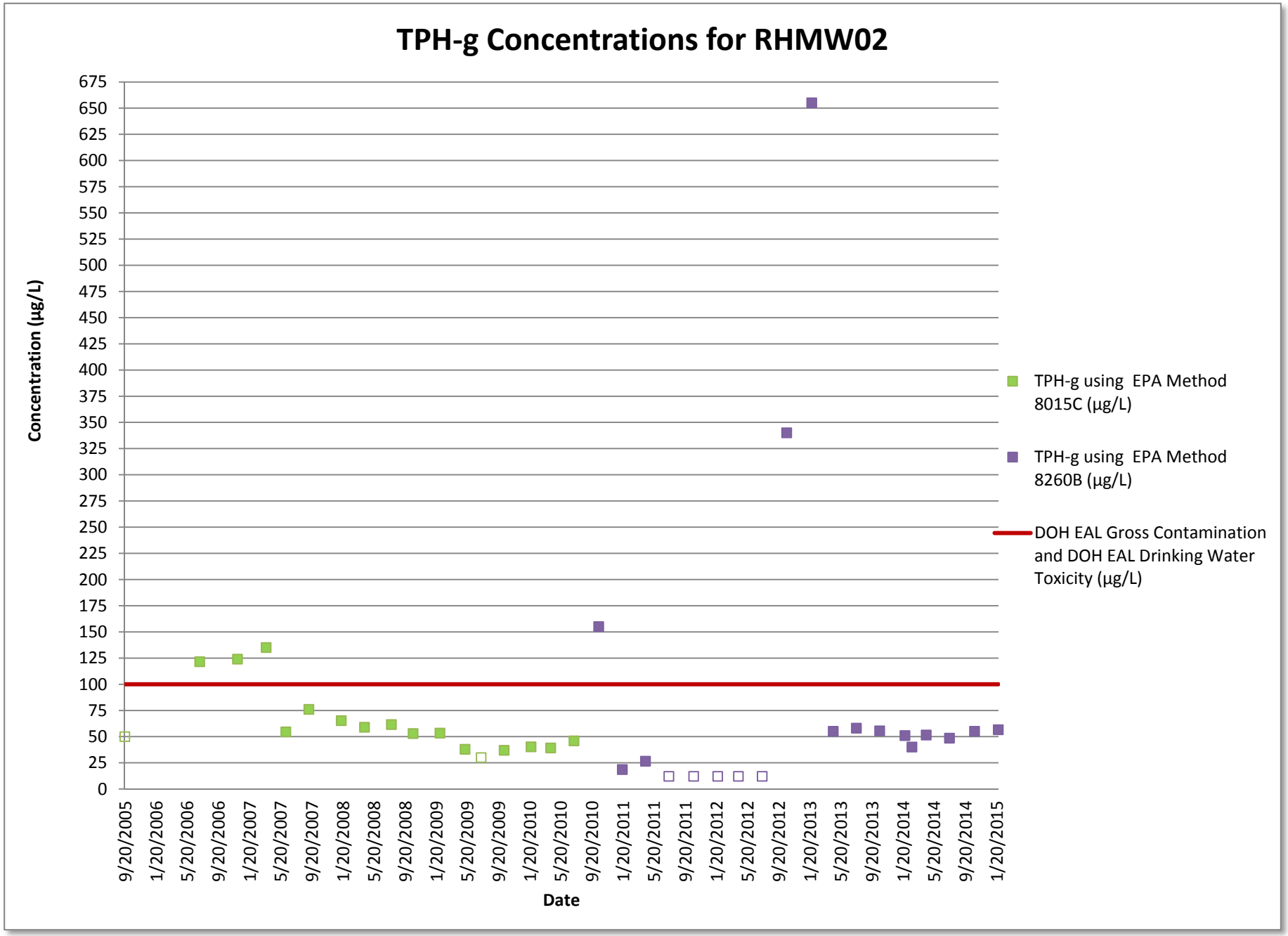

Data points for 9/20/2005 through 4/21/2014 are the average of the primary and duplicate samples.
Possible laboratory contamination for 10/21/2013 and 1/28/2014 sampling events.
Unfilled boxes indicate non-detections. MDLs are shown for July 2009, and LODs are shown for September 2005 and from July 2011 on.
Primary sample results are shown for 1/26/2012 and 7/18/2012; all other concentrations are the average of the primary and duplicate sample results.

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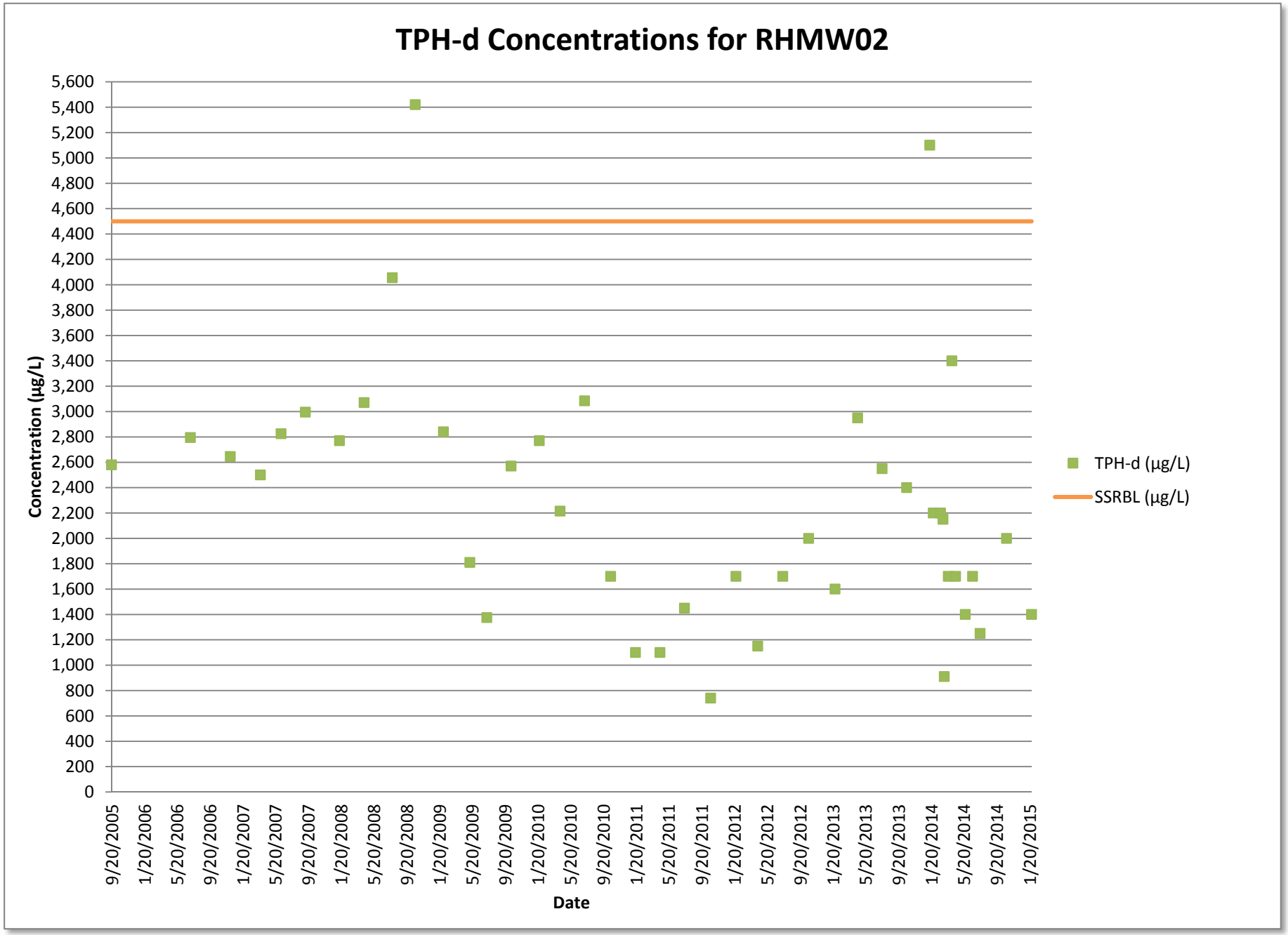

Data points for 9/20/2005 through 4/21/2014 are the average of the primary and duplicate samples.

Numerous sample results had a chromatographic pattern that did not match the calibration standard. The relatively high TPH-d values may not necessarily be indicative that there is diesel fuel or other petroleum products in the well.

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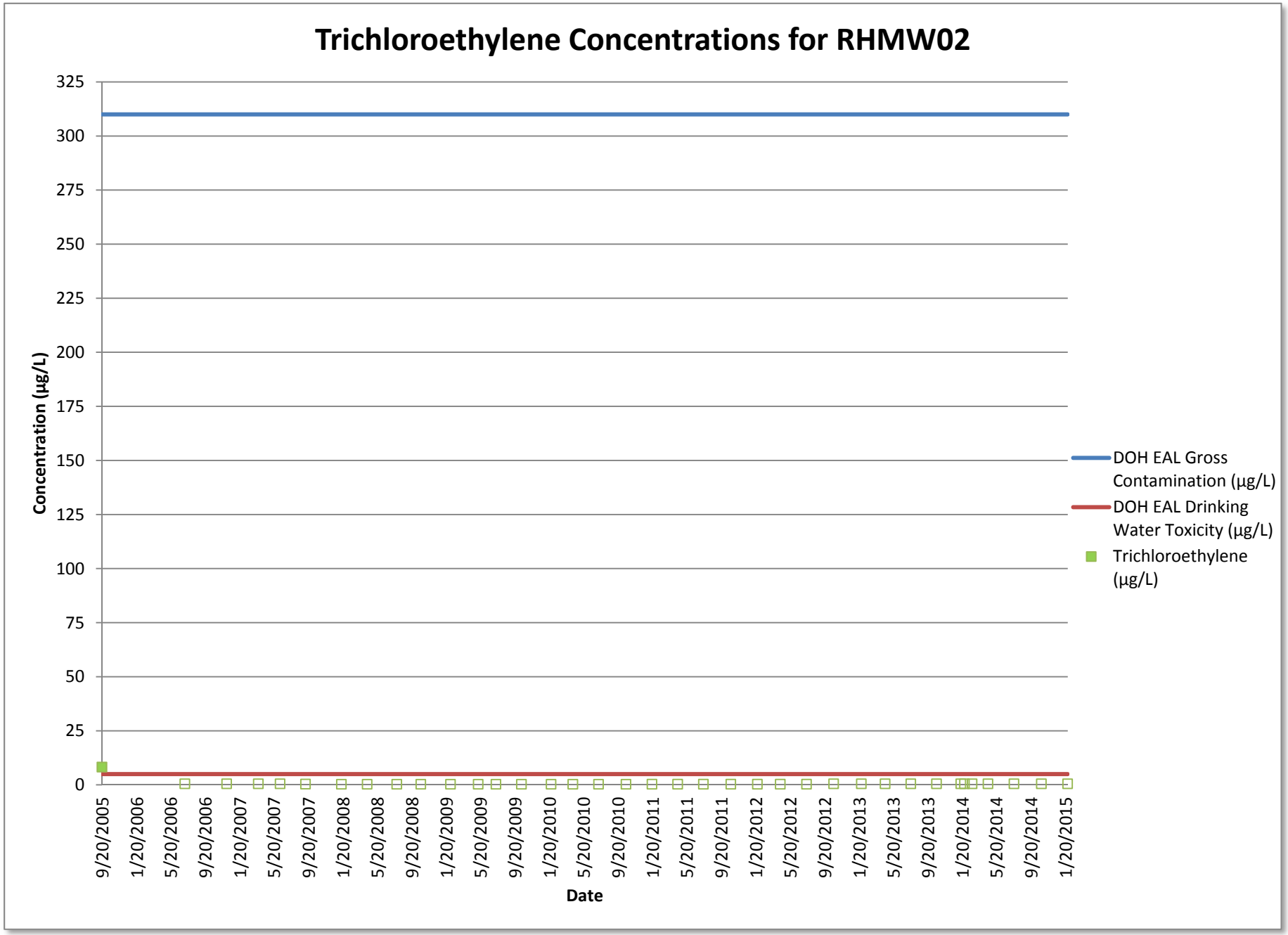

Data points for 9/20/2005 through 4/21/2014 are the average of the primary and duplicate samples.
Unfilled boxes indicate non-detections. MDLs are shown for July 2006 through October 2009, and LODs are shown from January 2010 on.

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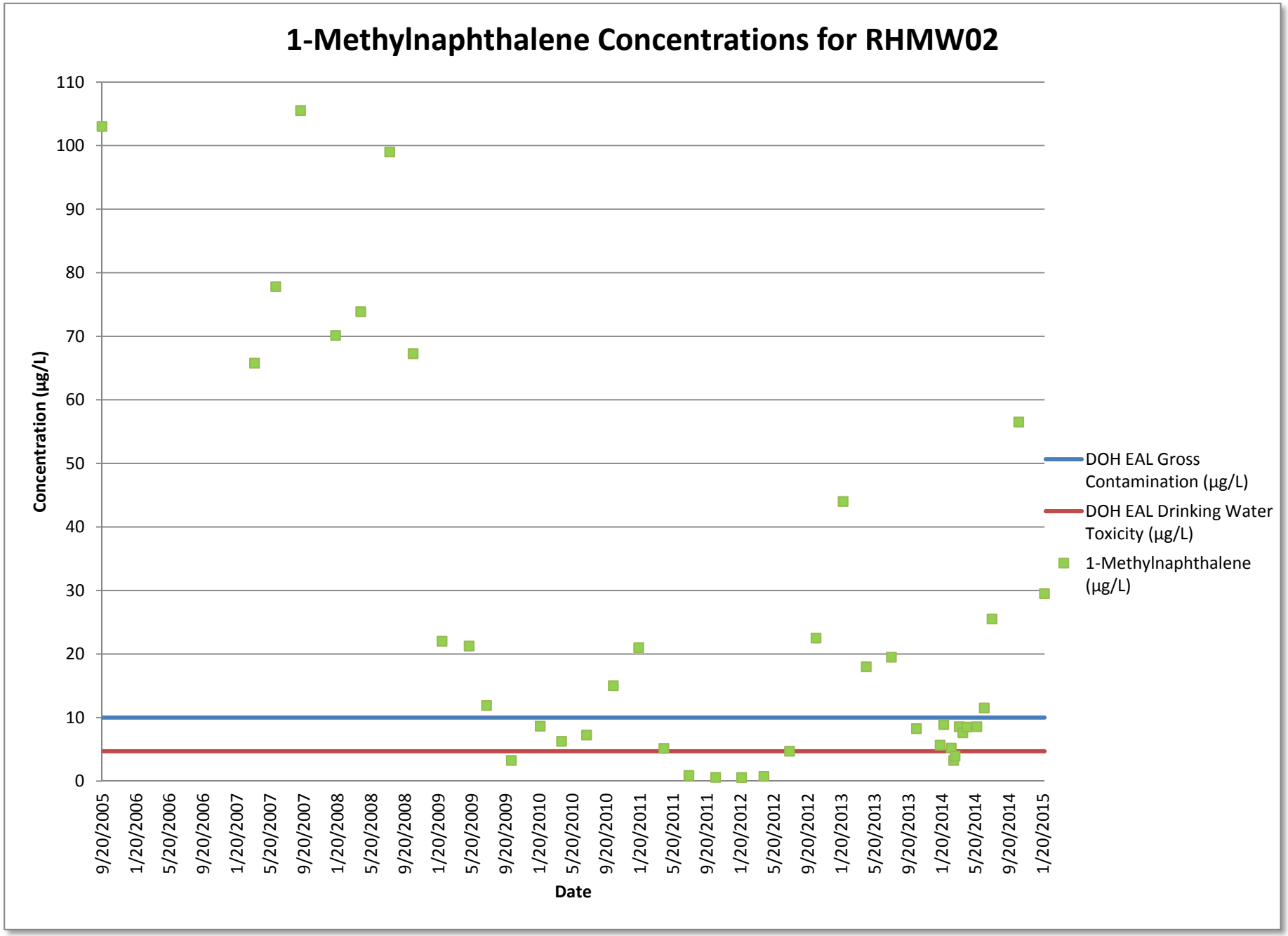

Data points for 9/20/2005 and 3/27/2007 through 4/21/2014 are the average of the primary and duplicate samples.

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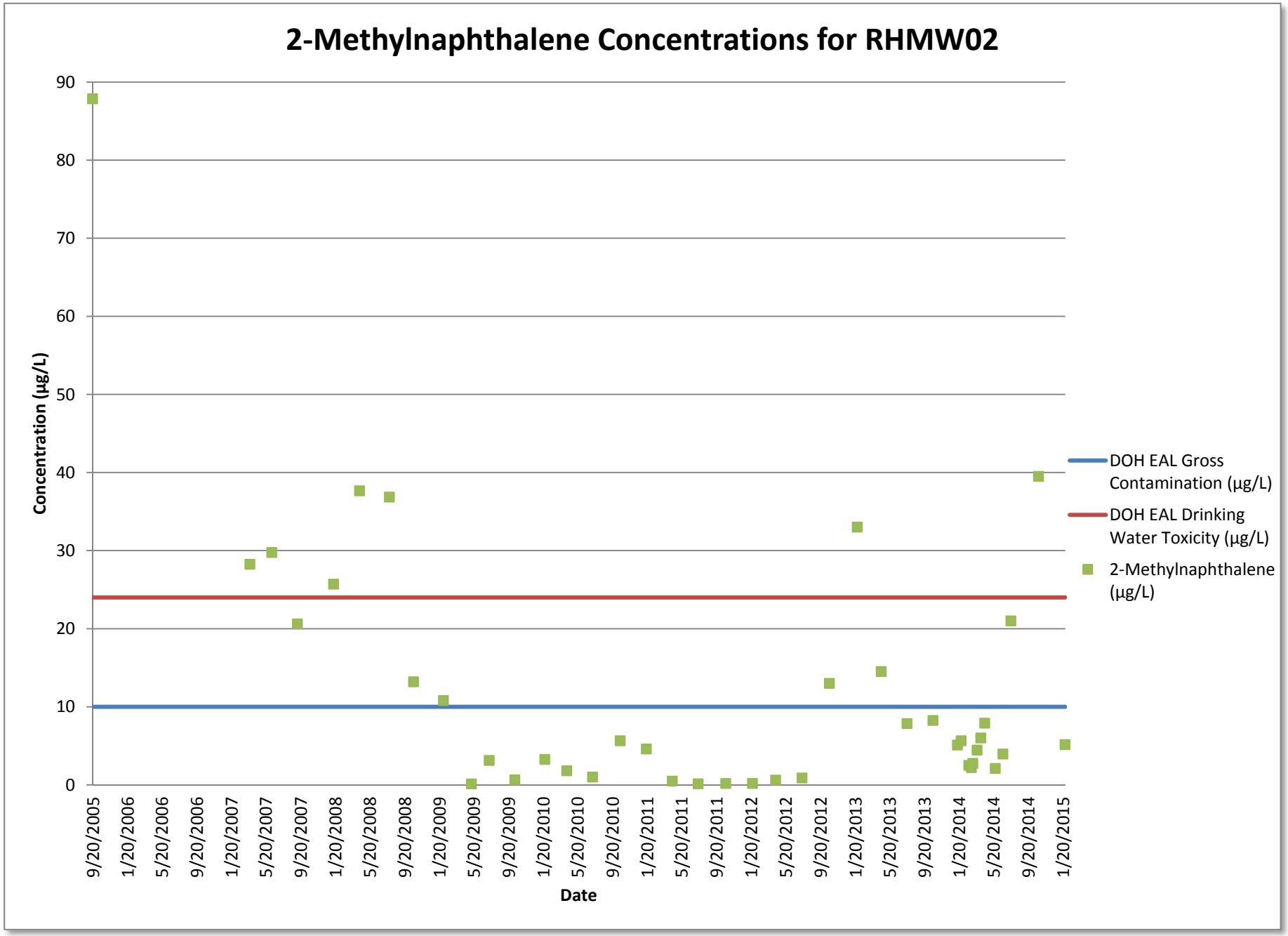

Data points for 9/20/2005 and 3/27/2007 through 4/21/2014 are the average of the primary and duplicate samples.

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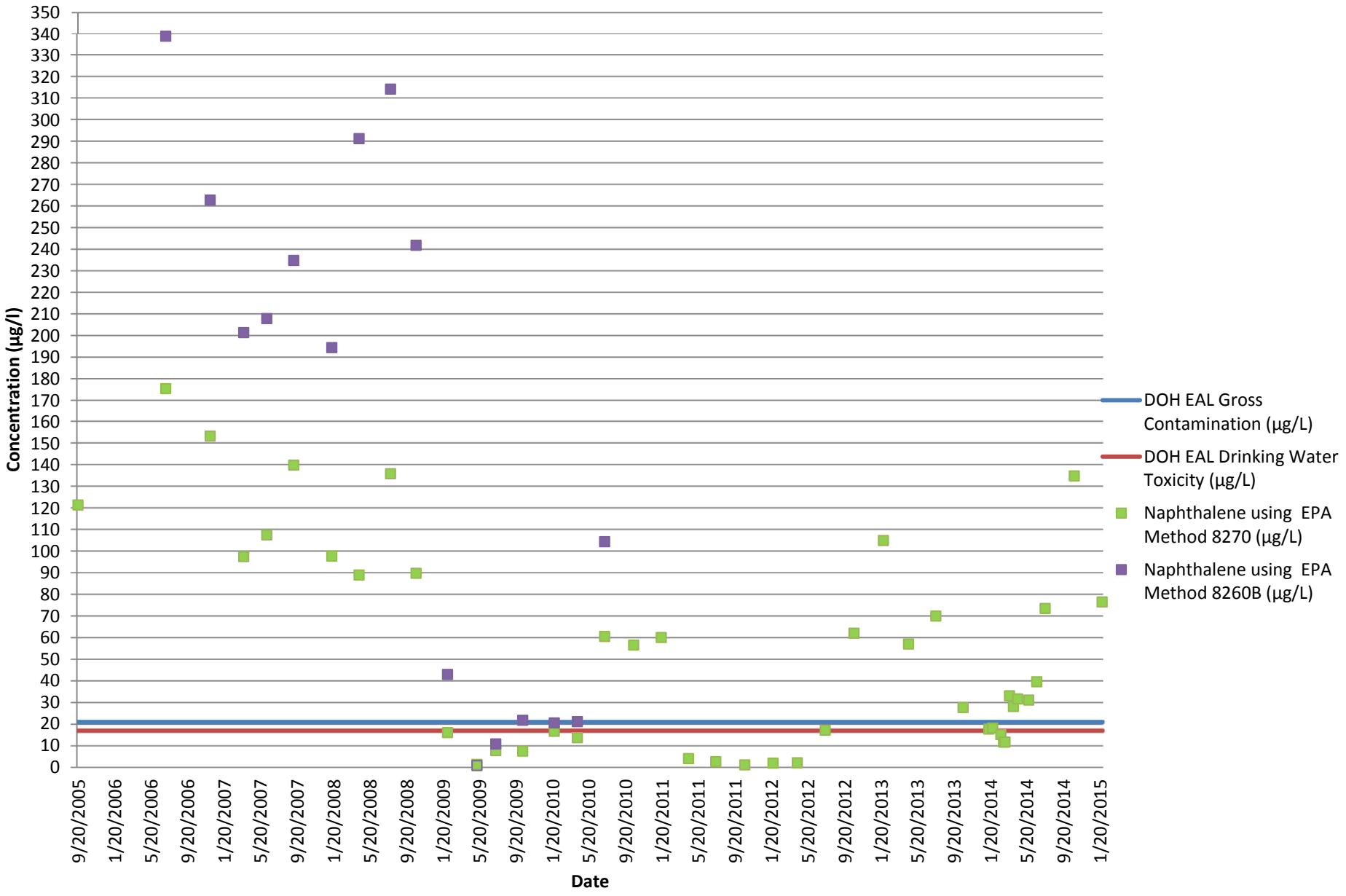
Naphthalene Concentrations for RHMW02



Possible laboratory contamination for 10/21/2013 and 1/28/2014 sampling events.

Unfilled boxes indicate non-detections. LODs are shown.

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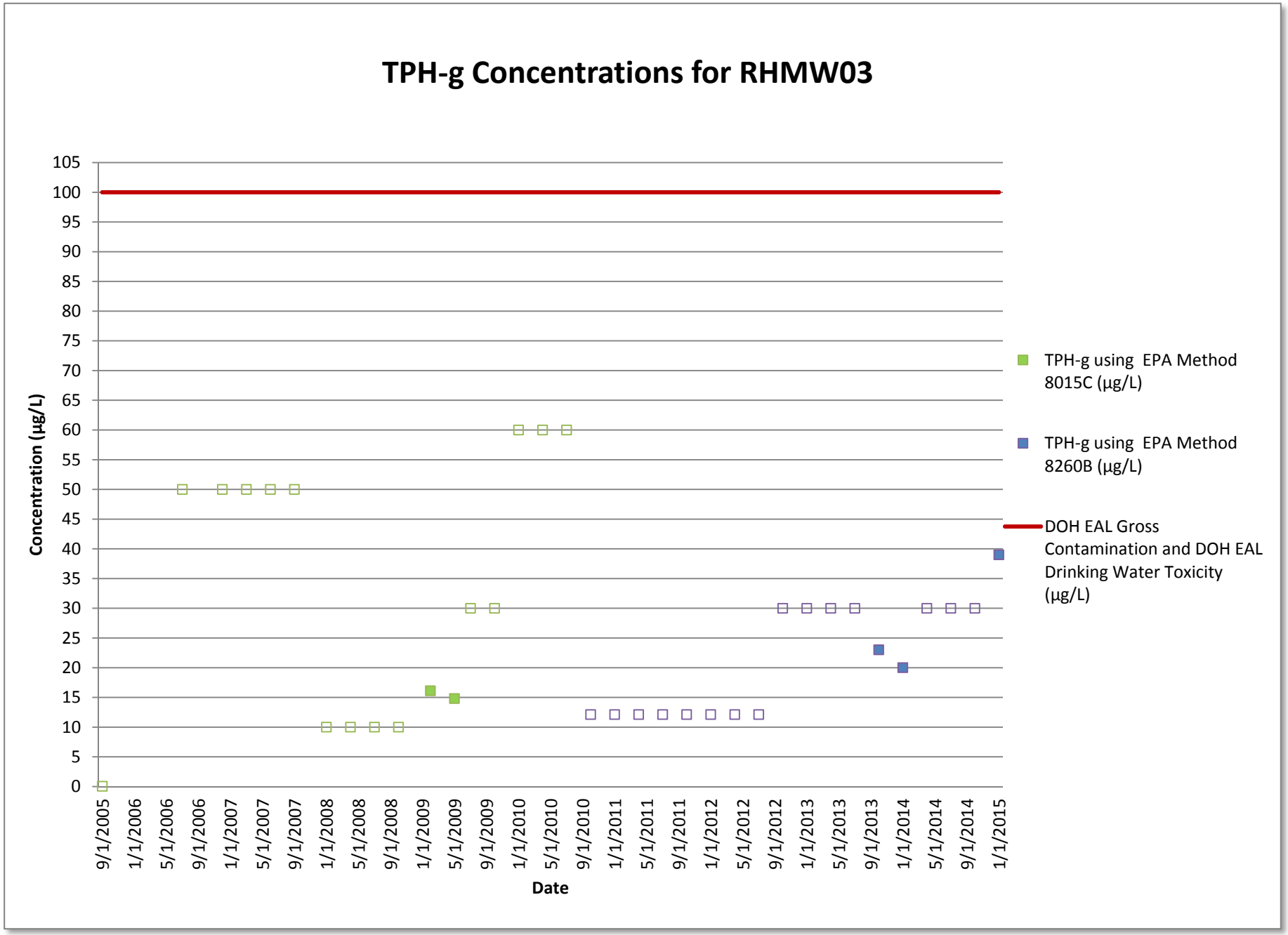

Possible laboratory contamination for 10/21/2013 and 1/28/2014 sampling events.

Unfilled boxes indicate non-detections. MDLs are shown for July 2006 through October 2009, and LODs are shown for September 2005 and from January 2010 on.

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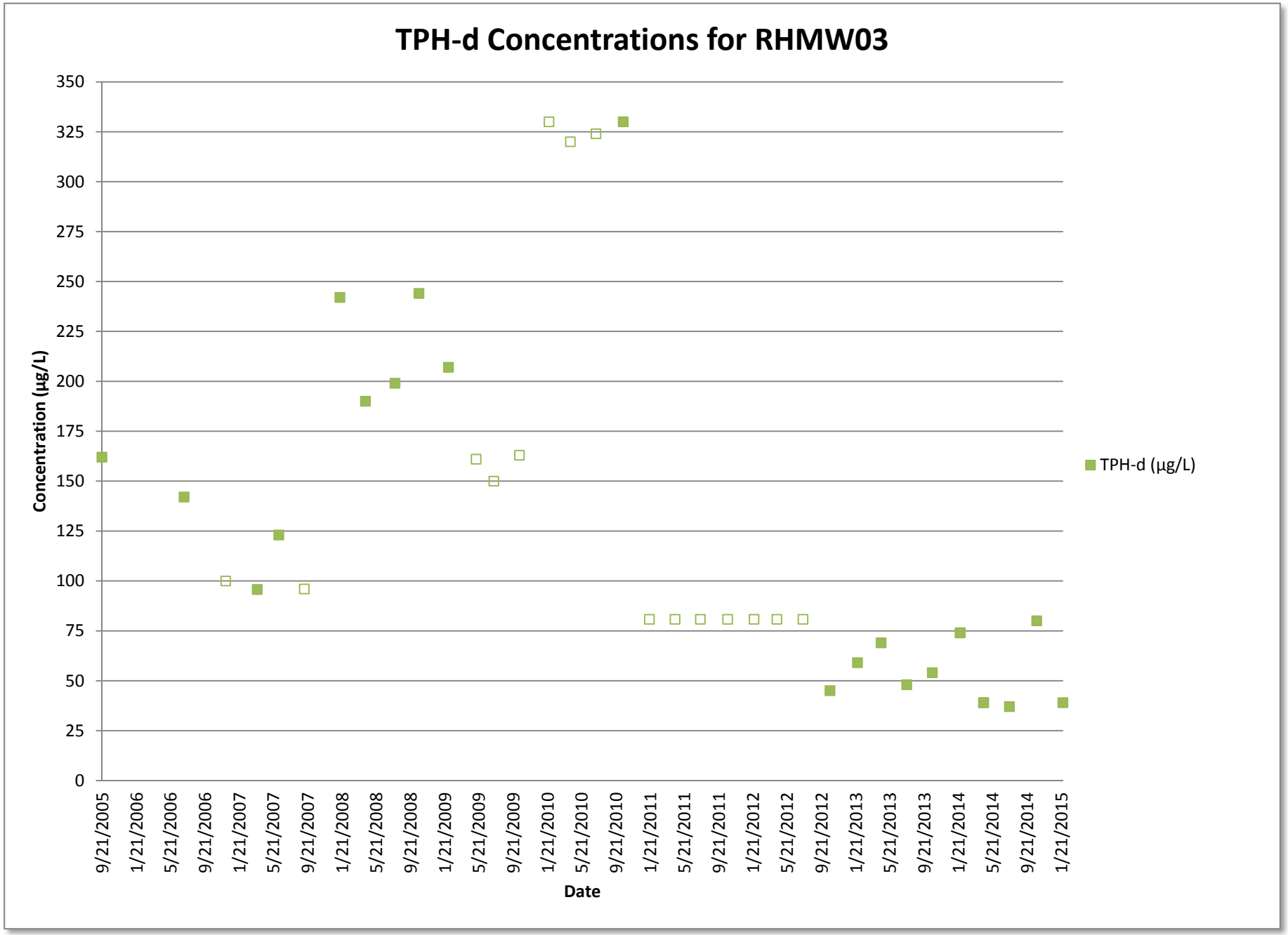

The Site-Specific Risk-Based Level (SSRBL) is 4,500 µg/L.

Unfilled boxes indicate non-detections. MDLs are shown for December 2006 through October 2009, and LODs are shown for September 2005 and from January 2010 on.

Numerous sample results had a chromatographic pattern that didn't match the calibration standard. The relatively high TPH-d values may not necessarily be indicative that there is diesel fuel or other petroleum products in the well.

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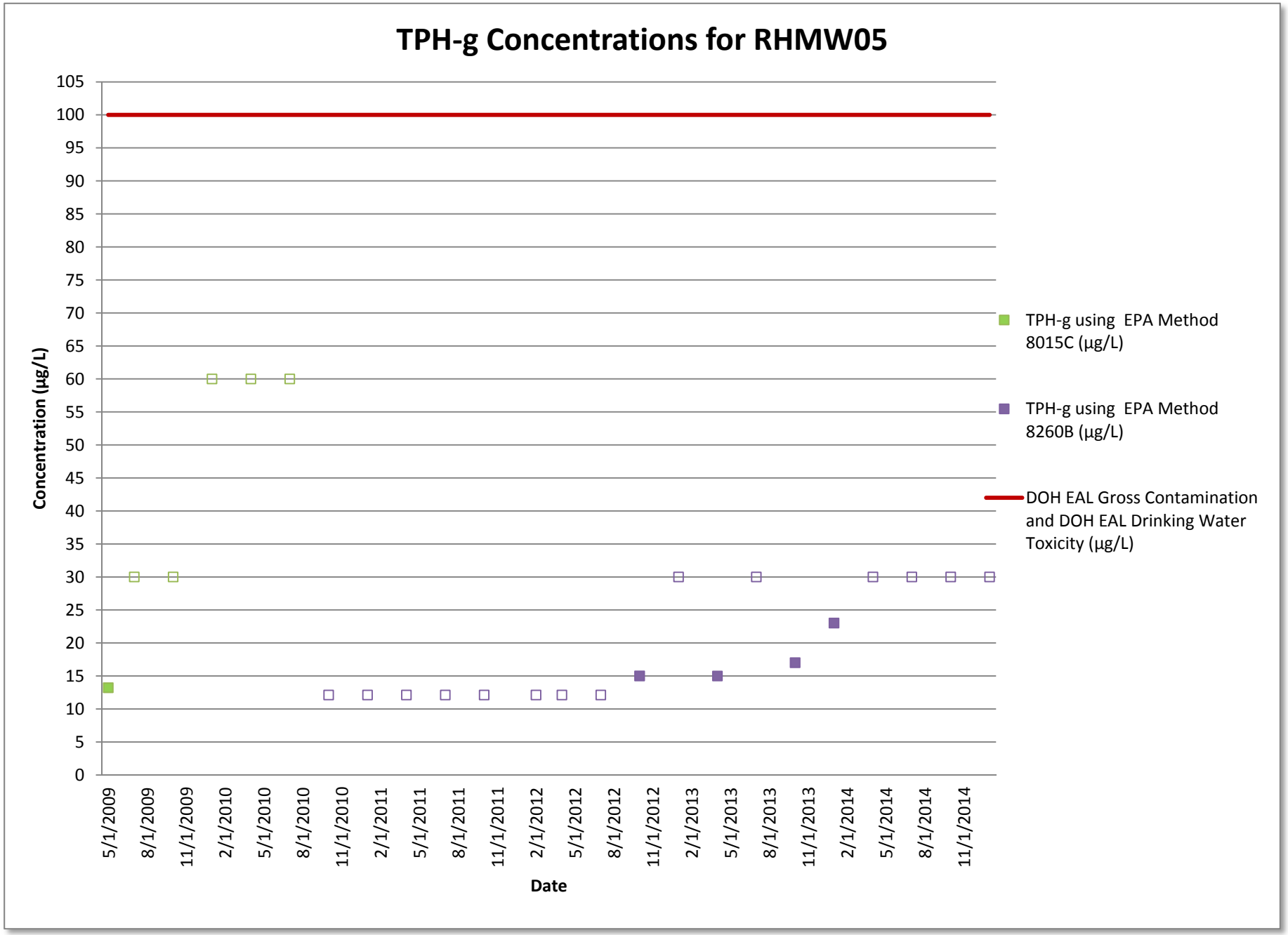

Data point for 7/17/2012 is the average of the primary and duplicate samples.
Unfilled boxes indicate non-detections. MDLs are shown for July and October 2009, and LODs are shown from January 2010 on.
Possible laboratory contamination for 10/22/2012, 10/22/2013, and 1/29/2014 sampling events.

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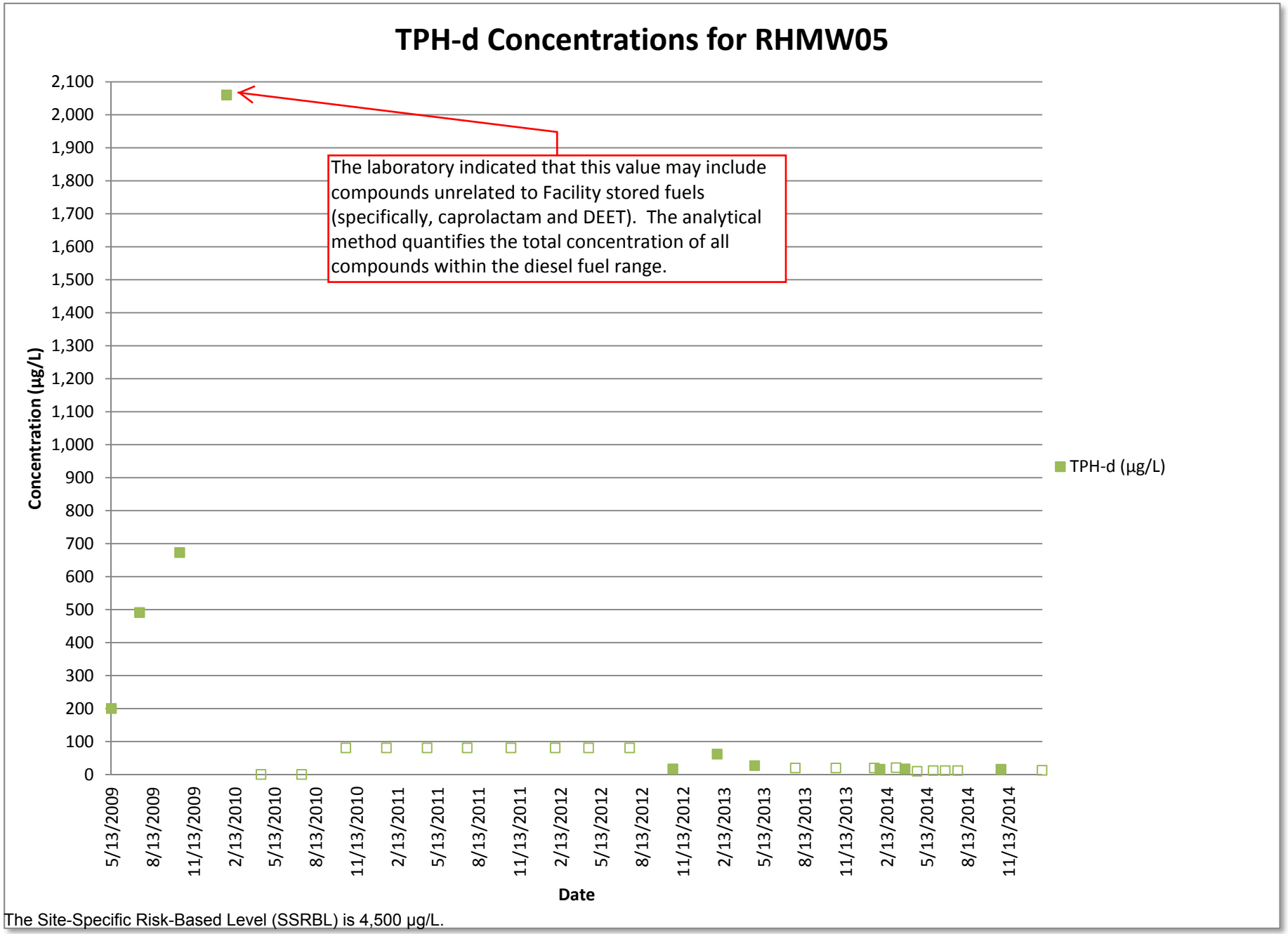

The Site-Specific Risk-Based Level (SSRBL) is 4,500 µg/L.

Data point for 7/17/2012 is the average of the primary and duplicate samples.

Unfilled boxes indicate non-detections. LODs are shown.

Numerous sample results had a chromatographic pattern that did not match the calibration standard. The relatively high TPH-d values may not necessarily be indicative that there is diesel fuel or other petroleum products in the well.

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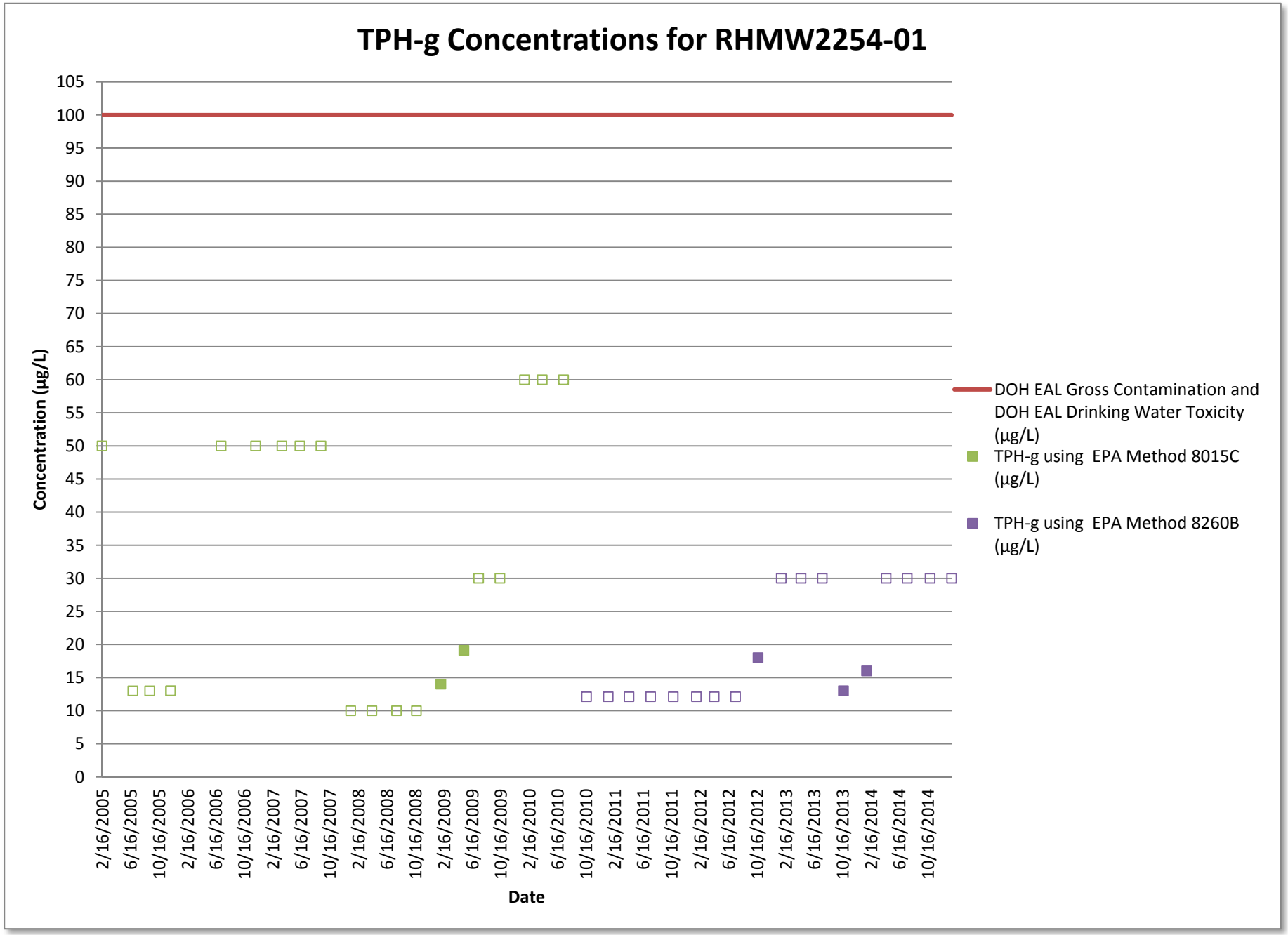

Unfilled boxes indicate non-detections. MRLs are shown for February 2005, MDLs are shown for June 2005 through October 2009, and LODs are shown from January 2010 on.
Possible laboratory contamination for 10/22/2012, 10/22/2013, and 1/29/2014 sampling events.

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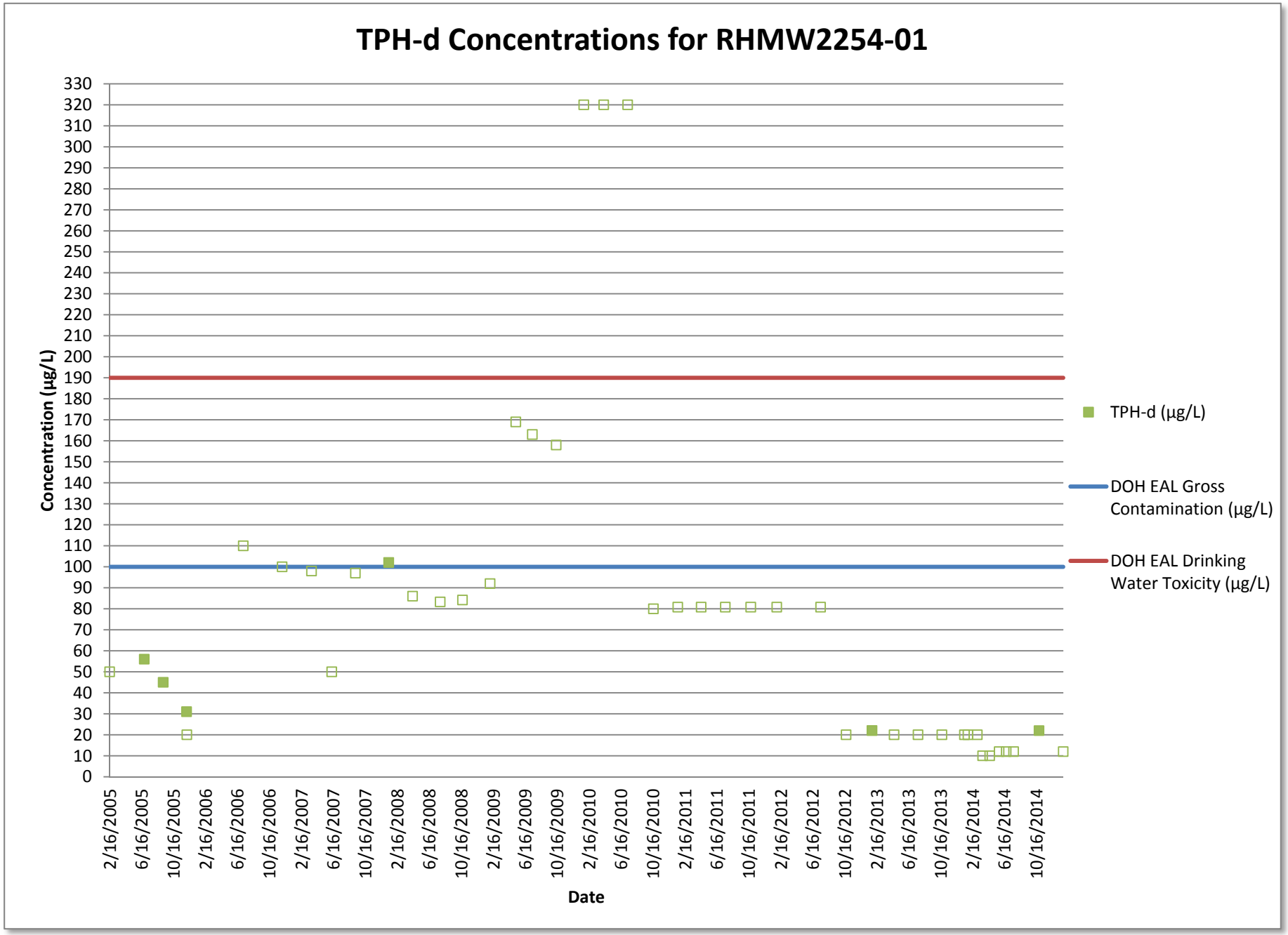

Unfilled boxes indicate non-detections. MRLs are shown for February 2005, MDLs are shown for December 2005 through October 2009, and LODs are shown from January 2010 on.
Laboratory data rejected for 1/15/2008 sampling event.
Numerous sample results had a chromatographic pattern that did not match the calibration standard. The relatively high TPH-d values may not necessarily be indicative that there is diesel fuel or other petroleum products in the well.

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APPENDIX E

Cumulative Groundwater Results
(included on attached CD)

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