Final Fourth 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

January 2014

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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Prepared by:

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Prepared under:

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FINAL FOURTH 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:

Department of the Navy
Commanding Officer, Naval Facilities Engineering Command, Hawaii
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Contract Number: N62742-12-D-1853 Contract Task Order: 0002

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Contract No.	N62742-12-D-1853		Contract Task Order 0002
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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.
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 fourth quarter 2013 groundwater sampling conducted on October 21 and 22, 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 October 21 and 22, 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] (92 micrograms per liter [μg/L]), Total Petroleum Hydrocarbons as gasoline [TPH-g] (15 μg/L), pyrene (0.027 μg/L) and dissolved lead (2.06 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 (2,400 μg/L), TPH-g (48 μg/L), acenaphthene (0.54 μg/L), fluorene (0.27 μg/L), 1-methylnaphthalene (9.0 μg/L), 2-methylnaphthalene (9.0 μg/L), naphthalene (30 μg/L), ethylbenzene (0.14 μg/L), and xylenes (0.37 μg/L) were detected. TPH-d and naphthalene were detected at concentrations above the DOH EALs for both drinking water toxicity and gross contamination. 1-methylnaphthalene was detected at a concentration above the DOH EAL for drinking water toxicity.
- RHMW03 TPH-d (54 μg/L) and TPH-g (23 μg/L) were detected. None of the chemical constituents analyzed for were detected at concentrations above the DOH EALs.
- RHMW05 TPH-g (17 μg/L) and naphthalene (0.17 μg/L) were detected. None of the chemical constituents analyzed for were detected at concentrations above the DOH EALs.
- RHMW2254-01 TPH-g (13 μg/L) and naphthalene (0.036 μg/L) were detected. None of the chemical constituents analyzed for were detected at concentrations above the DOH EALs.

TPH-g was detected in the method and trip blanks at concentrations of 21 and 15 μ g/L, respectively. Because of this, it is likely that the TPH-g concentrations detected in the groundwater samples are all biased high.

Since the wells were last sampled (July 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, 1-methylnaphthalene, and naphthalene concentrations in RHMW02 decreased slightly from the last event in July 2013 but remained above the DOH EALs.

Based on the results of the groundwater monitoring, continuing the groundwater monitoring program at the RHSF is recommended.

SECTION 1 – INTRODUCTION

This quarterly groundwater monitoring report presents the results of the fourth quarter 2013 groundwater sampling conducted on October 21 and 22, 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

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*

JP-5 Jet Fuel Propellant-5

JP-8 Jet Fuel Propellant-8

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.

In July 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, naphthalene, and 1-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).
- 31. Groundwater Monitoring Report, July 2013 (Submitted in September 2013).

SECTION 2 – GROUNDWATER SAMPLING

On October 21 and 22, 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 (92 μg/L), TPH-g (15 μg/L), pyrene (0.027 μg/L) and dissolved lead (2.06 μg/L) were detected. None of the chemical constituents analyzed for were detected at concentrations above the DOH EALs.
- RHMW02 TPH-d (2,400 μg/L), TPH-g (48 μg/L), acenaphthene (0.54 μg/L), fluorene (0.27 μg/L), 1-methylnaphthalene (9.0 μg/L), 2-methylnaphthalene (9.0 μg/L), naphthalene (30 μg/L), ethylbenzene (0.14 μg/L), and xylenes (0.37 μg/L) were detected. TPH-d and naphthalene were detected at concentrations above the DOH EALs for both drinking water toxicity and gross contamination. 1-methylnaphthalene was detected at a concentration above the DOH EAL for drinking water toxicity.
- RHMW03 TPH-d (54 μg/L) and TPH-g (23 μg/L) were detected. None of the chemical constituents analyzed for were detected at concentrations above the DOH EALs.
- RHMW05 TPH-g (17 μg/L) and naphthalene (0.17 μg/L) was detected. None of the chemical constituents analyzed for were detected at concentrations above the DOH EALs.
- RHMW2254-01 TPH-g (13 μg/L) and naphthalene (0.036 μg/L) were detected. None of the chemical constituents analyzed for were detected at concentrations above the DOH EALs.

TPH-g was detected in the method and trip blanks at concentrations of 21 and 15 μ g/L, respectively. Because of this, it is likely that the TPH-g concentrations detected in the groundwater samples are all biased high.

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 have shown a decreasing trend from a high of 1,500 μg/L in February 2005. Other than a concentration of 340 μg/L detected in April 2013, TPH-d concentrations have remained below both DOH EALs since April 2012.
- **RHMW02** COPCs detected during this round of quarterly sampling were consistent with historical data. TPH-q, TPH-d, trichloroethylene, 1-methylnaphthalene,

2-methylnaphthalene, and naphthalene have historically been detected at concentrations above the DOH EALs. TPH-d and naphthalene concentrations decreased from the last event in July 2013 but remained above the DOH EALs. 1-methylnaphthalene concentrations fell below the DOH EAL for gross contamination but remained above the drinking water toxicity EAL. The concentrations of 2-methylnaphthalene and TPH-g remained below both DOH EALs. Trichloroethylene has not been detected in RHMW02 since September 2005.

- 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 last detected at a concentration above the DOH EAL for
 gross contamination in January 2008. Although the method reporting limits for TPH-d
 exceeded one or both DOH EALs between May 2009 and July 2010, TPH-d has not been
 detected at concentrations above the DOH EALs since January 2008.

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 drum was stored onsite at ADIT 3. On December 11, 2013, the drum of water was picked up by Pacific Commercial Services, LLC and disposed 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 (October 21 and 22, 2013) Red Hill Bulk Fuel Storage Facility

October 2013 Quarterly Monitoring Report

Madhad	Observiced	DOH		RHMW2254-01 (ES041)				RHWM01 (ES037)						RHMW02 (ES038)					RHWM03 (ES040)			RHMW05 (ES042)						
Method	Chemical	Drinking Water Toxicity	Gross Contamination	Results	Q	LOQ	LOD	DL	Results	Q	LOQ	LOD	DL	Results	Q	LOQ	LOD	DL	Results	Q	LOQ L	OD	DL	Results	Q	LOQ	LOD	DL
EPA 8015B	TPH-d	190	100	N.D.	U	50	20	15	92	HD	50	20	15	2,400	HD	52	21	15	54	HD		20	15	N.D.	U	50	20	15
EPA 8260B	TPH-g	100 370	100 20	13 N.D.	B,J	50 0.2	30 0.05	13 0.021	15 N.D.	B,J U	50 0.21	30 0.052	13 0.021	48 0.54	B,J	50 0.21	30 0.053	13 0.022	23 N.D.	B,J U		.05	13 0.021	17 N.D.	B,J	50 0.2	30 0.051	13 0.021
	Acenaphthene Acenaphthylene	240	2.000	N.D.	U	0.2	0.05	0.021	N.D.	U	0.21	0.052	0.021	0.54 N.D.	U	0.21	0.053	0.022	N.D.	U			0.021	N.D.	U	0.2	0.051	0.021
	Anthracene	1,800	22	N.D.	U	0.2	0.05	0.034	N.D.	U	0.21	0.052	0.035	N.D.	Ü	0.21	0.053	0.036	N.D.	Ü			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	0.21	0.052	0.025	N.D.	Ü	0.21	0.053	0.025	N.D.	U			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	0.21	0.052	0.023	N.D.	U	0.21	0.053	0.023	N.D.	U	0.2	.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	0.037	N.D.	U	0.21	0.052	0.038	N.D.	U	0.21	0.053	0.038	N.D.	U			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	0.21	0.052	0.026	N.D.	U	0.21	0.053	0.026	N.D.	U			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	0.21	0.052	0.024	N.D.	U	0.21	0.0533	0.025	N.D.	U			0.024	N.D.	U	0.2	0.051	0.024
EPA 8270C	Chrysene Dibenzo[a,h]anthracene	9.2 0.0092	0.52	N.D.	U	0.2	0.05 0.05	0.019 0.027	N.D.	U	0.21	0.052	0.020 0.028	N.D. N.D.	U	0.21	0.053	0.020	N.D. N.D.	U			0.019	N.D. N.D.	U	0.2	0.051 0.051	0.019
•	Fluoranthene	1,500	130	N.D.	U	0.2	0.05	0.027	N.D.	U	0.21	0.052	0.028	N.D.	U	0.21	0.053	0.028	N.D.	U			0.027	N.D.	U	0.2	0.051	0.027
•	Fluorene	240	950	N.D.	U	0.2	0.05	0.025	N.D.	U	0.21	0.052	0.025	0.27		0.21	0.053	0.026	N.D.	U			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	0.21	0.052	0.023	N.D.	U	0.21	0.053	0.023	N.D.	U	0.2	.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	0.21	0.052	0.029	9.0		0.21	0.53	0.030	N.D.	U			0.029	N.D.	U	0.2	0.051	0.029
l	2-Methylnaphthalene	24	10	N.D.	U	0.2	0.05	0.027	N.D.	U	0.21	0.052	0.027	9.0		0.21	0.053	0.028	N.D.	U			0.027	N.D.	U	0.2	0.051	0.027
	Naphthalene	17	21	0.036	J	0.2	0.05	0.023	N.D.	U	0.21	0.052	0.024	30		2.1	0.53	0.24	N.D.	U			0.023	0.17	J	0.2	0.051	0.023
 	Phenanthrene Pyrene	240 180	410 68	N.D.	U	0.2	0.05 0.05	0.031 0.025	N.D. 0.027	J	0.21	0.052	0.031 0.025	N.D. N.D.	U	0.21	0.053	0.032	N.D. N.D.	U			0.031	N.D. N.D.	U	0.2	0.051 0.051	0.031
	1,1,1-Trichloroethane	200	970	N.D.	U	5	0.05	0.025	0.027 N.D.	U	5	0.052	0.025	N.D.	U	5	0.053	0.026	N.D.	U).5	0.025	N.D.	U	5	0.051	0.025
 	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).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).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).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		1	0.64	N.D.	U	5	1	0.64
	1,2,4-Trichlorobenzene	70	3,000	N.D.	U	5	1	0.5	N.D.	U	5	1	0.5	N.D.	U	5	1	0.5	N.D.	U	5	1	0.5	N.D.	U	5	1	0.5
-	1,2-Dibromo-3- chloropropane 1,2-Dibromoethane	0.04	10 50.000	N.D.	U	10	0.5	1.2 0.24	N.D.	U	10	0.5	1.2 0.24	N.D.	U	10	0.5	1.2 0.24	N.D.	U		2	1.2 0.24	N.D. N.D.	U	10	0.5	1.2 0.24
-	1,2-Dibromoemane 1,2-Dichlorobenzene	600	10	N.D.	U	1	0.5	0.24	N.D.	U	1	0.5	0.46	N.D.	U	1	0.5	0.24	N.D.	U			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	0.44	N.D.	U	1	0.5	0.24	N.D.	U			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).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).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			0.25	N.D.	U	1	0.5	0.25
-	1,4-Dichlorobenzene	75 22,000	5 20,000	N.D.	U,ICH	1	0.5	0.43	N.D.	U,ICH	20	0.5	0.43	N.D.	U,ICH	1	0.5	0.43 6	N.D.	U,ICH).5	0.43	N.D. N.D.	U,ICH	20	0.5	0.43
-	Acetone Benzene	5	170	N.D.	U,ICH	20	10 0.5	6 0.14	N.D.	U	1	0.5	6 0.14	N.D. N.D.	U,ICH	20	0.5	0.14	N.D. N.D.	U		10).5	6 0.14	N.D.	U,ICH	1	10 0.5	6 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.	Ü	5	0.5	0.21	N.D.	Ü		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		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).5	0.23	N.D.	U	1	0.5	0.23
EPA 8260B	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	0.17	N.D.	U	5	0.5	0.17
-	Chloroethane Chloroform	21,000 70	16 2,400	N.D.	U	10 5	5 0.5	2.3 0.46	N.D.	U	10 5	5 0.5	2.3 0.46	N.D. N.D.	U	10 5	0.5	2.3 0.46	N.D. N.D.	U			2.3 0.46	N.D. N.D.	U	10 5	5 0.5	2.3 0.46
-	Chloromethane	1.8	50,000	N.D.	U,IJ	10	2	1.8	N.D.	U,IJ	10	2	1.8	N.D.	U,IJ	10	0.5	1.8	N.D.	U,IJ		2	1.8	N.D.	U,IJ	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		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).5	0.25	N.D.	U	1	0.5	0.25
	Ethylbenzene	700	30	N.D.	U	1	0.5	0.14	N.D.	U	1	0.5	0.14	0.14	J	1	0.5	0.14	N.D.	J	1).5	0.14	N.D.	J	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).5	0.32	N.D.	U	1	0.5	0.32
-	Methyl ethyl ketone (2-Butanone) Methyl isobutyl ketone (4-Methyl-2-	7,100	8,400	N.D.	U,ICH	10	5.0	2.2	N.D.	U,ICH	10	5.0	2.2	N.D.	U,ICH	10	5.0	2.2	N.D.	U,ICH	10	5.0	2.2	N.D.	U,ICH	10	5.0	2.2
	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		5.0	4.4	N.D.	U	10	5.0	4.4
-	Methylana ablasida	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			0.31	N.D.	U	1	0.5	0.31
 	Methylene chloride Styrene	4.8 100	9,100 10	N.D.	U	5 1	1.0 0.5	0.64 0.17	N.D.	U	5	1.0 0.5	0.64	N.D. N.D.	U	5 1	1.0 0.5	0.64 0.17	N.D.	U			0.64 0.17	N.D. N.D.	U	5 1	1.0 0.5	0.64
 	Tetrachloroethane, 1,1,1,2-	0.52	50,000	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			0.17	N.D.	U	1	0.5	0.17
 	Tetrachloroethane, 1,1,2,2-	0.067	500	N.D.	Ü	1		0.41	N.D.	Ü	1	0.5	0.41	N.D.	U	1	0.5	0.41	N.D.	U			0.41	N.D.	Ü	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			0.39	N.D.	U	5	0.5	0.39
}	Toluene trans-1,2- Dichloroethylene	1,000 100	40 260	N.D. N.D.	U	1	0.5 0.5	0.24	N.D. N.D.	U	1	0.5	0.24	N.D. N.D.	U	1	0.5 0.5	0.24	N.D. N.D.	U			0.24	N.D. N.D.	U	1	0.5 0.5	0.24
}	Trichloroethylene	5	310	N.D.	U	1		0.37	N.D.	U	1	0.5	0.37	N.D.	U	1	0.5	0.37	N.D.	U			0.37	N.D.	U	1	0.5	0.37
 	Vinyl chloride	2	3,400	N.D.	U	1	0.5	0.37	N.D.	U	1	0.5	0.37	N.D.	U	1	0.5	0.3	N.D.	U			0.37	N.D.	U	1	0.5	0.3
	Xylenes	10,000	20	N.D.	Ü	11		0.23	N.D.	Ü	11	1.5	0.23	0.37	J	11	1.5	0.23	N.D.	U			0.23	N.D.	U	11	1.5	0.23
EPA 6020	Dissolved Lead	15	50,000	-	-	-	-	-	2.06	•	1	0.2	0.0898	N.D.	U	1	0.2	0.0898	N.D.	U	1).2	0.0898	N.D.	U	1	0.2	0.0898
EPA 200.8	Total Lead	15	50,000	N.D.	U	1.0	-	0.0898	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

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

Not Analyzed

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

Analyte was present in the associated method blank. Detection Limit or Method Detection Limit (MDL)

DL Detection Limit or Method Detection Limit (MDL)
DOH EALS
EPA Environmental Protection Agency
HD The chromatographic pattern was inconsistent with the profile of the reference fuel standard.
ICH Initial calibration verification recovery is above the control limit for this analyte.

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

The chromatographic pattern was inconsistent with the profile of the reference fuel standard. Initial calibration verification recovery is above the control limit for this analyte. Calibration verification recovery is below the control limit for this analyte.

Analyte was detected at a concentration below the LOQ and above the DL. Reported value is estimated. Limit of Detection
Limit of Quantitation
Not Detected

J LOD LOQ N.D. Q TPH-d TPH-g

Total Petroleum Hydrocarbons as diesel
Total Petroleum Hydrocarbons as gasoline
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 TPH-g, 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 concentrations of TPH-g detected in the primary and duplicate samples were both well below the DOH EALs; therefore, the slightly high RPD is unlikely to affect data usability. Additionally, ethylbenzene was detected in the primary sample but not the duplicated sample; however, the concentration detected in the primary sample was equal to the detection limit and well below the DOH EALs, so this is unlikely to affect data usability.

All 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 ES037, ES038, ES039, and ES040 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 ES038, 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. All sample holding time and sample preservation were in compliance with EPA guidance.

For this sampling event, one trip blank was collected. TPH-g was detected in the trip blank (15 μ g/L) and method blank (21 μ g/L) at concentrations below the limit of detection [LOD]. TPH-g was detected in all field samples at concentrations below the DOH EALs. It is likely that TPH-g concentrations in the samples have been affected by laboratory contamination and are biased high; however, because the concentrations are all well below the DOH EALs, this is unlikely to affect data usability. Therefore, the groundwater sample data are considered representative of the groundwater quality on site. The trip blank results are provided in Table 3.1.

Completeness

Completeness is defined as the overall percentage of valid analytical results (including estimated results) compared to the total number of analytical results reported by the analytical laboratory. No data were rejected for this project, and therefore the completeness goal for this project (90%), was successfully met.

Comparability

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

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, dibromochloromethane, 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 indeno[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 and method blanks 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. The data assessment concludes that all data generated during this event are usable for the intended purpose.

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TABLE 3.1 Quality Control Results for Groundwater Sampling (October 21, 2013) Red Hill Bulk Fuel Storage Facility **October 2013 Quarterly Monitoring Report**

	Chemical Constituent	DOH	EALs		F	RHMW02 (ESO:	38)				/W02 (ES039)	(DUP)			ES Trip					
Method		Drinking Water Toxicity	Gross Contamination	Result	Q	LOQ	LOD	DL	Result	Q	LOQ	LOD	DL	RPD Duplicate (%)	Result	Q	LOQ	LOD	DL	
EDA 0045D	TDU	-		0.400	LID	50	04	45	0.400	ШБ	50	04	45							
EPA 8015B EPA 8260B	TPH-d TPH-q	190 100	100 100	2,400 48	HD B,J	52 50	21 30	15 13	2,400 63	HD B	50 50	21 30	15 13	0 27.03	15	B,J	50	30	13	
LI A 0200B	Acenaphthene	370	20	0.54	Б,5	0.21	0.053	0.022	0.57		0.21	0.052	0.021	5.41	-	-	-	-	-	
	Acenaphthylene	240	2,000	N.D.	U	0.21	0.053	0.019	N.D.	U	0.21	0.052	0.019	NA	-	-	-	-	-	
	Anthracene	1,800	22	N.D.	U	0.21	0.053	0.036	N.D.	U	0.21	0.052	0.035	NA	-	-	-	-	-	
	Benzo[a]anthracene	0.092	4.7	N.D.	U	0.21	0.053	0.025	N.D.	U	0.21	0.052	0.025	NA	-	-	-	-	-	
	Benzo[g,h,i]perylene	1,500	0.13	N.D.	U	0.21	0.053	0.023	N.D.	U	0.21	0.052	0.023	NA NA	-	-	-	-	-	
	Benzo[a]pyrene Benzo[b]fluoranthene	0.2 0.092	0.81 0.75	N.D. N.D.	U	0.21 0.21	0.053 0.053	0.038 0.026	N.D. N.D.	U	0.21 0.21	0.052 0.052	0.038 0.026	NA NA	-	-	-	-	-	
	Benzo[k]fluoranthene	0.92	0.4	N.D.	Ü	0.21	0.0533	0.025	N.D.	Ü	0.21	0.052	0.024	NA NA	-	_	_	-	-	
EDA 00700	Chrysene	9.2	1	N.D.	Ü	0.21	0.053	0.020	N.D.	U	0.21	0.052	0.020	NA	-	-	-	-	-	
EPA 8270C	Dibenzo[a,h]anthracene	0.0092	0.52	N.D.	U	0.21	0.053	0.028	N.D.	U	0.21	0.052	0.028	NA	-	-	-	-	-	
	Fluoranthene	1,500	130	N.D.	U	0.21	0.053	0.029	N.D.	U	0.21	0.052	0.028	NA	-	-	-	-	-	
	Fluorene	240	950	0.27		0.21	0.053	0.026	0.31		0.21	0.052	0.025	13.79	-	-	-	-	-	
	Indeno[1,2,3-cd]pyrene	0.092 4.7	0.095 10	N.D.	U	0.21	0.053	0.023	N.D.	U	0.21	0.052 0.052	0.023	NA 18.18	-	-	-	-	-	
	1-Methylnaphthalene 2-Methylnaphthalene	24	10	9.0 9.0		0.21 0.21	0.53 0.053	0.030 0.028	7.5 7.5		0.21	0.052	0.029 0.027	18.18	-	-	-	-	-	
	Naphthalene	17	21	30		2.1	0.53	0.026	25		2.1	0.52	0.027	18.18	-	-	-	-	-	
	Phenanthrene	240	410	N.D.	U	0.21	0.053	0.032	N.D.	U	0.21	0.052	0.032	NA	-	-	-	-	-	
	Pyrene	180	68	N.D.	U	0.21	0.053	0.026	N.D.	U	0.21	0.052	0.026	NA	-	-	-	-	-	
	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 7	50,000	N.D.	U	5	0.5	0.28	N.D.	U	5	0.5	0.28	NA NA	N.D.	U	5	0.5	0.28	
	1,1-Dichloroethylene 1,2,3-Trichloropropane	0.6	1,500 50,000	N.D. N.D.	U	5	0.5	0.43 0.64	N.D. N.D.	U	5	0.5	0.43 0.64	NA NA	N.D. N.D.	U	5	0.5	0.43 0.64	
	1,2,4-Trichlorobenzene	70	3,000	N.D.	Ü	5	1	0.5	N.D.	U	5	1	0.5	NA NA	N.D.	Ü	5	1	0.5	
	1,2-Dibromo-3- chloropropane	0.04	10	N.D.	Ü	10	2	1.2	N.D.	Ü	10	2	1.2	NA	N.D.	Ü	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 NA	N.D.	U	5	0.5	0.42	
	1,3-Dichlorobenzene 1,3-Dichloropropene (total of cis/trans)	180 0.43	5 50,000	N.D. N.D.	U	1 1	0.5 0.5	0.4 0.25	N.D. N.D.	U	1	0.5 0.5	0.4 0.25	NA NA	N.D. N.D.	U	1 1	0.5 0.5	0.4 0.25	
	1,4-Dichlorobenzene	75	5	N.D.	Ü	1	0.5	0.43	N.D.	U	1	0.5	0.43	NA NA	N.D.	Ü	1	0.5	0.43	
	Acetone	22,000	20,000	N.D.	U,ICH	20	10	6	N.D.	U,ICH	20	10	6	NA	N.D.	Ü	20	10	6	
	Benzene	5	170	N.D.	U	1	0.5	0.14	N.D.	U	1	0.5	0.14	NA	N.D.	U	1	0.5	0.14	
	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 NA	N.D.	U	20	5	3.9	
EPA 8260B	Carbon Tetrachloride Chlorobenzene	5 100	520 50	N.D. N.D.	U	5	0.5 0.5	0.23 0.17	N.D. N.D.	U	5	0.5 0.5	0.23 0.17	NA NA	N.D. N.D.	U	5	0.5 0.5	0.23 0.17	
LFA 0200B	Chloroethane	21,000	16	N.D.	Ü	10	5	2.3	N.D.	U	10	5	2.3	NA NA	N.D.	Ü	10	5	2.3	
	Chloroform	70	2,400	N.D.	Ü	5	0.5	0.46	N.D.	Ü	5	0.5	0.46	NA	N.D.	Ü	5	0.5	0.46	
	Chloromethane	1.8	50,000	N.D.	U,IJ	10	2	1.8	N.D.	U,IJ	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	0.14	J	1	0.5	0.14	N.D.	J	1	0.5	0.14	NA NA	N.D.	U	1	0.5	0.14	
	Hexachlorobutadiene Methyl ethyl ketone (2-Butanone)	0.86 7,100	6 8,400	N.D. N.D.	U,ICH	10	0.5 5.0	0.32 2.2	N.D. N.D.	U,ICH	1 10	0.5 5.0	0.32 2.2	NA NA	N.D. N.D.	U	10	0.5 5.0	0.32 2.2	
	Methyl isobutyl ketone (4-Methyl-2-Pentanone)	2,000	1300	N.D.	U,ICH	10	5.0	4.4	N.D.	U	10	5.0	4.4	NA NA	N.D.	U	10	5.0	4.4	
	Methyl tert-butyl Ether	12	5	N.D.	Ü	1	0.5	0.31	N.D.	Ü	1	0.5	0.31	NA NA	N.D.	Ü	1	0.5	0.31	
	Methylene chloride	4.8	9,100	N.D.	Ü	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 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 NA	N.D.	U	1	0.5	0.41	
	Tetrachloroethylene Toluene	5 1,000	170 40	N.D. N.D.	U	5 1	0.5 0.5	0.39 0.24	N.D. N.D.	U	5	0.5 0.5	0.39 0.24	NA NA	N.D. N.D.	U	5	0.5 0.5	0.39 0.24	
	trans-1.2- Dichloroethylene	1,000	260	N.D. N.D.	U	1	0.5	0.24	N.D.	U	1	0.5	0.24	NA NA	N.D. N.D.	U	1	0.5	0.24	
	Trichloroethylene	5	310	N.D.	U	1	0.5	0.37	N.D.	U	1	0.5	0.37	NA NA	N.D.	U	1	0.5	0.37	
	Vinyl chloride	2	3,400	N.D.	Ü	1	0.5	0.3	N.D.	Ü	1	0.5	0.3	NA NA	N.D.	Ü	1	0.5	0.3	
	Xylenes	10,000	20	0.37	J	11	1.5	0.23	0.37	J	11	1.5	0.23	0	N.D.	U	11	1.5	0.23	
			50,000	N.D.				0.0898	N.D.										-	

The data are in micrograms per liter (μ g/L). Shaded values exceeded the DOH EALs. Not Analyzed

Not Analyzed
Analyte was present in the associated method blank.
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).
Detection Limit or Method Detection Limit (MDL)
Environmental Protection Agency
The chromatographic pattern was inconsistent with the profile of the reference fuel standard.
Initial calibration verification recovery is above the control limit for this analyte.
Calibration verification recovery is below the control limit for this analyte. B DOH EALs

DL EPA HD ICH IJ

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

Limit of Detection
Limit of Quantitation
Both results for duplicate pair were non-detect, no RPD calculations
Not Detected
Qualifiers
Total Petroleum Hydrocarbons as gasoline
Total Petroleum Hydrocarbons as diesel
Undetected at DL and is reported as less than the LOD.

LOD LOQ NA N.D. Q TPH-g

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SECTION 4 – SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

On October 21 and 22, 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 (92 μg/L), TPH-g (15 μg/L), pyrene (0.027 μg/L) and dissolved lead (2.06 μg/L) were detected. None of the chemical constituents analyzed for were detected at concentrations above the DOH EALs.
- RHMW02 TPH-d (2,400 μg/L), TPH-g (48 μg/L), acenaphthene (0.54 μg/L), fluorene (0.27 μg/L), 1-methylnaphthalene (9.0 μg/L), 2-methylnaphthalene (9.0 μg/L), naphthalene (30 μg/L), ethylbenzene (0.14 μg/L), and xylenes (0.37 μg/L) were detected. TPH-d and naphthalene were detected at concentrations above the DOH EALs for both drinking water toxicity and gross contamination. 1-methylnaphthalene was detected at a concentration above the DOH EAL for drinking water toxicity.
- RHMW03 TPH-d (54 μ g/L) and TPH-g (23 μ g/L) were detected. None of the chemical constituents analyzed for were detected at concentrations above the DOH EALs.
- RHMW05 TPH-g (17 μg/L) and naphthalene (0.17 μg/L) was detected. None of the chemical constituents analyzed for were detected at concentrations above the DOH EALs.
- RHMW2254-01 TPH-g (13 μg/L) and naphthalene (0.036 μg/L) were detected. None of the chemical constituents analyzed for were detected at concentrations above the DOH EALs.

TPH-g was detected in the method and trip blanks at concentrations of 21 and 15 μ g/L, respectively. Because of this, it is likely that the TPH-g concentrations detected in the groundwater samples are all biased high.

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 have shown a decreasing trend from a high of 1,500 μg/L in February 2005. Other than a concentration of 340 μg/L detected in April 2013, TPH-d concentrations have remained below both DOH EALs since April 2012.

- RHMW02 COPCs detected during this round of quarterly sampling were consistent with historical data. TPH-g, TPH-d, trichloroethylene, 1-methylnaphthalene, 2-methylnaphthalene, and naphthalene have historically been detected at concentrations above the DOH EALs. TPH-d and naphthalene concentrations decreased from the last event in July 2013 but remained above the DOH EALs. 1-methylnaphthalene concentrations fell below the DOH EAL for gross contamination but remained above the drinking water toxicity EAL. The concentrations of 2-methylnaphthalene and TPH-g remained below both DOH EALs. Trichloroethylene has not been detected in RHMW02 since September 2005.
- 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 last detected at a concentration above the DOH EAL for
 gross contamination in January 2008. Although the method reporting limits for TPH-d
 exceeded one or both DOH EALs between May 2009 and July 2010, TPH-d has not been
 detected at concentrations above the DOH EALs since January 2008.

Conclusions and Recommendations

Since the wells were last sampled (July 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, 1-methylnaphthalene, and naphthalene concentrations in RHMW02 decreased slightly from the last event in July 2013 but remained above the DOH EALs.

Based on the results of the groundwater monitoring, continuing the groundwater monitoring program at the RHSF is recommended.

SECTION 5 – FUTURE WORK

GROUNDWATER SAMPLING

Future work includes the first quarter 2014 groundwater monitoring which is scheduled for January 2014. It is anticipated that the quarterly groundwater monitoring status report will be submitted in March 2014.

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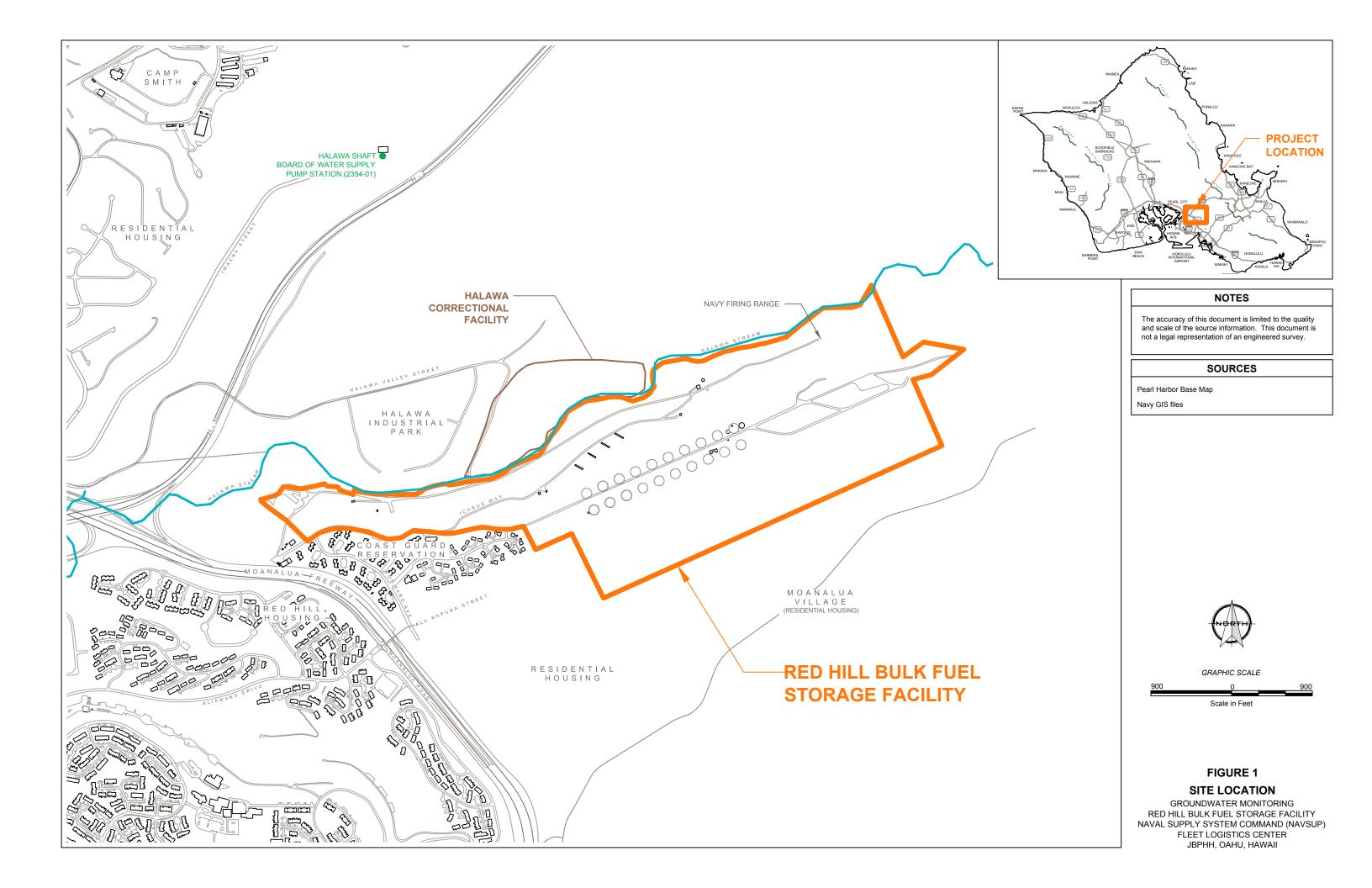
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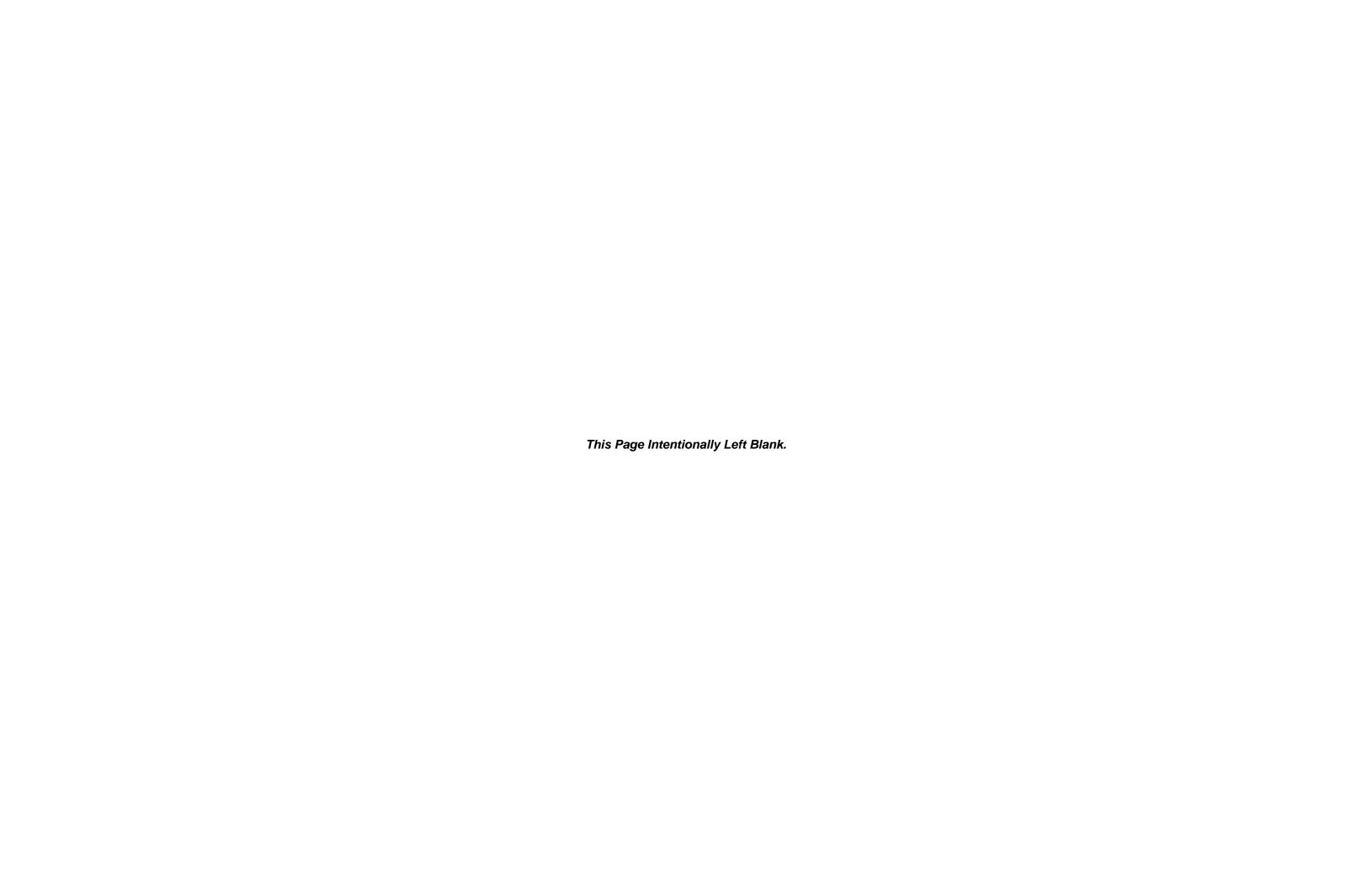
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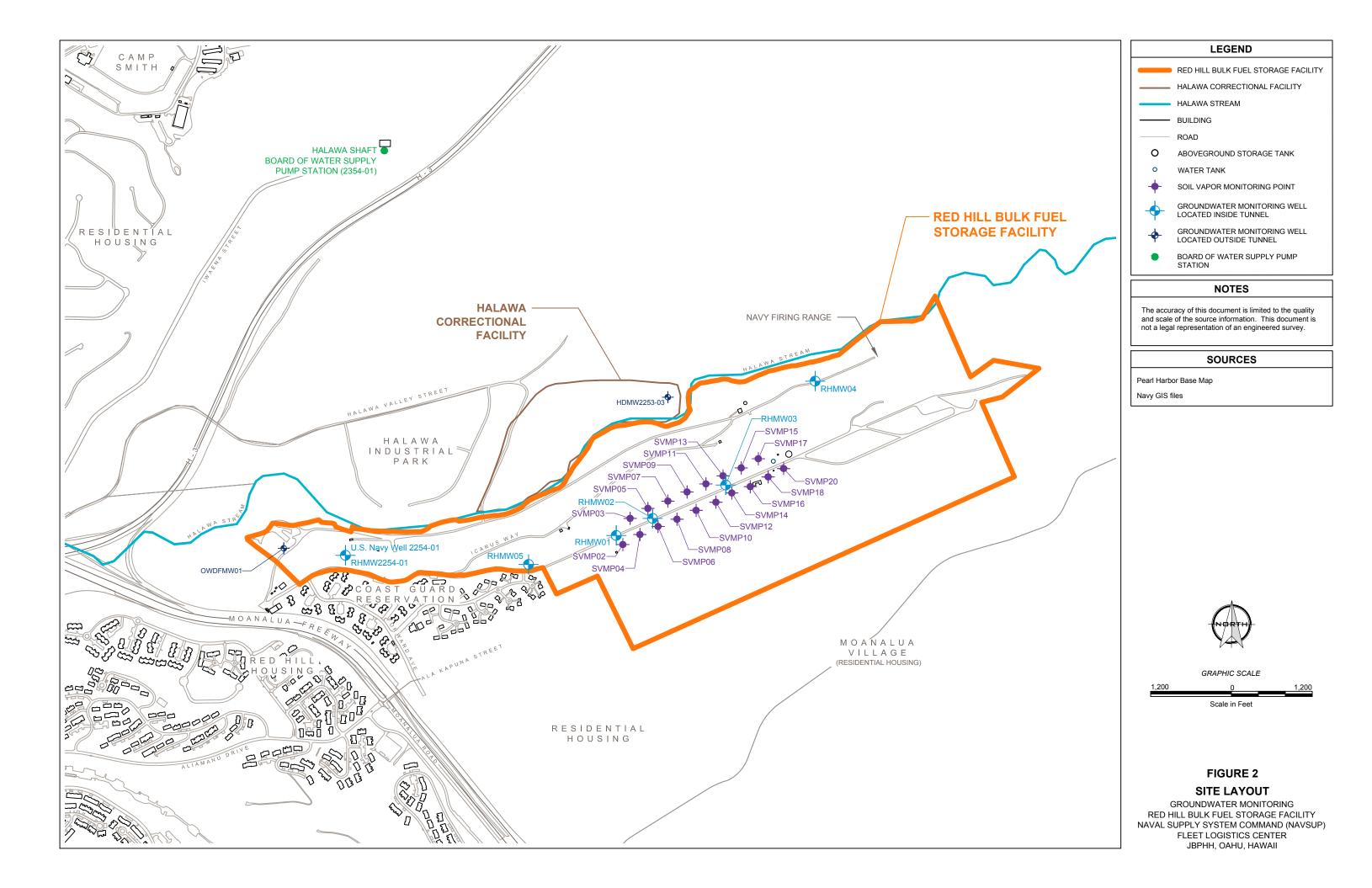
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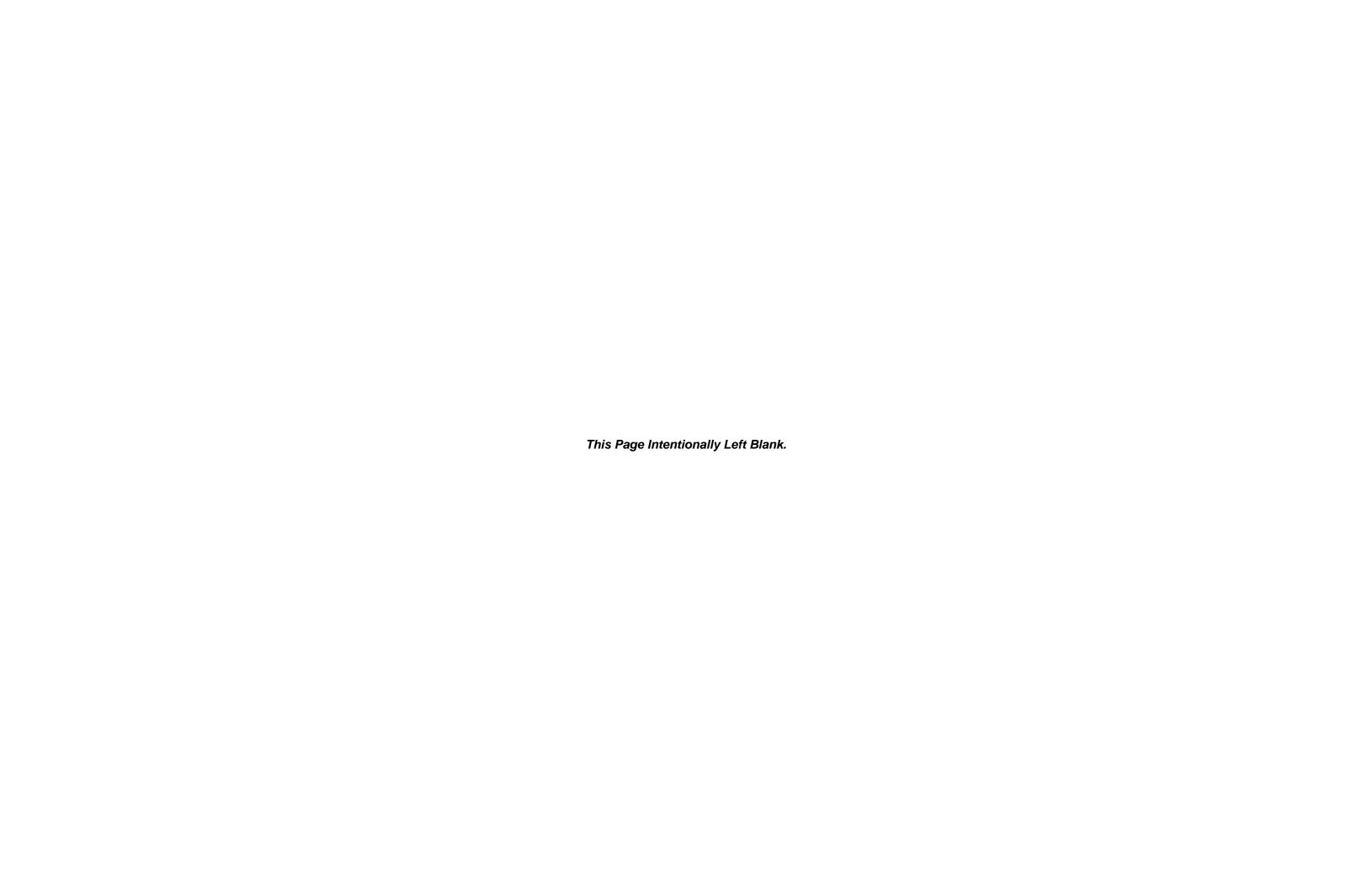
FIGURES











APPENDIX A Groundwater Sampling Logs





Well ID: RI	HMW01	Location:	Red Hill	Bulk Fuel Stora	age Facility P	roject No.: 1	12066	
Initial Water	Level: 84.4	7 ft	Date:	10/21/2013	Т	ime: 920		
Total Depth	of Well:	97.40 ft	_ Personr	nel Involved:	Branden Ibara, Jeff Harttemer			
Length of Saturated Zone:		Weathe	er Conditions:		-			
Volume of W	ater to be Rem	noved:	Method	of Removal:	Blad	der Pump		
Water Level	After Purging:	84.47 ft	Pumpin	g Rate:	0.11	L/min		
Well Purge [Data:							
Time	Volume Removed	pH	Conductivity (mS/cm)	DO (mg/l)	Temperature	Salinity	Redox (ORP) (mV)	
952	0.0 L	7.05	0.296	8.35	26.25	-	18.6	
1005	1.0 L	7.11	0.368	2.83	24.85		-55.9	
1013	2.0 L	7.10	0.364	1.07	24.84		-43.6	
1025	3.0 L	7.09	0.363	0.91	24.75	_	-41.4	
1035	4.0 L	7.05	0.359	0.76	24.74		-40.0	
1044	5.0 L	7.00	0.355	0.74	24.68		-34.7	
							-	
Sample With	drawal Method		Bladder Pun	mn.				
Appearance		•	Diaddel 1 dil	<u> </u>				
, ippos	Color:		Clear					
	Turbidity:		Low					
	Sediment:		None					
	Other:		None					
Laboratory A	nalysis Parame	store and Drog	convotivos:	TDU 4 9015.	TPH-g, VOCs - 82)60. DAUG 927(Oc cim:	
Laboratory A	analysis Farame	cicis and ries	scivatives.	lead - 6020	1111-g, VOCS - 02	100, FAI 15 - 02 / C	JC SIIII,	
Number and	Types of Samp	ole Containers	s: 6 - 40m	-	amber jar, 1 - 500m	l amber iar 1 - 3	250ml HDPF	
	tification Numb		7 [1030]	1 1 0 1 0 1 0	anibor jar, r coon	ir arribor jar, r		
•	ation Procedure							
	did not have sa							
Sampled by:		ara, Jeff Hartt						
Sampled De	livered to:		Environmenta		Transporters: FedI	Ξx		
Date: 10/2	22/2013	Ca	pacity of Car	sing (Gallons/Lir	Time: <u>1200</u>			



Well ID: R	HMW02	Location:	Red Hill	Bulk Fuel Stora	ge Facility	Project No.:	112066		
Initial Water	Level: 87.0	08 ft	Date:	10/21/2013		Time: 110	5		
Total Depth	of Well:	94.35 ft	Personr	Personnel Involved: Br		ara, Jeff Hartter	ner		
Length of Sa	aturated Zone:		Weathe	Weather Conditions:		<u>-</u>			
Volume of V	Vater to be Ren	noved: 5.0 L	Method	of Removal:	Bla	ndder Pump			
Water Level	After Purging:	87.08 ft	_ Pumpin	g Rate:	0.4	15 L/min			
Well Purge	Data:								
Time	Volume Removed		onductivity (mS/cm)	DO (mg/l)	Temperature	Salinity	Redox (ORP) (mV)		
1107	0.0 L	7.89	0.562	8.20	25.57	-	24.3		
1110	1.0 L	6.72	0.608	1.24	24.25		-95.7		
1112	2.0 L	6.60	0.612	0.50	23.84		-108.5		
1114	3.0 L	6.57	0.613	0.35	23.72		-105.1		
1116	4.0 L	6.56	0.614	0.38	23.69	-	-102.8		
1118	5.0 L	6.53	0.614	0.39	23.79	·	-96.1		
Sample Wit	hdrawal Method	١٠	Bladder Pum	ın					
Appearance		••	Diaddol 1 dil	<u>. P</u>					
, ippourumou	Color:		Clear						
	Turbidity:		Low						
	Sediment:		None						
	Other:	Slig	ght PHC Odo	r					
Laboratory A	Analysis Param	eters and Prese	ervatives:	TPH-d - 8015;	TPH-g, VOCs -	8260; PAHs - 82	270c sim;		
				lead - 6020					
Number and	d Types of Sam	ple Containers:	16 - 40ml \	/OAs, 6 - 1L am	ber jar, 4 - 500m	nl amber jar, 4 -	500ml HDPE		
Sample Ider	ntification Numb	ers: ES038	[1125], ES0	38 MS/MSD [11:	25], ES039 (Dup) [1200]			
Decontamin	ation Procedure	es: Triple Rins	sed						
	did not have sa								
Sampled by		ara, Jeff Hartte							
Sampled De		Calscience E	nvironmenta		Fransporters: <u>Fe</u>	α⊨x			
Date: 10/	22/2013	Cai	pacity of Cas	ا ing (Gallons/Lin	Гіте: <u>1200 </u>				



Well ID: R	HMW03	Location:	Red Hil	II Bulk Fuel Stora	age Facility	Project N	lo.: <u>1</u>	12066	
Initial Water	Level:	103.31 ft	Date:	10/21/2013		Time:	1217		
Total Depth	of Well:	110.12 ft	Personnel Involved:		Branden	Branden Ibara, Jeff Harttemer			
Length of S	aturated Zo	ne: <u>-</u>	Weather Conditions:			-			
Volume of V	Vater to be	Removed: 6.0 L	Method	d of Removal:	В	ladder Pum	ıp		
Water Level After Purging: 103.59 ft		Pumpir	ng Rate:	(0.3 L/min				
Well Purge									
Time	Volume Removed		onductivity (mS/cm)	DO (mg/l)	Temperature	e Sal	linity	Redox (ORP) (mV)	
1219	0.0 L	8.70	0.752	7.40	27.66		-	29.8	
1223	1.0 L	6.97	0.773	5.12	26.84		-	31.4	
1226	2.0 L	6.82	0.775	2.53	26.45		-	24.4	
1229	3.0 L	6.81	0.770	2.17	26.39		_	21.6	
1232	4.0 L	6.82	0.769	2.29	26.39		_	20.5	
1236	5.0 L	6.85	0.769	2.13	26.42		_	19.2	
1239	6.0 L	6.85	0.769	2.15	26.44		-	18.9	
Sample Wit	hdrawal Me	thod:	Bladder Pu	mp		_			
Appearance	of Sample	:							
	Color:		Clear						
	Turbidity:		Low						
	Sediment	·	None	_					
	Other:		None						
Laboratory /	Analysis Pa	rameters and Prese	ervatives:	TPH-d - 8015;	TPH-g, VOCs	- 8260; PAI	Hs - 8270	ıc sim;	
				lead - 6020					
Number and	d Types of S	Sample Containers:	6 - 40n	nl VOAs, 2 - 1L a	amber jar, 1 - 50	00ml ambei	r jar, 1 - 2	:50ml HDPE	
Sample Ide	ntification N	umbers: ES040	[1300]						
Decontamin	nation Proce	dures: Triple Rins	sed						
		ve salinity paramete							
Sampled by		n Ibara, Jeff Hartte		tal Lab	Transportars: F	odEv			
Sampled De Date: 10/	22/2013	Calscience E	iiviioiiiiient		Transporters: <u>F</u> Time: 1200	cu⊏X			
<u> 10/</u>		Car	acity of Ca	ising (Gallons/Lir					



Well ID: F	RHMW05	Location:	Red Hill	Bulk Fuel Stora	age Facility	Project No.:	112066		
Initial Wate	r Level: 83	.80 ft	Date:	10/22/2013		Time: 940			
Total Depth	of Well:	-	Person	Personnel Involved:		Branden Ibara, Jeff Harttemer			
Length of S	Saturated Zone:	: <u>-</u>	Weather Conditions:			-			
Volume of V	Water to be Re	emoved:	Method	l of Removal:	Bla	adder Pump			
Water Leve	el After Purging	: 83.81 ft	Pumpin	ng Rate:	0.5	33 L/min			
Well Purge	Data:								
Time	Volume Removed	C pH	onductivity (mS/cm)	DO (mg/l)	Temperature	Salinity	Redox (ORP) (mV)		
947	0.0 L	8.17	0.954	9.51	24.24	-	-134.0		
950	1.0 L	7.7	0.935	8.55	23.18	-	-125.5		
954	2.0 L	7.51	0.924	8.22	22.94	-	-119.4		
958	3.0 L	7.25	0.935	8.52	22.36	-	-108.3		
1000	4.0 L	7.16	0.944	8.51	22.33	-	-105.3		
1002	5.0 L	7.16	0.946	8.47	22.34	-	-105.6		
						-			
						-			
						<u> </u>			
						-			
Sample Wi	thdrawal Metho	od:	Bladder Pur	mp					
Appearance	e of Sample:								
	Color:		Clear						
	Turbidity:		Clear						
	Sediment:		None						
	Other:		None						
Laboratory	Analysis Paran	neters and Pres	ervatives:	TPH-d - 8015;	TPH-g, VOCs -	8260; PAHs - 827	Oc sim;		
·	•			lead - 6020	<u>.</u>				
Number an	d Types of Sar	nple Containers	: 6 - 40m	nl VOAs, 2 - 1L a	amber jar, 1 - 500	0ml amber jar, 1 -	250ml HDPE		
Sample Ide	ntification Num	nbers: ES042	2 [1015]		•	•			
Decontami	nation Procedu	res: Triple Rin	sed						
Notes: YS	I did not have	salinity paramet	er.						
Sampled by	y: Branden I	bara, Jeff Hartte	emer						
Sampled D		Calscience E	nvironment		Transporters: Fe	edEx			
Date: <u>10</u>	/22/2013	0-	'		Time: 1200				



Well ID: RHN	/W2254-01	Locatio	on: Red Hill	Bulk Fuel Stora	ige Facility Pi	roject No.:	112066
Initial Water	Level:		Date:	10/22/2013	Ti	me: 845	
Total Depth o	of Well:	-	Personr	nel Involved:	Branden Ibar	a, Jeff Harttem	er
Length of Sa	turated Zone:		Weathe	er Conditions:		-	
Volume of W	ater to be Rem	noved:	Method	of Removal:	Blado	der Pump	
Water Level	After Purging:	_	Pumpin	g Rate:	0.33	L/min	
Well Purge D	oata:						
Time	Volume Removed	рН	Conductivity (mS/cm)	DO (mg/l)	Temperature	Salinity	Redox (ORP) (mV)
847	0.0 L	7.26	0.607	8.66	23.88		-113.9
850	1.0 L	7.49	0.608	8.55	22.33		-123.8
853	2.0 L	7.30	0.606	8.48	22.13		-110.0
856	3.0 L	7.04	0.606	8.5	22.04		-99.4
859	4.0 L	7.14	0.607	8.45	22.01	<u>-</u>	-105.2
Sample With	drawal Method	l:	Bladder Pun	mp			
	Color:		Clear				
	Turbidity:		Clear				
	Sediment:		None				
	Other:		None				
Laboratory A	nalysis Parame	eters and Pr	reservatives:	TPH-d - 8015; lead - 200.8	TPH-g, VOCs - 82	60; PAHs - 827	'0c sim;
Number and	Types of Samp	ole Containe	ers: 6 - 40m	I VOAs, 2 - 1L a	ımber jar, 1 - 500m	l amber jar, 1 -	250ml HDPE
	tification Numb		041, ES041 UF			•	
•	ation Procedure						
	did not have sa						
Sampled by:	Branden Iba						
Sampled Del	ivered to:		e Environmenta	al Lab	Transporters: FedE	X	
Date: 10/2	2/2013		Conneits of Co	ina (Callona/Lir	Time: 1200		



APPENDIX B Field Notes



Date 10/21/13 Location Red Hill Project / Client NAVFAC Purpose 1 GW Samplins Personnels JH, BI ofor Most @ office it and ear must 8800 @ Rod (bil). H!S meeting 0805 Cal. broke 45I. 0810 Prop of drum and pullel. waiting for TA to bring extention cords Entered Rad Hill Tunnels 0900 0920 Cange RHMWOI , DTW: 84, 47 bloc. 0925 Begin Junghy RHAWOI WZO Collected ES 037 Franktimuol 1100 RHMN OZ DTW187.08" 1000 Start purgra RHMUOZ collected 95034, ESO34MS/ASD + 95039 (Dup) From RHMUOZ 1107 1125 RYMW03 DTW: 103.31 1217 Start punjing RHMO3 Wilested RSO40 From RHMMO3 1220 1300 1335 Dropped of IDV and depart site, 3x 10/2/13/

Location Project / Client NAVEAC

Date 10/22/17 101

Purpose ronnivater Singling Personne 1: JL, BI 0700 Mes e office Land equipment USOU Ensered Red Will tamels 630 Annied at Panp House 848 Started paging RHMU2254-01 0900 Collected 85041 + 85041 UF Fran RHM12254-01 0940 RHW-05 DTW 83.80 0949 Start to punge Rythures 1015 Collected ESOUZ Rom RHAMOS 1100 Exited tunnels, Poop off IDW Ext site 1200 Meet Ann Dang, Drop off three coolers at Fed by 1215 Depart Ful Ex. 517,012/13



APPENDIX C Laboratory Reports







CALSCIENCE

WORK ORDER NUMBER: 13-10-1794

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

Richard Vellas

Approved for release on 10/31/2013 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.



Contents

Client Project Name: Red Hill LTM 112066

Work Order Number: 13-10-1794

1	Work Order Narrative	3
2	Client Sample Data. 2.1 EPA 8015B (M) TPH Diesel (Aqueous). 2.2 EPA 6020 ICP/MS Metals (Aqueous). 2.3 EPA 8270C SIM PAHs (Aqueous). 2.4 GC/MS GRO/EPA 8260B Volatile Organics (Aqueous).	4 4 6 7 14
3	Quality Control Sample Data. 3.1 MS/MSD. 3.2 PDS/PDSD. 3.3 LCS/LCSD.	30 30 35 36
4	Sample Analysis Summary	41
5	Glossary of Terms and Qualifiers	42
6	Chain of Custody/Sample Receipt Form	43



Work Order Narrative

Work Order: 13-10-1794 Page 1 of 1

Condition Upon Receipt:

Samples were received under Chain of Custody (COC) on 10/24/13. They were assigned to Work Order 13-10-1794.

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.

Subcontractor Information:

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

Page 1 of 2



Project: Red Hill LTM 112066

Analytical Report

Environmental Science International, Inc.

Date Received:

Work Order:

10/24/13

Work Order:

13-10-1794

Kailua, HI 96734-2500

Preparation:

EPA 3510C

Method:

Units:

ug/L

ES037 13-10-1794-2-G 10/21/13 Aqueous GC 45	10/25/13 10/25/13 131025B03
Client Sample Number Lab Sample Date/Time Matrix Instrume Number Collected	ent Date Date/Time QC Batch ID Prepared Analyzed

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

- TPH as Diesel is quantified in the carbon range C10-C28.

ParameterResultDLLODLOQDFQualifiersTPH as Diesel921520501HD

<u>Surrogate</u> <u>Rec. (%)</u> <u>Control Limits</u> <u>Qualifiers</u>

n-Octacosane 139 51-141

ES038	13-10-1794-3-G	10/21/13 11:25	Aqueous	GC 45	10/25/13	10/25/13 19:59	131025B03
Comment(s):	- Results were evaluated to the MDL (DL), con	centrations >=	to the MDL (DI	_) but < RL ((LOQ), if found, are	qualified with a	a "J" flag.
	- TPH as Diesel is quantified in the carbon rand	70 C10-C28					

- TPH as Diesel is quantified in the carbon range C10-C28.

 Parameter
 Result
 DL
 LOD
 LOQ
 DF
 Qualifiers

 TPH as Diesel
 2400
 15
 21
 52
 1.04
 HD

Surrogate Rec. (%) Control Limits Qualifiers

n-Octacosane 122 51-141

ES039	13-10-1794-4-G	10/21/13 12:00	Aqueous	GC 45	10/25/13	10/25/13 20:16	131025B03
Comment(s):	- Results were evaluated to the MDL (DL), con-	centrations >=	to the MDL (DI	L) but < RL (L	OQ), if found, are	e qualified with a	"J" flag.

- Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), in found, are qualified with a 3 mag

- TPH as Diesel is quantified in the carbon range C10-C28.

ParameterResultDLLODLOQDFQualifiersTPH as Diesel24001521521.04HD

Surrogate Rec. (%) Control Limits Qualifiers

n-Octacosane 137 51-141

ES040 13-10	0-1794-5-G 10/21/13 13:00	13 Aqueous GC 45		/25/13 131025B03 :34
-------------	------------------------------	------------------	--	-------------------------

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

- TPH as Diesel is quantified in the carbon range C10-C28.

ParameterResultDLLODLOQDFQualifiersTPH as Diesel541520501HD

Surrogate Rec. (%) Control Limits Qualifiers

n-Octacosane 139 51-141



Environmental Science International, Inc. Date Received: 10/24/13 354 Uluniu Street, Suite 304 Work Order: 13-10-1794 EPA 3510C Kailua, HI 96734-2500 Preparation: Method: EPA 8015B (M) Units: ug/L

Project: Red Hill LTM 112066 Page 2 of 2

Client Sample Number			Date/Time Collected		Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
ES041		13-10-1794-6-G	10/21/13 09:00	Aqueous	GC 45	10/25/13	10/25/13 20:51	131025B03
Comment(s): - Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.								

TPH as Diesel is quantified in the carbon range C10-C28.

<u>LOQ</u> <u>DF</u> Qualifiers **Parameter** <u>Result</u> <u>DL</u> <u>LOD</u> TPH as Diesel 15 U 20 50 <20

Qualifiers **Surrogate** Rec. (%) **Control Limits**

n-Octacosane 137 51-141

ES042	13-10-1794-8-G	10/21/13 10:15	Aqueous	GC 45	10/25/13	10/25/13 21:08	131025B03
Comment(s):	- Results were evaluated to the MDL (DL), con-	centrations >=	to the MDL (DI	_) but < RL ((LOQ), if found, are	qualified with	a "J" flag.

- TPH as Diesel is quantified in the carbon range C10-C28.

Result <u>DF</u> <u>Parameter</u> DL LOD LOQ Qualifiers 15 TPH as Diesel <20 20 50

Control Limits Qualifiers Surrogate Rec. (%)

121 51-141 n-Octacosane

Method Blank	099-1	5-516-64 I	N/A A	queous	GC 45	10/25/13	10/25/13 13:21	131025B03
Comment(s):	- Results were evaluated to the M	DL (DL), concer	ntrations >= to the	MDL (DL)	but < RL	(LOQ), if found, a	re qualified with a	"J" flag.
<u>Parameter</u>		<u>Result</u>	<u>DL</u>	<u>LOD</u>		<u>LOQ</u>	<u>DF</u>	<u>Qualifiers</u>
TPH as Diesel		<20	15	20		50	1	U
Surrogate n-Octacosane		Rec. (%) 129	Control Limits 51-141	<u>Qualifi</u>	<u>ers</u>			

U



Lead

Analytical Report

Environmental Science International, Inc.

Date Received:

Work Order:

13-10-1794

Kailua, HI 96734-2500

Preparation:

Method:

EPA 3020A Total

Method:

EPA 6020

Units: ua/L

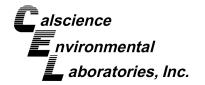
			Į	Jnits:				ug/L
Project: Red	Hill LTM 112066						Р	age 1 of 1
Client Sample N	lumber	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
ES037		13-10-1794-2-J	10/21/13 10:30	Aqueous	ICP/MS 04	10/24/13	10/25/13 16:20	131024L04D
Comment(s):	- Results were evaluated to	o the MDL (DL), cor	ncentrations >= to	o the MDL (DL	.) but < RL (LO	Q), if found,	are qualified with	a "J" flag.
<u>Parameter</u>		<u>Result</u>	<u>DL</u>	<u>LOD</u>	LO	Q	<u>DF</u>	<u>Qualifiers</u>
Lead		2.06	0.0898	0.200	1.0	0	1	
ES038		13-10-1794-3-J	10/21/13 11:25	Aqueous	ICP/MS 04	10/24/13	10/25/13 16:17	131024L04D
Comment(s):	- Results were evaluated to	o the MDL (DL), cor	ncentrations >= to	o the MDL (DL	.) but < RL (LO	Q), if found,	are qualified with	a "J" flag.
<u>Parameter</u>		Result	<u>DL</u>	<u>LOD</u>	LO	<u>Q</u>	<u>DF</u>	Qualifiers
Lead		<0.200	0.0898	0.200	1.0	0	1	U
ES039		13-10-1794-4-J	10/21/13 12:00	Aqueous	ICP/MS 04	10/24/13	10/25/13 16:23	131024L04D
Comment(s):	- Results were evaluated to	o the MDL (DL), cor	ncentrations >= to	o the MDL (DL	.) but < RL (LO	Q), if found,	are qualified with	a "J" flag.
Parameter		Result	DL	LOD	LO		<u>DF</u>	<u>Qualifiers</u>
Lead		<0.200	0.0898	0.200	1.0	0	1	U
ES040		13-10-1794-5-J	10/21/13 13:00	Aqueous	ICP/MS 04	10/24/13	10/25/13 16:27	131024L04D
Comment(s):	- Results were evaluated to	o the MDL (DL), con	ncentrations >= to	o the MDL (DL	.) but < RL (LO	Q), if found,	are qualified with	a "J" flag.
Parameter		Result	<u>DL</u>	<u>LOD</u>	LO	<u>Q</u>	<u>DF</u>	Qualifiers
Lead		<0.200	0.0898	0.200	1.0	0	1	U
ES042		13-10-1794-8-J	10/21/13 10:15	Aqueous	ICP/MS 04	10/24/13	10/25/13 16:30	131024L04D
Comment(s):	- Results were evaluated to	o the MDL (DL), cor	ncentrations >= to	o the MDL (DL	.) but < RL (LO	Q), if found,	are qualified with	a "J" flag.
<u>Parameter</u>		Result	<u>DL</u>	<u>LOD</u>	LO	<u>Q</u>	<u>DF</u>	Qualifiers
Lead		<0.200	0.0898	0.200	1.0	0	1	U
Method Blank		099-14-497-46	N/A	Aqueous	ICP/MS 04	10/24/13	10/25/13 15:47	131024L04D
Comment(s):	- Results were evaluated to	o the MDL (DL), cor	ncentrations >= to	o the MDL (DL	.) but < RL (LO	Q), if found,	are qualified with	a "J" flag.
Parameter		Result	<u>DL</u>	LOD	LO	Q	<u>DF</u>	Qualifiers

0.0898

0.200

1.00

< 0.200



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354 Uluniu Street, Suite 304 Kailua, HI 96734-2500 Date Received: Work Order:

10/24/13 13-10-1794

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EPA 3510C

Method:

EPA 8270C SIM PAHs

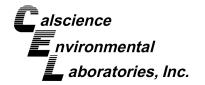
Units:

ug/L

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Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
ES037	13-10-1794-2-H	10/21/13 10:30	Aqueous	GC/MS AAA	10/24/13	10/25/13 14:38	131024L06
Comment(s): - Results were evaluated to	o the MDL (DL), con	centrations >= to t	he MDL (DL	.) but < RL (LOC	Q), if found, a	re qualified with a	a "J" flag.
<u>Parameter</u>	Result	<u>DL</u>	LOD	LOC	<u>2</u>	<u>DF</u>	<u>Qualifiers</u>
Naphthalene	< 0.052	0.024	0.052	0.21	l	1.03	U
2-Methylnaphthalene	< 0.052	0.027	0.052	0.21	Ì	1.03	U
1-Methylnaphthalene	< 0.052	0.029	0.052	0.21	l	1.03	U
Acenaphthylene	< 0.052	0.019	0.052	0.21		1.03	U
Acenaphthene	< 0.052	0.021	0.052	0.2		1.03	U
Fluorene	< 0.052	0.025	0.052	0.21		1.03	U
Phenanthrene	< 0.052	0.032	0.052	0.2	I	1.03	U
Anthracene	< 0.052	0.035	0.052	0.2	I	1.03	U
Fluoranthene	< 0.052	0.028	0.052	0.2	I	1.03	U
Pyrene	0.027	0.026	0.052	0.2	I	1.03	J
Benzo (a) Anthracene	< 0.052	0.025	0.052	0.2	I	1.03	U
Chrysene	< 0.052	0.020	0.052	0.2		1.03	U
Benzo (k) Fluoranthene	< 0.052	0.024	0.052	0.2	I	1.03	U
Benzo (b) Fluoranthene	< 0.052	0.026	0.052	0.2	I	1.03	U
Benzo (a) Pyrene	< 0.052	0.038	0.052	0.2	I	1.03	U
Indeno (1,2,3-c,d) Pyrene	< 0.052	0.023	0.052	0.2		1.03	U
Dibenz (a,h) Anthracene	< 0.052	0.028	0.052	0.2	I	1.03	U
Benzo (g,h,i) Perylene	<0.052	0.023	0.052	0.2	I	1.03	U
Surrogate	Rec. (%)	Control Limi	its Qualif	<u>iers</u>			
Nitrobenzene-d5	60	28-139					
2-Fluorobiphenyl	72	33-144					
p-Terphenyl-d14	95	23-160					



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Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
ES038	13-10-1794-3-H	10/21/13 11:25	Aqueous	GC/MS AAA	10/24/13	10/25/13 15:02	131024L06
Comment(s): - Results were evaluated	to the MDL (DL), con	centrations >= to t	the MDL (DL) but < RL (LOC	(), if found, a	re qualified with a	a "J" flag.
<u>Parameter</u>	Result	<u>DL</u>	<u>LOD</u>	LOC	<u>)</u>	<u>DF</u>	<u>Qualifiers</u>
2-Methylnaphthalene	9.0	0.028	0.053	0.21		1.06	
1-Methylnaphthalene	9.0	0.030	0.053	0.21		1.06	
Acenaphthylene	< 0.053	0.019	0.053	0.21		1.06	U
Acenaphthene	0.54	0.022	0.053	0.21		1.06	
Fluorene	0.27	0.026	0.053	0.21		1.06	
Phenanthrene	< 0.053	0.032	0.053	0.21		1.06	U
Anthracene	< 0.053	0.036	0.053	0.21		1.06	U
Fluoranthene	< 0.053	0.029	0.053	0.21		1.06	U
Pyrene	< 0.053	0.026	0.053	0.21		1.06	U
Benzo (a) Anthracene	< 0.053	0.025	0.053	0.21		1.06	U
Chrysene	< 0.053	0.020	0.053	0.21		1.06	U
Benzo (k) Fluoranthene	< 0.053	0.025	0.053	0.21		1.06	U
Benzo (b) Fluoranthene	< 0.053	0.026	0.053	0.21		1.06	U
Benzo (a) Pyrene	< 0.053	0.038	0.053	0.21		1.06	U
Indeno (1,2,3-c,d) Pyrene	< 0.053	0.023	0.053	0.21		1.06	U
Dibenz (a,h) Anthracene	< 0.053	0.028	0.053	0.21		1.06	U
Benzo (g,h,i) Perylene	<0.053	0.023	0.053	0.21		1.06	U
Surrogate	<u>Rec. (%)</u>	Control Lim	<u>its</u> Qualifi	<u>iers</u>			
Nitrobenzene-d5	66	28-139					
2-Fluorobiphenyl	68	33-144					
p-Terphenyl-d14	87	23-160					

ES038	13-10		0/21/13 1:25	Aqueous	GC/MS AAA	10/24/13	10/25/13 16:58	131024L06
Comment(s): - F	Results were evaluated to the MI	DL (DL), concen	trations >= to the	ne MDL (DL)	but < RL (LOC), if found, are	e qualified with a	"J" flag.
<u>Parameter</u>		<u>Result</u>	<u>DL</u>	<u>LOD</u>	LOC	<u>l</u>	<u>DF</u>	<u>Qualifiers</u>
Naphthalene		30	0.24	0.53	2.1	•	10.6	
Curronata		Dog (0/)	Control Limi	to Ovolifi	•••			
<u>Surrogate</u>		Rec. (%)	Control Limi	<u>ts</u> Qualifi	<u>ers</u>			
Nitrobenzene-d5		35	28-139					
2-Fluorobiphenyl		69	33-144					
p-Terphenyl-d14		81	23-160					



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EPA 3510C

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
ES039	13-10-1794-4-H	10/21/13 12:00	Aqueous	GC/MS AAA	10/24/13	10/25/13 15:25	131024L06
Comment(s): - Results were evaluated to	the MDL (DL), con	centrations >= to t	he MDL (DL) but < RL (LOC), if found, a	re qualified with a	a "J" flag.
<u>Parameter</u>	<u>Result</u>	<u>DL</u>	LOD	LOC	<u>)</u>	<u>DF</u>	<u>Qualifiers</u>
2-Methylnaphthalene	7.5	0.027	0.052	0.21		1.03	
1-Methylnaphthalene	7.5	0.029	0.052	0.21		1.03	
Acenaphthylene	<0.052	0.019	0.052	0.21		1.03	U
Acenaphthene	0.57	0.021	0.052	0.21		1.03	
Fluorene	0.31	0.025	0.052	0.21		1.03	
Phenanthrene	<0.052	0.032	0.052	0.21		1.03	U
Anthracene	<0.052	0.035	0.052	0.21		1.03	U
Fluoranthene	< 0.052	0.028	0.052	0.21		1.03	U
Pyrene	<0.052	0.026	0.052	0.21		1.03	U
Benzo (a) Anthracene	<0.052	0.025	0.052	0.21		1.03	U
Chrysene	<0.052	0.020	0.052	0.21		1.03	U
Benzo (k) Fluoranthene	<0.052	0.024	0.052	0.21		1.03	U
Benzo (b) Fluoranthene	< 0.052	0.026	0.052	0.21		1.03	U
Benzo (a) Pyrene	< 0.052	0.038	0.052	0.21		1.03	U
Indeno (1,2,3-c,d) Pyrene	<0.052	0.023	0.052	0.21		1.03	U
Dibenz (a,h) Anthracene	<0.052	0.028	0.052	0.21		1.03	U
Benzo (g,h,i) Perylene	<0.052	0.023	0.052	0.21		1.03	U
<u>Surrogate</u>	Rec. (%)	Control Limi	its Qualif	<u>iers</u>			
Nitrobenzene-d5	76	28-139					
2-Fluorobiphenyl	79	33-144					
p-Terphenyl-d14	101	23-160					

ES039	13	-10-1794-4-H	10/21/13 12:00	Aqueous	GC/MS AAA	10/24/13	10/25/13 18:07	131024L06
Comment(s):	- Results were evaluated to the	MDL (DL), conc	entrations >= to the	ne MDL (DL)	but < RL (LOC	(a), if found, are	e qualified with a	"J" flag.
<u>Parameter</u>		<u>Result</u>	<u>DL</u>	<u>LOD</u>	LOC	<u>]</u>	<u>DF</u>	<u>Qualifiers</u>
Naphthalene		25	0.24	0.52	2.1	1	10.4	
Surrogate		Rec. (%)	Control Limi	ts Qualifi	<u>ers</u>			
Nitrobenzene-d5		35	28-139					
2-Fluorobiphenyl		76	33-144					
p-Terphenyl-d14		90	23-160					





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Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
ES040	13-10-1794-5-H	10/21/13 13:00	Aqueous	GC/MS AAA	10/24/13	10/25/13 15:48	131024L06
Comment(s): - Results were evaluated to	o the MDL (DL), con	centrations >= to t	the MDL (DL) but < RL (LOC	(a), if found, are	e qualified with a	"J" flag.
<u>Parameter</u>	Result	<u>DL</u>	LOD	LOC	<u>]</u>	<u>DF</u>	<u>Qualifiers</u>
Naphthalene	< 0.050	0.023	0.050	0.20)	1.01	U
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
<u>Surrogate</u>	Rec. (%)	Control Lim	its Qualif	<u>iers</u>			
Nitrobenzene-d5	69	28-139					
2-Fluorobiphenyl	73	33-144					
p-Terphenyl-d14	87	23-160					

o Contents



Analytical Report

Environmental Science International, Inc.

354 Uluniu Street, Suite 304

Kailua, HI 96734-2500

Date Received:

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EPA 3510C

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
ES041	13-10-1794-6-H	10/21/13 09:00	Aqueous	GC/MS AAA	10/24/13	10/25/13 16:11	131024L06
Comment(s): - Results were evaluated to	the MDL (DL), cond	centrations >= to t	he MDL (DL) but < RL (LOC	(a), if found, are	qualified with a	"J" flag.
<u>Parameter</u>	Result	<u>DL</u>	LOD	LOC	<u>D</u>	<u>)F</u>	<u>Qualifiers</u>
Naphthalene	0.036	0.023	0.050	0.20	1		J
2-Methylnaphthalene	< 0.050	0.027	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	0.025	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	0.037	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 Limi	its Qualif	<u>iers</u>			
Nitrobenzene-d5	83	28-139					
2-Fluorobiphenyl	86	33-144					
p-Terphenyl-d14	99	23-160					





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354 Uluniu Street, Suite 304 Kailua, HI 96734-2500 Date Received:

10/24/13 13-10-1794

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Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
ES042	13-10-1794-8-H	10/21/13 10:15	Aqueous	GC/MS AAA	10/24/13	10/25/13 16:35	131024L06
Comment(s): - Results were evaluated t	o the MDL (DL), con	centrations >= to the	he MDL (DL) but < RL (LOC	(), if found, are	e qualified with a	"J" flag.
<u>Parameter</u>	Result	<u>DL</u>	LOD	LOC	<u>)</u>	<u>DF</u>	<u>Qualifiers</u>
Naphthalene	0.17	0.023	0.051	0.20	1	1.02	J
2-Methylnaphthalene	<0.051	0.027	0.051	0.20	1	1.02	U
1-Methylnaphthalene	<0.051	0.029	0.051	0.20	1	1.02	U
Acenaphthylene	< 0.051	0.018	0.051	0.20)	1.02	U
Acenaphthene	< 0.051	0.021	0.051	0.20)	1.02	U
Fluorene	< 0.051	0.025	0.051	0.20)	1.02	U
Phenanthrene	< 0.051	0.031	0.051	0.20)	1.02	U
Anthracene	< 0.051	0.035	0.051	0.20)	1.02	U
Fluoranthene	< 0.051	0.028	0.051	0.20)	1.02	U
Pyrene	< 0.051	0.025	0.051	0.20)	1.02	U
Benzo (a) Anthracene	< 0.051	0.024	0.051	0.20)	1.02	U
Chrysene	<0.051	0.019	0.051	0.20	1	1.02	U
Benzo (k) Fluoranthene	< 0.051	0.024	0.051	0.20)	1.02	U
Benzo (b) Fluoranthene	< 0.051	0.025	0.051	0.20)	1.02	U
Benzo (a) Pyrene	< 0.051	0.037	0.051	0.20)	1.02	U
Indeno (1,2,3-c,d) Pyrene	< 0.051	0.022	0.051	0.20)	1.02	U
Dibenz (a,h) Anthracene	< 0.051	0.027	0.051	0.20)	1.02	U
Benzo (g,h,i) Perylene	<0.051	0.022	0.051	0.20	1	1.02	U
Surrogate	Rec. (%)	Control Limi	ts Qualifi	<u>iers</u>			
Nitrobenzene-d5	71	28-139					
2-Fluorobiphenyl	73	33-144					
p-Terphenyl-d14	88	23-160					





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10/24/13

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Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
Method Blank	099-15-148-19	N/A	Aqueous	GC/MS AAA	10/24/13	10/25/13 13:52	131024L06
Comment(s): - Results were evaluated	to the MDL (DL), con	centrations >= to the	he MDL (DL) but < RL (LOC	(a), if found, are	qualified with a	a "J" flag.
<u>Parameter</u>	Result	<u>DL</u>	LOD	LOC	<u> </u>	<u>DF</u>	<u>Qualifiers</u>
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 Limi	its Qualif	<u>iers</u>			
Nitrobenzene-d5	77	28-139					
2-Fluorobiphenyl	66	33-144					
p-Terphenyl-d14	95	23-160					





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354 Uluniu Street, Suite 304 Kailua, HI 96734-2500 Work Order: Preparation:

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13-10-1794 EPA 5030C

Method:

GC/MS / EPA 8260B

Units:

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Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
ES Trip	13-10-1794-1-A	10/21/13 08:00	Aqueous	GC/MS LL	10/26/13	10/26/13 14:44	131026L01
Comment(s): - Results were evaluated to	o the MDL (DL), con	centrations >= t	o the MDL (DL) but < RL (LOC)), if found, are	qualified with a	a "J" flag.
<u>Parameter</u>	<u>Result</u>	<u>DL</u>	<u>LOD</u>	LOC	<u>DI</u>	<u> </u>	<u>Qualifiers</u>
Acetone	<10	6.0	10	20	1		U,ICH
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,ICH
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,IJ
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
1,1,2-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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Kailua, HI 96734-2500

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<u>Parameter</u>	<u>Result</u>	<u>DL</u>	<u>LOD</u>	<u>LOQ</u>	<u>DF</u>	<u>Qualifiers</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	15	13	30	50	1	B,J

Rec. (%)	Control Limits	Qualifiers
102	80-126	
101	80-134	
97	80-120	
98	88-112	
87	80-120	
	102 101 97 98	102 80-126 101 80-134 97 80-120 98 88-112







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Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID	
ES037	13-10-1794-2-A	10/21/13 10:30	Aqueous	GC/MS LL	10/26/13	10/26/13 17:26	131026L01	
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.								
<u>Parameter</u>	Result	<u>DL</u>	<u>LOD</u>	LOC	<u>D</u>	<u>)F</u>	<u>Qualifiers</u>	
Acetone	<10	6.0	10	20	1		U,ICH	
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,ICH	
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,IJ	
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	





Environmental Science International, Inc. 354 Uluniu Street, Suite 304

Kailua, HI 96734-2500

Project: Red Hill LTM 112066

Date Received: Work Order: Preparation:

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<u>Parameter</u>	Result	<u>DL</u>	LOD	LOQ	<u>DF</u>	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	15	13	30	50	1	B,J

Surrogate	Rec. (%)	Control Limits	Qualifiers
Dibromofluoromethane	99	80-126	
1,2-Dichloroethane-d4	95	80-134	
Toluene-d8	93	80-120	
Toluene-d8-TPPH	91	88-112	
1,4-Bromofluorobenzene	93	80-120	







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354 Uluniu Street, Suite 304 Kailua, HI 96734-2500 Work Order: Preparation:

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Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument		ate/Time QC Batch ID nalyzed
ES038	13-10-1794-3-A	10/21/13 11:25	Aqueous	GC/MS LL		0/26/13 131026L01 5:11
Comment(s): - Results were evaluated t	o the MDL (DL), con	centrations >= t	to the MDL (DL	but < RL (LOC	Q), if found, are qua	lified with a "J" flag.
<u>Parameter</u>	<u>Result</u>	<u>DL</u>	<u>LOD</u>	LOC	<u>DF</u>	<u>Qualifiers</u>
Acetone	<10	6.0	10	20	1	U,ICH
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,ICH
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,IJ
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	0.14	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
Hexachloro-1,3-Butadiene	<0.50	0.32	0.50	1.0	1	U





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Kailua, HI 96734-2500

Project: Red Hill LTM 112066

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<u>Parameter</u>	Result	<u>DL</u>	LOD	LOQ	<u>DF</u>	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	0.37	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	48	13	30	50	1	B,J

Surrogate	Rec. (%)	Control Limits	Qualifiers
Dibromofluoromethane	106	80-126	
1,2-Dichloroethane-d4	103	80-134	
Toluene-d8	97	80-120	
Toluene-d8-TPPH	98	88-112	
1,4-Bromofluorobenzene	97	80-120	







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354 Uluniu Street, Suite 304

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Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID	
ES039	13-10-1794-4-A	10/21/13 12:00	Aqueous	GC/MS LL	10/26/13	10/26/13 15:38	131026L01	
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.								
<u>Parameter</u>	<u>Result</u>	<u>DL</u>	LOD	LOC	<u>D</u>	E	<u>Qualifiers</u>	
Acetone	<10	6.0	10	20	1		U,ICH	
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,ICH	
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,IJ	
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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<u>Parameter</u>	Result	<u>DL</u>	<u>LOD</u>	<u>LOQ</u>	<u>DF</u>	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	0.37	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	63	13	30	50	1	В
Surrogate	Rec. (%)	Control Limits	Qualifiers			

Surrogate	Rec. (%)	Control Limits	Qualif
Dibromofluoromethane	101	80-126	
1,2-Dichloroethane-d4	99	80-134	
Toluene-d8	95	80-120	
Toluene-d8-TPPH	98	88-112	
1,4-Bromofluorobenzene	97	80-120	







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Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID	
ES040	13-10-1794-5-A	10/21/13 13:00	Aqueous	GC/MS LL	10/26/13	10/26/13 17:52	131026L01	
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.								
<u>Parameter</u>	<u>Result</u>	<u>DL</u>	<u>LOD</u>	LOC	<u>2</u> <u>E</u>	<u>)F</u>	<u>Qualifiers</u>	
Acetone	<10	6.0	10	20	1		U,ICH	
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,ICH	
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,IJ	
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			U	
Hexachloro-1,3-Butadiene	<0.50	0.32	0.50	1.0			U	
, 					·			





Environmental Science International, Inc. 354 Uluniu Street, Suite 304

Kailua, HI 96734-2500

Project: Red Hill LTM 112066

Date Received: Work Order: Preparation:

Method: Units:

10/24/13 13-10-1794 EPA 5030C

GC/MS / EPA 8260B ug/L

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<u>Parameter</u>	Result	<u>DL</u>	LOD	LOQ	<u>DF</u>	<u>Qualifiers</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	23	13	30	50	1	B,J

Rec. (%)	Control Limits	<u>Qualifiers</u>
97	80-126	
95	80-134	
98	80-120	
99	88-112	
91	80-120	
	97 95 98 99	97 80-126 95 80-134 98 80-120 99 88-112





Environmental Science International, Inc.

354 Uluniu Street, Suite 304

Kailua, HI 96734-2500

Date Received:

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GC/MS / EPA 8260B

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10/24/13

ug/L

13-10-1794 EPA 5030C

Project: Red Hill LTM 112066

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
ES041	13-10-1794-6-A	10/21/13 09:00	Aqueous	GC/MS LL	10/26/13	10/26/13 18:19	131026L01
Comment(s): - Results were evaluated t	o the MDL (DL), con	centrations >= t	to the MDL (DL	but < RL (LOC	(a), if found, are c	ualified with a	a "J" flag.
<u>Parameter</u>	Result	<u>DL</u>	LOD	LOC	<u>DF</u>	-	<u>Qualifiers</u>
Acetone	<10	6.0	10	20	1		U,ICH
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,ICH
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,IJ
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





Environmental Science International, Inc. 354 Uluniu Street, Suite 304

Kailua, HI 96734-2500

Date Received: Work Order: Preparation: Method:

Units:

10/24/13 13-10-1794 EPA 5030C GC/MS / EPA 8260B

ug/L

Project: Red Hill LTM 112066

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<u>Parameter</u>	Result	<u>DL</u>	LOD	LOQ	<u>DF</u>	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	13	13	30	50	1	B,J
Surrogate	Rec. (%)	Control Limits	Qualifiers			
Dibromofluoromethane	101	80-126				
1,2-Dichloroethane-d4	97	80-134				
Toluene-d8	99	80-120				
Toluene-d8-TPPH	100	88-112				
1,4-Bromofluorobenzene	90	80-120				



Environmental Science International, Inc.

354 Uluniu Street, Suite 304

Kailua, HI 96734-2500

Date Received:

Work Order:

Preparation:

EPA 5030C

Method:

GC/MS / EPA 8260B

10/24/13

13-10-1794

Units:

ug/L

Project: Red Hill LTM 112066

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Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
ES042	13-10-1794-8-A	10/21/13 10:15	Aqueous	GC/MS LL	10/26/13	10/26/13 18:46	131026L01
Comment(s): - Results were evaluated to	o the MDL (DL), con	centrations >= t	o the MDL (DL) but < RL (LOC), if found, are	qualified with	a "J" flag.
<u>Parameter</u>	<u>Result</u>	<u>DL</u>	<u>LOD</u>	LOC	<u>D</u>	<u>F</u>	<u>Qualifiers</u>
Acetone	<10	6.0	10	20	1		U,ICH
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,ICH
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,IJ
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





Environmental Science International, Inc. 354 Uluniu Street, Suite 304

Date Received: Work Order: Preparation:

10/24/13 13-10-1794 EPA 5030C

Method: Units:

GC/MS / EPA 8260B ug/L

Project: Red Hill LTM 112066

Kailua, HI 96734-2500

1,4-Bromofluorobenzene

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Parameter	<u>Result</u>	<u>DL</u>	LOD	LOQ	<u>DF</u>	<u>Qualifiers</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	17	13	30	50	1	B,J
Surrogate	Rec. (%)	Control Limits	Qualifiers			
Dibromofluoromethane	103	80-126				
1,2-Dichloroethane-d4	103	80-134				
Toluene-d8	93	80-120				
Toluene-d8-TPPH	94	88-112				

80-120

88





Environmental Science International, Inc.

354 Uluniu Street, Suite 304 Kailua, HI 96734-2500 Date Received: Work Order: Preparation:

13-10-1794 EPA 5030C

Method:

GC/MS / EPA 8260B

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ug/L

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Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
Method Blank	099-13-057-27	N/A	Aqueous	GC/MS LL	10/26/13	10/26/13 14:17	131026L01
Comment(s): - Results were evaluate	ated to the MDL (DL), cor	ncentrations >=	to the MDL (DI	_) but < RL (LOC	Q), if found, are	qualified with	a "J" flag.
<u>Parameter</u>	Result	<u>DL</u>	<u>LOD</u>	LOC	<u>2</u> <u>C</u>	<u>)F</u>	<u>Qualifiers</u>
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





Environmental Science International, Inc. 354 Uluniu Street, Suite 304

Kailua, HI 96734-2500

Project: Red Hill LTM 112066

Date Received: Work Order: Preparation:

Method: Units:

10/24/13 13-10-1794 EPA 5030C

GC/MS / EPA 8260B ug/L

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<u>Parameter</u>	Result	<u>DL</u>	LOD	LOQ	<u>DF</u>	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	<u>Qualifiers</u>			

Surrogate	Rec. (%)	Control Limits	Qu
Dibromofluoromethane	100	80-126	
1,2-Dichloroethane-d4	97	80-134	
Toluene-d8	98	80-120	
Toluene-d8-TPPH	98	88-112	
1,4-Bromofluorobenzene	90	80-120	







Environmental Science International, Inc. 354 Uluniu Street, Suite 304

Kailua, HI 96734-2500

Project: Red Hill LTM 112066

Date Received:

Work Order:

Method:

Preparation:

10/24/13 13-10-1794

EPA 3510C

EPA 8015B (M)

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Quality Control Sample ID		Matrix		Instrument	Date Prepared		Date Analyzed	MS	MS/MSD Batch Number	
ES038		Aqueou	s	GC 45	10/25/1	3	10/25/13 18:55	131	025S03	
Parameter	Sample Conc.	Spike Added	MS Conc.	MS %Rec.	MSD Conc.	MSD %Rec.	%Rec. CL	RPD	RPD CL	Qualifiers
TPH as Diesel	2389	4000	7414	126	7601	130	55-133	2	0-30	





Environmental Science International, Inc.

354 Uluniu Street, Suite 304 Kailua, HI 96734-2500 Date Received:

Work Order:

Preparation: Method: 13-10-1794 EPA 3020A Total

10/24/13

EPA 6020

Project: Red Hill LTM 112066 Page 2 of 5

Quality Control Sample ID	ie ID		Matrix		Date Prepared		Date Analyzed	MS	MS/MSD Batch Number	
ES038		Aqueou	s	ICP/MS 04	10/24/1	13	10/25/13 16:00	131	024S04	
Parameter	Sample Conc.	<u>Spike</u> Added	MS Conc.	<u>MS</u> %Rec.	MSD Conc.	MSD %Rec.	%Rec. CL	<u>RPD</u>	RPD CL	Qualifiers
Lead	ND	100.0	107.9	108	108.8	109	80-120	1	0-20	





Environmental Science International, Inc.

Kailua, HI 96734-2500

Project: Red Hill LTM 112066

Date Received:

10/24/13 13-10-1794

354 Uluniu Street, Suite 304

Work Order: Preparation:

EPA 3510C

Method:

EPA 8270C SIM PAHs

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Quality Control Sample ID		Matrix		Instrument	Date Prepared		Date Analyzed	MS	/MSD Batch	Number
ES038		Aqueou	ıs	GC/MS AAA	10/24/1	13	10/25/13 17:21	131	024S06	
Parameter	Sample Conc.	Spike Added	MS Conc.	MS %Rec.	MSD Conc.	MSD %Rec.	%Rec. CL	RPD	RPD CL	Qualifiers
Naphthalene	29.69	2.000	22.52	0	21.60	0	21-133	4	0-25	3
2-Methylnaphthalene	8.963	2.000	9.366	20	9.337	19	21-140	0	0-25	3
1-Methylnaphthalene	8.994	2.000	9.057	3	8.921	0	20-140	2	0-25	3
Acenaphthylene	ND	2.000	1.693	85	1.658	83	33-145	2	0-25	
Acenaphthene	0.5368	2.000	2.078	77	2.049	76	49-121	1	0-25	
Fluorene	0.2697	2.000	1.813	77	1.788	76	59-121	1	0-25	
Phenanthrene	ND	2.000	1.714	86	1.689	84	54-120	1	0-25	
Anthracene	ND	2.000	1.466	73	1.456	73	27-133	1	0-25	
Fluoranthene	ND	2.000	1.835	92	1.765	88	26-137	4	0-25	
Pyrene	ND	2.000	1.581	79	1.574	79	18-168	0	0-25	
Benzo (a) Anthracene	ND	2.000	1.579	79	1.571	79	33-143	0	0-25	
Chrysene	ND	2.000	1.530	77	1.519	76	17-168	1	0-25	
Benzo (k) Fluoranthene	ND	2.000	1.682	84	1.598	80	24-159	5	0-25	
Benzo (b) Fluoranthene	ND	2.000	1.474	74	1.549	77	24-159	5	0-25	
Benzo (a) Pyrene	ND	2.000	1.659	83	1.649	82	17-163	1	0-25	
Indeno (1,2,3-c,d) Pyrene	ND	2.000	1.436	72	1.428	71	10-171	1	0-25	
Dibenz (a,h) Anthracene	ND	2.000	1.265	63	1.276	64	10-219	1	0-25	
Benzo (g,h,i) Perylene	ND	2.000	1.148	57	1.149	57	10-227	0	0-25	

RPD: Relative Percent Difference. CL: Control Limits





Environmental Science International, Inc.

Kailua, HI 96734-2500

Project: Red Hill LTM 112066

Date Received:

10/24/13 13-10-1794

354 Uluniu Street, Suite 304 Work Order: Preparation:

EPA 5030C

Method:

GC/MS / EPA 8260B

Page 4 of 5

Quality Control Sample ID		Matrix		Instrument	Date Prepared [Date Analyzed	MS/MSD Bate		Number
ES038		Aqueous	S	GC/MS LL	10/26/1	3	10/26/13 16:05	131	026S01	
Parameter	Sample Conc.	<u>Spike</u> Added	MS Conc.	MS %Rec.	MSD Conc.	MSD %Rec.	%Rec. CL	<u>RPD</u>	RPD CL	<u>Qualifiers</u>
Acetone	ND	50.00	58.71	117	67.34	135	40-140	14	0-20	
Benzene	ND	50.00	40.15	80	41.76	84	80-120	4	0-20	
Bromodichloromethane	ND	50.00	42.25	84	44.22	88	75-120	5	0-20	
Bromoform	ND	50.00	45.28	91	47.76	96	70-130	5	0-20	
Bromomethane	ND	50.00	48.95	98	53.61	107	30-145	9	0-20	
2-Butanone	ND	50.00	46.35	93	46.38	93	30-150	0	0-20	
Carbon Tetrachloride	ND	50.00	41.46	83	43.92	88	65-140	6	0-20	
Chlorobenzene	ND	50.00	39.98	80	42.29	85	80-120	6	0-20	
Chloroethane	ND	50.00	39.93	80	46.89	94	60-135	16	0-20	
Chloroform	ND	50.00	41.30	83	43.72	87	65-135	6	0-20	
Chloromethane	ND	50.00	35.23	70	42.21	84	40-125	18	0-20	
Dibromochloromethane	ND	50.00	45.30	91	47.56	95	60-135	5	0-20	
1,2-Dibromo-3-Chloropropane	ND	50.00	50.93	102	55.79	112	50-130	9	0-20	
1,2-Dibromoethane	ND	50.00	43.97	88	44.87	90	80-120	2	0-20	
1,2-Dichlorobenzene	ND	50.00	45.07	90	48.27	97	70-120	7	0-20	
1,3-Dichlorobenzene	ND	50.00	43.07	86	46.54	93	75-125	8	0-20	
1,4-Dichlorobenzene	ND	50.00	42.90	86	46.44	93	75-125	8	0-20	
1,1-Dichloroethane	ND	50.00	42.21	84	45.39	91	70-135	7	0-20	
1,2-Dichloroethane	ND	50.00	41.64	83	44.21	88	70-130	6	0-20	
1,1-Dichloroethene	ND	50.00	40.00	80	44.48	89	70-130	11	0-20	
c-1,2-Dichloroethene	ND	50.00	42.31	85	44.45	89	70-125	5	0-20	
t-1,2-Dichloroethene	ND	50.00	40.50	81	44.18	88	60-140	9	0-20	
1,2-Dichloropropane	ND	50.00	39.71	79	41.95	84	75-125	5	0-20	
c-1,3-Dichloropropene	ND	50.00	48.51	97	51.56	103	70-130	6	0-20	
t-1,3-Dichloropropene	ND	50.00	38.46	77	40.40	81	55-140	5	0-20	
Ethylbenzene	ND	50.00	46.51	93	48.94	98	75-125	5	0-20	
Methylene Chloride	ND	50.00	42.80	86	46.94	94	55-140	9	0-20	
4-Methyl-2-Pentanone	ND	50.00	43.74	87	46.09	92	60-135	5	0-20	
Styrene	ND	50.00	43.53	87	45.57	91	65-135	5	0-20	
1,1,1,2-Tetrachloroethane	ND	50.00	43.44	87	46.01	92	80-130	6	0-20	
1,1,2,2-Tetrachloroethane	ND	50.00	38.58	77	41.17	82	65-130	6	0-20	
Tetrachloroethene	ND	50.00	48.38	97	50.83	102	45-150	5	0-20	
Toluene	ND	50.00	44.14	88	45.24	90	75-120	2	0-20	
1,2,4-Trichlorobenzene	ND	50.00	54.63	109	61.18	122	65-135	11	0-20	
1,1,1-Trichloroethane	ND	50.00	43.20	86	45.59	91	65-130	5	0-20	
Hexachloro-1,3-Butadiene	ND	50.00	47.46	95	52.00	104	50-140	9	0-20	
1,1,2-Trichloroethane	ND	50.00	40.68	81	41.83	84	75-125	3	0-20	

RPD: Relative Percent Difference. CL: Control Limits





Environmental Science International, Inc. 354 Uluniu Street, Suite 304

Kailua, HI 96734-2500

Date Received:

Work Order:

Preparation:

Method:

10/24/13 13-10-1794

EPA 5030C GC/MS / EPA 8260B

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Project: Red Hill LTM 112066

Parameter	Sample Conc.	Spike Added	MS Conc.	<u>MS</u> %Rec.	MSD Conc.	MSD %Rec.	%Rec. CL	RPD	RPD CL	<u>Qualifiers</u>
Trichloroethene	ND	50.00	44.18	88	46.95	94	70-125	6	0-20	
1,2,3-Trichloropropane	ND	50.00	43.25	86	43.89	88	75-125	1	0-20	
Vinyl Chloride	ND	50.00	41.05	82	47.84	96	50-145	15	0-20	
p/m-Xylene	ND	100.0	96.06	96	98.25	98	75-130	2	0-20	
o-Xylene	ND	50.00	48.42	97	50.94	102	80-120	5	0-20	
Methyl-t-Butyl Ether (MTBE)	ND	50.00	44.69	89	49.97	100	65-125	11	0-20	





Quality Control - PDS/PDSD

Environmental Science International, Inc. 354 Uluniu Street, Suite 304

Kailua, HI 96734-2500

Project: Red Hill LTM 112066

Date Received:

Work Order:

Preparation:

Method:

10/24/13

13-10-1794 EPA 3020A Total

EPA 6020

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Quality Control Sample ID	Matrix	Instrument	Date Prepa	ared Date Anal	yzed PDS/P	DSD Batch Number
ES038	Aqueous	us ICP/MS 04		0:00 10/25/13	16:07 131024	1 S04
<u>Parameter</u>	Sample Conc.	Spike Added	PDS Conc.	PDS %Rec.	%Rec. CL	Qualifiers
Lead	ND	100.0	105.1	105	75-125	





Quality Control - LCS/LCSD

Environmental Science International, Inc. 354 Uluniu Street, Suite 304

Kailua, HI 96734-2500

Project: Red Hill LTM 112066

Date Received:

Work Order:

Preparation:

EPA 8015B (M)

Method:

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10/24/13

13-10-1794

EPA 3510C

Quality Control Sample ID		Matrix		Instrument	Date Prepa	red Date A	Analyzed	LCS/LCSD Ba	atch Number
099-15-516-64		Aqueo	Aqueous 0		10/25/13	10/25/13 13:3		131025B03	
Parameter	<u>Spike</u> <u>Added</u>	LCS Conc.	LCS LCS Conc. %Rec.		LCSD %Rec.	%Rec. CL	RPD	RPD CL	<u>Qualifiers</u>
TPH as Diesel	4000	4250	106	4403	110	60-132	4	0-11	





Quality Control - LCS

Environmental Science International, Inc. 354 Uluniu Street, Suite 304

Kailua, HI 96734-2500

Date Received:

Work Order:

Preparation: Method:

10/24/13 13-10-1794

EPA 3020A Total

EPA 6020 Page 2 of 5

Project: Red Hill LTM 112066

Quality Control Sample ID	Matrix	Instrument	Date Analy	zed	LCS Batch Number
099-14-497-46	Aqueous	ICP/MS 04	10/25/13 1	5:51	131024L04D
Parameter	Spike Added	Conc. Recovered	LCS %Rec.	%Rec.	CL Qualifiers
Lead	100.0	101.3	101	80-120	

n to Contents



Quality Control - LCS

Environmental Science International, Inc.

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

Project: Red Hill LTM 112066

Date Received:

Work Order:

Preparation:

Method:

10/24/13 13-10-1794

EPA 3510C

EPA 8270C SIM PAHs

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Quality Control Sample ID	Matrix	Instrument	Date Ana	alyzed L	CS Batch Number
099-15-148-19	Aqueous	GC/MS AAA	10/25/13	14:15 1	31024L06
<u>Parameter</u>	Spike Added	Conc. Recovered	LCS %Rec.	%Rec. Cl	Qualifiers
Naphthalene	2.000	1.701	85	21-133	
2-Methylnaphthalene	2.000	1.799	90	21-140	
1-Methylnaphthalene	2.000	1.662	83	20-140	
Acenaphthylene	2.000	1.765	88	33-145	
Acenaphthene	2.000	1.771	89	55-121	
Fluorene	2.000	1.805	90	59-121	
Phenanthrene	2.000	1.791	90	54-120	
Anthracene	2.000	1.717	86	27-133	
Fluoranthene	2.000	1.926	96	26-137	
Pyrene	2.000	1.787	89	45-129	
Benzo (a) Anthracene	2.000	1.756	88	33-143	
Chrysene	2.000	1.711	86	17-168	
Benzo (k) Fluoranthene	2.000	1.947	97	24-159	
Benzo (b) Fluoranthene	2.000	1.635	82	24-159	
Benzo (a) Pyrene	2.000	1.841	92	17-163	
Indeno (1,2,3-c,d) Pyrene	2.000	1.597	80	25-175	
Dibenz (a,h) Anthracene	2.000	1.378	69	25-175	
Benzo (g,h,i) Perylene	2.000	1.274	64	25-157	





Quality Control - LCS/LCSD

Environmental Science International, Inc. 354 Uluniu Street, Suite 304

Kailua, HI 96734-2500

Project: Red Hill LTM 112066

Date Received:

10/24/13 Work Order: 13-10-1794 EPA 5030C

Preparation:

Method:

GC/MS / EPA 8260B

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Quality Control Sample ID		Matrix Instrument I		Date Prepa	ared Date A	Analyzed	LCS/LCSD B	/LCSD Batch Number				
099-13-057-27		Aqueo	us C	C/MS LL	10/26/13	10/26/	13 12:55	131026L01				
<u>Parameter</u>	<u>Spike</u> Added	LCS Conc.	<u>LCS</u> %Rec.	LCSD Conc.	LCSD %Rec.	%Rec. CL	<u>RPD</u>	RPD CL	Qualifiers			
Acetone	50.00	64.44	129	N/A	N/A	40-140	N/A	0-20				
Benzene	50.00	43.29	87	N/A	N/A	80-120	N/A	0-20				
Bromodichloromethane	50.00	43.40	87	N/A	N/A	75-120	N/A	0-20				
Bromoform	50.00	46.58	93	N/A	N/A	70-130	N/A	0-20				
Bromomethane	50.00	52.24	104	N/A	N/A	30-145	N/A	0-20				
2-Butanone	50.00	53.70	107	N/A	N/A	30-150	N/A	0-20				
Carbon Tetrachloride	50.00	44.68	89	N/A	N/A	65-140	N/A	0-20				
Chlorobenzene	50.00	41.74	83	N/A	N/A	80-120	N/A	0-20				
Chloroethane	50.00	42.64	85	N/A	N/A	60-135	N/A	0-20				
Chloroform	50.00	44.47	89	N/A	N/A	65-135	N/A	0-20				
Chloromethane	50.00	37.91	76	N/A	N/A	40-125	N/A	0-20				
Dibromochloromethane	50.00	45.85	92	N/A	N/A	60-135	N/A	0-20				
1,2-Dibromo-3-Chloropropane	50.00	47.48	95	N/A	N/A	50-130	N/A	0-20				
1,2-Dibromoethane	50.00	43.52	87	N/A	N/A	80-120	N/A	0-20				
1,2-Dichlorobenzene	50.00	43.54	87	N/A	N/A	70-120	N/A	0-20				
1,3-Dichlorobenzene	50.00	44.16	88	N/A	N/A	75-125	N/A	0-20				
1,4-Dichlorobenzene	50.00	44.28	89	N/A	N/A	75-125	N/A	0-20				
1,1-Dichloroethane	50.00	46.99	94	N/A	N/A	70-135						
1,2-Dichloroethane	50.00	43.84	88	N/A	N/A	70-130	N/A	0-20				
1,1-Dichloroethene	50.00	41.87	84	N/A	N/A	70-130	N/A	0-20				
c-1,2-Dichloroethene	50.00	45.17	90	N/A	N/A	70-125	N/A	0-20				
t-1,2-Dichloroethene	50.00	43.39	87	N/A	N/A	60-140	N/A	0-20				
1,2-Dichloropropane	50.00	43.00	86	N/A	N/A	75-125	N/A	0-20				
c-1,3-Dichloropropene	50.00	52.08	104	N/A	N/A	70-130	N/A	0-20				
t-1,3-Dichloropropene	50.00	40.53	81	N/A	N/A	55-140	N/A	0-20				
Ethylbenzene	50.00	49.12	98	N/A	N/A	75-125	N/A	0-20				
Methylene Chloride	50.00	46.60	93	N/A	N/A	55-140	N/A	0-20				
4-Methyl-2-Pentanone	50.00	48.20	96	N/A	N/A	60-135	N/A	0-20				
Styrene	50.00	45.75	92	N/A	N/A	65-135	N/A	0-20				
1,1,1,2-Tetrachloroethane	50.00	45.15	90	N/A	N/A	80-130	N/A	0-20				
1,1,2,2-Tetrachloroethane	50.00	42.63	85	N/A	N/A	65-130	N/A	0-20				
Tetrachloroethene	50.00	46.11	92	N/A	N/A	45-150	N/A	0-20				
Toluene	50.00	47.22	94	N/A	N/A	75-120	N/A	0-20				
1,2,4-Trichlorobenzene	50.00	48.26	97	N/A	N/A	65-135	N/A	0-20				
1,1,1-Trichloroethane	50.00	45.68	91	N/A	N/A	65-130	N/A	0-20				
Hexachloro-1,3-Butadiene	50.00	44.51	89	N/A	N/A	50-140	N/A	0-20				
1,1,2-Trichloroethane	50.00	45.53	91	N/A	N/A	75-125	N/A	0-20				

RPD: Relative Percent Difference. CL: Control Limits





Quality Control - LCS/LCSD

Environmental Science International, Inc.

Date Received:

Work Order:

13-10-1794

Kailua, HI 96734-2500

Preparation:

Method:

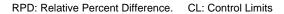
Date Received:

10/24/13

EPA 5030C

Project: Red Hill LTM 112066 Page 5 of 5

<u>Parameter</u>	<u>Spike</u> <u>Added</u>	LCS Conc.	LCS %Rec.	LCSD Conc.	LCSD %Rec.	%Rec. CL	<u>RPD</u>	RPD CL	<u>Qualifiers</u>
Trichloroethene	50.00	45.17	90	N/A	N/A	70-125	N/A	0-20	
1,2,3-Trichloropropane	50.00	43.40	87	N/A	N/A	75-125	N/A	0-20	
Vinyl Chloride	50.00	43.84	88	N/A	N/A	50-145	N/A	0-20	
p/m-Xylene	100.0	99.58	100	N/A	N/A	75-130	N/A	0-20	
o-Xylene	50.00	49.39	99	N/A	N/A	80-120	N/A	0-20	
Methyl-t-Butyl Ether (MTBE)	50.00	46.52	93	N/A	N/A	65-125	N/A	0-20	
Gasoline Range Organics	1000	1058	106	1093	109	80-120	3	0-20	







Sample Analysis Summary Report

Work Order: 13-10-1794				Page 1 of 1
<u>Method</u>	<u>Extraction</u>	Chemist ID	Instrument	Analytical Location
EPA 6020	EPA 3020A Total	598	ICP/MS 04	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	486	GC/MS LL	2

Location 1: 7440 Lincoln Way, Garden Grove, CA 92841 Location 2: 7445 Lampson Avenue, Garden Grove, CA 92841



Glossary of Terms and Qualifiers

Work Order: 13-10-1794 Page 1 of 1

Qualifiers	<u>Definition</u>
*	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.
В	Analyte was present in the associated method blank.
BU	Sample analyzed after holding time expired.
BV	Sample received after holding time expired.
DL	The Detection Limit (DL) is the smallest analyte concentration that can be demonstrated to be different from zero or a blank concentration at the 99% level of confidence.
E	Concentration exceeds the calibration range.
ET	Sample was extracted past end of recommended max. holding time.
HD	The chromatographic pattern was inconsistent with the profile of the reference fuel standard.
ICH	Initial calibration verification recovery is above the control limit for this analyte.
ICJ	Initial calibration verification recovery is below the control limit for this analyte.
IH	Calibration verification recovery is above the control limit for this analyte.
IJ	Calibration verification recovery is below the control limit for this analyte.
J	Analyte was detected at a concentration below the LOQ and above the DL. Reported value is estimated.
JA	Analyte positively identified but quantitation is an estimate.
LOD	The Limit of Detection (LOD) is the smallest amount or concentration of a substance that must be present in a sample in order to be detected at 99% confidence level.
LOQ	The Limit of Quantitation (LOQ) is the lowest concentration of a substance that produces a quantitative result within specified limits of precision and bias.
Q	Spike recovery and RPD control limits do not apply resulting from the parameter concentration in the sample exceeding the spike concentration by a factor of four or greater.
SG	The sample extract was subjected to Silica Gel treatment prior to analysis.

- 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).
- Χ % Recovery and/or RPD out-of-range.
- Ζ 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.

Calscience Environmental Laboratories, Inc.

WO # / LAB USE ONLY

CHAI	N OF	CUS	TODY	RECOR
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Popular

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.

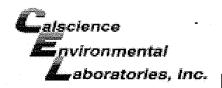
13-10-1794

Date Page.

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WORK ORDER #: **13-10-** □ □ □ □

SAMPLE RECEIPT FORM

Cooler <u>/</u> of <u>3</u>

CLIENT: ESI	DATE:	10/24/	<u>/ 13</u>
TEMPERATURE: Thermometer ID: SC2 (Criteria: 0.0 °C – 6.0 °C, not fro	zen except se	ediment/tissue	∍)
Temperature $\underline{2} \cdot \underline{5}$ °C - 0.2 °C (CF) = $\underline{2} \cdot \underline{3}$ °C	☐ Blank	☑ Sample	•
☐ Sample(s) outside temperature criteria (PM/APM contacted by:)	• •		
☐ Sample(s) outside temperature criteria but received on ice/chilled on sam	e day of samp	ling.	
☐ Received at ambient temperature, placed on ice for transport by	Courier.		
Ambient Temperature: ☐ Air ☐ Filter		Checked by	y: <u>836</u>
CUSTODY SEALS INTACT:			
	nt □ N/A	Checked by	836
☐ Cooler ☐ ☐ No (Not Intact) ☑ Not Prese ☐ Sample ☐ Not Prese		Checked by	
2 Gampie 1 Tvo (Not intact) 1 Not i rese		Onecked by	. 0/3
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 labe	els.		
☐ 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	Ø		
Aqueous samples received within 15-minute holding time			_
☐ pH ☐ Residual Chlorine ☐ Dissolved Sulfides ☐ Dissolved Oxygen	🗆		Z
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:	🗆		Z
Solid: □4ozCGJ □8ozCGJ □16ozCGJ □Sleeve () □EnCc	res [®]	Cores® □_	
Aqueous: ŹVOA ZVOAh □VOAna₂ □125AGB □125AGBh □125AGB	Bp ZÍ1AGB [□1AGB na ₂ □	1AGB s
□500AGB Ø500AGJ □500AGJs □250AGB □250CGB □250CG			
□250PB ☑250PB n / □125PB □125PB znna □100PJ □100PJ na ₂ □			
Air: Tedlar [®] Canister Other: Trip Blank Lot#: 13 10 57 Container: C: Clear A: Amber P: Plastic G: Glass J: Jar B: Bottle Z: Ziploc/Resealable Bag E: Proceptative: b: HCL p: HNC pa. No. 2 par. No	Énvelope F	Reviewed by:	



WORK ORDER #: 13-10- 1 7 9

SAMPLE RECEIPT FORM

Cooler $\frac{2}{2}$ of $\frac{3}{2}$

CLIENT: ESI	DATE:	10/	/13
TEMPERATURE: Thermometer ID: SC2 (Criteria: 0.0 °C – 6.0 °C, not froze	n except se	ediment/tiss	ue)
Temperature <u>2 • & </u> °C - 0.2 °C (CF) = <u>2 • 6</u> °C	☐ Blank	☑ Samp	ole
☐ Sample(s) outside temperature criteria (PM/APM contacted by:).			
☐ Sample(s) outside temperature criteria but received on ice/chilled on same d	ay of samp	ling.	
\square Received at ambient temperature, placed on ice for transport by Co	urier.		
Ambient Temperature: □ Air □ Filter		Checked	by: <u>836</u>
CUSTODY SEALS INTACT:			0.7.5
□ Cooler □ □ No (Not Intact) □ Not Present	□ N/A		
☑ Sample □ □ No (Not Intact) 및 Not Present		Checked	by: <u>89)</u>
CAMPI E CONDITIONI.	V	N.I	N I / A
	Yes	No	N/A
Chain-Of-Custody (COC) document(s) received with samples	· _	· 🔲	
COC document(s) received complete	. <u>/</u> Z		
☐ 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		. Ц	
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	Z		
Aqueous samples received within 15-minute holding time			
☐ pH ☐ Residual Chlorine ☐ Dissolved Sulfides ☐ Dissolved Oxygen			
Proper preservation noted on COC or sample container	>		
Unpreserved vials received for Volatiles analysis			
Volatile analysis container(s) free of headspace	. /		
Tedlar bag(s) free of condensation CONTAINER TYPE:			Z
Solid: □4ozÇGJ □8ozCGJ □16ozCGJ □Sleeve () □EnCore	s [®] □Terra	Cores® 🗆	
Aqueous: ДVOA □VOAh □VOAna₂ □125AGB □125AGBh □125AGBp	Z1AGB	□1AGB na ₂	□1AGB s
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Air: □Tedlar [®] □Canister Other: □ Trip Blank Lot#:	Labeled		
Container: C: Clear A: Amber P: Plastic G: Glass J: Jar B: Bottle Z: Ziploc/Resealable Bag E: En		Reviewed by	



Supplemental Report 1



CALSCIENCE

WORK ORDER NUMBER: 13-10-1794

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

Richard Vellas

Approved for release on 10/31/2013 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.



Contents

Client Project Name: Red Hill LTM 112066 Work Order Number: 13-10-1794

1	Work Order Narrative	3
2	Client Sample Data	4 4
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4	Sample Analysis Summary	7
5	Glossary of Terms and Qualifiers	8
6	Chain of Custody/Sample Receipt Form	9



Work Order Narrative

Work Order: 13-10-1794 Page 1 of 1

Condition Upon Receipt:

Samples were received under Chain of Custody (COC) on 10/24/13. They were assigned to Work Order 13-10-1794.

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.

Subcontractor Information:

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

U



Lead

Lead

Analytical Report

Environmental Science International, Inc. Date Received: 10/24/13 354 Uluniu Street, Suite 304 Work Order: 13-10-1794 Kailua, HI 96734-2500 Preparation: N/A

> Method: EPA 200.8 Units: ug/L

> > 1

Page 1 of 1 Project: Red Hill LTM 112066

Client Sample N	Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
ES041UF		13-10-1794-7-A	10/21/13 09:00	Aqueous	ICP/MS 04	10/24/13	10/25/13 20:58	131024L02D
Comment(s):	- Results were evaluated t	o the MDL (DL), cond	centrations >= t	o the MDL (D	L) but < RL (LO	Q), if found, are	qualified with a	"J" flag.
<u>Parameter</u>		Resu	<u>ilt</u>	<u>RL</u>	<u>MDL</u>	<u>DF</u>	<u>C</u>	<u>lualifiers</u>

Method Blank	099-16-094-51	N/A	Aqueous	ICP/MS 04	10/24/13	10/25/13 20:38	131024L02D
Comment(s):	- Results were evaluated to the MDL (DL), co	oncentration	ns >= to the MDL (DL) but < RL (LC	Q), if found, are	qualified with	a "J" flag.
Parameter	Re	sult	RL	MDL	DF		Qualifiers

1.00

1.00

0.0898

0.0898

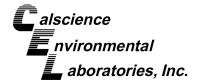
<0.0898

<0.0898



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





Quality Control - Spike/Spike Duplicate

Environmental Science International, Inc.

354 Uluniu Street, Suite 304 Kailua, HI 96734-2500 Date Received:

10/24/13

Work Order:

13-10-1794

Preparation: Method:

EPA 200.8

N/A

Project: Red Hill LTM 112066

Page 1 of 1

Quality Control Sample ID		Matrix		Instrument	Date P	repared	Date Analyzed	MS	/MSD Batch	Number
ES041UF		Aqueou	s	ICP/MS 04	10/24/1	13	10/25/13 20:48	131	024S02D	
Parameter	Sample Conc.	Spike Added	MS Conc.	<u>MS</u> %Rec.	MSD Conc.	MSD %Rec.	%Rec. CL	RPD	RPD CL	Qualifiers
Lead	ND	100.0	99.99	100	82.72	83	80-120	19	0-20	





Quality Control - LCS

Environmental Science International, Inc. 354 Uluniu Street, Suite 304

Kailua, HI 96734-2500

Project: Red Hill LTM 112066

Date Received:

Work Order:

Preparation:

Method:

10/24/13

13-10-1794 N/A

EPA 200.8

Page 1 of 1

Quality Control Sample ID	Matrix	x Instrument Da		alyzed	LCS Batch Number
099-16-094-51	Aqueous	ICP/MS 04	10/25/13	20:44	131024L02D
Parameter	Spike Added	Conc. Recovered	LCS %Rec.	%Rec.	CL Qualifiers
Lead	100.0	109.9	110	80-120	





Sample Analysis Summary Report

Work Order: 13-10-1794				Page 1 of 1
Method	Extraction	Chemist ID	<u>Instrument</u>	Analytical Location
EPA 200.8	N/A	598	ICP/MS 04	1



Glossary of Terms and Qualifiers

Work Order: 13-10-1794 Page 1 of 1

<u>Qualifiers</u>	<u>Definition</u>
*	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.
В	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.
Е	Concentration exceeds the calibration range.
ET	Sample was extracted past end of recommended max. holding time.
HD	The chromatographic pattern was inconsistent with the profile of the reference fuel standard.
ICH	Initial calibration verification recovery is above the control limit for this analyte.
ICJ	Initial calibration verification recovery is below the control limit for this analyte.
IH	Calibration verification recovery is above the control limit for this analyte.
IJ	Calibration verification recovery is below the control limit for this analyte.
J	Analyte was detected at a concentration below the LOQ and above the DL. Reported value is estimated.
JA	Analyte positively identified but quantitation is an estimate.
LOD	The Limit of Detection (LOD) is the smallest amount or concentration of a substance that must be present in a sample in order to be detected at 99% confidence level.
LOQ	The Limit of Quantitation (LOQ) is the lowest concentration of a substance that produces a quantitative result within specified limits of precision and bias.
Q	Spike recovery and RPD control limits do not apply resulting from the parameter concentration in the sample exceeding the spike concentration by a factor of four or greater.
SG	The sample extract was subjected to Silica Gel treatment prior to analysis

- SG The sample extract was subjected to Silica Gel treatment prior to analysis.
- Undetected at Detection Limit (DL) and is reported as less than the Limit of Detection (LOD). U
- Χ % Recovery and/or RPD out-of-range.
- Ζ 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.

Calscience Environmental Laboratories, Inc. 7440 Lincoln Way, Garden Grove, CA 92841-1427 • (714) 895-5494

WO # / LAB USE ONLY

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NEY	SAMPLE ID	DATE	TIME	MATRIX	CONT.	dun	Pres	Fee	S _X	\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\	HGT.	TPH	BTE	VOC	Öxòc	Prep	svo	Pest	PCB	PAH	T22 i	C.	2	7	
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11/01/12 Revision

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WORK ORDER #: **13-10-** □ □ □ □

SAMPLE RECEIPT FORM

Cooler <u>/</u> of <u>3</u>

CLIENT: ESI DATE:	10/24/	<u>′13</u>							
TEMPERATURE: Thermometer ID: SC2 (Criteria: 0.0 °C – 6.0 °C, not frozen except se	ediment/tissue)							
Temperature °C - 0.2 °C (CF) = °C □ Blank	✓ Sample								
☐ Sample(s) outside temperature criteria (PM/APM contacted by:).									
\square Sample(s) outside temperature criteria but received on ice/chilled on same day of sampling.									
☐ Received at ambient temperature, placed on ice for transport by Courier.									
Ambient Temperature: ☐ Air ☐ Filter	Checked by	: <u>836</u>							
CUSTODY SEALS INTACT:	<u> </u>	836							
□ Cooler □ □ No (Not Intact) □ Not Present □ N/A	Checked by								
Sample □ □ No (Not Intact) □ Not Present	Checked by	: 873							
SAMPLE CONDITION: Yes	No	N/A							
Chain-Of-Custody (COC) document(s) received with samples									
COC document(s) received complete									
☐ Collection date/time, matrix, and/or # of containers logged in based on sample labels.									
☐ No analysis requested. ☐ Not relinquished. ☐ No date/time relinquished.									
Sampler's name indicated on COC									
Sample container label(s) consistent with COC									
Sample container(s) intact and good condition									
Proper containers and sufficient volume for analyses requested									
Analyses received within holding time									
Aqueous samples received within 15-minute holding time									
□ pH □ Residual Chlorine □ Dissolved Sulfides □ Dissolved Oxygen □		Ø							
Proper preservation noted on COC or sample container									
Unpreserved vials received for Volatiles analysis Volatile analysis container(s) free of headspace	<u></u>	П							
·	. Ц								
Tedlar bag(s) free of condensation □ CONTAINER TYPE:	Ш								
Solid: 40zCGJ 80zCGJ 160zCGJ Sleeve () EnCores® Terra									
Aqueous: ZVOA ZVOAh □VOAna₂ □125AGB □125AGBh □125AGBp Z1AGB [□1AGB na ₂ □	1AGB s							
□500AGB Ø500AGJ □500AGJs □250AGB □250CGB □250CGBs □1PB	□1PB na □5	500PB							
□250PB Ø250PBn/ □125PB □125PBznna □100PJ □100PJna ₂ □ □ □									
Air: Tedlar® Canister Other: Trip Blank Lot#: 13 10 57 15 Labeled Container: C: Clear A: Amber P: Plastic G: Glass J: Jar B: Bottle Z: Ziploc/Resealable Bag E: Envelope Freservative: h: HCL n: HNO ₃ na ₂ :Na ₂ S ₂ O ₃ na: NaOH p: H ₃ PO ₄ s: H ₂ SO ₄ u: Ultra-pure znna: ZnAc ₂ +NaOH f: Filtered	/Checked by: Reviewed by: _ Scanned by:	802							

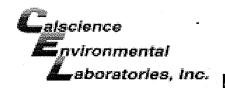


WORK ORDER #: 13-10- 1 2 9 4

SAMPLE RECEIPT FORM Cooler 2 of _

DATE: <u>10 / / 13</u>	3

CLIENT:	DAIE:_	107	/ 13_
TEMPERATURE: Thermometer ID: SC2 (Criteria: 0.0 °C – 6.0 °C, not froz	en except se	diment/tissu	ıe)
Temperature 2 · 8 °C - 0.2 °C (CF) = 2 · 6 °C	☐ Blank	✓ Sampl	e
☐ Sample(s) outside temperature criteria (PM/APM contacted by:).		,	_
☐ Sample(s) outside temperature criteria but received on ice/chilled on same	day of campl	ina	
		ng.	
☐ Received at ambient temperature, placed on ice for transport by C	ourier.		836
Ambient Temperature: Air Filter		Checked b	y: <u> </u>
CUSTODY SEALS INTACT:			Management of the second of th
□ Cooler □ □ No (Not Intact) □ Not Present	□ N/A	Checked b	v: 836
✓ Sample □ □ No (Not Intact) □ Not Present		Checked b	-
SAMPLE CONDITION:	Yes	No	N/A
Chain-Of-Custody (COC) document(s) received with samples	,	. 🗆	
COC document(s) received complete			
\square Collection date/time, matrix, and/or # of containers logged in based on sample labels	S.		
☐ No analysis requested. ☐ Not relinquished. ☐ No date/time relinquished.			
Sampler's name indicated on COC	. 🗷		
Sample container label(s) consistent with COC	. Z		
Sample container(s) intact and good condition	. 🗷		
Proper containers and sufficient volume for analyses requested	. 🖊		
Analyses received within holding time	. 🖊		
Aqueous samples received within 15-minute holding time			
☐ pH ☐ Residual Chlorine ☐ Dissolved Sulfides ☐ Dissolved Oxygen	🗆		
Proper preservation noted on COC or sample container	🗲		
Unpreserved vials received for Volatiles analysis			
Volatile analysis container(s) free of headspace	/🗹		
Tedlar bag(s) free of condensation	🗆		
CONTAINER TYPE:			
Solid: □4ozCGJ □8ozCGJ □16ozCGJ □Sleeve () □EnCore			
Aqueous: ⊅VOA □VOAh □VOAna₂ □125AGB □125AGBh □125AGBþ	o Ø1AGB □]1AGB na₂ [∃1AGB s
Ø500AGB □500AGJ □500AGJs □250AGB □250CGB □250CGB	s □1PB [□1PB na □	1500PB
□250PB ☑250PBn¼□125PB □125PB znna □100PJ □100PJ na₂ □_	<u></u>		
Air: □Tedlar [®] □Canister Other: □ Trip Blank Lot# :		Checked by	
Container: C: Clear A: Amber P: Plastic G: Glass J: Jar B: Bottle Z: Ziploc/Resealable Bag E: E		eviewed by:	
Preservative: h: HCL n: HNO3 na2:Na2S2O3 na: NaOH p: H3PO4 s: H2SO4 u: Ultra-pure znna: ZnAc2+N	aoh T: Filtered	ocanned by	

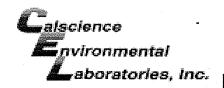


WORK ORDER #: **13-10-** □ □ □ □

SAMPLE RECEIPT FORM

Cooler $\frac{3}{2}$ of $\frac{3}{2}$

CLIENT: ESI	DATE:	10/24	/13
TEMPERATURE: Thermometer ID: SC2 (Criteria: 0.0 °C – 6.0 °C, not froze		_	
Temperature $\frac{2}{\sqrt{2}} \cdot \frac{2}{\sqrt{2}} ^{\circ}\text{C} \cdot 0.2 ^{\circ}\text{C} (CF) = \frac{2}{\sqrt{2}} \cdot \frac{2}{\sqrt{2}} ^{\circ}\text{C}$	☐ Blank	✓ Sample	Ð
☐ Sample(s) outside temperature criteria (PM/APM contacted by:).			
☐ Sample(s) outside temperature criteria but received on ice/chilled on same	day of sampl	ing.	
☐ Received at ambient temperature, placed on ice for transport by C	ourier.		_
Ambient Temperature: Air Filter		Checked b	y: <u>83 (</u>
CUSTODY SEALS INTACT:	2 Marine	i i	
□ Cooler □ □ No (Not Intact) ☑ Not Present	□ N/A	Checked by	y: 836
Sample □ □ No (Not Intact) □ Not Present		Checked by	
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	_		Ц
Sample container(s) intact and good condition	_		
Proper containers and sufficient volume for analyses requested	' /		
Analyses received within holding time	. 🗷		
Aqueous samples received within 15-minute holding time			_
□ pH □ Residual Chlorine □ Dissolved Sulfides □ Dissolved Oxygen			
Proper preservation noted on COC or sample container	. ⊿		
Unpreserved vials received for Volatiles analysis Volatile analysis container(s) free of headspace		 1	
Tedlar bag(s) free of condensation			
CONTAINER TYPE:	🗀		/ LJ
Solid: □4ozCGJ □8ozCGJ □16ozCGJ □Sleeve () □EnCore	es [®] □Terra	Cores [®] □_	A
Aqueous: ZVOA □VOAh □VOAna₂ □125AGB □125AGBh □125AGBp	☑1AGB [□1AGB na ₂ □	∃1AGB s
□500AGB Ø500AGJ □500AGJs □250AGB □250CGB	s □1PB	□1PB na □	500PB
□250PB			
Air: Tedlar® Canister Other: Trip Blank Lot#:		-	
Container: C: Clear A: Amber P: Plastic G: Glass J: Jar B: Bottle Z: Ziploc/Resealable Bag E: E Preservative: h: HCL n: HNO ₃ na ₂ :Na ₂ S ₂ O ₃ na: NaOH p: H ₃ PO ₄ s: H ₂ SO ₄ u: Ultra-pure znna: ZnAc ₂ +N ₆	,	Reviewed by: Scanned by	



WORK ORDER #: **13-10-** □ □ □ □

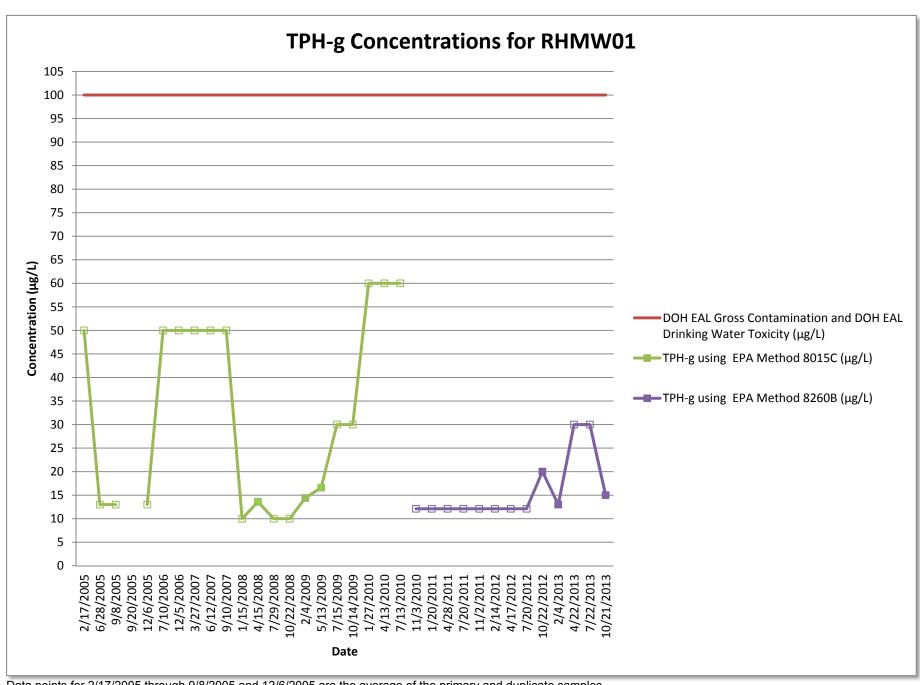
SAMPLE RECEIPT FORM

Cooler $\frac{3}{2}$ of $\frac{3}{2}$

CLIENT: ESI	DATE:	10/24	/ 13
TEMPERATURE: Thermometer ID: SC2 (Criteria: 0.0 °C – 6.0 °C, not from the second secon	zen except se	ediment/tissue	
☐ Sample(s) outside temperature criteria (PM/APM contacted by:)		•	
☐ Sample(s) outside temperature criteria but received on ice/chilled on sam		lina.	
☐ Received at ambient temperature, placed on ice for transport by		9.	
Ambient Temperature: □ Air □ Filter		Checked by	v. 836
			,, <u> </u>
CUSTODY SEALS INTACT:			6
□ Cooler □ □ No (Not Intact) ☑ Not Prese	nt □ N/A		
☑ Sample □ □ No (Not Intact) □ Not Prese	nt	Checked by	1: <u>895</u>
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 labe	5		
☐ 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	Z		
Proper containers and sufficient volume for analyses requested			
Analyses received within holding time	' /		
Aqueous samples received within 15-minute holding time	-		
☐ pH ☐ Residual Chlorine ☐ Dissolved Sulfides ☐ Dissolved Oxygen	🗆		Z
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:	🗆		K
Solid: □4ozCGJ □8ozCGJ □16ozCGJ □Sleeve() □EnCc	ores [®] □Terra	Cores [®] □_	
Aqueous: ZVOA □VOAh □VOAna₂ □125AGB □125AGBh □125AG	Bp Z1AGB [□1AGB na ₂ □]1AGB s
□500AGB Ø500AGJ □500AGJs □250AGB □250CGB □250CG	B s □1PB	□1PB na □	500PB
□250РВ ☑ 250РВ п ұ□125РВ □125РВ znna □100РЈ □100РЈ na ₂ □			
Air: ☐Tedlar® ☐Canister Other: ☐ Trip Blank Lot#: Container: C: Clear A: Amber P: Plastic G: Glass J: Jar B: Bottle Z: Ziploc/Resealable Bag E		/Checked by: Reviewed by:	
Preservative: h: HCL n: HNO ₃ na ₂ :Na ₂ S ₂ O ₃ na: NaOH p: H ₃ PO ₄ s: H ₂ SO ₄ u: Ultra-pure znna: ZnAc ₂ :	•		

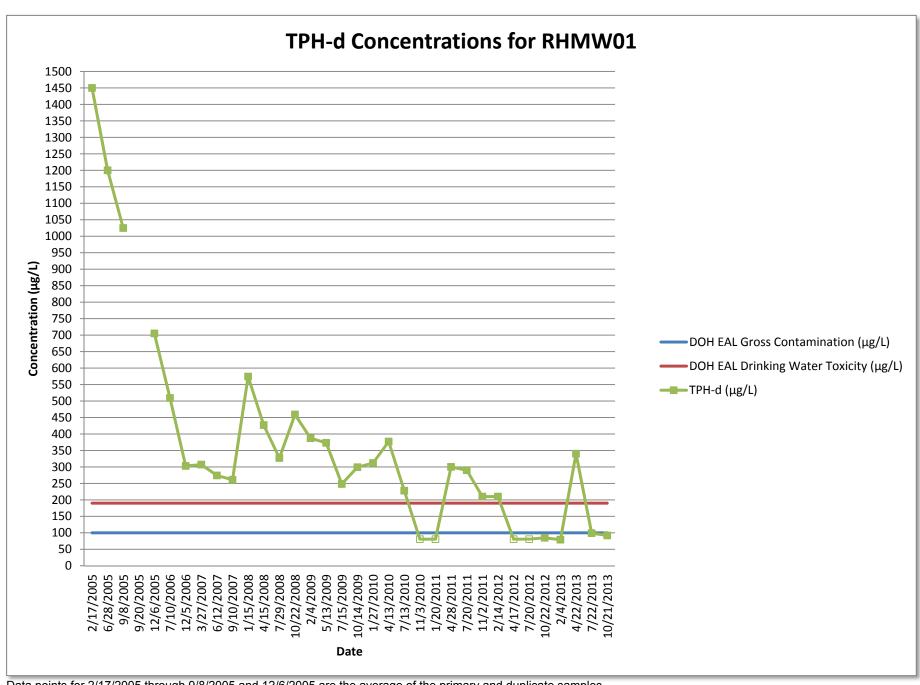
APPENDIX D Historical Groundwater Exceedance Trends





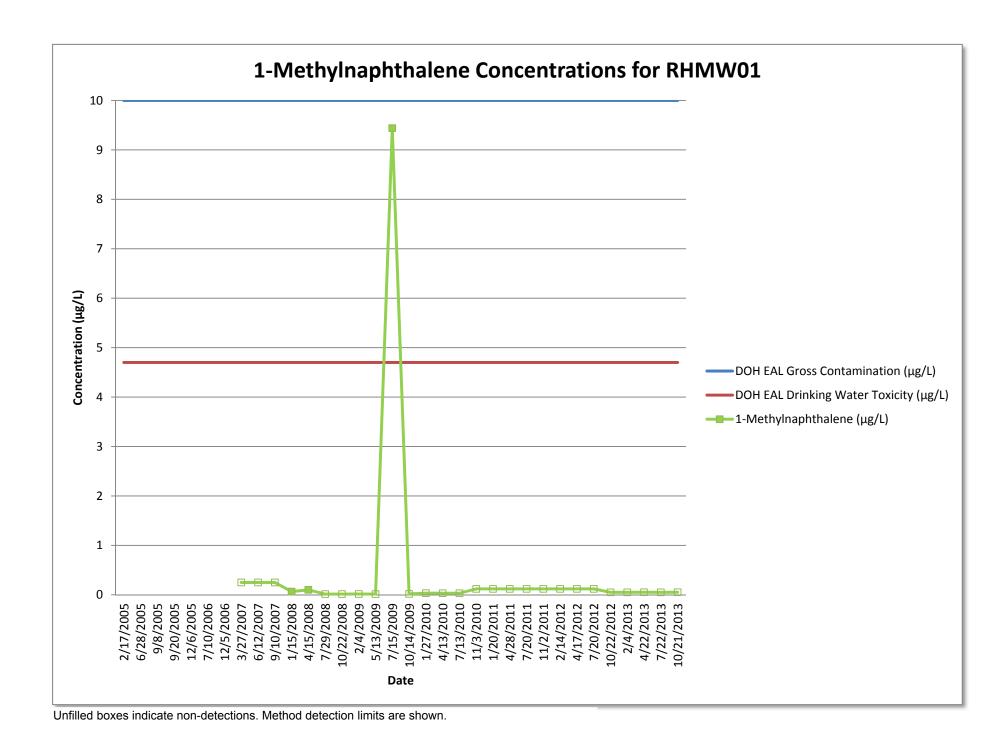
Data points for 2/17/2005 through 9/8/2005 and 12/6/2005 are the average of the primary and duplicate samples. Unfilled boxes indicate non-detections. Method detection limits are shown.



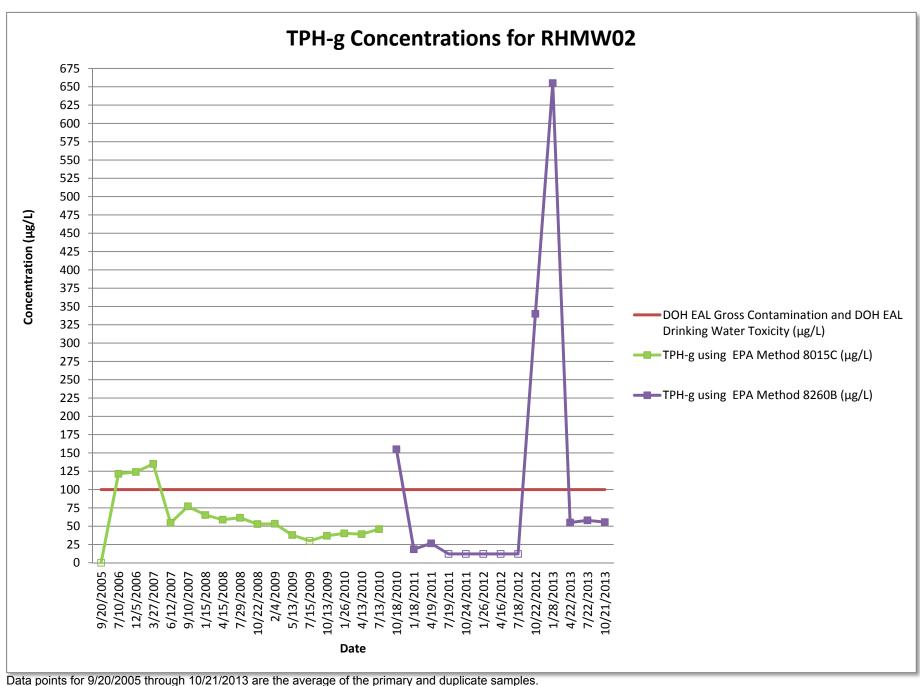


Data points for 2/17/2005 through 9/8/2005 and 12/6/2005 are the average of the primary and duplicate samples. Unfilled boxes indicate non-detections. Method detection limits are shown.





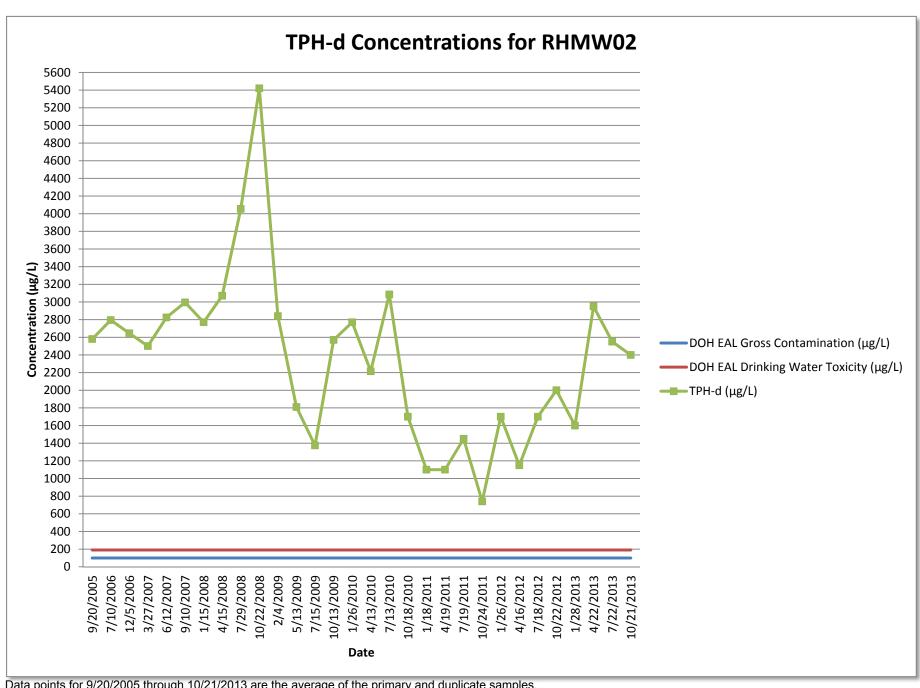




Unfilled boxes indicate non-detections. Method detection limits are shown.

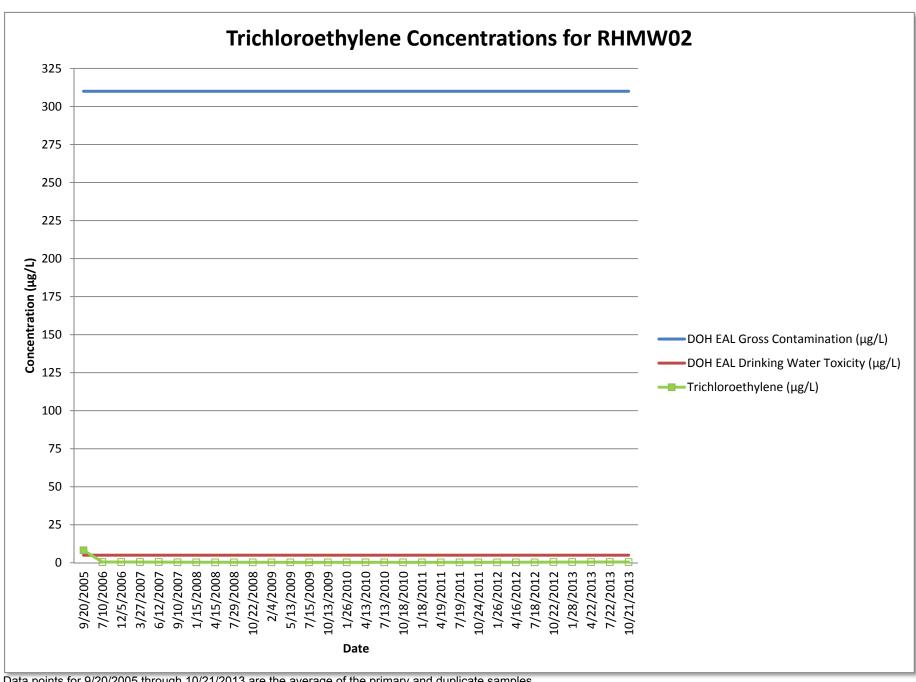
Primary sample results are shown for 1/26/2012 and 7/18/2012; all other concentrations are the average of the primary and duplicate sample results.





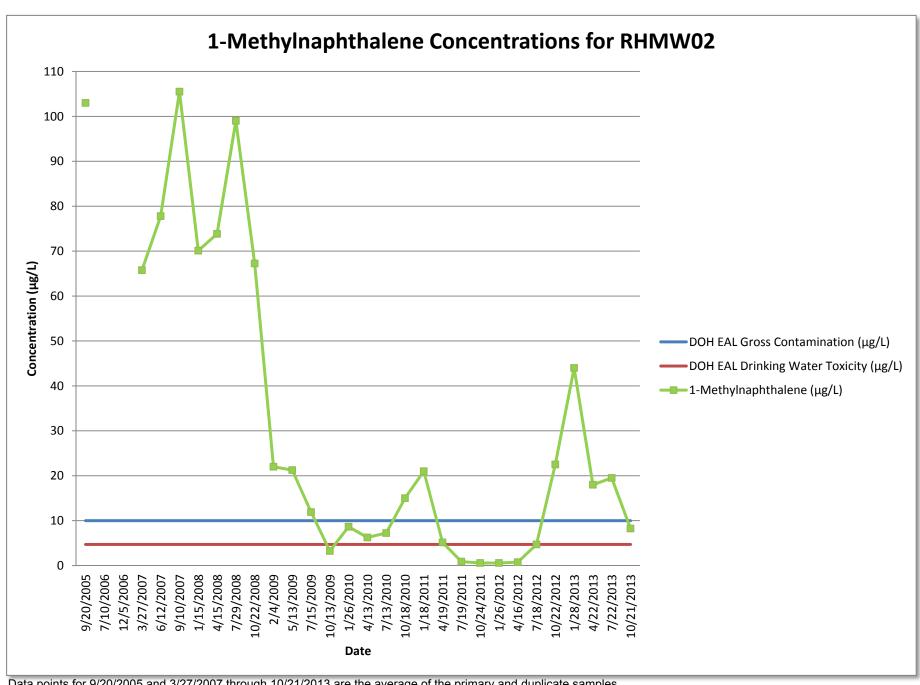
Data points for 9/20/2005 through 10/21/2013 are the average of the primary and duplicate samples. Unfilled boxes indicate non-detections. Method detection limits are shown.





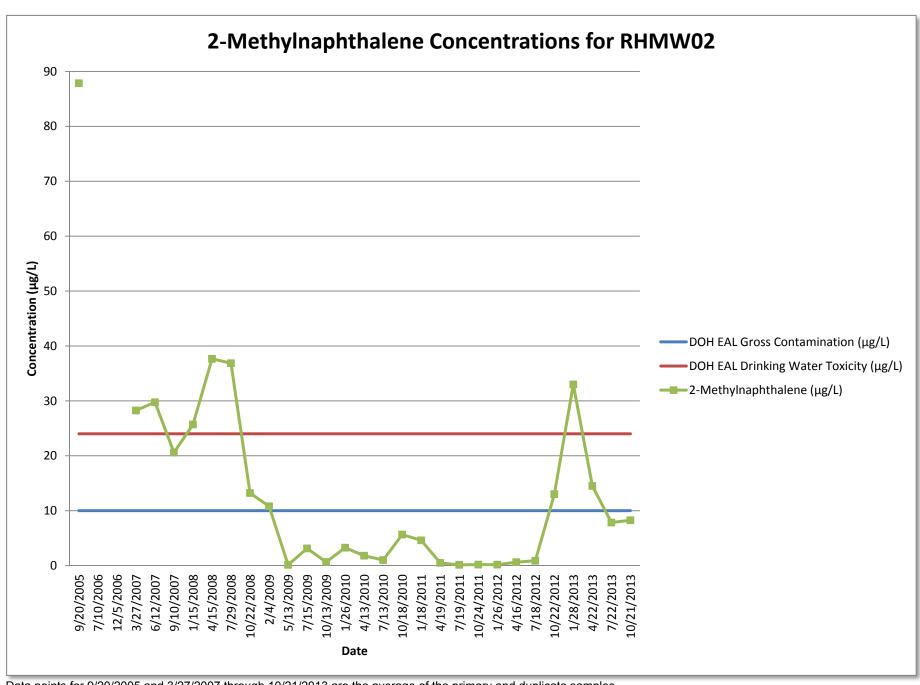
Data points for 9/20/2005 through 10/21/2013 are the average of the primary and duplicate samples. Unfilled boxes indicate non-detections. Method detection limits are shown.





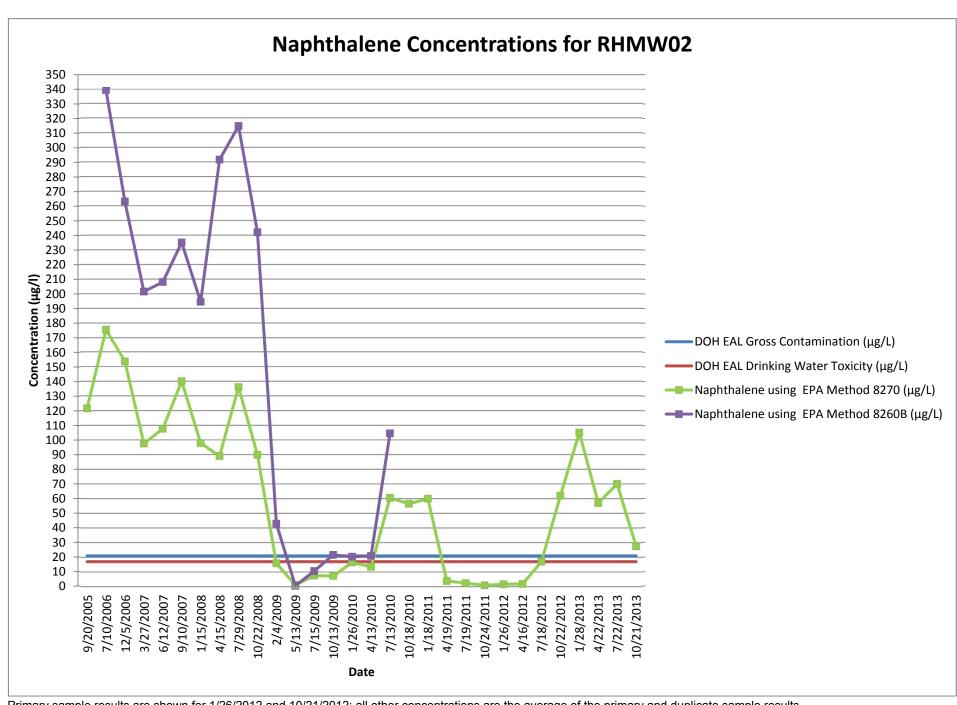
Data points for 9/20/2005 and 3/27/2007 through 10/21/2013 are the average of the primary and duplicate samples. Unfilled boxes indicate non-detections. Method detection limits are shown.





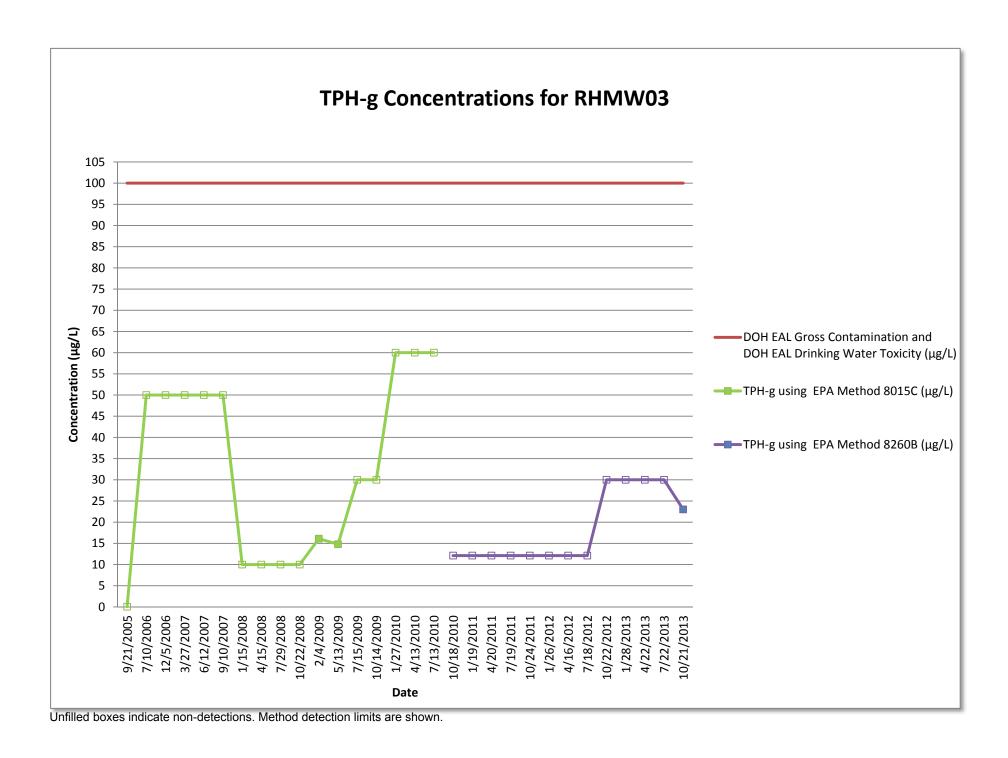
Data points for 9/20/2005 and 3/27/2007 through 10/21/2013 are the average of the primary and duplicate samples. Unfilled boxes indicate non-detections. Method detection limits are shown.



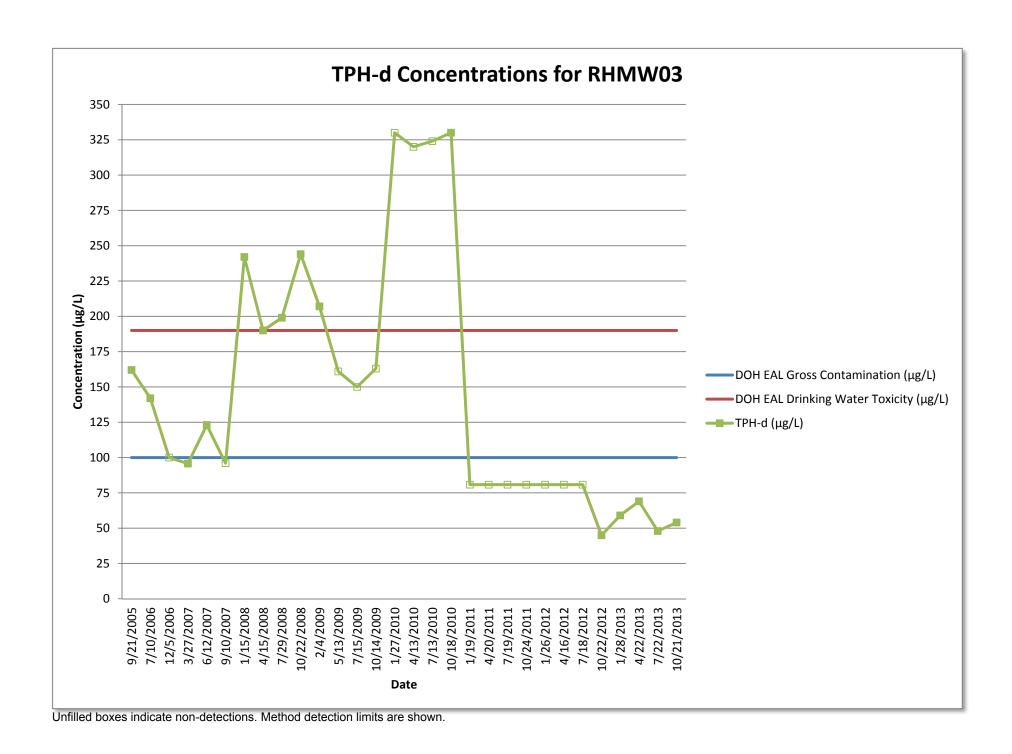


Primary sample results are shown for 1/26/2012 and 10/21/2012; all other concentrations are the average of the primary and duplicate sample results. Unfilled boxes indicate non-detections. Method detection limits are shown.

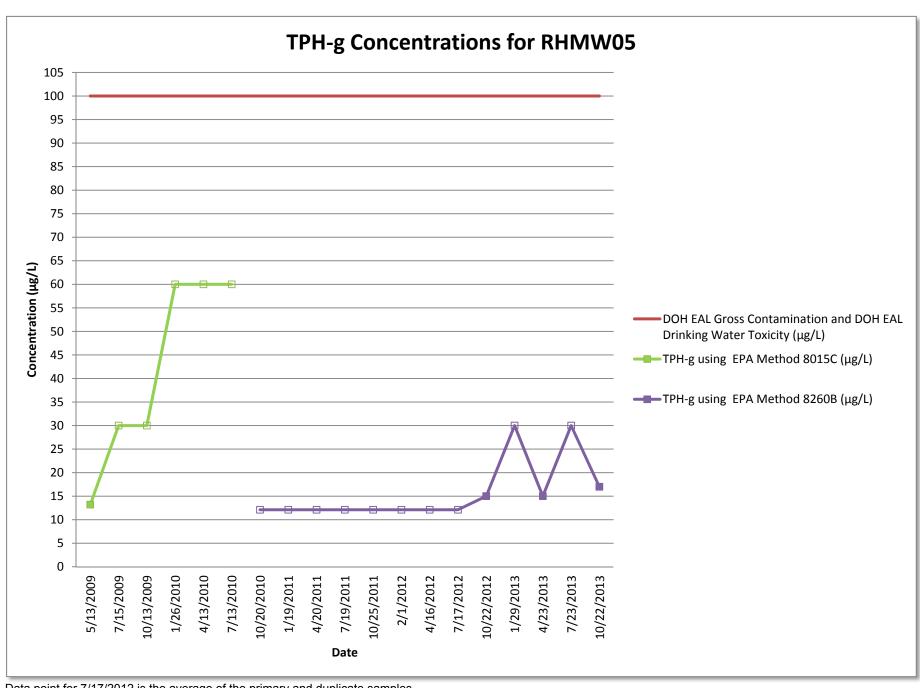






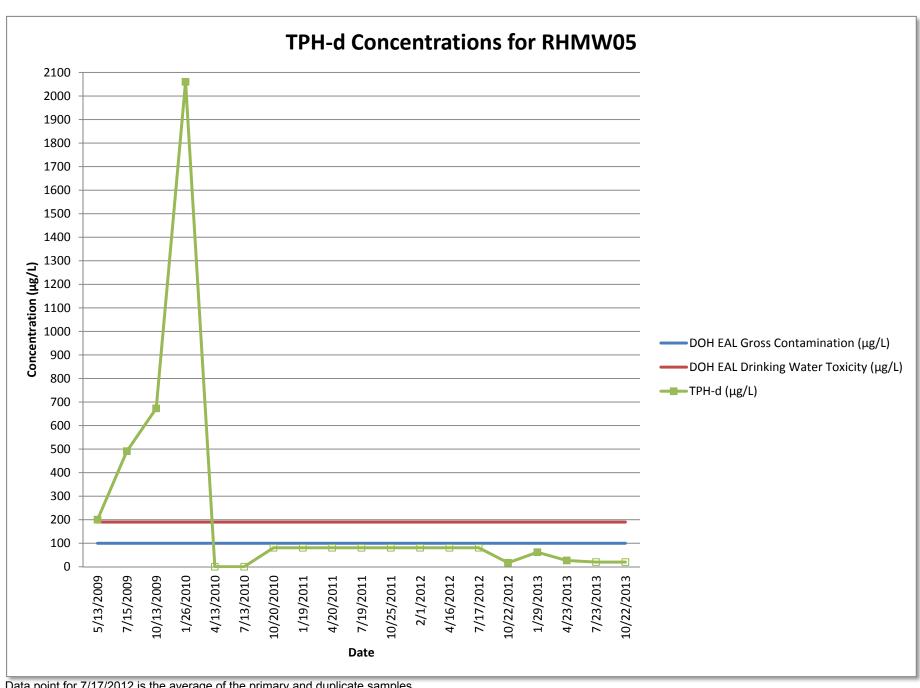






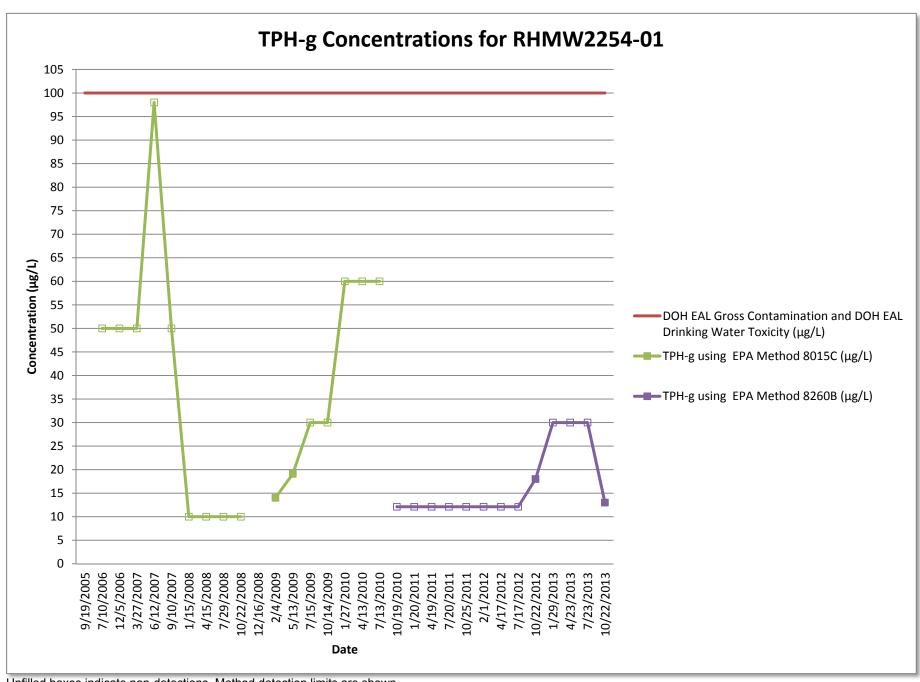
Data point for 7/17/2012 is the average of the primary and duplicate samples. Unfilled boxes indicate non-detections. Method detection limits are shown. Possible laboratory contamination for 10/23/2012 and 11/22/2013 sampling event.





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.

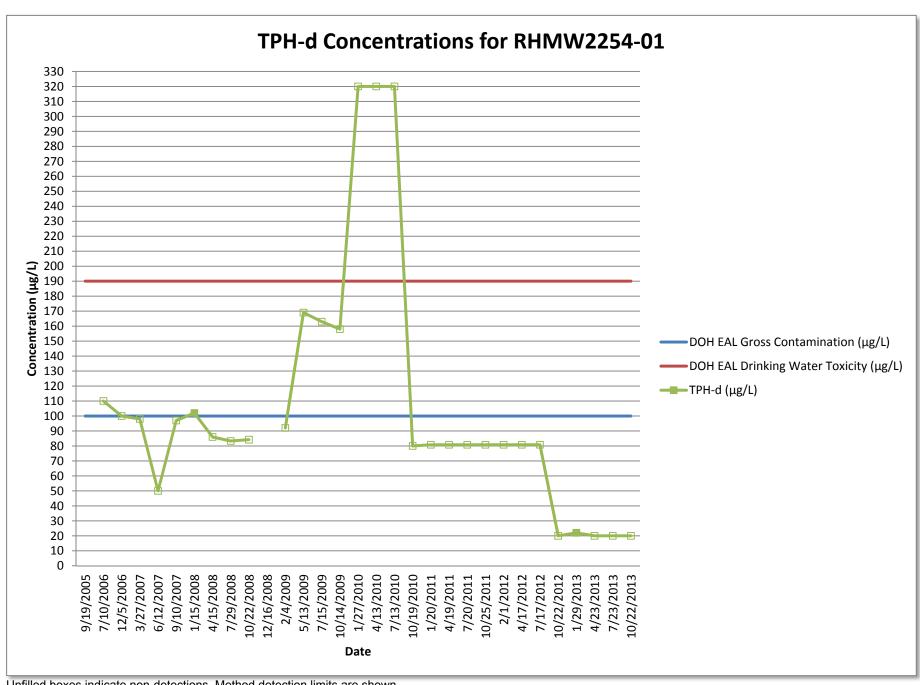




Unfilled boxes indicate non-detections. Method detection limits are shown.

Possible laboratory contamination for 10/23/2012 and 10/22/2013 sampling event.





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



APPENDIX E Waste Disposal Manifest



V 12/11...

3 ,	ıl	NO. I LAMADOOLIO	1. Generator ID Number			Jo Benedick			1 4 197			
4	1	NON-HAZARDOUS WASTE MANIFEST		000 050	<i>R</i> .∩ 1	2. Page 1 of 1	3. Emergency Respon		4. Waste T	racking N		000001504
	-	5. Generator's Name and Maili	no Address			- 1	808-206-		han malline and	000)		000021584
		COMNAVREG HAV	VĂII, C/O NA	VFAC HAW	AII. COI	DE PRJ42	Generator's Site Addre	s (ii ainerent t	nan malling addr	9SS)	н	IC8553-05
		400 MARSHALL	ROAD, ATTN:	ESTRELI	TA HIGA		RED	HILL B	ULK FUE	L STO		
	1.	ЈВРНН, НІ 968				1	AIEA	, HI 9	6701			
		Generator's Phone: 6. Transporter 1 Company Nam	<u>808-471-</u>	4216					11.0 504.10			
	`								U.S. EPA ID	Number		
	 -	PACIFIC COMME 7. Transporter 2 Company Nam		CES, LLC		80	<u>8-545-4599</u>		H I	<u>R 0</u>	0 0 0	97824
	' '	7. Hansporter & Company Nan	i¢						U.S. EPA ID	Number		
	-	<u>UNITEK SOLVEN</u> B. Designated Facility Name an	IT SERVICES,	<u>INCOA</u>	HII	808	3-682-8284				3 2 4 4	3715
				TNC					U.S. EPA ID	Number		į
		UNITEK SOLVEN 91-125 KAOMI		THC.					11 T	D 0	0 0 1	1 2 7 1 5
		KAPOLEI, HI	96707						пт	ט פ	0 2 4	13715
	F	acility's Phone:	808-682-	0284				,	<u> </u>	r——		
		9. Waste Shipping Name	and Description				10. Cont		11. Total	12. Unit		
		1.					No.	Туре	Quantity	Wt./Vol.		
뚱		" MATERIA	L NOT REGULA	TED BY	DOT							
ΙĔ		(WELL PURG	E AND DECONT	'AMINATI	ON WATER)						NON-RCRA
GENERATOR	i _						001	DM	00020	G		
晹		2.										
li												i i
	Ŀ	3.										
	ĺ	3.				•						W. Carlotte
									i			
	L				****							
	1.	4.	2011								4.	
		UG300	TPM		PH.	6						
	1:	3. Special Handling Instructions	s and Additional Information		(1							
H		9b1:NR										
8							2000	051				PPM
	1		ION: I HEREBY DECLA	ARE THAT THE	CONTENTS OF T	HTS CONSTGMM	2008	9b1:	V Desarton		HALOGEN:	
		GENERATOR'S CERTIFICAT SHIPPING NAME (WHERE A	PPLICABLE) AND ARE (CLASSIFIED, P	ACKED, MARKED	, AND LABEL	ENT ARE FULLY AN ED AND ARE IN AL	ACCURATEL	IN PROPER CO	ABOVE E	Y PROPER	400
		GENERATOR'S CERTIFICAT SHIPPING NAME (WHERE A BY HIGHWAY ACCORDING T	PPLICABLE) AND ARE (O APPLICABLE GOVERNA	CLASSIFIED, P ENET REGULATI	ACKED, MARKED ONS. I FURTH	, and label Er certify t	ENT ARE FULLY AN ED AND ARE IN AL MAT IF THIS IS U	ACCURATEL RESPECTS	IN PROPER CO	ABOVE E	Y PROPER FOR TRANSP	400 PRT
	1	GENERATOR'S CERTIFICAT SHIPPING NAME (WHERE A BY HIGHWAY ACCORDING T CFR PART 279; THAT IT	PPLICABLE) AND ARE (O APPLICABLE GOVERNM DOES NOT CONTAIN PCE	CLASSIFIED, P INET REGULATI 35 GREATER TH	ACKED, MARKED ONS. I FURTH AN OR EQUAL T	, and label Er certify t O 2 PPM; and	ENT ARE FULLY AN ED AND ARE IN AL HAT IF THIS IS U THAT IT HAS NOT	O ACCURATEL L RESPECTS BED OIL IT BEEN CONTA	IN PROPER CO IS SUBJECT 1	ABOVE E OMDITION TO REGUL T CARBUR	Y PROPER FOR TRANSPATION UNDER ATOR CLEARS	400 200 40 35
	1	GENERATOR'S CERTIFICAT SHIPPING NAMB (WHERE A BY HIGHMAY ACCORDING T CFR PART 279; THAT IT BRAND SPRAW, FREON, HA 4. GENERATOR'S/OFFEROR'	PPLICABLE) AND ARE (O APPLICABLE GOVERNO DOES NOT CONTAIN PCE LOGBHATED SOAVENTS, S CERTIFICATION: I here!	CLASSIFIED, PARTIES GREATER THE CREATER TH	ACKED, MARKED ONS. I FURTH AN OR EQUAL T ARDOUS HATERI Contents of this Co	, AND LABEL ER CERTIFY T O 2 PPM; AND ALS AND/OR H Onsignment are fo	ENT ARE FULLY AN ED AND ARE IN AL HAT IF THIS IS U THAT IT HAS NOT EXARDOUS WASTER. Ully and accurately des	ACCURATED RESPECTS RECORD OF LITERS REEN CONTA	IN PROPER CO IS SUBJECT TO MINATED WITH y the proper ship	ABOVE E OMDITION TO REGUL T CARBUR	Y PROPER FOR TRANSPATION UNDER ATOR CLEARS	400 200 40 35
	14	GENERATOR'S CERTIFICAT SHIPPING NAME (WHERE A BY HIGHWAY ACCORDING T CFR PART 279; THAT IT	PPLICABLE) AND ARE CO APPLICABLE GOVERNM DOES NOT CONTAIN PCE LOSENATED SOLVENTS, S CERTIFICATION: I hereixed, and are in all respects in	CLASSIFIED, PARTIES GREATER THE CREATER TH	ACKED, MARKED ONS. I FURTH AN OR EQUAL T ARDOUS HATERI Contents of this Co	, AND LABEL ER CERTIFY T O 2 PPM; AND ALS AND/OR H Onsignment are fo	ENT ARE FULLY AN ED AND ARE IN AL HAT IF THIS IS U THAT IT HAS NOT AZARDOUS MASTER. Ully and accurately des international and nati	ACCURATED RESPECTS RECORD OF LITERS REEN CONTA	IN PROPER CO IS SUBJECT TO MINATED WITH y the proper ship	ABOVE E OMDITION TO REGUL T CARBUR	Y PROPER FOR TRANSPATION UNDER ATOR CLEARS	400 ann 40 Re, led, packaged,
Y	14	GENBRATOR'S CERTIFICAT SHIPPING NAMB (WHERE A BY HIGHMAY ACCORDING T CFR PART 279; THAT IT BRANE SERAY, FREON, HA 4. GENERATOR'S/OFFEROR' marked and labeled/placarde enerator's/Offeror's Printed/Typ	PPLICABLE) AND ARE OF APPLICABLE GOVERNA DOES NOT CONTAIN PCE SOMEWHATER SOMEWHATER OF A CHARLES AND ARE OF A CHARLES AND	CLASSIFIED, B INET REGULATI ES GREATER TH OA OTHER KAZ by declare that the proper condition	ACKED, MARKED ONS. I FURTH AN OR EQUAL T ARDOUS HATERI 9 Contents of this of for transport according	AND LABEL OR SPEM; AND ALS AND/OR A onsignment are fi ding to applicable	ENT ARE FULLY AN ED AND ARE IN AL HAT IF THIS IS U THAT IT HAS NOT AZARDOUS MASTER. Ully and accurately des international and nati	ACCURATED RESPECTS RECORD OF LITERS REEN CONTA	IN PROPER CO IS SUBJECT TO MINATED WITH y the proper ship	ABOVE E OMDITION TO REGUL T CARBUR	Y PROPER FOR TRANSP ATION UNDER ATOR CLEANE , and are classi	400 ac. 40 as, led, packaged,
Y	14 G	GENBRATOR'S CERTIFICAT SHIPPING NAMB (WHERE A BY HIGHMAY ACCORDING T CFR PART 279; THAT IT BRANE SERAY, FREON, HA 4. GENERATOR'S/OFFEROR' marked and labeled/placarde enerator's/Offeror's Printed/Typ	PPLICABLE) AND ARE OF APPLICABLE GOVERNA DOES NOT CONTAIN PCE. SCHMITTED SOAVENTS, SCERTIFICATION: heret and are in all respects in Ded Name	CLASSIFIED, B INET REGULATI ES GREATER TH OA OTHER KAZ by declare that the proper condition	ACKED, MARKED ONS. I FURTH AN OR EQUAL T ARDOUS HATERI CONTENTS of this of for transport accor VREG	, AND LABEL ER CERTIFY TO 2 PPM; AND ALS AND/OR H onsignment are fi ding to applicable Signate	ENT ARE FULLY AN ED AND ARE IN AL MAT IF THIS IS U THAT IT HAS NOT ALARDOUS WASTER. Ully and accurately design international and national or the second of the second or t	ACCURATEI A RESPECTS AND OIL IT BEEN CONTA A Man and A Contract A	IN PROPER CO IS SUBJECT TO MINATED WITH y the proper ship	ABOVE E OMDITION TO REGUL T CARBUR	Y PROPER FOR TRANSP ATION UNDER ATOR CLEANE , and are classi	400 ac. 40 as, led, packaged,
INT't ←	14 G	SENERATOR'S CERTIFICAT SHIPPING NAME (WHERE A BY HIGHMAY ACCORDING T CFR PART 279; THAT IT BANKE SPANY, THE SPANY, THE MARKE SPANY FROM MARKED STANY, THE MARKED STANY FROM MARKED STANY, THE MARKED STANY, THE SPANY TH	PPLICABLE) AND ARE OF APPLICABLE GOVERNA DOES NOT CONTAIN PCE. SCENTIFICATION: heret bed, and are in all respects in Ded Name Import to U.S.	CLASSIFIED, B INET REGULATI ES GREATER TH OA OTHER KAZ by declare that the proper condition	ACKED, MARKED ONS. I FURTH AN OR EQUAL T ARDOUS HATERI CONTENTS of this of for transport accor VREG	AND LABEL OR SPEM; AND ALS AND/OR A onsignment are fi ding to applicable	ENT ARE FULLY AN ED AND ARE IN AL MAT IF THIS IS UTHAT IT HAS NOT ALARDOUS WASTER. Ully and accurately design international and national and nationa	ACCURATEI L RESPECTS SED OIL IT BEEN CONTA ribed above by mal government	IN PROPER CO IS SUBJECT TO MINATED WITH y the proper ship	ABOVE E OMDITION TO REGUL T CARBUR	Y PROPER FOR TRANSP ATION UNDER ATOR CLEANE , and are classi	400 ac. 40 as, led, packaged,
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