Revised Final
Fourth Quarter 2012 - 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 2013

Department of the Navy
Naval Facilities Engineering Command, Hawaii
400 Marshall Road
JBPHH HI 96860-3139

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

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Prepared for:

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Prepared under:

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REVISED FINAL
FOURTH QUARTER 2012 - QUARTERLY GROUNDWATER MONITORING REPORT
INSIDE TUNNEL WELLS
RED HILL BULK FUEL STORAGE FACILITY

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

Prepared for:
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ACRONYMS AND ABBREVIATIONS

ACRONYMS/ ABBREVIATIONS	DEFINITION/MEANING
%	percent
bgs	below ground surface
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
N.D.	Not Detected
PAH	Polycyclic Aromatic Hydrocarbons
PARCCS	Precision, Accuracy, Representativeness, Completeness, Comparability, and Sensitivity
pH	hydrogen activity
RHSF	Red Hill Bulk Fuel Storage Facility
RPD	Relative Percent Difference
SAP	Sampling and Analysis Plan
TEC	The Environmental Company, Inc.
TPH	Total Petroleum Hydrocarbons
TPH-d	Total Petroleum Hydrocarbons as diesel
TPH-g	Total Petroleum Hydrocarbons as gasoline
U.S.	United States of America
UST	Underground Storage Tank
VOC	Volatile Organic Compound
WP	Work Plan

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EXECUTIVE SUMMARY

This quarterly groundwater monitoring report presents the results of the fourth quarter 2012 groundwater sampling conducted on October 22 and 23, 2012, 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 22 and 23, 2012, 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] (85 micrograms per Liter [µg/L]), Total Petroleum Hydrocarbons as gasoline [TPH-g] (20 µg/L), and dissolved lead (0.178 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 (2,200 µg/L), TPH-g (320 µg/L), acenaphthene (0.58 µg/L), fluorene (0.29 µg/L), 1-methylnaphthalene (24 µg/L), 2-methylnaphthalene (14 µg/L), naphthalene (63 µg/L), ethylbenzene (0.18 µg/L), toluene (0.59 µg/L), and xylenes (0.51 µg/L) were detected. TPH-d, TPH-g, 1-methylnaphthalene, and naphthalene were detected at concentrations above the DOH EALs for both drinking water toxicity and gross contamination. 2-Methylnaphthalene was detected at a concentration above the DOH EAL for gross contamination.

- **RHMW03** – TPH-d (45 µg/L), naphthalene (0.029 µg/L), and toluene (0.31 µg/L) were detected. None of the chemical constituents analyzed for were detected at concentrations above the DOH EALs.

- **RHMW05** – TPH-d (17 µg/L), TPH-g (15 µg/L), naphthalene (0.038 µg/L), and toluene (0.54 µg/L) were detected. None of the chemical constituents analyzed for were detected at concentrations above the DOH EALs.

- **RHMW2254-01** – TPH-g (18 µg/L), naphthalene (0.037 µg/L), toluene (0.71 µg/L), and total lead (0.169 µg/L) were detected. None of the chemical constituents analyzed for were detected at concentrations above the DOH EALs.

Since the wells were last sampled (July 2012), 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. TPH-d concentrations detected in the sample collected from well RHMW02 are consistent with previous analytical data. 1-Methylnaphthalene, 2-methylnaphthalene, and naphthalene concentrations have increased since the last sampling event; however, elevated concentrations have been detected in groundwater samples collected during past sampling events. TPH-g was detected at concentrations above the DOH EAL in RHMW02; however, TPH-g concentrations increased in October 2010 and then decreased in subsequent sampling events.

With the exception of TPH-g, concentrations of Contaminants of Potential Concern [COPCs] have not changed significantly. TPH-d, 1-methylnaphthalene, 2-methylnaphthalene, and naphthalene concentrations have been decreasing over the long-term. Historically, TPH-g concentrations have increased in the past (e.g., in October 2010) and then decreased in the following rounds of sampling.

Based on the results of the groundwater monitoring, ESI recommends continuing the groundwater monitoring program at the RHSF. If TPH-g concentrations in Well RHMW02 continue to increase, we recommend increasing monitoring frequency to monthly in accordance with the RHSF Groundwater Protection Plan.

SECTION 1 – INTRODUCTION

This quarterly groundwater monitoring report presents the results of the fourth quarter 2012 groundwater sampling conducted on October 22 and 23, 2012, 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. 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. Naval Facilities Engineering Command [NAVFAC] Public Works Department operates the infiltration gallery and DON Well 2254-01.

TABLE 1.1
Current Status of the USTs
Quarterly Groundwater Monitoring Reporting – Inside Tunnel Wells
Red Hill Bulk Fuel Storage Facility

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

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

1.2 PHYSICAL SETTING

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

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

In the immediate area of the RHSF, Koolau Volcanic Series lavas dominate, although there are consolidated and unconsolidated non-calcareous deposits in the vicinity that consist of alluvium generated during erosion of the Koolau volcanic shield. South-southwest of the RHSF, and in isolated exposures to the west, are pyroclastic deposits formed during eruptions from three Honolulu Volcanic Series vents, Salt Lake, Aliamanu, and Makalapa (Stearns and Vaksvik, 1935). Based on established geology and records of the drilled wells (Stearns and Vaksvik, 1938), the RHSF is underlain by Koolau Volcanic Series basalts.

The area of the RHSF is classified as *Rock Land*, where 25-90% of the land surface is covered by exposed rock and there are only shallow soils (Foote, et al., 1972).

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

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

Shallow 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. 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, ideno[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, and July. 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, 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).

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SECTION 2 – GROUNDWATER SAMPLING

On October 22 and 23, 2012, 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 Solinst 122 oil/water interface probe. No measurable product was detected in any of the wells.

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 a flow rate of approximately 0.1 to 0.5 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 [PAH] using EPA Method 8270C SIM, and dissolved lead using EPA Method 6020. An additional sample was collected from well RHMW2254-01 and 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 (85 µg/]), TPH-g (20 µg/L), and dissolved lead (0.178 µg/L) were detected. None of the chemical constituents analyzed for were detected at concentrations above the DOH EALs.

- **RHMW02** – TPH-d (2,200 µg/L), TPH-g (320 µg/L), acenaphthene (0.58 µg/L), fluorene (0.29 µg/L), 1-methylnaphthalene (24 µg/L), 2-methylnaphthalene (14 µg/L), naphthalene (63 µg/L), ethylbenzene (0.18 µg/L), toluene (0.59 µg/L), and xylenes (0.51 µg/L) were detected. TPH-d, TPH-g, 1-methylnaphthalene, and naphthalene were detected at concentrations above the DOH EALs for both drinking water toxicity and gross contamination. 2-Methylnaphthalene was detected at a concentration above the DOH EAL for gross contamination.

- **RHMW03** – TPH-d (45 µg/L), naphthalene (0.029 µg/L), and toluene (0.31 µg/L) were detected. None of the chemical constituents analyzed for were detected at concentrations above the DOH EALs.

- **RHMW05** – TPH-d (17 µg/L), TPH-g (15 µg/L), naphthalene (0.038 µg/L), and toluene (0.54 µg/L) were detected. None of the chemical constituents analyzed for were detected at concentrations above the DOH EALs.

- **RHMW2254-01** – TPH-g (18 µg/L), naphthalene (0.037 µg/L), toluene (0.71 µg/L), and total lead (0.169 µg/L) were detected. None of the chemical constituents analyzed for were detected at concentrations above the DOH EALs.

2.2.1 Groundwater Contaminant Trends

- **RHMW01** – The 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. TPH-d concentrations have decreased from 2,500 µg/L in September 2005 to 85 µg/L in October 2012.

- **RHMW02** – COPCs detected during this round of quarterly sampling were consistent with historical data. TPH-d, TPH-g, 1-methylnaphthalene, 2-methylnaphthalene, and naphthalene have historically been detected at concentrations above the DOH EALs. TPH-d concentrations show a decreasing trend from a high of 6,000 µg/L in October 2008 to concentrations ranging from 1,800-2,200 µg/L during the last several rounds of sampling.

  1-Methylnaphthalene, 2-methylnaphthalene, and naphthalene show a decreasing trend over the long-term. 1-Methylnaphthalene concentrations have decreased from between 102-104 µg/L in 2005 to between 4.7-24 µg/L during the last few rounds of sampling. 2-Methylnaphthalene concentrations have decreased from between 87.2-88.5 µg/L in 2005 to between 12-14 µg/L during this round of sampling. Note, however that 1-methylnaphthalene,

2-methylnaphthalene, and naphthalene have increased since the last sampling event. Elevated concentrations of these COPCs have been detected during past sampling events. TPH-g concentrations show a slight increasing trend with a substantial increase from non-detect during the last round of sampling to 360 µg/L during this round of sampling.

- **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 EAL; however it has not been detected at concentrations above the DOH EAL 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; however it has not been detected at concentrations above the DOH EAL since January 2010.

- **RHMW2254-01** – COPCs detected during this round of quarterly sampling were consistent with historical data. None of the COPCs have been detected at concentrations above the DOH EALs.

2.3 WASTE DISPOSAL

The purged groundwater and decontamination water generated during sampling of the inside tunnel wells was stored in a 55-gallon drum along with the purged water and decontamination water from the outside tunnel wells. The water was disposed of following receipt of the analytical results for the outside tunnel wells. The drum was stored onsite at Adit 3. On December 10, 2012, the drum of water was picked up by Pacific Commercial Services, LLC, and disposed of at Unitek Solvent Services, Inc. The waste disposal manifest is included in Appendix D.

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TABLE 2.1
Analytical Results for Groundwater Sampling (October 22 and 23, 2012)
Red Hill Bulk Fuel Storage Facility
October 2012 Quarterly Status Report

Chemical Constituent	RHMW01 (ES001)	RHMW02 (ES002)	RHMW02 (ES003) (Dup)	RHMW03 (ES004)	RHMW05 (ES005)	RHMW2254-01 (ES006)	LOD	DOH EALs	
								Drinking Water Toxicity	Gross Contamination
TPH-d	85	**2,200**	**1,800**	45	17	N.D.	20	190	100
TPH-g	20	**320**	**360**	N.D.	15	18	30	100	100
Acenaphthene	N.D.	0.58	0.59	N.D.	N.D.	N.D.	0.05	370	20
Fluorene	N.D.	0.29	0.3	N.D.	N.D.	N.D.	0.05	240	950
1-Methylnaphthalene	N.D.	**24**	**21**	N.D.	N.D.	N.D.	0.05	4.7	10
2-Methylnaphthalene	N.D.	**14**	**12**	N.D.	N.D.	N.D.	0.05	24	10
Naphthalene	N.D.	**63**	**61**	0.029	0.038	0.037	0.05	17	21
Ethylbenzene	N.D.	0.18	0.18	N.D.	N.D.	N.D.	0.5	700	30
Toluene	N.D.	0.59	0.6	0.54	0.31	0.71	0.5	1,000	40
Xylenes	N.D.	0.51	0.47	N.D.	N.D.	N.D.	1.0	10,000	20
Dissolved Lead	0.178	N.D.	N.D.	N.D.	N.D.	N.D.	0.2	15	50,000
Total Lead	-	-	-	-	-	0.169	0.2	15	50,000

The data are in micrograms per liter (µg/L).
Shaded values exceeded the DOH EALs.
- Not Analyzed
DOH EALs DOH Tier 1 Environmental Action Levels for groundwater where groundwater is a current drinking water source and surface water is greater than 150 meters from the site (DOH, Fall 2011).
LOD Limit of Detection
N.D. Not Detected
TPH-d Total Petroleum Hydrocarbons as diesel
TPH-g Total Petroleum Hydrocarbons as gasoline

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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, method 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 its 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 project samples. Field duplicates were sent to the laboratory along with the primary samples.

For this monitoring event, several RPDs for MS/MSD and LCS/LCSD pairs were above precision criteria; however, since all results for these analytes in primary samples were not detected, these exceedances are not considered to have an impact on project decisions. The RPDs of primary and field duplicate samples are provided in Table 3.1. All 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.

Accuracy

Accuracy is defined as the degree of agreement of a measurement to an accepted reference 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.

All of the LCS and surrogate spike recoveries for analyzed constituents were within acceptable percent recovery limits. The analyte concentrations (naphthalene, 2-methylnaphthalene and 1-methylnaphthalene) for ES002, the primary sample on which the MS and MSD were performed, were significantly higher than the added spike concentration which prevented an accurate

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

Representativeness

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

Representativeness is also evaluated via compliance with established sample holding time and sample preservation, and through the analysis of blank samples, including method blank and trip blank samples. The sample holding time and sample preservation complied with the EPA criteria. For this sampling event, one trip blank was collected, and TPH-g was not detected. TPH-g was detected in the method blank below the Limit of Detection [LOD]. Therefore, the groundwater sample data are considered representative of the groundwater quality on site.

Completeness

Completeness is defined as the overall percentage of valid analytical results (including estimated results) compared to the total number of analytical results reported by the analytical laboratory. No data were rejected for this project, and therefore the completeness goal for this project (90%), was successfully met. Successful completion of data acquisition can only be accomplished if both the field and laboratory portions of the project are performed according to the procedures described in the WP/SAP (ESI, 2012).

Comparability

Comparability expresses the confidence with which one data set can be compared to another data set. Comparability can be related to accuracy and precision because these quantities are measures of data reliability. Data, with acceptable precision and accuracy, are considered comparable if collection techniques, analytical procedures, methods and reporting are equivalent. For this monitoring event, the samples were collected using approaches consistent with those in the previous events, and the same analytical methods/procedures were used to measure the concentration of COPCs. Therefore, the results are considered comparable within this data set and with the data collected from previous sampling events.

Sensitivity

The Limits Of Quantitation [LOQs] are established by the laboratory based on the LODs or instrument detection limits, historical laboratory 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. 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 the DOH EAL. As suggested by the DOH, the project action level will be the LOD for these analytes.

3.2 Data Assessment and Usability Conclusions

The PARCCS criteria were evaluated, and with a few exceptions, all criteria were met. These exceptions include the exceedances of recovery criteria for MS/MSDs for the three PAHs (naphthalene, 1–methylnaphthalene, and 2–methylnaphthalene) due to significantly higher concentrations in the parent sample (which exceeded project action levels) when compared to the spiked concentration, and prevents the accurate evaluation of MS/MSD recovery. Since the surrogate recoveries and the recoveries of these three PAH in the LCS/LCSD are all within recovery criteria, the accuracy is considered acceptable, and the exceedance is attributed to the high parent sample concentrations. The precision criteria exceedances (LCS/LCSD and MS/MSD) are also not considered to affect the usability of the data for project decisions, since no detects occurred for the analytes for which these exceedances occurred. Therefore, the data assessment concludes that all data generated during this event are usable for the intended use for project decisions.

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TABLE 3.1
Quality Control Results for Groundwater Sampling (October 22 and 23, 2012)
Red Hill Bulk Fuel Storage Facility
October 2012 Quarterly Status Report

Method	Chemical Constituent	DOH EALs		RHMW02 (ES002)					RHMW02 (ES003)					RPD Duplicate (%)	ES Trip				
		Drinking Water Toxicity	Gross Contamination	Result	Q	LOQ	LOD	DL	Result	Q	LOQ	LOD	DL		Result	Q	LOQ	LOD	DL
EPA 8015B	TPH-d	190	100	**2,200**	HD	50	20	15	**1,800**	HD	50	20	15	20	-	-	-	-	-
EPA 8015B	TPH-g	-	-	-	-	-	-	-	-	-	-	-	-	-	N.D.	U	200	100	44
EPA 8260B	TPH-g	100	100	**320**	B	50	30	13	**360**	B	50	30	13	11.76	-	-	-	-	-
EPA 8270C SIM (PAH)	Acenaphthene	370	20	0.58	U	0.2	0.05	0.018	0.59	U	0.2	0.05	0.018	1.71	-	-	-	-	-
	Acenaphthylene	240	2,000	N.D.	U	0.2	0.05	0.021	N.D.	U	0.2	0.05	0.021	0	-	-	-	-	-
	Anthracene	1,800	22	N.D.	U	0.2	0.05	0.034	N.D.	U	0.2	0.05	0.034	0	-	-	-	-	-
	Benzo[a]anthracene	0.092	4.7	N.D.	U	0.2	0.05	0.024	N.D.	U	0.2	0.05	0.024	0	-	-	-	-	-
	Benzo[g,h,i]perylene	1,500	0.13	N.D.	U	0.2	0.05	0.022	N.D.	U	0.2	0.05	0.022	0	-	-	-	-	-
	Benzo[a]pyrene	0.2	0.81	N.D.	U	0.2	0.05	0.036	N.D.	U	0.2	0.05	0.036	0	-	-	-	-	-
	Benzo[b]fluoranthene	0.092	0.75	N.D.	U	0.2	0.05	0.025	N.D.	U	0.2	0.05	0.025	0	-	-	-	-	-
	Benzo[k]fluoranthene	0.92	0.4	N.D.	U	0.2	0.05	0.023	N.D.	U	0.2	0.05	0.023	0	-	-	-	-	-
	Chrysene	9.2	1	N.D.	U	0.2	0.05	0.019	N.D.	U	0.2	0.05	0.019	0	-	-	-	-	-
	Dibenzo[a,h]anthracene	0.0092	0.52	N.D.	U	0.2	0.05	0.027	N.D.	U	0.2	0.05	0.027	0	-	-	-	-	-
	Fluoranthene	1,500	130	N.D.	U	0.2	0.05	0.027	N.D.	U	0.2	0.05	0.027	0	-	-	-	-	-
	Fluorene	240	950	0.29		0.2	0.05	0.024	0.3		0.2	0.05	0.024	3.39	-	-	-	-	-
	Indeno[1,2,3-cd]pyrene	0.092	0.095	N.D.	U	0.2	0.05	0.022	N.D..	U	0.2	0.05	0.022	0	-	-	-	-	-
	1-Methylnaphthalene	4.7	10	**24**		2	0.5	0.26	**21**		2	0.5	0.26	13.33	-	-	-	-	-
	2-Methylnaphthalene	24	10	**14**		2	0.5	0.28	**12**		2	0.5	0.28	15.38	-	-	-	-	-
	Naphthalene	17	21	**63**		2	0.5	0.23	**61**		2	0.5	0.23	3.23	-	-	-	-	-
	Phenanthrene	240	410	N.D.	U	0.2	0.05	0.031	N.D.	U	0.2	0.05	0.031	0	-	-	-	-	-
	Pyrene	180	68	N.D.	U	0.2	0.05	0.025	N.D.	U	0.2	0.05	0.025	0	-	-	-	-	-
EPA 8260B (VOC)	1,1,1-Trichloroethane	200	970	N.D.	U	5	0.5	0.3	N.D.	U	5	0.5	0.3	0	-	-	-	-	-
	1,1,2-Trichloroethane	5	50,000	N.D.	U	1	0.5	0.38	N.D.	U	1	0.5	0.38	0	-	-	-	-	-
	1,1-Dichloroethane	2.4	50,000	N.D.	U	5	0.5	0.28	N.D.	U	5	0.5	0.28	0	-	-	-	-	-
	1,1-Dichloroethylene	7	1,500	N.D.	U	1	0.5	0.431	N.D.	U	1	0.5	0.431	0	-	-	-	-	-
	1,2,3-Trichloropropane	0.6	50,000	N.D.	U	5	1	0.64	N.D.	U	5	1	0.64	0	-	-	-	-	-
	1,2,4-Trichlorobenzene	70	3,000	N.D.	U	5	1	0.5	N.D.	U	5	1	0.5	0	-	-	-	-	-
	1,2-Dibromo-3-chloropropane	0.04	10	N.D.	U	10	5	1.2	N.D.	U	10	5	1.2	0	-	-	-	-	-
	1,2-Dibromoethane	0.04	50,000	N.D.	U	1	0.5	0.36	N.D.	U	1	0.5	0.36	0	-	-	-	-	-
	1,2-Dichlorobenzene	600	10	N.D.	U	1	0.5	0.46	N.D.	U	1	0.5	0.46	0	-	-	-	-	-
	1,2-Dichloroethane	0.15	7,000	N.D.	U	1	0.5	0.24	N.D.	U	1	0.5	0.24	0	-	-	-	-	-
	1,2-Dichloropropane	5	10	N.D.	U	5	0.5	0.42	N.D.	U	5	0.5	0.42	0	-	-	-	-	-
	1,3-Dichlorobenzene	180	5	N.D.	U	1	0.5	0.4	N.D.	U	1	0.5	0.4	0	-	-	-	-	-
	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	0	-	-	-	-	-

TABLE 3.1 (continue)
Quality Control Results for Groundwater Sampling (October 22 and 23, 2012)
Red Hill Bulk Fuel Storage Facility
October 2012 Quarterly Status Report

Method	Chemical Constituent	DOH EALs		RHMW02 (ES002)					RHMW02 (ES003)					RPD Duplicate (%)	ES Trip				
		Drinking Water Toxicity	Gross Contamination	Result	Q	LOQ	LOD	DL	Result	Q	LOQ	LOD	DL		Result	Q	LOQ	LOD	DL
EPA 8260B (VOC)	1,4-Dichlorobenzene	75	5	N.D.	U	1	0.5	0.43	N.D.	U	1	0.5	0.43	0	-	-	-	-	-
	Acetone	22,000	20,000	N.D.	U	20	10	6	N.D.	U	20	10	6	0	-	-	-	-	-
	Benzene	5	170	N.D.	U	1	0.5	0.14	N.D.	U	1	0.5	0.14	0	-	-	-	-	-
	Bromodichloromethane	0.12	50,000	N.D.	U	5	0.5	0.21	N.D.	U	5	0.5	0.21	0	-	-	-	-	-
	Bromoform	80	510	N.D.	U	10	1	0.5	N.D.	U	10	1	0.5	0	-	-	-	-	-
	Bromomethane	8.7	50,000	N.D.	U	20	5	3.9	N.D.	U	20	5	3.9	0	-	-	-	-	-
	Carbon Tetrachloride	5	520	N.D.	U	1	0.5	0.23	N.D.	U	1	0.5	0.23	0	-	-	-	-	-
	Chlorobenzene	100	50	N.D.	U	5	0.5	0.17	N.D.	U	5	0.5	0.17	0	-	-	-	-	-
	Chloroethane	21,000	16	N.D.	U	10	5	2.3	N.D.	U	10	5	2.3	0	-	-	-	-	-
	Chloroform	70	2,400	N.D.	U	5	0.5	0.46	N.D.	U	5	0.5	0.46	0	-	-	-	-	-
	Chloromethane	1.8	50,000	N.D.	IH,U	10	5	1.8	N.D.	U	10	5	1.8	0	-	-	-	-	-
	cis-1,2-Dichloroethylene	70	50,000	N.D.	U	1	0.5	0.476	N.D.	U	1	0.5	0.476	0	-	-	-	-	-
	Dibromochloromethane	0.16	50,000	N.D.	U	1	0.5	0.25	N.D.	U	1	0.5	0.25	0	-	-	-	-	-
	Ethylbenzene	700	30	0.18	J	1	0.5	0.14	0.18	J	1	0.5	0.14	0	-	-	-	-	-
	Hexachlorobutadiene	0.86	6	N.D.	U	1	0.5	0.32	N.D.	U	1	0.5	0.32	0	-	-	-	-	-
	Methyl ethyl ketone (2-Butanone)	7,100	8,400	N.D.	U	10	5.0	2.21	N.D.	U	10	5.0	2.21	0	-	-	-	-	-
	Methyl isobutyl ketone (4-Methyl-2-Pentanone)	2,000	1300	N.D.	U	10	5.0	4.4	N.D.	U	10	5.0	4.4	0	-	-	-	-	-
	Methyl tert-butyl Ether	12	5	N.D.	U	1	0.5	0.31	N.D.	U	1	0.5	0.31	0	-	-	-	-	-
	Methylene chloride	4.8	9,100	N.D.	U	5	1.0	0.64	N.D.	U	5	1.0	0.64	0	-	-	-	-	-
	Styrene	100	10	N.D.	U	1	0.5	0.17	N.D.	U	1	0.5	0.17	0	-	-	-	-	-
	1,1,1,2-Tetrachloroethane	0.52	50,000	N.D.	U	1	0.5	0.4	N.D.	U	1	0.5	0.4	0	-	-	-	-	-
	1,1,2,2-Tetrachloroethane	0.067	500	N.D.	U	1	0.5	0.41	N.D.	U	1	0.5	0.41	0	-	-	-	-	-
	Tetrachloroethylene	5	170	N.D.	U	5	0.5	0.387	N.D.	U	5	0.5	0.387	0	-	-	-	-	-
	Toluene	1,000	40	0.59	J	1	0.5	0.24	0.6	J	1	0.5	0.24	1.68	-	-	-	-	-
	trans-1,2-Dichloroethylene	100	260	N.D.	U	1	0.5	0.368	N.D.	U	1	0.5	0.368	0	-	-	-	-	-
	Trichloroethylene	5	310	N.D.	U	1	0.5	0.368	N.D.	U	1	0.5	0.368	0	-	-	-	-	-
	Vinyl chloride	2	3,400	N.D.	U	1	0.5	0.3	N.D.	U	1	0.5	0.3	0	-	-	-	-	-
	Xylenes	10,000	20	0.51	J	10	1	0.23	0.47	J	10	1	0.23	8.16	-	-	-	-	-
	1,1,1-Trichloroethane	200	970	N.D.	U	5	0.5	0.3	N.D.	U	5	0.5	0.3	0	-	-	-	-	-

TABLE 3.1 (continue)
Quality Control Results for Groundwater Sampling (October 22 and 23, 2012)
Red Hill Bulk Fuel Storage Facility
October 2012 Quarterly Status Report

Method	Chemical Constituent	DOH EALs		RHMW02 (ES002)					RHMW02 (ES003)					RPD Duplicate (%)	ES Trip				
		Drinking Water Toxicity	Gross Contamination	Result	Q	LOQ	LOD	DL	Result	Q	LOQ	LOD	DL		Result	Q	LOQ	LOD	DL
EPA 6020	Lead	15	50,000	N.D.	U	1	0.2	0.0898	N.D.	U	1	0.2	0.0898	0	-	-	-	-	-

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

-	Not Analyzed
%	percent
B	Analyte was present in the associated method blank.
DL	Detection Limit
DOH EALs	DOH Tier 1 Environmental Action Levels for groundwater where groundwater is a current drinking water source and surface water is greater than 150 meters from the site.
HD	The chromatographic pattern was inconsistent with the profile of the reference fuel standard.
IH	Calibration verified recovery below method confidence limit for this analyte.
J	Analyte was detected at a concentration below the LOQ and above the DL. Reported value is estimated.
LOD	Limit of Detection
LOQ	Limit of Quantitation
N.D.	Not Detected
Q	Qualifier
RPD	Relative Percent Difference
TPH-d	Total Petroleum Hydrocarbons as diesel
TPH-g	Total Petroleum Hydrocarbons as gasoline
U	Undetected at DL and is reported as less than the LOD.

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SECTION 4 – SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

On October 22 and 23, 2012, 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 Naval Facilities Engineering Command [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 (85 µg/L), TPH-g (20 µg/L), and dissolved lead (0.178 µg/L) were detected. None of the chemical constituents analyzed for were detected at concentrations above the DOH EALs.

- **RHMW02** – TPH-d (2,200 µg/L), TPH-g (320 µg/L), acenaphthene (0.58 µg/L), fluorene (0.29 µg/L), 1-methylnaphthalene (24 µg/L), 2-methylnaphthalene (14 µg/L), naphthalene (63 µg/L), ethylbenzene (0.18 µg/L), toluene (0.59 µg/L), and xylenes (0.51 µg/L) were detected. TPH-d, TPH-g, 1-methylnaphthalene, and naphthalene were detected at concentrations above the DOH EALs for both drinking water toxicity and gross contamination. 2-Methylnaphthalene was detected at a concentration above the DOH EAL for gross contamination.

- **RHMW03** – TPH-d (45 µg/L), naphthalene (0.029 µg/L), and toluene (0.54 µg/L) were detected. None of the chemical constituents analyzed for were detected at concentrations above the DOH EALs.

- **RHMW05** – TPH-d (17 µg/L), TPH-g (15 µg/L), naphthalene (0.038 µg/L), and toluene (0.31 µg/L) were detected. None of the chemical constituents analyzed for were detected at concentrations above the DOH EALs.

- **RHMW2254-01** – TPH-g (18 µg/L), naphthalene (0.037 µg/L), toluene (0.71 µg/L), and total lead (0.169 µg/L) were detected. None of the chemical constituents analyzed for were detected at concentrations above the DOH EALs.

Groundwater Contaminant Trends

- **RHMW01** – COPCs detected during this round of quarterly sampling were consistent with historical data. TPH-d has historically been detected at concentrations above the DOH EAL. TPH-d concentrations showed a decreasing trend from 2,500 µg/L in September 2005 to 85 µg/L in October 2012.

- **RHMW02** – COPCs detected during this round of quarterly sampling were consistent with historical data. TPH-d, TPH-g, 1-methylnaphthalene, 2-methylnaphthalene, and naphthalene have historically been detected at concentrations above the DOH EALs. TPH-d

concentrations show a decreasing trend from a high of 6,000 µg/L in October 2008 to concentrations ranging from 1,800-2,200 µg/L during the last several rounds of sampling.

1-Methylnaphthalene, 2-methylnaphthalene, and naphthalene show a decreasing trend over the long-term. 1-Methylnaphthalene concentrations have decreased from between 102-104 µg/L in 2005 to between 4.7-24 µg/L during the last few rounds of sampling. 2-Methylnaphthalene concentrations have decreased from between 87.2-88.5 µg/L in 2005 to between 12-14 µg/L during this round of sampling. Note, however that 1-methylnaphthalene, 2-methylnaphthalene, and naphthalene have increased since the last sampling event. Elevated concentrations of these COPCs have been detected during past sampling events. TPH-g concentrations showed a slight increasing trend with a substantial increase from non-detect during the last round of sampling to 360 µg/L during this round of sampling.

- **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 EAL; however it has not been detected at concentrations above the DOH EAL 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; however it has not been detected at concentrations above the DOH EAL since January 2010.

- **RHMW2254-01** – COPCs detected during this round of quarterly sampling were consistent with historical data. None of the COPCs have been detected at concentrations above the DOH EAL.

Conclusions and Recommendations

Since the wells were last sampled (July 2012), 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. TPH-d concentrations detected in the groundwater sample from well RHMW02 remained consistent with previous analytical data. 1-Methylnaphthalene, 2-methylnaphthalene, and naphthalene concentrations have increased since the last sampling event; however, elevated concentrations have been detected in groundwater samples collected during past sampling events. TPH-g was detected at concentrations above the DOH EAL in RHMW02; however, TPH-g concentrations increased in October 2010 and then decreased in subsequent sampling events.

Based on the results of the groundwater monitoring, ESI recommends continuing the groundwater monitoring program at the RHSF. If TPH-g concentrations in Well RHMW02 continue to increase, we recommend increasing monitoring frequency to monthly in accordance with the RHSF Groundwater Protection Plan.

A copy of this report will be submitted to the DOH and a copy be kept on file at NAVFAC.

SECTION 5 – FUTURE WORK

GROUNDWATER SAMPLING

Future work includes the first quarter 2013 groundwater monitoring in January 2013. It is anticipated that the quarterly groundwater monitoring status reports will be submitted in February 2013.

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SECTION 6 – REFERENCES

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FIGURES

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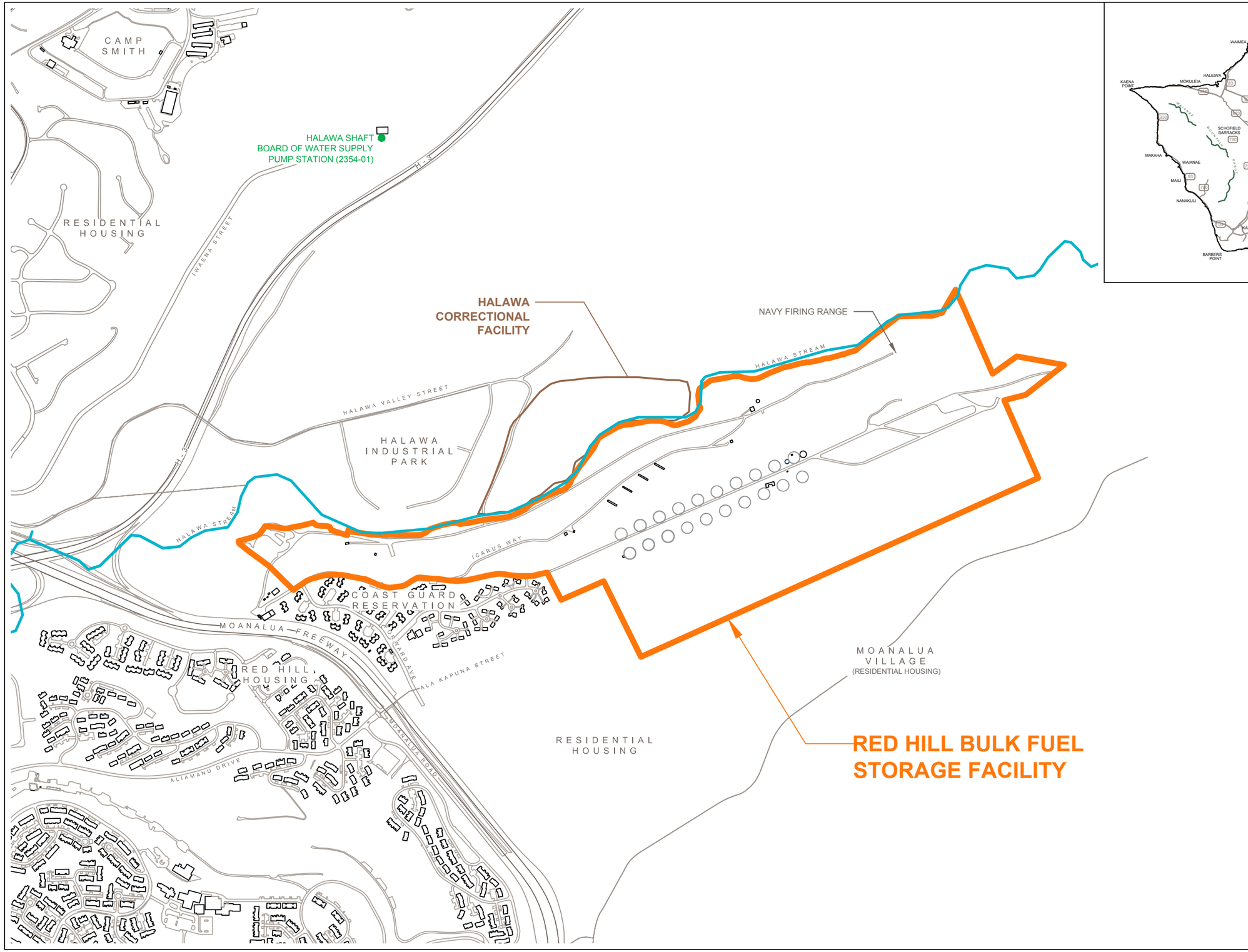

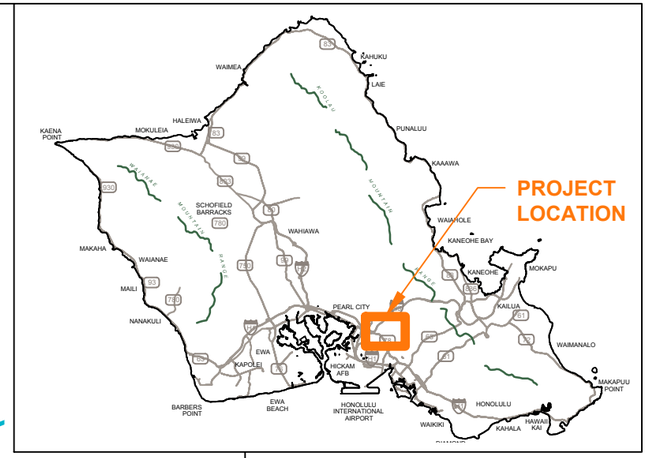

NOTES

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SOURCES

Pearl Harbor Base Map

Navy GIS files

NORTH

GRAPHIC SCALE

900 0 900

Scale in Feet

FIGURE 1

SITE LOCATION

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

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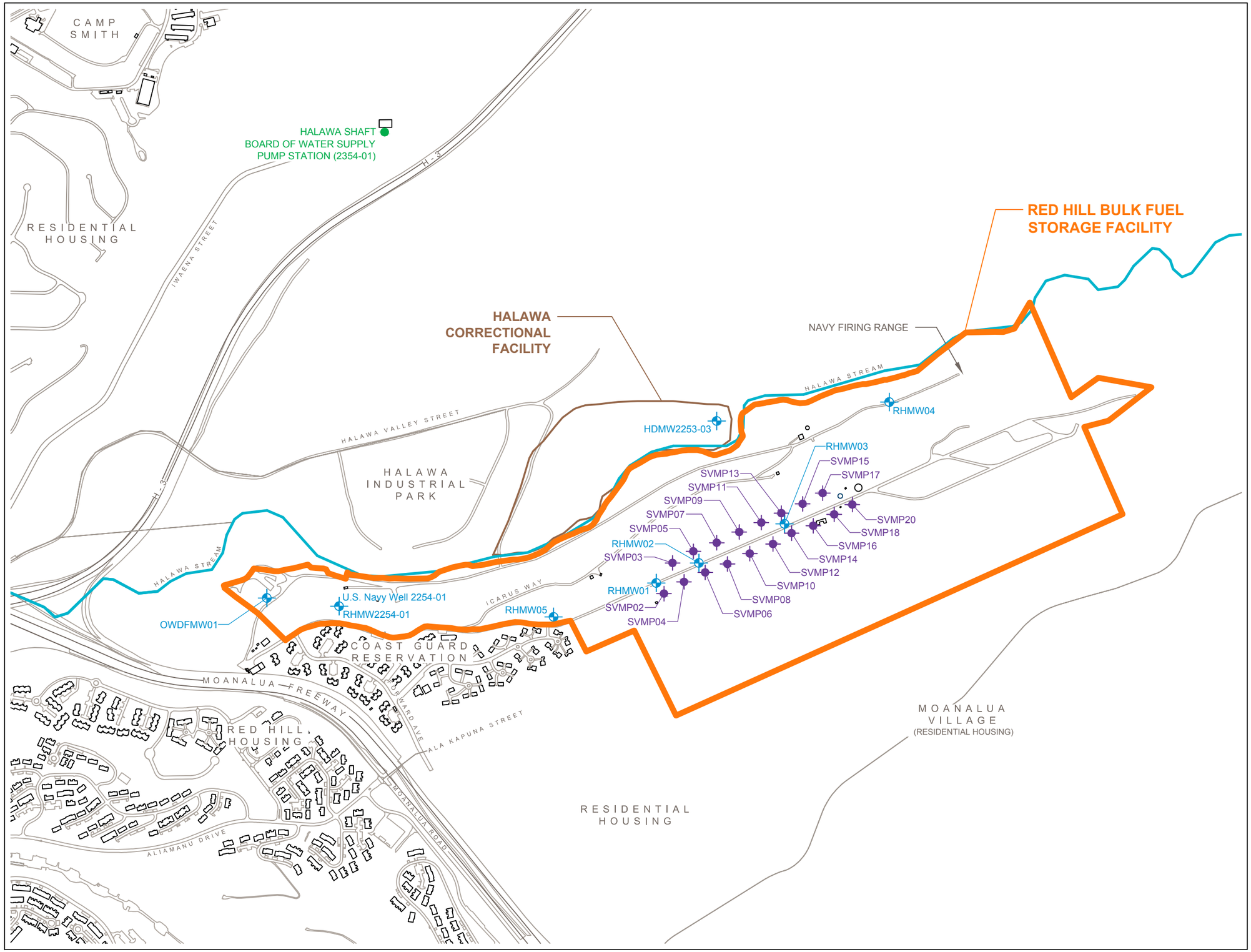

LEGEND

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

NOTES

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

SOURCES

Pearl Harbor Base Map

Navy GIS files

NORTH

GRAPHIC SCALE

1,200 0 1,200

Scale in Feet

FIGURE 2

SITE LAYOUT

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

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APPENDIX A

Groundwater Sampling Logs

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Groundwater Sampling Log

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

Initial Water Level: 84.19 ft Date: 10/22/2012 Time: 1005

Total Depth of Well: 97.42 ft Personnel Involved: Justin Lam, Branden Ibara

Length of Saturated Zone: - Weather Conditions: -

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

Water Level After Purging: - Pumping Rate: 0.35 L/min

Well Purge Data:

Time	Volume Removed	pH	Conductivity (mS/cm)	DO (mg/l)	Temperature	Salinity	Redox (ORP) (mV)
1131	0	7.93	0.304	8.14	24.11	0.14	-176.5
1133	1	7.81	0.301	7.84	24.24	0.14	-167.9
1135	2	7.92	0.304	8.21	24.18	0.10	-171.4
1138	3	7.80	0.305	8.19	23.72	0.17	-181.6
1140	4	7.77	0.305	8.04	23.68	0.14	-182.6
1143	5	7.75	0.304	8.13	23.63	0.14	-181.5
1146	6	7.85	0.304	8.20	23.64	0.14	-181.9
1150	7	7.90	0.304	8.19	23.70	0.10	-187.6
1152	8	7.91	0.301	8.22	23.90	0.14	-181.4
1155	9	7.90	0.301	8.27	24.00	0.14	-184.7
1159	10	7.92	0.298	8.24	24.01	0.14	-185.5

Sample Withdrawal Method: Bladder Pump

Appearance of Sample:

Color: Clear

Turbidity: Low

Sediment: None

Other:

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

Number and Types of Sample Containers: 6 - VOAs, 3 - 1L amber jar, 1 - 500ml HDPE bottle

Sample Identification Numbers: ES001 [1230]

Decontamination Procedures: Triple Rinsed

Notes:

Sampled by: Justin Lam, Branden Ibara

Sampled Delivered to: Calscience Environmental Lab Transporters: FedEx

Date: 10/25/2012 Time: 1040

Capacity of Casing (Gallons/Linear Feet)
2"-0.16• 4"-0.65 • 8"-2.61 • 10"-4.08 • 12"-5.87

Groundwater Sampling Log

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

Initial Water Level: 86.81 ft Date: 10/22/2012 Time: 1345

Total Depth of Well: 94.35 ft Personnel Involved: Justin Lam, Branden Ibara

Length of Saturated Zone: - Weather Conditions: -

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

Water Level After Purging: 86.81 Pumping Rate: 0.41 L/min

Well Purge Data:

Time	Volume Removed	pH	Conductivity (mS/cm)	DO (mg/l)	Temperature	Salinity	Redox (ORP) (mV)
1350	0	7.40	0.527	7.95	25.54	0.25	-161.9
1352	1	7.30	0.542	5.28	25.25	0.26	-193.7
1354	2	6.75	0.549	2.25	24.28	0.26	-199.1
1356	3	6.75	0.548	1.05	24.53	0.26	-192.1
1359	4	6.75	0.551	0.69	24.45	0.27	-190.6
1402	5	6.75	0.553	0.61	24.43	0.27	-190.1
1405	6	6.75	0.553	0.60	24.43	0.27	-190.2
1407	7	6.74	0.551	0.60	24.43	0.27	-188.2

Sample Withdrawal Method: Bladder Pump

Appearance of Sample:

Color: Clear

Turbidity: Low

Sediment: None

Other:

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

Number and Types of Sample Containers: 22 - VOAs, 8 - 1L amber jar, 5 - 500ml HDPE bottle

Sample Identification Numbers: ES002 [1415], ES002 MS/MSD [1415], ES003 (Dup) [1330]

Decontamination Procedures: Triple Rinsed

Notes:

Sampled by: Justin Lam, Branden Ibara

Sampled Delivered to: Calscience Environmental Lab Transporters: FedEx

Date: 10/25/2012 Time: 1040

Capacity of Casing (Gallons/Linear Feet)

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

Groundwater Sampling Log

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

Initial Water Level: 103.05 ft Date: 10/22/2012 Time: 1535

Total Depth of Well: - Personnel Involved: Justin Lam, Branden Ibara

Length of Saturated Zone: - Weather Conditions: -

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

Water Level After Purging: 103.05 ft Pumping Rate: 0.39 L/min

Well Purge Data:

Time	Volume Removed	pH	Conductivity (mS/cm)	DO (mg/l)	Temperature	Salinity	Redox (ORP) (mV)
1547	0	7.62	0.663	5.8	27.58	0.33	-133.1
1550	1	7.52	0.687	5.41	28.11	0.33	-152.1
1552	2	7.24	0.692	4.97	28.42	0.33	-153.6
1555	3	7.05	0.692	3.68	27.61	0.33	-157.1
1557	4	7.04	0.724	2.27	26.97	0.35	-166.1
1600	5	7.03	0.728	2.20	26.90	0.35	-168.1
1602	6	7.03	0.728	2.22	26.90	0.35	-168.5
1605	7	7.03	0.728	2.20	26.90	0.35	-168.9

Sample Withdrawal Method: Bladder Pump

Appearance of Sample:

Color: Clear

Turbidity: Low

Sediment: None

Other:

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

Number and Types of Sample Containers: 6 - VOAs, 3 - 1L amber jar, 1 - 500ml HDPE bottle

Sample Identification Numbers: ES004 [1610]

Decontamination Procedures: Triple Rinsed

Notes:

Sampled by: Justin Lam, Branden Ibara

Sampled Delivered to: Calscience Environmental Lab Transporters: FedEx

Date: 10/25/2012 Time: 1040

Capacity of Casing (Gallons/Linear Feet)

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

Groundwater Sampling Log

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

Initial Water Level: 83.72 ft Date: 10/23/2012 Time: 935

Total Depth of Well: - Personnel Involved: Justin Lam, Branden Ibara

Length of Saturated Zone: - Weather Conditions: -

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

Water Level After Purging: - Pumping Rate: 0.3 L/min

Well Purge Data:

Time	Volume Removed	pH	Conductivity (mS/cm)	DO (mg/l)	Temperature	Salinity	Redox (ORP) (mV)
1017	0	7.53	1.016	6.77	22.88	0.50	-166.2
1019	1	7.46	1.018	6.48	22.94	0.50	-170.2
1026	2	7.19	1.002	7.73	23.70	0.49	-165.8
1029	3	7.15	1.054	7.71	22.72	0.53	-166.9
1031	4	7.10	1.071	7.80	22.52	0.53	-166.8
1034	5	7.10	1.101	7.73	22.52	0.53	-167.1
1037	6	7.08	1.091	7.70	22.50	0.53	-167.9

Sample Withdrawal Method: Bladder Pump

Appearance of Sample:

Color: Clear

Turbidity: Low

Sediment: None

Other:

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

Number and Types of Sample Containers: 6 - VOAs, 3 - 1L amber jar, 1 - 500ml HDPE bottle

Sample Identification Numbers: ES005 [1045]

Decontamination Procedures: Triple Rinsed

Notes:

Sampled by: Justin Lam, Branden Ibara

Sampled Delivered to: Calscience Environmental Lab Transporters: FedEx

Date: 10/25/2012 Time: 1040

Capacity of Casing (Gallons/Linear Feet)

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

Groundwater Sampling Log

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

Initial Water Level: 83.05 ft Date: 10/23/2012 Time: 1025

Total Depth of Well: - Personnel Involved: Justin Lam, Branden Ibara

Length of Saturated Zone: - Weather Conditions: -

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

Water Level After Purging: 83.05 ft Pumping Rate: 0.33 L/min

Well Purge Data:

Time	Volume Removed	pH	Conductivity (mS/cm)	DO (mg/l)	Temperature	Salinity	Redox (ORP) (mV)
1145	0	7.68	0.590	7.3	24.08	0.28	-167.8
1148	1	7.06	0.581	7.24	23.43	0.28	-172.7
1151	2	7.06	0.582	7.53	23.45	0.28	-173.7
1154	3	7.05	0.586	7.55	23.50	0.28	-174.4
1157	4	7.05	0.588	7.54	23.49	0.28	-174.8
1200	5	7.06	0.588	7.54	23.51	0.28	-174.9

Sample Withdrawal Method: Bladder Pump

Appearance of Sample:

Color: Clear

Turbidity: Low

Sediment: None

Other:

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

Number and Types of Sample Containers: 6 - VOAs, 3 - 1L amber jar, 1 - 500ml HDPE bottle

Sample Identification Numbers: ES006 [1210]

Decontamination Procedures: Triple Rinsed

Notes:

Sampled by: Justin Lam, Branden Ibara

Sampled Delivered to: Calscience Environmental Lab Transporters: FedEx

Date: 10/25/2012 Time: 1040

Capacity of Casing (Gallons/Linear Feet)

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

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APPENDIX B

Field Notes

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CONTENTS

PAGE	REFERENCE	DATE

Location Red Hill Date 10/17/12

Project / Client 112066 NAVFAC

Purpose: Conduct a dry run on equipment that will be used during the LTM.

personnel: RC, JL, BI

925: ESI get to Adit 5. safety meeting

930: enter Adit 5.

1025: vacuum box, vacuum ~~inlet~~ change to a barb. get a barb from the soil vapor tube to the sampling ~~tube~~ inlet tube

1045: RHMW03 took fitting air inlet. need to replace. RHMW03 to outlet is 80 feet.

1100: check diameter of IP probe tip to make sure it fits in the wells w/ tubing.

1105: RHMW01-186 feet to nearest outlet. RHMW01 needs pump installed. 1" well, no pump in well right now.

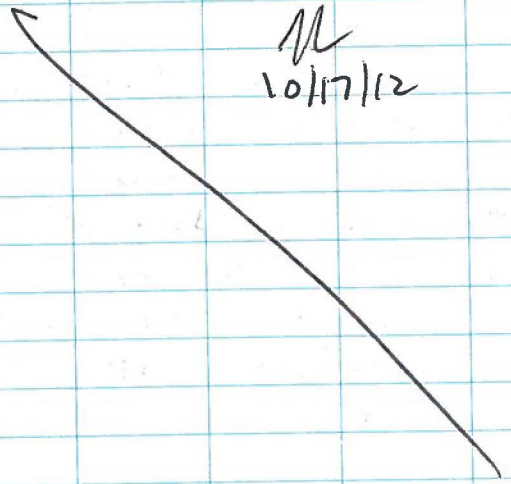
Location Red Hill Date 10/17/12

Project / Client 112066 NAVFAC

1120: RHMW 05 - 224' from nearest outlet.
took fitting from water outlet. need to get tubing and fitting for outlet hose.

1125: begin to exit tunnels.

1145: ESI out of tunnel.
leave Red Hill.



10/17/12

Location Red Hill Date 10/22/12

Project / Client 112066 NAVFAC

purpose: groundwater sampling
fuel product monitoring

personnel: Justin Lam
Branden Ibara

850: ESI arrive at Red Hill,

900: ESI arrive at adit 5,
safety meeting.
prep equipment.

917: ESI enter adit 5.
walk to RHMW01.

930: ESI reached RHMW01.
changed fitting on tubing, so that ESI can sample the well.
ESI will bring new fitting next time for water hose. Installed 1" pump in RHMW01.
PID: 0-0: ppvb.

10/23/12
1005:

1005: gauged well
DTW = 84.19
DTB = 97.42
no product, no odor PID: 160 ppvb.

Location Red Hill Date 10/22/12

Project / Client 112066

1010: set up equipment on RHMW01. Concrete currently using the only outlet.

1030: Concrete Cover finished.

1048: begin pumping well.

1050: adjust. controls, because water not pumping.

1100: air and water hose need to be switched.

1110: start compressor back up.

1115: well not pumping well, but water is coming out.

1130: begin purging well. 10L pumped out.

1200: begin sampling well.

1315: pump tubing blew out from the airline and both sets of tubing disconnected and fell into the MW w/ the pump. Collected all the samples except one 1 liter bottle was 25% to full.

Location Red Hill Date 10/22/12

Project / Client 112066

(from previous page)

1315: ~~The trapped~~ It happened while collecting the last 1 liter bottle. will have to retrieve the pump another day.

1330: move to RHMW02.

1345: set up on RHMW02

1/10/12 ~~1350~~: PID: 86.81 DTB: 94.35. no odor PID: 188 PPMB.

1350: begin purging RHMW02

1407: 7L purged begin collecting the samples. RHMW02 has MS/MSD and a duplicate sample (ES003). geo control setting for RHMW02 Charge time: 10 exhaust time: 18 pressure: 60

1410/1415: begin sampling well.

1515: sampling RHMW02 complete. clean up move to RHMW03.

1530: move to RHMW03.

Location Red Hill Date 10/22/12

Project / Client 112066 NAVFAC

1535: gauge RHMW03
DTW 103.05
PTB- IP goes to 109' and it did not touch the bottom of the well.
> 109'
no odor, PID: 180 ppb.

1547: begin purging well.

1605: finish purging well
begin sampling.

1610: sample time for ES004.

1620: ESI leave adit 5.

1650: ESI leave Red Hill.

10/22/12

Location Red Hill Date 10/23/12

Project / Client 112066, NAVFAC

purpose: groundwater sampling
RHMW05, RHMW2254-01

personnel: JL, BI

750: ESI arrive at Red Hill.

800: ESI get to adit #5
Safety meeting.

805: prep equipment.

815: enter adit 5.
go to RHMW2254-01.

845: ESI reached the Red Hill Pumping station.
BI went out adit 3 to call the pumphouse.

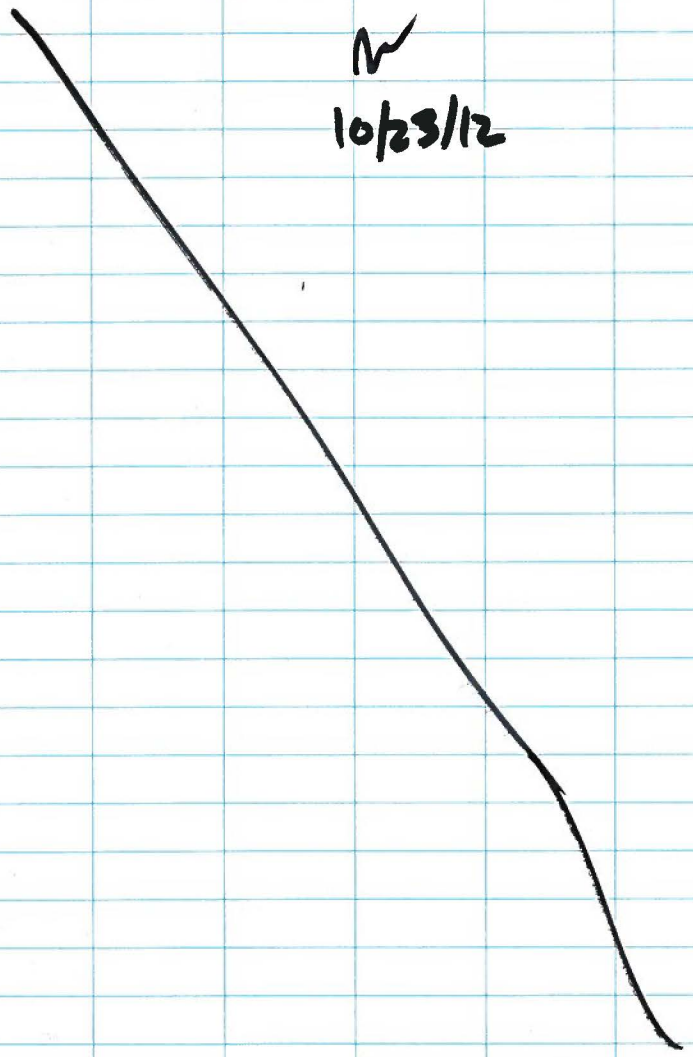
915: ESI can't get into the Pump station more to RHMW05, will get back to RHMW2254-01 later.

930: ESI get to RHMW05.
PID: 175 ppb.
- change air fitting on well

10[illegible]: begin purging well RHMW05.

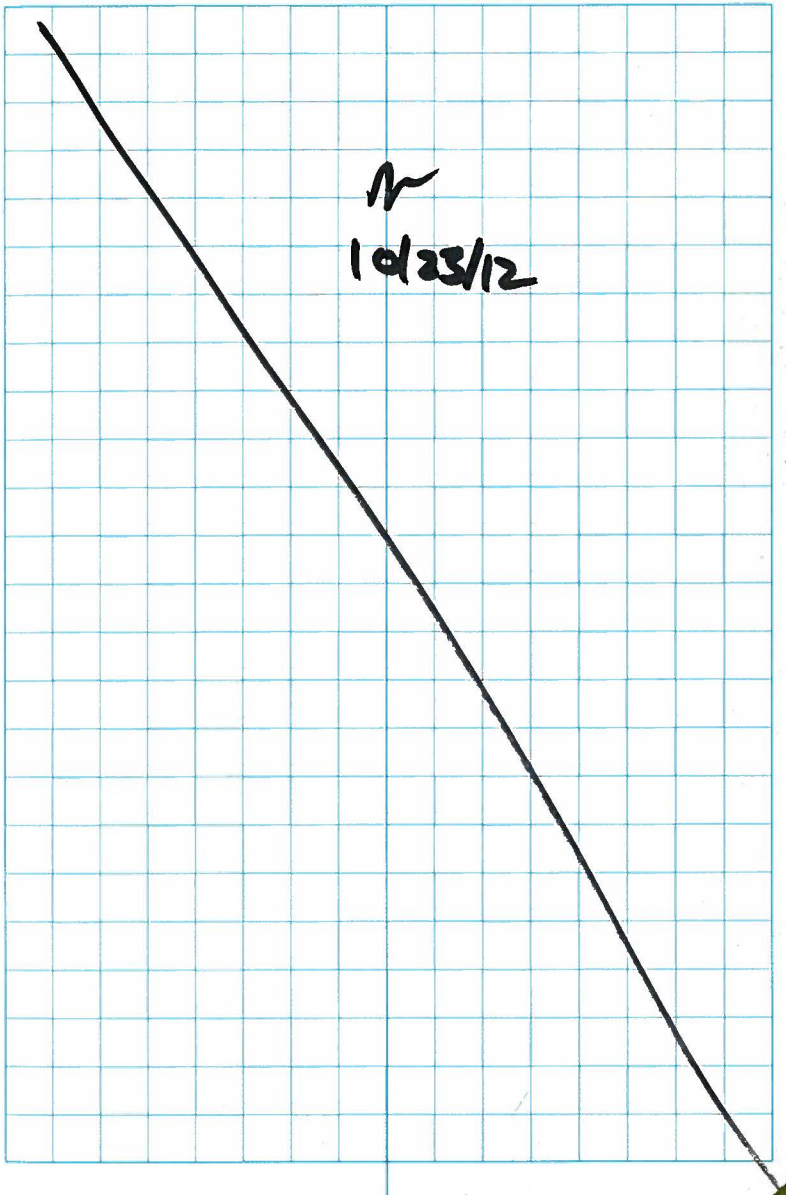
Location _____ Date _____

Project / Client _____



Location _____ Date _____

Project / Client _____



Location Red Hill Date 10/23/12

Project / Client 112066

1019 – 1025 – stop purging to let train through. It would have run over the electrical cord.

1025: begin pumping again.

1037: stop ~~pumping~~ purging

1045: sample well. ESE05.

1050 clean up at RHMW05

1055: move to Red Hill pump station to well ~~RH~~ MW2254-01.

1110: get to pump station

1115: open well
PID: 34 ppm.

1120: BI go back to adit 5 to get one more ~~HDPE~~ bottle.

1125: ~~DTB: 88.~~ M 10/23/12
DTW: ~~77.21~~ M 10/23/12 83.05
DTB: ~~88.34~~ 10/23/12 Did not hit bottom.
no odor
~~Don't know if that is the~~ true depth to bottom, may have hit pump.
Set up equipment. M 10/23/12

Location Red Hill Date 10/23/12

Project / Client 112066 NAVFAC

1145: begin pumping RHMW2254-01.

1230: finish purging well.
5L. purged.
begin sampling

1210: sample time.

1230: finish sampling RHMW2254-01.
clean up around RHMW2254-01

1240: leave pump station go back to adit 5.
To get into the pump station
Alfred. 330 6099
Tony 330 6023

1315: ESI out of tunnels.

1335: leave Red Hill go to Fedex to ship samples.

1345: get to Fedex

1355: leave Fed EX.

10/23/12 M

Location Red Hill Date 12/10/12

Project / Client NAVFAC 112066

purpose: IDW disposal
personnel: JL, JN
weather: sunny, light trade winds

827: ESJ arrive at RHSF gate
830: ESI arrive at RHSF adit #3 safety meeting
835: load ~~up~~ drums on to truck
840: leave RHSF meet PCS in front of Halawa Correctional Facility.
855: Estra Higa arrive at RHSF.
Estra signed ~~manifest~~.
905: ESI leave site.

12/10/12 JL

Location Date

Project / Client

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APPENDIX C

Laboratory Reports

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Calscience Environmental Laboratories, Inc.

CALSCIENCE

WORK ORDER NUMBER: 12-10-1749

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AIR | SOIL | WATER | MARINE CHEMISTRY

Analytical Report For

Client: Environmental Science International, Inc.

Client Project Name: Red Hill LTM 112066

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

Approved for release on 11/1/2012 by:
Richard Villafania
Project Manager

ResultLink

Email your PM

Calscience Environmental Laboratories, Inc.

Contents

Client Project Name: Red Hill LTM 112066
Work Order Number: 12-10-1749

Calscience Environmental Laboratories, Inc.

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ACCREDITED IN ACCORDANCE WITH nelac

Client:	Environmental Science International, Inc. 354 Uluniu Street, Suite 304 Kailua, HI 96734-2500	Work Order:	12-10-1749
		Project Name:	Red Hill LTM 112066
Attn:	Robert Chong	Received:	10/25/12 10:40

ANALYTICAL REPORT

12-10-1749-1 Client ID: ES001 Matrix: Aqueous Units: ug/L Sampled: 10/22/12 12:30

EPA 6020 ICP/MS Metals Extraction: EPA 3020A Total

Analyte	Result	Qual.	DL	LOD	LOQ	Dilution Factor	Preparation Date/Time	Analysis Date/Time	Batch
Lead	0.178	J	0.0898	0.200	1.00	1	10/26/12 00:00	10/26/12 18:31	121026L04D

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

12-10-1749-2 Client ID: ES002 Matrix: Aqueous Units: ug/L Sampled: 10/22/12 12:30

EPA 6020 ICP/MS Metals Extraction: EPA 3020A Total

Analyte	Result	Qual.	DL	LOD	LOQ	Dilution Factor	Preparation Date/Time	Analysis Date/Time	Batch
Lead	<0.200	U	0.0898	0.200	1.00	1	10/26/12 00:00	10/26/12 18:28	121026L04D

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

12-10-1749-3 Client ID: ES003 Matrix: Aqueous Units: ug/L Sampled: 10/22/12 12:30

EPA 6020 ICP/MS Metals Extraction: EPA 3020A Total

Analyte	Result	Qual.	DL	LOD	LOQ	Dilution Factor	Preparation Date/Time	Analysis Date/Time	Batch
Lead	<0.200	U	0.0898	0.200	1.00	1	10/26/12 00:00	10/26/12 18:35	121026L04D

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

12-10-1749-4 Client ID: ES004 Matrix: Aqueous Units: ug/L Sampled: 10/22/12 12:30

EPA 6020 ICP/MS Metals Extraction: EPA 3020A Total

Analyte	Result	Qual.	DL	LOD	LOQ	Dilution Factor	Preparation Date/Time	Analysis Date/Time	Batch
Lead	<0.200	U	0.0898	0.200	1.00	1	10/26/12 00:00	10/26/12 18:39	121026L04D

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

12-10-1749-5 Client ID: ES005 Matrix: Aqueous Units: ug/L Sampled: 10/22/12 12:30

EPA 6020 ICP/MS Metals Extraction: EPA 3020A Total

Analyte	Result	Qual.	DL	LOD	LOQ	Dilution Factor	Preparation Date/Time	Analysis Date/Time	Batch
Lead	<0.200	U	0.0898	0.200	1.00	1	10/26/12 00:00	10/26/12 18:43	121026L04D

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

12-10-1749-6 Client ID: ES006 Matrix: Aqueous Units: ug/L Sampled: 10/22/12 12:30

EPA 6020 ICP/MS Metals Extraction: EPA 3020A Total

Analyte	Result	Qual.	DL	LOD	LOQ	Dilution Factor	Preparation Date/Time	Analysis Date/Time	Batch
Lead	<0.200	U	0.0898	0.200	1.00	1	10/26/12 00:00	10/26/12 18:46	121026L04D

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

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Client:	Environmental Science International, Inc.	Work Order:	12-10-1749
	354 Uluniu Street, Suite 304	Project Name:	Red Hill LTM 112066
	Kailua, HI 96734-2500		
Attn:	Robert Chong	Received:	10/25/12 10:40

ANALYTICAL REPORT

12-10-1749-8 Client ID: ES006 UF Matrix: Aqueous Units: ug/L Sampled: 10/22/12 12:30

EPA 6020 ICP/MS Metals Extraction: EPA 3020A Total

Analyte	Result	Qual.	DL	LOD	LOQ	Dilution Factor	Preparation Date/Time	Analysis Date/Time	Batch
Lead	0.169	J	0.0898	0.200	1.00	1	10/26/12 00:00	10/26/12 18:50	121026L04D

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

099-14-497-5 Client ID: Method Blank Matrix: Aqueous Units: ug/L Sampled: 10/29/12 16:40

EPA 6020 ICP/MS Metals Extraction: EPA 3020A Total

Analyte	Result	Qual.	DL	LOD	LOQ	Dilution Factor	Preparation Date/Time	Analysis Date/Time	Batch
Lead	<0.200	U	0.0898	0.200	1.00	1	10/26/12 00:00	10/26/12 17:38	121026L04D

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

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Client:	Environmental Science International, Inc. 354 Uluniu Street, Suite 304 Kailua, HI 96734-2500	Work Order:	12-10-1749
		Project Name:	Red Hill LTM 112066
Attn:	Robert Chong	Received:	10/25/12 10:40

ANALYTICAL REPORT

12-10-1749-1 Client ID: ES001 Matrix: Aqueous Units: ug/L Sampled: 10/22/12 12:30

EPA 8015B (M) TPH Diesel Extraction: EPA 3510C

Analyte	Result	Qual.	DL	LOD	LOQ	Dilution Factor	Preparation Date/Time	Analysis Date/Time	Batch
TPH as Diesel	85	J,HD	15	20	50	1	10/26/12 00:00	10/27/12 02:09	121026B04

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

12-10-1749-2 Client ID: ES002 Matrix: Aqueous Units: ug/L Sampled: 10/22/12 12:30

EPA 8015B (M) TPH Diesel Extraction: EPA 3510C

Analyte	Result	Qual.	DL	LOD	LOQ	Dilution Factor	Preparation Date/Time	Analysis Date/Time	Batch
TPH as Diesel	2200	HD	15	20	50	1	10/26/12 00:00	10/27/12 02:23	121026B04

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

12-10-1749-3 Client ID: ES003 Matrix: Aqueous Units: ug/L Sampled: 10/22/12 12:30

EPA 8015B (M) TPH Diesel Extraction: EPA 3510C

Analyte	Result	Qual.	DL	LOD	LOQ	Dilution Factor	Preparation Date/Time	Analysis Date/Time	Batch
TPH as Diesel	1800	HD	15	20	50	1	10/26/12 00:00	10/27/12 02:39	121026B04

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

12-10-1749-4 Client ID: ES004 Matrix: Aqueous Units: ug/L Sampled: 10/22/12 12:30

EPA 8015B (M) TPH Diesel Extraction: EPA 3510C

Analyte	Result	Qual.	DL	LOD	LOQ	Dilution Factor	Preparation Date/Time	Analysis Date/Time	Batch
TPH as Diesel	45	J,HD	15	20	50	1	10/26/12 00:00	10/27/12 02:54	121026B04

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

12-10-1749-5 Client ID: ES005 Matrix: Aqueous Units: ug/L Sampled: 10/22/12 12:30

EPA 8015B (M) TPH Diesel Extraction: EPA 3510C

Analyte	Result	Qual.	DL	LOD	LOQ	Dilution Factor	Preparation Date/Time	Analysis Date/Time	Batch
TPH as Diesel	17	J,HD	15	20	50	1	10/26/12 00:00	10/27/12 03:09	121026B04

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

12-10-1749-6 Client ID: ES006 Matrix: Aqueous Units: ug/L Sampled: 10/22/12 12:30

EPA 8015B (M) TPH Diesel Extraction: EPA 3510C

Analyte	Result	Qual.	DL	LOD	LOQ	Dilution Factor	Preparation Date/Time	Analysis Date/Time	Batch
TPH as Diesel	<20	U	15	20	50	1	10/26/12 00:00	10/27/12 03:24	121026B04

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

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Client:	Environmental Science International, Inc. 354 Uluniu Street, Suite 304 Kailua, HI 96734-2500	Work Order:	099-15-516
		Project Name:	Red Hill LTM 112066
Attn:	Robert Chong	Received:	10/25/12 10:40

ANALYTICAL REPORT

099-15-516-12 Client ID: Method Blank Matrix: Aqueous Units: ug/L Sampled: 10/29/12 15:54

EPA 8015B (M) TPH Diesel Extraction: EPA 3510C

Analyte	Result	Qual.	DL	LOD	LOQ	Dilution Factor	Preparation Date/Time	Analysis Date/Time	Batch
TPH as Diesel	<20	U	15	20	50	1	10/26/12 00:00	10/27/12 00:53	121026B04

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

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Client:	Environmental Science International, Inc. 354 Uluniu Street, Suite 304 Kailua, HI 96734-2500	Work Order: Project Name:	12-10-1749 Red Hill LTM 112066
Attn:	Robert Chong	Received:	10/25/12 10:40

ANALYTICAL REPORT

12-10-1749-1 Client ID: ES001 Matrix: Aqueous Units: ug/L Sampled: 10/22/12 12:30

EPA 8270C SIM PAHs Extraction: EPA 3510C

Analyte	Result	Qual.	DL	LOD	LOQ	Dilution Factor	Preparation Date/Time	Analysis Date/Time	Batch
Naphthalene	<0.050	U	0.023	0.050	0.20	1	10/26/12 00:00	10/30/12 14:37	121026L04
2-Methylnaphthalene	<0.050	U	0.026	0.050	0.20	1	10/26/12 00:00	10/30/12 14:37	121026L04
1-Methylnaphthalene	<0.050	U	0.028	0.050	0.20	1	10/26/12 00:00	10/30/12 14:37	121026L04
Acenaphthylene	<0.050	U	0.018	0.050	0.20	1	10/26/12 00:00	10/30/12 14:37	121026L04
Acenaphthene	<0.050	U	0.021	0.050	0.20	1	10/26/12 00:00	10/30/12 14:37	121026L04
Fluorene	<0.050	U	0.024	0.050	0.20	1	10/26/12 00:00	10/30/12 14:37	121026L04
Phenanthrene	<0.050	U	0.031	0.050	0.20	1	10/26/12 00:00	10/30/12 14:37	121026L04
Anthracene	<0.050	U	0.034	0.050	0.20	1	10/26/12 00:00	10/30/12 14:37	121026L04
Fluoranthene	<0.050	U	0.027	0.050	0.20	1	10/26/12 00:00	10/30/12 14:37	121026L04
Pyrene	<0.050	U	0.025	0.050	0.20	1	10/26/12 00:00	10/30/12 14:37	121026L04
Benzo (a) Anthracene	<0.050	U	0.024	0.050	0.20	1	10/26/12 00:00	10/30/12 14:37	121026L04
Chrysene	<0.050	U	0.019	0.050	0.20	1	10/26/12 00:00	10/30/12 14:37	121026L04
Benzo (k) Fluoranthene	<0.050	U	0.023	0.050	0.20	1	10/26/12 00:00	10/30/12 14:37	121026L04
Benzo (b) Fluoranthene	<0.050	U	0.025	0.050	0.20	1	10/26/12 00:00	10/30/12 14:37	121026L04
Benzo (a) Pyrene	<0.050	U	0.036	0.050	0.20	1	10/26/12 00:00	10/30/12 14:37	121026L04
Indeno (1,2,3-c,d) Pyrene	<0.050	U	0.022	0.050	0.20	1	10/26/12 00:00	10/30/12 14:37	121026L04
Dibenz (a,h) Anthracene	<0.050	U	0.027	0.050	0.20	1	10/26/12 00:00	10/30/12 14:37	121026L04
Benzo (g,h,i) Perylene	<0.050	U	0.022	0.050	0.20	1	10/26/12 00:00	10/30/12 14:37	121026L04

Surr: Nitrobenzene-d5 (28-139%)	*87%*						*10/26/12 00:00*	*10/30/12 14:37*	*121026L04*
Surr: 2-Fluorobiphenyl (33-144%)	*89%*						*10/26/12 00:00*	*10/30/12 14:37*	*121026L04*
Surr: p-Terphenyl-d14 (23-160%)	*95%*						*10/26/12 00:00*	*10/30/12 14:37*	*121026L04*

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

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Client:	Environmental Science International, Inc.	Work Order:	12-10-1749
	354 Uluniu Street, Suite 304	Project Name:	Red Hill LTM 112066
	Kailua, HI 96734-2500		
Attn:	Robert Chong	Received:	10/25/12 10:40

ANALYTICAL REPORT

12-10-1749-2 Client ID: ES002 Matrix: Aqueous Units: ug/L Sampled: 10/22/12 12:30

EPA 8270C SIM PAHs Extraction: EPA 3510C

Analyte	Result	Qual.	DL	LOD	LOQ	Dilution Factor	Preparation Date/Time	Analysis Date/Time	Batch
Naphthalene	63		0.23	0.50	2.0	10	10/26/12 00:00	10/30/12 17:14	121026L04
2-Methylnaphthalene	14		0.26	0.50	2.0	10	10/26/12 00:00	10/30/12 17:14	121026L04
1-Methylnaphthalene	24		0.28	0.50	2.0	10	10/26/12 00:00	10/30/12 17:14	121026L04
Acenaphthylene	<0.050	U	0.018	0.050	0.20	1	10/26/12 00:00	10/30/12 15:03	121026L04
Acenaphthene	0.58		0.021	0.050	0.20	1	10/26/12 00:00	10/30/12 15:03	121026L04
Fluorene	0.29		0.024	0.050	0.20	1	10/26/12 00:00	10/30/12 15:03	121026L04
Phenanthrene	<0.050	U	0.031	0.050	0.20	1	10/26/12 00:00	10/30/12 15:03	121026L04
Anthracene	<0.050	U	0.034	0.050	0.20	1	10/26/12 00:00	10/30/12 15:03	121026L04
Fluoranthene	<0.050	U	0.027	0.050	0.20	1	10/26/12 00:00	10/30/12 15:03	121026L04
Pyrene	<0.050	U	0.025	0.050	0.20	1	10/26/12 00:00	10/30/12 15:03	121026L04
Benzo (a) Anthracene	<0.050	U	0.024	0.050	0.20	1	10/26/12 00:00	10/30/12 15:03	121026L04
Chrysene	<0.050	U	0.019	0.050	0.20	1	10/26/12 00:00	10/30/12 15:03	121026L04
Benzo (k) Fluoranthene	<0.050	U	0.023	0.050	0.20	1	10/26/12 00:00	10/30/12 15:03	121026L04
Benzo (b) Fluoranthene	<0.050	U	0.025	0.050	0.20	1	10/26/12 00:00	10/30/12 15:03	121026L04
Benzo (a) Pyrene	<0.050	U	0.036	0.050	0.20	1	10/26/12 00:00	10/30/12 15:03	121026L04
Indeno (1,2,3-c,d) Pyrene	<0.050	U	0.022	0.050	0.20	1	10/26/12 00:00	10/30/12 15:03	121026L04
Dibenz (a,h) Anthracene	<0.050	U	0.027	0.050	0.20	1	10/26/12 00:00	10/30/12 15:03	121026L04
Benzo (g,h,i) Perylene	<0.050	U	0.022	0.050	0.20	1	10/26/12 00:00	10/30/12 15:03	121026L04

Surr: Nitrobenzene-d5 (28-139%)	*86%*						*10/26/12 00:00*	*10/30/12 15:03*	*121026L04*
Surr: 2-Fluorobiphenyl (33-144%)	*93%*						*10/26/12 00:00*	*10/30/12 15:03*	*121026L04*
Surr: p-Terphenyl-d14 (23-160%)	*90%*						*10/26/12 00:00*	*10/30/12 15:03*	*121026L04*

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

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Attn:	Robert Chong	Received:	10/25/12 10:40

ANALYTICAL REPORT

12-10-1749-3 Client ID: ES003 Matrix: Aqueous Units: ug/L Sampled: 10/22/12 12:30

EPA 8270C SIM PAHs Extraction: EPA 3510C

Analyte	Result	Qual.	DL	LOD	LOQ	Dilution Factor	Preparation Date/Time	Analysis Date/Time	Batch
Naphthalene	61		0.23	0.50	2.0	10	10/26/12 00:00	10/30/12 17:41	121026L04
2-Methylnaphthalene	12		0.26	0.50	2.0	10	10/26/12 00:00	10/30/12 17:41	121026L04
1-Methylnaphthalene	21		0.28	0.50	2.0	10	10/26/12 00:00	10/30/12 17:41	121026L04
Acenaphthylene	<0.050	U	0.018	0.050	0.20	1	10/26/12 00:00	10/30/12 15:29	121026L04
Acenaphthene	0.59		0.021	0.050	0.20	1	10/26/12 00:00	10/30/12 15:29	121026L04
Fluorene	0.30		0.024	0.050	0.20	1	10/26/12 00:00	10/30/12 15:29	121026L04
Phenanthrene	<0.050	U	0.031	0.050	0.20	1	10/26/12 00:00	10/30/12 15:29	121026L04
Anthracene	<0.050	U	0.034	0.050	0.20	1	10/26/12 00:00	10/30/12 15:29	121026L04
Fluoranthene	<0.050	U	0.027	0.050	0.20	1	10/26/12 00:00	10/30/12 15:29	121026L04
Pyrene	<0.050	U	0.025	0.050	0.20	1	10/26/12 00:00	10/30/12 15:29	121026L04
Benzo (a) Anthracene	<0.050	U	0.024	0.050	0.20	1	10/26/12 00:00	10/30/12 15:29	121026L04
Chrysene	<0.050	U	0.019	0.050	0.20	1	10/26/12 00:00	10/30/12 15:29	121026L04
Benzo (k) Fluoranthene	<0.050	U	0.023	0.050	0.20	1	10/26/12 00:00	10/30/12 15:29	121026L04
Benzo (b) Fluoranthene	<0.050	U	0.025	0.050	0.20	1	10/26/12 00:00	10/30/12 15:29	121026L04
Benzo (a) Pyrene	<0.050	U	0.036	0.050	0.20	1	10/26/12 00:00	10/30/12 15:29	121026L04
Indeno (1,2,3-c,d) Pyrene	<0.050	U	0.022	0.050	0.20	1	10/26/12 00:00	10/30/12 15:29	121026L04
Dibenz (a,h) Anthracene	<0.050	U	0.027	0.050	0.20	1	10/26/12 00:00	10/30/12 15:29	121026L04
Benzo (g,h,i) Perylene	<0.050	U	0.022	0.050	0.20	1	10/26/12 00:00	10/30/12 15:29	121026L04

Surr: Nitrobenzene-d5 (28-139%)	*95%*						*10/26/12 00:00*	*10/30/12 15:29*	*121026L04*
Surr: 2-Fluorobiphenyl (33-144%)	*97%*						*10/26/12 00:00*	*10/30/12 15:29*	*121026L04*
Surr: p-Terphenyl-d14 (23-160%)	*95%*						*10/26/12 00:00*	*10/30/12 15:29*	*121026L04*

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

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Attn:	Robert Chong	Received:	10/25/12 10:40

ANALYTICAL REPORT

12-10-1749-4 Client ID: ES004 Matrix: Aqueous Units: ug/L Sampled: 10/22/12 12:30

EPA 8270C SIM PAHs Extraction: EPA 3510C

Analyte	Result	Qual.	DL	LOD	LOQ	Dilution Factor	Preparation Date/Time	Analysis Date/Time	Batch
Naphthalene	0.029	J	0.023	0.050	0.20	1	10/26/12 00:00	10/30/12 15:56	121026L04
2-Methylnaphthalene	<0.050	U	0.026	0.050	0.20	1	10/26/12 00:00	10/30/12 15:56	121026L04
1-Methylnaphthalene	<0.050	U	0.028	0.050	0.20	1	10/26/12 00:00	10/30/12 15:56	121026L04
Acenaphthylene	<0.050	U	0.018	0.050	0.20	1	10/26/12 00:00	10/30/12 15:56	121026L04
Acenaphthene	<0.050	U	0.021	0.050	0.20	1	10/26/12 00:00	10/30/12 15:56	121026L04
Fluorene	<0.050	U	0.024	0.050	0.20	1	10/26/12 00:00	10/30/12 15:56	121026L04
Phenanthrene	<0.050	U	0.031	0.050	0.20	1	10/26/12 00:00	10/30/12 15:56	121026L04
Anthracene	<0.050	U	0.034	0.050	0.20	1	10/26/12 00:00	10/30/12 15:56	121026L04
Fluoranthene	<0.050	U	0.027	0.050	0.20	1	10/26/12 00:00	10/30/12 15:56	121026L04
Pyrene	<0.050	U	0.025	0.050	0.20	1	10/26/12 00:00	10/30/12 15:56	121026L04
Benzo (a) Anthracene	<0.050	U	0.024	0.050	0.20	1	10/26/12 00:00	10/30/12 15:56	121026L04
Chrysene	<0.050	U	0.019	0.050	0.20	1	10/26/12 00:00	10/30/12 15:56	121026L04
Benzo (k) Fluoranthene	<0.050	U	0.023	0.050	0.20	1	10/26/12 00:00	10/30/12 15:56	121026L04
Benzo (b) Fluoranthene	<0.050	U	0.025	0.050	0.20	1	10/26/12 00:00	10/30/12 15:56	121026L04
Benzo (a) Pyrene	<0.050	U	0.036	0.050	0.20	1	10/26/12 00:00	10/30/12 15:56	121026L04
Indeno (1,2,3-c,d) Pyrene	<0.050	U	0.022	0.050	0.20	1	10/26/12 00:00	10/30/12 15:56	121026L04
Dibenz (a,h) Anthracene	<0.050	U	0.027	0.050	0.20	1	10/26/12 00:00	10/30/12 15:56	121026L04
Benzo (g,h,i) Perylene	<0.050	U	0.022	0.050	0.20	1	10/26/12 00:00	10/30/12 15:56	121026L04

Surr: Nitrobenzene-d5 (28-139%)	*87%*	*10/26/12 00:00*	*10/30/12 15:56*	*121026L04*
Surr: 2-Fluorobiphenyl (33-144%)	*87%*	*10/26/12 00:00*	*10/30/12 15:56*	*121026L04*
Surr: p-Terphenyl-d14 (23-160%)	*92%*	*10/26/12 00:00*	*10/30/12 15:56*	*121026L04*

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

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Client:	Environmental Science International, Inc.	Work Order:	12-10-1749
	354 Uluniu Street, Suite 304	Project Name:	Red Hill LTM 112066
	Kailua, HI 96734-2500		
Attn:	Robert Chong	Received:	10/25/12 10:40

ANALYTICAL REPORT

12-10-1749-5 Client ID: ES005 Matrix: Aqueous Units: ug/L Sampled: 10/22/12 12:30

EPA 8270C SIM PAHs Extraction: EPA 3510C

Analyte	Result	Qual.	DL	LOD	LOQ	Dilution Factor	Preparation Date/Time	Analysis Date/Time	Batch
Naphthalene	0.038	J	0.023	0.050	0.20	1	10/26/12 00:00	10/30/12 16:22	121026L04
2-Methylnaphthalene	<0.050	U	0.026	0.050	0.20	1	10/26/12 00:00	10/30/12 16:22	121026L04
1-Methylnaphthalene	<0.050	U	0.028	0.050	0.20	1	10/26/12 00:00	10/30/12 16:22	121026L04
Acenaphthylene	<0.050	U	0.018	0.050	0.20	1	10/26/12 00:00	10/30/12 16:22	121026L04
Acenaphthene	<0.050	U	0.021	0.050	0.20	1	10/26/12 00:00	10/30/12 16:22	121026L04
Fluorene	<0.050	U	0.024	0.050	0.20	1	10/26/12 00:00	10/30/12 16:22	121026L04
Phenanthrene	<0.050	U	0.031	0.050	0.20	1	10/26/12 00:00	10/30/12 16:22	121026L04
Anthracene	<0.050	U	0.034	0.050	0.20	1	10/26/12 00:00	10/30/12 16:22	121026L04
Fluoranthene	<0.050	U	0.027	0.050	0.20	1	10/26/12 00:00	10/30/12 16:22	121026L04
Pyrene	<0.050	U	0.025	0.050	0.20	1	10/26/12 00:00	10/30/12 16:22	121026L04
Benzo (a) Anthracene	<0.050	U	0.024	0.050	0.20	1	10/26/12 00:00	10/30/12 16:22	121026L04
Chrysene	<0.050	U	0.019	0.050	0.20	1	10/26/12 00:00	10/30/12 16:22	121026L04
Benzo (k) Fluoranthene	<0.050	U	0.023	0.050	0.20	1	10/26/12 00:00	10/30/12 16:22	121026L04
Benzo (b) Fluoranthene	<0.050	U	0.025	0.050	0.20	1	10/26/12 00:00	10/30/12 16:22	121026L04
Benzo (a) Pyrene	<0.050	U	0.036	0.050	0.20	1	10/26/12 00:00	10/30/12 16:22	121026L04
Indeno (1,2,3-c,d) Pyrene	<0.050	U	0.022	0.050	0.20	1	10/26/12 00:00	10/30/12 16:22	121026L04
Dibenz (a,h) Anthracene	<0.050	U	0.027	0.050	0.20	1	10/26/12 00:00	10/30/12 16:22	121026L04
Benzo (g,h,i) Perylene	<0.050	U	0.022	0.050	0.20	1	10/26/12 00:00	10/30/12 16:22	121026L04

Surr: Nitrobenzene-d5 (28-139%)	*84%*	*10/26/12 00:00*	*10/30/12 16:22*	*121026L04*
Surr: 2-Fluorobiphenyl (33-144%)	*86%*	*10/26/12 00:00*	*10/30/12 16:22*	*121026L04*
Surr: p-Terphenyl-d14 (23-160%)	*95%*	*10/26/12 00:00*	*10/30/12 16:22*	*121026L04*

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

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Client:	Environmental Science International, Inc. 354 Uluniu Street, Suite 304 Kailua, HI 96734-2500	Work Order: Project Name:	12-10-1749 Red Hill LTM 112066
Attn:	Robert Chong	Received:	10/25/12 10:40

ANALYTICAL REPORT

12-10-1749-6 Client ID: ES006 Matrix: Aqueous Units: ug/L Sampled: 10/22/12 12:30

EPA 8270C SIM PAHs Extraction: EPA 3510C

Analyte	Result	Qual.	DL	LOD	LOQ	Dilution Factor	Preparation Date/Time	Analysis Date/Time	Batch
Naphthalene	0.037	J	0.023	0.050	0.20	1	10/26/12 00:00	10/30/12 16:48	121026L04
2-Methylnaphthalene	<0.050	U	0.026	0.050	0.20	1	10/26/12 00:00	10/30/12 16:48	121026L04
1-Methylnaphthalene	<0.050	U	0.028	0.050	0.20	1	10/26/12 00:00	10/30/12 16:48	121026L04
Acenaphthylene	<0.050	U	0.018	0.050	0.20	1	10/26/12 00:00	10/30/12 16:48	121026L04
Acenaphthene	<0.050	U	0.021	0.050	0.20	1	10/26/12 00:00	10/30/12 16:48	121026L04
Fluorene	<0.050	U	0.024	0.050	0.20	1	10/26/12 00:00	10/30/12 16:48	121026L04
Phenanthrene	<0.050	U	0.031	0.050	0.20	1	10/26/12 00:00	10/30/12 16:48	121026L04
Anthracene	<0.050	U	0.034	0.050	0.20	1	10/26/12 00:00	10/30/12 16:48	121026L04
Fluoranthene	<0.050	U	0.027	0.050	0.20	1	10/26/12 00:00	10/30/12 16:48	121026L04
Pyrene	<0.050	U	0.025	0.050	0.20	1	10/26/12 00:00	10/30/12 16:48	121026L04
Benzo (a) Anthracene	<0.050	U	0.024	0.050	0.20	1	10/26/12 00:00	10/30/12 16:48	121026L04
Chrysene	<0.050	U	0.019	0.050	0.20	1	10/26/12 00:00	10/30/12 16:48	121026L04
Benzo (k) Fluoranthene	<0.050	U	0.023	0.050	0.20	1	10/26/12 00:00	10/30/12 16:48	121026L04
Benzo (b) Fluoranthene	<0.050	U	0.025	0.050	0.20	1	10/26/12 00:00	10/30/12 16:48	121026L04
Benzo (a) Pyrene	<0.050	U	0.036	0.050	0.20	1	10/26/12 00:00	10/30/12 16:48	121026L04
Indeno (1,2,3-c,d) Pyrene	<0.050	U	0.022	0.050	0.20	1	10/26/12 00:00	10/30/12 16:48	121026L04
Dibenz (a,h) Anthracene	<0.050	U	0.027	0.050	0.20	1	10/26/12 00:00	10/30/12 16:48	121026L04
Benzo (g,h,i) Perylene	<0.050	U	0.022	0.050	0.20	1	10/26/12 00:00	10/30/12 16:48	121026L04

Surr: Nitrobenzene-d5 (28-139%)	*58%*						*10/26/12 00:00*	*10/30/12 16:48*	*121026L04*
Surr: 2-Fluorobiphenyl (33-144%)	*60%*						*10/26/12 00:00*	*10/30/12 16:48*	*121026L04*
Surr: p-Terphenyl-d14 (23-160%)	*70%*						*10/26/12 00:00*	*10/30/12 16:48*	*121026L04*

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

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Client:	Environmental Science International, Inc.	Work Order:	099-15-148
	354 Uluniu Street, Suite 304	Project Name:	Red Hill LTM 112066
	Kailua, HI 96734-2500		
Attn:	Robert Chong	Received:	10/25/12 10:40

ANALYTICAL REPORT

099-15-148-1 Client ID: Method Blank Matrix: Aqueous Units: ug/L Sampled: 10/30/12 13:11

EPA 8270C SIM PAHs Extraction: EPA 3510C

Analyte	Result	Qual.	DL	LOD	LOQ	Dilution Factor	Preparation Date/Time	Analysis Date/Time	Batch
Naphthalene	<0.050	U	0.023	0.050	0.20	1	10/26/12 00:00	10/30/12 13:18	121026L04
2-Methylnaphthalene	<0.050	U	0.026	0.050	0.20	1	10/26/12 00:00	10/30/12 13:18	121026L04
1-Methylnaphthalene	<0.050	U	0.028	0.050	0.20	1	10/26/12 00:00	10/30/12 13:18	121026L04
Acenaphthylene	<0.050	U	0.018	0.050	0.20	1	10/26/12 00:00	10/30/12 13:18	121026L04
Acenaphthene	<0.050	U	0.021	0.050	0.20	1	10/26/12 00:00	10/30/12 13:18	121026L04
Fluorene	<0.050	U	0.024	0.050	0.20	1	10/26/12 00:00	10/30/12 13:18	121026L04
Phenanthrene	<0.050	U	0.031	0.050	0.20	1	10/26/12 00:00	10/30/12 13:18	121026L04
Anthracene	<0.050	U	0.034	0.050	0.20	1	10/26/12 00:00	10/30/12 13:18	121026L04
Fluoranthene	<0.050	U	0.027	0.050	0.20	1	10/26/12 00:00	10/30/12 13:18	121026L04
Pyrene	<0.050	U	0.025	0.050	0.20	1	10/26/12 00:00	10/30/12 13:18	121026L04
Benzo (a) Anthracene	<0.050	U	0.024	0.050	0.20	1	10/26/12 00:00	10/30/12 13:18	121026L04
Chrysene	<0.050	U	0.019	0.050	0.20	1	10/26/12 00:00	10/30/12 13:18	121026L04
Benzo (k) Fluoranthene	<0.050	U	0.023	0.050	0.20	1	10/26/12 00:00	10/30/12 13:18	121026L04
Benzo (b) Fluoranthene	<0.050	U	0.025	0.050	0.20	1	10/26/12 00:00	10/30/12 13:18	121026L04
Benzo (a) Pyrene	<0.050	U	0.036	0.050	0.20	1	10/26/12 00:00	10/30/12 13:18	121026L04
Indeno (1,2,3-c,d) Pyrene	<0.050	U	0.022	0.050	0.20	1	10/26/12 00:00	10/30/12 13:18	121026L04
Dibenz (a,h) Anthracene	<0.050	U	0.027	0.050	0.20	1	10/26/12 00:00	10/30/12 13:18	121026L04
Benzo (g,h,i) Perylene	<0.050	U	0.022	0.050	0.20	1	10/26/12 00:00	10/30/12 13:18	121026L04

Surr: Nitrobenzene-d5 (28-139%)	*85%*	*10/26/12 00:00*	*10/30/12 13:18*	*121026L04*
Surr: 2-Fluorobiphenyl (33-144%)	*85%*	*10/26/12 00:00*	*10/30/12 13:18*	*121026L04*
Surr: p-Terphenyl-d14 (23-160%)	*96%*	*10/26/12 00:00*	*10/30/12 13:18*	*121026L04*

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

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Client:	Environmental Science International, Inc.	Work Order:	12-10-1749
	354 Uluniu Street, Suite 304	Project Name:	Red Hill LTM 112066
	Kailua, HI 96734-2500		
Attn:	Robert Chong	Received:	10/25/12 10:40

ANALYTICAL REPORT

12-10-1749-1 Client ID: ES001 Matrix: Aqueous Units: ug/L Sampled: 10/22/12 12:30

GC/MS GRO/EPA 8260B Volatile Organics Extraction: EPA 5030C

Analyte	Result	Qual.	DL	LOD	LOQ	Dilution Factor	Preparation Date/Time	Analysis Date/Time	Batch
Acetone	<10	U	6.0	10	20	1	10/27/12 00:00	10/27/12 18:07	121027L01
Benzene	<0.50	U	0.14	0.50	1.0	1	10/27/12 00:00	10/27/12 18:07	121027L01
Bromodichloromethane	<0.50	U	0.21	0.50	5.0	1	10/27/12 00:00	10/27/12 18:07	121027L01
Bromoform	<1.0	U	0.50	1.0	10	1	10/27/12 00:00	10/27/12 18:07	121027L01
Bromomethane	<5.0	U	3.9	5.0	20	1	10/27/12 00:00	10/27/12 18:07	121027L01
2-Butanone	<5.0	U	2.2	5.0	10	1	10/27/12 00:00	10/27/12 18:07	121027L01
Carbon Tetrachloride	<0.50	U	0.23	0.50	1.0	1	10/27/12 00:00	10/27/12 18:07	121027L01
Chlorobenzene	<0.50	U	0.17	0.50	5.0	1	10/27/12 00:00	10/27/12 18:07	121027L01
Chloroethane	<5.0	U	2.3	5.0	10	1	10/27/12 00:00	10/27/12 18:07	121027L01
Chloroform	<0.50	U	0.46	0.50	5.0	1	10/27/12 00:00	10/27/12 18:07	121027L01
Chloromethane	<5.0	IH,U	1.8	5.0	10	1	10/27/12 00:00	10/27/12 18:07	121027L01
Dibromochloromethane	<0.50	U	0.25	0.50	1.0	1	10/27/12 00:00	10/27/12 18:07	121027L01
1,2-Dibromo-3-Chloropropane	<5.0	U	1.2	5.0	10	1	10/27/12 00:00	10/27/12 18:07	121027L01
1,2-Dibromoethane	<0.50	U	0.36	0.50	1.0	1	10/27/12 00:00	10/27/12 18:07	121027L01
1,2-Dichlorobenzene	<0.50	U	0.46	0.50	1.0	1	10/27/12 00:00	10/27/12 18:07	121027L01
1,3-Dichlorobenzene	<0.50	U	0.40	0.50	1.0	1	10/27/12 00:00	10/27/12 18:07	121027L01
1,4-Dichlorobenzene	<0.50	U	0.43	0.50	1.0	1	10/27/12 00:00	10/27/12 18:07	121027L01
1,1-Dichloroethane	<0.50	U	0.28	0.50	5.0	1	10/27/12 00:00	10/27/12 18:07	121027L01
1,2-Dichloroethane	<0.50	U	0.24	0.50	1.0	1	10/27/12 00:00	10/27/12 18:07	121027L01
1,1-Dichloroethene	<0.50	U	0.43	0.50	1.0	1	10/27/12 00:00	10/27/12 18:07	121027L01
c-1,2-Dichloroethene	<0.50	U	0.48	0.50	1.0	1	10/27/12 00:00	10/27/12 18:07	121027L01
t-1,2-Dichloroethene	<0.50	U	0.37	0.50	1.0	1	10/27/12 00:00	10/27/12 18:07	121027L01
1,2-Dichloropropane	<0.50	U	0.42	0.50	5.0	1	10/27/12 00:00	10/27/12 18:07	121027L01
c-1,3-Dichloropropene	<0.50	U	0.25	0.50	1.0	1	10/27/12 00:00	10/27/12 18:07	121027L01
t-1,3-Dichloropropene	<0.50	U	0.25	0.50	1.0	1	10/27/12 00:00	10/27/12 18:07	121027L01
Ethylbenzene	<0.50	U	0.14	0.50	1.0	1	10/27/12 00:00	10/27/12 18:07	121027L01
Methylene Chloride	<1.0	U	0.64	1.0	5.0	1	10/27/12 00:00	10/27/12 18:07	121027L01
4-Methyl-2-Pentanone	<5.0	U	4.4	5.0	10	1	10/27/12 00:00	10/27/12 18:07	121027L01
Styrene	<0.50	U	0.17	0.50	1.0	1	10/27/12 00:00	10/27/12 18:07	121027L01
1,1,1,2-Tetrachloroethane	<0.50	U	0.40	0.50	1.0	1	10/27/12 00:00	10/27/12 18:07	121027L01
1,1,2,2-Tetrachloroethane	<0.50	U	0.41	0.50	1.0	1	10/27/12 00:00	10/27/12 18:07	121027L01
Tetrachloroethene	<0.50	U	0.39	0.50	5.0	1	10/27/12 00:00	10/27/12 18:07	121027L01
Toluene	<0.50	U	0.24	0.50	1.0	1	10/27/12 00:00	10/27/12 18:07	121027L01
1,2,4-Trichlorobenzene	<1.0	U	0.50	1.0	5.0	1	10/27/12 00:00	10/27/12 18:07	121027L01
1,1,1-Trichloroethane	<0.50	U	0.30	0.50	5.0	1	10/27/12 00:00	10/27/12 18:07	121027L01
Hexachloro-1,3-Butadiene	<0.50	U	0.32	0.50	1.0	1	10/27/12 00:00	10/27/12 18:07	121027L01
1,1,2-Trichloroethane	<0.50	U	0.38	0.50	1.0	1	10/27/12 00:00	10/27/12 18:07	121027L01
Trichloroethene	<0.50	U	0.37	0.50	1.0	1	10/27/12 00:00	10/27/12 18:07	121027L01

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Client:	Environmental Science International, Inc.	Work Order:	12-10-1749
	354 Uluniu Street, Suite 304	Project Name:	Red Hill LTM 112066
	Kailua, HI 96734-2500		
Attn:	Robert Chong	Received:	10/25/12 10:40

ANALYTICAL REPORT

12-10-1749-1 Client ID: ES001 Matrix: Aqueous Units: ug/L Sampled: 10/22/12 12:30

GC/MS GRO/EPA 8260B Volatile Organics Extraction: EPA 5030C

Analyte	Result	Qual.	DL	LOD	LOQ	Dilution Factor	Preparation Date/Time	Analysis Date/Time	Batch
1,2,3-Trichloropropane	<1.0	U	0.64	1.0	5.0	1	10/27/12 00:00	10/27/12 18:07	121027L01
Vinyl Chloride	<0.50	U	0.30	0.50	1.0	1	10/27/12 00:00	10/27/12 18:07	121027L01
p/m-Xylene	<1.0	U	0.24	1.0	10	1	10/27/12 00:00	10/27/12 18:07	121027L01
o-Xylene	<0.50	U	0.23	0.50	1.0	1	10/27/12 00:00	10/27/12 18:07	121027L01
Methyl-t-Butyl Ether (MTBE)	<0.50	U	0.31	0.50	1.0	1	10/27/12 00:00	10/27/12 18:07	121027L01
Gasoline Range Organics	20	B,J	13	30	50	1	10/27/12 00:00	10/27/12 18:07	121027L01
Surr: Dibromofluoromethane (80-126%)	*90%*						*10/27/12 00:00*	*10/27/12 18:07*	*121027L01*
Surr: 1,2-Dichloroethane-d4 (80-134%)	*97%*						*10/27/12 00:00*	*10/27/12 18:07*	*121027L01*
Surr: Toluene-d8 (80-120%)	*99%*						*10/27/12 00:00*	*10/27/12 18:07*	*121027L01*
Surr: Toluene-d8-TPPH (88-112%)	*95%*						*10/27/12 00:00*	*10/27/12 18:07*	*121027L01*
Surr: 1,4-Bromofluorobenzene (80-120%)	*99%*						*10/27/12 00:00*	*10/27/12 18:07*	*121027L01*

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

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Client:	Environmental Science International, Inc.	Work Order:	12-10-1749
	354 Uluniu Street, Suite 304	Project Name:	Red Hill LTM 112066
	Kailua, HI 96734-2500		
Attn:	Robert Chong	Received:	10/25/12 10:40

ANALYTICAL REPORT

12-10-1749-2 Client ID: ES002 Matrix: Aqueous Units: ug/L Sampled: 10/22/12 12:30

GC/MS GRO/EPA 8260B Volatile Organics Extraction: EPA 5030C

Analyte	Result	Qual.	DL	LOD	LOQ	Dilution Factor	Preparation Date/Time	Analysis Date/Time	Batch
Acetone	<10	U	6.0	10	20	1	10/27/12 00:00	10/27/12 16:10	121027L01
Benzene	<0.50	U	0.14	0.50	1.0	1	10/27/12 00:00	10/27/12 16:10	121027L01
Bromodichloromethane	<0.50	U	0.21	0.50	5.0	1	10/27/12 00:00	10/27/12 16:10	121027L01
Bromoform	<1.0	U	0.50	1.0	10	1	10/27/12 00:00	10/27/12 16:10	121027L01
Bromomethane	<5.0	U	3.9	5.0	20	1	10/27/12 00:00	10/27/12 16:10	121027L01
2-Butanone	<5.0	U	2.2	5.0	10	1	10/27/12 00:00	10/27/12 16:10	121027L01
Carbon Tetrachloride	<0.50	U	0.23	0.50	1.0	1	10/27/12 00:00	10/27/12 16:10	121027L01
Chlorobenzene	<0.50	U	0.17	0.50	5.0	1	10/27/12 00:00	10/27/12 16:10	121027L01
Chloroethane	<5.0	U	2.3	5.0	10	1	10/27/12 00:00	10/27/12 16:10	121027L01
Chloroform	<0.50	U	0.46	0.50	5.0	1	10/27/12 00:00	10/27/12 16:10	121027L01
Chloromethane	<5.0	IH,U	1.8	5.0	10	1	10/27/12 00:00	10/27/12 16:10	121027L01
Dibromochloromethane	<0.50	U	0.25	0.50	1.0	1	10/27/12 00:00	10/27/12 16:10	121027L01
1,2-Dibromo-3-Chloropropane	<5.0	U	1.2	5.0	10	1	10/27/12 00:00	10/27/12 16:10	121027L01
1,2-Dibromoethane	<0.50	U	0.36	0.50	1.0	1	10/27/12 00:00	10/27/12 16:10	121027L01
1,2-Dichlorobenzene	<0.50	U	0.46	0.50	1.0	1	10/27/12 00:00	10/27/12 16:10	121027L01
1,3-Dichlorobenzene	<0.50	U	0.40	0.50	1.0	1	10/27/12 00:00	10/27/12 16:10	121027L01
1,4-Dichlorobenzene	<0.50	U	0.43	0.50	1.0	1	10/27/12 00:00	10/27/12 16:10	121027L01
1,1-Dichloroethane	<0.50	U	0.28	0.50	5.0	1	10/27/12 00:00	10/27/12 16:10	121027L01
1,2-Dichloroethane	<0.50	U	0.24	0.50	1.0	1	10/27/12 00:00	10/27/12 16:10	121027L01
1,1-Dichloroethene	<0.50	U	0.43	0.50	1.0	1	10/27/12 00:00	10/27/12 16:10	121027L01
c-1,2-Dichloroethene	<0.50	U	0.48	0.50	1.0	1	10/27/12 00:00	10/27/12 16:10	121027L01
t-1,2-Dichloroethene	<0.50	U	0.37	0.50	1.0	1	10/27/12 00:00	10/27/12 16:10	121027L01
1,2-Dichloropropane	<0.50	U	0.42	0.50	5.0	1	10/27/12 00:00	10/27/12 16:10	121027L01
c-1,3-Dichloropropene	<0.50	U	0.25	0.50	1.0	1	10/27/12 00:00	10/27/12 16:10	121027L01
t-1,3-Dichloropropene	<0.50	U	0.25	0.50	1.0	1	10/27/12 00:00	10/27/12 16:10	121027L01
Ethylbenzene	0.18	J	0.14	0.50	1.0	1	10/27/12 00:00	10/27/12 16:10	121027L01
Methylene Chloride	<1.0	U	0.64	1.0	5.0	1	10/27/12 00:00	10/27/12 16:10	121027L01
4-Methyl-2-Pentanone	<5.0	U	4.4	5.0	10	1	10/27/12 00:00	10/27/12 16:10	121027L01
Styrene	<0.50	U	0.17	0.50	1.0	1	10/27/12 00:00	10/27/12 16:10	121027L01
1,1,1,2-Tetrachloroethane	<0.50	U	0.40	0.50	1.0	1	10/27/12 00:00	10/27/12 16:10	121027L01
1,1,2,2-Tetrachloroethane	<0.50	U	0.41	0.50	1.0	1	10/27/12 00:00	10/27/12 16:10	121027L01
Tetrachloroethene	<0.50	U	0.39	0.50	5.0	1	10/27/12 00:00	10/27/12 16:10	121027L01
Toluene	0.59	J	0.24	0.50	1.0	1	10/27/12 00:00	10/27/12 16:10	121027L01
1,2,4-Trichlorobenzene	<1.0	U	0.50	1.0	5.0	1	10/27/12 00:00	10/27/12 16:10	121027L01
1,1,1-Trichloroethane	<0.50	U	0.30	0.50	5.0	1	10/27/12 00:00	10/27/12 16:10	121027L01
Hexachloro-1,3-Butadiene	<0.50	U	0.32	0.50	1.0	1	10/27/12 00:00	10/27/12 16:10	121027L01
1,1,2-Trichloroethane	<0.50	U	0.38	0.50	1.0	1	10/27/12 00:00	10/27/12 16:10	121027L01
Trichloroethene	<0.50	U	0.37	0.50	1.0	1	10/27/12 00:00	10/27/12 16:10	121027L01

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Client:	Environmental Science International, Inc.	Work Order:	12-10-1749
	354 Uluniu Street, Suite 304	Project Name:	Red Hill LTM 112066
	Kailua, HI 96734-2500		
Attn:	Robert Chong	Received:	10/25/12 10:40

ANALYTICAL REPORT

12-10-1749-2 Client ID: ES002 Matrix: Aqueous Units: ug/L Sampled: 10/22/12 12:30

GC/MS GRO/EPA 8260B Volatile Organics Extraction: EPA 5030C

Analyte	Result	Qual.	DL	LOD	LOQ	Dilution Factor	Preparation Date/Time	Analysis Date/Time	Batch
1,2,3-Trichloropropane	<1.0	U	0.64	1.0	5.0	1	10/27/12 00:00	10/27/12 16:10	121027L01
Vinyl Chloride	<0.50	U	0.30	0.50	1.0	1	10/27/12 00:00	10/27/12 16:10	121027L01
p/m-Xylene	<1.0	U	0.24	1.0	10	1	10/27/12 00:00	10/27/12 16:10	121027L01
o-Xylene	0.51	J	0.23	0.50	1.0	1	10/27/12 00:00	10/27/12 16:10	121027L01
Methyl-t-Butyl Ether (MTBE)	<0.50	U	0.31	0.50	1.0	1	10/27/12 00:00	10/27/12 16:10	121027L01
Gasoline Range Organics	320	B	13	30	50	1	10/27/12 00:00	10/27/12 16:10	121027L01

Surr: Dibromofluoromethane (80-126%)	*82%*						*10/27/12 00:00*	*10/27/12 16:10*	*121027L01*
Surr: 1,2-Dichloroethane-d4 (80-134%)	*100%*						*10/27/12 00:00*	*10/27/12 16:10*	*121027L01*
Surr: Toluene-d8 (80-120%)	*97%*						*10/27/12 00:00*	*10/27/12 16:10*	*121027L01*
Surr: Toluene-d8-TPPH (88-112%)	*94%*						*10/27/12 00:00*	*10/27/12 16:10*	*121027L01*
Surr: 1,4-Bromofluorobenzene (80-120%)	*101%*						*10/27/12 00:00*	*10/27/12 16:10*	*121027L01*

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

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Client:	Environmental Science International, Inc.	Work Order:	12-10-1749
	354 Uluniu Street, Suite 304	Project Name:	Red Hill LTM 112066
	Kailua, HI 96734-2500		
Attn:	Robert Chong	Received:	10/25/12 10:40

ANALYTICAL REPORT

12-10-1749-3 Client ID: ES003 Matrix: Aqueous Units: ug/L Sampled: 10/22/12 12:30

GC/MS GRO/EPA 8260B Volatile Organics Extraction: EPA 5030C

Analyte	Result	Qual.	DL	LOD	LOQ	Dilution Factor	Preparation Date/Time	Analysis Date/Time	Batch
Acetone	<10	U	6.0	10	20	1	10/27/12 00:00	10/27/12 18:36	121027L01
Benzene	<0.50	U	0.14	0.50	1.0	1	10/27/12 00:00	10/27/12 18:36	121027L01
Bromodichloromethane	<0.50	U	0.21	0.50	5.0	1	10/27/12 00:00	10/27/12 18:36	121027L01
Bromoform	<1.0	U	0.50	1.0	10	1	10/27/12 00:00	10/27/12 18:36	121027L01
Bromomethane	<5.0	U	3.9	5.0	20	1	10/27/12 00:00	10/27/12 18:36	121027L01
2-Butanone	<5.0	U	2.2	5.0	10	1	10/27/12 00:00	10/27/12 18:36	121027L01
Carbon Tetrachloride	<0.50	U	0.23	0.50	1.0	1	10/27/12 00:00	10/27/12 18:36	121027L01
Chlorobenzene	<0.50	U	0.17	0.50	5.0	1	10/27/12 00:00	10/27/12 18:36	121027L01
Chloroethane	<5.0	U	2.3	5.0	10	1	10/27/12 00:00	10/27/12 18:36	121027L01
Chloroform	<0.50	U	0.46	0.50	5.0	1	10/27/12 00:00	10/27/12 18:36	121027L01
Chloromethane	<5.0	IH,U	1.8	5.0	10	1	10/27/12 00:00	10/27/12 18:36	121027L01
Dibromochloromethane	<0.50	U	0.25	0.50	1.0	1	10/27/12 00:00	10/27/12 18:36	121027L01
1,2-Dibromo-3-Chloropropane	<5.0	U	1.2	5.0	10	1	10/27/12 00:00	10/27/12 18:36	121027L01
1,2-Dibromoethane	<0.50	U	0.36	0.50	1.0	1	10/27/12 00:00	10/27/12 18:36	121027L01
1,2-Dichlorobenzene	<0.50	U	0.46	0.50	1.0	1	10/27/12 00:00	10/27/12 18:36	121027L01
1,3-Dichlorobenzene	<0.50	U	0.40	0.50	1.0	1	10/27/12 00:00	10/27/12 18:36	121027L01
1,4-Dichlorobenzene	<0.50	U	0.43	0.50	1.0	1	10/27/12 00:00	10/27/12 18:36	121027L01
1,1-Dichloroethane	<0.50	U	0.28	0.50	5.0	1	10/27/12 00:00	10/27/12 18:36	121027L01
1,2-Dichloroethane	<0.50	U	0.24	0.50	1.0	1	10/27/12 00:00	10/27/12 18:36	121027L01
1,1-Dichloroethene	<0.50	U	0.43	0.50	1.0	1	10/27/12 00:00	10/27/12 18:36	121027L01
c-1,2-Dichloroethene	<0.50	U	0.48	0.50	1.0	1	10/27/12 00:00	10/27/12 18:36	121027L01
t-1,2-Dichloroethene	<0.50	U	0.37	0.50	1.0	1	10/27/12 00:00	10/27/12 18:36	121027L01
1,2-Dichloropropane	<0.50	U	0.42	0.50	5.0	1	10/27/12 00:00	10/27/12 18:36	121027L01
c-1,3-Dichloropropene	<0.50	U	0.25	0.50	1.0	1	10/27/12 00:00	10/27/12 18:36	121027L01
t-1,3-Dichloropropene	<0.50	U	0.25	0.50	1.0	1	10/27/12 00:00	10/27/12 18:36	121027L01
Ethylbenzene	0.18	J	0.14	0.50	1.0	1	10/27/12 00:00	10/27/12 18:36	121027L01
Methylene Chloride	<1.0	U	0.64	1.0	5.0	1	10/27/12 00:00	10/27/12 18:36	121027L01
4-Methyl-2-Pentanone	<5.0	U	4.4	5.0	10	1	10/27/12 00:00	10/27/12 18:36	121027L01
Styrene	<0.50	U	0.17	0.50	1.0	1	10/27/12 00:00	10/27/12 18:36	121027L01
1,1,1,2-Tetrachloroethane	<0.50	U	0.40	0.50	1.0	1	10/27/12 00:00	10/27/12 18:36	121027L01
1,1,2,2-Tetrachloroethane	<0.50	U	0.41	0.50	1.0	1	10/27/12 00:00	10/27/12 18:36	121027L01
Tetrachloroethene	<0.50	U	0.39	0.50	5.0	1	10/27/12 00:00	10/27/12 18:36	121027L01
Toluene	0.60	J	0.24	0.50	1.0	1	10/27/12 00:00	10/27/12 18:36	121027L01
1,2,4-Trichlorobenzene	<1.0	U	0.50	1.0	5.0	1	10/27/12 00:00	10/27/12 18:36	121027L01
1,1,1-Trichloroethane	<0.50	U	0.30	0.50	5.0	1	10/27/12 00:00	10/27/12 18:36	121027L01
Hexachloro-1,3-Butadiene	<0.50	U	0.32	0.50	1.0	1	10/27/12 00:00	10/27/12 18:36	121027L01
1,1,2-Trichloroethane	<0.50	U	0.38	0.50	1.0	1	10/27/12 00:00	10/27/12 18:36	121027L01
Trichloroethene	<0.50	U	0.37	0.50	1.0	1	10/27/12 00:00	10/27/12 18:36	121027L01

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Client:	Environmental Science International, Inc.	Work Order:	12-10-1749
	354 Uluniu Street, Suite 304	Project Name:	Red Hill LTM 112066
	Kailua, HI 96734-2500		
Attn:	Robert Chong	Received:	10/25/12 10:40

ANALYTICAL REPORT

12-10-1749-3 Client ID: ES003 Matrix: Aqueous Units: ug/L Sampled: 10/22/12 12:30

GC/MS GRO/EPA 8260B Volatile Organics Extraction: EPA 5030C

Analyte	Result	Qual.	DL	LOD	LOQ	Dilution Factor	Preparation Date/Time	Analysis Date/Time	Batch
1,2,3-Trichloropropane	<1.0	U	0.64	1.0	5.0	1	10/27/12 00:00	10/27/12 18:36	121027L01
Vinyl Chloride	<0.50	U	0.30	0.50	1.0	1	10/27/12 00:00	10/27/12 18:36	121027L01
p/m-Xylene	<1.0	U	0.24	1.0	10	1	10/27/12 00:00	10/27/12 18:36	121027L01
o-Xylene	0.47	J	0.23	0.50	1.0	1	10/27/12 00:00	10/27/12 18:36	121027L01
Methyl-t-Butyl Ether (MTBE)	<0.50	U	0.31	0.50	1.0	1	10/27/12 00:00	10/27/12 18:36	121027L01
Gasoline Range Organics	360	B	13	30	50	1	10/27/12 00:00	10/27/12 18:36	121027L01
Surr: Dibromofluoromethane (80-126%)	*81%*						*10/27/12 00:00*	*10/27/12 18:36*	*121027L01*
Surr: 1,2-Dichloroethane-d4 (80-134%)	*97%*						*10/27/12 00:00*	*10/27/12 18:36*	*121027L01*
Surr: Toluene-d8 (80-120%)	*100%*						*10/27/12 00:00*	*10/27/12 18:36*	*121027L01*
Surr: Toluene-d8-TPPH (88-112%)	*97%*						*10/27/12 00:00*	*10/27/12 18:36*	*121027L01*
Surr: 1,4-Bromofluorobenzene (80-120%)	*96%*						*10/27/12 00:00*	*10/27/12 18:36*	*121027L01*

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

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Client:	Environmental Science International, Inc.	Work Order:	12-10-1749
	354 Uluniu Street, Suite 304	Project Name:	Red Hill LTM 112066
	Kailua, HI 96734-2500		
Attn:	Robert Chong	Received:	10/25/12 10:40

ANALYTICAL REPORT

12-10-1749-4 Client ID: ES004 Matrix: Aqueous Units: ug/L Sampled: 10/22/12 12:30

GC/MS GRO/EPA 8260B Volatile Organics Extraction: EPA 5030C

Analyte	Result	Qual.	DL	LOD	LOQ	Dilution Factor	Preparation Date/Time	Analysis Date/Time	Batch
Acetone	<10	U	6.0	10	20	1	10/27/12 00:00	10/27/12 19:05	121027L01
Benzene	<0.50	U	0.14	0.50	1.0	1	10/27/12 00:00	10/27/12 19:05	121027L01
Bromodichloromethane	<0.50	U	0.21	0.50	5.0	1	10/27/12 00:00	10/27/12 19:05	121027L01
Bromoform	<1.0	U	0.50	1.0	10	1	10/27/12 00:00	10/27/12 19:05	121027L01
Bromomethane	<5.0	U	3.9	5.0	20	1	10/27/12 00:00	10/27/12 19:05	121027L01
2-Butanone	<5.0	U	2.2	5.0	10	1	10/27/12 00:00	10/27/12 19:05	121027L01
Carbon Tetrachloride	<0.50	U	0.23	0.50	1.0	1	10/27/12 00:00	10/27/12 19:05	121027L01
Chlorobenzene	<0.50	U	0.17	0.50	5.0	1	10/27/12 00:00	10/27/12 19:05	121027L01
Chloroethane	<5.0	U	2.3	5.0	10	1	10/27/12 00:00	10/27/12 19:05	121027L01
Chloroform	<0.50	U	0.46	0.50	5.0	1	10/27/12 00:00	10/27/12 19:05	121027L01
Chloromethane	<5.0	IH,U	1.8	5.0	10	1	10/27/12 00:00	10/27/12 19:05	121027L01
Dibromochloromethane	<0.50	U	0.25	0.50	1.0	1	10/27/12 00:00	10/27/12 19:05	121027L01
1,2-Dibromo-3-Chloropropane	<5.0	U	1.2	5.0	10	1	10/27/12 00:00	10/27/12 19:05	121027L01
1,2-Dibromoethane	<0.50	U	0.36	0.50	1.0	1	10/27/12 00:00	10/27/12 19:05	121027L01
1,2-Dichlorobenzene	<0.50	U	0.46	0.50	1.0	1	10/27/12 00:00	10/27/12 19:05	121027L01
1,3-Dichlorobenzene	<0.50	U	0.40	0.50	1.0	1	10/27/12 00:00	10/27/12 19:05	121027L01
1,4-Dichlorobenzene	<0.50	U	0.43	0.50	1.0	1	10/27/12 00:00	10/27/12 19:05	121027L01
1,1-Dichloroethane	<0.50	U	0.28	0.50	5.0	1	10/27/12 00:00	10/27/12 19:05	121027L01
1,2-Dichloroethane	<0.50	U	0.24	0.50	1.0	1	10/27/12 00:00	10/27/12 19:05	121027L01
1,1-Dichloroethene	<0.50	U	0.43	0.50	1.0	1	10/27/12 00:00	10/27/12 19:05	121027L01
c-1,2-Dichloroethene	<0.50	U	0.48	0.50	1.0	1	10/27/12 00:00	10/27/12 19:05	121027L01
t-1,2-Dichloroethene	<0.50	U	0.37	0.50	1.0	1	10/27/12 00:00	10/27/12 19:05	121027L01
1,2-Dichloropropane	<0.50	U	0.42	0.50	5.0	1	10/27/12 00:00	10/27/12 19:05	121027L01
c-1,3-Dichloropropene	<0.50	U	0.25	0.50	1.0	1	10/27/12 00:00	10/27/12 19:05	121027L01
t-1,3-Dichloropropene	<0.50	U	0.25	0.50	1.0	1	10/27/12 00:00	10/27/12 19:05	121027L01
Ethylbenzene	<0.50	U	0.14	0.50	1.0	1	10/27/12 00:00	10/27/12 19:05	121027L01
Methylene Chloride	<1.0	U	0.64	1.0	5.0	1	10/27/12 00:00	10/27/12 19:05	121027L01
4-Methyl-2-Pentanone	<5.0	U	4.4	5.0	10	1	10/27/12 00:00	10/27/12 19:05	121027L01
Styrene	<0.50	U	0.17	0.50	1.0	1	10/27/12 00:00	10/27/12 19:05	121027L01
1,1,1,2-Tetrachloroethane	<0.50	U	0.40	0.50	1.0	1	10/27/12 00:00	10/27/12 19:05	121027L01
1,1,2,2-Tetrachloroethane	<0.50	U	0.41	0.50	1.0	1	10/27/12 00:00	10/27/12 19:05	121027L01
Tetrachloroethene	<0.50	U	0.39	0.50	5.0	1	10/27/12 00:00	10/27/12 19:05	121027L01
Toluene	0.54	J	0.24	0.50	1.0	1	10/27/12 00:00	10/27/12 19:05	121027L01
1,2,4-Trichlorobenzene	<1.0	U	0.50	1.0	5.0	1	10/27/12 00:00	10/27/12 19:05	121027L01
1,1,1-Trichloroethane	<0.50	U	0.30	0.50	5.0	1	10/27/12 00:00	10/27/12 19:05	121027L01
Hexachloro-1,3-Butadiene	<0.50	U	0.32	0.50	1.0	1	10/27/12 00:00	10/27/12 19:05	121027L01
1,1,2-Trichloroethane	<0.50	U	0.38	0.50	1.0	1	10/27/12 00:00	10/27/12 19:05	121027L01
Trichloroethene	<0.50	U	0.37	0.50	1.0	1	10/27/12 00:00	10/27/12 19:05	121027L01

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Client:	Environmental Science International, Inc.	Work Order:	12-10-1749
	354 Uluniu Street, Suite 304	Project Name:	Red Hill LTM 112066
	Kailua, HI 96734-2500		
Attn:	Robert Chong	Received:	10/25/12 10:40

ANALYTICAL REPORT

12-10-1749-4 Client ID: ES004 Matrix: Aqueous Units: ug/L Sampled: 10/22/12 12:30

GC/MS GRO/EPA 8260B Volatile Organics Extraction: EPA 5030C

Analyte	Result	Qual.	DL	LOD	LOQ	Dilution Factor	Preparation Date/Time	Analysis Date/Time	Batch
1,2,3-Trichloropropane	<1.0	U	0.64	1.0	5.0	1	10/27/12 00:00	10/27/12 19:05	121027L01
Vinyl Chloride	<0.50	U	0.30	0.50	1.0	1	10/27/12 00:00	10/27/12 19:05	121027L01
p/m-Xylene	<1.0	U	0.24	1.0	10	1	10/27/12 00:00	10/27/12 19:05	121027L01
o-Xylene	<0.50	U	0.23	0.50	1.0	1	10/27/12 00:00	10/27/12 19:05	121027L01
Methyl-t-Butyl Ether (MTBE)	<0.50	U	0.31	0.50	1.0	1	10/27/12 00:00	10/27/12 19:05	121027L01
Gasoline Range Organics	<30	U	13	30	50	1	10/27/12 00:00	10/27/12 19:05	121027L01

Surr: Dibromofluoromethane (80-126%)	*85%*						*10/27/12 00:00*	*10/27/12 19:05*	*121027L01*
Surr: 1,2-Dichloroethane-d4 (80-134%)	*101%*						*10/27/12 00:00*	*10/27/12 19:05*	*121027L01*
Surr: Toluene-d8 (80-120%)	*100%*						*10/27/12 00:00*	*10/27/12 19:05*	*121027L01*
Surr: Toluene-d8-TPPH (88-112%)	*96%*						*10/27/12 00:00*	*10/27/12 19:05*	*121027L01*
Surr: 1,4-Bromofluorobenzene (80-120%)	*97%*						*10/27/12 00:00*	*10/27/12 19:05*	*121027L01*

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

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Client:	Environmental Science International, Inc.	Work Order:	12-10-1749
	354 Uluniu Street, Suite 304	Project Name:	Red Hill LTM 112066
	Kailua, HI 96734-2500		
Attn:	Robert Chong	Received:	10/25/12 10:40

ANALYTICAL REPORT

12-10-1749-5 Client ID: ES005 Matrix: Aqueous Units: ug/L Sampled: 10/22/12 12:30

GC/MS GRO/EPA 8260B Volatile Organics Extraction: EPA 5030C

Analyte	Result	Qual.	DL	LOD	LOQ	Dilution Factor	Preparation Date/Time	Analysis Date/Time	Batch
Acetone	<10	U	6.0	10	20	1	10/27/12 00:00	10/27/12 19:34	121027L01
Benzene	<0.50	U	0.14	0.50	1.0	1	10/27/12 00:00	10/27/12 19:34	121027L01
Bromodichloromethane	<0.50	U	0.21	0.50	5.0	1	10/27/12 00:00	10/27/12 19:34	121027L01
Bromoform	<1.0	U	0.50	1.0	10	1	10/27/12 00:00	10/27/12 19:34	121027L01
Bromomethane	<5.0	U	3.9	5.0	20	1	10/27/12 00:00	10/27/12 19:34	121027L01
2-Butanone	<5.0	U	2.2	5.0	10	1	10/27/12 00:00	10/27/12 19:34	121027L01
Carbon Tetrachloride	<0.50	U	0.23	0.50	1.0	1	10/27/12 00:00	10/27/12 19:34	121027L01
Chlorobenzene	<0.50	U	0.17	0.50	5.0	1	10/27/12 00:00	10/27/12 19:34	121027L01
Chloroethane	<5.0	U	2.3	5.0	10	1	10/27/12 00:00	10/27/12 19:34	121027L01
Chloroform	<0.50	U	0.46	0.50	5.0	1	10/27/12 00:00	10/27/12 19:34	121027L01
Chloromethane	<5.0	IH,U	1.8	5.0	10	1	10/27/12 00:00	10/27/12 19:34	121027L01
Dibromochloromethane	<0.50	U	0.25	0.50	1.0	1	10/27/12 00:00	10/27/12 19:34	121027L01
1,2-Dibromo-3-Chloropropane	<5.0	U	1.2	5.0	10	1	10/27/12 00:00	10/27/12 19:34	121027L01
1,2-Dibromoethane	<0.50	U	0.36	0.50	1.0	1	10/27/12 00:00	10/27/12 19:34	121027L01
1,2-Dichlorobenzene	<0.50	U	0.46	0.50	1.0	1	10/27/12 00:00	10/27/12 19:34	121027L01
1,3-Dichlorobenzene	<0.50	U	0.40	0.50	1.0	1	10/27/12 00:00	10/27/12 19:34	121027L01
1,4-Dichlorobenzene	<0.50	U	0.43	0.50	1.0	1	10/27/12 00:00	10/27/12 19:34	121027L01
1,1-Dichloroethane	<0.50	U	0.28	0.50	5.0	1	10/27/12 00:00	10/27/12 19:34	121027L01
1,2-Dichloroethane	<0.50	U	0.24	0.50	1.0	1	10/27/12 00:00	10/27/12 19:34	121027L01
1,1-Dichloroethene	<0.50	U	0.43	0.50	1.0	1	10/27/12 00:00	10/27/12 19:34	121027L01
c-1,2-Dichloroethene	<0.50	U	0.48	0.50	1.0	1	10/27/12 00:00	10/27/12 19:34	121027L01
t-1,2-Dichloroethene	<0.50	U	0.37	0.50	1.0	1	10/27/12 00:00	10/27/12 19:34	121027L01
1,2-Dichloropropane	<0.50	U	0.42	0.50	5.0	1	10/27/12 00:00	10/27/12 19:34	121027L01
c-1,3-Dichloropropene	<0.50	U	0.25	0.50	1.0	1	10/27/12 00:00	10/27/12 19:34	121027L01
t-1,3-Dichloropropene	<0.50	U	0.25	0.50	1.0	1	10/27/12 00:00	10/27/12 19:34	121027L01
Ethylbenzene	<0.50	U	0.14	0.50	1.0	1	10/27/12 00:00	10/27/12 19:34	121027L01
Methylene Chloride	<1.0	U	0.64	1.0	5.0	1	10/27/12 00:00	10/27/12 19:34	121027L01
4-Methyl-2-Pentanone	<5.0	U	4.4	5.0	10	1	10/27/12 00:00	10/27/12 19:34	121027L01
Styrene	<0.50	U	0.17	0.50	1.0	1	10/27/12 00:00	10/27/12 19:34	121027L01
1,1,1,2-Tetrachloroethane	<0.50	U	0.40	0.50	1.0	1	10/27/12 00:00	10/27/12 19:34	121027L01
1,1,2,2-Tetrachloroethane	<0.50	U	0.41	0.50	1.0	1	10/27/12 00:00	10/27/12 19:34	121027L01
Tetrachloroethene	<0.50	U	0.39	0.50	5.0	1	10/27/12 00:00	10/27/12 19:34	121027L01
Toluene	0.31	J	0.24	0.50	1.0	1	10/27/12 00:00	10/27/12 19:34	121027L01
1,2,4-Trichlorobenzene	<1.0	U	0.50	1.0	5.0	1	10/27/12 00:00	10/27/12 19:34	121027L01
1,1,1-Trichloroethane	<0.50	U	0.30	0.50	5.0	1	10/27/12 00:00	10/27/12 19:34	121027L01
Hexachloro-1,3-Butadiene	<0.50	U	0.32	0.50	1.0	1	10/27/12 00:00	10/27/12 19:34	121027L01
1,1,2-Trichloroethane	<0.50	U	0.38	0.50	1.0	1	10/27/12 00:00	10/27/12 19:34	121027L01
Trichloroethene	<0.50	U	0.37	0.50	1.0	1	10/27/12 00:00	10/27/12 19:34	121027L01

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Client:	Environmental Science International, Inc.	Work Order:	12-10-1749
	354 Uluniu Street, Suite 304	Project Name:	Red Hill LTM 112066
	Kailua, HI 96734-2500		
Attn:	Robert Chong	Received:	10/25/12 10:40

ANALYTICAL REPORT

12-10-1749-5 Client ID: ES005 Matrix: Aqueous Units: ug/L Sampled: 10/22/12 12:30

GC/MS GRO/EPA 8260B Volatile Organics Extraction: EPA 5030C

Analyte	Result	Qual.	DL	LOD	LOQ	Dilution Factor	Preparation Date/Time	Analysis Date/Time	Batch
1,2,3-Trichloropropane	<1.0	U	0.64	1.0	5.0	1	10/27/12 00:00	10/27/12 19:34	121027L01
Vinyl Chloride	<0.50	U	0.30	0.50	1.0	1	10/27/12 00:00	10/27/12 19:34	121027L01
p/m-Xylene	<1.0	U	0.24	1.0	10	1	10/27/12 00:00	10/27/12 19:34	121027L01
o-Xylene	<0.50	U	0.23	0.50	1.0	1	10/27/12 00:00	10/27/12 19:34	121027L01
Methyl-t-Butyl Ether (MTBE)	<0.50	U	0.31	0.50	1.0	1	10/27/12 00:00	10/27/12 19:34	121027L01
Gasoline Range Organics	15	B,J	13	30	50	1	10/27/12 00:00	10/27/12 19:34	121027L01

Surr: Dibromofluoromethane (80-126%)	*90%*	*10/27/12 00:00*	*10/27/12 19:34*	*121027L01*	
Surr: 1,2-Dichloroethane-d4 (80-134%)	*100%*	*10/27/12 00:00*	*10/27/12 19:34*	*121027L01*	
Surr: Toluene-d8 (80-120%)	*100%*	*10/27/12 00:00*	*10/27/12 19:34*	*121027L01*	
Surr: Toluene-d8-TPPH (88-112%)	*97%*	*10/27/12 00:00*	*10/27/12 19:34*	*121027L01*	
Surr: 1,4-Bromofluorobenzene (80-120%)	*95%*	*10/27/12 00:00*	*10/27/12 19:34*	*121027L01*	

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

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Client:	Environmental Science International, Inc.	Work Order:	12-10-1749
	354 Uluniu Street, Suite 304	Project Name:	Red Hill LTM 112066
	Kailua, HI 96734-2500		
Attn:	Robert Chong	Received:	10/25/12 10:40

ANALYTICAL REPORT

12-10-1749-6 Client ID: ES006 Matrix: Aqueous Units: ug/L Sampled: 10/22/12 12:30

GC/MS GRO/EPA 8260B Volatile Organics Extraction: EPA 5030C

Analyte	Result	Qual.	DL	LOD	LOQ	Dilution Factor	Preparation Date/Time	Analysis Date/Time	Batch
Acetone	<10	U	6.0	10	20	1	10/27/12 00:00	10/27/12 20:03	121027L01
Benzene	<0.50	U	0.14	0.50	1.0	1	10/27/12 00:00	10/27/12 20:03	121027L01
Bromodichloromethane	<0.50	U	0.21	0.50	5.0	1	10/27/12 00:00	10/27/12 20:03	121027L01
Bromoform	<1.0	U	0.50	1.0	10	1	10/27/12 00:00	10/27/12 20:03	121027L01
Bromomethane	<5.0	U	3.9	5.0	20	1	10/27/12 00:00	10/27/12 20:03	121027L01
2-Butanone	<5.0	U	2.2	5.0	10	1	10/27/12 00:00	10/27/12 20:03	121027L01
Carbon Tetrachloride	<0.50	U	0.23	0.50	1.0	1	10/27/12 00:00	10/27/12 20:03	121027L01
Chlorobenzene	<0.50	U	0.17	0.50	5.0	1	10/27/12 00:00	10/27/12 20:03	121027L01
Chloroethane	<5.0	U	2.3	5.0	10	1	10/27/12 00:00	10/27/12 20:03	121027L01
Chloroform	<0.50	U	0.46	0.50	5.0	1	10/27/12 00:00	10/27/12 20:03	121027L01
Chloromethane	<5.0	IH,U	1.8	5.0	10	1	10/27/12 00:00	10/27/12 20:03	121027L01
Dibromochloromethane	<0.50	U	0.25	0.50	1.0	1	10/27/12 00:00	10/27/12 20:03	121027L01
1,2-Dibromo-3-Chloropropane	<5.0	U	1.2	5.0	10	1	10/27/12 00:00	10/27/12 20:03	121027L01
1,2-Dibromoethane	<0.50	U	0.36	0.50	1.0	1	10/27/12 00:00	10/27/12 20:03	121027L01
1,2-Dichlorobenzene	<0.50	U	0.46	0.50	1.0	1	10/27/12 00:00	10/27/12 20:03	121027L01
1,3-Dichlorobenzene	<0.50	U	0.40	0.50	1.0	1	10/27/12 00:00	10/27/12 20:03	121027L01
1,4-Dichlorobenzene	<0.50	U	0.43	0.50	1.0	1	10/27/12 00:00	10/27/12 20:03	121027L01
1,1-Dichloroethane	<0.50	U	0.28	0.50	5.0	1	10/27/12 00:00	10/27/12 20:03	121027L01
1,2-Dichloroethane	<0.50	U	0.24	0.50	1.0	1	10/27/12 00:00	10/27/12 20:03	121027L01
1,1-Dichloroethene	<0.50	U	0.43	0.50	1.0	1	10/27/12 00:00	10/27/12 20:03	121027L01
c-1,2-Dichloroethene	<0.50	U	0.48	0.50	1.0	1	10/27/12 00:00	10/27/12 20:03	121027L01
t-1,2-Dichloroethene	<0.50	U	0.37	0.50	1.0	1	10/27/12 00:00	10/27/12 20:03	121027L01
1,2-Dichloropropane	<0.50	U	0.42	0.50	5.0	1	10/27/12 00:00	10/27/12 20:03	121027L01
c-1,3-Dichloropropene	<0.50	U	0.25	0.50	1.0	1	10/27/12 00:00	10/27/12 20:03	121027L01
t-1,3-Dichloropropene	<0.50	U	0.25	0.50	1.0	1	10/27/12 00:00	10/27/12 20:03	121027L01
Ethylbenzene	<0.50	U	0.14	0.50	1.0	1	10/27/12 00:00	10/27/12 20:03	121027L01
Methylene Chloride	<1.0	U	0.64	1.0	5.0	1	10/27/12 00:00	10/27/12 20:03	121027L01
4-Methyl-2-Pentanone	<5.0	U	4.4	5.0	10	1	10/27/12 00:00	10/27/12 20:03	121027L01
Styrene	<0.50	U	0.17	0.50	1.0	1	10/27/12 00:00	10/27/12 20:03	121027L01
1,1,1,2-Tetrachloroethane	<0.50	U	0.40	0.50	1.0	1	10/27/12 00:00	10/27/12 20:03	121027L01
1,1,2,2-Tetrachloroethane	<0.50	U	0.41	0.50	1.0	1	10/27/12 00:00	10/27/12 20:03	121027L01
Tetrachloroethene	<0.50	U	0.39	0.50	5.0	1	10/27/12 00:00	10/27/12 20:03	121027L01
Toluene	0.71	J	0.24	0.50	1.0	1	10/27/12 00:00	10/27/12 20:03	121027L01
1,2,4-Trichlorobenzene	<1.0	U	0.50	1.0	5.0	1	10/27/12 00:00	10/27/12 20:03	121027L01
1,1,1-Trichloroethane	<0.50	U	0.30	0.50	5.0	1	10/27/12 00:00	10/27/12 20:03	121027L01
Hexachloro-1,3-Butadiene	<0.50	U	0.32	0.50	1.0	1	10/27/12 00:00	10/27/12 20:03	121027L01
1,1,2-Trichloroethane	<0.50	U	0.38	0.50	1.0	1	10/27/12 00:00	10/27/12 20:03	121027L01
Trichloroethene	<0.50	U	0.37	0.50	1.0	1	10/27/12 00:00	10/27/12 20:03	121027L01

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Client:	Environmental Science International, Inc.	Work Order:	12-10-1749
	354 Uluniu Street, Suite 304	Project Name:	Red Hill LTM 112066
	Kailua, HI 96734-2500		
Attn:	Robert Chong	Received:	10/25/12 10:40

ANALYTICAL REPORT

12-10-1749-6 Client ID: ES006 Matrix: Aqueous Units: ug/L Sampled: 10/22/12 12:30

GC/MS GRO/EPA 8260B Volatile Organics Extraction: EPA 5030C

Analyte	Result	Qual.	DL	LOD	LOQ	Dilution Factor	Preparation Date/Time	Analysis Date/Time	Batch
1,2,3-Trichloropropane	<1.0	U	0.64	1.0	5.0	1	10/27/12 00:00	10/27/12 20:03	121027L01
Vinyl Chloride	<0.50	U	0.30	0.50	1.0	1	10/27/12 00:00	10/27/12 20:03	121027L01
p/m-Xylene	<1.0	U	0.24	1.0	10	1	10/27/12 00:00	10/27/12 20:03	121027L01
o-Xylene	<0.50	U	0.23	0.50	1.0	1	10/27/12 00:00	10/27/12 20:03	121027L01
Methyl-t-Butyl Ether (MTBE)	<0.50	U	0.31	0.50	1.0	1	10/27/12 00:00	10/27/12 20:03	121027L01
Gasoline Range Organics	18	B,J	13	30	50	1	10/27/12 00:00	10/27/12 20:03	121027L01

Surr: Dibromofluoromethane (80-126%)	*90%*						*10/27/12 00:00*	*10/27/12 20:03*	*121027L01*
Surr: 1,2-Dichloroethane-d4 (80-134%)	*100%*						*10/27/12 00:00*	*10/27/12 20:03*	*121027L01*
Surr: Toluene-d8 (80-120%)	*98%*						*10/27/12 00:00*	*10/27/12 20:03*	*121027L01*
Surr: Toluene-d8-TPPH (88-112%)	*95%*						*10/27/12 00:00*	*10/27/12 20:03*	*121027L01*
Surr: 1,4-Bromofluorobenzene (80-120%)	*98%*						*10/27/12 00:00*	*10/27/12 20:03*	*121027L01*

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

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Client:	Environmental Science International, Inc.	Work Order:	099-13-057
	354 Uluniu Street, Suite 304	Project Name:	Red Hill LTM 112066
	Kailua, HI 96734-2500		
Attn:	Robert Chong	Received:	10/25/12 10:40

ANALYTICAL REPORT

099-13-057-1 Client ID: Method Blank Matrix: Aqueous Units: ug/L Sampled: 10/27/12 15:25

GC/MS GRO/EPA 8260B Volatile Organics Extraction: EPA 5030C

Analyte	Result	Qual.	DL	LOD	LOQ	Dilution Factor	Preparation Date/Time	Analysis Date/Time	Batch
Acetone	<10	U	6.0	10	20	1	10/27/12 00:00	10/27/12 15:41	121027L01
Benzene	<0.50	U	0.14	0.50	1.0	1	10/27/12 00:00	10/27/12 15:41	121027L01
Bromodichloromethane	<0.50	U	0.21	0.50	5.0	1	10/27/12 00:00	10/27/12 15:41	121027L01
Bromoform	<1.0	U	0.50	1.0	10	1	10/27/12 00:00	10/27/12 15:41	121027L01
Bromomethane	<5.0	U	3.9	5.0	20	1	10/27/12 00:00	10/27/12 15:41	121027L01
2-Butanone	<5.0	U	2.2	5.0	10	1	10/27/12 00:00	10/27/12 15:41	121027L01
Carbon Tetrachloride	<0.50	U	0.23	0.50	1.0	1	10/27/12 00:00	10/27/12 15:41	121027L01
Chlorobenzene	<0.50	U	0.17	0.50	5.0	1	10/27/12 00:00	10/27/12 15:41	121027L01
Chloroethane	<5.0	U	2.3	5.0	10	1	10/27/12 00:00	10/27/12 15:41	121027L01
Chloroform	<0.50	U	0.46	0.50	5.0	1	10/27/12 00:00	10/27/12 15:41	121027L01
Chloromethane	<5.0	U	1.8	5.0	10	1	10/27/12 00:00	10/27/12 15:41	121027L01
Dibromochloromethane	<0.50	U	0.25	0.50	1.0	1	10/27/12 00:00	10/27/12 15:41	121027L01
1,2-Dibromo-3-Chloropropane	<5.0	U	1.2	5.0	10	1	10/27/12 00:00	10/27/12 15:41	121027L01
1,2-Dibromoethane	<0.50	U	0.36	0.50	1.0	1	10/27/12 00:00	10/27/12 15:41	121027L01
1,2-Dichlorobenzene	<0.50	U	0.46	0.50	1.0	1	10/27/12 00:00	10/27/12 15:41	121027L01
1,3-Dichlorobenzene	<0.50	U	0.40	0.50	1.0	1	10/27/12 00:00	10/27/12 15:41	121027L01
1,4-Dichlorobenzene	<0.50	U	0.43	0.50	1.0	1	10/27/12 00:00	10/27/12 15:41	121027L01
1,1-Dichloroethane	<0.50	U	0.28	0.50	5.0	1	10/27/12 00:00	10/27/12 15:41	121027L01
1,2-Dichloroethane	<0.50	U	0.24	0.50	1.0	1	10/27/12 00:00	10/27/12 15:41	121027L01
1,1-Dichloroethene	<0.50	U	0.43	0.50	1.0	1	10/27/12 00:00	10/27/12 15:41	121027L01
c-1,2-Dichloroethene	<0.50	U	0.48	0.50	1.0	1	10/27/12 00:00	10/27/12 15:41	121027L01
t-1,2-Dichloroethene	<0.50	U	0.37	0.50	1.0	1	10/27/12 00:00	10/27/12 15:41	121027L01
1,2-Dichloropropane	<0.50	U	0.42	0.50	5.0	1	10/27/12 00:00	10/27/12 15:41	121027L01
c-1,3-Dichloropropene	<0.50	U	0.25	0.50	1.0	1	10/27/12 00:00	10/27/12 15:41	121027L01
t-1,3-Dichloropropene	<0.50	U	0.25	0.50	1.0	1	10/27/12 00:00	10/27/12 15:41	121027L01
Ethylbenzene	<0.50	U	0.14	0.50	1.0	1	10/27/12 00:00	10/27/12 15:41	121027L01
Methylene Chloride	<1.0	U	0.64	1.0	5.0	1	10/27/12 00:00	10/27/12 15:41	121027L01
4-Methyl-2-Pentanone	<5.0	U	4.4	5.0	10	1	10/27/12 00:00	10/27/12 15:41	121027L01
Styrene	<0.50	U	0.17	0.50	1.0	1	10/27/12 00:00	10/27/12 15:41	121027L01
1,1,1,2-Tetrachloroethane	<0.50	U	0.40	0.50	1.0	1	10/27/12 00:00	10/27/12 15:41	121027L01
1,1,2,2-Tetrachloroethane	<0.50	U	0.41	0.50	1.0	1	10/27/12 00:00	10/27/12 15:41	121027L01
Tetrachloroethene	<0.50	U	0.39	0.50	5.0	1	10/27/12 00:00	10/27/12 15:41	121027L01
Toluene	<0.50	U	0.24	0.50	1.0	1	10/27/12 00:00	10/27/12 15:41	121027L01
1,2,4-Trichlorobenzene	<1.0	U	0.50	1.0	5.0	1	10/27/12 00:00	10/27/12 15:41	121027L01
1,1,1-Trichloroethane	<0.50	U	0.30	0.50	5.0	1	10/27/12 00:00	10/27/12 15:41	121027L01
Hexachloro-1,3-Butadiene	<0.50	U	0.32	0.50	1.0	1	10/27/12 00:00	10/27/12 15:41	121027L01
1,1,2-Trichloroethane	<0.50	U	0.38	0.50	1.0	1	10/27/12 00:00	10/27/12 15:41	121027L01
Trichloroethene	<0.50	U	0.37	0.50	1.0	1	10/27/12 00:00	10/27/12 15:41	121027L01

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Calscience Environmental Laboratories, Inc.

The difference is service

Client:	Environmental Science International, Inc.	Work Order:	099-13-057
	354 Uluniu Street, Suite 304	Project Name:	Red Hill LTM 112066
	Kailua, HI 96734-2500		
Attn:	Robert Chong	Received:	10/25/12 10:40

ANALYTICAL REPORT

099-13-057-1 Client ID: Method Blank Matrix: Aqueous Units: ug/L Sampled: 10/27/12 15:25

GC/MS GRO/EPA 8260B Volatile Organics Extraction: EPA 5030C

Analyte	Result	Qual.	DL	LOD	LOQ	Dilution Factor	Preparation Date/Time	Analysis Date/Time	Batch
1,2,3-Trichloropropane	<1.0	U	0.64	1.0	5.0	1	10/27/12 00:00	10/27/12 15:41	121027L01
Vinyl Chloride	<0.50	U	0.30	0.50	1.0	1	10/27/12 00:00	10/27/12 15:41	121027L01
p/m-Xylene	<1.0	U	0.24	1.0	10	1	10/27/12 00:00	10/27/12 15:41	121027L01
o-Xylene	<0.50	U	0.23	0.50	1.0	1	10/27/12 00:00	10/27/12 15:41	121027L01
Methyl-t-Butyl Ether (MTBE)	<0.50	U	0.31	0.50	1.0	1	10/27/12 00:00	10/27/12 15:41	121027L01
Gasoline Range Organics	14	J	13	30	50	1	10/27/12 00:00	10/27/12 15:41	121027L01

Surr: Dibromofluoromethane (80-126%)	*90%*						*10/27/12 00:00*	*10/27/12 15:41*	*121027L01*
Surr: 1,2-Dichloroethane-d4 (80-134%)	*99%*						*10/27/12 00:00*	*10/27/12 15:41*	*121027L01*
Surr: Toluene-d8 (80-120%)	*98%*						*10/27/12 00:00*	*10/27/12 15:41*	*121027L01*
Surr: Toluene-d8-TPPH (88-112%)	*95%*						*10/27/12 00:00*	*10/27/12 15:41*	*121027L01*
Surr: 1,4-Bromofluorobenzene (80-120%)	*97%*						*10/27/12 00:00*	*10/27/12 15:41*	*121027L01*

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

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Calscience Environmental Laboratories, Inc.

The difference is service

ACCREDITED IN ACCORDANCE WITH nelac

Client:	Environmental Science International, Inc. 354 Uluniu Street, Suite 304 Kailua, HI 96734-2500	Work Order:	12-10-1749
		Project Name:	Red Hill LTM 112066
Attn:	Robert Chong	Received:	10/25/12 10:40

ANALYTICAL REPORT

12-10-1749-7 Client ID: ES Trip Matrix: Aqueous Units: ug/L Sampled: 10/22/12 12:30

EPA 8015B (M) TPH Gasoline Extraction: EPA 5030C

Analyte	Result	Qual.	DL	LOD	LOQ	Dilution Factor	Preparation Date/Time	Analysis Date/Time	Batch
TPH as Gasoline	<100	U	44	100	200	1	10/26/12 00:00	10/26/12 15:09	121025B01
Surr: 1,4-Bromofluorobenzene (49-133%) 76%							*10/26/12 00:00*	*10/26/12 15:09*	*121025B01*

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

099-14-495-2 Client ID: Method Blank Matrix: Aqueous Units: ug/L Sampled: 10/27/12 15:13

EPA 8015B (M) TPH Gasoline Extraction: EPA 5030C

Analyte	Result	Qual.	DL	LOD	LOQ	Dilution Factor	Preparation Date/Time	Analysis Date/Time	Batch
TPH as Gasoline	<100	U	44	100	200	1	10/26/12 00:00	10/26/12 13:37	121025B01
Surr: 1,4-Bromofluorobenzene (49-133%) 75%							*10/26/12 00:00*	*10/26/12 13:37*	*121025B01*

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

Calscience Environmental Laboratories, Inc.

Quality Control - Spike/Spike Duplicate

ACCREDITED IN ACCORDANCE WITH nelac

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

Date Received: 10/25/12
Work Order No: 12-10-1749
Preparation: EPA 3020A Total
Method: EPA 6020

Project Red Hill LTM 112066

Quality Control Sample ID	Matrix	Instrument	Date Prepared	Date Analyzed	MS/MSD Batch Number
ES002	**Aqueous**	**ICP/MS 04**	**10/26/12**	**10/26/12**	**121026S04**

Parameter	SAMPLE CONC	SPIKE ADDED	MS CONC	MS %REC	MSD CONC	MSD %REC	%REC CL	RPD	RPD CL	Qualifiers
Lead	ND	100.0	99.10	99	99.34	99	80-120	0	0-20	

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RPD - Relative Percent Difference , CL - Control Limit

Calscience Environmental Laboratories, Inc.

Quality Control - Spike/Spike Duplicate

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

Date Received: 10/25/12
Work Order No: 12-10-1749
Preparation: EPA 5030C
Method: EPA 8015B (M)

Project Red Hill LTM 112066

Quality Control Sample ID	Matrix	Instrument	Date Prepared	Date Analyzed	MS/MSD Batch Number
ES002	**Aqueous**	**GC 4**	**10/26/12**	**10/26/12**	**121025S01**

Parameter	SAMPLE CONC	SPIKE ADDED	MS CONC	MS %REC	MSD CONC	MSD %REC	%REC CL	RPD	RPD CL	Qualifiers
TPH as Gasoline	625.7	2000	2510	94	2503	94	70-112	0	0-17	

RPD - Relative Percent Difference , CL - Control Limit

Calscience Environmental Laboratories, Inc.

Quality Control - PDS / PDSD

ACCREDITED IN ACCORDANCE WITH nelac

Environmental Science International, Inc.	Date Received	10/25/12
354 Uluniu Street, Suite 304	Work Order No:	12-10-1749
Kailua, HI 96734-2500	Preparation:	EPA 3020A Total
	Method:	EPA 6020

Project Red Hill LTM 112066

Quality Control Sample ID	Matrix	Instrument	Date Prepared	Date Analyzed	PDS/PDSD Batch Number
ES002	**Aqueous**	**ICP/MS 04**	**10/26/12**	**10/26/12**	**121026S04**

Parameter	SAMPLE_CONC	SPIKE_ADDED	PDS_CONC	PDS %REC	%REC CL	Qualifiers
Lead	ND	100.0	98.59	99	75-125	

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RPD - Relative Percent Difference , CL - Control Limit

Calscience Environmental Laboratories, Inc.

Quality Control - Spike/Spike Duplicate

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

Date Received: 10/25/12
Work Order No: 12-10-1749
Preparation: EPA 3510C
Method: EPA 8015B (M)

Project Red Hill LTM 112066

Quality Control Sample ID	Matrix	Instrument	Date Prepared	Date Analyzed	MS/MSD Batch Number
ES002	**Aqueous**	**GC 46**	**10/26/12**	**10/27/12**	**121026S04**

Parameter	SAMPLE CONC	SPIKE ADDED	MS CONC	MS %REC	MSD CONC	MSD %REC	%REC CL	RPD	RPD CL	Qualifiers
TPH as Diesel	2175	4000	5496	83	5404	81	55-133	2	0-30	

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RPD - Relative Percent Difference , CL - Control Limit

Calscience Environmental Laboratories, Inc.

Quality Control - Spike/Spike Duplicate

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

Date Received: 10/25/12
Work Order No: 12-10-1749
Preparation: EPA 3510C
Method: EPA 8270C SIM PAHs

Project Red Hill LTM 112066

Quality Control Sample ID	Matrix	Instrument	Date Prepared	Date Analyzed	MS/MSD Batch Number
ES002	**Aqueous**	**GC/MS AAA**	**10/26/12**	**10/30/12**	**121026S04**

Parameter	SAMPLE CONC	SPIKE ADDED	MS CONC	MS %REC	MSD CONC	MSD %REC	%REC CL	RPD	RPD CL	Qualifiers
Naphthalene	63.40	2.000	55.84	0	57.72	0	21-133	3	0-25	3
2-Methylnaphthalene	14.00	2.000	18.12	206	11.60	0	21-140	44	0-25	3,4
1-Methylnaphthalene	23.50	2.000	27.13	181	22.69	0	20-140	18	0-25	3
Acenaphthylene	ND	2.000	1.744	87	1.948	97	33-145	11	0-25	
Acenaphthene	0.5760	2.000	2.116	77	2.345	88	49-121	10	0-25	
Fluorene	0.2872	2.000	2.026	87	2.175	94	59-121	7	0-25	
Phenanthrene	ND	2.000	1.700	85	1.821	91	54-120	7	0-25	
Anthracene	ND	2.000	1.189	59	1.253	63	27-133	5	0-25	
Fluoranthene	ND	2.000	1.836	92	1.882	94	26-137	2	0-25	
Pyrene	ND	2.000	1.882	94	2.040	102	18-168	8	0-25	
Benzo (a) Anthracene	ND	2.000	1.978	99	2.147	107	33-143	8	0-25	
Chrysene	ND	2.000	1.867	93	2.037	102	17-168	9	0-25	
Benzo (k) Fluoranthene	ND	2.000	2.031	102	2.169	108	24-159	7	0-25	
Benzo (b) Fluoranthene	ND	2.000	2.004	100	2.098	105	24-159	5	0-25	
Benzo (a) Pyrene	ND	2.000	1.789	89	1.890	95	17-163	6	0-25	
Indeno (1,2,3-c,d) Pyrene	ND	2.000	1.698	85	1.915	96	10-171	12	0-25	
Dibenz (a,h) Anthracene	ND	2.000	1.496	75	1.602	80	10-219	7	0-25	
Benzo (g,h,i) Perylene	ND	2.000	1.584	79	1.772	89	10-227	11	0-25	

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RPD - Relative Percent Difference , CL - Control Limit

Calscience Environmental Laboratories, Inc.

Quality Control - Spike/Spike Duplicate

ACCREDITED IN ACCORDANCE WITH nelac

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

Date Received: 10/25/12
Work Order No: 12-10-1749
Preparation: EPA 5030C
Method: GC/MS / EPA 8260B

Project Red Hill LTM 112066

Quality Control Sample ID	Matrix	Instrument	Date Prepared	Date Analyzed	MS/MSD Batch Number
ES002	**Aqueous**	**GC/MS LL**	**10/27/12**	**10/27/12**	**121027S01**

Parameter	SAMPLE CONC	SPIKE ADDED	MS CONC	MS %REC	MSD CONC	MSD %REC	%REC CL	RPD	RPD CL	Qualifiers
Acetone	ND	50.00	60.88	122	53.86	108	40-140	12	0-20	
Benzene	ND	50.00	47.33	95	47.12	94	80-120	0	0-20	
Bromobenzene	ND	50.00	50.93	102	51.31	103	75-125	1	0-20	
Bromochloromethane	ND	50.00	51.51	103	51.85	104	65-135	1	0-20	
Bromodichloromethane	ND	50.00	49.43	99	48.71	97	75-120	1	0-20	
Bromoform	ND	50.00	51.25	102	50.72	101	70-130	1	0-20	
Bromomethane	ND	50.00	53.28	107	42.30	85	30-145	23	0-20	4
2-Butanone	ND	50.00	46.04	92	49.24	98	30-150	7	0-20	
n-Butylbenzene	4.084	50.00	61.70	115	60.56	113	70-135	2	0-20	
sec-Butylbenzene	3.971	50.00	57.50	107	57.74	108	70-125	0	0-20	
tert-Butylbenzene	ND	50.00	52.27	105	57.32	115	70-130	9	0-20	
Carbon Disulfide	ND	50.00	45.64	91	37.96	76	35-160	18	0-20	
Carbon Tetrachloride	ND	50.00	49.20	98	48.58	97	65-140	1	0-20	
Chlorobenzene	ND	50.00	49.99	100	50.56	101	80-120	1	0-20	
Chloroethane	ND	50.00	55.37	111	54.73	109	60-135	1	0-20	
Chloroform	ND	50.00	47.39	95	47.56	95	65-135	0	0-20	
Chloromethane	ND	50.00	47.31	95	34.86	70	40-125	30	0-20	4
2-Chlorotoluene	ND	50.00	51.20	102	52.08	104	75-125	2	0-20	
4-Chlorotoluene	ND	50.00	51.36	103	52.38	105	75-130	2	0-20	
Dibromochloromethane	ND	50.00	50.51	101	50.36	101	60-135	0	0-20	
1,2-Dibromo-3-Chloropropane	ND	50.00	53.27	107	54.42	109	50-130	2	0-20	
1,2-Dibromoethane	ND	50.00	52.84	106	51.17	102	80-120	3	0-20	
Dibromomethane	ND	50.00	49.19	98	48.96	98	75-125	0	0-20	
1,2-Dichlorobenzene	ND	50.00	51.33	103	51.52	103	70-120	0	0-20	
1,3-Dichlorobenzene	ND	50.00	50.24	100	51.96	104	75-125	3	0-20	
1,4-Dichlorobenzene	ND	50.00	50.81	102	50.87	102	75-125	0	0-20	
Dichlorodifluoromethane	ND	50.00	44.27	89	45.45	91	30-155	3	0-20	
1,1-Dichloroethane	ND	50.00	46.40	93	44.70	89	70-135	4	0-20	
1,2-Dichloroethane	ND	50.00	51.93	104	51.28	103	70-130	1	0-20	
1,1-Dichloroethene	ND	50.00	43.75	87	44.86	90	70-130	3	0-20	
c-1,2-Dichloroethene	ND	50.00	48.95	98	48.50	97	70-125	1	0-20	

RPD - Relative Percent Difference , CL - Control Limit

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Calscience Environmental Laboratories, Inc.

Quality Control - Spike/Spike Duplicate

ACCREDITED IN ACCORDANCE WITH nelac

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

Date Received: 10/25/12
Work Order No: 12-10-1749
Preparation: EPA 5030C
Method: GC/MS / EPA 8260B

Project Red Hill LTM 112066

Quality Control Sample ID	Matrix	Instrument	Date Prepared	Date Analyzed	MS/MSD Batch Number
ES002	**Aqueous**	**GC/MS LL**	**10/27/12**	**10/27/12**	**121027S01**

Parameter	SAMPLE CONC	SPIKE ADDED	MS CONC	MS %REC	MSD CONC	MSD %REC	%REC CL	RPD	RPD CL	Qualifiers
t-1,2-Dichloroethene	ND	50.00	46.83	94	47.08	94	60-140	1	0-20	
1,2-Dichloropropane	ND	50.00	48.60	97	48.58	97	75-125	0	0-20	
1,3-Dichloropropane	ND	50.00	51.96	104	50.04	100	75-125	4	0-20	
2,2-Dichloropropane	ND	50.00	48.31	97	47.24	94	70-135	2	0-20	
1,1-Dichloropropene	ND	50.00	52.52	105	53.00	106	75-130	1	0-20	
c-1,3-Dichloropropene	ND	50.00	50.40	101	51.50	103	70-130	2	0-20	
t-1,3-Dichloropropene	ND	50.00	48.45	97	47.74	95	55-140	1	0-20	
Ethylbenzene	ND	50.00	52.02	104	52.23	104	75-125	0	0-20	
2-Hexanone	ND	50.00	50.24	100	50.78	102	55-130	1	0-20	
Isopropylbenzene	ND	50.00	55.69	111	57.50	115	75-125	3	0-20	
p-Isopropyltoluene	ND	50.00	53.20	106	54.01	108	75-130	2	0-20	
Methylene Chloride	ND	50.00	42.07	84	42.75	86	55-140	2	0-20	
4-Methyl-2-Pentanone	ND	50.00	52.17	104	52.04	104	60-135	0	0-20	
Naphthalene	84.85	50.00	136.0	102	133.6	98	55-140	2	0-20	
n-Propylbenzene	6.182	50.00	58.80	105	59.24	106	70-130	1	0-20	
Styrene	ND	50.00	53.76	108	53.97	108	65-135	0	0-20	
1,1,1,2-Tetrachloroethane	ND	50.00	52.02	104	50.55	101	80-130	3	0-20	
1,1,2,2-Tetrachloroethane	ND	50.00	50.08	100	49.95	100	65-130	0	0-20	
Tetrachloroethene	ND	50.00	53.25	107	53.84	108	45-150	1	0-20	
Toluene	ND	50.00	50.15	100	50.26	101	75-120	0	0-20	
1,2,3-Trichlorobenzene	ND	50.00	56.99	114	57.59	115	55-140	1	0-20	
1,2,4-Trichlorobenzene	ND	50.00	59.97	120	60.24	120	65-135	0	0-20	
1,1,1-Trichloroethane	ND	50.00	49.06	98	49.03	98	65-130	0	0-20	
Hexachloro-1,3-Butadiene	ND	50.00	52.92	106	53.38	107	50-140	1	0-20	
1,1,2-Trichloro-1,2,2-Trifluoroethane	ND	50.00	47.59	95	47.96	96	80-130	1	0-20	
1,1,2-Trichloroethane	ND	50.00	50.18	100	49.79	100	75-125	1	0-20	
Trichloroethene	ND	50.00	49.43	99	50.16	100	70-125	1	0-20	
Trichlorofluoromethane	ND	50.00	54.54	109	54.19	108	60-145	1	0-20	
1,2,3-Trichloropropane	ND	50.00	51.62	103	51.28	103	75-125	1	0-20	
1,2,4-Trimethylbenzene	ND	50.00	55.07	110	55.28	111	75-130	0	0-20	
1,3,5-Trimethylbenzene	ND	50.00	52.97	106	52.89	106	75-130	0	0-20	

RPD - Relative Percent Difference , CL - Control Limit

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Calscience Environmental Laboratories, Inc.

Quality Control - Spike/Spike Duplicate

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

Date Received: 10/25/12
Work Order No: 12-10-1749
Preparation: EPA 5030C
Method: GC/MS / EPA 8260B

Project Red Hill LTM 112066

Quality Control Sample ID	Matrix	Instrument	Date Prepared	Date Analyzed	MS/MSD Batch Number
ES002	**Aqueous**	**GC/MS LL**	**10/27/12**	**10/27/12**	**121027S01**

Parameter	SAMPLE CONC	SPIKE ADDED	MS CONC	MS %REC	MSD CONC	MSD %REC	%REC CL	RPD	RPD CL	Qualifiers
Vinyl Acetate	ND	50.00	50.26	101	49.42	99	80-120	2	0-20	
Vinyl Chloride	ND	50.00	49.12	98	50.69	101	50-145	3	0-20	
p/m-Xylene	ND	100.0	103.7	104	104.3	104	75-130	1	0-20	
o-Xylene	ND	50.00	51.75	103	52.26	105	80-120	1	0-20	
Methyl-t-Butyl Ether (MTBE)	ND	50.00	47.18	94	47.15	94	65-125	0	0-20	
Tert-Butyl Alcohol (TBA)	ND	250.0	283.2	113	291.5	117	46-154	3	0-35	
Diisopropyl Ether (DIPE)	ND	50.00	49.96	100	50.35	101	81-123	1	0-20	
Ethyl-t-Butyl Ether (ETBE)	ND	50.00	50.99	102	50.97	102	74-122	0	0-20	
Tert-Amyl-Methyl Ether (TAME)	ND	50.00	51.21	102	50.01	100	76-124	2	0-20	
Ethanol	ND	500.0	562.1	112	568.0	114	60-138	1	0-35	

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RPD - Relative Percent Difference , CL - Control Limit

Calscience Environmental Laboratories, Inc.

Quality Control - LCS/LCS Duplicate

ACCREDITED IN ACCORDANCE WITH nelac

Environmental Science International, Inc.		Date Received:	N/A
354 Uluniu Street, Suite 304		Work Order No:	12-10-1749
Kailua, HI 96734-2500		Preparation:	EPA 3020A Total
		Method:	EPA 6020

Project: Red Hill LTM 112066

Quality Control Sample ID	Matrix	Instrument	Date Prepared	Date Analyzed	LCS/LCSD Batch Number
099-14-497-5	**Aqueous**	**ICP/MS 04**	**10/26/12**	**10/26/12**	**121026L04D**

Parameter	SPIKE ADDED	LCS CONC	LCS %REC	LCSD CONC	LCSD %REC	%REC CL	RPD	RPD CL	Qualifiers
Lead	100.0	96.10	96	93.29	93	80-120	3	0-20	

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RPD - Relative Percent Difference , CL - Control Limit

Calscience Environmental Laboratories, Inc.

Quality Control - LCS/LCS Duplicate

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Environmental Science International, Inc.		Date Received:	N/A
354 Uluniu Street, Suite 304		Work Order No:	12-10-1749
Kailua, HI 96734-2500		Preparation:	EPA 3510C
		Method:	EPA 8015B (M)

Project: Red Hill LTM 112066

Quality Control Sample ID	Matrix	Instrument	Date Prepared	Date Analyzed	LCS/LCSD Batch Number
099-15-516-12	**Aqueous**	**GC 46**	**10/26/12**	**10/27/12**	**121026B04**

Parameter	SPIKE ADDED	LCS CONC	LCS %REC	LCSD CONC	LCSD %REC	%REC CL	RPD	RPD CL	Qualifiers
TPH as Diesel	4000	3478	87	3444	86	60-132	1	0-11	

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RPD - Relative Percent Difference , CL - Control Limit

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

Date Received: N/A
Work Order No: 12-10-1749
Preparation: EPA 3510C
Method: EPA 8270C SIM PAHs

Project: Red Hill LTM 112066

Quality Control Sample ID	Matrix	Instrument	Date Prepared	Date Analyzed	LCS/LCSD Batch Number
099-15-148-1	**Aqueous**	**GC/MS AAA**	**10/26/12**	**10/30/12**	**121026L04**

Parameter	SPIKE ADDED	LCS CONC	LCS %REC	LCSD CONC	LCSD %REC	%REC CL	ME_CL	RPD	RPD CL	Qualifiers
Naphthalene	2.000	1.393	70	1.384	69	21-133	2-152	1	0-25	
2-Methylnaphthalene	2.000	1.560	78	1.538	77	21-140	1-160	1	0-25	
1-Methylnaphthalene	2.000	1.605	80	1.574	79	20-140	0-160	2	0-25	
Acenaphthylene	2.000	1.129	56	1.121	56	33-145	14-164	1	0-25	
Acenaphthene	2.000	1.315	66	1.317	66	55-121	44-132	0	0-25	
Fluorene	2.000	1.539	77	1.549	77	59-121	49-131	1	0-25	
Phenanthrene	2.000	1.434	72	1.430	72	54-120	43-131	0	0-25	
Anthracene	2.000	0.6780	34	0.6818	34	27-133	9-151	1	0-25	
Fluoranthene	2.000	1.502	75	1.508	75	26-137	8-156	0	0-25	
Pyrene	2.000	1.577	79	1.595	80	45-129	31-143	1	0-25	
Benzo (a) Anthracene	2.000	1.612	81	1.618	81	33-143	15-161	0	0-25	
Chrysene	2.000	1.571	79	1.570	79	17-168	0-193	0	0-25	
Benzo (k) Fluoranthene	2.000	1.859	93	1.980	99	24-159	2-182	6	0-25	
Benzo (b) Fluoranthene	2.000	1.957	98	1.904	95	24-159	2-182	3	0-25	
Benzo (a) Pyrene	2.000	1.303	65	1.313	66	17-163	0-187	1	0-25	
Indeno (1,2,3-c,d) Pyrene	2.000	1.710	85	1.722	86	25-175	0-200	1	0-25	
Dibenz (a,h) Anthracene	2.000	1.519	76	1.518	76	25-175	0-200	0	0-25	
Benzo (g,h,i) Perylene	2.000	1.612	81	1.587	79	25-157	3-179	2	0-25	

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

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RPD - Relative Percent Difference , CL - Control Limit

Calscience Environmental Laboratories, Inc.

Quality Control - LCS/LCS Duplicate

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

Date Received: N/A
Work Order No: 12-10-1749
Preparation: EPA 5030C
Method: GC/MS / EPA 8260B

Project: Red Hill LTM 112066

Quality Control Sample ID	Matrix	Instrument	Date Prepared	Date Analyzed	LCS/LCSD Batch Number
099-13-057-1	**Aqueous**	**GC/MS LL**	**10/27/12**	**10/27/12**	**121027L01**

Parameter	SPIKE ADDED	LCS CONC	LCS %REC	LCSD CONC	LCSD %REC	%REC CL	ME_CL	RPD	RPD CL	Qualifiers
Acetone	50.00	52.97	106	48.49	97	40-140	23-157	9	0-20	
Benzene	50.00	47.48	95	46.85	94	80-120	73-127	1	0-20	
Bromobenzene	50.00	51.80	104	50.57	101	75-125	67-133	2	0-20	
Bromochloromethane	50.00	50.48	101	51.82	104	65-130	54-141	3	0-20	
Bromodichloromethane	50.00	50.42	101	49.15	98	75-120	68-128	3	0-20	
Bromoform	50.00	54.73	109	52.24	104	70-130	60-140	5	0-20	
Bromomethane	50.00	36.14	72	33.71	67	30-145	11-164	7	0-20	
2-Butanone	50.00	52.05	104	46.99	94	30-150	10-170	10	0-20	
n-Butylbenzene	50.00	54.92	110	53.37	107	70-135	59-146	3	0-20	
sec-Butylbenzene	50.00	53.24	106	53.08	106	70-125	61-134	0	0-20	
tert-Butylbenzene	50.00	56.06	112	54.21	108	70-130	60-140	3	0-20	
Carbon Disulfide	50.00	46.55	93	37.41	75	35-160	14-181	22	0-20	X
Carbon Tetrachloride	50.00	51.40	103	50.21	100	65-140	52-152	2	0-20	
Chlorobenzene	50.00	51.00	102	50.36	101	80-120	73-127	1	0-20	
Chloroethane	50.00	56.14	112	54.25	108	60-135	48-148	3	0-20	
Chloroform	50.00	49.68	99	47.96	96	65-135	53-147	4	0-20	
Chloromethane	50.00	51.48	103	39.27	79	40-125	26-139	27	0-20	X
2-Chlorotoluene	50.00	52.62	105	51.57	103	75-125	67-133	2	0-20	
4-Chlorotoluene	50.00	51.80	104	51.37	103	75-130	66-139	1	0-20	
Dibromochloromethane	50.00	53.03	106	51.77	104	60-135	48-148	2	0-20	
1,2-Dibromo-3-Chloropropane	50.00	52.20	104	52.48	105	50-130	37-143	1	0-20	
1,2-Dibromoethane	50.00	53.44	107	51.06	102	80-120	73-127	5	0-20	
Dibromomethane	50.00	49.84	100	48.02	96	75-125	67-133	4	0-20	
1,2-Dichlorobenzene	50.00	52.47	105	51.72	103	70-120	62-128	1	0-20	
1,3-Dichlorobenzene	50.00	51.97	104	50.16	100	75-125	67-133	4	0-20	
1,4-Dichlorobenzene	50.00	51.04	102	48.56	97	75-125	67-133	5	0-20	
Dichlorodifluoromethane	50.00	51.52	103	50.72	101	30-155	9-176	2	0-20	
1,1-Dichloroethane	50.00	46.71	93	45.02	90	70-135	59-146	4	0-20	
1,2-Dichloroethane	50.00	51.05	102	50.48	101	70-130	60-140	1	0-20	
1,1-Dichloroethene	50.00	44.03	88	44.04	88	70-130	60-140	0	0-20	
c-1,2-Dichloroethene	50.00	49.33	99	49.39	99	70-125	61-134	0	0-20	
t-1,2-Dichloroethene	50.00	47.96	96	46.52	93	60-140	47-153	3	0-20	

RPD - Relative Percent Difference , CL - Control Limit

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Calscience Environmental Laboratories, Inc.

Quality Control - LCS/LCS Duplicate

ACCREDITED IN ACCORDANCE WITH nelac

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

Date Received: N/A
Work Order No: 12-10-1749
Preparation: EPA 5030C
Method: GC/MS / EPA 8260B

Project: Red Hill LTM 112066

Quality Control Sample ID	Matrix	Instrument	Date Prepared	Date Analyzed	LCS/LCSD Batch Number
099-13-057-1	Aqueous	GC/MS LL	10/27/12	10/27/12	121027L01

Parameter	SPIKE ADDED	LCS CONC	LCS %REC	LCSD CONC	LCSD %REC	%REC CL	ME_CL	RPD	RPD CL	Qualifiers
1,2-Dichloropropane	50.00	48.42	97	47.73	95	75-125	67-133	1	0-20	
1,3-Dichloropropane	50.00	51.45	103	50.06	100	75-125	67-133	3	0-20	
2,2-Dichloropropane	50.00	47.90	96	48.12	96	70-135	59-146	0	0-20	
1,1-Dichloropropene	50.00	53.21	106	52.35	105	75-130	66-139	2	0-20	
c-1,3-Dichloropropene	50.00	51.86	104	50.46	101	70-130	60-140	3	0-20	
t-1,3-Dichloropropene	50.00	48.54	97	47.22	94	55-140	41-154	3	0-20	
Ethylbenzene	50.00	52.66	105	52.49	105	75-125	67-133	0	0-20	
2-Hexanone	50.00	49.35	99	48.65	97	55-130	42-142	1	0-20	
Isopropylbenzene	50.00	53.35	107	52.74	105	75-125	67-133	1	0-20	
p-Isopropyltoluene	50.00	52.89	106	51.82	104	75-130	66-139	2	0-20	
Methylene Chloride	50.00	42.81	86	41.31	83	55-140	41-154	4	0-20	
4-Methyl-2-Pentanone	50.00	49.57	99	50.13	100	60-135	48-148	1	0-20	
Naphthalene	50.00	58.55	117	49.48	99	55-140	41-154	17	0-20	
n-Propylbenzene	50.00	53.07	106	52.28	105	70-130	60-140	2	0-20	
Styrene	50.00	54.11	108	53.38	107	65-135	53-147	1	0-20	
1,1,1,2-Tetrachloroethane	50.00	52.64	105	51.54	103	80-130	72-138	2	0-20	
1,1,2,2-Tetrachloroethane	50.00	51.75	104	50.01	100	65-130	54-141	3	0-20	
Tetrachloroethene	50.00	52.44	105	50.82	102	45-150	28-168	3	0-20	
Toluene	50.00	49.72	99	48.85	98	75-120	68-128	2	0-20	
1,2,3-Trichlorobenzene	50.00	57.03	114	51.66	103	55-140	41-154	10	0-20	
1,2,4-Trichlorobenzene	50.00	56.73	113	51.86	104	65-135	53-147	9	0-20	
1,1,1-Trichloroethane	50.00	50.57	101	49.18	98	65-130	54-141	3	0-20	
Hexachloro-1,3-Butadiene	50.00	51.65	103	50.52	101	50-140	35-155	2	0-20	
1,1,2-Trichloro-1,2,2-Trifluoroethane	50.00	49.03	98	47.75	95	80-130	72-138	3	0-20	
1,1,2-Trichloroethane	50.00	51.78	104	49.60	99	75-125	67-133	4	0-20	
Trichloroethene	50.00	49.85	100	49.24	98	70-125	61-134	1	0-20	
Trichlorofluoromethane	50.00	55.73	111	54.65	109	60-145	46-159	2	0-20	
1,2,3-Trichloropropane	50.00	52.45	105	50.67	101	75-125	67-133	3	0-20	
1,2,4-Trimethylbenzene	50.00	53.93	108	51.79	104	75-130	66-139	4	0-20	
1,3,5-Trimethylbenzene	50.00	54.03	108	52.08	104	75-130	66-139	4	0-20	
Vinyl Acetate	50.00	54.46	109	51.62	103	80-120	73-127	5	0-20	
Vinyl Chloride	50.00	52.44	105	50.63	101	50-145	34-161	4	0-20	

RPD - Relative Percent Difference , CL - Control Limit

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Calscience Environmental Laboratories, Inc.

Quality Control - LCS/LCS Duplicate

ACCREDITED IN ACCORDANCE WITH nelac

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

Date Received: N/A
Work Order No: 12-10-1749
Preparation: EPA 5030C
Method: GC/MS / EPA 8260B

Project: Red Hill LTM 112066

Quality Control Sample ID	Matrix	Instrument	Date Prepared	Date Analyzed	LCS/LCSD Batch Number
099-13-057-1	**Aqueous**	**GC/MS LL**	**10/27/12**	**10/27/12**	**121027L01**

Parameter	SPIKE ADDED	LCS CONC	LCS %REC	LCSD CONC	LCSD %REC	%REC CL	ME_CL	RPD	RPD CL	Qualifiers
p/m-Xylene	100.0	105.5	106	104.2	104	75-130	66-139	1	0-20	
o-Xylene	50.00	52.02	104	51.17	102	80-120	73-127	2	0-20	
Methyl-t-Butyl Ether (MTBE)	50.00	47.87	96	45.99	92	65-125	55-135	4	0-20	
Tert-Butyl Alcohol (TBA)	250.0	295.4	118	221.4	89	46-154	28-172	29	0-25	X
Diisopropyl Ether (DIPE)	50.00	51.06	102	49.67	99	81-123	74-130	3	0-20	
Ethyl-t-Butyl Ether (ETBE)	50.00	52.42	105	50.57	101	74-122	66-130	4	0-20	
Tert-Amyl-Methyl Ether (TAME)	50.00	50.77	102	49.44	99	76-124	68-132	3	0-20	
Ethanol	500.0	577.3	115	570.3	114	60-138	47-151	1	0-25	
Gasoline Range Organics	1000	863.5	86	821.9	82	80-120	73-127	5	0-20	

Total number of LCS compounds : 73
Total number of ME compounds : 0
Total number of ME compounds allowed : 4
LCS ME CL validation result : Pass

Return to Contents

RPD - Relative Percent Difference , CL - Control Limit

Calscience Environmental Laboratories, Inc.

Quality Control - LCS/LCS Duplicate

ACCREDITED IN ACCORDANCE WITH nelac

Environmental Science International, Inc.	Date Received:	N/A
354 Uluniu Street, Suite 304	Work Order No:	12-10-1749
Kailua, HI 96734-2500	Preparation:	EPA 5030C
	Method:	EPA 8015B (M)

Project: Red Hill LTM 112066

Quality Control Sample ID	Matrix	Instrument	Date Prepared	Date Analyzed	LCS/LCSD Batch Number
099-14-495-2	**Aqueous**	**GC 4**	**10/26/12**	**10/26/12**	**121025B01**

Parameter	SPIKE ADDED	LCS CONC	LCS %REC	LCSD CONC	LCSD %REC	%REC CL	RPD	RPD CL	Qualifiers
TPH as Gasoline	2000	1864	93	1825	91	72-114	2	0-10	

RPD - Relative Percent Difference , CL - Control Limit

Calscience Environmental Laboratories, Inc.

Glossary of Terms and Qualifiers

Work Order Number: 12-10-1749

Qualifier	Definition
*	See applicable analysis comment.
<	Less than the indicated value.
>	Greater than the indicated value.
1	Surrogate compound recovery was out of control due to a required sample dilution. Therefore, the sample data was reported without further clarification.
2	Surrogate compound recovery was out of control due to matrix interference. The associated method blank surrogate spike compound was in control and, therefore, the sample data was reported without further clarification.
3	Recovery of the Matrix Spike (MS) or Matrix Spike Duplicate (MSD) compound was out of control due to matrix interference. The associated LCS and/or LCSD was in control and, therefore, the sample data was reported without further clarification.
4	The MS/MSD RPD was out of control due to matrix interference. The LCS/LCSD RPD was in control and, therefore, the sample data was reported without further clarification.
5	The PDS/PDSD or PES/PESD associated with this batch of samples was out of control due to a matrix interference effect. The associated batch LCS/LCSD was in control and, hence, the associated sample data was reported without further clarification.
6	Surrogate recovery below the acceptance limit.
7	Surrogate recovery above the acceptance limit.
B	Analyte was present in the associated method blank.
BU	Sample analyzed after holding time expired.
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 calibrtn. verif. recov. above method CL for this analyte.
ICJ	Initial calibrtn. verif. recov. below method CL for this analyte.
IH	Calibrtn. verif. recov. below method CL for this analyte.
IJ	Calibrtn. verif. recov. above method CL for this analyte.
J	Analyte was detected at a concentration below the LOQ and above the DL. Reported value is estimated.
LOD	The Limit of Detection (LOD) is the smallest amount or concentration of a substance that must be present in a sample in order to be detected at 99% confidence level.
LOQ	The Limit of Quantitation (LOQ) is the lowest concentration of a substance that produces a quantitative result within specified limits of precision and bias.
Q	Spike recovery and RPD control limits do not apply resulting from the parameter concentration in the sample exceeding the spike concentration by a factor of four or greater.
SG	The sample extract was subjected to Silica Gel treatment prior to analysis.
U	Undetected at Detection Limit (DL) and is reported as less than the Limit of Detection (LOD).
X	% Recovery and/or RPD out-of-range.
Z	Analyte presence was not confirmed by second column or GC/MS analysis.

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

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WO # / LAB USE ONLY: **12-10-1749**

CHAIN OF CUSTODY RECORD

Date 10/23/12

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LABORATORY CLIENT: Environmental Science International

ADDRESS: 354 Ulunia St #304

CITY Kailua STATE Hi ZIP 96734

TEL: 808-261-0740 E-MAIL: rchong@esciencei.com

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

☐ COELT EDF GLOBAL ID LOG CODE

SPECIAL INSTRUCTIONS: ES001 collected 2.25L instead of 3L.

CLIENT PROJECT NAME / NUMBER: Red Hill LTM 112066

P.O. NO.:

PROJECT CONTACT: Robert Chong

SAMPLER(S): (PRINT) BI, JL

REQUESTED ANALYSES

LAB USE ONLY	SAMPLE ID	SAMPLING DATE	SAMPLING TIME	MATRIX	NO. OF CONT.	Unpreserved	Preserved	Field Filtered	TPH (g) or GRO (~~8015~~ 8015B)	TPH (d) or DRO or (C6C36) or (C6-C44)	TPH ( )	BTEX / MTBE (8260) or ( )	VOCs (8260)	Oxygenates (8260)	En Core / Terra Core Prep (5035)	SVOCs (8270)	Pesticides (8081)	PCBs (8082)	PNAs (~~8310~~) or (8270) SIM	T22 Metals (6010B/747X)	Cr(VI) [7196 or 7199 or 218.6]	Lead (6020)				
1	ES001	10/22/12	1230	water	10	X	X	X	X	X			X						X			X				
2	ES002	10/22/12	1415	water	10	X	X	X	X	X			X						X			X				
3	ES003	10/22/12	1330	water	10	X	X	X	X	X			X						X			X				
2 ~~4~~	ES002 MS/MSD	10/22/12	1415	water	~~20~~ 13 BK	X	X	X	X	X			X						X			X				
4B ~~5~~	ES 004	10/22/12	1610	water	10	X	X	X	X	X			X						X			X				
54 ~~6~~	ES005	10/23/12	1045	water	10	X	X	X	X	X			X						X			X				
65 ~~7~~	ES006	10/23/12	1210	water	10	X	X	X	X	X			X						X			X				
~~8~~ [illegible]	~~ES001 F~~	~~10/22/12~~		~~water~~			~~X~~	~~X~~														~~X~~				
[illegible]	~~ES002 F~~	~~10/22/12~~		~~water~~			~~X~~	~~X~~														~~X~~				
[illegible]	~~ES003 F~~	~~10/22/12~~		~~water~~			~~X~~	~~X~~														~~X~~				

Relinquished by: (Signature)	Received by: (Signature/Affiliation)	Date:	Time:
[signature]		10/23/12	13:50
Relinquished by: (Signature)	Received by: (Signature/Affiliation) [signature]	Date: 10/25/12	Time: 1040
Relinquished by: (Signature)	Received by: (Signature/Affiliation)	Date:	Time:

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WO # / LAB USE ONLY: 12-10-1749

Date 10/23/12
Page 2 of 2

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

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

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

☐ COELT EDF | GLOBAL ID | LOG CODE

SPECIAL INSTRUCTIONS:

REQUESTED ANALYSES

LAB USE ONLY	SAMPLE ID	SAMPLING DATE	SAMPLING TIME	MATRIX	NO. OF CONT.	Unpreserved	Preserved	Field Filtered	TPH (g) or GRO (8260) 5035	TPH (d) or DRO or (C6C36) or (C6-C44)	TPH ( )	BTEX / MTBE (8260) or ( )	VOCs (8260)	Oxygenates (8260)	En Core / Terra Core Prep (5035)	SVOCs (8270)	Pesticides (8081)	PCBs (8082)	PNAs (8310) or (8270) sim	T22 Metals (6010B/747X)	Cr(VI) [7196 or 7199 or 218.6]	Lead (6020)
	ES002 MS/MSD F	10/22/12		water			X	X														X
	ES004 F	10/22/12		water			X	X														X
	ES005 F	10/23/12		water			X	X														X
	ES006 F	10/23/12		water			X	X														X
7	ES Trip	10/23/12	0700	water	3		X		X													
8	ES 006 UF	10/23/12	1210	water	1		X															X

Relinquished by: (Signature)	Received by: (Signature/Affiliation)	Date:	Time:
		10/23/12	1350
Relinquished by: (Signature)	Received by: (Signature/Affiliation)	Date:	Time:
		10/25/12	1040
Relinquished by: (Signature)	Received by: (Signature/Affiliation)	Date:	Time:

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

01/01/12 Revision

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ORIGIN ID: HNLA

UNITED STATES US

SHIP DATE: 230CT12
ACTWGT: 76.5 LB
CAD: /POS1302
DIMS: 28x17x15 IN

BILL RECIPIENT

SAMPLE CONTROL
CAL SCIENCE LABS
7440 LINCOLN WAY

GARDEN GROVE CA 92841
(714) 895-6494 REF:
INV:
PO: DEPT:

FedEx Express

J12101112180125

THU - 25 OCT A1
** 2DAY **

TRK# 0215 8704 8094 8896

VZ APVA

92841
CA-US SNA

Shipper's Declaration. Shipper's Declaration not required. Dry Ice Dry Ice, 9, UN 1845 ____ x ____ kg

Dangerous goods (including dry ice) cannot be shipped in FedEx packaging or placed in a FedEx Express Drop Box.

Cargo Aircraft Only

7 Payment Bill to:

Sender Acct. No. in Section 1 will be billed. Recipient Third Party Credit Card Cash/Check

Enter FedEx Acct. No. or Credit Card No. below.

Obtain Recip. Acct. No.

Total Packages 1

Total Weight 50 lbs.

Credit Card Auth.

Our liability is limited to $100 unless you declare a higher value. See the current FedEx Service Guide for details.

553

Rev. Date 2/08•Part #158279•©1994–2008 FedEx•PRINTED IN U.S.A.•SRS

Part # 158279-435 RRD 09/12

1749

ORIGIN ID: HNLA

UNITED STATES US

SHIP DATE: 230CT12
ACTWGT: 79.3 LB
CAD: /POS1302
DIMS: 28x16x14 IN

BILL RECIPIENT

TO

CALSCIENCE
7440 LINCOLN WAY

GARDEN GROVE CA 92841
(714) 895-6494 REF:
INV:
PO: DEPT:

FedEx Express

J12101112180125

THU - 25 OCT A1
** 2DAY **

TRK# 0215 8704 8094 8885

VZ APVA

92841
CA-US SNA

Drop Box.

Bill to:

Enter FedEx Acct. No. or Credit Card No. below.

Obtain Recip. Acct. No.

Recipient Third Party Credit Card Cash/Check

Total Weight 80 lbs.

Credit Card Auth.

100 unless you declare a higher value. See the current FedEx Service Guide for details.

55

RT 357 1 C

8885
10.25

FZ

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Part # 158279-435 RRD 09/12

Align Open End of FedEx Pouch Here

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Calscience Environmental Laboratories, Inc.

WORK ORDER #: 12-10-[1][7][4][5]

SAMPLE RECEIPT FORM

Cooler 1 of 2

CLIENT: ESI

DATE: 10/25/12

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

Temperature 3.3 °C - 0.3 °C (CF) = 3.0 °C ☑ Blank ☐ Sample

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

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

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

Ambient Temperature: ☐ Air ☐ Filter Initial: [illegible]

CUSTODY SEALS INTACT:

☑ Cooler ☐_____ ☐ No (Not Intact) ☐ Not Present ☐ N/A Initial: [illegible]

☑ Sample ☐_____ ☐ No (Not Intact) ☐ Not Present Initial: b.L

SAMPLE CONDITION:	Yes	No	N/A
Chain-Of-Custody (COC) document(s) received with samples	☑	☐	☐
COC document(s) received complete	☑	☐	☐
☐ Collection date/time, matrix, and/or # of containers logged in based on sample labels.			
☐ No analysis requested. ☐ Not relinquished. ☐ No date/time relinquished.			
Sampler's name indicated on COC	☑	☐	☐
Sample container label(s) consistent with COC	☑	☐	☐
Sample container(s) intact and good condition	☑	☐	☐
Proper containers and sufficient volume for analyses requested	☑	☐	☐
Analyses received within holding time	☑	☐	☐
pH / Res. Chlorine / Diss. Sulfide / Diss. Oxygen received within 24 hours	☐	☐	☑
Proper preservation noted on COC or sample container	☑	☐	☐
☑ Unpreserved vials received for Volatiles analysis			
Volatile analysis container(s) free of headspace	☑	☐	☐
Tedlar bag(s) free of condensation	☐	☐	☑

CONTAINER TYPE:

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

Water: ☑VOA 6 ☑VOAh (-7) ☐VOA**na**$_2$ ☐125AGB ☐125AGB**h** ☐125AGB**p** ☑1AGB 3 ☐1AGB**na**$_2$ ☐1AGB**s**

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

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

Air: ☐Tedlar® ☐Canister **Other:** ☐_____ **Trip Blank Lot#:** N/A **Labeled/Checked by:** b.L

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

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

(-2) 16x VOA, 4x 250 PBnf, 8x 1AGB (28 Containers)

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Calscience Environmental Laboratories, Inc.

WORK ORDER #: 12-10-[1][7][4][9]

SAMPLE RECEIPT FORM

Cooler 2 of 2

CLIENT: EST DATE: 10/25/12

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

Temperature 3.5 °C - 0.3 °C (CF) = 3.2 °C ☑ Blank ☐ Sample

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

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

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

Ambient Temperature: ☐ Air ☐ Filter **Initial:** AH

CUSTODY SEALS INTACT:

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

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

SAMPLE CONDITION:	Yes	No	N/A
Chain-Of-Custody (COC) document(s) received with samples	☑	☐	☐
COC document(s) received complete	☑	☐	☐
☐ Collection date/time, matrix, and/or # of containers logged in based on sample labels.			
☐ No analysis requested. ☐ Not relinquished. ☐ No date/time relinquished.			
Sampler's name indicated on COC	☑	☐	☐
Sample container label(s) consistent with COC	☑	☐	☐
Sample container(s) intact and good condition	☑	☐	☐
Proper containers and sufficient volume for analyses requested	☑	☐	☐
Analyses received within holding time	☑	☐	☐
pH / Res. Chlorine / Diss. Sulfide / Diss. Oxygen received within 24 hours	☐	☐	☑
Proper preservation noted on COC or sample container	☑	☐	☐
☐ Unpreserved vials received for Volatiles analysis			
Volatile analysis container(s) free of headspace	☐	☐	☑
Tedlar bag(s) free of condensation	☐	☐	☑

CONTAINER TYPE:

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

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

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

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

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

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

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

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APPENDIX D

Waste Disposal Manifest

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NON-HAZARDOUS WASTE MANIFEST	1. Generator ID Number	2. Page 1 of	3. Emergency Response Phone	4. Waste Tracking Number
	HIR 000 050 401	1	808-206-9989	000019367

GENERATOR

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

Generator's Site Address (if different than mailing address)
HIC8553-01
RED HILL BULK FUEL STORAGE FACILITY
AIEA, HI 96701

6. Transporter 1 Company Name: PACIFIC COMMERCIAL SERVICES, LLC. 808-545-4599
U.S. EPA ID Number: H I R 0 0 0 0 9 7 8 2 4

7. Transporter 2 Company Name: UNITEK SOLVENT SERVICES, INC.-OAHU 808-682-8284
U.S. EPA ID Number: H I D 9 8 2 4 4 3 7 1 5

8. Designated Facility Name and Site Address
UNITEK SOLVENT SERVICES, INC.
91-125 KAOMI LOOP
KAPOLEI, HI 96707
Facility's Phone: 808-682-8284
U.S. EPA ID Number: H I D 9 8 2 4 4 3 7 1 5

	9. Waste Shipping Name and Description	10. Containers No.	10. Containers Type	11. Total Quantity	12. Unit Wt./Vol.	
1.	MATERIAL NOT REGULATED BY DOT (WELL PURGE AND DECONTAMINATION WATER)	001	DM	00025	G	NON-RCRA
2.						
3.						
4.	Hg : see manifest # 19377					

13. Special Handling Instructions and Additional Information
9bT: NR 2008 9b1: TOTAL HALOGEN: HydroClave <100ppm LC

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

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

Generator's/Offeror's Printed/Typed Name: Estrelita Higa
Signature: Estrelita Higa
Month: 12 Day: 10 Year: 12

INT'L

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

TRANSPORTER

16. Transporter Acknowledgment of Receipt of Materials

Transporter 1 Printed/Typed Name: Mark Chang
Signature:
Month: 12 Day: 10 Year: 12

Transporter 2 Printed/Typed Name: Mark Chang NO
Signature: Mark Chang
Month: 12 Day: 10 Year: 12

DESIGNATED FACILITY

17. Discrepancy

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

Manifest Reference Number:

17b. Alternate Facility (or Generator) U.S. EPA ID Number

Facility's Phone:

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

SEE CONSOLIDATED MANIFEST NW12-07

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

Printed/Typed Name: R. ALHAMBRA
Signature:
Month: 12 Day: 13 Year: 2012

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