Final
Third Quarter 2013 - 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, and 020028

September 2013

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:

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Naval Facilities Engineering Command, Hawaii
400 Marshall Road
JBPHH, HI 96860-3139

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Prepared under:

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FINAL
THIRD QUARTER 2013 - 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
%	percent
bgs	below ground surface
BTEX	benzene, toluene, ethylbenzene, and xylene
COPC	Contaminant of Potential Concern
DLNR	State of Hawaii Department of Land and Natural Resources
DOH	State of Hawaii Department of Health
DON	Department of the Navy
EAL	Environmental Action Level
EPA	Environmental Protection Agency
ESI	Environmental Science International
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
TEC	The Environmental Company, Inc.
TPH	Total Petroleum Hydrocarbons
TPH-d	Total Petroleum Hydrocarbons as diesel
TPH-g	Total Petroleum Hydrocarbons as gasoline
U.S.	United States of America
UST	Underground Storage Tank
VOC	Volatile Organic Compound
WP	Work Plan

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EXECUTIVE SUMMARY

This quarterly groundwater monitoring report presents the results of the third quarter 2013 groundwater sampling conducted on July 22 and 23, 2013, 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, and 020028.

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

On July 22 and 23, 2013, ESI personnel collected groundwater samples from five monitoring wells at the RHSF (wells RHMW01, RHMW02, RHMW03, RHMW05, and RHMW2254-01). A summary of the analytical results is provided below.

- **RHMW01** – Total Petroleum Hydrocarbons as diesel [TPH-d] (99 micrograms per liter [µg/L]) and naphthalene (0.048 µg/L) were detected. None of the chemical constituents analyzed for were detected at concentrations above the DOH Environmental Action Levels [EALs].

- **RHMW02** – TPH-d (2,500 µg/L), Total Petroleum Hydrocarbons as gasoline [TPH-g] (55 µg/L), acenaphthene (0.52 µg/L), fluorene (0.23 µg/L), 1-methylnaphthalene (21 µg/L), 2-methylnaphthalene (9.1 µg/L), naphthalene (73 µg/L), ethylbenzene (0.17 µg/L), and xylenes (0.45 µg/L), and dissolved lead (0.135 µg/L) were detected. TPH-d, 1-methylnaphthalene, and naphthalene were detected at concentrations above the DOH EALs for both drinking water toxicity and gross contamination.

- **RHMW03** – TPH-d (48 µg/L) and naphthalene (0.064 µg/L) were detected. None of the chemical constituents analyzed for were detected at concentrations above the DOH EALs.

- **RHMW05** – Naphthalene (0.033 µg/L) was detected. None of the chemical constituents analyzed for were detected at concentrations above the DOH EALs.

- **RHMW2254-01** – Total lead (0.300 µg/L) and naphthalene (0.099 µg/L) were detected. None of the chemical constituents analyzed for were detected at concentrations above the DOH EALs.

Since the wells were last sampled (April 2013), groundwater contaminant concentrations in four wells (RHMW01, RHMW03, RHMW05, and RHMW2254-01) remained at low concentrations

and did not change significantly, or were not detected. Only the groundwater samples from RHMW02 showed concentrations of contaminants of potential concern [COPCs] exceeding the DOH EALs.

TPH-d concentrations detected in well RHMW01 during the last sampling (April 2013) event increased above the DOH EALs for both drinking water toxicity and gross contamination for the first time since February 2012. During this round of sampling, TPH-d was detected at a concentration just below the DOH EAL for gross contamination, but well below the drinking DOH EALs.

2-Methylnaphthalene concentrations detected in the primary and duplicate samples collected from well RHMW02 during this sampling event decreased to concentrations below the DOH EALs. TPH-d concentrations detected in the samples collected from well RHMW02 decreased, but still exceeded the EALs and were consistent with previous analytical data. This decrease is consistent with a decrease in TPH-d concentration in well RHMW01 during this event.

With the exception of 2-methylnaphthalene, concentration of COPCs in well RHMW02 have not changed significantly. TPH-d, 1-methylnaphthalene, 2-methylnaphthalene, and naphthalene concentrations have been decreasing since groundwater monitoring was initiated in 2005. This is the first sampling event since July 2012 that 2-methylnaphthalene concentrations have been detected below both the drinking water toxicity and gross contamination DOH EALs.

Based on the results of the groundwater monitoring, continuing the groundwater monitoring program at the RHSF is recommended. If TPH-d concentrations in well RHMW02 significantly increase, the monitoring frequency should be increased to monthly in accordance with the RHSF Groundwater Protection Plan.

SECTION 1 – INTRODUCTION

This quarterly groundwater monitoring report presents the results of the third quarter 2013 groundwater sampling conducted on July 22 and 23, 2013, 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 11-281 Subchapter 7, Release Response Action. The DOH Facility ID number for the RHSF is 9-102271. The DOH Release ID numbers are 990051, 010011, and 020028.

The groundwater sampling was conducted as part of the long-term groundwater and soil vapor monitoring 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 west 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.

Five groundwater monitoring wells (wells RHMW01, RHMW02, RHMW03, RHMW05, and RHMW2254-01) are located within the RHSF lower access tunnel (Figure 2). Two groundwater monitoring wells (wells HDMW2253-03 and OWDFMW01) are located outside of the RHSF tunnel system. Monitoring data for the two wells located outside the tunnel are included in a separate report.

Monitoring wells RHMW01, RHMW02, RHMW03, and RHMW05 are located inside the underground tunnels. Monitoring well RHMW2254-01 is located inside the infiltration gallery of the Department of the Navy [DON] Well 2254-01. The DON Well 2254-01 is located

approximately 2,400 feet downgradient of the USTs and provides approximately 24 percent [%] of the potable water to the Pearl Harbor System, which serves approximately 52,200 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
July 2013 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 the drilled wells (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 types of aquifers. 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, which 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. 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. The DON Well 2254-01 is located approximately 2,400 feet downgradient of the USTs (Figure 2).

1.3 BACKGROUND

The RHSF was constructed by the U.S. Government in the early 1940s. Twenty USTs and a series of tunnels were constructed. The USTs were constructed of steel and they currently contain JP-5, JP-8, and F-76. Several tanks in the past have stored DON special fuel oil, DON distillate, aviation gasoline, and motor gasoline (Environet, 2010). The fueling system is a self-contained underground unit that was installed into native rock comprised primarily of basalt with

some interbedded tuffs and breccias (Environet, 2010). Each UST measures approximately 245 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 involved installing 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 grade at the time of the well completion. In February 2001, a groundwater sample was collected from the well. Total Petroleum Hydrocarbons [TPH] and lead were detected in the samples. Lead was detected at a concentration above the DOH EAL (The Environmental Company, Inc. [TEC], 2009; DOH, 2000).

In 2005, the RHSF groundwater monitoring program was initiated. It involved routine groundwater sampling of wells RHMW01 and RHMW2254-01. Samples were collected in February, June, September, and December of 2005. Lead was detected at concentrations above the DOH EAL 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 groundwater monitoring wells (wells RHMW02, RHMW03, and RHMW04) within the RHSF (TEC, 2008). Well RHMW04 was installed 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 two existing wells (wells RHMW01 and RHMW2254-01). The COPCs with concentrations exceeding DOH EALs are summarized below.

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

In 2006, TEC installed dedicated sampling pumps in the five wells (wells RHWM01, RHWM02, RHMW03, RHWM04,and RHMW2254-01). In July and December of 2006, groundwater

samples were collected from the five wells. The COPCs with concentrations exceeding DOH EALs are summarized below.

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

In 2007, groundwater samples were collected from the four wells RHWM01, RHWM02, RHMW03, and RHMW2254-01. Samples were collected in March, June, and September of 2007. The COPCs with concentrations exceeding DOH EALs are summarized below.

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

In 2008, groundwater samples were collected from wells RHWM01, RHWM02, RHMW03, and RHMW2254-01. Samples were collected in January, April, July, and October of 2008. The COPCs with concentrations exceeding 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 EAL.
- **RHMW02** – TPH-d, naphthalene, 1-methylnaphthalene, and 2-methylnaphthalene were detected at concentrations above the DOH EALs.
- **RHMW03** – TPH-d was detected at concentrations above the DOH EAL.

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 downgradient of the USTs. Well RHMW05 was added to the quarterly groundwater sampling program. In 2009, quarterly groundwater samples were collect from wells RHMW01, RHMW02, RHMW03, RHMW05, and RHMW2254-01. Samples were collected in February, May, July, and October of 2009. The COPCs with concentrations exceeding DOH EALs are summarized below.

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

In 2010, groundwater samples were collected from wells RHMW01, RHMW02, RHMW03, RHMW05, and RHMW2254-01. Samples were collected in January, April, July, and October. The COPCs with concentrations exceeding DOH EALs are summarized below.

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

In 2011, quarterly groundwater samples were collected from wells RHMW01, RHMW02, RHMW03, RHMW05, and RHMW2254-01. Samples were collected in January, April, July, and October. The COPCs with concentrations exceeding DOH EALs are summarized below.

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

In 2012, quarterly groundwater samples were collected from wells RHMW01, RHMW02, RHMW03, RHMW05, and RHMW2254-01. Samples were collected in February, April, July, and November. The COPCs with concentrations exceeding DOH EALs are summarized below.

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

In January 2013, quarterly groundwater samples were collected from wells RHMW01, RHMW02, RHMW03, RHMW05, and RHMW2254-01. The COPCs with concentrations exceeding DOH EALs are summarized below.

- **RHMW02** – TPH-d, TPH-g, naphthalene, 1-methylnaphthalene, and 2-methylnaphthalene were detected at concentrations above the DOH EALs.

In April 2013, quarterly groundwater samples were collected from wells RHMW01, RHMW02, RHMW03, RHMW05, and RHMW2254-01. The COPCs with concentrations exceeding DOH EALs are summarized below.

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

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 in January 2013).

29. Groundwater Monitoring Report, January 2013 (Submitted in April 2013).

30. Groundwater Monitoring Report, April 2013 (Submitted in July 2013).

SECTION 2 – GROUNDWATER SAMPLING

On July 22 and 23, 2013, ESI personnel collected groundwater samples from five monitoring wells at the RHSF (wells RHMW01, RHMW02, RHMW03, RHMW05, and RHMW2254-01). The samples were collected in accordance with DOH UST release response requirements (DOH, 2000) and the RHSF 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 with the exception of RHMW02. A slight petroleum hydrocarbon odor was noticed when collecting groundwater samples from RHMW02.

2.1 GROUNDWATER SAMPLING

Prior to collecting groundwater samples, the monitoring wells were purged of 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 water was not drawn down. The groundwater samples were collected at flow rates of approximately 0.10 to 0.33 liters per minute. Samples collected for dissolved lead analysis were filtered in the field using 0.45 micron filters.

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, Polycyclic Aromatic Hydrocarbons [PAHs] using EPA Method 8270C SIM, dissolved lead using

EPA Method 6020, and total lead using EPA Method 200.8. The sample collected from well RHMW2254-01 was analyzed for total lead (unfiltered) as DON Well 2254-01 is a drinking water supply well. The analytical results are summarized below and in Table 2.1. A copy of the laboratory report is included in Appendix C.

- **RHMW01** – TPH-d (99 µg/L) and naphthalene (0.048 µg/L) were detected. None of the chemical constituents analyzed for were detected at concentrations above the DOH EALs.

- **RHMW02** – TPH-d (2,500 µg/L), TPH-g (55 µg/L), acenaphthene (0.52 µg/L), fluorene (0.23 µg/L), 1-methylnaphthalene (21 µg/L), 2-methylnaphthalene (9.1 µg/L), naphthalene (73 µg/L), ethylbenzene (0.17 µg/L), xylenes (0.45 µg/L), and dissolved lead (0.135 µg/L) were detected. TPH-d, 1-methylnaphthalene, and naphthalene were detected at concentrations above the DOH EALs for both drinking water toxicity and gross contamination.

- **RHMW03** – TPH-d (48 µg/L) and naphthalene (0.064 µg/L) were detected. None of the chemical constituents analyzed for were detected at concentrations above the DOH EALs.

- **RHMW05** – Naphthalene (0.033 µg/L) was detected. None of the chemical constituents analyzed for were detected at concentrations above the DOH EALs.

- **RHMW2254-01** – Total lead (0.300 µg/L) and naphthalene (0.099 µg/L) were detected. None of the chemical constituents analyzed for were detected at concentrations above the DOH EALs.

2.3 GROUNDWATER CONTAMINANT TRENDS

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

- **RHMW01** – COPCs detected during this round of quarterly sampling were consistent with historical data. TPH-d has historically been detected at concentrations above the DOH EAL for both drinking water toxicity and gross contamination. TPH-d concentrations showed a decreasing trend from 1,500 µg/L in February 2005 to 79 µg/L in February 2013. The TPH-d concentration increased to 340 µg/L in April 2013, but decreased to 99 µg/L during this sampling event below both DOH EALs.

- **RHMW02** – TPH-d, TPH-g, 1-methylnaphthalene, 2-methylnaphthalene, and naphthalene have historically been detected at concentrations above the DOH EALs. TPH-d concentrations during the last several rounds of sampling have shown an increasing trend, but concentrations have been lower than the high of 5,420 µg/L in October 2008 and decreased slightly during this sampling event. 1-Methylnaphthalene and naphthalene concentrations remained consistent with the last event in April 2013. The concentration of

2-Methylnaphthalene dropped below the DOH EALs. TPH-g concentrations remained consistent and below the DOH EALs during the last two rounds of sampling, indicating the high concentrations detected in October 2012 and January 2013 may be anomalous.

- **RHMW03** – COPCs detected during this round of quarterly sampling were consistent with historical data. 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 were consistent with historical data. TPH-d has historically been detected 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 were consistent with historical data. TPH-d was detected at a concentration above the DOH EAL for gross contamination in January 2008; however, it has not been detected at concentrations above the DOH EALs since then.

Historical groundwater contaminants concentrations above the DOH EALs for both drinking water toxicity and gross contamination are presented in Appendix D.

2.4 WASTE DISPOSAL

The purged groundwater and decontamination water generated during sampling of the inside tunnel wells was stored in a 55-gallon drum along with the purged water and decontamination water from the outside tunnel wells. The water was disposed of following receipt of the analytical results for the outside tunnel wells. The drum was stored onsite at Adit 3. On August 23, 2013, the drum of water was picked up by Pacific Commercial Services, LLC, and disposed of at Unitek Solvent Services, Inc. The waste disposal manifest is included in Appendix E.

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TABLE 2.1
Analytical Results for Groundwater Sampling (July 22 and 23, 2013)
Red Hill Bulk Fuel Storage Facility
July 2013 Quarterly Monitoring Report

Method	Chemical	DOH EALs		RHMW2254-01 (ES032)					RHWM01 (ES028)					RHWM02 (ES029)					RHWM03 (ES031)					RHMW05 (ES033)				
		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	50	20	15	99	HD	50	20	15	**2,500**	HD	50	20	15	48	HD, J	50	20	15	N.D.	U	50	20	15
EPA 8260B	TPH-g	100	100	N.D.	U	50	30	13	N.D.[1]	U	50	30	13	55[1]		50	30	13	N.D.[1]	U	50	30	13	N.D.[1]	U	50	30	13
EPA 8270C	Acenaphthene	370	20	N.D.	U	0.2	0.05	0.021	N.D.	U	0.2	0.05	0.021	0.52		0.2	0.05	0.021	N.D.	U	0.2	0.05	0.021	N.D.	U	0.2	0.051	0.021
	Acenaphthylene	240	2,000	N.D.	U	0.2	0.05	0.018	N.D.	U	0.2	0.05	0.018	N.D.	U	0.2	0.05	0.018	N.D.	U	0.2	0.05	0.018	N.D.	U	0.2	0.051	0.018
	Anthracene	1,800	22	N.D.	U	0.2	0.05	0.034	N.D.	U	0.2	0.05	0.034	N.D.	U	0.2	0.05	0.034	N.D.	U	0.2	0.05	0.034	N.D.	U	0.2	0.051	0.035
	Benzo[a]anthracene	0.092	4.7	N.D.	U	0.2	0.05	0.024	N.D.	U	0.2	0.05	0.024	N.D.	U	0.2	0.05	0.024	N.D.	U	0.2	0.05	0.024	N.D.	U	0.2	0.051	0.024
	Benzo[g,h,i]perylene	1,500	0.13	N.D.	U	0.2	0.05	0.022	N.D.	U	0.2	0.05	0.022	N.D.	U	0.2	0.05	0.022	N.D.	U	0.2	0.05	0.022	N.D.	U	0.2	0.051	0.022
	Benzo[a]pyrene	0.2	0.81	N.D.	U	0.2	0.05	0.036	N.D.	U	0.2	0.05	0.036	N.D.	U	0.2	0.05	0.036	N.D.	U	0.2	0.05	0.037	N.D.	U	0.2	0.051	0.037
	Benzo[b]fluoranthene	0.092	0.75	N.D.	U	0.2	0.05	0.025	N.D.	U	0.2	0.05	0.025	N.D.	U	0.2	0.05	0.025	N.D.	U	0.2	0.05	0.025	N.D.	U	0.2	0.051	0.025
	Benzo[k]fluoranthene	0.92	0.4	N.D.	U	0.2	0.05	0.023	N.D.	U	0.2	0.05	0.023	N.D.	U	0.2	0.05	0.023	N.D.	U	0.2	0.05	0.024	N.D.	U	0.2	0.051	0.024
	Chrysene	9.2	1	N.D.	U	0.2	0.05	0.019	N.D.	U	0.2	0.05	0.019	N.D.	U	0.2	0.05	0.019	N.D.	U	0.2	0.05	0.019	N.D.	U	0.2	0.051	0.019
	Dibenzo[a,h]anthracene	0.0092	0.52	N.D.	U	0.2	0.05	0.027	N.D.	U	0.2	0.05	0.027	N.D.	U	0.2	0.05	0.027	N.D.	U	0.2	0.05	0.027	N.D.	U	0.2	0.051	0.027
	Fluoranthene	1,500	130	N.D.	U	0.2	0.05	0.027	N.D.	U	0.2	0.05	0.027	N.D.	U	0.2	0.05	0.027	N.D.	U	0.2	0.05	0.027	N.D.	U	0.2	0.051	0.028
	Fluorene	240	950	N.D.	U	0.2	0.05	0.024	N.D.	U	0.2	0.05	0.024	0.23		0.2	0.05	0.024	N.D.	U	0.2	0.05	0.025	N.D.	U	0.2	0.051	0.025
	Indeno[1,2,3-cd]pyrene	0.092	0.095	N.D.	U	0.2	0.05	0.022	N.D.	U	0.2	0.05	0.022	N.D.	U	0.2	0.05	0.022	N.D.	U	0.2	0.05	0.022	N.D.	U	0.2	0.051	0.022
	1-Methylnaphthalene	4.7	10	N.D.	U	0.2	0.05	0.028	N.D.	U	0.2	0.05	0.028	**21**		2	0.5	0.28	N.D.	U	0.2	0.05	0.029	N.D.	U	0.2	0.051	0.029
	2-Methylnaphthalene	24	10	N.D.	U	0.2	0.05	0.026	N.D.	U	0.2	0.05	0.026	9.1		0.2	0.05	0.026	N.D.	U	0.2	0.05	0.027	N.D.	U	0.2	0.051	0.027
	Naphthalene	17	21	0.099	J	0.2	0.05	0.023	0.048	J	0.2	0.05	0.023	**73**		2	0.5	0.23	0.064	J	0.2	0.05	0.023	0.033	J	0.2	0.051	0.023
	Phenanthrene	240	410	N.D.	U	0.2	0.05	0.03	N.D.	U	0.2	0.05	0.031	N.D.	U	0.2	0.05	0.03	N.D.	U	0.2	0.05	0.031	N.D.	U	0.2	0.051	0.031
	Pyrene	180	68	N.D.	U	0.2	0.05	0.025	N.D.	U	0.2	0.05	0.025	N.D.	U	0.2	0.05	0.025	N.D.	U	0.2	0.05	0.025	N.D.	U	0.2	0.051	0.025
EPA 8260B	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	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	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	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	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)	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	20	10	6	N.D.	U	20	10	6	N.D.	U	20	10	6
	Benzene	5	170	N.D.	U	1	0.5	0.14	N.D.[1]	U	1	0.5	0.14	N.D.[1]	U	1	0.5	0.14	N.D.[1]	U	1	0.5	0.14	N.D.[1]	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	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	20	5	3.9	N.D.	U	20	5	3.9	N.D.	U	20	5	3.9	N.D.	U	20	5	3.9	N.D.	U	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	1.8	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	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.[1]	U	1	0.5	0.14	0.17[1]	J	1	0.5	0.14	N.D.[1]	U	1	0.5	0.14	N.D.[1]	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
	Tetrachloroethane, 1,1,1,2-	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
	Tetrachloroethane, 1,1,2,2-	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
	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.[1]	U	1	0.5	0.24	N.D.[1]	U	1	0.5	0.24	N.D.[1]	U	1	0.5	0.24	N.D.[1]	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.[1]	U	1	0.5	0.23	0.45[1]	J	11	1.5	0.23	N.D.[1]	U	11	1.5	0.23	N.D.[1]	U	11	1.5	0.23
EPA 6020	Dissolved Lead	15	50,000	-	-	-	-	-	N.D.	U	1	0.2	0.0898	0.135	J	1	0.2	0.0898	N.D.	U	1	0.2	0.0898	N.D.	U	1	0.2	0.0898
EPA 200.8	Total Lead	15	50,000	0.300	J	1.0	-*	0.0898	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

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

- Not Analyzed
- * This sample was analyzed by EPA Method 200.8 and therefore does not have an LOD
- 1 These results may be biased low due to exceeding the hold time by one day.
- 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.
- 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 meets the quality objectives for the project. The data quality assessment was performed in accordance with the approved WP/SAP prepared by ESI (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].

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 and laboratory LCS/Laboratory Control Sample Duplicates [LCSDs] or 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 primary and field duplicate samples are provided in Table 3.1. With the exception of 2-methylnaphthalene, all duplicate RPDs are less than 20% (below 50% as recommended in the NAVFAC Project Procedures Manual [DON 2007]), and therefore, the data precision is considered acceptable. The concentration of 2-methylnaphthalene detected in the primary sample ES029 (9.1 µg/L) was close to the DOH EAL for gross contamination (10 µg/L). However, the concentration detected in the field duplicate sample ES030 (6.6 µg/L) was well below the DOH EALs. Because of this and the fact that 1-methylnaphthalene and TPH-d were detected in sample ES029 at concentrations exceeding the DOH EALs, the high RPD is unlikely to affect data usability.

The RPD of the MS/MSD results for 2-methylnaphthalene was above the acceptable maximum of 20%. This is in line with the field duplicate sample RPD results. Also, the high sample concentration in the MS/MSD samples relative to the spike amounts, likely resulted in the low precision of the recovery. All other RPDs for MS/MSD and LCS/LCSD pairs were within the acceptance range.

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 established by the individual laboratory.

Between July 2006 and July 2010, naphthalene was analyzed for 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 October 2012, naphthalene concentrations in RHMW02 have exceeded DOH EALs for both gross contamination and drinking water toxicity. The naphthalene concentration detected in July 2012 (17 µg/L) was equal to the DOH EAL for drinking water (17 µg/L) but below the DOH EAL for gross contamination (21 µg/L); it is possible that accounting for the low bias, the actual naphthalene concentration detected during this event exceeded both EALs. Naphthalene concentrations between April 2011 and April 2012 were all an order of magnitude below both EALs, and it is unlikely that decisions based on these data are significantly affected by the low bias

Results for TPH-d in samples ES028, ES029, ES030, and ES031 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. The chromatograms are not part of the standard laboratory package and were not reviewed by ESI.

All surrogate spike recoveries for analyzed constituents were within acceptable percent recovery limits. All LCS recoveries were within recovery limits. Naphthalene, 2-methylnaphthalene and 1-methylnaphthalene concentrations for ES029, 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.

All other MS and MSD recoveries were within acceptable recovery limits, therefore, the data accuracy for this monitoring event is considered acceptable.

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 compliance with the sample collection procedures described in the WP/SAP (ESI, 2012).

Representativeness is also evaluated via compliance with established sample holding time and sample preservation, and through the analysis of blank samples, including method blank and trip blank samples. The hold time for VOC/TPH-g analysis for samples ES028, ES029, ES030, and ES031 were exceeded by one day. According to Standard Operative Procedure II-B, *Standard and Full Data Validation Procedure for GC/MS Volatile Organics by SW-846 8260B*, in the Navy Project Procedure Manual, the hold time exceedance only affects aromatic volatiles (benzene, toluene, ethylbenzene, and xylene [BTEX] compounds and the BTEX portion of TPH-g) (DoN 2007). A footnote has been added to the affected results in Tables 2-1 and 3-1 to indicate a possible low bias; however, due to the low BTEX concentrations detected during this event and in previous events, this is unlikely to affect project decisions. It is unlikely that the samples were significantly affected by this delay in analysis and therefore, the groundwater sample data are considered representative of the groundwater quality on site. All other sample holding time and sample preservation were in compliance with EPA guidance.

For this sampling event, one trip blank was collected. TPH-g (21 µg/L) was detected in the trip blank at a concentration below the limit of detection [LOD]. TPH-g was detected in samples ES029 and ES030. In ES029 and ES030, the TPH-g is likely attributable to the gasoline-range organics associated with the high concentrations of TPH-d and is consistent with TPH-g concentrations detected during the last sampling event. However, concentrations of TPH-g detected in the samples were no more than approximately half of the EAL, and it is unlikely the contamination in the trip blank significantly affects data usability. Therefore, the groundwater sample data are considered representative of the groundwater quality on site. The quality control 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.

Between July 2006 and July 2010, naphthalene was analyzed for 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. 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 TPH-g data 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 methods. The LOQs for samples may require adjustment due to matrix interference or if high levels of target analytes necessitate dilution before analysis. Matrix interference and sample dilutions have the effect of increasing the LOQs. Laboratory LODs and LOQs for several analytes 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.

LODs and LOQs for several analytes were greater than the DOH EALs (as stated in the WP/SAP), and therefore it is not possible to determine whether the analytes are present at concentrations greater than or equal to the DOH EALs. As suggested by the DOH Technical Guidance Manual, when the LOQ exceeds the DOH EAL, the project action level will be the LOQ for these analytes. The affected analytes for this monitoring event are 1,1-dichloroethane, 1,2,3-trichloropropane, 1,2-dibromo-3-chloropropane, 1,2-dibromoethane, 1,2-dichloroethane, 1,3-dichloropropene, bromodichloromethane, bromomethane, chloromethane, dibromochloro-methane, hexachlorobutadiene, methylene chloride, 1,1,1,2-tetrachloroethane, 1,1,2,2-tetrachloroethane, benzo[a]anthracene, benzo[g,h,i]perylene, benzo[b]fluoranthene, benzo[k]fluoranthene, dibenzo[a,h]anthracene, and ideno[1,2,3-cd]pyrene.

3.2 Data Assessment and Usability Conclusions

The PARCCS criteria were evaluated, and with a few exceptions, all criteria were met. TPH-g contamination in the trip blank shows that there may be a slight high bias in the TPH-g groundwater sample results; however, it is unlikely that this affects the usability of the data for making project decisions. Other analytes that had issues causing concentrations to be biased high or low were either not detected in groundwater samples, or were detected at concentrations well below project action levels. The data assessment concludes that all data generated during this event are usable for the intended purpose.

TABLE 3.1
Quality Control Results for Groundwater Sampling (July 22, 2013)
Red Hill Bulk Fuel Storage Facility
July 2013 Quarterly Monitoring Report

Method	Chemical Constituent	DOH EALs		RHMW02 (ES029)					RHMW02 (ES030) (DUP)					RPD Duplicate (%)	ES Trip				
		Drinking Water Toxicity	Gross Contamination	Result	Q	LOQ	LOD	DL	Result	Q	LOQ	LOD	DL		Result	Q	LOQ	LOD	DL
EPA 8015B	TPH-d	190	100	**2,500**	HD	50	20	15	**2,600**	HD	50	20	15	4	-	-	-	-	-
EPA 8260B	TPH-g	100	100	**55**[1]		50	30	13	61[1]		50	30	13	10	21	J	50	30	13
EPA 8270C	Acenaphthene	370	20	0.52		0.2	0.05	0.021	0.51		0.2	0.05	0.021	2	-	-	-	-	-
	Acenaphthylene	240	2,000	N.D.	U	0.2	0.05	0.018	N.D.	U	0.2	0.05	0.018	NA	-	-	-	-	-
	Anthracene	1,800	22	N.D.	U	0.2	0.05	0.034	N.D.	U	0.2	0.05	0.034	NA	-	-	-	-	-
	Benzo[a]anthracene	0.092	4.7	N.D.	U	0.2	0.05	0.024	N.D.	U	0.2	0.05	0.024	NA	-	-	-	-	-
	Benzo[g,h,i]perylene	1,500	0.13	N.D.	U	0.2	0.05	0.022	N.D.	U	0.2	0.05	0.022	NA	-	-	-	-	-
	Benzo[a]pyrene	0.2	0.81	N.D.	U	0.2	0.05	0.036	N.D.	U	0.2	0.05	0.037	NA	-	-	-	-	-
	Benzo[b]fluoranthene	0.092	0.75	N.D.	U	0.2	0.05	0.025	N.D.	U	0.2	0.05	0.025	NA	-	-	-	-	-
	Benzo[k]fluoranthene	0.92	0.4	N.D.	U	0.2	0.05	0.023	N.D.	U	0.2	0.05	0.023	NA	-	-	-	-	-
	Chrysene	9.2	1	N.D.	U	0.2	0.05	0.019	N.D.	U	0.2	0.05	0.019	NA	-	-	-	-	-
	Dibenzo[a,h]anthracene	0.0092	0.52	N.D.	U	0.2	0.05	0.027	N.D.	U	0.2	0.05	0.027	NA	-	-	-	-	-
	Fluoranthene	1,500	130	N.D.	U	0.2	0.05	0.027	N.D.	U	0.2	0.05	0.027	NA	-	-	-	-	-
	Fluorene	240	950	0.23		0.2	0.05	0.024	0.22		0.2	0.05	0.025	4	-	-	-	-	-
	Indeno[1,2,3-cd]pyrene	0.092	0.095	N.D.	U	0.2	0.05	0.022	N.D.	U	0.2	0.05	0.022	NA	-	-	-	-	-
	1-Methylnaphthalene	4.7	10	**21**		2	0.5	0.28	**18**		2	0.5	0.28	15	-	-	-	-	-
	2-Methylnaphthalene	24	10	9.1		0.2	0.05	0.026	6.6		0.2	0.05	0.027	32	-	-	-	-	-
	Naphthalene	17	21	**73**		2	0.5	0.23	**67**		2	0.5	0.23	9	-	-	-	-	-
	Phenanthrene	240	410	N.D.	U	0.2	0.05	0.03	N.D.	U	0.2	0.05	0.031	NA	-	-	-	-	-
	Pyrene	180	68	N.D.	U	0.2	0.05	0.025	N.D.	U	0.2	0.05	0.025	NA	-	-	-	-	-
EPA 8260B	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
	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
	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
	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
	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
	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
	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
	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
	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
	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
	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
	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
	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
	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
	Acetone	22,000	20,000	N.D.	U	20	10	6	N.D.	U	20	10	6	NA	N.D.	U	20	10	6
	Benzene	5	170	N.D.[1]	U	1	0.5	0.14	N.D.[1]	U	1	0.5	0.14	NA	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
	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
	Bromomethane	8.7	50,000	N.D.	U	20	5	3.9	N.D.	U	20	5	3.9	NA	N.D.	U	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
	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
	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
	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
	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
	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
	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
	Ethylbenzene	700	30	0.17[1]	J	1	0.5	0.14	0.19[1]	J	1	0.5	0.14	11	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
	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
	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
	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
	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
	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
	Tetrachloroethane, 1,1,1,2-	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
	Tetrachloroethane, 1,1,2,2-	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
	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
	Toluene	1,000	40	N.D.[1]	U	1	0.5	0.24	N.D.[1]	U	1	0.5	0.24	NA	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
	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
	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
	Xylenes	10,000	20	0.45[1]	J	11	1.5	0.23	0.50[1]	J	11	1.5	0.23	11	N.D.	U	11	1.5	0.23
EPA 6020	Lead	15	50,000	0.135	J	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
1 These results may be biased low due to exceeding the hold time by one day.
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.
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 July 22 and 23, 2013, ESI personnel collected groundwater samples from five monitoring wells at the RHSF (wells RHMW01, RHMW02, RHMW03, RHMW05, and RHMW2254-01).

The groundwater sampling was conducted as part of the long-term groundwater and soil vapor monitoring 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 (99 µg/L) and naphthalene (0.048 µg/L) were detected. None of the chemical constituents analyzed for were detected at concentrations above the DOH EALs.

- **RHMW02** – TPH-d (2,500 µg/L), TPH-g (55 µg/L), acenaphthene (0.52 µg/L), fluorene (0.23 µg/L), 1-methylnaphthalene (21 µg/L), 2-methylnaphthalene (9.1 µg/L), naphthalene (73 µg/L), ethylbenzene (0.17 µg/L), xylenes (0.45 µg/L), and dissolved lead (0.135 µg/L) were detected. TPH-d, 1-methylnaphthalene, and naphthalene were detected at concentrations above the DOH EALs for both drinking water toxicity and gross contamination.

- **RHMW03** – TPH-d (48 µg/L) and naphthalene (0.064 µg/L) were detected. None of the chemical constituents analyzed for were detected at concentrations above the DOH EALs.

- **RHMW05** – Naphthalene (0.033 µg/L) was detected. None of the chemical constituents analyzed for were detected at concentrations above the DOH EALs.

- **RHMW2254-01** – Total lead (0.300 µg/L) and naphthalene (0.099 µg/L) were detected. None of the chemical constituents analyzed for were detected at concentrations above the DOH EALs.

Groundwater Contaminant Trends

- **RHMW01** – COPCs detected during this round of quarterly sampling were consistent with historical data. TPH-d has historically been detected at concentrations above the DOH EAL for both drinking water toxicity and gross contamination. TPH-d concentrations showed a decreasing trend from 1,500 µg/L in February 2005 to 79 µg/L in February 2013. The TPH-d concentration increased to 340 µg/L in April 2013, but decreased to 99 µg/L during this sampling event below both DOH EALs.

- **RHMW02** – TPH-d, TPH-g, 1-methylnaphthalene, 2-methylnaphthalene, and naphthalene have historically been detected at concentrations above the DOH EALs. TPH-d concentrations during the last several rounds of sampling have shown an increasing trend, but concentrations have been lower than the high of 5,420 µg/L in October 2008 and decreased slightly during this sampling event. 1-Methylnaphthalene concentrations

remained consistent with the last event in April 2013. TPH-g concentrations remained below the DOH EALs during the last two rounds of sampling, indicating the high concentrations detected in October 2012 and January 2013 may be anomalous. Naphthalene concentrations decreased slightly since the last event in April 2013.

- **RHMW03** – COPCs detected during this round of quarterly sampling were consistent with historical data. 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 were consistent with historical data. TPH-d has historically been detected 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 were consistent with historical data. TPH-d was detected at a concentration above the DOH EAL for gross contamination in January 2008; however, it has not been detected at concentrations above the DOH EALs since then.

Conclusions and Recommendations

Since the wells were last sampled (April 2013), groundwater contaminant concentrations in four wells (RHMW01, RHMW03, RHMW05, and RHMW2254-01) remained at low concentrations and did not change significantly, or were not detected. Only the groundwater samples from RHMW02 had concentrations of COPCs exceeding the DOH EALs.

TPH-d concentrations detected in well RHMW01 during the last sampling (April 2013) event increased above the DOH EALs for both drinking water toxicity and gross contamination for the first time since February 2012. During this round of sampling, TPH-d was detected at a concentration just below the DOH EAL for gross contamination, but well below the drinking DOH EALs.

2-Methylnaphthalene concentrations detected in the primary and duplicate samples collected from well RHMW02 during this sampling event decreased to concentrations below the DOH EALs. TPH-d concentrations detected in the samples collected from well RHMW02 decreased, but still exceeded the EALs and were consistent with previous analytical data. This decrease is consistent with a decrease in TPH-d concentration in well RHMW01 during this event.

With the exception of 2-methylnaphthalene, concentration of COPCs in well RHMW02 have not changed significantly. TPH-d, 1-methylnaphthalene, 2-methylnaphthalene, and naphthalene concentrations have been decreasing since groundwater monitoring was initiated in 2005. This is the first sampling event since July 2012 that 2-methylnaphthalene concentrations have been detected below both the drinking water toxicity and gross contamination DOH EALs.

Based on the results of the groundwater monitoring, continuing the groundwater monitoring program at the RHSF is recommended. If TPH-d concentrations in well RHMW02 significantly increase, the monitoring frequency should be increased to monthly in accordance with the RHSF Groundwater Protection Plan.

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SECTION 5 – FUTURE WORK

GROUNDWATER SAMPLING

Future work includes the fourth quarter 2013 groundwater monitoring which is scheduled for October 2013. It is anticipated that the quarterly groundwater monitoring status report will be submitted in November 2013.

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SECTION 6 – REFERENCES

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FIGURES

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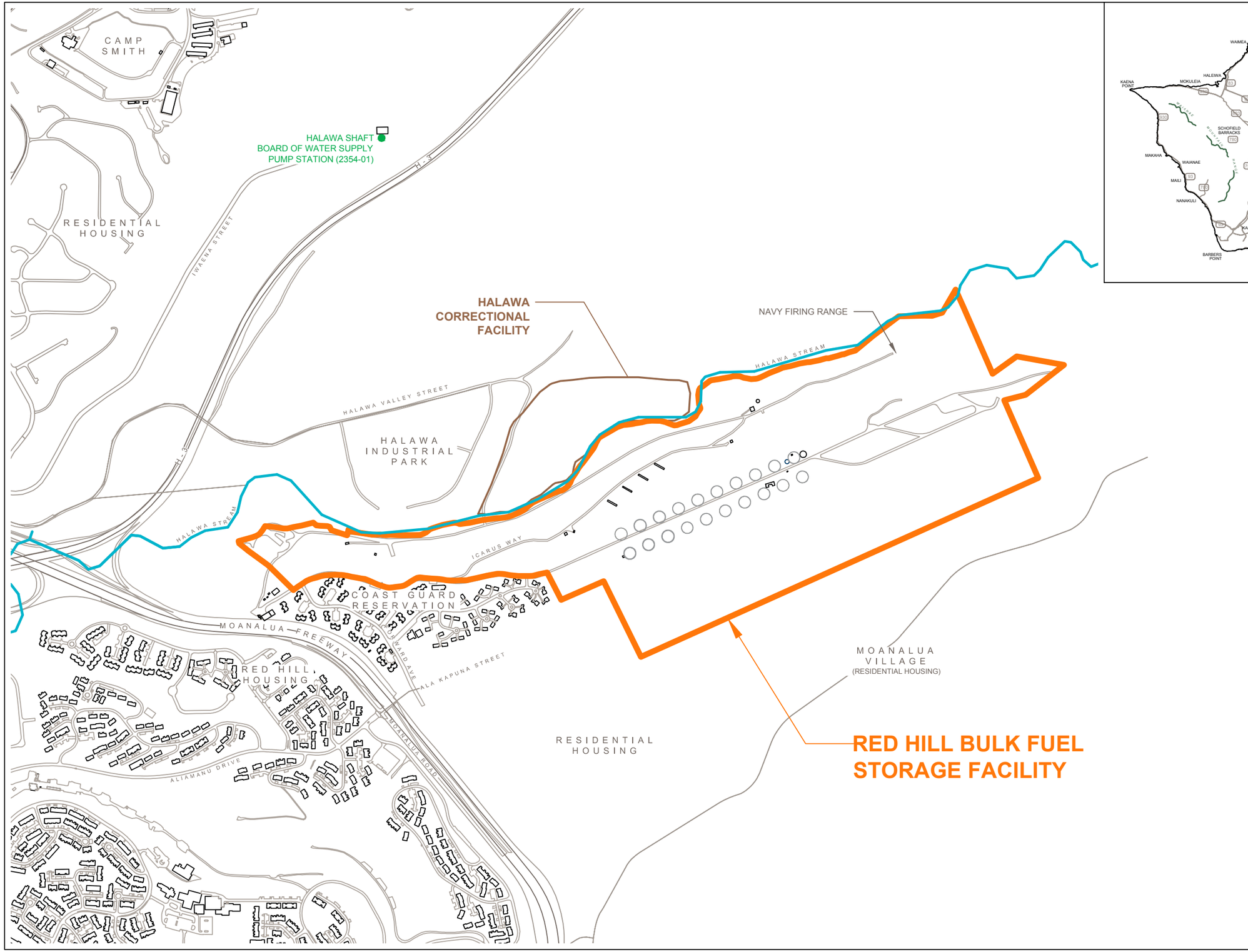

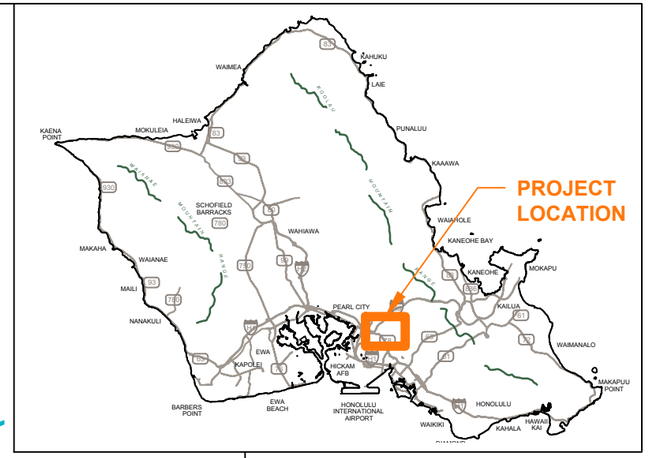

NOTES

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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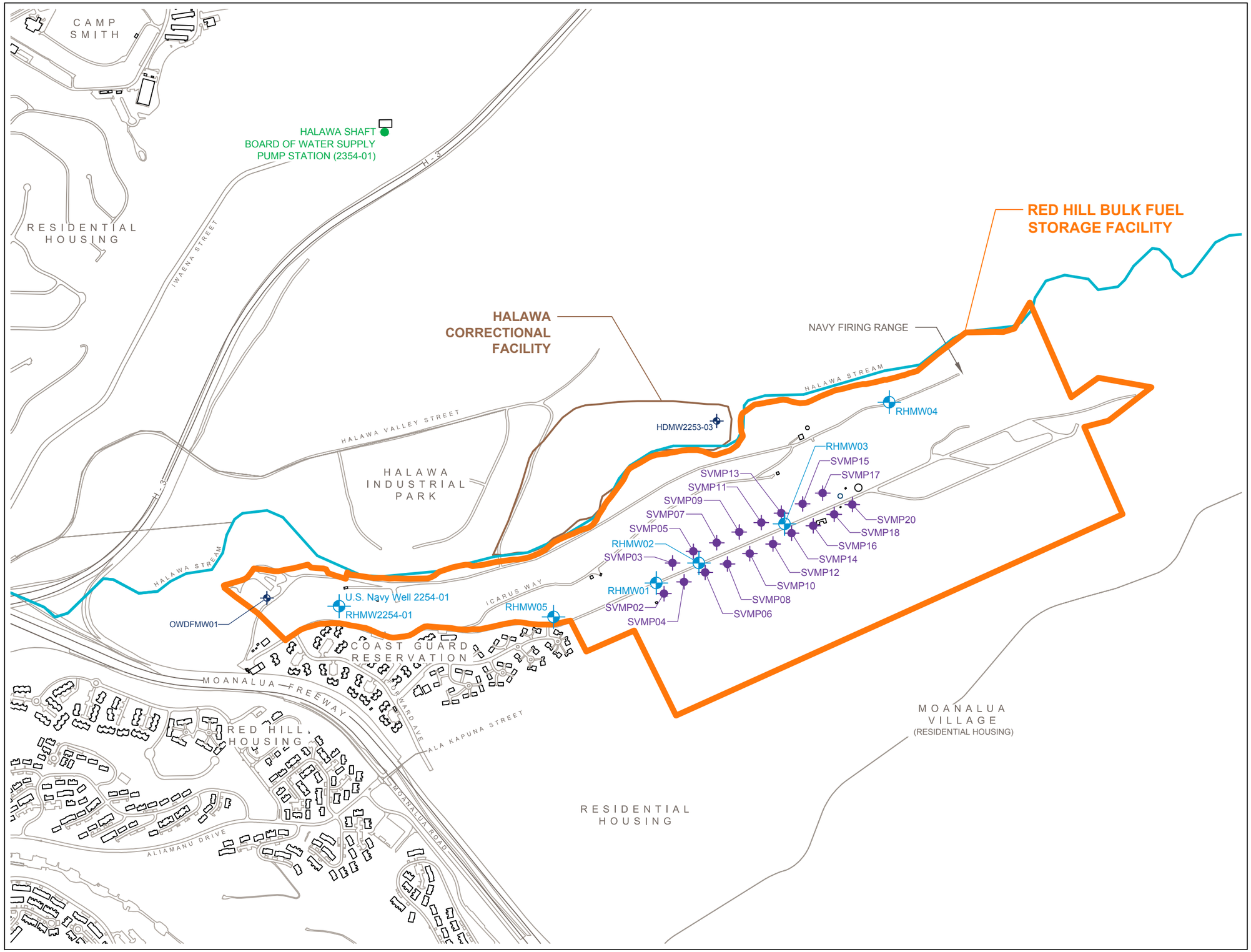

LEGEND

- 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

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

1,200 0 1,200

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: 84.29 ft Date: 7/22/2013 Time: 810

Total Depth of Well: 97.40 ft Personnel Involved: Branden Ibara, Tina Alder

Length of Saturated Zone: - Weather Conditions: -

Volume of Water to be Removed: - Method of Removal: Bladder Pump

Water Level After Purging: 84.35 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)
835	0.0 L	8.70	0.294	3.31	25.67	-	99.2
845	1.0 L	7.12	0.301	0.89	24.59	-	100.9
900	2.0 L	6.89	0.317	0.74	24.40	-	118.3
907	3.0 L	7.19	0.317	0.79	24.32	-	112.7
915	4.0 L	6.90	0.314	0.48	24.31	-	109.3
922	5.0 L	6.84	0.310	0.46	24.27	-	107.3

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: ES028 [0920]

Decontamination Procedures: Triple Rinsed

Notes: YSI did not have salinity parameter.

Sampled by: Branden Ibara, Tina Alder

Sampled Delivered to: Calscience Environmental Lab Transporters: FedEx

Date: 7/23/2013 Time: 1400

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: 86.96 ft Date: 7/22/2013 Time: 950

Total Depth of Well: 94.35 ft Personnel Involved: Branden Ibara, Tina Alder

Length of Saturated Zone: - Weather Conditions: -

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

Water Level After Purging: 86.96 ft Pumping Rate: 0.33 L/min

Well Purge Data:

Time	Volume Removed	pH	Conductivity (mS/cm)	DO (mg/l)	Temperature	Salinity	Redox (ORP) (mV)
957	0.0 L	6.91	0.514	2.13	24.24	-	140.6
1003	2.0 L	6.50	0.527	1.58	24.05	-	123.1
1006	3.0 L	6.37	0.527	1.60	23.98	-	113.4
1009	4.0 L	6.30	0.529	1.58	23.97	-	100.6
1012	5.0 L	6.30	0.528	1.49	23.96	-	98.4

Sample Withdrawal Method: Bladder Pump

Appearance of Sample:

Color: Clear

Turbidity: Low

Sediment: None

Other: Slight PHC Odor

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: ES029 [1015], ES029 MS/MSD [1015], ES030 (Dup) [1100]

Decontamination Procedures: Triple Rinsed

Notes: YSI did not have salinity parameter.

Sampled by: Branden Ibara, Tina Alder

Sampled Delivered to: Calscience Environmental Lab Transporters: FedEx

Date: 7/23/2013 Time: 1400

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: 103.23 ft Date: 7/22/2013 Time: 1122

Total Depth of Well: 110.12 ft Personnel Involved: Branden Ibara, Tina Alder

Length of Saturated Zone: - Weather Conditions: -

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

Water Level After Purging: 103.23 ft Pumping Rate: 0.22 L/min

Well Purge Data:

Time	Volume Removed	pH	Conductivity (mS/cm)	DO (mg/l)	Temperature	Salinity	Redox (ORP) (mV)
1130	0.0 L	9.24	0.667	5.27	27.76	-	75.2
1145	2.0 L	6.69	0.678	2.46	26.97	-	68.2
1148	3.0 L	6.55	0.670	1.85	26.92	-	71.1
1151	4.0 L	6.55	0.666	1.49	26.49	-	73.6
1154	5.0 L	6.50	0.660	1.48	26.29	-	72.7
1157	6.0 L	6.49	0.657	1.64	26.37	-	71.7

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: ES031 [1145]

Decontamination Procedures: Triple Rinsed

Notes: YSI did not have salinity parameter.

Sampled by: Branden Ibara, Tina Alder

Sampled Delivered to: Calscience Environmental Lab Transporters: FedEx

Date: 7/23/2013 Time: 1400

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: 83.85 ft Date: 7/23/2013 Time: 1016

Total Depth of Well: - Personnel Involved: Branden Ibara, Tina Alder

Length of Saturated Zone: - Weather Conditions: -

Volume of Water to be Removed: - Method of Removal: Bladder Pump

Water Level After Purging: 82.85 ft Pumping Rate: 0.33 L/min

Well Purge Data:

Time	Volume Removed	pH	Conductivity (mS/cm)	DO (mg/l)	Temperature	Salinity	Redox (ORP) (mV)
1024	0.0 L	8.83	0.879	5.28	23.14	-	71.4
1027	1.0 L	8.29	0.826	5.61	22.97	-	67.6
1030	2.0 L	8.05	0.813	5.98	22.77	-	64.9
1033	3.0 L	7.66	0.808	6.74	22.59	-	62.1
1036	4.0 L	7.46	0.808	6.99	22.51	-	61.6
1039	5.0 L	7.42	0.809	7.15	22.49	-	61.4

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 - 6020

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

Sample Identification Numbers: ES033 [1045]

Decontamination Procedures: Triple Rinsed

Notes: YSI did not have salinity parameter.

Sampled by: Branden Ibara, Tina Alder

Sampled Delivered to: Calscience Environmental Lab Transporters: FedEx

Date: 7/23/2013 Time: 1400

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: 82.56 ft Date: 7/23/2013 Time: 845

Total Depth of Well: - Personnel Involved: Branden Ibara, Tina Alder

Length of Saturated Zone: - Weather Conditions: -

Volume of Water to be Removed: - Method of Removal: Bladder Pump

Water Level After Purging: - Pumping Rate: 0.24 L/min

Well Purge Data:

Time	Volume Removed	pH	Conductivity (mS/cm)	DO (mg/l)	Temperature	Salinity	Redox (ORP) (mV)
902	0.0 L	6.39	0.289	2.03	26.23	-	22.7
910	1.0 L	7.48	0.522	5.21	23.09	-	71.8
913	2.0 L	7.33	0.523	5.40	22.16	-	70.7
916	3.0 L	7.32	0.519	5.54	21.98	-	70.3
919	4.0 L	7.30	0.519	5.57	21.88	-	71.2

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 - 250ml HDPE

Sample Identification Numbers: ES032, ES032 UF [0930]

Decontamination Procedures: Triple Rinsed

Notes: YSI did not have salinity parameter.

Sampled by: Branden Ibara, Tina Alder

Sampled Delivered to: Calscience Environmental Lab Transporters: FedEx

Date: 7/23/2013 Time: 1400

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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82

Location RHSF Date 7/22/13

Project / Client NAVFAC

Purpose: GW Sampling
Personnel: BI, TA

0700 Met at office
0745 Health + Safety Meeting
0810 RHMW01
DTW = 84.29 ft PID: 0.0
DTB: 97.40 ft
835 Start purging RHMW01
0920 Start collecting sample from RHMW01 ES028.
0950 RHMW02
DTW: 86.96' PID: 0.0
DTB: 94.35'
0957 Start purging RHMW02
1015 collecting Sample from RHMW02 ES029, ES029MS/MSD, ES030 (Dup)
1122 Start purging RHMW03
1200 Start collecting ES031 from RHMW03
1300 Dropped ~~off~~ IDW and left site for Office
1335 Back at office

7/22/13

Location RHSF Date 7/23/13

83

Project / Client NAVFAC

Purpose: GW Sampling
Personnel: BI, TA

0650 Calibrated YSI, pick-up ice
0730 Health + Safety Meeting
Unload equipment
0745 Enter Red Hill
0820 Arrived at Pumphouse, waiting for pumphouse personnel to arrive
0835 Pumphouse door opened
Gauge RHMW-2254-01
DTW: PID: 0.0
DTB: —
0845 Start purging RHMW-2254-01
~~0900~~ collected ES032 from
0930 RHMW2254-01
0940 left Pumphouse
1015 wire securing pump to well cap stopped at pump. repaired temp with hose clamp at RHMW05
1046 Gauge RHMW05
DTW: 83.85 PID: 0.0
DTB: —

[redacted]

1400 Dropped off Aperpet

7/23/13

mw Sampling
, BI, TA

On-site, Health + Safety Meeting
0913 Gauge OWDFMW01
DTW: 120.72 PID: 0.0
DTB: 145.10
0915 collected ESO34, ESO34(MS/MSD) ESO35 from OWDFMW01
0955 Met DLNR at Halana
Start purge HDMW2253-03
collected ESO36 from HDMW2253-03
Dropped off IDW and backed samples
1047 Left Red Hill for FedEx.
1122 left FedEx
1245 Back at office unloading

7/24/13

APPENDIX C

Laboratory Reports

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Calscience Environmental Laboratories, Inc.

CALSCIENCE

WORK ORDER NUMBER: 13-07-1671

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: Robert Chong
354 Uluniu Street, Suite 304
Kailua, HI 96734-2500

Approved for release on 08/01/2013 by:
Richard Villafania
Project Manager

ResultLink

Email your PM

ACCREDITED IN ACCORDANCE WITH nelac

Calscience Environmental Laboratories, 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.

Calscience Environmental Laboratories, Inc.

Contents

Client Project Name: Red Hill LTM 112066
Work Order Number: 13-07-1671

Calscience Environmental Laboratories, Inc.

Work Order Narrative

Work Order: 13-07-1671 Page 1 of 1

Condition Upon Receipt:

Samples were received under Chain of Custody (COC) on 07/25/13. They were assigned to Work Order 13-07-1671.

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:

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.

Due to analytical instrument issues for the GRO/Volatiles analysis, samples ES 028, ES 029, ES 030, and ES 031 were not analyzed within the recommended holding time of 7 days for unpreserved samples. The samples were analyzed on the 8th day after the sample collection date. Calscience is evaluating contingency measures to prevent similar issues going forward though recommends that an additional set of HCl-preserved sample vials be collected to extend the analytical holding time if needed.

Subcontractor Information:

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

Return to Contents

Calscience Environmental Laboratories, Inc.

Analytical Report

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

Project: Red Hill LTM 112066

Date Received: 07/25/13
Work Order: 13-07-1671
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
ES 028	**13-07-1671-2-H**	**07/22/13 09:20**	**Aqueous**	**GC 45**	**07/26/13**	**07/26/13 23:58**	**130726B04**

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 DRO is quantified in the carbon range C10-C28.

Parameter	Result	DL	LOD	LOQ	DF	Qualifiers
TPH as Diesel	99	15	20	50	1	HD

Surrogate	Rec. (%)	Control Limits	Qualifiers
n-Octacosane	91	51-141	

ES 029	**13-07-1671-3-H**	**07/22/13 10:15**	**Aqueous**	**GC 45**	**07/26/13**	**07/27/13 00:14**	**130726B04**

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 DRO is quantified in the carbon range C10-C28.

Parameter	Result	DL	LOD	LOQ	DF	Qualifiers
TPH as Diesel	2500	15	20	50	1	HD

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

ES 030	**13-07-1671-4-H**	**07/22/13 11:00**	**Aqueous**	**GC 45**	**07/26/13**	**07/27/13 00:33**	**130726B04**

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 DRO is quantified in the carbon range C10-C28.

Parameter	Result	DL	LOD	LOQ	DF	Qualifiers
TPH as Diesel	2600	15	20	50	1	HD

Surrogate	Rec. (%)	Control Limits	Qualifiers
n-Octacosane	97	51-141	

ES 031	**13-07-1671-5-H**	**07/22/13 11:45**	**Aqueous**	**GC 45**	**07/26/13**	**07/27/13 00:50**	**130726B04**

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 DRO is quantified in the carbon range C10-C28.

Parameter	Result	DL	LOD	LOQ	DF	Qualifiers
TPH as Diesel	48	15	20	50	1	HD,J

Surrogate	Rec. (%)	Control Limits	Qualifiers
n-Octacosane	91	51-141	

Return to Contents

Calscience Environmental Laboratories, Inc.

Analytical Report

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

Project: Red Hill LTM 112066

Date Received: 07/25/13
Work Order: 13-07-1671
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
ES 032	**13-07-1671-6-G**	**07/23/13 09:30**	**Aqueous**	**GC 45**	**07/26/13**	**07/27/13 01:08**	**130726B04**

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 DRO is quantified in the carbon range C10-C28.

Parameter	Result	DL	LOD	LOQ	DF	Qualifiers
TPH as Diesel	<20	15	20	50	1	U

Surrogate	Rec. (%)	Control Limits	Qualifiers
n-Octacosane	79	51-141	

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
ES 033	**13-07-1671-8-H**	**07/23/13 10:45**	**Aqueous**	**GC 45**	**07/26/13**	**07/27/13 01:25**	**130726B04**

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 DRO is quantified in the carbon range C10-C28.

Parameter	Result	DL	LOD	LOQ	DF	Qualifiers
TPH as Diesel	<20	15	20	50	1	U

Surrogate	Rec. (%)	Control Limits	Qualifiers
n-Octacosane	82	51-141	

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
Method Blank	**099-15-516-52**	**N/A**	**Aqueous**	**GC 45**	**07/26/13**	**07/26/13 22:31**	**130726B04**

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	<20	15	20	50	1	U

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

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Calscience Environmental Laboratories, Inc.

Analytical Report

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

Date Received: 07/25/13
Work Order: 13-07-1671
Preparation: EPA 3020A Total
Method: EPA 6020
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
ES 028	**13-07-1671-2-G**	**07/22/13 09:20**	**Aqueous**	**ICP/MS 03**	**07/26/13**	**07/26/13 16:11**	**130726L03D**

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	1.00	1	U

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
ES 029	**13-07-1671-3-G**	**07/22/13 10:15**	**Aqueous**	**ICP/MS 03**	**07/26/13**	**07/26/13 16:08**	**130726L03D**

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	0.135	0.0898	0.200	1.00	1	J

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
ES 030	**13-07-1671-4-G**	**07/22/13 11:00**	**Aqueous**	**ICP/MS 03**	**07/26/13**	**07/26/13 16:20**	**130726L03D**

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	1.00	1	U

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
ES 031	**13-07-1671-5-G**	**07/22/13 11:45**	**Aqueous**	**ICP/MS 03**	**07/26/13**	**07/26/13 16:23**	**130726L03D**

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	1.00	1	U

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
ES 033	**13-07-1671-8-G**	**07/23/13 10:45**	**Aqueous**	**ICP/MS 03**	**07/26/13**	**07/26/13 16:29**	**130726L03D**

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	1.00	1	U

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
Method Blank	**099-14-497-41**	**N/A**	**Aqueous**	**ICP/MS 03**	**07/26/13**	**07/26/13 15:44**	**130726L03D**

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	1.00	1	U

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Calscience Environmental Laboratories, Inc.

Analytical Report

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

Date Received: 07/25/13
Work Order: 13-07-1671
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
ES 028	**13-07-1671-2-I**	**07/22/13 09:20**	**Aqueous**	**GC/MS AAA**	**07/26/13**	**07/29/13 18:15**	**130726L03**

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	0.023	0.050	0.20	1	J
2-Methylnaphthalene	<0.050	0.026	0.050	0.20	1	U
1-Methylnaphthalene	<0.050	0.028	0.050	0.20	1	U
Acenaphthylene	<0.050	0.018	0.050	0.20	1	U
Acenaphthene	<0.050	0.021	0.050	0.20	1	U
Fluorene	<0.050	0.024	0.050	0.20	1	U
Phenanthrene	<0.050	0.031	0.050	0.20	1	U
Anthracene	<0.050	0.034	0.050	0.20	1	U
Fluoranthene	<0.050	0.027	0.050	0.20	1	U
Pyrene	<0.050	0.025	0.050	0.20	1	U
Benzo (a) Anthracene	<0.050	0.024	0.050	0.20	1	U
Chrysene	<0.050	0.019	0.050	0.20	1	U
Benzo (k) Fluoranthene	<0.050	0.023	0.050	0.20	1	U
Benzo (b) Fluoranthene	<0.050	0.025	0.050	0.20	1	U
Benzo (a) Pyrene	<0.050	0.036	0.050	0.20	1	U
Indeno (1,2,3-c,d) Pyrene	<0.050	0.022	0.050	0.20	1	U
Dibenz (a,h) Anthracene	<0.050	0.027	0.050	0.20	1	U
Benzo (g,h,i) Perylene	<0.050	0.022	0.050	0.20	1	U

Surrogate	Rec. (%)	Control Limits	Qualifiers
Nitrobenzene-d5	74	28-139	
2-Fluorobiphenyl	68	33-144	
p-Terphenyl-d14	81	23-160	

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Calscience Environmental Laboratories, Inc.

Analytical Report

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

Date Received: 07/25/13
Work Order: 13-07-1671
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
ES 029	**13-07-1671-3-I**	**07/22/13 10:15**	**Aqueous**	**GC/MS AAA**	**07/26/13**	**07/29/13 18:41**	**130726L03**

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	9.1	0.026	0.050	0.20	0.99	
Acenaphthylene	<0.050	0.018	0.050	0.20	0.99	U
Acenaphthene	0.52	0.021	0.050	0.20	0.99	
Fluorene	0.23	0.024	0.050	0.20	0.99	
Phenanthrene	<0.050	0.030	0.050	0.20	0.99	U
Anthracene	<0.050	0.034	0.050	0.20	0.99	U
Fluoranthene	<0.050	0.027	0.050	0.20	0.99	U
Pyrene	<0.050	0.025	0.050	0.20	0.99	U
Benzo (a) Anthracene	<0.050	0.024	0.050	0.20	0.99	U
Chrysene	<0.050	0.019	0.050	0.20	0.99	U
Benzo (k) Fluoranthene	<0.050	0.023	0.050	0.20	0.99	U
Benzo (b) Fluoranthene	<0.050	0.025	0.050	0.20	0.99	U
Benzo (a) Pyrene	<0.050	0.036	0.050	0.20	0.99	U
Indeno (1,2,3-c,d) Pyrene	<0.050	0.022	0.050	0.20	0.99	U
Dibenz (a,h) Anthracene	<0.050	0.027	0.050	0.20	0.99	U
Benzo (g,h,i) Perylene	<0.050	0.022	0.050	0.20	0.99	U

Surrogate	Rec. (%)	Control Limits	Qualifiers
Nitrobenzene-d5	88	28-139	
2-Fluorobiphenyl	74	33-144	
p-Terphenyl-d14	79	23-160	

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
ES 029	**13-07-1671-3-I**	**07/22/13 10:15**	**Aqueous**	**GC/MS AAA**	**07/26/13**	**07/30/13 16:10**	**130726L03**

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	73	0.23	0.50	2.0	9.9	
1-Methylnaphthalene	21	0.28	0.50	2.0	9.9	

Surrogate	Rec. (%)	Control Limits	Qualifiers
Nitrobenzene-d5	62	28-139	
2-Fluorobiphenyl	80	33-144	
p-Terphenyl-d14	83	23-160	

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Calscience Environmental Laboratories, Inc.

Analytical Report

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

Date Received: 07/25/13
Work Order: 13-07-1671
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
ES 030	**13-07-1671-4-I**	**07/22/13 11:00**	**Aqueous**	**GC/MS AAA**	**07/26/13**	**07/29/13 19:07**	**130726L03**

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	6.6	0.027	0.050	0.20	1	
Acenaphthylene	<0.050	0.018	0.050	0.20	1	U
Acenaphthene	0.51	0.021	0.050	0.20	1	
Fluorene	0.22	0.025	0.050	0.20	1	
Phenanthrene	<0.050	0.031	0.050	0.20	1	U
Anthracene	<0.050	0.034	0.050	0.20	1	U
Fluoranthene	<0.050	0.027	0.050	0.20	1	U
Pyrene	<0.050	0.025	0.050	0.20	1	U
Benzo (a) Anthracene	<0.050	0.024	0.050	0.20	1	U
Chrysene	<0.050	0.019	0.050	0.20	1	U
Benzo (k) Fluoranthene	<0.050	0.023	0.050	0.20	1	U
Benzo (b) Fluoranthene	<0.050	0.025	0.050	0.20	1	U
Benzo (a) Pyrene	<0.050	0.037	0.050	0.20	1	U
Indeno (1,2,3-c,d) Pyrene	<0.050	0.022	0.050	0.20	1	U
Dibenz (a,h) Anthracene	<0.050	0.027	0.050	0.20	1	U
Benzo (g,h,i) Perylene	<0.050	0.022	0.050	0.20	1	U

Surrogate	Rec. (%)	Control Limits	Qualifiers
Nitrobenzene-d5	85	28-139	
2-Fluorobiphenyl	73	33-144	
p-Terphenyl-d14	77	23-160	

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
ES 030	**13-07-1671-4-I**	**07/22/13 11:00**	**Aqueous**	**GC/MS AAA**	**07/26/13**	**07/30/13 16:36**	**130726L03**

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	67	0.23	0.50	2.0	10	
1-Methylnaphthalene	18	0.28	0.50	2.0	10	

Surrogate	Rec. (%)	Control Limits	Qualifiers
Nitrobenzene-d5	58	28-139	
2-Fluorobiphenyl	78	33-144	
p-Terphenyl-d14	80	23-160	

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Calscience Environmental Laboratories, Inc.

Analytical Report

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

Date Received: 07/25/13
Work Order: 13-07-1671
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
ES 031	**13-07-1671-5-I**	**07/22/13 11:45**	**Aqueous**	**GC/MS AAA**	**07/26/13**	**07/29/13 19:34**	**130726L03**

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	0.064	0.023	0.050	0.20	1.01	J
2-Methylnaphthalene	<0.050	0.027	0.050	0.20	1.01	U
1-Methylnaphthalene	<0.050	0.029	0.050	0.20	1.01	U
Acenaphthylene	<0.050	0.018	0.050	0.20	1.01	U
Acenaphthene	<0.050	0.021	0.050	0.20	1.01	U
Fluorene	<0.050	0.025	0.050	0.20	1.01	U
Phenanthrene	<0.050	0.031	0.050	0.20	1.01	U
Anthracene	<0.050	0.034	0.050	0.20	1.01	U
Fluoranthene	<0.050	0.027	0.050	0.20	1.01	U
Pyrene	<0.050	0.025	0.050	0.20	1.01	U
Benzo (a) Anthracene	<0.050	0.024	0.050	0.20	1.01	U
Chrysene	<0.050	0.019	0.050	0.20	1.01	U
Benzo (k) Fluoranthene	<0.050	0.024	0.050	0.20	1.01	U
Benzo (b) Fluoranthene	<0.050	0.025	0.050	0.20	1.01	U
Benzo (a) Pyrene	<0.050	0.037	0.050	0.20	1.01	U
Indeno (1,2,3-c,d) Pyrene	<0.050	0.022	0.050	0.20	1.01	U
Dibenz (a,h) Anthracene	<0.050	0.027	0.050	0.20	1.01	U
Benzo (g,h,i) Perylene	<0.050	0.022	0.050	0.20	1.01	U

Surrogate	Rec. (%)	Control Limits	Qualifiers
Nitrobenzene-d5	73	28-139	
2-Fluorobiphenyl	63	33-144	
p-Terphenyl-d14	77	23-160	

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Calscience Environmental Laboratories, Inc.

Analytical Report

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

Date Received: 07/25/13
Work Order: 13-07-1671
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
ES 032	**13-07-1671-6-I**	**07/23/13 09:30**	**Aqueous**	**GC/MS AAA**	**07/26/13**	**07/29/13 20:00**	**130726L03**

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	0.099	0.023	0.050	0.20	0.99	J
2-Methylnaphthalene	<0.050	0.026	0.050	0.20	0.99	U
1-Methylnaphthalene	<0.050	0.028	0.050	0.20	0.99	U
Acenaphthylene	<0.050	0.018	0.050	0.20	0.99	U
Acenaphthene	<0.050	0.021	0.050	0.20	0.99	U
Fluorene	<0.050	0.024	0.050	0.20	0.99	U
Phenanthrene	<0.050	0.030	0.050	0.20	0.99	U
Anthracene	<0.050	0.034	0.050	0.20	0.99	U
Fluoranthene	<0.050	0.027	0.050	0.20	0.99	U
Pyrene	<0.050	0.025	0.050	0.20	0.99	U
Benzo (a) Anthracene	<0.050	0.024	0.050	0.20	0.99	U
Chrysene	<0.050	0.019	0.050	0.20	0.99	U
Benzo (k) Fluoranthene	<0.050	0.023	0.050	0.20	0.99	U
Benzo (b) Fluoranthene	<0.050	0.025	0.050	0.20	0.99	U
Benzo (a) Pyrene	<0.050	0.036	0.050	0.20	0.99	U
Indeno (1,2,3-c,d) Pyrene	<0.050	0.022	0.050	0.20	0.99	U
Dibenz (a,h) Anthracene	<0.050	0.027	0.050	0.20	0.99	U
Benzo (g,h,i) Perylene	<0.050	0.022	0.050	0.20	0.99	U

Surrogate	Rec. (%)	Control Limits	Qualifiers
Nitrobenzene-d5	75	28-139	
2-Fluorobiphenyl	66	33-144	
p-Terphenyl-d14	83	23-160	

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Calscience Environmental Laboratories, Inc.

Analytical Report

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

Date Received: 07/25/13
Work Order: 13-07-1671
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
ES 033	**13-07-1671-8-I**	**07/23/13 10:45**	**Aqueous**	**GC/MS AAA**	**07/26/13**	**07/29/13 20:26**	**130726L03**

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	0.033	0.023	0.051	0.20	1.01	J
2-Methylnaphthalene	<0.051	0.027	0.051	0.20	1.01	U
1-Methylnaphthalene	<0.051	0.029	0.051	0.20	1.01	U
Acenaphthylene	<0.051	0.018	0.051	0.20	1.01	U
Acenaphthene	<0.051	0.021	0.051	0.20	1.01	U
Fluorene	<0.051	0.025	0.051	0.20	1.01	U
Phenanthrene	<0.051	0.031	0.051	0.20	1.01	U
Anthracene	<0.051	0.035	0.051	0.20	1.01	U
Fluoranthene	<0.051	0.028	0.051	0.20	1.01	U
Pyrene	<0.051	0.025	0.051	0.20	1.01	U
Benzo (a) Anthracene	<0.051	0.024	0.051	0.20	1.01	U
Chrysene	<0.051	0.019	0.051	0.20	1.01	U
Benzo (k) Fluoranthene	<0.051	0.024	0.051	0.20	1.01	U
Benzo (b) Fluoranthene	<0.051	0.025	0.051	0.20	1.01	U
Benzo (a) Pyrene	<0.051	0.037	0.051	0.20	1.01	U
Indeno (1,2,3-c,d) Pyrene	<0.051	0.022	0.051	0.20	1.01	U
Dibenz (a,h) Anthracene	<0.051	0.027	0.051	0.20	1.01	U
Benzo (g,h,i) Perylene	<0.051	0.022	0.051	0.20	1.01	U

Surrogate	Rec. (%)	Control Limits	Qualifiers
Nitrobenzene-d5	71	28-139	
2-Fluorobiphenyl	63	33-144	
p-Terphenyl-d14	73	23-160	

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Calscience Environmental Laboratories, Inc.

Analytical Report

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

Date Received: 07/25/13
Work Order: 13-07-1671
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	**099-15-148-16**	**N/A**	**Aqueous**	**GC/MS AAA**	**07/26/13**	**07/29/13 11:33**	**130726L03**

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	0.023	0.050	0.20	1	U
2-Methylnaphthalene	<0.050	0.026	0.050	0.20	1	U
1-Methylnaphthalene	<0.050	0.028	0.050	0.20	1	U
Acenaphthylene	<0.050	0.018	0.050	0.20	1	U
Acenaphthene	<0.050	0.021	0.050	0.20	1	U
Fluorene	<0.050	0.024	0.050	0.20	1	U
Phenanthrene	<0.050	0.031	0.050	0.20	1	U
Anthracene	<0.050	0.034	0.050	0.20	1	U
Fluoranthene	<0.050	0.027	0.050	0.20	1	U
Pyrene	<0.050	0.025	0.050	0.20	1	U
Benzo (a) Anthracene	<0.050	0.024	0.050	0.20	1	U
Chrysene	<0.050	0.019	0.050	0.20	1	U
Benzo (k) Fluoranthene	<0.050	0.023	0.050	0.20	1	U
Benzo (b) Fluoranthene	<0.050	0.025	0.050	0.20	1	U
Benzo (a) Pyrene	<0.050	0.036	0.050	0.20	1	U
Indeno (1,2,3-c,d) Pyrene	<0.050	0.022	0.050	0.20	1	U
Dibenz (a,h) Anthracene	<0.050	0.027	0.050	0.20	1	U
Benzo (g,h,i) Perylene	<0.050	0.022	0.050	0.20	1	U

Surrogate	Rec. (%)	Control Limits	Qualifiers
Nitrobenzene-d5	74	28-139	
2-Fluorobiphenyl	75	33-144	
p-Terphenyl-d14	82	23-160	

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Calscience Environmental Laboratories, Inc.

Analytical Report

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

Date Received: 07/25/13
Work Order: 13-07-1671
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
ES Trip	**13-07-1671-1-A**	**07/22/13 08:30**	**Aqueous**	**GC/MS LL**	**07/30/13**	**07/30/13 20:47**	**130730L02**

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

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Calscience Environmental Laboratories, Inc.

Analytical Report

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

Date Received:	07/25/13
Work Order:	13-07-1671
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	U
Trichloroethene	<0.50	0.37	0.50	1.0	1	U
1,2,3-Trichloropropane	<1.0	0.64	1.0	5.0	1	U
Vinyl Chloride	<0.50	0.30	0.50	1.0	1	U
p/m-Xylene	<1.0	0.30	1.0	10	1	U
o-Xylene	<0.50	0.23	0.50	1.0	1	U
Methyl-t-Butyl Ether (MTBE)	<0.50	0.31	0.50	1.0	1	U
Gasoline Range Organics	21	13	30	50	1	J

Surrogate	Rec. (%)	Control Limits	Qualifiers
Dibromofluoromethane	93	80-126	
1,2-Dichloroethane-d4	88	80-134	
Toluene-d8	99	80-120	
Toluene-d8-TPPH	95	88-112	
1,4-Bromofluorobenzene	92	80-120	

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Calscience Environmental Laboratories, Inc.

Analytical Report

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

Date Received: 07/25/13
Work Order: 13-07-1671
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
ES 028	**13-07-1671-2-A**	**07/22/13 09:20**	**Aqueous**	**GC/MS LL**	**07/30/13**	**07/30/13 21:15**	**130730L02**

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.
- Sample extracted outside recommended holding time.

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

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Calscience Environmental Laboratories, Inc.

Analytical Report

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

Date Received: 07/25/13
Work Order: 13-07-1671
Preparation: EPA 5030C
Method: GC/MS / EPA 8260B
Units: ug/L

Project: Red Hill LTM 112066

Parameter	Result	DL	LOD	LOQ	DF	Qualifiers
Hexachloro-1,3-Butadiene	<0.50	0.32	0.50	1.0	1	U
1,1,2-Trichloroethane	<0.50	0.38	0.50	1.0	1	U
Trichloroethene	<0.50	0.37	0.50	1.0	1	U
1,2,3-Trichloropropane	<1.0	0.64	1.0	5.0	1	U
Vinyl Chloride	<0.50	0.30	0.50	1.0	1	U
p/m-Xylene	<1.0	0.30	1.0	10	1	U
o-Xylene	<0.50	0.23	0.50	1.0	1	U
Methyl-t-Butyl Ether (MTBE)	<0.50	0.31	0.50	1.0	1	U
Gasoline Range Organics	<30	13	30	50	1	U

Surrogate	Rec. (%)	Control Limits	Qualifiers
Dibromofluoromethane	92	80-126	
1,2-Dichloroethane-d4	89	80-134	
Toluene-d8	100	80-120	
Toluene-d8-TPPH	96	88-112	
1,4-Bromofluorobenzene	91	80-120	

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Calscience Environmental Laboratories, Inc.

Analytical Report

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

Date Received: 07/25/13
Work Order: 13-07-1671
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
ES 029	**13-07-1671-3-A**	**07/22/13 10:15**	**Aqueous**	**GC/MS LL**	**07/30/13**	**07/30/13 21:43**	**130730L02**

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.
- Sample extracted outside recommended holding time.

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

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Calscience Environmental Laboratories, Inc.

Analytical Report

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

Date Received: 07/25/13
Work Order: 13-07-1671
Preparation: EPA 5030C
Method: GC/MS / EPA 8260B
Units: ug/L

Project: Red Hill LTM 112066

Parameter	Result	DL	LOD	LOQ	DF	Qualifiers
Hexachloro-1,3-Butadiene	<0.50	0.32	0.50	1.0	1	U
1,1,2-Trichloroethane	<0.50	0.38	0.50	1.0	1	U
Trichloroethene	<0.50	0.37	0.50	1.0	1	U
1,2,3-Trichloropropane	<1.0	0.64	1.0	5.0	1	U
Vinyl Chloride	<0.50	0.30	0.50	1.0	1	U
p/m-Xylene	<1.0	0.30	1.0	10	1	U
o-Xylene	0.45	0.23	0.50	1.0	1	J
Methyl-t-Butyl Ether (MTBE)	<0.50	0.31	0.50	1.0	1	U
Gasoline Range Organics	55	13	30	50	1	

Surrogate	Rec. (%)	Control Limits	Qualifiers
Dibromofluoromethane	97	80-126	
1,2-Dichloroethane-d4	92	80-134	
Toluene-d8	98	80-120	
Toluene-d8-TPPH	94	88-112	
1,4-Bromofluorobenzene	95	80-120	

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Calscience Environmental Laboratories, Inc.

Analytical Report

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

Date Received: 07/25/13
Work Order: 13-07-1671
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
ES 030	**13-07-1671-4-A**	**07/22/13 11:00**	**Aqueous**	**GC/MS LL**	**07/30/13**	**07/30/13 22:11**	**130730L02**

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.
- Sample extracted outside recommended holding time.

Parameter	Result	DL	LOD	LOQ	DF	Qualifiers
Acetone	<10	6.0	10	20	1	U
Benzene	<0.50	0.14	0.50	1.0	1	U
Bromodichloromethane	<0.50	0.21	0.50	5.0	1	U
Bromoform	<1.0	0.50	1.0	10	1	U
Bromomethane	<5.0	3.9	5.0	20	1	U
2-Butanone	<5.0	2.2	5.0	10	1	U
Carbon Tetrachloride	<0.50	0.23	0.50	1.0	1	U
Chlorobenzene	<0.50	0.17	0.50	5.0	1	U
Chloroethane	<5.0	2.3	5.0	10	1	U
Chloroform	<0.50	0.46	0.50	5.0	1	U
Chloromethane	<2.0	1.8	2.0	10	1	U
Dibromochloromethane	<0.50	0.25	0.50	1.0	1	U
1,2-Dibromo-3-Chloropropane	<2.0	1.2	2.0	10	1	U
1,2-Dibromoethane	<0.50	0.36	0.50	1.0	1	U
1,2-Dichlorobenzene	<0.50	0.46	0.50	1.0	1	U
1,3-Dichlorobenzene	<0.50	0.40	0.50	1.0	1	U
1,4-Dichlorobenzene	<0.50	0.43	0.50	1.0	1	U
1,1-Dichloroethane	<0.50	0.28	0.50	5.0	1	U
1,2-Dichloroethane	<0.50	0.24	0.50	1.0	1	U
1,1-Dichloroethene	<0.50	0.43	0.50	1.0	1	U
c-1,2-Dichloroethene	<0.50	0.48	0.50	1.0	1	U
t-1,2-Dichloroethene	<0.50	0.37	0.50	1.0	1	U
1,2-Dichloropropane	<0.50	0.42	0.50	5.0	1	U
c-1,3-Dichloropropene	<0.50	0.25	0.50	1.0	1	U
t-1,3-Dichloropropene	<0.50	0.25	0.50	1.0	1	U
Ethylbenzene	0.19	0.14	0.50	1.0	1	J
Methylene Chloride	<1.0	0.64	1.0	5.0	1	U
4-Methyl-2-Pentanone	<5.0	4.4	5.0	10	1	U
Styrene	<0.50	0.17	0.50	1.0	1	U
1,1,1,2-Tetrachloroethane	<0.50	0.40	0.50	1.0	1	U
1,1,2,2-Tetrachloroethane	<0.50	0.41	0.50	1.0	1	U
Tetrachloroethene	<0.50	0.39	0.50	5.0	1	U
Toluene	<0.50	0.24	0.50	1.0	1	U
1,2,4-Trichlorobenzene	<1.0	0.50	1.0	5.0	1	U
1,1,1-Trichloroethane	<0.50	0.30	0.50	5.0	1	U

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Calscience Environmental Laboratories, Inc.

Analytical Report

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

Date Received: 07/25/13
Work Order: 13-07-1671
Preparation: EPA 5030C
Method: GC/MS / EPA 8260B
Units: ug/L

Project: Red Hill LTM 112066

Parameter	Result	DL	LOD	LOQ	DF	Qualifiers
Hexachloro-1,3-Butadiene	<0.50	0.32	0.50	1.0	1	U
1,1,2-Trichloroethane	<0.50	0.38	0.50	1.0	1	U
Trichloroethene	<0.50	0.37	0.50	1.0	1	U
1,2,3-Trichloropropane	<1.0	0.64	1.0	5.0	1	U
Vinyl Chloride	<0.50	0.30	0.50	1.0	1	U
p/m-Xylene	<1.0	0.30	1.0	10	1	U
o-Xylene	0.50	0.23	0.50	1.0	1	J
Methyl-t-Butyl Ether (MTBE)	<0.50	0.31	0.50	1.0	1	U
Gasoline Range Organics	61	13	30	50	1	

Surrogate	Rec. (%)	Control Limits	Qualifiers
Dibromofluoromethane	93	80-126	
1,2-Dichloroethane-d4	92	80-134	
Toluene-d8	98	80-120	
Toluene-d8-TPPH	94	88-112	
1,4-Bromofluorobenzene	94	80-120	

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Calscience Environmental Laboratories, Inc.

Analytical Report

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

Date Received: 07/25/13
Work Order: 13-07-1671
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
ES 031	**13-07-1671-5-A**	**07/22/13 11:45**	**Aqueous**	**GC/MS LL**	**07/30/13**	**07/30/13 22:38**	**130730L02**

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.
- Sample extracted outside recommended holding time.

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

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Calscience Environmental Laboratories, Inc.

Analytical Report

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

Date Received: 07/25/13
Work Order: 13-07-1671
Preparation: EPA 5030C
Method: GC/MS / EPA 8260B
Units: ug/L

Project: Red Hill LTM 112066

Parameter	Result	DL	LOD	LOQ	DF	Qualifiers
Hexachloro-1,3-Butadiene	<0.50	0.32	0.50	1.0	1	U
1,1,2-Trichloroethane	<0.50	0.38	0.50	1.0	1	U
Trichloroethene	<0.50	0.37	0.50	1.0	1	U
1,2,3-Trichloropropane	<1.0	0.64	1.0	5.0	1	U
Vinyl Chloride	<0.50	0.30	0.50	1.0	1	U
p/m-Xylene	<1.0	0.30	1.0	10	1	U
o-Xylene	<0.50	0.23	0.50	1.0	1	U
Methyl-t-Butyl Ether (MTBE)	<0.50	0.31	0.50	1.0	1	U
Gasoline Range Organics	<30	13	30	50	1	U

Surrogate	Rec. (%)	Control Limits	Qualifiers
Dibromofluoromethane	89	80-126	
1,2-Dichloroethane-d4	89	80-134	
Toluene-d8	98	80-120	
Toluene-d8-TPPH	95	88-112	
1,4-Bromofluorobenzene	89	80-120	

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Calscience Environmental Laboratories, Inc.

Analytical Report

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

Date Received: 07/25/13
Work Order: 13-07-1671
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
ES 032	**13-07-1671-6-A**	**07/23/13 09:30**	**Aqueous**	**GC/MS LL**	**07/30/13**	**07/30/13 23:06**	**130730L02**

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

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Calscience Environmental Laboratories, Inc.

Analytical Report

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

Date Received: 07/25/13
Work Order: 13-07-1671
Preparation: EPA 5030C
Method: GC/MS / EPA 8260B
Units: ug/L

Project: Red Hill LTM 112066

Parameter	Result	DL	LOD	LOQ	DF	Qualifiers
Hexachloro-1,3-Butadiene	<0.50	0.32	0.50	1.0	1	U
1,1,2-Trichloroethane	<0.50	0.38	0.50	1.0	1	U
Trichloroethene	<0.50	0.37	0.50	1.0	1	U
1,2,3-Trichloropropane	<1.0	0.64	1.0	5.0	1	U
Vinyl Chloride	<0.50	0.30	0.50	1.0	1	U
p/m-Xylene	<1.0	0.30	1.0	10	1	U
o-Xylene	<0.50	0.23	0.50	1.0	1	U
Methyl-t-Butyl Ether (MTBE)	<0.50	0.31	0.50	1.0	1	U
Gasoline Range Organics	<30	13	30	50	1	U

Surrogate	Rec. (%)	Control Limits	Qualifiers
Dibromofluoromethane	90	80-126	
1,2-Dichloroethane-d4	91	80-134	
Toluene-d8	99	80-120	
Toluene-d8-TPPH	95	88-112	
1,4-Bromofluorobenzene	91	80-120	

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Calscience Environmental Laboratories, Inc.

Analytical Report

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

Date Received: 07/25/13
Work Order: 13-07-1671
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
ES 033	**13-07-1671-8-A**	**07/23/13 10:45**	**Aqueous**	**GC/MS LL**	**07/30/13**	**07/30/13 23:33**	**130730L02**

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

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Calscience Environmental Laboratories, Inc.

Analytical Report

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

Date Received: 07/25/13
Work Order: 13-07-1671
Preparation: EPA 5030C
Method: GC/MS / EPA 8260B
Units: ug/L

Project: Red Hill LTM 112066

Parameter	Result	DL	LOD	LOQ	DF	Qualifiers
Hexachloro-1,3-Butadiene	<0.50	0.32	0.50	1.0	1	U
1,1,2-Trichloroethane	<0.50	0.38	0.50	1.0	1	U
Trichloroethene	<0.50	0.37	0.50	1.0	1	U
1,2,3-Trichloropropane	<1.0	0.64	1.0	5.0	1	U
Vinyl Chloride	<0.50	0.30	0.50	1.0	1	U
p/m-Xylene	<1.0	0.30	1.0	10	1	U
o-Xylene	<0.50	0.23	0.50	1.0	1	U
Methyl-t-Butyl Ether (MTBE)	<0.50	0.31	0.50	1.0	1	U
Gasoline Range Organics	<30	13	30	50	1	U

Surrogate	Rec. (%)	Control Limits	Qualifiers
Dibromofluoromethane	93	80-126	
1,2-Dichloroethane-d4	93	80-134	
Toluene-d8	97	80-120	
Toluene-d8-TPPH	93	88-112	
1,4-Bromofluorobenzene	91	80-120	

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Calscience Environmental Laboratories, Inc.

Analytical Report

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

Date Received: 07/25/13
Work Order: 13-07-1671
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	**099-13-057-26**	**N/A**	**Aqueous**	**GC/MS LL**	**07/30/13**	**07/30/13 20:20**	**130730L02**

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

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Calscience Environmental Laboratories, Inc.

Analytical Report

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

Date Received: 07/25/13
Work Order: 13-07-1671
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	U
Trichloroethene	<0.50	0.37	0.50	1.0	1	U
1,2,3-Trichloropropane	<1.0	0.64	1.0	5.0	1	U
Vinyl Chloride	<0.50	0.30	0.50	1.0	1	U
p/m-Xylene	<1.0	0.30	1.0	10	1	U
o-Xylene	<0.50	0.23	0.50	1.0	1	U
Methyl-t-Butyl Ether (MTBE)	<0.50	0.31	0.50	1.0	1	U
Gasoline Range Organics	<30	13	30	50	1	U

Surrogate	Rec. (%)	Control Limits	Qualifiers
Dibromofluoromethane	91	80-126	
1,2-Dichloroethane-d4	88	80-134	
Toluene-d8	99	80-120	
Toluene-d8-TPPH	95	88-112	
1,4-Bromofluorobenzene	92	80-120	

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Calscience Environmental Laboratories, Inc.

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: 07/25/13
Work Order: 13-07-1671
Preparation: EPA 3510C
Method: EPA 8015B (M)

Quality Control Sample ID	Matrix	Instrument	Date Prepared	Date Analyzed	MS/MSD Batch Number
ES 029	**Aqueous**	**GC 45**	**07/26/13**	**07/26/13 23:23**	**130726S04**

Parameter	Sample Conc.	Spike Added	MS Conc.	MS %Rec.	MSD Conc.	MSD %Rec.	%Rec. CL	RPD	RPD CL	Qualifiers
TPH as Diesel	2535	4000	6971	111	7134	115	55-133	2	0-30	

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RPD: Relative Percent Difference. CL: Control Limits

Calscience Environmental Laboratories, Inc.

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: 07/25/13
Work Order: 13-07-1671
Preparation: EPA 3020A Total
Method: EPA 6020

Quality Control Sample ID	Matrix	Instrument	Date Prepared	Date Analyzed	MS/MSD Batch Number
ES 029	**Aqueous**	**ICP/MS 03**	**07/26/13**	**07/26/13 15:53**	**130726S03**

Parameter	Sample Conc.	Spike Added	MS Conc.	MS %Rec.	MSD Conc.	MSD %Rec.	%Rec. CL	RPD	RPD CL	Qualifiers
Lead	ND	100.0	107.2	107	107.4	107	80-120	0	0-20	

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RPD: Relative Percent Difference. CL: Control Limits

Calscience Environmental Laboratories, Inc.

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: 07/25/13
Work Order: 13-07-1671
Preparation: EPA 3510C
Method: EPA 8270C SIM PAHs

Quality Control Sample ID	Matrix	Instrument	Date Prepared	Date Analyzed	MS/MSD Batch Number
ES 029	**Aqueous**	**GC/MS AAA**	**07/26/13**	**07/29/13 20:52**	**130726S03**

Parameter	Sample Conc.	Spike Added	MS Conc.	MS %Rec.	MSD Conc.	MSD %Rec.	%Rec. CL	RPD	RPD CL	Qualifiers
Naphthalene	72.61	2.000	49.72	0	54.10	0	21-133	8	0-25	3
2-Methylnaphthalene	9.123	2.000	6.340	0	8.854	0	21-140	33	0-25	3,4
1-Methylnaphthalene	20.68	2.000	16.50	0	19.27	0	20-140	16	0-25	3
Acenaphthylene	ND	2.000	1.429	71	1.477	74	33-145	3	0-25	
Acenaphthene	0.5233	2.000	1.783	63	1.858	67	49-121	4	0-25	
Fluorene	0.2334	2.000	1.635	70	1.667	72	59-121	2	0-25	
Phenanthrene	ND	2.000	1.303	65	1.307	65	54-120	0	0-25	
Anthracene	ND	2.000	1.145	57	1.143	57	27-133	0	0-25	
Fluoranthene	ND	2.000	1.453	73	1.436	72	26-137	1	0-25	
Pyrene	ND	2.000	1.354	68	1.361	68	18-168	0	0-25	
Benzo (a) Anthracene	ND	2.000	1.423	71	1.410	70	33-143	1	0-25	
Chrysene	ND	2.000	1.315	66	1.315	66	17-168	0	0-25	
Benzo (k) Fluoranthene	ND	2.000	1.460	73	1.442	72	24-159	1	0-25	
Benzo (b) Fluoranthene	ND	2.000	1.512	76	1.496	75	24-159	1	0-25	
Benzo (a) Pyrene	ND	2.000	1.562	78	1.540	77	17-163	1	0-25	
Indeno (1,2,3-c,d) Pyrene	ND	2.000	1.441	72	1.418	71	10-171	2	0-25	
Dibenz (a,h) Anthracene	ND	2.000	1.247	62	1.226	61	10-219	2	0-25	
Benzo (g,h,i) Perylene	ND	2.000	1.149	57	1.136	57	10-227	1	0-25	

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RPD: Relative Percent Difference. CL: Control Limits

Calscience Environmental Laboratories, Inc.

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: 07/25/13
Work Order: 13-07-1671
Preparation: EPA 5030C
Method: GC/MS / EPA 8260B

Quality Control Sample ID	Matrix	Instrument	Date Prepared	Date Analyzed	MS/MSD Batch Number
ES 029	**Aqueous**	**GC/MS LL**	**07/30/13**	**07/31/13 00:01**	**130730S01**

Parameter	Sample Conc.	Spike Added	MS Conc.	MS %Rec.	MSD Conc.	MSD %Rec.	%Rec. CL	RPD	RPD CL	Qualifiers
Acetone	ND	50.00	56.35	113	53.65	107	40-140	5	0-20	
Benzene	ND	50.00	43.99	88	42.32	85	80-120	4	0-20	
Bromodichloromethane	ND	50.00	41.56	83	39.91	80	75-120	4	0-20	
Bromoform	ND	50.00	45.53	91	46.60	93	70-130	2	0-20	
Bromomethane	ND	50.00	43.11	86	45.93	92	30-145	6	0-20	
2-Butanone	ND	50.00	44.17	88	43.75	87	30-150	1	0-20	
Carbon Tetrachloride	ND	50.00	41.55	83	39.40	79	65-140	5	0-20	
Chlorobenzene	ND	50.00	41.39	83	40.04	80	80-120	3	0-20	
Chloroethane	ND	50.00	43.09	86	40.13	80	60-135	7	0-20	
Chloroform	ND	50.00	41.61	83	39.28	79	65-135	6	0-20	
Chloromethane	ND	50.00	41.74	83	41.92	84	40-125	0	0-20	
Dibromochloromethane	ND	50.00	44.69	89	43.90	88	60-135	2	0-20	
1,2-Dibromo-3-Chloropropane	ND	50.00	42.44	85	42.37	85	50-130	0	0-20	
1,2-Dibromoethane	ND	50.00	43.55	87	42.66	85	80-120	2	0-20	
1,2-Dichlorobenzene	ND	50.00	41.09	82	40.48	81	70-120	2	0-20	
1,3-Dichlorobenzene	ND	50.00	40.24	80	39.76	80	75-125	1	0-20	
1,4-Dichlorobenzene	ND	50.00	42.49	85	41.50	83	75-125	2	0-20	
1,1-Dichloroethane	ND	50.00	40.08	80	39.00	78	70-135	3	0-20	
1,2-Dichloroethane	ND	50.00	43.15	86	40.49	81	70-130	6	0-20	
1,1-Dichloroethene	ND	50.00	40.26	81	38.57	77	70-130	4	0-20	
c-1,2-Dichloroethene	ND	50.00	41.65	83	41.94	84	70-125	1	0-20	
t-1,2-Dichloroethene	ND	50.00	42.20	84	41.02	82	60-140	3	0-20	
1,2-Dichloropropane	ND	50.00	43.38	87	42.24	84	75-125	3	0-20	
c-1,3-Dichloropropene	ND	50.00	47.25	95	45.13	90	70-130	5	0-20	
t-1,3-Dichloropropene	ND	50.00	36.39	73	35.86	72	55-140	1	0-20	
Ethylbenzene	ND	50.00	43.76	88	42.27	85	75-125	3	0-20	
Methylene Chloride	ND	50.00	43.54	87	41.43	83	55-140	5	0-20	
4-Methyl-2-Pentanone	ND	50.00	41.16	82	40.02	80	60-135	3	0-20	
Styrene	ND	50.00	44.64	89	42.93	86	65-135	4	0-20	
1,1,1,2-Tetrachloroethane	ND	50.00	45.22	90	43.52	87	80-130	4	0-20	
1,1,2,2-Tetrachloroethane	ND	50.00	42.00	84	42.52	85	65-130	1	0-20	
Tetrachloroethene	ND	50.00	47.51	95	45.16	90	45-150	5	0-20	
Toluene	ND	50.00	43.07	86	40.88	82	75-120	5	0-20	
1,2,4-Trichlorobenzene	ND	50.00	44.11	88	43.90	88	65-135	0	0-20	
1,1,1-Trichloroethane	ND	50.00	40.83	82	38.50	77	65-130	6	0-20	
Hexachloro-1,3-Butadiene	ND	50.00	41.67	83	41.24	82	50-140	1	0-20	
1,1,2-Trichloroethane	ND	50.00	45.10	90	42.48	85	75-125	6	0-20	

RPD: Relative Percent Difference. CL: Control Limits

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Calscience Environmental Laboratories, Inc.

Quality Control - Spike/Spike Duplicate

Environmental Science International, Inc.	Date Received: 07/25/13
354 Uluniu Street, Suite 304	Work Order: 13-07-1671
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
Trichloroethene	ND	50.00	42.89	86	41.05	82	70-125	4	0-20	
1,2,3-Trichloropropane	ND	50.00	44.34	89	41.24	82	75-125	7	0-20	
Vinyl Chloride	ND	50.00	40.78	82	39.52	79	50-145	3	0-20	
p/m-Xylene	ND	100.0	85.40	85	81.08	81	75-130	5	0-20	
o-Xylene	ND	50.00	42.06	84	39.60	79	80-120	6	0-20	3
Methyl-t-Butyl Ether (MTBE)	ND	50.00	37.84	76	37.64	75	65-125	1	0-20	

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RPD: Relative Percent Difference. CL: Control Limits

Calscience Environmental Laboratories, Inc.

Quality Control - PDS/PDSD

Environmental Science International, Inc.		Date Received:	07/25/13
354 Uluniu Street, Suite 304		Work Order:	13-07-1671
Kailua, HI 96734-2500		Preparation:	EPA 3020A Total
		Method:	EPA 6020
Project: Red Hill LTM 112066			Page 1 of 1

Quality Control Sample ID	Matrix	Instrument	Date Prepared	Date Analyzed	PDS/PDSD Batch Number
ES 029	**Aqueous**	**ICP/MS 03**	**07/26/13 00:00**	**07/26/13 15:59**	**130726S03**

Parameter	Sample Conc.	Spike Added	PDS Conc.	PDS %Rec.	%Rec. CL	Qualifiers
Lead	ND	100.0	100.8	101	75-125	

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RPD: Relative Percent Difference. CL: Control Limits

Calscience Environmental Laboratories, Inc.

Quality Control - LCS/LCSD

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

Project: Red Hill LTM 112066

Date Received: 07/25/13
Work Order: 13-07-1671
Preparation: EPA 3510C
Method: EPA 8015B (M)
Page 1 of 5

Quality Control Sample ID	Matrix	Instrument	Date Prepared	Date Analyzed	LCS/LCSD Batch Number
099-15-516-52	**Aqueous**	**GC 45**	**07/26/13**	**07/26/13 22:47**	**130726B04**

Parameter	Spike Added	LCS Conc.	LCS %Rec.	LCSD Conc.	LCSD %Rec.	%Rec. CL	RPD	RPD CL	Qualifiers
TPH as Diesel	4000	4620	116	4498	112	60-132	3	0-11	

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RPD: Relative Percent Difference. CL: Control Limits

Calscience Environmental Laboratories, Inc.

Quality Control - LCS

Environmental Science International, Inc.	Date Received:	07/25/13
354 Uluniu Street, Suite 304	Work Order:	13-07-1671
Kailua, HI 96734-2500	Preparation:	EPA 3020A Total
	Method:	EPA 6020
Project: Red Hill LTM 112066		Page 2 of 5

Quality Control Sample ID	Matrix	Instrument	Date Analyzed	LCS Batch Number
099-14-497-41	**Aqueous**	**ICP/MS 03**	**07/26/13 15:50**	**130726L03D**

Parameter	Spike Added	Conc. Recovered	LCS %Rec.	%Rec. CL	Qualifiers
Lead	100.0	96.90	97	80-120	

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RPD: Relative Percent Difference. CL: Control Limits

Calscience Environmental Laboratories, Inc.

Quality Control - LCS

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

Project: Red Hill LTM 112066

Date Received: 07/25/13
Work Order: 13-07-1671
Preparation: EPA 3510C
Method: EPA 8270C SIM PAHs

Quality Control Sample ID	Matrix	Instrument	Date Analyzed	LCS Batch Number
099-15-148-16	**Aqueous**	**GC/MS AAA**	**07/29/13 11:59**	**130726L03**

Parameter	Spike Added	Conc. Recovered	LCS %Rec.	%Rec. CL	Qualifiers
Naphthalene	2.000	1.641	82	21-133	
2-Methylnaphthalene	2.000	1.737	87	21-140	
1-Methylnaphthalene	2.000	1.598	80	20-140	
Acenaphthylene	2.000	1.600	80	33-145	
Acenaphthene	2.000	1.610	81	55-121	
Fluorene	2.000	1.671	84	59-121	
Phenanthrene	2.000	1.481	74	54-120	
Anthracene	2.000	1.351	68	27-133	
Fluoranthene	2.000	1.473	74	26-137	
Pyrene	2.000	1.584	79	45-129	
Benzo (a) Anthracene	2.000	1.568	78	33-143	
Chrysene	2.000	1.502	75	17-168	
Benzo (k) Fluoranthene	2.000	1.631	82	24-159	
Benzo (b) Fluoranthene	2.000	1.633	82	24-159	
Benzo (a) Pyrene	2.000	1.698	85	17-163	
Indeno (1,2,3-c,d) Pyrene	2.000	1.545	77	25-175	
Dibenz (a,h) Anthracene	2.000	1.326	66	25-175	
Benzo (g,h,i) Perylene	2.000	1.241	62	25-157	

Total number of LCS compounds: 18
Total number of ME compounds: 0
Total number of ME compounds allowed: 1
LCS ME CL validation result: Pass

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RPD: Relative Percent Difference. CL: Control Limits

Calscience Environmental Laboratories, Inc.

Quality Control - LCS/LCSD

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

Project: Red Hill LTM 112066

Date Received: 07/25/13
Work Order: 13-07-1671
Preparation: EPA 5030C
Method: GC/MS / EPA 8260B
Page 4 of 5

Quality Control Sample ID	Matrix	Instrument	Date Prepared	Date Analyzed	LCS/LCSD Batch Number
099-13-057-26	**Aqueous**	**GC/MS LL**	**07/30/13**	**07/30/13 18:56**	**130730L02**

Parameter	Spike Added	LCS Conc.	LCS %Rec.	LCSD Conc.	LCSD %Rec.	%Rec. CL	RPD	RPD CL	Qualifiers
Acetone	50.00	75.72	151	N/A	N/A	40-140	N/A	0-20	
Benzene	50.00	53.87	108	N/A	N/A	80-120	N/A	0-20	
Bromodichloromethane	50.00	50.21	100	N/A	N/A	75-120	N/A	0-20	
Bromoform	50.00	58.22	116	N/A	N/A	70-130	N/A	0-20	
Bromomethane	50.00	58.56	117	N/A	N/A	30-145	N/A	0-20	
2-Butanone	50.00	59.63	119	N/A	N/A	30-150	N/A	0-20	
Carbon Tetrachloride	50.00	50.51	101	N/A	N/A	65-140	N/A	0-20	
Chlorobenzene	50.00	50.85	102	N/A	N/A	80-120	N/A	0-20	
Chloroethane	50.00	51.79	104	N/A	N/A	60-135	N/A	0-20	
Chloroform	50.00	49.70	99	N/A	N/A	65-135	N/A	0-20	
Chloromethane	50.00	51.81	104	N/A	N/A	40-125	N/A	0-20	
Dibromochloromethane	50.00	54.93	110	N/A	N/A	60-135	N/A	0-20	
1,2-Dibromo-3-Chloropropane	50.00	48.78	98	N/A	N/A	50-130	N/A	0-20	
1,2-Dibromoethane	50.00	54.27	109	N/A	N/A	80-120	N/A	0-20	
1,2-Dichlorobenzene	50.00	50.66	101	N/A	N/A	70-120	N/A	0-20	
1,3-Dichlorobenzene	50.00	51.06	102	N/A	N/A	75-125	N/A	0-20	
1,4-Dichlorobenzene	50.00	53.41	107	N/A	N/A	75-125	N/A	0-20	
1,1-Dichloroethane	50.00	50.23	100	N/A	N/A	70-135	N/A	0-20	
1,2-Dichloroethane	50.00	49.86	100	N/A	N/A	70-130	N/A	0-20	
1,1-Dichloroethene	50.00	49.81	100	N/A	N/A	70-130	N/A	0-20	
c-1,2-Dichloroethene	50.00	52.16	104	N/A	N/A	70-125	N/A	0-20	
t-1,2-Dichloroethene	50.00	53.49	107	N/A	N/A	60-140	N/A	0-20	
1,2-Dichloropropane	50.00	53.34	107	N/A	N/A	75-125	N/A	0-20	
c-1,3-Dichloropropene	50.00	59.86	120	N/A	N/A	70-130	N/A	0-20	
t-1,3-Dichloropropene	50.00	46.32	93	N/A	N/A	55-140	N/A	0-20	
Ethylbenzene	50.00	54.54	109	N/A	N/A	75-125	N/A	0-20	
Methylene Chloride	50.00	54.06	108	N/A	N/A	55-140	N/A	0-20	
4-Methyl-2-Pentanone	50.00	54.61	109	N/A	N/A	60-135	N/A	0-20	
Styrene	50.00	55.76	112	N/A	N/A	65-135	N/A	0-20	
1,1,1,2-Tetrachloroethane	50.00	53.71	107	N/A	N/A	80-130	N/A	0-20	
1,1,2,2-Tetrachloroethane	50.00	54.37	109	N/A	N/A	65-130	N/A	0-20	
Tetrachloroethene	50.00	53.54	107	N/A	N/A	45-150	N/A	0-20	
Toluene	50.00	52.86	106	N/A	N/A	75-120	N/A	0-20	
1,2,4-Trichlorobenzene	50.00	57.01	114	N/A	N/A	65-135	N/A	0-20	
1,1,1-Trichloroethane	50.00	48.94	98	N/A	N/A	65-130	N/A	0-20	
Hexachloro-1,3-Butadiene	50.00	54.06	108	N/A	N/A	50-140	N/A	0-20	
1,1,2-Trichloroethane	50.00	53.95	108	N/A	N/A	75-125	N/A	0-20	

RPD: Relative Percent Difference. CL: Control Limits

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Calscience Environmental Laboratories, Inc.

Quality Control - LCS/LCSD

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

Project: Red Hill LTM 112066

Date Received: 07/25/13
Work Order: 13-07-1671
Preparation: EPA 5030C
Method: GC/MS / EPA 8260B

Parameter	Spike Added	LCS Conc.	LCS %Rec.	LCSD Conc.	LCSD %Rec.	%Rec. CL	RPD	RPD CL	Qualifiers
Trichloroethene	50.00	52.76	106	N/A	N/A	70-125	N/A	0-20	
1,2,3-Trichloropropane	50.00	51.92	104	N/A	N/A	75-125	N/A	0-20	
Vinyl Chloride	50.00	50.66	101	N/A	N/A	50-145	N/A	0-20	
p/m-Xylene	100.0	106.1	106	N/A	N/A	75-130	N/A	0-20	
o-Xylene	50.00	51.18	102	N/A	N/A	80-120	N/A	0-20	
Methyl-t-Butyl Ether (MTBE)	50.00	47.32	95	N/A	N/A	65-125	N/A	0-20	
Gasoline Range Organics	1000	1013	101	939.9	94	80-120	8	0-20	

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RPD: Relative Percent Difference. CL: Control Limits

Calscience Environmental Laboratories, Inc.

Sample Analysis Summary Report

Work Order: 13-07-1671

Method	Extraction	Chemist ID	Instrument	Analytical Location
EPA 6020	EPA 3020A Total	598	ICP/MS 03	1
EPA 8015B (M)	EPA 3510C	682	GC 45	1
EPA 8270C SIM PAHs	EPA 3510C	773	GC/MS AAA	1
GC/MS / EPA 8260B	EPA 5030C	670	GC/MS LL	2

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Calscience Environmental Laboratories, Inc.

Glossary of Terms and Qualifiers

Work Order: 13-07-1671 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.
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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Calscience Environmental Laboratories, Inc.

7440 Lincoln Way, Garden Grove, CA 92841-1427 • (714) 895-5494
Other CA office locations: Concord and San Luis Obispo
For courier service / sample drop off information,
contact sales@calscience.com or call us.

CHAIN OF CUSTODY RECORD

WO # / LAB USE ONLY
13-07-1671

Date 7/23/13
Page 1 of 1

LABORATORY CLIENT: Environmental Science International
ADDRESS: 354 Uluniu St. #304
CITY: Kailua STATE: Hi ZIP: 96734
TEL: 808-261-0740 E-MAIL: RCHONG@ESSCIENCEI.com, DFEHER@ESSCIENCEI.com

CLIENT PROJECT NAME / NUMBER: Red Hill LTM 112066
PROJECT CONTACT: Robert Chong
P.O. NO.:
SAMPLER(S): (PRINT) BI/JL

TURNAROUND TIME:
☐ SAME DAY ☐ 24 HR ☐ 48 HR ☐ 72 HR ☒ STANDARD

☐ COELT EDF GLOBAL ID LOG CODE

SPECIAL INSTRUCTIONS:
DoD QSM 4.2

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) ~~GCFID~~ 8260	TPH(d) ~~GCFID~~ 8015B	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 ~~8270C~~ 8270 SIM	T22 Metals ☐ 6010/747X ☐ 6020/747X	Cr(VI) ☐ 7196 ☐ 7199 ☐ 218.6	Lead 6020	Lead 200.8		
1	ES Trip	7/22/13	0830	water	3		X		X					X												
2	ES028	7/22/13	0920	water	10	X	X	X	X	X				X						X			X			
3	ES029	7/22/13	1015	water	10	X	X	X	X	X				X						X			X			
4	ES030	7/22/13	1100	water	10	X	X	X	X	X				X						X			X			
5	ES031	7/22/13	1145	water	10	X	X	X	X	X				X						X			X			
6	ES032	7/23/13	0930	water	9 ~~10~~	X	X	X	X	X				X						X			~~X~~	BI		
7	ES032 UF	7/23/13	0930	water	1		X																	X		
8	ES033	7/23/13	1045	water	10	X	X	X	X	X				X						X			X			
9	ES029 MS/MSD	7/22/13	1015	water	10	X	X	X	X	X				X						X			X			

3 pc 7/25/13

Relinquished by: (Signature)	Received by: (Signature/Affiliation)	Date: 7/23/13	Time: 14:00.
Relinquished by: (Signature)	Received by: (Signature/Affiliation)	Date:	Time:
Relinquished by: (Signature)	Received by: (Signature/Affiliation) (FEDEX)	Date: 7/25/13	Time: 10:30

DISTRIBUTION: White with final report, Green and Yellow to Client.
Please note that pages 1 and 2 of 2 of our T/Cs are printed on the reverse side of the Green and Yellow copies respectively.

11/01/12 Revision

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TRK# 0200 8531 6209 1696
MASTER
VZ APVA

THU – 25 JUL AA
** 2DAY **
DSR
92841
CA–US SNA

Express
J131113021201126

2 of 3
MPS# 0681 7958 0112 3230
Mstr# 8531 6209 1696 0200
VZ APVA

THU – 25 JUL AA
** 2DAY **
DSR
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MPS# 0681 7958 0112 3240
Mstr# 8531 6209 1696 0200
VZ APVA

THU – 25 JUL AA
** 2DAY **
DSR
92841
CA–US SNA

Recipient's Name Please print.

Company

( )

Phone Number

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Calscience Environmental Laboratories, Inc.

WORK ORDER #: 13-07-1671

SAMPLE RECEIPT FORM

Cooler 1 of 3

CLIENT: ESI

DATE: 07/25/13

TEMPERATURE: Thermometer ID: SC3 (Criteria: 0.0 °C – 6.0 °C, not frozen except sediment/tissue)

Temperature 3.7 °C - 0.2 °C (CF) = 3.5 °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 Initial: JN

CUSTODY SEALS INTACT:

☑ Cooler ☐_____ ☐ No (Not Intact) ☐ Not Present ☐ N/A Initial: JN

☑ Sample ☐_____ ☐ No (Not Intact) ☐ Not Present Initial: JN

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	☑	☐	☐
pH/Res. Cl/Diss. Sulfide/Diss. Oxygen received within 15-min holding time	☐	☐	☑
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® ☐_____

Water: ☐VOA (6) ☑VOA**h** (3) ☐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** (1) ☐125PB ☐125PB**znna** ☐100PJ ☐100PJ**na$_2$** ☐_____ ☐_____ ☐_____

Air: ☐Tedlar® ☐Canister **Other:** ☐_____ **Trip Blank Lot#:** 130702A **Labeled/Checked by:** JN

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

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:** YS

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Calscience Environmental Laboratories, Inc.

WORK ORDER #: 13-07-1671

SAMPLE RECEIPT FORM

Cooler 2 of 3

CLIENT: ESI

DATE: 07/25/13

TEMPERATURE: Thermometer ID: SC3 (Criteria: 0.0 °C – 6.0 °C, not frozen except sediment/tissue)

Temperature 3.3 °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 **Initial:** JS

CUSTODY SEALS INTACT:

☑ Cooler	☐_____	☐ No (Not Intact)	☐ Not Present	☐ N/A	**Initial:** JS
☑ Sample	☐_____	☐ No (Not Intact)	☐ Not Present		**Initial:** JS

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	☑	☐	☐
pH/Res. Cl/Diss. Sulfide/Diss. Oxygen received within 15-min holding time.. ☐		☐	☑
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® ☐_____

Water: ☐VOA ☐VOA**h** ☐VOA**na$_2$** ☐125AGB ☐125AGB**h** ☐125AGB**p** ☑1AGB (2) ☐1AGB**na$_2$** ☐1AGB**s**

☐500AGB ☑500AGJ (2) ☐500AGJ**s** ☐250AGB ☐250CGB ☐250CGB**s** ☐1PB ☐1PB**na** ☐500PB

☐250PB ☑250PB**n** (2) ☐125PB ☐125PB**znna** ☐100PJ ☐100PJ**na$_2$** ☐_____ ☐_____ ☐_____

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

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

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:** YS

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Calscience Environmental Laboratories, Inc.

WORK ORDER #: 13-07-1671

SAMPLE RECEIPT FORM

Cooler 3 of 3

CLIENT: ESI

DATE: 07/25/13

TEMPERATURE: Thermometer ID: SC3 (Criteria: 0.0 °C – 6.0 °C, not frozen except sediment/tissue)

Temperature 3.8 °C - 0.2 °C (CF) = 3.6 °C ☐ Blank ☑ Sample

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

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

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

Ambient Temperature: ☐ Air ☐ Filter Initial: RS

CUSTODY SEALS INTACT:

☑ Cooler	☐ _____	☐ No (Not Intact)	☐ Not Present	☐ N/A	Initial: RS
☐ Sample	☐ _____	☐ No (Not Intact)	☐ Not Present		Initial: AP

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	☑	☐	☐
pH/Res. Cl/Diss. Sulfide/Diss. Oxygen received within 15-min holding time..	☐	☐	☑
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® ☐_____

Water: ☐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:** JD

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

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:** YS

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Calscience Environmental Laboratories, Inc.

WORK ORDER #: 13-07-1671

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:** _____

(-4) 1 x 500 Amber glass jar and 1 x 1L Amber glass bottle; collection time per label is 10:15

(-4)(-5) 1 of 2 1L Amber glass bottle (unpreserved) received broken

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

Comments: _____

*Transferred at Client's request.

Initial / Date: JO 07/25/13

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Calscience Environmental Laboratories, Inc.

Supplemental Report 1

CALSCIENCE

WORK ORDER NUMBER: 13-07-1671

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: Robert Chong
354 Uluniu Street, Suite 304
Kailua, HI 96734-2500

Approved for release on 08/01/2013 by:
Richard Villafania
Project Manager

ResultLink

Email your PM

Calscience Environmental Laboratories, 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.

Calscience Environmental Laboratories, Inc.

Contents

Client Project Name: Red Hill LTM 112066
Work Order Number: 13-07-1671

Calscience Environmental Laboratories, Inc.

Work Order Narrative

Work Order: 13-07-1671 Page 1 of 1

Condition Upon Receipt:

Samples were received under Chain of Custody (COC) on 07/25/13. They were assigned to Work Order 13-07-1671.

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:

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.

Due to analytical instrument issues for the GRO/Volatiles analysis, samples ES 028, ES 029, ES 030, and ES 031 were not analyzed within the recommended holding time of 7 days for unpreserved samples. The samples were analyzed on the 8th day after the sample collection date. Calscience is evaluating contingency measures to prevent similar issues going forward though recommends that an additional set of HCl-preserved sample vials be collected to extend the analytical holding time if needed.

Subcontractor Information:

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

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Calscience Environmental Laboratories, Inc.

Analytical Report

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

Project: Red Hill LTM 112066

Date Received: 07/25/13
Work Order: 13-07-1671
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
ES 032 UF	**13-07-1671-7-A**	**07/23/13 09:30**	**Aqueous**	**ICP/MS 03**	**07/26/13**	**07/26/13 16:26**	**130726L01**

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	0.300	1.00	0.0898	1	

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
Method Blank	**099-10-008-2405**	**N/A**	**Aqueous**	**ICP/MS 03**	**07/26/13**	**07/26/13 14:07**	**130726L01**

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	U

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

Calscience Environmental Laboratories, Inc.

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: 07/25/13
Work Order: 13-07-1671
Preparation: N/A
Method: EPA 200.8

Quality Control Sample ID	Matrix	Instrument	Date Prepared	Date Analyzed	MS/MSD Batch Number
13-07-1774-1	**Aqueous**	**ICP/MS 03**	**07/26/13**	**07/26/13 14:16**	**130726S01**

Parameter	Sample Conc.	Spike Added	MS Conc.	MS %Rec.	MSD Conc.	MSD %Rec.	%Rec. CL	RPD	RPD CL	Qualifiers
Lead	ND	100.0	110.0	110	107.1	107	80-120	3	0-20	

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RPD: Relative Percent Difference. CL: Control Limits

Calscience Environmental Laboratories, Inc.

Quality Control - LCS

Environmental Science International, Inc.	Date Received:	07/25/13
354 Uluniu Street, Suite 304	Work Order:	13-07-1671
Kailua, HI 96734-2500	Preparation:	N/A
	Method:	EPA 200.8
Project: Red Hill LTM 112066		Page 1 of 1

Quality Control Sample ID	Matrix	Instrument	Date Analyzed	LCS Batch Number
099-10-008-2405	**Aqueous**	**ICP/MS 03**	**07/26/13 14:13**	**130726L01**

Parameter	Spike Added	Conc. Recovered	LCS %Rec.	%Rec. CL	Qualifiers
Lead	100.0	96.79	97	80-120	

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RPD: Relative Percent Difference. CL: Control Limits

Calscience Environmental Laboratories, Inc.

Sample Analysis Summary Report

Work Order: 13-07-1671

Method	Extraction	Chemist ID	Instrument	Analytical Location
EPA 200.8	N/A	598	ICP/MS 03	1

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Calscience Environmental Laboratories, Inc.

Glossary of Terms and Qualifiers

Work Order: 13-07-1671 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.
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.
HDH	The sample chromatographic pattern for TPH matches the chromatographic pattern of the specified standard but heavier hydrocarbons were also present (or detected).
HDL	The sample chromatographic pattern for TPH matches the chromatographic pattern of the specified standard but lighter hydrocarbons were also present (or detected).
J	Analyte was detected at a concentration below the reporting limit and above the laboratory method detection limit. Reported value is estimated.
ME	LCS Recovery Percentage is within Marginal Exceedance (ME) Control Limit range (+/- 4 SD from the mean).
ND	Parameter not detected at the indicated reporting limit.
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 the laboratory method detection limit.
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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Calscience Environmental Laboratories, Inc.

7440 Lincoln Way, Garden Grove, CA 92841-1427 • (714) 895-5494
Other CA office locations: Concord and San Luis Obispo
For courier service / sample drop off information,
contact sales@calscience.com or call us.

CHAIN OF CUSTODY RECORD

WO # / LAB USE ONLY
13-07-1671

Date 7/23/13
Page 1 of 1

LABORATORY CLIENT: Environmental Science International
ADDRESS: 354 Uluniu St. #304
CITY: Kailua STATE: Hi ZIP: 96734
TEL: 808-261-0740 E-MAIL: RCHONG@ESCIENCEI.com, DFEHER@ESCIENCEI.com

CLIENT PROJECT NAME / NUMBER: Red Hill LTM 112066
PROJECT CONTACT: Robert Chong
P.O. NO.:
SAMPLER(S): (PRINT) BI/JL

TURNAROUND TIME:
☐ SAME DAY ☐ 24 HR ☐ 48 HR ☐ 72 HR ☒ STANDARD

☐ COELT EDF GLOBAL ID LOG CODE

SPECIAL INSTRUCTIONS:
DoD QSM 4.2

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) ~~GCFID~~ 8260	TPH(d) ~~GCFID~~ 8015B	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 ~~8270C~~ 8270 SIM	T22 Metals ☐ 6010/747X ☐ 6020/747X	Cr(VI) ☐ 7196 ☐ 7199 ☐ 218.6	Lead 6020	Lead 200.8		
1	ES Trip	7/22/13	0830	water	3		X		X					X												
2	ES028	7/22/13	0920	water	10	X	X	X	X	X				X						X			X			
3	ES029	7/22/13	1015	water	10	X	X	X	X	X				X						X			X			
4	ES030	7/22/13	1100	water	10	X	X	X	X	X				X						X			X			
5	ES031	7/22/13	1145	water	10	X	X	X	X	X				X						X			X			
6	ES032	7/23/13	0930	water	9 ~~10~~	X	X	X	X	X				X						X			~~X~~	BI		
7	ES032 UF	7/23/13	0930	water	1		X																	X		
8	ES033	7/23/13	1045	water	10	X	X	X	X	X				X						X			X			
9	ES029 MS/MSD	7/22/13	1015	water	10	X	X	X	X	X				X						X			X			
10																										

3 pl 7/25/13

Relinquished by: (Signature)	Received by: (Signature/Affiliation)	Date: 7/23/13	Time: 14:00.
Relinquished by: (Signature)	Received by: (Signature/Affiliation)	Date:	Time:
Relinquished by: (Signature)	Received by: (Signature/Affiliation) (FEDEX)	Date: 7/25/13	Time: 10:30

DISTRIBUTION: White with final report, Green and Yellow to Client.
Please note that pages 1 and 2 of 2 of our T/Cs are printed on the reverse side of the Green and Yellow copies respectively.

11/01/12 Revision

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1671 1671

1 of 3
TRK# 0200 8531 6209 1696
MASTER
VZ APVA

THU – 25 JUL AA
** 2DAY **
DSR
92841
CA–US SNA

Express

J131113021201126

2 of 3
MPS# 0681 7958 0112 3230
Mstr# 8531 6209 1696 0200
VZ APVA

THU – 25 JUL AA
** 2DAY **
DSR
92841
CA–US SNA

J131113

3 of 3
MPS# 0681 7958 0112 3240
Mstr# 8531 6209 1696 0200
VZ APVA

THU – 25 JUL AA
** 2DAY **
DSR
92841
CA–US SNA

Recipient's Name Please print.

Company

Phone Number

( )

Calscience Environmental Laboratories, Inc.

WORK ORDER #: 13-07-1671

SAMPLE RECEIPT FORM

Cooler 1 of 3

CLIENT: ESI

DATE: 07/25/13

TEMPERATURE: Thermometer ID: SC3 (Criteria: 0.0 °C – 6.0 °C, not frozen except sediment/tissue)

Temperature 3.7 °C - 0.2 °C (CF) = 3.5 °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 Initial: JN

CUSTODY SEALS INTACT:

☑ Cooler	☐_____	☐ No (Not Intact)	☐ Not Present	☐ N/A	Initial: JN
☑ Sample	☐_____	☐ No (Not Intact)	☐ Not Present		Initial: JP

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	☑	☐	☐
pH/Res. Cl/Diss. Sulfide/Diss. Oxygen received within 15-min holding time	☐	☐	☑
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® ☐_____

Water: ☐VOA (6) ☑VOA**h** (3) ☐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#:** 130702A **Labeled/Checked by:** JN

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

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:** YS

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Calscience Environmental Laboratories, Inc.

WORK ORDER #: 13-07-1671

SAMPLE RECEIPT FORM

Cooler 2 of 3

CLIENT: ESI DATE: 07/25/13

TEMPERATURE: Thermometer ID: SC3 (Criteria: 0.0 °C – 6.0 °C, not frozen except sediment/tissue)

Temperature 3.3 °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 Initial: JS

CUSTODY SEALS INTACT:

☑ Cooler	☐_____	☐ No (Not Intact)	☐ Not Present	☐ N/A	Initial: JS
☑ Sample	☐_____	☐ No (Not Intact)	☐ Not Present		Initial: JS

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	☑	☐	☐
pH/Res. Cl/Diss. Sulfide/Diss. Oxygen received within 15-min holding time.. ☐		☐	☑
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® ☐_____

Water: ☐VOA ☐VOA**h** ☐VOA**na$_2$** ☐125AGB ☐125AGB**h** ☐125AGB**p** ☑1AGB (2) ☐1AGB**na$_2$** ☐1AGB**s**

☐500AGB ☑500AGJ (2) ☐500AGJ**s** ☐250AGB ☐250CGB ☐250CGB**s** ☐1PB ☐1PB**na** ☐500PB

☐250PB ☑250PB**n** (2) ☐125PB ☐125PB**znna** ☐100PJ ☐100PJ**na$_2$** ☐_____ ☐_____ ☐_____

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

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

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:** YS

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Calscience Environmental Laboratories, Inc.

WORK ORDER #: 13-07-1671

SAMPLE RECEIPT FORM

Cooler 3 of 3

CLIENT: ESI

DATE: 07/25/13

TEMPERATURE: Thermometer ID: SC3 (Criteria: 0.0 °C – 6.0 °C, not frozen except sediment/tissue)

Temperature 3.8 °C - 0.2 °C (CF) = 3.6 °C ☐ Blank ☑ Sample

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

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

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

Ambient Temperature: ☐ Air ☐ Filter Initial: RS

CUSTODY SEALS INTACT:

☑ Cooler	☐ _____	☐ No (Not Intact)	☐ Not Present	☐ N/A	Initial: RS
☐ Sample	☐ _____	☐ No (Not Intact)	☐ Not Present		Initial: AP

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	☑	☐	☐
pH/Res. Cl/Diss. Sulfide/Diss. Oxygen received within 15-min holding time..	☐	☐	☑
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® ☐_____

Water: ☐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:** JD

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

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:** YS

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Calscience Environmental Laboratories, Inc.

WORK ORDER #: 13-07-1671

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:** _____

(-4) 1 x 500 Amber glass jar and 1 x 1L Amber glass bottle; collection time per label is 10:15

(-4)(-5) 1 of 2 1L Amber glass bottle (unpreserved) received broken

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

Comments: _____

*Transferred at Client's request.

Initial / Date: JO 07/25/13

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APPENDIX D

Historical Groundwater Exceedance Trends

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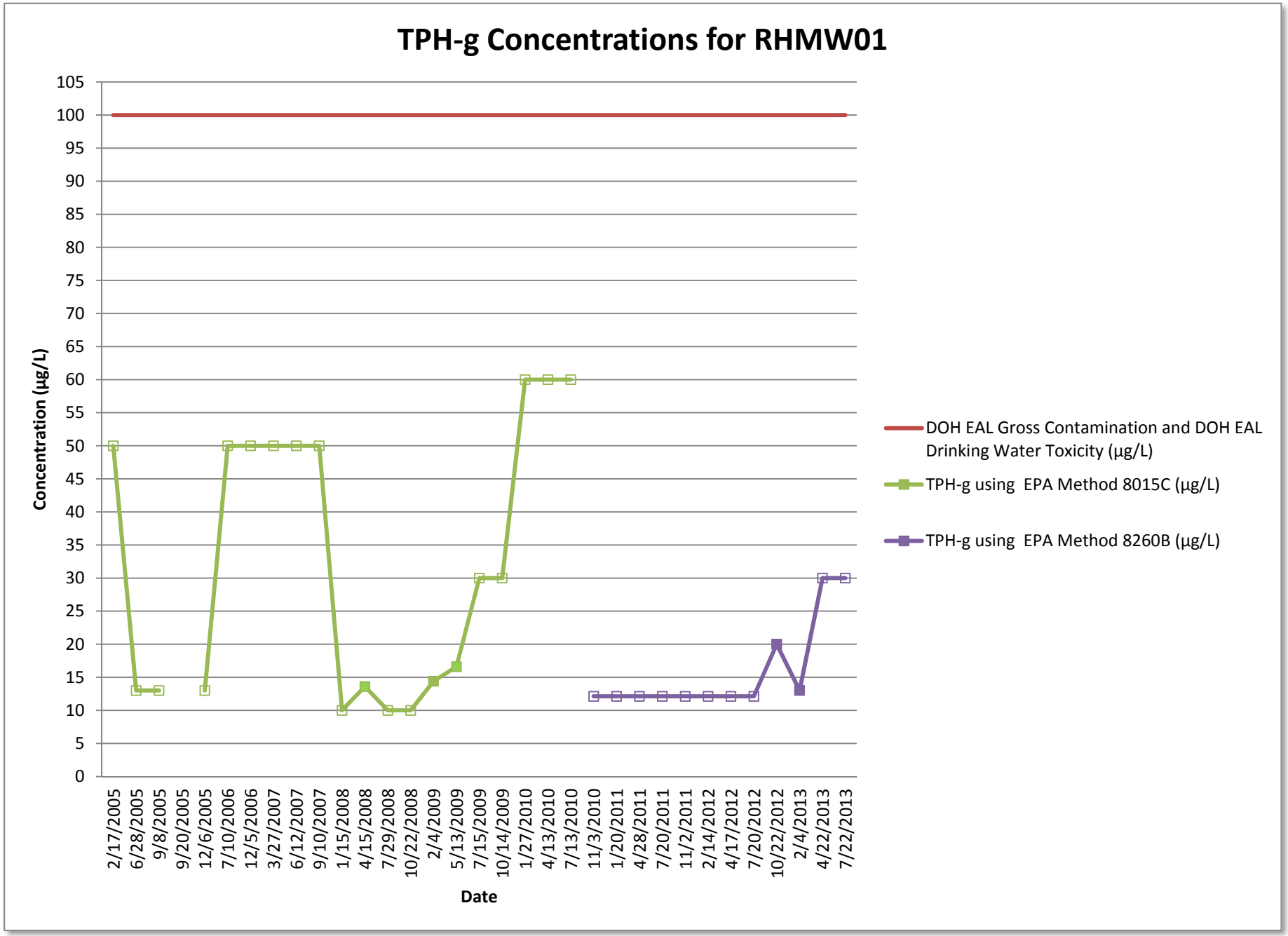

Data points for 2/17/2005 through 9/8/2005 and 12/6/2005 are the average of the primary and duplicate samples.
Unfilled boxes indicate non-detections. Method detection limits are shown.

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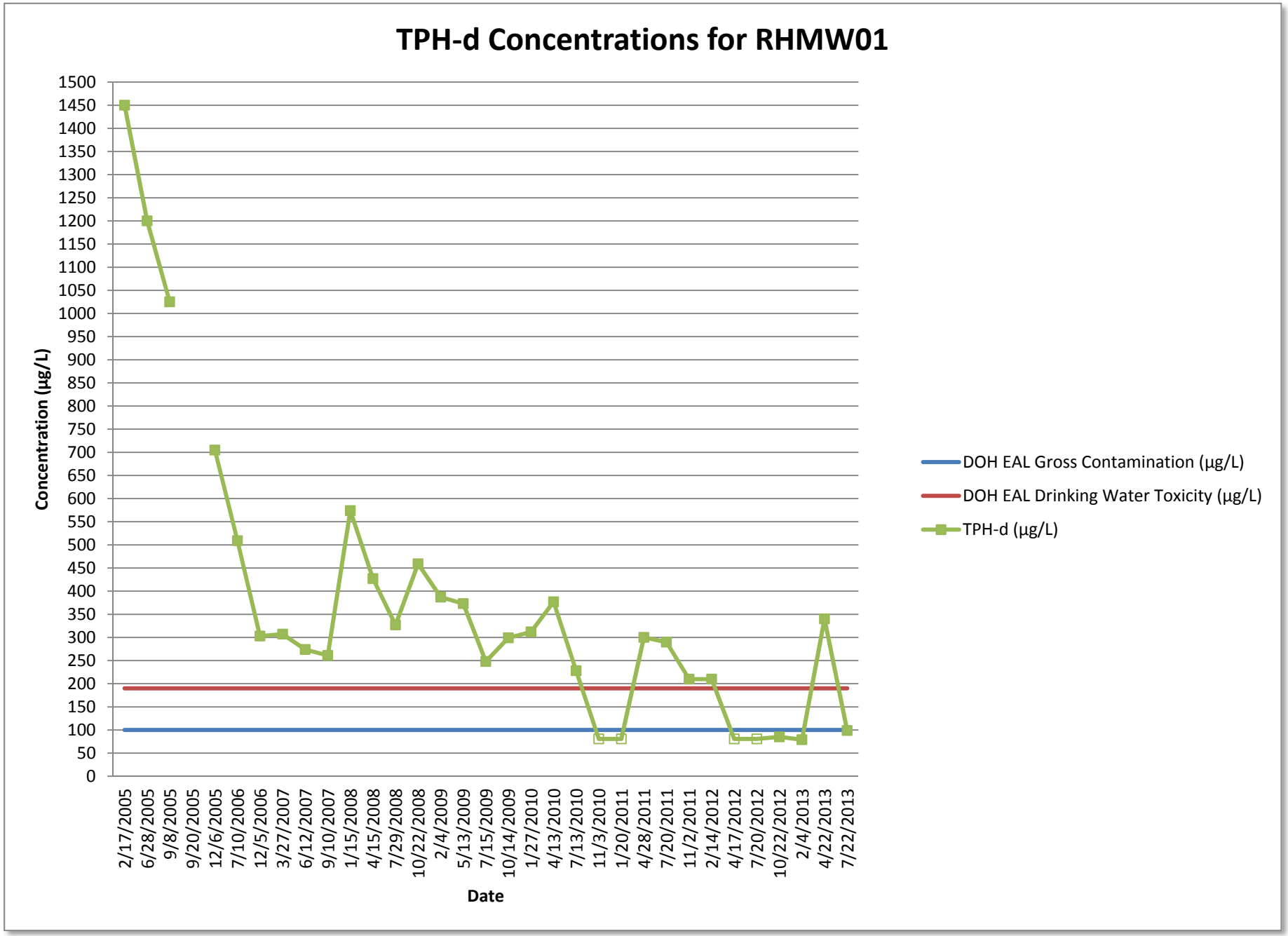

Data points for 2/17/2005 through 9/8/2005 and 12/6/2005 are the average of the primary and duplicate samples.
Unfilled boxes indicate non-detections. Method detection limits are shown.

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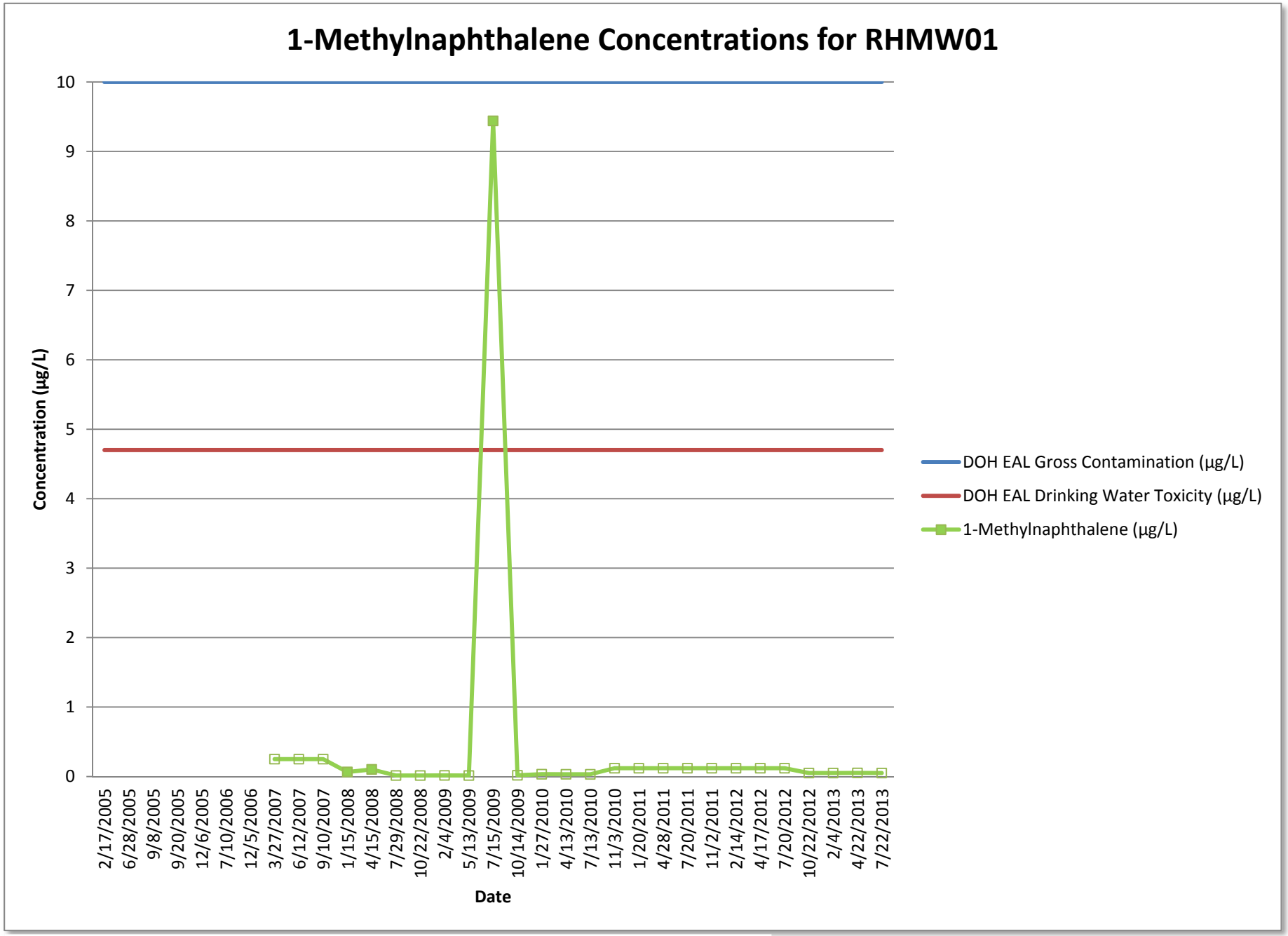

Unfilled boxes indicate non-detections. Method detection limits are shown.

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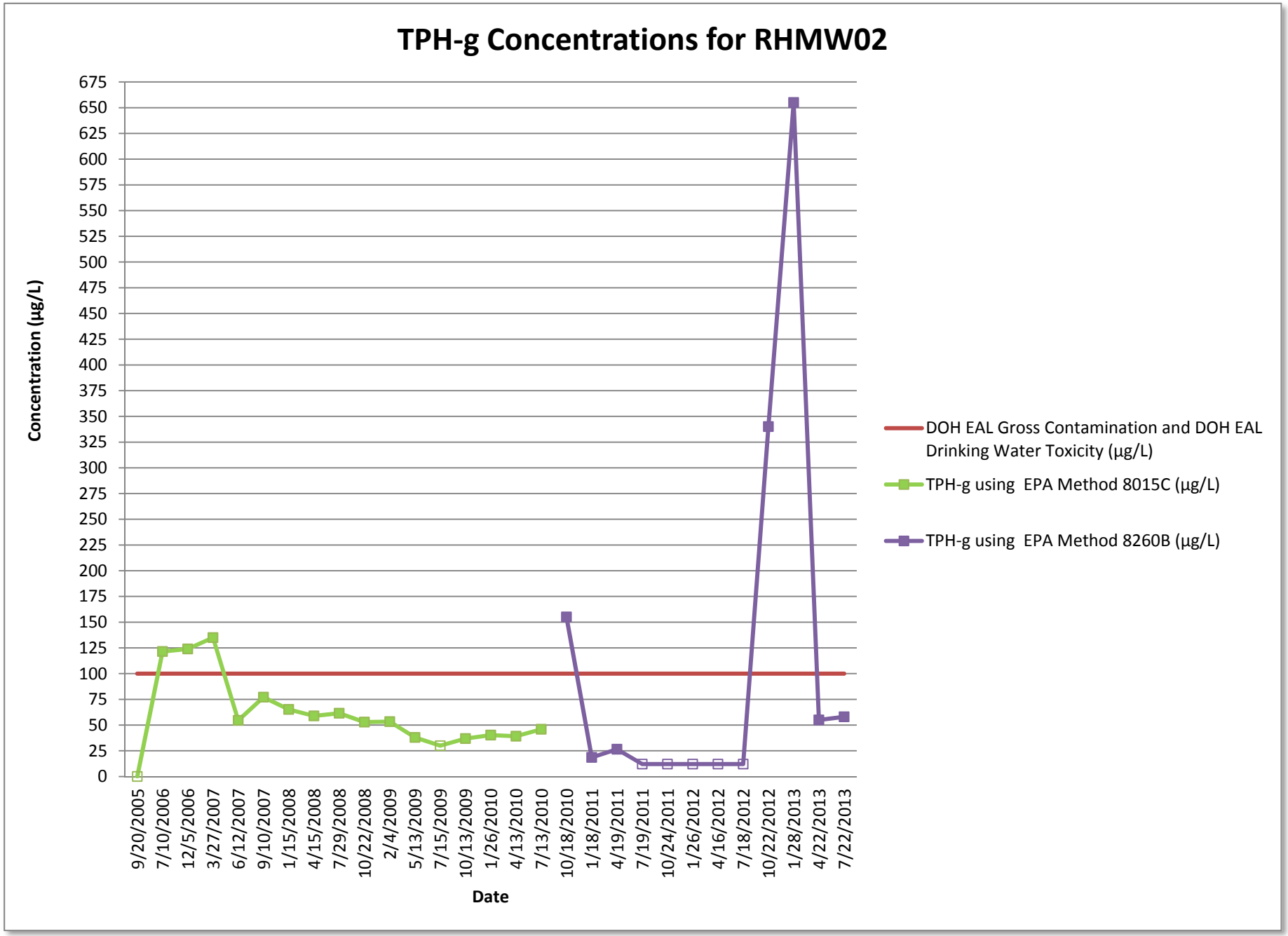

Data points for 9/20/2005 through 7/22/2013 are the average of the primary and duplicate samples.
Unfilled boxes indicate non-detections. Method detection limits are shown.
Primary sample results are shown for 1/26/2012 and 7/18/2012; all other concentrations are the average of the primary and duplicate sample results.
Unfilled boxes indicate non-detections. Method detection limits are shown.

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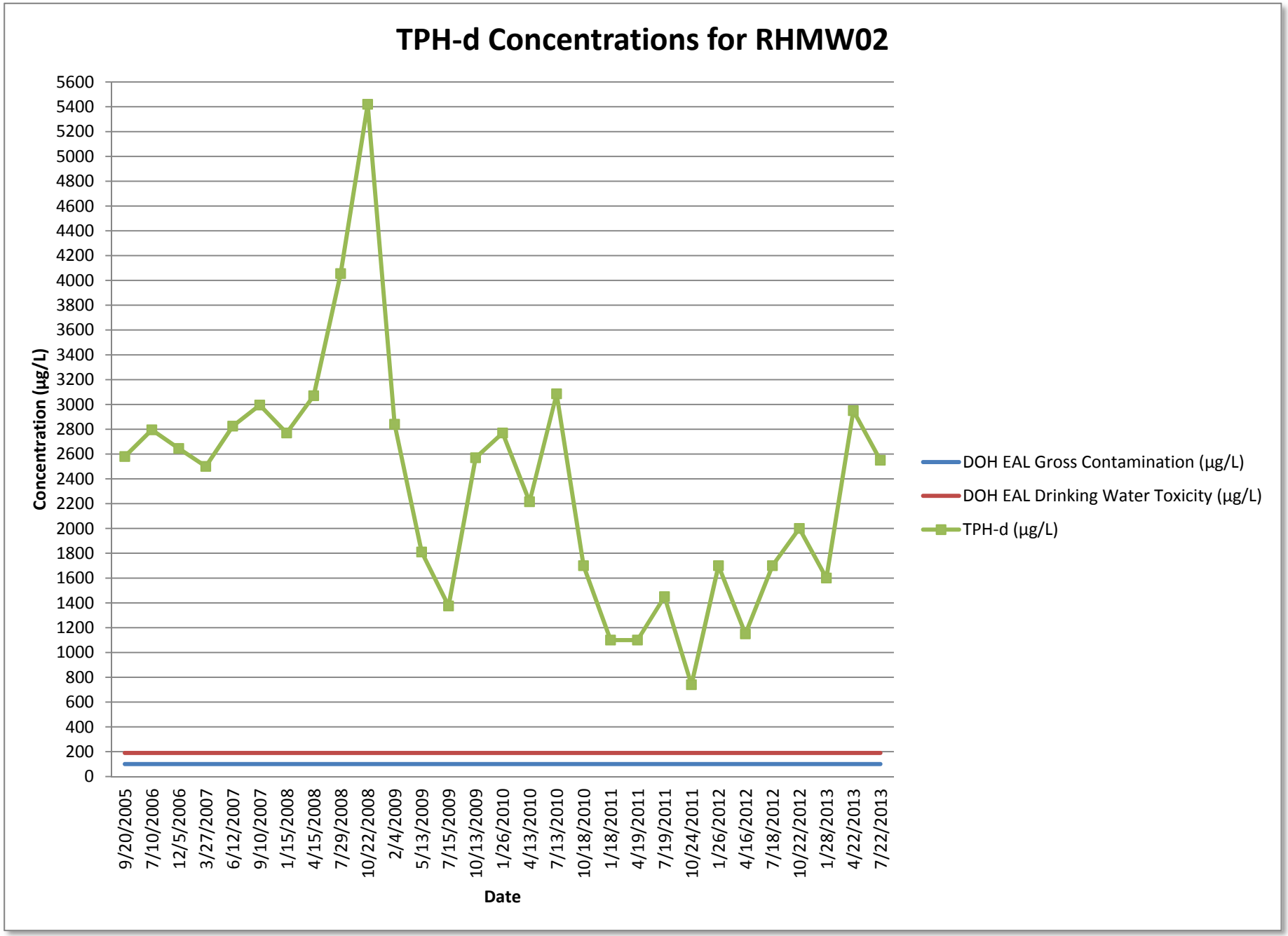

Data points for 9/20/2005 through 7/22/2013 are the average of the primary and duplicate samples.
Unfilled boxes indicate non-detections. Method detection limits are shown.

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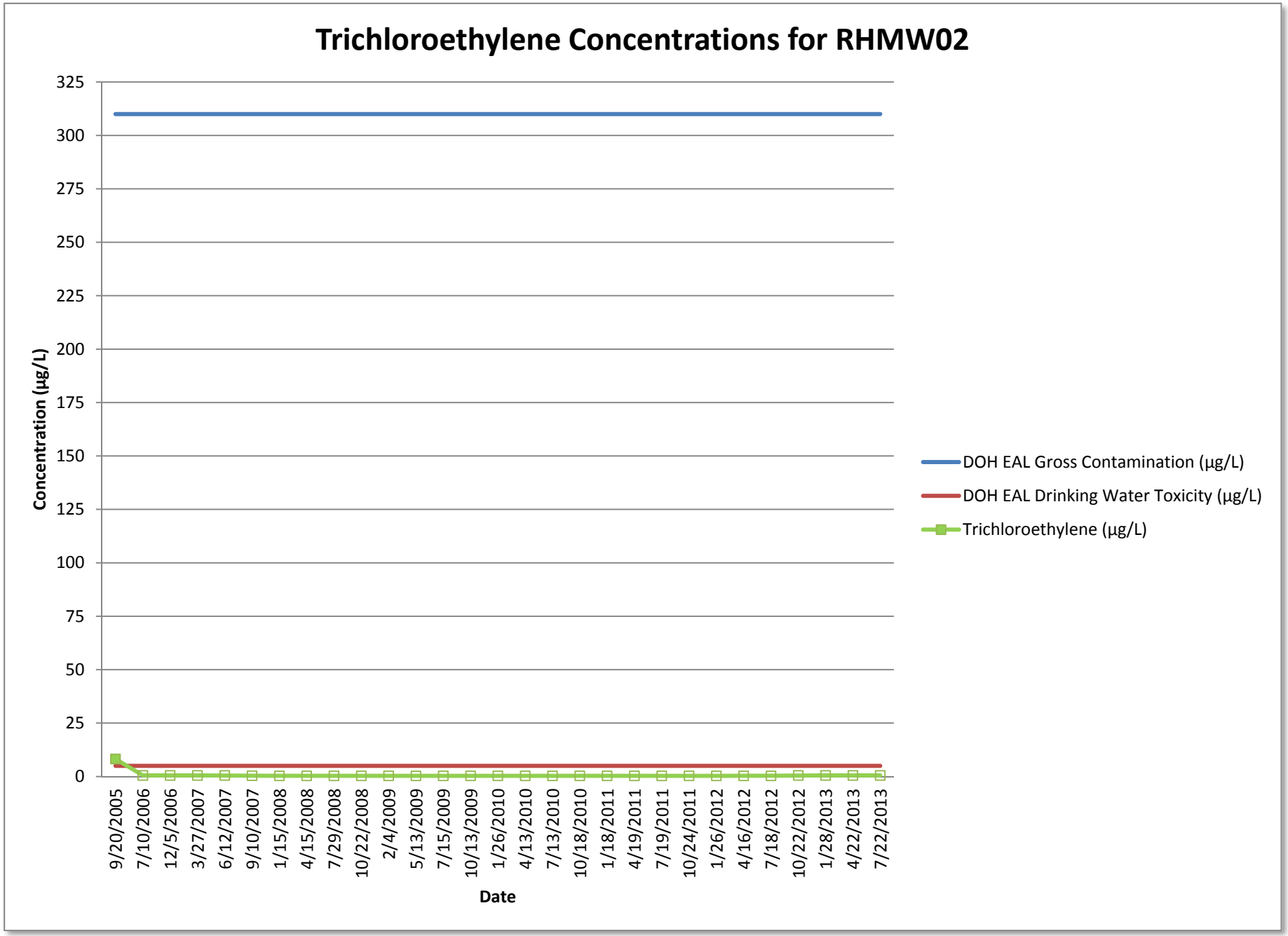

Data points for 9/20/2005 through 7/22/2013 are the average of the primary and duplicate samples.
Unfilled boxes indicate non-detections. Method detection limits are shown.

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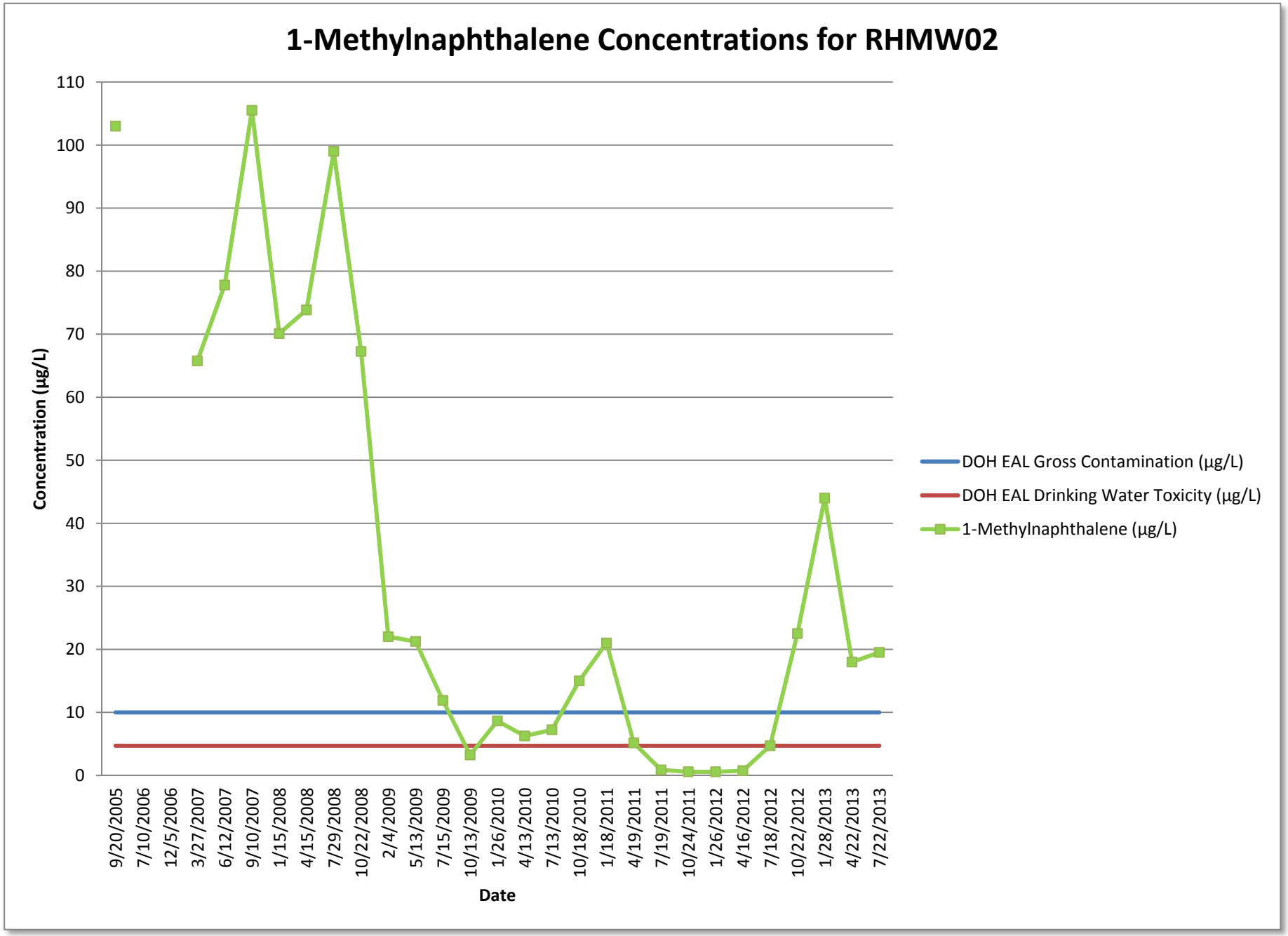

Data points for 9/20/2005 and 3/27/2007 through 7/22/2013 are the average of the primary and duplicate samples.
Unfilled boxes indicate non-detections. Method detection limits are shown.

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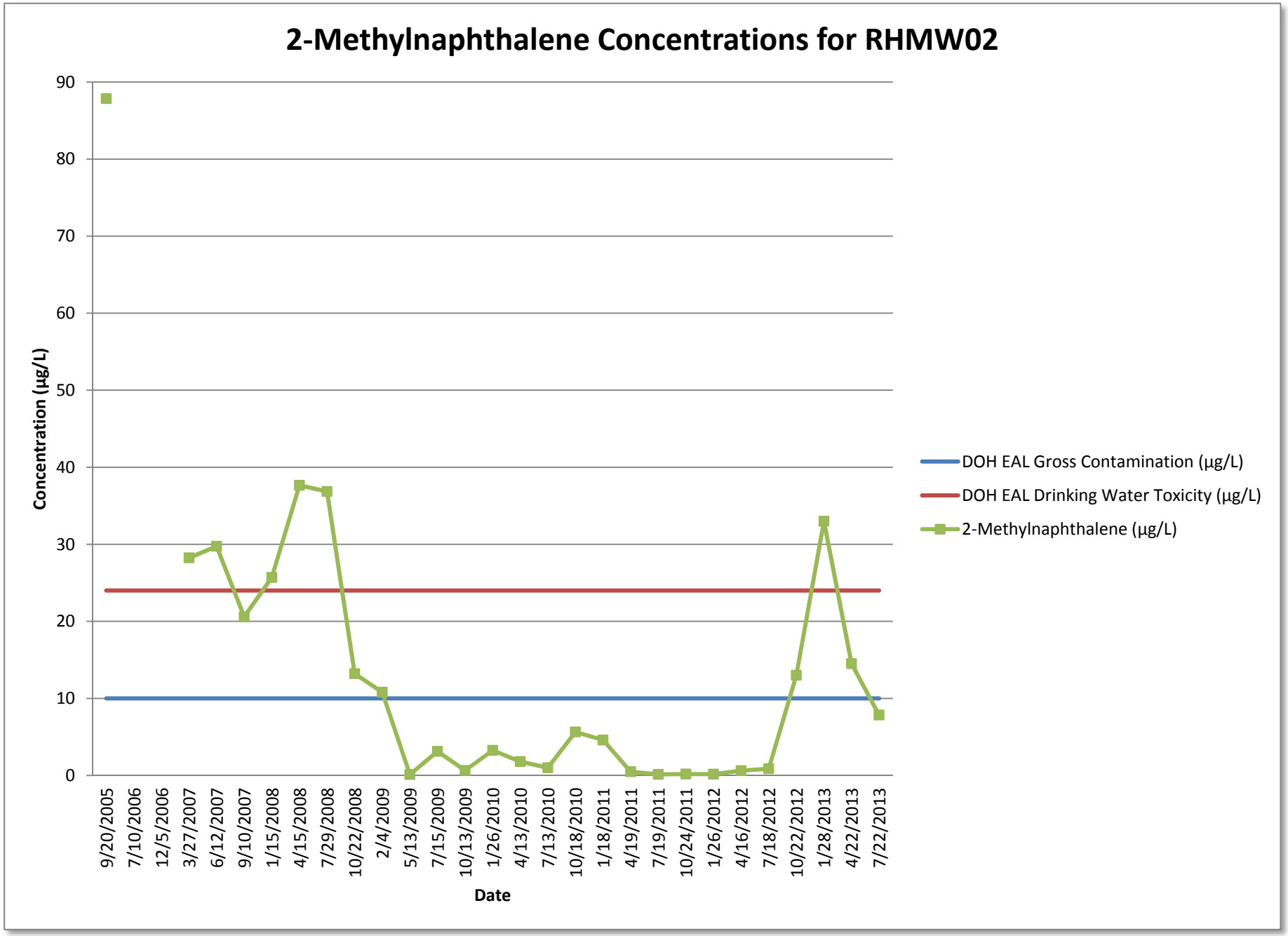

Data points for 9/20/2005 and 3/27/2007 through 7/22/2013 are the average of the primary and duplicate samples.
Unfilled boxes indicate non-detections. Method detection limits are shown.

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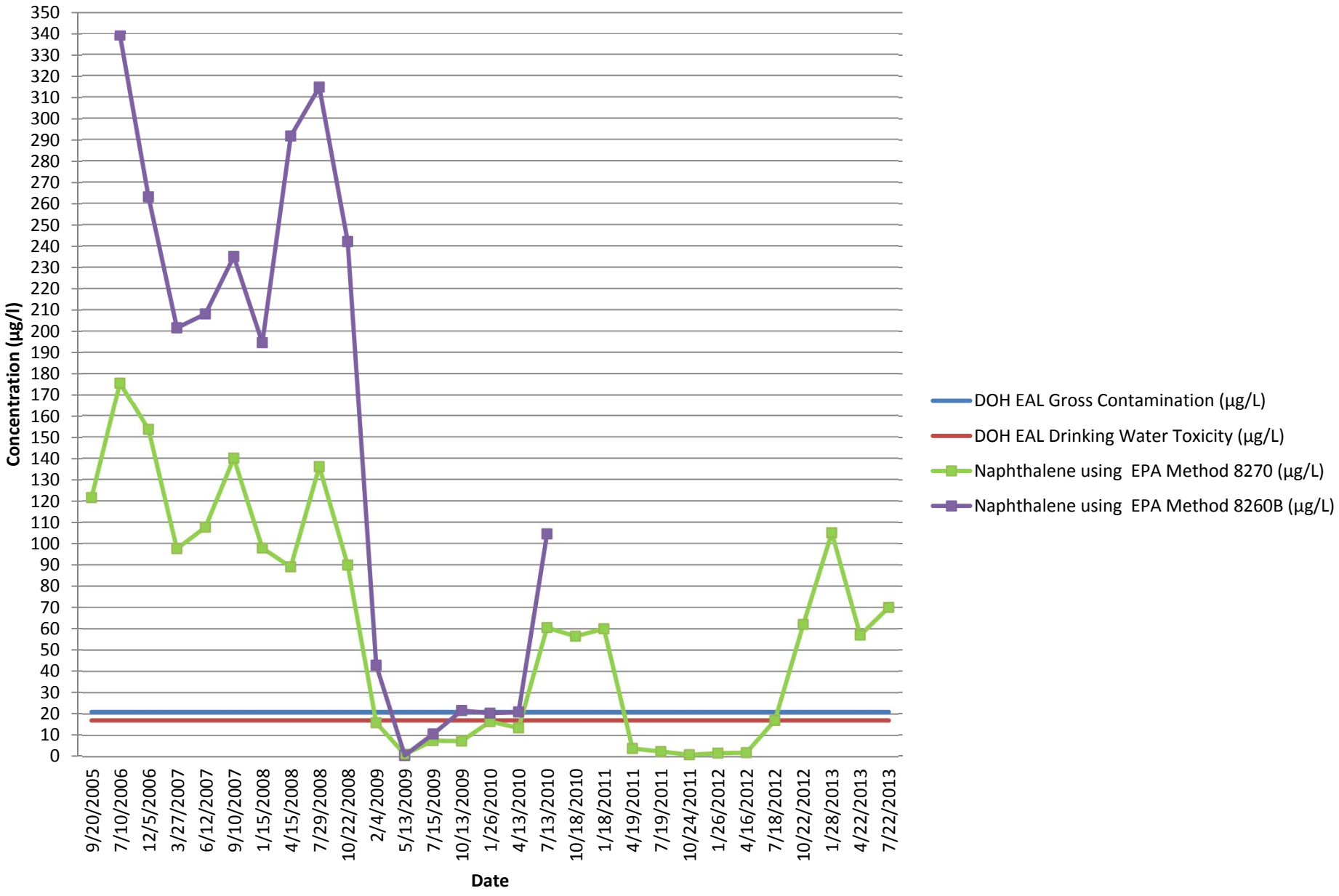
Naphthalene Concentrations for RHMW02



Primary sample results are shown for 1/26/2012 and 7/22/2012; all other concentrations are the average of the primary and duplicate sample results.
Unfilled boxes indicate non-detections. Method detection limits are shown.

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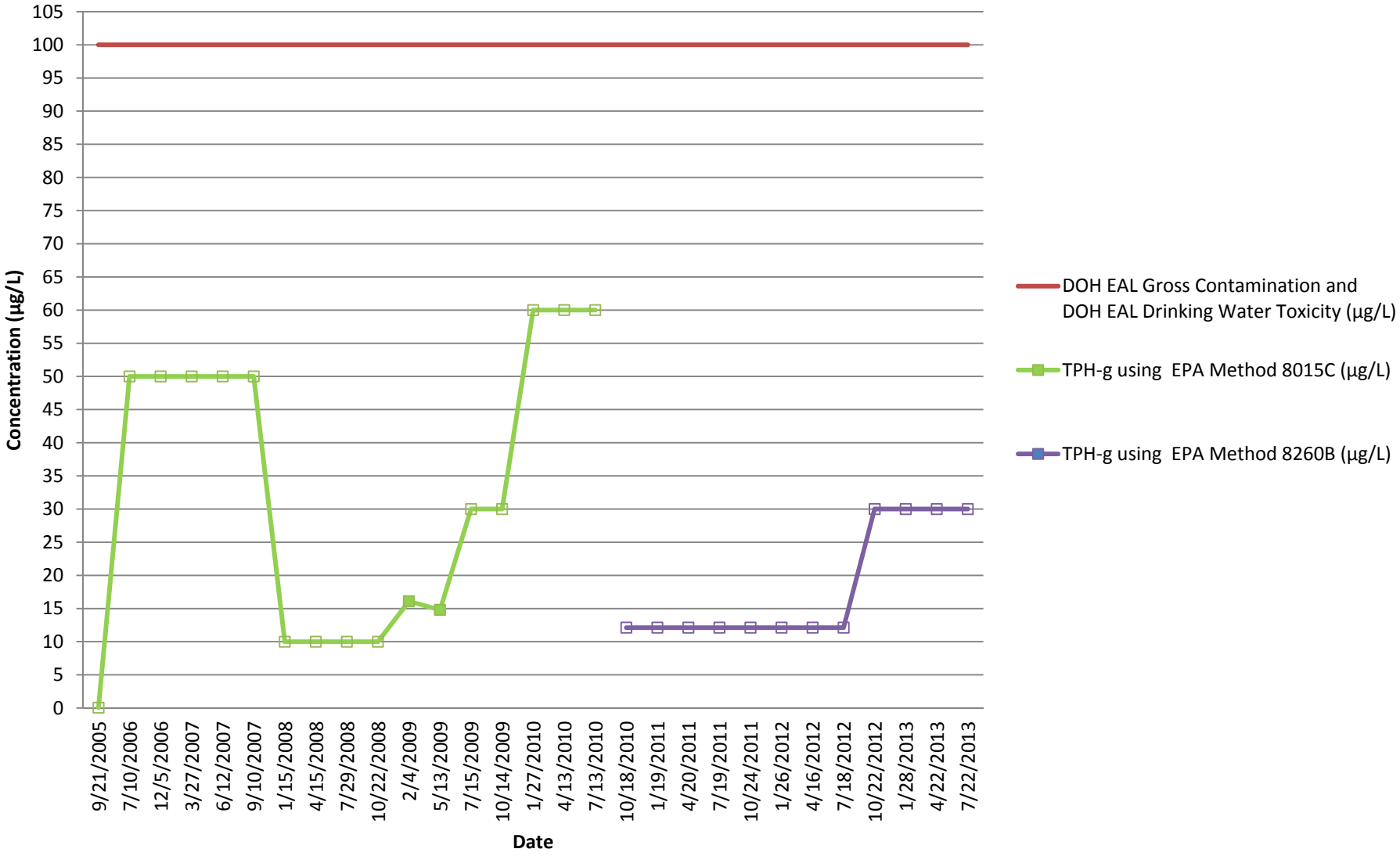
TPH-g Concentrations for RHMW03



Unfilled boxes indicate non-detections. Method detection limits are shown.

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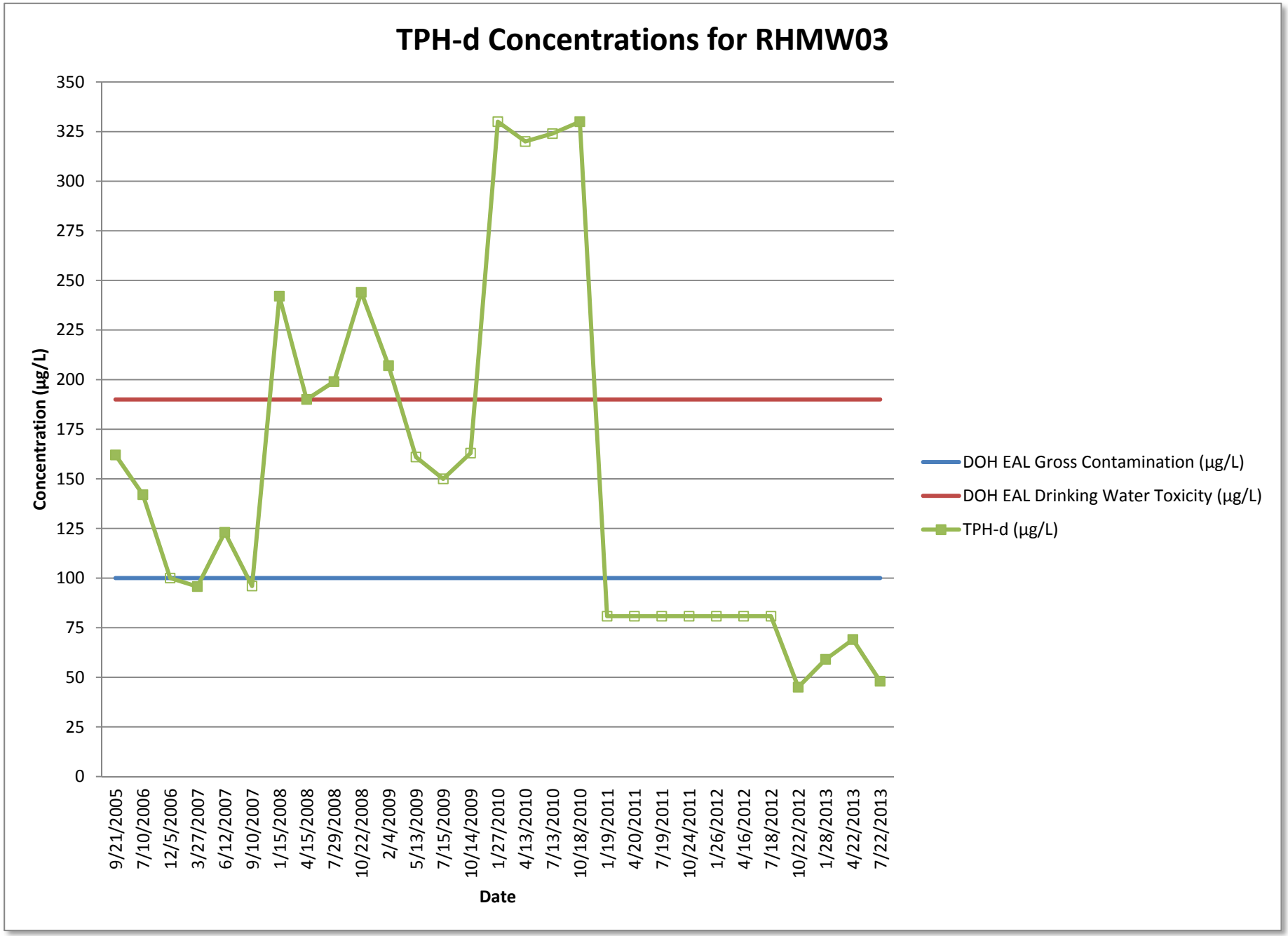

Unfilled boxes indicate non-detections. Method detection limits are shown.

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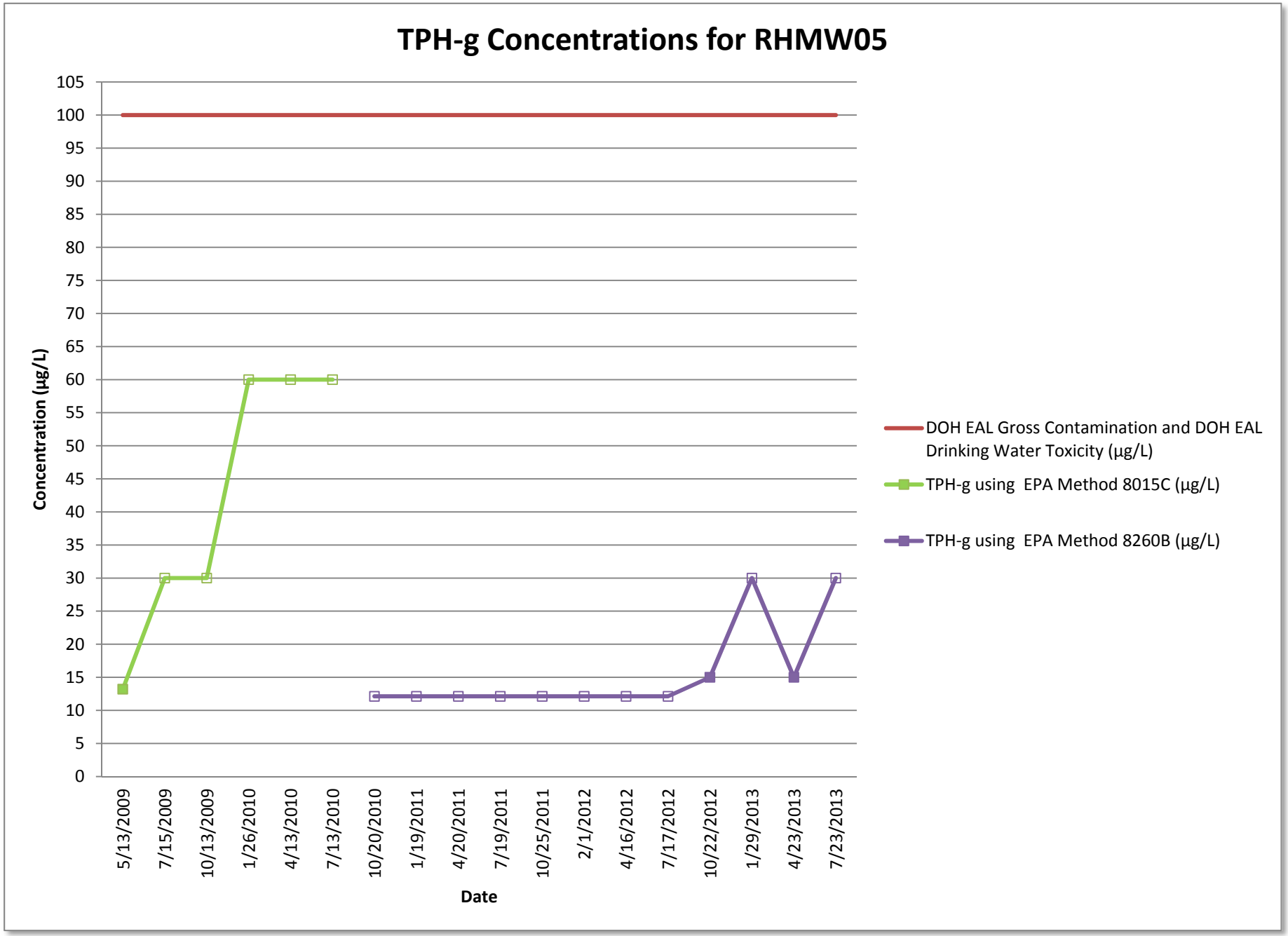

Data point for 7/17/2012 is the average of the primary and duplicate samples.
Unfilled boxes indicate non-detections. Method detection limits are shown.
Possible laboratory contamination for 10/23/2012 sampling event.

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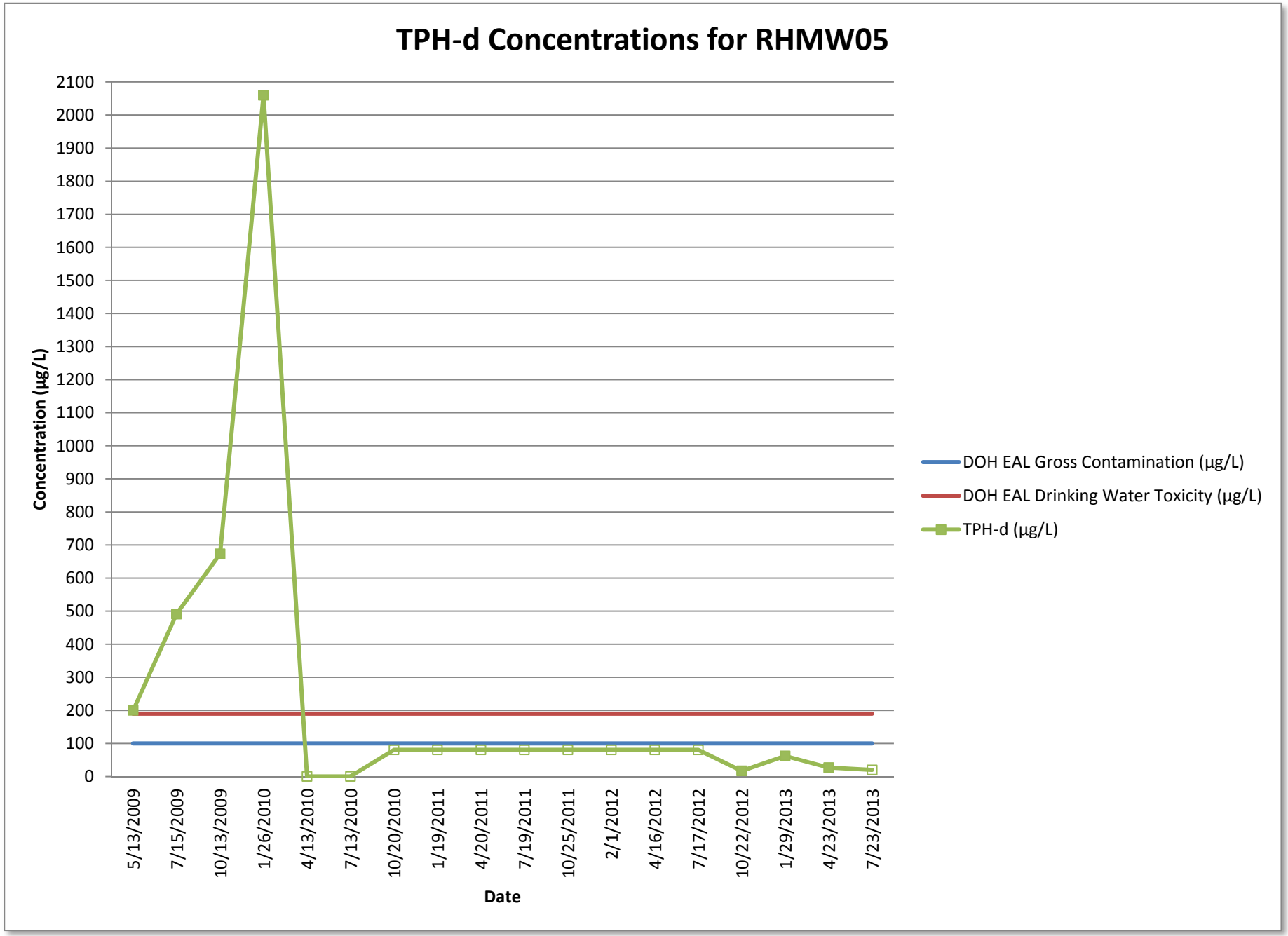

Data point for 7/17/2012 is the average of the primary and duplicate samples.
Unfilled boxes indicate non-detections. Method detection limits are shown.

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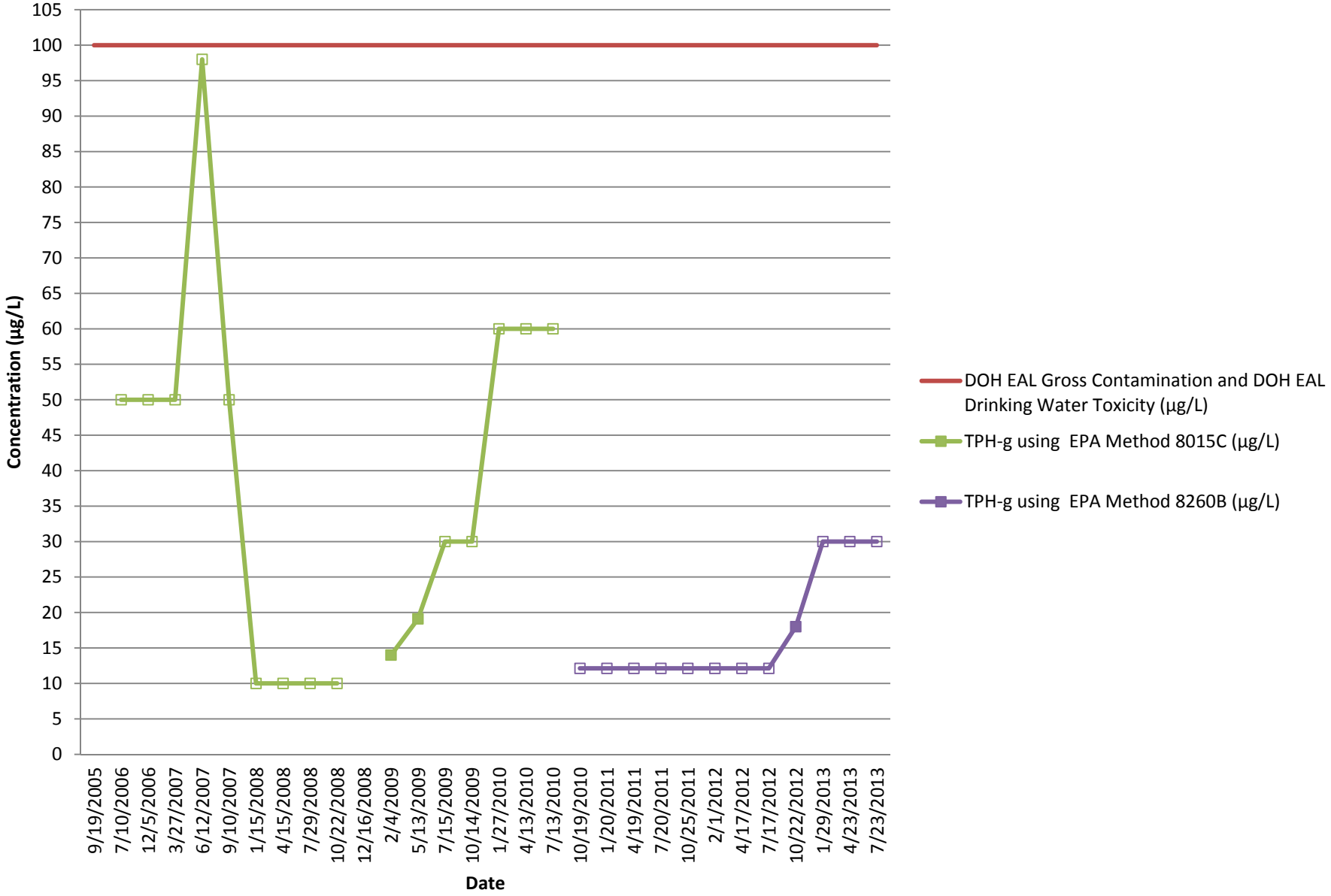
TPH-g Concentrations for RHMW2254-01



Unfilled boxes indicate non-detections. Method detection limits are shown.
Possible laboratory contamination for 10/23/2012 sampling event.

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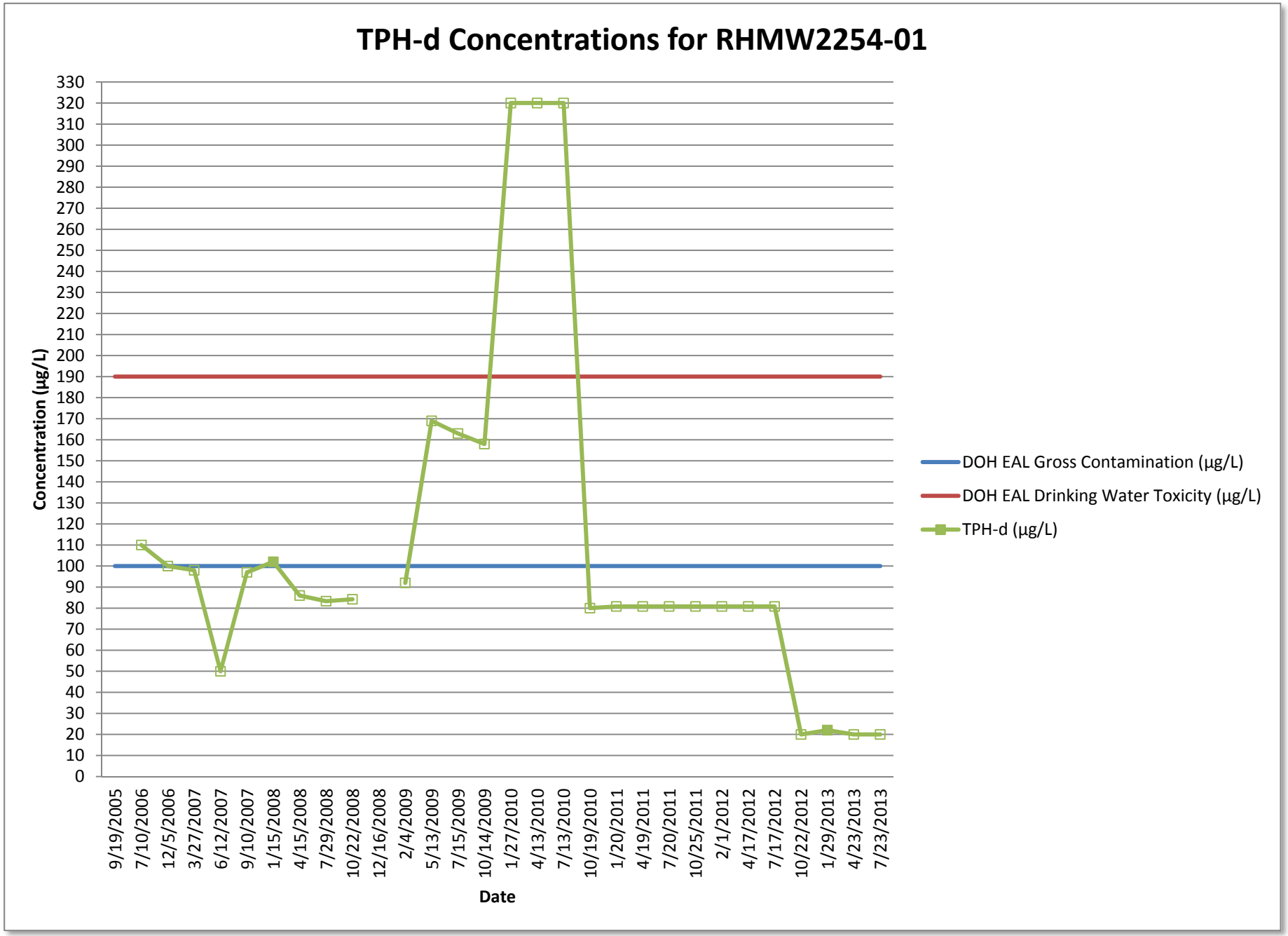

Unfilled boxes indicate non-detections. Method detection limits are shown.
Laboratory data rejected for 1/15/2008 sampling event.

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APPENDIX E

Waste Disposal Manifest

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NON-HAZARDOUS WASTE MANIFEST

1. Generator ID Number	2. Page 1 of	3. Emergency Response Phone	4. Waste Tracking Number
HIR 000 050 401	1	808-206-9989	000019559

GENERATOR

5. Generator's Name and Mailing Address
COMNAVREG HAWAII, C/O NAVFAC HAWAII, CODE PRJ42
400 MARSHALL ROAD, ATTN: ESTRELITA HIGA
JBPHH, HI 96860-3139
Generator's Phone: 808-471-4216

Generator's Site Address (if different than mailing address)
HIC8553-04
RED HILL BULK FUEL STORAGE FACILITY
AIEA, HI 96701

6. Transporter 1 Company Name: PACIFIC COMMERCIAL SERVICES, LLC. 808-545-4599 — U.S. EPA ID Number: HIR000097824

7. Transporter 2 Company Name: UNITEK SOLVENT SERVICES, INC.-OAHU 808-682-8284 — U.S. EPA ID Number: HID982443715

8. Designated Facility Name and Site Address
UNITEK SOLVENT SERVICES, INC.
91-125 KAOMI LOOP
KAPOLEI, HI 96707
Facility's Phone: ~~808-682-8284~~
U.S. EPA ID Number: HID982443715

	9. Waste Shipping Name and Description	10. Containers No.	10. Containers Type	11. Total Quantity	12. Unit Wt./Vol.	
1.	MATERIAL NOT REGULATED BY DOT (WELL PURGE AND DECONTAMINATION WATER)	001	DM	00020	G	NON-RCRA
2.						
3.						
4.	<400 PPM PH=6					

13. Special Handling Instructions and Additional Information
9b1: NR (<400 PPM) 2008 9b1: TOTAL HALOGEN:

GENERATOR'S CERTIFICATION: I HEREBY DECLARE THAT THE CONTENTS OF THIS CONSIGNMENT ARE FULLY AND ACCURATELY DESCRIBED ABOVE BY PROPER SHIPPING NAME (WHERE APPLICABLE) AND ARE CLASSIFIED, PACKED, MARKED, AND LABELED AND ARE IN ALL RESPECTS IN PROPER CONDITION FOR TRANSPORT BY HIGHWAY ACCORDING TO APPLICABLE GOVERNMENT REGULATIONS. I FURTHER CERTIFY THAT IF THIS IS USED OIL IT IS SUBJECT TO REGULATION UNDER 40 CFR PART 279; THAT IT DOES NOT CONTAIN PCBS GREATER THAN OR EQUAL TO 2 PPM; AND THAT IT HAS NOT BEEN CONTAMINATED WITH CARBURATOR CLEANERS, ~~BRAKE SPRAY, FREON, HALOGENATED SOLVENTS, OR OTHER HAZARDOUS MATERIALS AND/OR HAZARDOUS WASTES.~~

14. **GENERATOR'S/OFFEROR'S CERTIFICATION:** I hereby declare that the contents of this consignment are fully and accurately described above by the proper shipping name, and are classified, packaged, marked and labeled/placarded, and are in all respects in proper condition for transport according to applicable international and national governmental regulations.

Generator's/Offeror's Printed/Typed Name: Estrelita Higa — Signature: Estrelita Higa — Month: 08 Day: 23 Year: 13

INT'L

15. International Shipments ☐ Import to U.S. ☐ Export from U.S. Port of entry/exit:
Transporter Signature (for exports only): Date leaving U.S.:

TRANSPORTER

16. Transporter Acknowledgment of Receipt of Materials

Transporter 1 Printed/Typed Name: ALAN O. MILLARE — Signature: Alan O. Millare — Month: 8 Day: 23 Year: 13

Transporter 2 Printed/Typed Name: Silinga Lemafa — Signature: — Month: 8 Day: 28 Year: 13

DESIGNATED FACILITY

17. Discrepancy

17a. Discrepancy Indication Space ☐ Quantity ☐ Type ☐ Residue ☐ Partial Rejection ☐ Full Rejection

Manifest Reference Number:

17b. Alternate Facility (or Generator) — U.S. EPA ID Number
Facility's Phone:

17c. Signature of Alternate Facility (or Generator) — Month Day Year

PCB test provided SEE CONSOLIDATED MANIFEST Mwingy

18. Designated Facility Owner or Operator: Certification of receipt of materials covered by the manifest except as noted in Item 17a

Printed/Typed Name: R. ALTHAUSEN — Signature: — Month: 08 Day: 30 Year: 2013

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