Final
First Quarter 2013 - Quarterly Groundwater Monitoring Report Outside Tunnel Wells

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

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

April 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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400 Marshall Road
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Prepared under:

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FINAL
FIRST QUARTER 2013 - QUARTERLY GROUNDWATER MONITORING REPORT OUTSIDE TUNNEL WELLS RED HILL BULK FUEL STORAGE FACILITY

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

Prepared for:
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Commanding Officer, Naval Facilities Engineering Command, Hawaii
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Contract Number: N62742-12-D-1853
Contract Task Order: 0002

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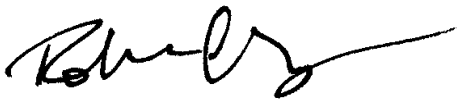
Darren Uchima, Navy Technical Representative Date



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ACRONYMS AND ABBREVIATIONS

ACRONYMS/ ABBREVIATIONS	DEFINITION/MEANING
%	percent
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
QC	Quality Control
RHSF	Red Hill Bulk Fuel Storage Facility
RPD	Relative Percent Difference
SAP	Sampling and Analysis Plan
TEC	The Environmental Company, Inc.
TPH-d	Total Petroleum Hydrocarbons as diesel
TPH-g	Total Petroleum Hydrocarbons as gasoline
U.S.	United States of America
UST	Underground Storage Tank
VOC	Volatile Organic Compounds
WP	Work Plan

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EXECUTIVE SUMMARY

This quarterly monitoring report presents the results of the first quarter 2013 groundwater sampling event conducted on January 30, 2013, at the outside tunnel wells of the Red Hill Bulk Fuel Storage Facility [RHSF], Joint Base Pearl Harbor-Hickam [JBPHH], Hawaii. The RHSF is located in Halawa Heights on the Island of Oahu. There are 18 active and 2 inactive underground storage tanks [USTs] located at the RHSF. The State of Hawaii Department of Health [DOH] Facility Identification [ID] number is 9-102271. The DOH Release ID numbers are 990051, 010011, 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 January 30, 2013, ESI personnel collected groundwater samples from two outside tunnel monitoring wells (wells HDMW2253-03 and OWDFMW01). A summary of the analytical results is provided below.

- **HDMW2253-03** – Total Petroleum Hydrocarbons as diesel [TPH-d] (600 micrograms per Liter [µg/L]) and naphthalene (0.37 µg/L) were detected. TPH-d was detected at a concentration above the DOH Environmental Action Levels [EALs] for both drinking water toxicity and gross contamination.

- **OWDFMW01** – TPH-d (1,000 µg/L), acetone (17 µg/L), naphthalene (0.032-0.039 µg/L), and benzene (0.39 µg/L) were detected. TPH-d was detected at a concentration above the DOH EALs for both drinking water toxicity and gross contamination.

Since the wells were last sampled (November 2012), with the exception of TPH-d, groundwater contaminant concentrations remained at low concentrations and did not change significantly, or were not detected. TPH-d concentrations increased in well HDMW2253-03 and decreased in well OWDFMW01. The TPH-d concentration detected in HDMW2253-03 was the highest concentration detected since quarterly groundwater monitoring was initiated in 2009. TPH-d concentrations increased from 25 µg/L during the last round of sampling to 600 µg/L during this round of sampling. TPH-d concentrations in well OWDFMW01 decreased from 2,500 µg/L during the last round of sampling to 1,000 µg/L during this round of sampling.

Based on the results of the assessment, we recommend continuing the groundwater monitoring program at the RHSF. If the TPH-d concentrations continue to systemically increase, we recommend increasing monitoring frequency to monthly even though the two outside wells are not included in the RHSF Groundwater Protection Plan.

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SECTION 1 – INTRODUCTION

This quarterly monitoring report presents the results of the first quarter 2013 groundwater sampling event conducted on January 30, 2013, at the outside tunnel wells of the RHSF, JBPHH, Hawaii. The RHSF is located in Halawa Heights on the Island of Oahu. The purpose of the sampling is to (1) assess the condition of groundwater beneath and in the vicinity of the RHSF with respect to chemical constituents associated with jet fuel propellant and marine diesel fuel, and (2) to ensure the Navy remains in compliance with DOH UST release response requirements as described in Hawaii Administrative Rules 11-281 Subchapter 7, Release Response Action (DOH, 2000). 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, 2012a).

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

Two groundwater monitoring wells (well HDMW2253-03 and OWDFMW01) are located outside of the RHSF tunnel system (Figure 2). Well HDMW2253-03 is located at the Halawa Correctional Facility (outside the RHSF) and well OWDFMW01 is located at the Oily Waste Disposal Facility near Adit 3. Five groundwater monitoring wells (wells RHMW01, RHMW02, RHMW03, RHMW05, and RHMW2254-01) are located within the RHSF lower access tunnel. (Monitoring data for the five wells located inside 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. NAVFAC Public Works Department operates the infiltration gallery and DON Well 2254-01.

TABLE 1.1
Current Status of the USTs
Red Hill Bulk Fuel Storage Facility
January 2013 Quarterly Monitoring Report

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

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

1.2 PHYSICAL SETTINGS

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

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

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 Site, 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 to 90% of the land surface is covered by exposed rock and there are only shallow soils (Foote, et al., 1972).

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

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

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

The nearest drinking water supply well is the 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 to supply fuel to the Navy. The USTs were constructed of steel and they currently contain JP-5, JP-8, and F-76. Several tanks in the past have stored 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 depths varying between 100 feet and 200 feet below ground surface.

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

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

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

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

In 2011, groundwater samples were collected from wells OWDFMW01 and HDMW2253-03. Samples were collected in January, April, July, and October 2011. None of the COPCs were detected at concentrations exceeding the gross contamination or drinking water toxicity DOH EALs.

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

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

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

1.3.1 Previous Reports

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

1. Groundwater Monitoring Report, August 2009 (submitted September 2009).
2. Groundwater Monitoring Report, October 2009 (submitted December 2009).
3. Groundwater Monitoring Report, January, 2010 (submitted April 2010).
4. Groundwater Monitoring Report, April 2010 (submitted May 2010).
5. Groundwater Monitoring Report, July 2010 (submitted August 2010).
6. Groundwater Monitoring Report, October 2010 (submitted December 2010).
7. Groundwater Monitoring Report, January 2011 (submitted March 2011).
8. Groundwater Monitoring Report, April 2011 (submitted June 2011).
9. Groundwater Monitoring Report, July 2011 (submitted September 2011).
10. Groundwater Monitoring Report, October 2011 (submitted December 2011).
11. Groundwater Monitoring Report, January 2012 (submitted March 2012).
12. Groundwater Monitoring Report, April 2012 (submitted July 2012).
13. Groundwater Monitoring Report, July 2012 (submitted August 2012).
14. Groundwater Monitoring Report, November 2012 (submitted January 2013)

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SECTION 2 – GROUNDWATER SAMPLING

On January 30, 2013, ESI personnel collected groundwater samples from two monitoring wells (wells OWDFMW01 and HDMW2253-03). The samples were collected in accordance with DOH UST release response requirements and the RHSF Groundwater Protection Plan (TEC, 2008). Prior to purging and sampling, the depth to groundwater and the depth to the bottom of the wells were measured. Well OWDFMW01 was measured using a Geotech oil/water interface probe. Well HDMW2253-03 was measured by the DLNR using their Geotech oil/water interface probe. The measurements are included in the groundwater sampling logs. No measurable product, sheen, or petroleum hydrocarbon odor was observed in either well.

2.1 GROUNDWATER SAMPLING

Prior to collecting groundwater samples, disposable bailers were used to purge groundwater from the monitoring wells. The wells were purged at a rate of 0.21 and 0.42 liters per minute.

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

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

2.2 ANALYTICAL RESULTS

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

- **HDMW2253-03** – TPH-d (600 µg/L) and naphthalene (0.037 µg/L) were detected. TPH-d was detected at a concentration above the DOH EALs for both drinking water toxicity and gross contamination.

- **OWDFMW01** – TPH-d (1,000 µg/L), acetone (17 µg/L), naphthalene (0.032-0.039 µg/L), and benzene (0.39 µg/L) were detected. TPH-d was detected at a concentration above the DOH EALs for both drinking water toxicity and gross contamination.

2.2.1 Groundwater Contaminant Trends

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

- **HDMW2253-03** – Both TPH-d and naphthalene were detected; however, TPH-g which was detected during the previous sampling event in November 2012 (15 µg/L) was not detected this round of quarterly sampling. Naphthalene was last detected in July 2010. TPH-d concentrations detected during this round of quarterly sampling increased to concentrations above the DOH EALs for both drinking water toxicity and gross contamination. TPH-d concentrations last exceeded the DOH EALs for both drinking water toxicity and gross contamination in April 2012 (160 µg/L).

- **OWDFMW01** – With the exception of TPH-d, groundwater contaminant concentrations remained at low concentrations and did not change significantly, or were not detected. TPH-d concentrations detected during this round of sampling remained above the DOH EALs for both drinking water toxicity and gross contamination, but decreased from the previous sampling event in November 2012 (2,500 µg/L).

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

2.3 WASTE DISPOSAL

The purged groundwater and decontamination water generated during sampling of the wells was stored in a 55-gallon drum along with the purged water and decontamination water from the inside tunnel wells. The drum was stored onsite at Adit 3. On February 26, 2013, the drum of water was picked up by Pacific Commercial Services, LLC and disposed at Unitek Solvent Services, Inc. The waste disposal manifest is included in Appendix E.

TABLE 2.1
Analytical Results for Groundwater Sampling (January 30, 2013)
Red Hill Bulk Fuel Storage Facility
January 2013 Quarterly Monitoring Report

Method	Chemical	DOH EALs		OWDFMW01 (ES016)					OWDFMW01 (ES017) (Dup)					HDMW2253-03 (ES018)				
		Drinking Water Toxicity	Gross Contamination	Results	Q	LOQ	LOD	DL	Results	Q	LOQ	LOD	DL	Results	Q	LOQ	LOD	DL
EPA 8015B	TPH-d	190	100	**1,000**		50	20	15	**1,000**		50	20	15	**600**		50	20	15
EPA 8260B	TPH-g	100	100	N.D.	U	50	30	13	N.D.	U	50	30	13	N.D.	U	50	30	13
EPA 8270C SIM	Acenaphthene	370	20	N.D.	U	0.2	0.05	0.018	N.D.	U	0.2	0.05	0.018	N.D.	U	0.2	0.05	0.018
	Acenaphthylene	240	2,000	N.D.	U	0.2	0.05	0.021	N.D.	U	0.2	0.05	0.021	N.D.	U	0.2	0.05	0.021
	Anthracene	1,800	22	N.D.	U	0.2	0.05	0.034	N.D.	U	0.2	0.05	0.034	N.D.	U	0.2	0.05	0.034
	Benzo[a]anthracene	0.092	4.7	N.D.	U	0.2	0.05	0.024	N.D.	U	0.2	0.05	0.024	N.D.	U	0.2	0.05	0.024
	Benzo[g,h,i]perylene	1,500	0.13	N.D.	U	0.2	0.05	0.022	N.D.	U	0.2	0.05	0.022	N.D.	U	0.2	0.05	0.022
	Benzo[a]pyrene	0.2	0.81	N.D.	U	0.2	0.05	0.036	N.D.	U	0.2	0.05	0.036	N.D.	U	0.2	0.05	0.036
	Benzo[b]fluoranthene	0.092	0.75	N.D.	U	0.2	0.05	0.025	N.D.	U	0.2	0.05	0.025	N.D.	U	0.2	0.05	0.025
	Benzo[k]fluoranthene	0.92	0.4	N.D.	U	0.2	0.05	0.023	N.D.	U	0.2	0.05	0.023	N.D.	U	0.2	0.05	0.023
	Chrysene	9.2	1	N.D.	U	0.2	0.05	0.019	N.D.	U	0.2	0.05	0.019	N.D.	U	0.2	0.05	0.019
	Dibenzo[a,h]anthracene	0.0092	0.52	N.D.	U	0.2	0.05	0.027	N.D.	U	0.2	0.05	0.027	N.D.	U	0.2	0.05	0.027
	Fluoranthene	1,500	130	N.D.	U	0.2	0.05	0.027	N.D.	U	0.2	0.05	0.027	N.D.	U	0.2	0.05	0.027
	Fluorene	240	950	N.D.	U	0.2	0.05	0.024	N.D.	U	0.2	0.05	0.024	N.D.	U	0.2	0.05	0.024
	Indeno[1,2,3-cd]pyrene	0.092	0.095	N.D.	U	0.2	0.05	0.022	N.D.	U	0.2	0.05	0.022	N.D.	U	0.2	0.05	0.022
	1,-Methylnaphthalene	4.7	10	N.D.	U	0.2	0.05	0.028	N.D.	U	0.2	0.05	0.028	N.D.	U	0.2	0.05	0.028
	2,-Methylnaphthalene	24	10	N.D.	U	0.2	0.05	0.026	N.D.	U	0.2	0.05	0.026	N.D.	U	0.2	0.05	0.026
	Naphthalene	17	21	0.032	J	0.2	0.05	0.023	0.039	J	0.2	0.05	0.023	0.037	J	0.2	0.05	0.023
	Phenanthrene	240	410	N.D.	U	0.2	0.05	0.031	N.D.	U	0.2	0.05	0.031	N.D.	U	0.2	0.05	0.031
	Pyrene	180	68	N.D.	U	0.2	0.05	0.025	N.D.	U	0.2	0.05	0.025	N.D.	U	0.2	0.05	0.025
EPA 8260B	1,1,1-Trichloroethane	200	970	N.D.	U	5	0.5	0.3	N.D.	U	5	0.5	0.3	N.D.	U	5	0.5	0.3
	1,1,2-Trichloroethane	5	50,000	N.D.	U	1	0.5	0.38	N.D.	U	1	0.5	0.38	N.D.	U	1	0.5	0.38
	1,1-Dichloroethane	2.4	50,000	N.D.	U	5	0.5	0.28	N.D.	U	5	0.5	0.28	N.D.	U	5	0.5	0.28
	1,1-Dichloroethylene	7	1,500	N.D.	U	1	0.5	0.43	N.D.	U	1	0.5	0.43	N.D.	U	1	0.5	0.43
	1,2,3-Trichloropropane	0.6	50,000	N.D.	U	5	2	0.64	N.D.	U	5	2	0.64	N.D.	U	5	2	0.64
	1,2,4-Trichlorobenzene	70	3,000	N.D.	U	5	1	0.5	N.D.	U	5	1	0.5	N.D.	U	5	1	0.5
	1,2-Dibromo-3- chloropropane	0.04	10	N.D.	U	10	2	1.2	N.D.	U	10	2	1.2	N.D.	U	10	2	1.2
	1,2-Dibromoethane	0.04	50,000	N.D.	U	1	0.5	0.36	N.D.	U	1	0.5	0.36	N.D.	U	1	0.5	0.36
	1,2-Dichlorobenzene	600	10	N.D.	U	1	0.5	0.46	N.D.	U	1	0.5	0.46	N.D.	U	1	0.5	0.46
	1,2-Dichloroethane	0.15	7,000	N.D.	U	1	0.5	0.24	N.D.	U	1	0.5	0.24	N.D.	U	1	0.5	0.24
	1,2-Dichloropropane	5	10	N.D.	U	5	0.5	0.42	N.D.	U	5	0.5	0.42	N.D.	U	5	0.5	0.42
	1,3-Dichlorobenzene	180	5	N.D.	U	1	0.5	0.4	N.D.	U	1	0.5	0.4	N.D.	U	1	0.5	0.4
	1,3-Dichloropropene (total of cis/trans)	0.43	50,000	N.D.	U	1	0.5	0.25	N.D.	U	1	0.5	0.25	N.D.	U	1	0.5	0.25
	1,4-Dichlorobenzene	75	5	N.D.	U	1	0.5	0.43	N.D.	U	1	0.5	0.43	N.D.	U	1	0.5	0.43
	Acetone	22,000	20,000	17	ICH, J	20	10	10	N.D.	ICH, U	20	10	10	N.D.	ICH, U	20	10	10
	Benzene	5	170	0.39	J	1	0.5	0.14	0.17	J	1	0.5	0.14	N.D.	U	1	0.5	0.14
	Bromodichloromethane	0.12	50,000	N.D.	U	5	0.5	0.21	N.D.	U	5	0.5	0.21	N.D.	U	5	0.5	0.21
	Bromoform	80	510	N.D.	IJ, U	10	2	0.5	N.D.	IJ, U	10	2	0.5	N.D.	IJ, U	10	2	0.5
	Bromomethane	8.7	50,000	N.D.	U	20	5	3.9	N.D.	U	20	5	3.9	N.D.	U	20	5	3.9
	Carbon Tetrachloride	5	520	N.D.	U	1	0.5	0.23	N.D.	U	1	0.5	0.23	N.D.	U	1	0.5	0.23
	Chlorobenzene	100	50	N.D.	U	5	0.5	0.17	N.D.	U	5	0.5	0.17	N.D.	U	5	0.5	0.17
	Chloroethane	21,000	16	N.D.	U	10	5	2.3	N.D.	U	10	5	2.3	N.D.	U	10	5	2.3
	Chloroform	70	2,400	N.D.	U	5	0.5	0.46	N.D.	U	5	0.5	0.46	N.D.	U	5	0.5	0.46
	Chloromethane	1.8	50,000	N.D.	U	10	2	1.8	N.D.	U	10	2	1.8	N.D.	U	10	2	1.8
	cis-1,2-Dichloroethylene	70	50,000	N.D.	U	1	0.5	0.48	N.D.	U	1	0.5	0.48	N.D.	U	1	0.5	0.48
	Dibromochloromethane	0.16	50,000	N.D.	U	1	0.5	0.25	N.D.	U	1	0.5	0.25	N.D.	U	1	0.5	0.25
	Ethylbenzene	700	30	N.D.	U	1	0.5	0.14	N.D.	U	1	0.5	0.14	N.D.	U	1	0.5	0.14
	Hexachlorobutadiene	0.86	6	N.D.	U	1	0.5	0.32	N.D.	U	1	0.5	0.32	N.D.	U	1	0.5	0.32
	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	N.D.	U	10	5.0	2.21
	Methyl isobutyl ketone (4-Methyl-2-Pentanone)	2,000	1300	N.D.	U	10	5.0	4.4	N.D.	U	10	5.0	4.4	N.D.	U	10	5.0	4.4
	Methyl tert-butyl Ether	12	5	N.D.	U	1	0.5	0.31	N.D.	U	1	0.5	0.31	N.D.	U	1	0.5	0.31
	Methylene chloride	4.8	9,100	N.D.	U	5	2.0	0.64	N.D.	U	5	2.0	0.64	N.D.	U	5	2.0	0.64
	Styrene	100	10	N.D.	U	1	0.5	0.17	N.D.	U	1	0.5	0.17	N.D.	U	1	0.5	0.17
	Tetrachloroethane, 1,1,1,2-	0.52	50,000	N.D.	U	1	0.5	0.4	N.D.	U	1	0.5	0.4	N.D.	U	1	0.5	0.4
	Tetrachloroethane, 1,1,2,2-	0.067	500	N.D.	U	1	0.5	0.41	N.D.	U	1	0.5	0.41	N.D.	U	1	0.5	0.41
	Tetrachloroethylene	5	170	N.D.	U	5	0.5	0.39	N.D.	U	5	0.5	0.39	N.D.	U	5	0.5	0.39
	Toluene	1,000	40	N.D.	U	1	0.5	0.24	N.D.	U	1	0.5	0.24	N.D.	U	1	0.5	0.24
	trans-1,2- Dichloroethylene	100	260	N.D.	U	1	0.5	0.37	N.D.	U	1	0.5	0.37	N.D.	U	1	0.5	0.37
	Trichloroethylene	5	310	N.D.	U	1	0.5	0.37	N.D.	U	1	0.5	0.37	N.D.	U	1	0.5	0.37
	Vinyl chloride	2	3,400	N.D.	U	1	0.5	0.3	N.D.	U	1	0.5	0.3	N.D.	U	1	0.5	0.3
	Xylenes	10,000	20	N.D.	U	10	1	0.23	N.D.	U	10	1	0.23	N.D.	U	10	1	0.23
EPA 6020	Dissolved Lead	15	50,000	N.D.	U	1	0.2	0.0898	N.D.	U	1	0.2	0.0898	N.D.	U	1	0.2	0.0898

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

DOH EALs DOH Tier 1 Environmental Action Levels for groundwater where groundwater is a current drinking water source and surface water is greater than 150 meters from the site (DOH, Fall 2011).
DL Detection Limit or Method Detection Limit (MDL)
EPA Environmental Protection Agency
ICH Initial calibration verification recovery above method control limit for this analyte.
IJ Calibration verification recovery above method control limit for this analyte.
J Analyte was detected at a concentration below the LOQ and above the DL. Reported value is estimated.
LOD Limit of Detection
LOQ Limit of Quantitation
N.D. Not Detected
Q Qualifiers
TPH-g Total Petroleum Hydrocarbons as gasoline
TPH-d Total Petroleum Hydrocarbons as diesel
U Undetected at DL and is reported as less than the LOD.

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SECTION 3 – DATA QUALITY ASSESSMENT

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

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/LCSD 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, the RPDs for MS/MSD and LCS/LCSD pairs were all within the acceptable range except for 1,1,2,2-tetrachloroethane (40%), which is discussed in the next section. The RPDs of detected analytes for the primary and field duplicate samples (ES016 and ES017) are provided in Table 3.1. The benzene and naphthalene concentrations detected in the samples were below the respective limits of quantitation [LOQs] implying a higher uncertainty for these results than for values detected above the LOQs (i.e. estimated, J-flagged). Consequently, the assigned RPDs signified the anticipated decrease in precision below the LOQs but were not indicative of a QC issue. TPH-d was detected above the DOH EAL, and with excellent precision (RPD = 0%). Therefore the data precision is considered acceptable.

Accuracy

Accuracy is defined as the degree of conformity of a measurement to a standard or true value. Accuracy is evaluated through measurement of the percent recovery of an analyte in a reference standard or spiked sample. Accuracy limits for surrogates, laboratory control spike, MS, and MSD samples are established by the individual laboratory. The acceptance criteria for accuracy are dependent on the analytical method and are based on historical laboratory data.

All of the LCS and surrogate spike recoveries for analyzed constituents were within acceptable percent recovery limits. The MS/MSD recoveries for tetrachloroethylene and trichloroethylene were high, and the MS/MSD recovery for 1,1,2,2-tetrachloroethane was low. The MS/MSD recoveries for the three analytes were outside of the control limits. However, the analyte concentrations detected in the samples were below the respective LOQs, implying a higher uncertainty for these results than for values detected above the LOQs. Consequently, the assigned RPDs signified the anticipated decrease in precision below the LOQs but were not indicative of a QC issue. All other MS/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 specifically written for this project (ESI, 2012a).

Representativeness is also evaluated through the compliance with the sample holding time, sample preservation, and 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 included in the cooler to assess cross contamination during sample transport for TPH-g and VOCs. There was no detection of VOCs in the method blank. TPH-g was detected in the trip blank below the LOD, and was qualified (J), and implied a high uncertainty for the result and was not indicative of a QC issue. 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 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, 2012a).

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 LOQs are established by the laboratory based on the LODs or instrument detection limits, historical data, and EPA limits established for the methods. The LOQs for samples may require adjustment due to matrix interference or if high levels of target analytes necessitate dilution before analysis. Matrix interference and sample dilutions have the effect of increasing the LOQs. Laboratory LODs and LOQs for several analytes differed from the LODs and LOQs in the WP/SAP because the laboratory updates them quarterly. LODs and LOQs for several analytes were greater than the DOH EALs (as stated in the WP/SAP) and therefore it is not possible to determine whether the analytes are present at concentrations greater than or equal to the DOH EALs. As suggested by the DOH Technical Guidance Manual, 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 several VOCs. Since the surrogate recoveries and the recoveries of the VOCs in the LCS/LCSD are all within recovery criteria, the MS/MSD exceendaces are not considered to affect the usability of the data, but may indicate some matrix heterogeneity. Since the data are consistent with data from previous events, it appears that the effect of this QC exceedance is not substantial, and the data is usable. The data assessment concludes that all data generated during this event are usable for their intended use.

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TABLE 3.1
Quality Control Results for Groundwater Sampling (January 30, 2013)
Red Hill Bulk Fuel Storage Facility
January 2013 Quarterly Monitoring Report

Method	Chemical Constituent	DOH EALs		OWDFMW01 (ES016)					OWDFMW01 (ES017)					RPD Duplicate (%)	ES Trip				
		Drinking Water Toxicity	Gross Contamination	Results	Q	LOQ	LOD	DL	Results	Q	LOQ	LOD	DL		Results	Q	LOQ	LOD	DL
EPA 8015B	TPH-d	190	100	**1,000**		50	20	15	**1,000**		50	20	15	NA	-	-	-	-	-
EPA 8260B	TPH-g	100	100	N.D.	U	50	30	13	N.D.	U	50	30	13	NA	14	J	50	30	13
EPA 8270C SIM	Acenaphthene	370	20	N.D.	U	0.2	0.05	0.018	N.D.	U	0.2	0.05	0.018	NA	-	-	-	-	-
	Acenaphthylene	240	2,000	N.D.	U	0.2	0.05	0.021	N.D.	U	0.2	0.05	0.021	NA	-	-	-	-	-
	Anthracene	1,800	22	N.D.	U	0.2	0.05	0.034	N.D.	U	0.2	0.05	0.034	NA	-	-	-	-	-
	Benzo[a]anthracene	0.092	4.7	N.D.	U	0.2	0.05	0.024	N.D.	U	0.2	0.05	0.024	NA	-	-	-	-	-
	Benzo[g,h,i]perylene	1,500	0.13	N.D.	U	0.2	0.05	0.022	N.D.	U	0.2	0.05	0.022	NA	-	-	-	-	-
	Benzo[a]pyrene	0.2	0.81	N.D.	U	0.2	0.05	0.036	N.D.	U	0.2	0.05	0.036	NA	-	-	-	-	-
	Benzo[b]fluoranthene	0.092	0.75	N.D.	U	0.2	0.05	0.025	N.D.	U	0.2	0.05	0.025	NA	-	-	-	-	-
	Benzo[k]fluoranthene	0.92	0.4	N.D.	U	0.2	0.05	0.023	N.D.	U	0.2	0.05	0.023	NA	-	-	-	-	-
	Chrysene	9.2	1	N.D.	U	0.2	0.05	0.019	N.D.	U	0.2	0.05	0.019	NA	-	-	-	-	-
	Dibenzo[a,h]anthracene	0.0092	0.52	N.D.	U	0.2	0.05	0.027	N.D.	U	0.2	0.05	0.027	NA	-	-	-	-	-
	Fluoranthene	1,500	130	N.D.	U	0.2	0.05	0.027	N.D.	U	0.2	0.05	0.027	NA	-	-	-	-	-
	Fluorene	240	950	N.D.	U	0.2	0.05	0.024	N.D.	U	0.2	0.05	0.024	NA	-	-	-	-	-
	Indeno[1,2,3-cd]pyrene	0.092	0.095	N.D.	U	0.2	0.05	0.022	N.D.	U	0.2	0.05	0.022	NA	-	-	-	-	-
	1,-Methylnaphthalene	4.7	10	N.D.	U	0.2	0.05	0.028	N.D.	U	0.2	0.05	0.028	NA	-	-	-	-	-
	2,-Methylnaphthalene	24	10	N.D.	U	0.2	0.05	0.026	N.D.	U	0.2	0.05	0.026	NA	-	-	-	-	-
	Naphthalene	17	21	0.032	J	0.2	0.05	0.023	0.039	J	0.2	0.05	0.023	19.72	-	-	-	-	-
	Phenanthrene	240	410	N.D.	U	0.2	0.05	0.031	N.D.	U	0.2	0.05	0.031	NA	-	-	-	-	-
	Pyrene	180	68	N.D.	U	0.2	0.05	0.025	N.D.	U	0.2	0.05	0.025	NA	-	-	-	-	-
EPA 8260B	1,1,1-Trichloroethane	200	970	N.D.	U	5	0.5	0.3	N.D.	U	5	0.5	0.3	NA	N.D.	U	5	0.5	0.3
	1,1,2-Trichloroethane	5	50,000	N.D.	U	1	0.5	0.38	N.D.	U	1	0.5	0.38	NA	N.D.	U	1	0.5	0.38
	1,1-Dichloroethane	2.4	50,000	N.D.	U	5	0.5	0.28	N.D.	U	5	0.5	0.28	NA	N.D.	U	5	0.5	0.28
	1,1-Dichloroethylene	7	1,500	N.D.	U	1	0.5	0.43	N.D.	U	1	0.5	0.43	NA	N.D.	U	1	0.5	0.43
	1,2,3-Trichloropropane	0.6	50,000	N.D.	U	5	2	0.64	N.D.	U	5	2	0.64	NA	N.D.	U	5	2	0.64
	1,2,4-Trichlorobenzene	70	3,000	N.D.	U	5	1	0.5	N.D.	U	5	1	0.5	NA	N.D.	U	5	1	0.5
	1,2-Dibromo-3- chloropropane	0.04	10	N.D.	U	10	2	1.2	N.D.	U	10	2	1.2	NA	N.D.	U	10	2	1.2
	1,2-Dibromoethane	0.04	50,000	N.D.	U	1	0.5	0.36	N.D.	U	1	0.5	0.36	NA	N.D.	U	1	0.5	0.36
	1,2-Dichlorobenzene	600	10	N.D.	U	1	0.5	0.46	N.D.	U	1	0.5	0.46	NA	N.D.	U	1	0.5	0.46
	1,2-Dichloroethane	0.15	7,000	N.D.	U	1	0.5	0.24	N.D.	U	1	0.5	0.24	NA	N.D.	U	1	0.5	0.24
	1,2-Dichloropropane	5	10	N.D.	U	5	0.5	0.42	N.D.	U	5	0.5	0.42	NA	N.D.	U	5	0.5	0.42
	1,3-Dichlorobenzene	180	5	N.D.	U	1	0.5	0.4	N.D.	U	1	0.5	0.4	NA	N.D.	U	1	0.5	0.4
	1,3-Dichloropropene (total of cis/trans)	0.43	50,000	N.D.	U	1	0.5	0.25	N.D.	U	1	0.5	0.25	NA	N.D.	U	1	0.5	0.25
	1,4-Dichlorobenzene	75	5	N.D.	U	1	0.5	0.43	N.D.	U	1	0.5	0.43	NA	N.D.	U	1	0.5	0.43
	Acetone	22,000	20,000	17	ICH, J	20	10	10	N.D.	ICH, U	20	10	10	NA	N.D.	IJ, ICH, U	20	10	6
	Benzene	5	170	0.39	J	1	0.5	0.14	0.17	J	1	0.5	0.14	78.57	N.D.	U	1	0.5	0.14
	Bromodichloromethane	0.12	50,000	N.D.	U	5	0.5	0.21	N.D.	U	5	0.5	0.21	NA	N.D.	U	5	0.5	0.21
	Bromoform	80	510	N.D.	IJ, U	10	2	0.5	N.D.	IJ, U	10	2	0.5	NA	N.D.	U	10	2	0.5
	Bromomethane	8.7	50,000	N.D.	U	20	5	3.9	N.D.	U	20	5	3.9	NA	N.D.	U	20	5	3.9
	Carbon Tetrachloride	5	520	N.D.	U	1	0.5	0.23	N.D.	U	1	0.5	0.23	NA	N.D.	U	1	0.5	0.23
	Chlorobenzene	100	50	N.D.	U	5	0.5	0.17	N.D.	U	5	0.5	0.17	NA	N.D.	U	5	0.5	0.17
	Chloroethane	21,000	16	N.D.	U	10	5	2.3	N.D.	U	10	5	2.3	NA	N.D.	U	10	5	2.3
	Chloroform	70	2,400	N.D.	U	5	0.5	0.46	N.D.	U	5	0.5	0.46	NA	N.D.	U	5	0.5	0.46
	Chloromethane	1.8	50,000	N.D.	U	10	2	1.8	N.D.	U	10	2	1.8	NA	N.D.	U	10	2	1.8
	cis-1,2-Dichloroethylene	70	50,000	N.D.	U	1	0.5	0.48	N.D.	U	1	0.5	0.48	NA	N.D.	U	1	0.5	0.48
	Dibromochloromethane	0.16	50,000	N.D.	U	1	0.5	0.25	N.D.	U	1	0.5	0.25	NA	N.D.	U	1	0.5	0.25
	Ethylbenzene	700	30	N.D.	U	1	0.5	0.14	N.D.	U	1	0.5	0.14	NA	N.D.	U	1	0.5	0.14
	Hexachlorobutadiene	0.86	6	N.D.	U	1	0.5	0.32	N.D.	U	1	0.5	0.32	NA	N.D.	U	1	0.5	0.32
	Methyl ethyl ketone (2-Butanone)	7,100	8,400	N.D.	U	10	5.0	2.21	N.D.	U	10	5.0	2.21	NA	N.D.	U	10	5.0	2.21
	Methyl isobutyl ketone (4-Methyl-2-Pentanone)	2,000	1300	N.D.	U	10	5.0	4.4	N.D.	U	10	5.0	4.4	NA	N.D.	U	10	5.0	4.4
	Methyl tert-butyl Ether	12	5	N.D.	U	1	0.5	0.31	N.D.	U	1	0.5	0.31	NA	N.D.	U	1	0.5	0.31
	Methylene chloride	4.8	9,100	N.D.	U	5	2.0	0.64	N.D.	U	5	2.0	0.64	NA	N.D.	U	5	2.0	0.64
	Styrene	100	10	N.D.	U	1	0.5	0.17	N.D.	U	1	0.5	0.17	NA	N.D.	U	1	0.5	0.17
	Tetrachloroethane, 1,1,1,2-	0.52	50,000	N.D.	U	1	0.5	0.4	N.D.	U	1	0.5	0.4	NA	N.D.	U	1	0.5	0.4
	Tetrachloroethane, 1,1,2,2-	0.067	500	N.D.	U	1	0.5	0.41	N.D.	U	1	0.5	0.41	NA	N.D.	U	1	0.5	0.41
	Tetrachloroethylene	5	170	N.D.	U	5	0.5	0.39	N.D.	U	5	0.5	0.39	NA	N.D.	U	5	0.5	0.39
	Toluene	1,000	40	N.D.	U	1	0.5	0.24	N.D.	U	1	0.5	0.24	NA	N.D.	U	1	0.5	0.24
	trans-1,2- Dichloroethylene	100	260	N.D.	U	1	0.5	0.37	N.D.	U	1	0.5	0.37	NA	N.D.	U	1	0.5	0.37
	Trichloroethylene	5	310	N.D.	U	1	0.5	0.37	N.D.	U	1	0.5	0.37	NA	N.D.	U	1	0.5	0.37
	Vinyl chloride	2	3,400	N.D.	U	1	0.5	0.3	N.D.	U	1	0.5	0.3	NA	N.D.	U	1	0.5	0.3
	Xylenes	10,000	20	N.D.	U	10	1	0.23	N.D.	U	10	1	0.23	NA	N.D.	U	10	1	0.23
EPA 6020	Dissolved Lead	15	50,000	N.D.	U	1	0.2	0.0898	N.D.	U	1	0.2	0.0898	NA	-	-	-	-	-

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

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

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SECTION 4 – SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

This quarterly monitoring report presents the results of groundwater sampling conducted on January 30, 2013, at the RHSF, JBPHH, Hawaii. The RHSF is located in Halawa Heights on the Island of Oahu. The DOH Facility ID number for the RHSF is 9-102271. The DOH Release ID numbers are 990051, 010011, 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.

On January 30, 2013, ESI personnel collected groundwater samples from two monitoring wells (wells HDMW2253-03 and OWDFMW01). A summary of the analytical results is provided below.

- **HDMW2253-03** – TPH-d (600 µg/L) and naphthalene (0.037 µg/L) were detected. TPH-d was detected at a concentration above the DOH EALs for both drinking water toxicity and gross contamination.

- **OWDFMW01** – TPH-d (1,000 µg/L), acetone (17 µg/L), benzene (0.39 µg/L), and naphthalene (0.032 µg/L) were detected. TPH-d was detected at a concentration above the DOH EALs for both drinking water toxicity and gross contamination.

Groundwater Contaminant Trends

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

- **HDMW2253-03** – Both TPH-d and naphthalene were detected; however, TPH-g which was detected during the previous sampling event in November 2012 (15 µg/L) was not detected this round of quarterly sampling. Naphthalene was last detected in July 2010. TPH-d concentrations detected during this round of quarterly sampling increased to concentrations above the DOH EALs for both drinking water toxicity and gross contamination. TPH-d concentrations last exceeded the DOH EALs for both drinking water toxicity and gross contamination in April 2012 (160 µg/L).

- **OWDFMW01** – With the exception of TPH-d, groundwater contaminant concentrations remained at low concentrations and did not change significantly, or were not detected. TPH-d concentrations detected during this round of sampling remained above the DOH EALs for both drinking water toxicity and gross contamination, but decreased from the previous sampling event in November 2012 (2,500 µg/L).

Conclusions and Recommendations

Since the wells were last sampled (November 2012), with the exception of TPH-d, groundwater contaminant concentrations remained at low concentrations and did not change significantly, or were not detected. TPH-d concentrations increased in well HDMW2253-03 and decreased in well OWDFMW01. The TPH-d concentration detected in HDMW2253-03 was the highest concentration detected since quarterly groundwater monitoring was initiated in 2009. TPH-d concentrations increased from 25 µg/L during the last round of sampling to 600 µg/L during this round of sampling. TPH-d concentrations in well OWDFMW01 decreased from 2,500 µg/L during the last round of sampling to 1,000 µg/L.

Based on the results of the assessment, we recommend continuing the groundwater monitoring program at the RHSF. If the TPH-d concentrations continue to systemically increase, we recommend increasing monitoring frequency to monthly even though the two outside wells are not included in the RHSF Groundwater Protection Plan.

SECTION 5 – FUTURE WORK

GROUNDWATER SAMPLING

Future work includes the second quarter 2013 groundwater monitoring which is scheduled for April 2013. It is anticipated that the quarterly groundwater monitoring status report will be submitted in May 2013.

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SECTION 6 – REFERENCES

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TEC, 2010b, Quarterly Groundwater Monitoring Report – Outside (Non-Tunnel) Wells, Prepared for Navy Region Hawaii, Pearl Harbor, Hawaii, May 2010.

FIGURES

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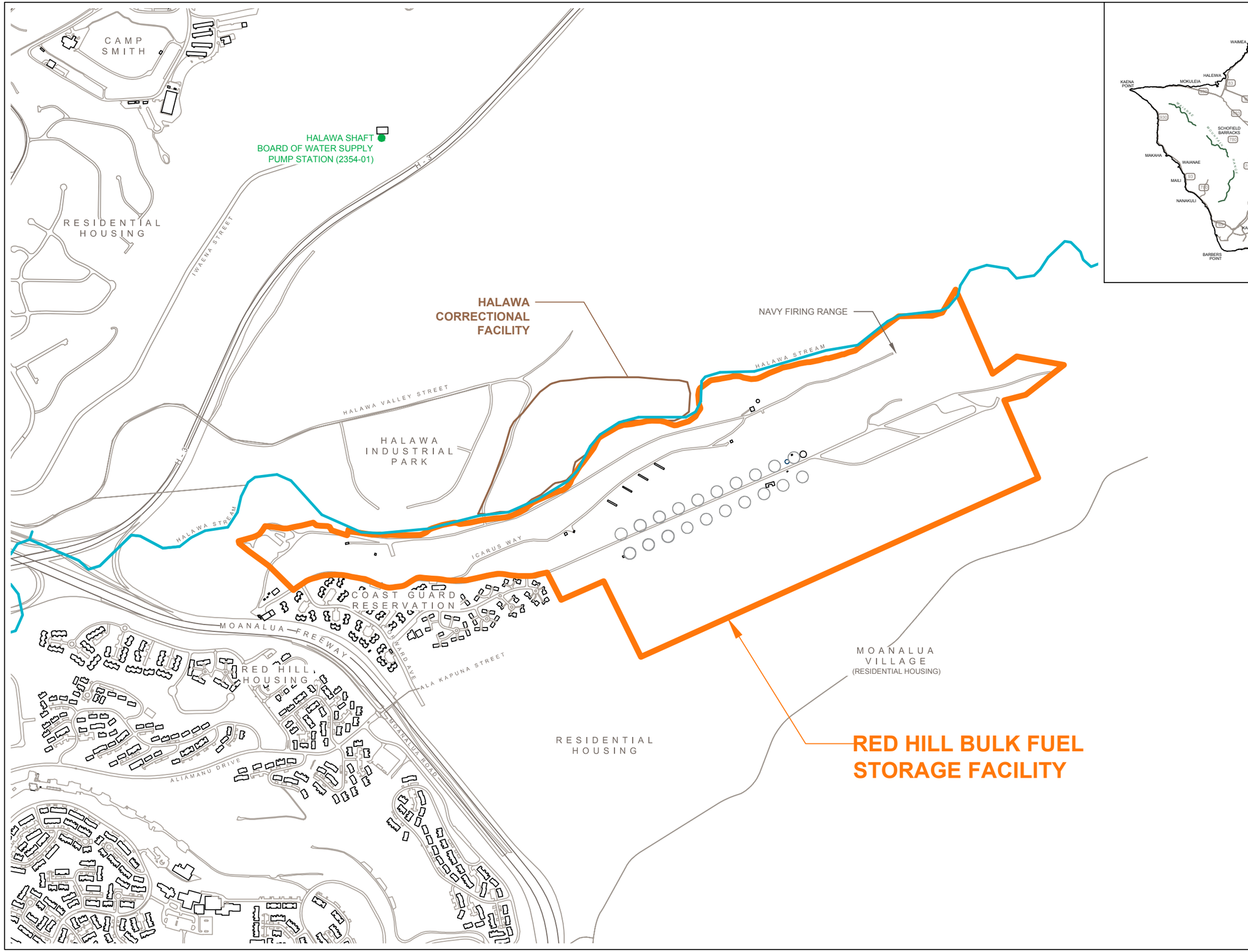

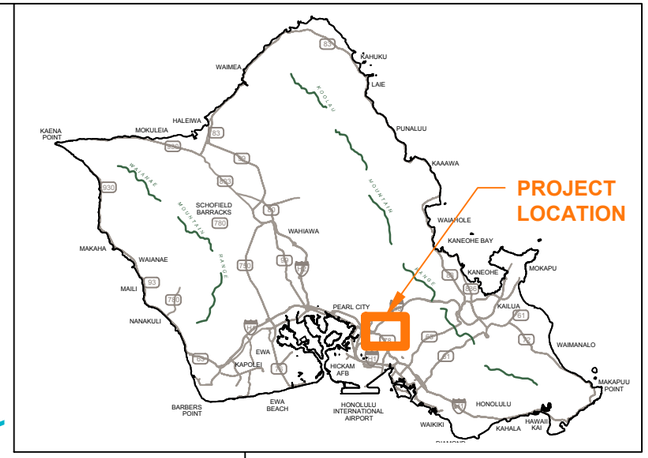

NOTES

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

SOURCES

Pearl Harbor Base Map

Navy GIS files

NORTH

GRAPHIC SCALE

900 0 900

Scale in Feet

FIGURE 1

SITE LOCATION

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

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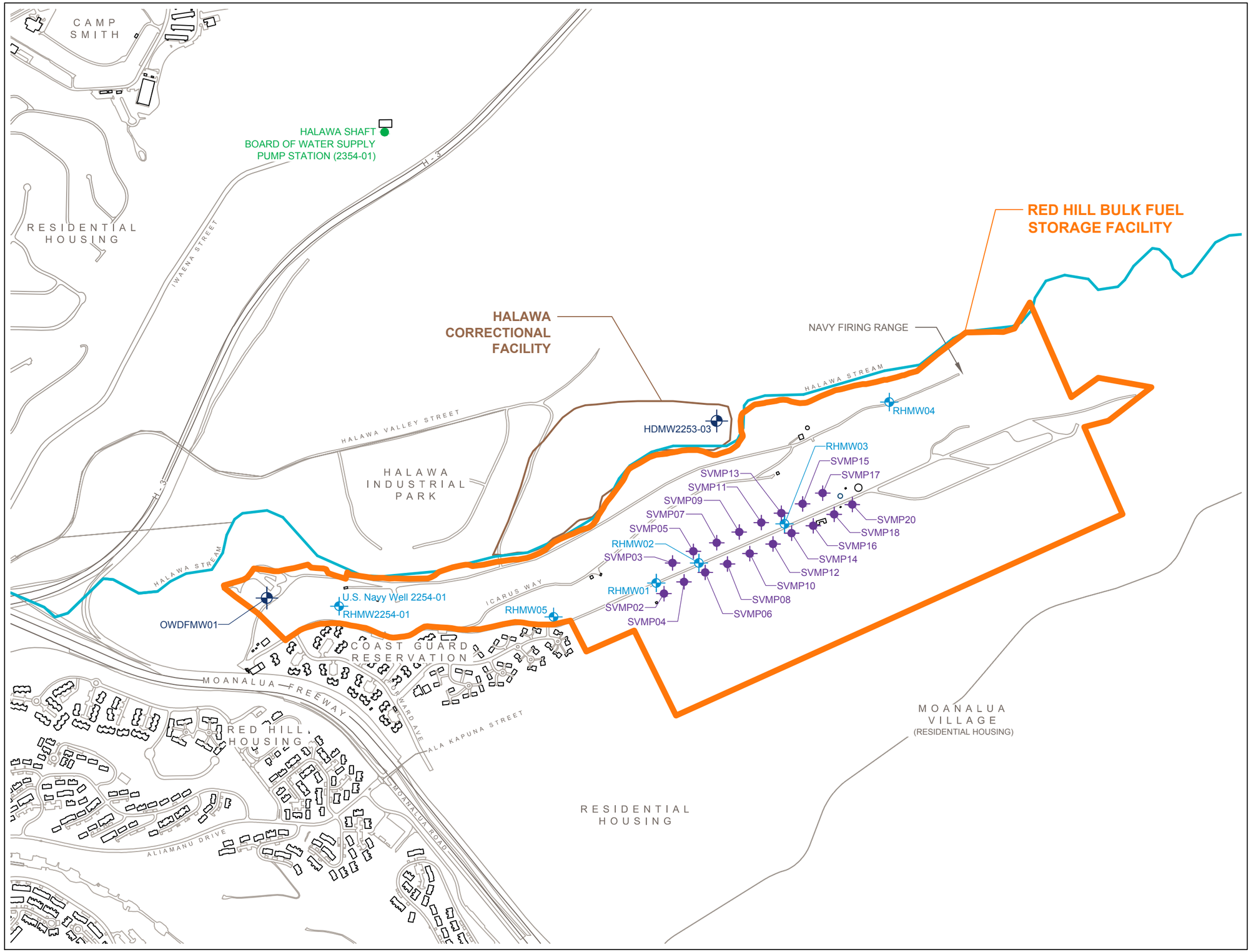

LEGEND

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

NOTES

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

SOURCES

Pearl Harbor Base Map

Navy GIS files

NORTH

GRAPHIC SCALE

1,200 0 1,200

Scale in Feet

FIGURE 2

SITE LAYOUT

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

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APPENDIX A

Groundwater Sampling Logs

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Groundwater Sampling Log

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

Initial Water Level: 120.55 ft Date: 1/30/2013 Time: 730

Total Depth of Well: 145.10 ft Personnel Involved: Justin Lam, Branden Ibara

Length of Saturated Zone: - Weather Conditions: Clear

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

Water Level After Purging: 120.55 ft Pumping Rate: 0.42 L/min

Well Purge Data:

Time	Volume Removed	pH	Conductivity (mS/cm)	DO (mg/l)	Temperature	Salinity	Redox (ORP) (mV)
738	0.0 L	7.61	4.089	6.40	22.74	2.28	20.8
740	1.0 L	8.85	3.473	5.45	23.19	1.89	-5.1
742	2.0 L	8.80	3.534	5.03	23.32	1.92	-7.7
744	3.0 L	8.84	3.556	4.89	23.37	1.93	-7.7
746	4.0 L	8.87	3.558	4.86	23.35	1.93	-7.7
750	5.0 L	8.85	3.555	4.87	23.33	1.92	-7.7

Sample Withdrawal Method: Disposable Bailer

Appearance of Sample:

Color: Clear

Turbidity: Low

Sediment: Slight

Other:

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

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

Sample Identification Numbers: ES016 [0800], ES017 (Dup) [0930], ES016 MS/MSD [0800]

Decontamination Procedures: Triple Rinsed

Notes:

Sampled by: Justin Lam, Branden Ibara

Sampled Delivered to: Calscience Environmental Lab Transporters: FedEx

Date: 2/1/2013 Time: 1045

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

Initial Water Level: 208.15 ft Date: 1/30/2013 Time: 955

Total Depth of Well: 1575 ft Personnel Involved: Justin Lam, Branden Ibara

Length of Saturated Zone: - Weather Conditions: Clear, Sunny

Volume of Water to be Removed: - Method of Removal: Disposable Bailer

Water Level After Purging: - Pumping Rate: 0.21 L/min

Well Purge Data:

Time	Volume Removed	pH	Conductivity (mS/cm)	DO (mg/l)	Temperature	Salinity	Redox (ORP) (mV)
1111	0.0 L	7.64	0.692	2.80	22.70	0.35	-50.4
1114	1.0 L	7.19	0.513	1.56	22.54	0.26	-101.3
1117	2.0 L	7.08	0.511	1.41	22.36	0.26	-52.1
1121	3.0 L	7.07	0.499	1.38	22.46	0.25	-84.9
1127	4.0 L	7.07	0.497	1.37	22.32	0.25	-85.6
1134	5.0 L	7.07	0.501	1.35	22.40	0.25	-89.1

Sample Withdrawal Method: Disposable Bailer

Appearance of Sample:

Color: Clear

Turbidity: Low

Sediment: Slight

Other:

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

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

Sample Identification Numbers: ES018 [1100]

Decontamination Procedures: Triple Rinsed

Notes:

Sampled by: Justin Lam, Branden Ibara

Sampled Delivered to: Calscience Environmental Lab Transporters: FedEx

Date: 2/1/2013 Time: 1045

Capacity of Casing (Gallons/Linear Feet)

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

APPENDIX B

Field Notes

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Location Red Hill Date 1/28/13

Project / Client 112066 NAVFAC

purpose: gw sampling
personnel: JL, BI
~~0~~ 735: ESI onsite.
750: safety meeting.
805: ESI enter through adit #5.
830: gauge RHMW01
840: turn on compressor and control box, begin pumping.
850: compressor shut off, no water being pumped out.
855: compressor will not stay on.
930: compressor started and stayed on. well not pumping.
935: pull pump out. test pump.
1000: put pump back in well. ~~test~~ attempt to pump again, not pumping.
1005: compressor will not start.
1032: move to RHMW02.
1040: gauge RHMW02
PTW: 86.75
1050: begin pumping well. RHMW02

Location Red Hill Date 1/28/13

Project / Client 112066 NAVFAC

1210: finish sampling RHMW02
move to RHMW03
1215 RHMW03
PTW: 102.98
PTB: 110.12
1218: begin purging RHMW03
1220: no water purging.
1241: water purging again
1305: finish RHMW03
1310: walk back to RHMW01.
1320: set up equipment at ~~RHMW01~~ RH 1/29/13 RHMW01
1 compressor will not stay on. The outlet by Tank 1/2 not usable. So had to connect to extension cords. There was not enough voltage to operate the compressor. Compressor worked fine at two other wells today.
1445: leave RHMW01.
1500: EST exit tunnels.

Location Red Hill Date 1/28/13

Project / Client 112066 NAVFAC

1300: clean up for day.
1315: drop off drum at adit 3.
1325: ESI leave Red Hill.

1/28/13

Location Red Hill Date 1/29/13

Project / Client 112066 NAVFAC

purpose: gw sampling
personnel: JL, BI

730: ESI onsite
740: safety meeting.
750: ESI enter adit #5.
elevator not working.
752: JL called RC about the situation
800: check adit #3.
adit #3 is clear. can enter lower tunnels through adit #3.
830: JL, BI bring equipment through adit #3.
832: wait for pump house to be opened.
850: pump house opened
910: gauged RHMW2254-01
DTW: 82.78
DTB: ——
920: begin purging RHMW2254-01
935: collect sample.
1000: leave pump station. 1/29/13

Location Red Hill Date 1/29/13

Project / Client 112066

1015: gauge RHMW05 1/29/13
DTW: ~~88.6~~ 83.61
no depth to bottom, TP
could not get past 86.70 ~~feet~~

1045: sample well.

1100: clean up around RHMW05
move to RHMW01.

1100: gauge well RHMW01

1115: attempt to purge well.

1145: water in tubing but not ~~enough to~~ coming out of tubing
1/29/13

1215: water still not coming out
check bladder pump. put
pump back in well.

1245: stop attempt to purge well.
no water coming out of tubing
not enough time to sample the
well. Pack up equipment
charge time: 15s exhaust: 5s

1255: leave through adit #5

1310: ~~leave~~ exit tunnels at adit #5

1330: clean up equipment

1330 leave Red Hill to meet
Domos at Fed Ex. 1/29/13

Location Red Hill. Date 1/30/13

Project / Client 112066 NAVFAC

Purpose: gw sampling
personnel: BJ, JL

715: ESI at adit #3

730: gauge OWDFMW01
DTW: 120.55
DTB: 145.10

740: begin hand bailing the well.

810: begin sampling well.

830: finish sampling well.
clean up and pack samples.

915: leave Red Hill wait for
DLNR at Halawa correctional
Facility.

930: DLNR at HCF.

938: go to HDMW2253-03.
DLNR

950: gauge well.
955: DTW: 208.15 JL

~~1058~~: DLNR finish w/ their work.

1105: ESI begin purging well

1135: finish purging, begin sampling
HDMW2253-03.

Location Red Hill Date 1/30/13

Project / Client 112066 NAVFAC

1155: leave H&F. go to RHSF. adit #5

1200: get to adit #5
a worker getting out of adit #5 said elevator wasn't working properly.

1205: ESI tested elevator.
went out to get equipment to sample RHMW01.

1220: get back to elevator; someone was stuck in elevator.
FSI leave tunnels.

1230: ESI empty purge water into the IDW drum at adit #5

1240. ESI leave RHSF.
go to Fed Ex

1/30/13

Location Red Hill Date 1/31/13

Project / Client 112066 NAVFAC

purpose: Soil vapor monitoring
personnel: JL, BI

800: ESI get to adit 5
Safety meeting
prep equipment

810: enter adit 5
elevator stuck go to adit #3

822: enter adit 3.

840: purge SVMP02

shallow	518	532	518	545
mid	778	757	808	808
deep	821	885	842	885

857 purge SVMP03

shallow	23	13	6	25
mid	16	10	3	20
deep	50	67	23	75

913 purge SVMP04

shallow	33	30	41	57
mid	57	53	40	67
deep	424	397	431	441

Location Red Hill Date 1/31/13

Project / Client 112066 NAVFAC

1159 SVMP 02 needs to be resampled. the tube on the PID was loose and pulling in outside air from the bag. ambient Readings were high due to maintenance work being done at tank 05. (+900 ppmv)

1210 resample SVMP 02

shallow	542	535	551	555
mid	919	922	885	931
deep	936	973	966	990

1225 ESI leave tunnels.

1245. ESI exit adit 3.

1/31/13

Location Red Hill Date 2/4/13

Project / Client 112066 NAVFAC

purpose: gw sampling

personnel: JL, BI

800: ESI get to RHSF elevator still not working at adit 5.

815: ESI unpack equipment at adit 3.
safety meeting.

820: ESI enter adit 3.

845: gauge RH MW01
DTW: 84.04

900: begin ~~purging~~ pumping from well. M 2/4/13

1000: begin sampling RH MW01.

1215: finish sampling RH MW01 leave tunnels through adit 3.

1235: exit tunnels.

1245: leave RHSF

2/4/13

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APPENDIX C

Laboratory Reports

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Calscience Environmental Laboratories, Inc.

CALSCIENCE

WORK ORDER NUMBER: 13-02-0014

The difference is service

AIR | SOIL | WATER | MARINE CHEMISTRY

Analytical Report For

Client: Environmental Science International, Inc.

Client Project Name: Red Hill LTM 112066

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

Approved for release on 02/7/2013 by:
Richard Villafania
Project Manager

ResultLink

Email your PM

Calscience Environmental Laboratories, Inc.

Contents

Client Project Name: Red Hill LTM 112066
Work Order Number: 13-02-0014

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:	13-02-0014
		Project Name:	Red Hill LTM 112066
Attn:	Robert Chong	Received:	02/01/13 10:45

ANALYTICAL REPORT

13-02-0014-1 Client ID: ES016 Matrix: Aqueous Units: ug/L Sampled: 01/30/13 08:00

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	02/01/13 00:00	02/04/13 16:55	130201L02D

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

13-02-0014-2 Client ID: ES017 Matrix: Aqueous Units: ug/L Sampled: 01/30/13 09:30

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	02/01/13 00:00	02/04/13 16:58	130201L02D

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

13-02-0014-3 Client ID: ES018 Matrix: Aqueous Units: ug/L Sampled: 01/30/13 11:00

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	02/01/13 00:00	02/04/13 17:01	130201L02D

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

099-14-497-15 Client ID: Method Blank Matrix: Aqueous Units: ug/L Sampled: 02/05/13 15:30

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	02/01/13 00:00	02/04/13 16:20	130201L02D

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

Return to Contents

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:	13-02-0014
		Project Name:	Red Hill LTM 112066
Attn:	Robert Chong	Received:	02/01/13 10:45

ANALYTICAL REPORT

13-02-0014-1 Client ID: ES016 Matrix: Aqueous Units: ug/L Sampled: 01/30/13 08:00

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	1000		15	20	50	1	02/04/13 00:00	02/05/13 02:45	130204B14
Surr: n-Octacosane (51-141%)	*99%*						*02/04/13 00:00*	*02/05/13 02:45*	*130204B14*

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

13-02-0014-2 Client ID: ES017 Matrix: Aqueous Units: ug/L Sampled: 01/30/13 09:30

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	1000		15	20	50	1	02/04/13 00:00	02/05/13 03:02	130204B14
Surr: n-Octacosane (51-141%)	*92%*						*02/04/13 00:00*	*02/05/13 03:02*	*130204B14*

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

13-02-0014-3 Client ID: ES018 Matrix: Aqueous Units: ug/L Sampled: 01/30/13 11:00

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	600		15	20	50	1	02/04/13 00:00	02/05/13 03:20	130204B14
Surr: n-Octacosane (51-141%)	*107%*						*02/04/13 00:00*	*02/05/13 03:20*	*130204B14*

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

099-15-516-26 Client ID: Method Blank Matrix: Aqueous Units: ug/L Sampled: 02/05/13 16:44

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	02/04/13 00:00	02/05/13 01:17	130204B14
Surr: n-Octacosane (51-141%)	*115%*						*02/04/13 00:00*	*02/05/13 01:17*	*130204B14*

-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:	13-02-0014 Red Hill LTM 112066
Attn:	Robert Chong	Received:	02/01/13 10:45

ANALYTICAL REPORT

13-02-0014-1 Client ID: ES016 Matrix: Aqueous Units: ug/L Sampled: 01/30/13 08:00

EPA 8270C SIM PAHs Extraction: EPA 3510C

Analyte	Result	Qual.	DL	LOD	LOQ	Dilution Factor	Preparation Date/Time	Analysis Date/Time	Batch
Naphthalene	0.032	J	0.023	0.050	0.20	1	02/04/13 00:00	02/05/13 17:34	130204L11
2-Methylnaphthalene	<0.050	U	0.026	0.050	0.20	1	02/04/13 00:00	02/05/13 17:34	130204L11
1-Methylnaphthalene	<0.050	U	0.028	0.050	0.20	1	02/04/13 00:00	02/05/13 17:34	130204L11
Acenaphthylene	<0.050	U	0.018	0.050	0.20	1	02/04/13 00:00	02/05/13 17:34	130204L11
Acenaphthene	<0.050	U	0.021	0.050	0.20	1	02/04/13 00:00	02/05/13 17:34	130204L11
Fluorene	<0.050	U	0.024	0.050	0.20	1	02/04/13 00:00	02/05/13 17:34	130204L11
Phenanthrene	<0.050	U	0.031	0.050	0.20	1	02/04/13 00:00	02/05/13 17:34	130204L11
Anthracene	<0.050	U	0.034	0.050	0.20	1	02/04/13 00:00	02/05/13 17:34	130204L11
Fluoranthene	<0.050	U	0.027	0.050	0.20	1	02/04/13 00:00	02/05/13 17:34	130204L11
Pyrene	<0.050	U	0.025	0.050	0.20	1	02/04/13 00:00	02/05/13 17:34	130204L11
Benzo (a) Anthracene	<0.050	U	0.024	0.050	0.20	1	02/04/13 00:00	02/05/13 17:34	130204L11
Chrysene	<0.050	U	0.019	0.050	0.20	1	02/04/13 00:00	02/05/13 17:34	130204L11
Benzo (k) Fluoranthene	<0.050	U	0.023	0.050	0.20	1	02/04/13 00:00	02/05/13 17:34	130204L11
Benzo (b) Fluoranthene	<0.050	U	0.025	0.050	0.20	1	02/04/13 00:00	02/05/13 17:34	130204L11
Benzo (a) Pyrene	<0.050	U	0.036	0.050	0.20	1	02/04/13 00:00	02/05/13 17:34	130204L11
Indeno (1,2,3-c,d) Pyrene	<0.050	U	0.022	0.050	0.20	1	02/04/13 00:00	02/05/13 17:34	130204L11
Dibenz (a,h) Anthracene	<0.050	U	0.027	0.050	0.20	1	02/04/13 00:00	02/05/13 17:34	130204L11
Benzo (g,h,i) Perylene	<0.050	U	0.022	0.050	0.20	1	02/04/13 00:00	02/05/13 17:34	130204L11

Surr: Nitrobenzene-d5 (28-139%)	*108%*	*02/04/13 00:00*	*02/05/13 17:34*	*130204L11*
Surr: 2-Fluorobiphenyl (33-144%)	*96%*	*02/04/13 00:00*	*02/05/13 17:34*	*130204L11*
Surr: p-Terphenyl-d14 (23-160%)	*110%*	*02/04/13 00:00*	*02/05/13 17:34*	*130204L11*

-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:	13-02-0014
	354 Uluniu Street, Suite 304	Project Name:	Red Hill LTM 112066
	Kailua, HI 96734-2500		
Attn:	Robert Chong	Received:	02/01/13 10:45

ANALYTICAL REPORT

13-02-0014-2 Client ID: ES017 Matrix: Aqueous Units: ug/L Sampled: 01/30/13 09:30

EPA 8270C SIM PAHs Extraction: EPA 3510C

Analyte	Result	Qual.	DL	LOD	LOQ	Dilution Factor	Preparation Date/Time	Analysis Date/Time	Batch
Naphthalene	0.039	J	0.023	0.050	0.20	1	02/04/13 00:00	02/05/13 18:00	130204L11
2-Methylnaphthalene	<0.050	U	0.026	0.050	0.20	1	02/04/13 00:00	02/05/13 18:00	130204L11
1-Methylnaphthalene	<0.050	U	0.028	0.050	0.20	1	02/04/13 00:00	02/05/13 18:00	130204L11
Acenaphthylene	<0.050	U	0.018	0.050	0.20	1	02/04/13 00:00	02/05/13 18:00	130204L11
Acenaphthene	<0.050	U	0.021	0.050	0.20	1	02/04/13 00:00	02/05/13 18:00	130204L11
Fluorene	<0.050	U	0.024	0.050	0.20	1	02/04/13 00:00	02/05/13 18:00	130204L11
Phenanthrene	<0.050	U	0.031	0.050	0.20	1	02/04/13 00:00	02/05/13 18:00	130204L11
Anthracene	<0.050	U	0.034	0.050	0.20	1	02/04/13 00:00	02/05/13 18:00	130204L11
Fluoranthene	<0.050	U	0.027	0.050	0.20	1	02/04/13 00:00	02/05/13 18:00	130204L11
Pyrene	<0.050	U	0.025	0.050	0.20	1	02/04/13 00:00	02/05/13 18:00	130204L11
Benzo (a) Anthracene	<0.050	U	0.024	0.050	0.20	1	02/04/13 00:00	02/05/13 18:00	130204L11
Chrysene	<0.050	U	0.019	0.050	0.20	1	02/04/13 00:00	02/05/13 18:00	130204L11
Benzo (k) Fluoranthene	<0.050	U	0.023	0.050	0.20	1	02/04/13 00:00	02/05/13 18:00	130204L11
Benzo (b) Fluoranthene	<0.050	U	0.025	0.050	0.20	1	02/04/13 00:00	02/05/13 18:00	130204L11
Benzo (a) Pyrene	<0.050	U	0.036	0.050	0.20	1	02/04/13 00:00	02/05/13 18:00	130204L11
Indeno (1,2,3-c,d) Pyrene	<0.050	U	0.022	0.050	0.20	1	02/04/13 00:00	02/05/13 18:00	130204L11
Dibenz (a,h) Anthracene	<0.050	U	0.027	0.050	0.20	1	02/04/13 00:00	02/05/13 18:00	130204L11
Benzo (g,h,i) Perylene	<0.050	U	0.022	0.050	0.20	1	02/04/13 00:00	02/05/13 18:00	130204L11

Surr: Nitrobenzene-d5 (28-139%)	*105%*	*02/04/13 00:00*	*02/05/13 18:00*	*130204L11*
Surr: 2-Fluorobiphenyl (33-144%)	*96%*	*02/04/13 00:00*	*02/05/13 18:00*	*130204L11*
Surr: p-Terphenyl-d14 (23-160%)	*107%*	*02/04/13 00:00*	*02/05/13 18:00*	*130204L11*

-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:	13-02-0014
	354 Uluniu Street, Suite 304	Project Name:	Red Hill LTM 112066
	Kailua, HI 96734-2500		
Attn:	Robert Chong	Received:	02/01/13 10:45

ANALYTICAL REPORT

13-02-0014-3 Client ID: ES018 Matrix: Aqueous Units: ug/L Sampled: 01/30/13 11:00

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	02/04/13 00:00	02/05/13 18:26	130204L11
2-Methylnaphthalene	<0.050	U	0.026	0.050	0.20	1	02/04/13 00:00	02/05/13 18:26	130204L11
1-Methylnaphthalene	<0.050	U	0.028	0.050	0.20	1	02/04/13 00:00	02/05/13 18:26	130204L11
Acenaphthylene	<0.050	U	0.018	0.050	0.20	1	02/04/13 00:00	02/05/13 18:26	130204L11
Acenaphthene	<0.050	U	0.021	0.050	0.20	1	02/04/13 00:00	02/05/13 18:26	130204L11
Fluorene	<0.050	U	0.024	0.050	0.20	1	02/04/13 00:00	02/05/13 18:26	130204L11
Phenanthrene	<0.050	U	0.031	0.050	0.20	1	02/04/13 00:00	02/05/13 18:26	130204L11
Anthracene	<0.050	U	0.034	0.050	0.20	1	02/04/13 00:00	02/05/13 18:26	130204L11
Fluoranthene	<0.050	U	0.027	0.050	0.20	1	02/04/13 00:00	02/05/13 18:26	130204L11
Pyrene	<0.050	U	0.025	0.050	0.20	1	02/04/13 00:00	02/05/13 18:26	130204L11
Benzo (a) Anthracene	<0.050	U	0.024	0.050	0.20	1	02/04/13 00:00	02/05/13 18:26	130204L11
Chrysene	<0.050	U	0.019	0.050	0.20	1	02/04/13 00:00	02/05/13 18:26	130204L11
Benzo (k) Fluoranthene	<0.050	U	0.023	0.050	0.20	1	02/04/13 00:00	02/05/13 18:26	130204L11
Benzo (b) Fluoranthene	<0.050	U	0.025	0.050	0.20	1	02/04/13 00:00	02/05/13 18:26	130204L11
Benzo (a) Pyrene	<0.050	U	0.036	0.050	0.20	1	02/04/13 00:00	02/05/13 18:26	130204L11
Indeno (1,2,3-c,d) Pyrene	<0.050	U	0.022	0.050	0.20	1	02/04/13 00:00	02/05/13 18:26	130204L11
Dibenz (a,h) Anthracene	<0.050	U	0.027	0.050	0.20	1	02/04/13 00:00	02/05/13 18:26	130204L11
Benzo (g,h,i) Perylene	<0.050	U	0.022	0.050	0.20	1	02/04/13 00:00	02/05/13 18:26	130204L11

Surr: Nitrobenzene-d5 (28-139%)	*108%*	*02/04/13 00:00*	*02/05/13 18:26*	*130204L11*
Surr: 2-Fluorobiphenyl (33-144%)	*97%*	*02/04/13 00:00*	*02/05/13 18:26*	*130204L11*
Surr: p-Terphenyl-d14 (23-160%)	*110%*	*02/04/13 00:00*	*02/05/13 18:26*	*130204L11*

-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:	02/01/13 10:45

ANALYTICAL REPORT

099-15-148-8 Client ID: Method Blank Matrix: Aqueous Units: ug/L Sampled: 02/05/13 15:30

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	02/04/13 00:00	02/05/13 15:22	130204L11
2-Methylnaphthalene	<0.050	U	0.026	0.050	0.20	1	02/04/13 00:00	02/05/13 15:22	130204L11
1-Methylnaphthalene	<0.050	U	0.028	0.050	0.20	1	02/04/13 00:00	02/05/13 15:22	130204L11
Acenaphthylene	<0.050	U	0.018	0.050	0.20	1	02/04/13 00:00	02/05/13 15:22	130204L11
Acenaphthene	<0.050	U	0.021	0.050	0.20	1	02/04/13 00:00	02/05/13 15:22	130204L11
Fluorene	<0.050	U	0.024	0.050	0.20	1	02/04/13 00:00	02/05/13 15:22	130204L11
Phenanthrene	<0.050	U	0.031	0.050	0.20	1	02/04/13 00:00	02/05/13 15:22	130204L11
Anthracene	<0.050	U	0.034	0.050	0.20	1	02/04/13 00:00	02/05/13 15:22	130204L11
Fluoranthene	<0.050	U	0.027	0.050	0.20	1	02/04/13 00:00	02/05/13 15:22	130204L11
Pyrene	<0.050	U	0.025	0.050	0.20	1	02/04/13 00:00	02/05/13 15:22	130204L11
Benzo (a) Anthracene	<0.050	U	0.024	0.050	0.20	1	02/04/13 00:00	02/05/13 15:22	130204L11
Chrysene	<0.050	U	0.019	0.050	0.20	1	02/04/13 00:00	02/05/13 15:22	130204L11
Benzo (k) Fluoranthene	<0.050	U	0.023	0.050	0.20	1	02/04/13 00:00	02/05/13 15:22	130204L11
Benzo (b) Fluoranthene	<0.050	U	0.025	0.050	0.20	1	02/04/13 00:00	02/05/13 15:22	130204L11
Benzo (a) Pyrene	<0.050	U	0.036	0.050	0.20	1	02/04/13 00:00	02/05/13 15:22	130204L11
Indeno (1,2,3-c,d) Pyrene	<0.050	U	0.022	0.050	0.20	1	02/04/13 00:00	02/05/13 15:22	130204L11
Dibenz (a,h) Anthracene	<0.050	U	0.027	0.050	0.20	1	02/04/13 00:00	02/05/13 15:22	130204L11
Benzo (g,h,i) Perylene	<0.050	U	0.022	0.050	0.20	1	02/04/13 00:00	02/05/13 15:22	130204L11

Surr: Nitrobenzene-d5 (28-139%)	*107%*	*02/04/13 00:00*	*02/05/13 15:22*	*130204L11*
Surr: 2-Fluorobiphenyl (33-144%)	*102%*	*02/04/13 00:00*	*02/05/13 15:22*	*130204L11*
Surr: p-Terphenyl-d14 (23-160%)	*116%*	*02/04/13 00:00*	*02/05/13 15:22*	*130204L11*

-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:	13-02-0014 Red Hill LTM 112066
Attn:	Robert Chong	Received:	02/01/13 10:45

ANALYTICAL REPORT

13-02-0014-1 Client ID: ES016 Matrix: Aqueous Units: ug/L Sampled: 01/30/13 08:00

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	17	ICH,J	10	10	20	1	02/04/13 00:00	02/04/13 14:10	130204L01
Benzene	0.39	J	0.14	0.50	1.0	1	02/04/13 00:00	02/04/13 14:10	130204L01
Bromodichloromethane	<0.50	U	0.21	0.50	5.0	1	02/04/13 00:00	02/04/13 14:10	130204L01
Bromoform	<2.0	IJ,U	0.50	2.0	10	1	02/04/13 00:00	02/04/13 14:10	130204L01
Bromomethane	<5.0	U	3.9	5.0	20	1	02/04/13 00:00	02/04/13 14:10	130204L01
2-Butanone	<5.0	U	2.2	5.0	10	1	02/04/13 00:00	02/04/13 14:10	130204L01
Carbon Tetrachloride	<0.50	U	0.23	0.50	1.0	1	02/04/13 00:00	02/04/13 14:10	130204L01
Chlorobenzene	<0.50	U	0.17	0.50	5.0	1	02/04/13 00:00	02/04/13 14:10	130204L01
Chloroethane	<5.0	U	2.3	5.0	10	1	02/04/13 00:00	02/04/13 14:10	130204L01
Chloroform	<0.50	U	0.46	0.50	5.0	1	02/04/13 00:00	02/04/13 14:10	130204L01
Chloromethane	<2.0	U	1.8	2.0	10	1	02/04/13 00:00	02/04/13 14:10	130204L01
Dibromochloromethane	<0.50	U	0.25	0.50	1.0	1	02/04/13 00:00	02/04/13 14:10	130204L01
1,2-Dibromo-3-Chloropropane	<2.0	U	1.2	2.0	10	1	02/04/13 00:00	02/04/13 14:10	130204L01
1,2-Dibromoethane	<0.50	U	0.36	0.50	1.0	1	02/04/13 00:00	02/04/13 14:10	130204L01
1,2-Dichlorobenzene	<0.50	U	0.46	0.50	1.0	1	02/04/13 00:00	02/04/13 14:10	130204L01
1,3-Dichlorobenzene	<0.50	U	0.40	0.50	1.0	1	02/04/13 00:00	02/04/13 14:10	130204L01
1,4-Dichlorobenzene	<0.50	U	0.43	0.50	1.0	1	02/04/13 00:00	02/04/13 14:10	130204L01
1,1-Dichloroethane	<0.50	U	0.28	0.50	5.0	1	02/04/13 00:00	02/04/13 14:10	130204L01
1,2-Dichloroethane	<0.50	U	0.24	0.50	1.0	1	02/04/13 00:00	02/04/13 14:10	130204L01
1,1-Dichloroethene	<0.50	U	0.43	0.50	1.0	1	02/04/13 00:00	02/04/13 14:10	130204L01
c-1,2-Dichloroethene	<0.50	U	0.48	0.50	1.0	1	02/04/13 00:00	02/04/13 14:10	130204L01
t-1,2-Dichloroethene	<0.50	U	0.37	0.50	1.0	1	02/04/13 00:00	02/04/13 14:10	130204L01
1,2-Dichloropropane	<0.50	U	0.42	0.50	5.0	1	02/04/13 00:00	02/04/13 14:10	130204L01
c-1,3-Dichloropropene	<0.50	U	0.25	0.50	1.0	1	02/04/13 00:00	02/04/13 14:10	130204L01
t-1,3-Dichloropropene	<0.50	U	0.25	0.50	1.0	1	02/04/13 00:00	02/04/13 14:10	130204L01
Ethylbenzene	<0.50	U	0.14	0.50	1.0	1	02/04/13 00:00	02/04/13 14:10	130204L01
Methylene Chloride	<2.0	U	0.64	2.0	5.0	1	02/04/13 00:00	02/04/13 14:10	130204L01
4-Methyl-2-Pentanone	<5.0	U	4.4	5.0	10	1	02/04/13 00:00	02/04/13 14:10	130204L01
Styrene	<0.50	U	0.17	0.50	1.0	1	02/04/13 00:00	02/04/13 14:10	130204L01
1,1,1,2-Tetrachloroethane	<0.50	U	0.40	0.50	1.0	1	02/04/13 00:00	02/04/13 14:10	130204L01
1,1,2,2-Tetrachloroethane	<0.50	U	0.41	0.50	1.0	1	02/04/13 00:00	02/04/13 14:10	130204L01
Tetrachloroethene	<0.50	U	0.39	0.50	5.0	1	02/04/13 00:00	02/04/13 14:10	130204L01
Toluene	<0.50	U	0.24	0.50	1.0	1	02/04/13 00:00	02/04/13 14:10	130204L01
1,2,4-Trichlorobenzene	<0.50	U	0.50	0.50	5.0	1	02/04/13 00:00	02/04/13 14:10	130204L01
1,1,1-Trichloroethane	<0.50	U	0.30	0.50	5.0	1	02/04/13 00:00	02/04/13 14:10	130204L01
Hexachloro-1,3-Butadiene	<0.50	U	0.32	0.50	1.0	1	02/04/13 00:00	02/04/13 14:10	130204L01
1,1,2-Trichloroethane	<0.50	U	0.38	0.50	1.0	1	02/04/13 00:00	02/04/13 14:10	130204L01
Trichloroethene	<0.50	U	0.37	0.50	1.0	1	02/04/13 00:00	02/04/13 14:10	130204L01

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Client:	Environmental Science International, Inc.	Work Order:	13-02-0014
	354 Uluniu Street, Suite 304	Project Name:	Red Hill LTM 112066
	Kailua, HI 96734-2500		
Attn:	Robert Chong	Received:	02/01/13 10:45

ANALYTICAL REPORT

13-02-0014-1 Client ID: ES016 Matrix: Aqueous Units: ug/L Sampled: 01/30/13 08:00

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	<2.0	U	0.64	2.0	5.0	1	02/04/13 00:00	02/04/13 14:10	130204L01
Vinyl Chloride	<0.50	U	0.30	0.50	1.0	1	02/04/13 00:00	02/04/13 14:10	130204L01
p/m-Xylene	<1.0	U	0.30	1.0	10	1	02/04/13 00:00	02/04/13 14:10	130204L01
o-Xylene	<0.50	U	0.23	0.50	1.0	1	02/04/13 00:00	02/04/13 14:10	130204L01
Methyl-t-Butyl Ether (MTBE)	<0.50	U	0.31	0.50	1.0	1	02/04/13 00:00	02/04/13 14:10	130204L01
Gasoline Range Organics	<30	U	13	30	50	1	02/04/13 00:00	02/04/13 14:10	130204L01

Surr: Dibromofluoromethane (80-126%)	*88%*						*02/04/13 00:00*	*02/04/13 14:10*	*130204L01*
Surr: 1,2-Dichloroethane-d4 (80-134%)	*94%*						*02/04/13 00:00*	*02/04/13 14:10*	*130204L01*
Surr: Toluene-d8 (80-120%)	*98%*						*02/04/13 00:00*	*02/04/13 14:10*	*130204L01*
Surr: Toluene-d8-TPPH (88-112%)	*99%*						*02/04/13 00:00*	*02/04/13 14:10*	*130204L01*
Surr: 1,4-Bromofluorobenzene (80-120%)	*96%*						*02/04/13 00:00*	*02/04/13 14:10*	*130204L01*

-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:	13-02-0014
	354 Uluniu Street, Suite 304	Project Name:	Red Hill LTM 112066
	Kailua, HI 96734-2500		
Attn:	Robert Chong	Received:	02/01/13 10:45

ANALYTICAL REPORT

13-02-0014-2 Client ID: ES017 Matrix: Aqueous Units: ug/L Sampled: 01/30/13 09:30

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	ICH,U	10	10	20	1	02/04/13 00:00	02/04/13 17:15	130204L01
Benzene	0.17	J	0.14	0.50	1.0	1	02/04/13 00:00	02/04/13 17:15	130204L01
Bromodichloromethane	<0.50	U	0.21	0.50	5.0	1	02/04/13 00:00	02/04/13 17:15	130204L01
Bromoform	<2.0	IJ,U	0.50	2.0	10	1	02/04/13 00:00	02/04/13 17:15	130204L01
Bromomethane	<5.0	U	3.9	5.0	20	1	02/04/13 00:00	02/04/13 17:15	130204L01
2-Butanone	<5.0	U	2.2	5.0	10	1	02/04/13 00:00	02/04/13 17:15	130204L01
Carbon Tetrachloride	<0.50	U	0.23	0.50	1.0	1	02/04/13 00:00	02/04/13 17:15	130204L01
Chlorobenzene	<0.50	U	0.17	0.50	5.0	1	02/04/13 00:00	02/04/13 17:15	130204L01
Chloroethane	<5.0	U	2.3	5.0	10	1	02/04/13 00:00	02/04/13 17:15	130204L01
Chloroform	<0.50	U	0.46	0.50	5.0	1	02/04/13 00:00	02/04/13 17:15	130204L01
Chloromethane	<2.0	U	1.8	2.0	10	1	02/04/13 00:00	02/04/13 17:15	130204L01
Dibromochloromethane	<0.50	U	0.25	0.50	1.0	1	02/04/13 00:00	02/04/13 17:15	130204L01
1,2-Dibromo-3-Chloropropane	<2.0	U	1.2	2.0	10	1	02/04/13 00:00	02/04/13 17:15	130204L01
1,2-Dibromoethane	<0.50	U	0.36	0.50	1.0	1	02/04/13 00:00	02/04/13 17:15	130204L01
1,2-Dichlorobenzene	<0.50	U	0.46	0.50	1.0	1	02/04/13 00:00	02/04/13 17:15	130204L01
1,3-Dichlorobenzene	<0.50	U	0.40	0.50	1.0	1	02/04/13 00:00	02/04/13 17:15	130204L01
1,4-Dichlorobenzene	<0.50	U	0.43	0.50	1.0	1	02/04/13 00:00	02/04/13 17:15	130204L01
1,1-Dichloroethane	<0.50	U	0.28	0.50	5.0	1	02/04/13 00:00	02/04/13 17:15	130204L01
1,2-Dichloroethane	<0.50	U	0.24	0.50	1.0	1	02/04/13 00:00	02/04/13 17:15	130204L01
1,1-Dichloroethene	<0.50	U	0.43	0.50	1.0	1	02/04/13 00:00	02/04/13 17:15	130204L01
c-1,2-Dichloroethene	<0.50	U	0.48	0.50	1.0	1	02/04/13 00:00	02/04/13 17:15	130204L01
t-1,2-Dichloroethene	<0.50	U	0.37	0.50	1.0	1	02/04/13 00:00	02/04/13 17:15	130204L01
1,2-Dichloropropane	<0.50	U	0.42	0.50	5.0	1	02/04/13 00:00	02/04/13 17:15	130204L01
c-1,3-Dichloropropene	<0.50	U	0.25	0.50	1.0	1	02/04/13 00:00	02/04/13 17:15	130204L01
t-1,3-Dichloropropene	<0.50	U	0.25	0.50	1.0	1	02/04/13 00:00	02/04/13 17:15	130204L01
Ethylbenzene	<0.50	U	0.14	0.50	1.0	1	02/04/13 00:00	02/04/13 17:15	130204L01
Methylene Chloride	<2.0	U	0.64	2.0	5.0	1	02/04/13 00:00	02/04/13 17:15	130204L01
4-Methyl-2-Pentanone	<5.0	U	4.4	5.0	10	1	02/04/13 00:00	02/04/13 17:15	130204L01
Styrene	<0.50	U	0.17	0.50	1.0	1	02/04/13 00:00	02/04/13 17:15	130204L01
1,1,1,2-Tetrachloroethane	<0.50	U	0.40	0.50	1.0	1	02/04/13 00:00	02/04/13 17:15	130204L01
1,1,2,2-Tetrachloroethane	<0.50	U	0.41	0.50	1.0	1	02/04/13 00:00	02/04/13 17:15	130204L01
Tetrachloroethene	<0.50	U	0.39	0.50	5.0	1	02/04/13 00:00	02/04/13 17:15	130204L01
Toluene	<0.50	U	0.24	0.50	1.0	1	02/04/13 00:00	02/04/13 17:15	130204L01
1,2,4-Trichlorobenzene	<0.50	U	0.50	0.50	5.0	1	02/04/13 00:00	02/04/13 17:15	130204L01
1,1,1-Trichloroethane	<0.50	U	0.30	0.50	5.0	1	02/04/13 00:00	02/04/13 17:15	130204L01
Hexachloro-1,3-Butadiene	<0.50	U	0.32	0.50	1.0	1	02/04/13 00:00	02/04/13 17:15	130204L01
1,1,2-Trichloroethane	<0.50	U	0.38	0.50	1.0	1	02/04/13 00:00	02/04/13 17:15	130204L01
Trichloroethene	<0.50	U	0.37	0.50	1.0	1	02/04/13 00:00	02/04/13 17:15	130204L01

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Client:	Environmental Science International, Inc.	Work Order:	13-02-0014
	354 Uluniu Street, Suite 304	Project Name:	Red Hill LTM 112066
	Kailua, HI 96734-2500		
Attn:	Robert Chong	Received:	02/01/13 10:45

ANALYTICAL REPORT

13-02-0014-2 Client ID: ES017 Matrix: Aqueous Units: ug/L Sampled: 01/30/13 09:30

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	<2.0	U	0.64	2.0	5.0	1	02/04/13 00:00	02/04/13 17:15	130204L01
Vinyl Chloride	<0.50	U	0.30	0.50	1.0	1	02/04/13 00:00	02/04/13 17:15	130204L01
p/m-Xylene	<1.0	U	0.30	1.0	10	1	02/04/13 00:00	02/04/13 17:15	130204L01
o-Xylene	<0.50	U	0.23	0.50	1.0	1	02/04/13 00:00	02/04/13 17:15	130204L01
Methyl-t-Butyl Ether (MTBE)	<0.50	U	0.31	0.50	1.0	1	02/04/13 00:00	02/04/13 17:15	130204L01
Gasoline Range Organics	<30	U	13	30	50	1	02/04/13 00:00	02/04/13 17:15	130204L01

Surr: Dibromofluoromethane (80-126%)	*95%*						*02/04/13 00:00*	*02/04/13 17:15*	*130204L01*
Surr: 1,2-Dichloroethane-d4 (80-134%)	*96%*						*02/04/13 00:00*	*02/04/13 17:15*	*130204L01*
Surr: Toluene-d8 (80-120%)	*98%*						*02/04/13 00:00*	*02/04/13 17:15*	*130204L01*
Surr: Toluene-d8-TPPH (88-112%)	*100%*						*02/04/13 00:00*	*02/04/13 17:15*	*130204L01*
Surr: 1,4-Bromofluorobenzene (80-120%)	*93%*						*02/04/13 00:00*	*02/04/13 17:15*	*130204L01*

-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:	13-02-0014
	354 Uluniu Street, Suite 304	Project Name:	Red Hill LTM 112066
	Kailua, HI 96734-2500		
Attn:	Robert Chong	Received:	02/01/13 10:45

ANALYTICAL REPORT

13-02-0014-3 Client ID: ES018 Matrix: Aqueous Units: ug/L Sampled: 01/30/13 11:00

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	ICH,U	10	10	20	1	02/04/13 00:00	02/04/13 17:42	130204L01
Benzene	<0.50	U	0.14	0.50	1.0	1	02/04/13 00:00	02/04/13 17:42	130204L01
Bromodichloromethane	<0.50	U	0.21	0.50	5.0	1	02/04/13 00:00	02/04/13 17:42	130204L01
Bromoform	<2.0	IJ,U	0.50	2.0	10	1	02/04/13 00:00	02/04/13 17:42	130204L01
Bromomethane	<5.0	U	3.9	5.0	20	1	02/04/13 00:00	02/04/13 17:42	130204L01
2-Butanone	<5.0	U	2.2	5.0	10	1	02/04/13 00:00	02/04/13 17:42	130204L01
Carbon Tetrachloride	<0.50	U	0.23	0.50	1.0	1	02/04/13 00:00	02/04/13 17:42	130204L01
Chlorobenzene	<0.50	U	0.17	0.50	5.0	1	02/04/13 00:00	02/04/13 17:42	130204L01
Chloroethane	<5.0	U	2.3	5.0	10	1	02/04/13 00:00	02/04/13 17:42	130204L01
Chloroform	<0.50	U	0.46	0.50	5.0	1	02/04/13 00:00	02/04/13 17:42	130204L01
Chloromethane	<2.0	U	1.8	2.0	10	1	02/04/13 00:00	02/04/13 17:42	130204L01
Dibromochloromethane	<0.50	U	0.25	0.50	1.0	1	02/04/13 00:00	02/04/13 17:42	130204L01
1,2-Dibromo-3-Chloropropane	<2.0	U	1.2	2.0	10	1	02/04/13 00:00	02/04/13 17:42	130204L01
1,2-Dibromoethane	<0.50	U	0.36	0.50	1.0	1	02/04/13 00:00	02/04/13 17:42	130204L01
1,2-Dichlorobenzene	<0.50	U	0.46	0.50	1.0	1	02/04/13 00:00	02/04/13 17:42	130204L01
1,3-Dichlorobenzene	<0.50	U	0.40	0.50	1.0	1	02/04/13 00:00	02/04/13 17:42	130204L01
1,4-Dichlorobenzene	<0.50	U	0.43	0.50	1.0	1	02/04/13 00:00	02/04/13 17:42	130204L01
1,1-Dichloroethane	<0.50	U	0.28	0.50	5.0	1	02/04/13 00:00	02/04/13 17:42	130204L01
1,2-Dichloroethane	<0.50	U	0.24	0.50	1.0	1	02/04/13 00:00	02/04/13 17:42	130204L01
1,1-Dichloroethene	<0.50	U	0.43	0.50	1.0	1	02/04/13 00:00	02/04/13 17:42	130204L01
c-1,2-Dichloroethene	<0.50	U	0.48	0.50	1.0	1	02/04/13 00:00	02/04/13 17:42	130204L01
t-1,2-Dichloroethene	<0.50	U	0.37	0.50	1.0	1	02/04/13 00:00	02/04/13 17:42	130204L01
1,2-Dichloropropane	<0.50	U	0.42	0.50	5.0	1	02/04/13 00:00	02/04/13 17:42	130204L01
c-1,3-Dichloropropene	<0.50	U	0.25	0.50	1.0	1	02/04/13 00:00	02/04/13 17:42	130204L01
t-1,3-Dichloropropene	<0.50	U	0.25	0.50	1.0	1	02/04/13 00:00	02/04/13 17:42	130204L01
Ethylbenzene	<0.50	U	0.14	0.50	1.0	1	02/04/13 00:00	02/04/13 17:42	130204L01
Methylene Chloride	<2.0	U	0.64	2.0	5.0	1	02/04/13 00:00	02/04/13 17:42	130204L01
4-Methyl-2-Pentanone	<5.0	U	4.4	5.0	10	1	02/04/13 00:00	02/04/13 17:42	130204L01
Styrene	<0.50	U	0.17	0.50	1.0	1	02/04/13 00:00	02/04/13 17:42	130204L01
1,1,1,2-Tetrachloroethane	<0.50	U	0.40	0.50	1.0	1	02/04/13 00:00	02/04/13 17:42	130204L01
1,1,2,2-Tetrachloroethane	<0.50	U	0.41	0.50	1.0	1	02/04/13 00:00	02/04/13 17:42	130204L01
Tetrachloroethene	<0.50	U	0.39	0.50	5.0	1	02/04/13 00:00	02/04/13 17:42	130204L01
Toluene	<0.50	U	0.24	0.50	1.0	1	02/04/13 00:00	02/04/13 17:42	130204L01
1,2,4-Trichlorobenzene	<0.50	U	0.50	0.50	5.0	1	02/04/13 00:00	02/04/13 17:42	130204L01
1,1,1-Trichloroethane	<0.50	U	0.30	0.50	5.0	1	02/04/13 00:00	02/04/13 17:42	130204L01
Hexachloro-1,3-Butadiene	<0.50	U	0.32	0.50	1.0	1	02/04/13 00:00	02/04/13 17:42	130204L01
1,1,2-Trichloroethane	<0.50	U	0.38	0.50	1.0	1	02/04/13 00:00	02/04/13 17:42	130204L01
Trichloroethene	<0.50	U	0.37	0.50	1.0	1	02/04/13 00:00	02/04/13 17:42	130204L01

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Client:	Environmental Science International, Inc.	Work Order:	13-02-0014
	354 Uluniu Street, Suite 304	Project Name:	Red Hill LTM 112066
	Kailua, HI 96734-2500		
Attn:	Robert Chong	Received:	02/01/13 10:45

ANALYTICAL REPORT

13-02-0014-3 Client ID: ES018 Matrix: Aqueous Units: ug/L Sampled: 01/30/13 11:00

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	<2.0	U	0.64	2.0	5.0	1	02/04/13 00:00	02/04/13 17:42	130204L01
Vinyl Chloride	<0.50	U	0.30	0.50	1.0	1	02/04/13 00:00	02/04/13 17:42	130204L01
p/m-Xylene	<1.0	U	0.30	1.0	10	1	02/04/13 00:00	02/04/13 17:42	130204L01
o-Xylene	<0.50	U	0.23	0.50	1.0	1	02/04/13 00:00	02/04/13 17:42	130204L01
Methyl-t-Butyl Ether (MTBE)	<0.50	U	0.31	0.50	1.0	1	02/04/13 00:00	02/04/13 17:42	130204L01
Gasoline Range Organics	<30	U	13	30	50	1	02/04/13 00:00	02/04/13 17:42	130204L01

Surr: Dibromofluoromethane (80-126%)	*99%*						*02/04/13 00:00*	*02/04/13 17:42*	*130204L01*
Surr: 1,2-Dichloroethane-d4 (80-134%)	*100%*						*02/04/13 00:00*	*02/04/13 17:42*	*130204L01*
Surr: Toluene-d8 (80-120%)	*101%*						*02/04/13 00:00*	*02/04/13 17:42*	*130204L01*
Surr: Toluene-d8-TPPH (88-112%)	*102%*						*02/04/13 00:00*	*02/04/13 17:42*	*130204L01*
Surr: 1,4-Bromofluorobenzene (80-120%)	*92%*						*02/04/13 00:00*	*02/04/13 17:42*	*130204L01*

-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:	13-02-0014
	354 Uluniu Street, Suite 304	Project Name:	Red Hill LTM 112066
	Kailua, HI 96734-2500		
Attn:	Robert Chong	Received:	02/01/13 10:45

ANALYTICAL REPORT

13-02-0014-4 Client ID: ESTrip Matrix: Aqueous Units: ug/L Sampled: 01/30/13 07:00

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	IJ,ICH,U	10	10	20	1	02/01/13 00:00	02/01/13 20:00	130201L01
Benzene	<0.50	U	0.14	0.50	1.0	1	02/01/13 00:00	02/01/13 20:00	130201L01
Bromodichloromethane	<0.50	U	0.21	0.50	5.0	1	02/01/13 00:00	02/01/13 20:00	130201L01
Bromoform	<2.0	U	0.50	2.0	10	1	02/01/13 00:00	02/01/13 20:00	130201L01
Bromomethane	<5.0	U	3.9	5.0	20	1	02/01/13 00:00	02/01/13 20:00	130201L01
2-Butanone	<5.0	U	2.2	5.0	10	1	02/01/13 00:00	02/01/13 20:00	130201L01
Carbon Tetrachloride	<0.50	U	0.23	0.50	1.0	1	02/01/13 00:00	02/01/13 20:00	130201L01
Chlorobenzene	<0.50	U	0.17	0.50	5.0	1	02/01/13 00:00	02/01/13 20:00	130201L01
Chloroethane	<5.0	U	2.3	5.0	10	1	02/01/13 00:00	02/01/13 20:00	130201L01
Chloroform	<0.50	U	0.46	0.50	5.0	1	02/01/13 00:00	02/01/13 20:00	130201L01
Chloromethane	<2.0	U	1.8	2.0	10	1	02/01/13 00:00	02/01/13 20:00	130201L01
Dibromochloromethane	<0.50	U	0.25	0.50	1.0	1	02/01/13 00:00	02/01/13 20:00	130201L01
1,2-Dibromo-3-Chloropropane	<2.0	U	1.2	2.0	10	1	02/01/13 00:00	02/01/13 20:00	130201L01
1,2-Dibromoethane	<0.50	U	0.36	0.50	1.0	1	02/01/13 00:00	02/01/13 20:00	130201L01
1,2-Dichlorobenzene	<0.50	U	0.46	0.50	1.0	1	02/01/13 00:00	02/01/13 20:00	130201L01
1,3-Dichlorobenzene	<0.50	U	0.40	0.50	1.0	1	02/01/13 00:00	02/01/13 20:00	130201L01
1,4-Dichlorobenzene	<0.50	U	0.43	0.50	1.0	1	02/01/13 00:00	02/01/13 20:00	130201L01
1,1-Dichloroethane	<0.50	U	0.28	0.50	5.0	1	02/01/13 00:00	02/01/13 20:00	130201L01
1,2-Dichloroethane	<0.50	U	0.24	0.50	1.0	1	02/01/13 00:00	02/01/13 20:00	130201L01
1,1-Dichloroethene	<0.50	U	0.43	0.50	1.0	1	02/01/13 00:00	02/01/13 20:00	130201L01
c-1,2-Dichloroethene	<0.50	U	0.48	0.50	1.0	1	02/01/13 00:00	02/01/13 20:00	130201L01
t-1,2-Dichloroethene	<0.50	U	0.37	0.50	1.0	1	02/01/13 00:00	02/01/13 20:00	130201L01
1,2-Dichloropropane	<0.50	U	0.42	0.50	5.0	1	02/01/13 00:00	02/01/13 20:00	130201L01
c-1,3-Dichloropropene	<0.50	U	0.25	0.50	1.0	1	02/01/13 00:00	02/01/13 20:00	130201L01
t-1,3-Dichloropropene	<0.50	U	0.25	0.50	1.0	1	02/01/13 00:00	02/01/13 20:00	130201L01
Ethylbenzene	<0.50	U	0.14	0.50	1.0	1	02/01/13 00:00	02/01/13 20:00	130201L01
Methylene Chloride	<2.0	U	0.64	2.0	5.0	1	02/01/13 00:00	02/01/13 20:00	130201L01
4-Methyl-2-Pentanone	<5.0	U	4.4	5.0	10	1	02/01/13 00:00	02/01/13 20:00	130201L01
Styrene	<0.50	U	0.17	0.50	1.0	1	02/01/13 00:00	02/01/13 20:00	130201L01
1,1,1,2-Tetrachloroethane	<0.50	U	0.40	0.50	1.0	1	02/01/13 00:00	02/01/13 20:00	130201L01
1,1,2,2-Tetrachloroethane	<0.50	U	0.41	0.50	1.0	1	02/01/13 00:00	02/01/13 20:00	130201L01
Tetrachloroethene	<0.50	U	0.39	0.50	5.0	1	02/01/13 00:00	02/01/13 20:00	130201L01
Toluene	<0.50	U	0.24	0.50	1.0	1	02/01/13 00:00	02/01/13 20:00	130201L01
1,2,4-Trichlorobenzene	<0.50	U	0.50	0.50	5.0	1	02/01/13 00:00	02/01/13 20:00	130201L01
1,1,1-Trichloroethane	<0.50	U	0.30	0.50	5.0	1	02/01/13 00:00	02/01/13 20:00	130201L01
Hexachloro-1,3-Butadiene	<0.50	U	0.32	0.50	1.0	1	02/01/13 00:00	02/01/13 20:00	130201L01
1,1,2-Trichloroethane	<0.50	U	0.38	0.50	1.0	1	02/01/13 00:00	02/01/13 20:00	130201L01
Trichloroethene	<0.50	U	0.37	0.50	1.0	1	02/01/13 00:00	02/01/13 20:00	130201L01

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ACCREDITED IN ACCORDANCE WITH nelac

Client:	Environmental Science International, Inc.	Work Order:	13-02-0014
	354 Uluniu Street, Suite 304	Project Name:	Red Hill LTM 112066
	Kailua, HI 96734-2500		
Attn:	Robert Chong	Received:	02/01/13 10:45

ANALYTICAL REPORT

13-02-0014-4 Client ID: ESTrip Matrix: Aqueous Units: ug/L Sampled: 01/30/13 07:00

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	<2.0	U	0.64	2.0	5.0	1	02/01/13 00:00	02/01/13 20:00	130201L01
Vinyl Chloride	<0.50	U	0.30	0.50	1.0	1	02/01/13 00:00	02/01/13 20:00	130201L01
p/m-Xylene	<1.0	U	0.30	1.0	10	1	02/01/13 00:00	02/01/13 20:00	130201L01
o-Xylene	<0.50	U	0.23	0.50	1.0	1	02/01/13 00:00	02/01/13 20:00	130201L01
Methyl-t-Butyl Ether (MTBE)	<0.50	U	0.31	0.50	1.0	1	02/01/13 00:00	02/01/13 20:00	130201L01
Gasoline Range Organics	14	J	13	30	50	1	02/01/13 00:00	02/01/13 20:00	130201L01

Surr: Dibromofluoromethane (80-126%)	*104%*						*02/01/13 00:00*	*02/01/13 20:00*	*130201L01*
Surr: 1,2-Dichloroethane-d4 (80-134%)	*104%*						*02/01/13 00:00*	*02/01/13 20:00*	*130201L01*
Surr: Toluene-d8 (80-120%)	*100%*						*02/01/13 00:00*	*02/01/13 20:00*	*130201L01*
Surr: Toluene-d8-TPPH (88-112%)	*101%*						*02/01/13 00:00*	*02/01/13 20:00*	*130201L01*
Surr: 1,4-Bromofluorobenzene (80-120%)	*94%*						*02/01/13 00:00*	*02/01/13 20:00*	*130201L01*

-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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ACCREDITED IN ACCORDANCE WITH nelac

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:	02/01/13 10:45

ANALYTICAL REPORT

099-13-057-5 Client ID: Method Blank Matrix: Aqueous Units: ug/L Sampled: 02/04/13 11:36

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	10	10	20	1	02/04/13 00:00	02/04/13 13:42	130204L01
Benzene	<0.50	U	0.14	0.50	1.0	1	02/04/13 00:00	02/04/13 13:42	130204L01
Bromodichloromethane	<0.50	U	0.21	0.50	5.0	1	02/04/13 00:00	02/04/13 13:42	130204L01
Bromoform	<2.0	U	0.50	2.0	10	1	02/04/13 00:00	02/04/13 13:42	130204L01
Bromomethane	<5.0	U	3.9	5.0	20	1	02/04/13 00:00	02/04/13 13:42	130204L01
2-Butanone	<5.0	U	2.2	5.0	10	1	02/04/13 00:00	02/04/13 13:42	130204L01
Carbon Tetrachloride	<0.50	U	0.23	0.50	1.0	1	02/04/13 00:00	02/04/13 13:42	130204L01
Chlorobenzene	<0.50	U	0.17	0.50	5.0	1	02/04/13 00:00	02/04/13 13:42	130204L01
Chloroethane	<5.0	U	2.3	5.0	10	1	02/04/13 00:00	02/04/13 13:42	130204L01
Chloroform	<0.50	U	0.46	0.50	5.0	1	02/04/13 00:00	02/04/13 13:42	130204L01
Chloromethane	<2.0	U	1.8	2.0	10	1	02/04/13 00:00	02/04/13 13:42	130204L01
Dibromochloromethane	<0.50	U	0.25	0.50	1.0	1	02/04/13 00:00	02/04/13 13:42	130204L01
1,2-Dibromo-3-Chloropropane	<2.0	U	1.2	2.0	10	1	02/04/13 00:00	02/04/13 13:42	130204L01
1,2-Dibromoethane	<0.50	U	0.36	0.50	1.0	1	02/04/13 00:00	02/04/13 13:42	130204L01
1,2-Dichlorobenzene	<0.50	U	0.46	0.50	1.0	1	02/04/13 00:00	02/04/13 13:42	130204L01
1,3-Dichlorobenzene	<0.50	U	0.40	0.50	1.0	1	02/04/13 00:00	02/04/13 13:42	130204L01
1,4-Dichlorobenzene	<0.50	U	0.43	0.50	1.0	1	02/04/13 00:00	02/04/13 13:42	130204L01
1,1-Dichloroethane	<0.50	U	0.28	0.50	5.0	1	02/04/13 00:00	02/04/13 13:42	130204L01
1,2-Dichloroethane	<0.50	U	0.24	0.50	1.0	1	02/04/13 00:00	02/04/13 13:42	130204L01
1,1-Dichloroethene	<0.50	U	0.43	0.50	1.0	1	02/04/13 00:00	02/04/13 13:42	130204L01
c-1,2-Dichloroethene	<0.50	U	0.48	0.50	1.0	1	02/04/13 00:00	02/04/13 13:42	130204L01
t-1,2-Dichloroethene	<0.50	U	0.37	0.50	1.0	1	02/04/13 00:00	02/04/13 13:42	130204L01
1,2-Dichloropropane	<0.50	U	0.42	0.50	5.0	1	02/04/13 00:00	02/04/13 13:42	130204L01
c-1,3-Dichloropropene	<0.50	U	0.25	0.50	1.0	1	02/04/13 00:00	02/04/13 13:42	130204L01
t-1,3-Dichloropropene	<0.50	U	0.25	0.50	1.0	1	02/04/13 00:00	02/04/13 13:42	130204L01
Ethylbenzene	<0.50	U	0.14	0.50	1.0	1	02/04/13 00:00	02/04/13 13:42	130204L01
Methylene Chloride	<2.0	U	0.64	2.0	5.0	1	02/04/13 00:00	02/04/13 13:42	130204L01
4-Methyl-2-Pentanone	<5.0	U	4.4	5.0	10	1	02/04/13 00:00	02/04/13 13:42	130204L01
Styrene	<0.50	U	0.17	0.50	1.0	1	02/04/13 00:00	02/04/13 13:42	130204L01
1,1,1,2-Tetrachloroethane	<0.50	U	0.40	0.50	1.0	1	02/04/13 00:00	02/04/13 13:42	130204L01
1,1,2,2-Tetrachloroethane	<0.50	U	0.41	0.50	1.0	1	02/04/13 00:00	02/04/13 13:42	130204L01
Tetrachloroethene	<0.50	U	0.39	0.50	5.0	1	02/04/13 00:00	02/04/13 13:42	130204L01
Toluene	<0.50	U	0.24	0.50	1.0	1	02/04/13 00:00	02/04/13 13:42	130204L01
1,2,4-Trichlorobenzene	<0.50	U	0.50	0.50	5.0	1	02/04/13 00:00	02/04/13 13:42	130204L01
1,1,1-Trichloroethane	<0.50	U	0.30	0.50	5.0	1	02/04/13 00:00	02/04/13 13:42	130204L01
Hexachloro-1,3-Butadiene	<0.50	U	0.32	0.50	1.0	1	02/04/13 00:00	02/04/13 13:42	130204L01
1,1,2-Trichloroethane	<0.50	U	0.38	0.50	1.0	1	02/04/13 00:00	02/04/13 13:42	130204L01
Trichloroethene	<0.50	U	0.37	0.50	1.0	1	02/04/13 00:00	02/04/13 13:42	130204L01

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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:	02/01/13 10:45

ANALYTICAL REPORT

099-13-057-5 Client ID: Method Blank Matrix: Aqueous Units: ug/L Sampled: 02/04/13 11:36

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	<2.0	U	0.64	2.0	5.0	1	02/04/13 00:00	02/04/13 13:42	130204L01
Vinyl Chloride	<0.50	U	0.30	0.50	1.0	1	02/04/13 00:00	02/04/13 13:42	130204L01
p/m-Xylene	<1.0	U	0.30	1.0	10	1	02/04/13 00:00	02/04/13 13:42	130204L01
o-Xylene	<0.50	U	0.23	0.50	1.0	1	02/04/13 00:00	02/04/13 13:42	130204L01
Methyl-t-Butyl Ether (MTBE)	<0.50	U	0.31	0.50	1.0	1	02/04/13 00:00	02/04/13 13:42	130204L01
Gasoline Range Organics	<30	U	13	30	50	1	02/04/13 00:00	02/04/13 13:42	130204L01

Surr: Dibromofluoromethane (80-126%)	*93%*	*02/04/13 00:00*	*02/04/13 13:42*	*130204L01*	
Surr: 1,2-Dichloroethane-d4 (80-134%)	*92%*	*02/04/13 00:00*	*02/04/13 13:42*	*130204L01*	
Surr: Toluene-d8 (80-120%)	*99%*	*02/04/13 00:00*	*02/04/13 13:42*	*130204L01*	
Surr: Toluene-d8-TPPH (88-112%)	*100%*	*02/04/13 00:00*	*02/04/13 13:42*	*130204L01*	
Surr: 1,4-Bromofluorobenzene (80-120%)	*97%*	*02/04/13 00:00*	*02/04/13 13:42*	*130204L01*	

-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:	02/01/13 10:45

ANALYTICAL REPORT

099-13-057-6 Client ID: Method Blank Matrix: Aqueous Units: ug/L Sampled: 02/04/13 17:49

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	10	10	20	1	02/01/13 00:00	02/01/13 13:49	130201L01
Benzene	<0.50	U	0.14	0.50	1.0	1	02/01/13 00:00	02/01/13 13:49	130201L01
Bromodichloromethane	<0.50	U	0.21	0.50	5.0	1	02/01/13 00:00	02/01/13 13:49	130201L01
Bromoform	<2.0	U	0.50	2.0	10	1	02/01/13 00:00	02/01/13 13:49	130201L01
Bromomethane	<5.0	U	3.9	5.0	20	1	02/01/13 00:00	02/01/13 13:49	130201L01
2-Butanone	<5.0	U	2.2	5.0	10	1	02/01/13 00:00	02/01/13 13:49	130201L01
Carbon Tetrachloride	<0.50	U	0.23	0.50	1.0	1	02/01/13 00:00	02/01/13 13:49	130201L01
Chlorobenzene	<0.50	U	0.17	0.50	5.0	1	02/01/13 00:00	02/01/13 13:49	130201L01
Chloroethane	<5.0	U	2.3	5.0	10	1	02/01/13 00:00	02/01/13 13:49	130201L01
Chloroform	<0.50	U	0.46	0.50	5.0	1	02/01/13 00:00	02/01/13 13:49	130201L01
Chloromethane	<2.0	U	1.8	2.0	10	1	02/01/13 00:00	02/01/13 13:49	130201L01
Dibromochloromethane	<0.50	U	0.25	0.50	1.0	1	02/01/13 00:00	02/01/13 13:49	130201L01
1,2-Dibromo-3-Chloropropane	<2.0	U	1.2	2.0	10	1	02/01/13 00:00	02/01/13 13:49	130201L01
1,2-Dibromoethane	<0.50	U	0.36	0.50	1.0	1	02/01/13 00:00	02/01/13 13:49	130201L01
1,2-Dichlorobenzene	<0.50	U	0.46	0.50	1.0	1	02/01/13 00:00	02/01/13 13:49	130201L01
1,3-Dichlorobenzene	<0.50	U	0.40	0.50	1.0	1	02/01/13 00:00	02/01/13 13:49	130201L01
1,4-Dichlorobenzene	<0.50	U	0.43	0.50	1.0	1	02/01/13 00:00	02/01/13 13:49	130201L01
1,1-Dichloroethane	<0.50	U	0.28	0.50	5.0	1	02/01/13 00:00	02/01/13 13:49	130201L01
1,2-Dichloroethane	<0.50	U	0.24	0.50	1.0	1	02/01/13 00:00	02/01/13 13:49	130201L01
1,1-Dichloroethene	<0.50	U	0.43	0.50	1.0	1	02/01/13 00:00	02/01/13 13:49	130201L01
c-1,2-Dichloroethene	<0.50	U	0.48	0.50	1.0	1	02/01/13 00:00	02/01/13 13:49	130201L01
t-1,2-Dichloroethene	<0.50	U	0.37	0.50	1.0	1	02/01/13 00:00	02/01/13 13:49	130201L01
1,2-Dichloropropane	<0.50	U	0.42	0.50	5.0	1	02/01/13 00:00	02/01/13 13:49	130201L01
c-1,3-Dichloropropene	<0.50	U	0.25	0.50	1.0	1	02/01/13 00:00	02/01/13 13:49	130201L01
t-1,3-Dichloropropene	<0.50	U	0.25	0.50	1.0	1	02/01/13 00:00	02/01/13 13:49	130201L01
Ethylbenzene	<0.50	U	0.14	0.50	1.0	1	02/01/13 00:00	02/01/13 13:49	130201L01
Methylene Chloride	<2.0	U	0.64	2.0	5.0	1	02/01/13 00:00	02/01/13 13:49	130201L01
4-Methyl-2-Pentanone	<5.0	U	4.4	5.0	10	1	02/01/13 00:00	02/01/13 13:49	130201L01
Styrene	<0.50	U	0.17	0.50	1.0	1	02/01/13 00:00	02/01/13 13:49	130201L01
1,1,1,2-Tetrachloroethane	<0.50	U	0.40	0.50	1.0	1	02/01/13 00:00	02/01/13 13:49	130201L01
1,1,2,2-Tetrachloroethane	<0.50	U	0.41	0.50	1.0	1	02/01/13 00:00	02/01/13 13:49	130201L01
Tetrachloroethene	<0.50	U	0.39	0.50	5.0	1	02/01/13 00:00	02/01/13 13:49	130201L01
Toluene	<0.50	U	0.24	0.50	1.0	1	02/01/13 00:00	02/01/13 13:49	130201L01
1,2,4-Trichlorobenzene	<0.50	U	0.50	0.50	5.0	1	02/01/13 00:00	02/01/13 13:49	130201L01
1,1,1-Trichloroethane	<0.50	U	0.30	0.50	5.0	1	02/01/13 00:00	02/01/13 13:49	130201L01
Hexachloro-1,3-Butadiene	<0.50	U	0.32	0.50	1.0	1	02/01/13 00:00	02/01/13 13:49	130201L01
1,1,2-Trichloroethane	<0.50	U	0.38	0.50	1.0	1	02/01/13 00:00	02/01/13 13:49	130201L01
Trichloroethene	<0.50	U	0.37	0.50	1.0	1	02/01/13 00:00	02/01/13 13:49	130201L01

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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:	02/01/13 10:45

ANALYTICAL REPORT

099-13-057-6 Client ID: Method Blank Matrix: Aqueous Units: ug/L Sampled: 02/04/13 17:49

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	<2.0	U	0.64	2.0	5.0	1	02/01/13 00:00	02/01/13 13:49	130201L01
Vinyl Chloride	<0.50	U	0.30	0.50	1.0	1	02/01/13 00:00	02/01/13 13:49	130201L01
p/m-Xylene	<1.0	U	0.30	1.0	10	1	02/01/13 00:00	02/01/13 13:49	130201L01
o-Xylene	<0.50	U	0.23	0.50	1.0	1	02/01/13 00:00	02/01/13 13:49	130201L01
Methyl-t-Butyl Ether (MTBE)	<0.50	U	0.31	0.50	1.0	1	02/01/13 00:00	02/01/13 13:49	130201L01
Gasoline Range Organics	<30	U	13	30	50	1	02/01/13 00:00	02/01/13 13:49	130201L01

Surr: Dibromofluoromethane (80-126%)	*94%*						*02/01/13 00:00*	*02/01/13 13:49*	*130201L01*
Surr: 1,2-Dichloroethane-d4 (80-134%)	*94%*						*02/01/13 00:00*	*02/01/13 13:49*	*130201L01*
Surr: Toluene-d8 (80-120%)	*98%*						*02/01/13 00:00*	*02/01/13 13:49*	*130201L01*
Surr: Toluene-d8-TPPH (88-112%)	*100%*						*02/01/13 00:00*	*02/01/13 13:49*	*130201L01*
Surr: 1,4-Bromofluorobenzene (80-120%)	*94%*						*02/01/13 00:00*	*02/01/13 13:49*	*130201L01*

-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.

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: 02/01/13
Work Order No: 13-02-0014
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
ES016	**Aqueous**	**ICP/MS 03**	**02/01/13**	**02/04/13**	**130201S02D**

Parameter	SAMPLE CONC	SPIKE ADDED	MS CONC	MS %REC	MSD CONC	MSD %REC	%REC CL	RPD	RPD CL	Qualifiers
Lead	ND	100.0	107.8	108	106.5	106	80-120	1	0-20	

Return to Contents

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 02/01/13
354 Uluniu Street, Suite 304	Work Order No: 13-02-0014
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
ES016	**Aqueous**	**ICP/MS 03**	**02/01/13**	**02/04/13**	**130201S02D**

Parameter	SAMPLE CONC	SPIKE ADDED	PDS CONC	PDS %REC	PDSD CONC	PDSD %REC	%REC CL	RPD	RPD CL	Qualifiers
Lead	ND	100.0	107.9	108	109.5	109	75-125	1	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: 02/01/13
Work Order No: 13-02-0014
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
ES016	**Aqueous**	**GC 45**	**02/04/13**	**02/05/13**	**130204S14**

Parameter	SAMPLE CONC	SPIKE ADDED	MS CONC	MS %REC	MSD CONC	MSD %REC	%REC CL	RPD	RPD CL	Qualifiers
TPH as Diesel	1036	4000	4602	89	4715	92	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: 02/01/13
Work Order No: 13-02-0014
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
ES016	**Aqueous**	**GC/MS AAA**	**01/01/95**	**02/05/13**	**130204S11**

Parameter	SAMPLE CONC	SPIKE ADDED	MS CONC	MS %REC	MSD CONC	MSD %REC	%REC CL	RPD	RPD CL	Qualifiers
Naphthalene	ND	2.000	1.958	98	2.014	101	21-133	3	0-25	
2-Methylnaphthalene	ND	2.000	2.172	109	2.240	112	21-140	3	0-25	
1-Methylnaphthalene	ND	2.000	2.139	107	2.199	110	20-140	3	0-25	
Acenaphthylene	ND	2.000	1.987	99	2.020	101	33-145	2	0-25	
Acenaphthene	ND	2.000	1.936	97	2.026	101	49-121	5	0-25	
Fluorene	ND	2.000	2.121	106	2.159	108	59-121	2	0-25	
Phenanthrene	ND	2.000	2.090	104	2.134	107	54-120	2	0-25	
Anthracene	ND	2.000	1.925	96	1.975	99	27-133	3	0-25	
Fluoranthene	ND	2.000	2.088	104	2.133	107	26-137	2	0-25	
Pyrene	ND	2.000	2.398	120	2.419	121	18-168	1	0-25	
Benzo (a) Anthracene	ND	2.000	2.603	130	2.639	132	33-143	1	0-25	
Chrysene	ND	2.000	2.243	112	2.312	116	17-168	3	0-25	
Benzo (k) Fluoranthene	ND	2.000	2.537	127	2.577	129	24-159	2	0-25	
Benzo (b) Fluoranthene	ND	2.000	2.539	127	2.594	130	24-159	2	0-25	
Benzo (a) Pyrene	ND	2.000	2.372	119	2.413	121	17-163	2	0-25	
Indeno (1,2,3-c,d) Pyrene	ND	2.000	2.289	114	2.344	117	10-171	2	0-25	
Dibenz (a,h) Anthracene	ND	2.000	2.284	114	2.297	115	10-219	1	0-25	
Benzo (g,h,i) Perylene	ND	2.000	2.230	111	2.255	113	10-227	1	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: 02/01/13
Work Order No: 13-02-0014
Preparation: EPA 5030C
Method: EPA 8260B

Project Red Hill LTM 112066

Quality Control Sample ID	Matrix	Instrument	Date Prepared	Date Analyzed	MS/MSD Batch Number
13-01-1812-1	**Aqueous**	**GC/MS OO**	**02/01/13**	**02/01/13**	**130201S01**

Parameter	SAMPLE CONC	SPIKE ADDED	MS CONC	MS %REC	MSD CONC	MSD %REC	%REC CL	RPD	RPD CL	Qualifiers
Acetone	ND	50.00	37.82	76	49.25	98	40-140	26	0-20	4
Benzene	ND	50.00	44.02	88	49.35	99	80-120	11	0-20	
Bromodichloromethane	ND	50.00	45.98	92	52.26	105	75-120	13	0-20	
Bromoform	ND	50.00	47.63	95	56.04	112	70-130	16	0-20	
Bromomethane	ND	50.00	43.28	87	43.96	88	30-145	2	0-20	
2-Butanone	ND	50.00	43.99	88	49.70	99	30-150	12	0-20	
Carbon Tetrachloride	ND	50.00	43.17	86	47.14	94	65-140	9	0-20	
Chlorobenzene	ND	50.00	44.98	90	51.01	102	80-120	13	0-20	
Chloroethane	ND	50.00	46.57	93	49.31	99	60-135	6	0-20	
Chloroform	ND	50.00	44.94	90	49.80	100	65-135	10	0-20	
Chloromethane	ND	50.00	33.74	67	39.58	79	40-125	16	0-20	
Dibromochloromethane	ND	50.00	45.43	91	52.51	105	60-135	14	0-20	
1,2-Dibromo-3-Chloropropane	ND	50.00	39.96	80	51.15	102	50-130	25	0-20	4
1,2-Dibromoethane	ND	50.00	47.17	94	54.84	110	80-120	15	0-20	
1,2-Dichlorobenzene	ND	50.00	46.43	93	53.65	107	70-120	14	0-20	
1,3-Dichlorobenzene	ND	50.00	46.25	93	52.55	105	75-125	13	0-20	
1,4-Dichlorobenzene	ND	50.00	45.66	91	52.28	105	75-125	14	0-20	
1,1-Dichloroethane	ND	50.00	43.08	86	47.35	95	70-135	9	0-20	
1,2-Dichloroethane	ND	50.00	43.58	87	49.85	100	70-130	13	0-20	
1,1-Dichloroethene	ND	50.00	37.37	75	40.41	81	70-130	8	0-20	
c-1,2-Dichloroethene	ND	50.00	46.73	93	51.33	103	70-125	9	0-20	
t-1,2-Dichloroethene	ND	50.00	45.05	90	50.02	100	60-140	10	0-20	
1,2-Dichloropropane	ND	50.00	45.58	91	52.86	106	75-125	15	0-20	
c-1,3-Dichloropropene	ND	50.00	47.71	95	54.81	110	70-130	14	0-20	
t-1,3-Dichloropropene	ND	50.00	42.27	85	49.27	99	55-140	15	0-20	
Ethylbenzene	ND	50.00	47.32	95	53.19	106	75-125	12	0-20	
Methylene Chloride	ND	50.00	43.63	87	49.00	98	55-140	12	0-20	
4-Methyl-2-Pentanone	ND	50.00	45.41	91	55.10	110	60-135	19	0-20	
Styrene	ND	50.00	47.47	95	55.44	111	65-135	15	0-20	
1,1,1,2-Tetrachloroethane	ND	50.00	46.26	93	52.75	106	80-130	13	0-20	
1,1,2,2-Tetrachloroethane	ND	50.00	44.83	90	53.54	107	65-130	18	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: 02/01/13
Work Order No: 13-02-0014
Preparation: EPA 5030C
Method: EPA 8260B

Project Red Hill LTM 112066

Quality Control Sample ID	Matrix	Instrument	Date Prepared	Date Analyzed	MS/MSD Batch Number
13-01-1812-1	**Aqueous**	**GC/MS OO**	**02/01/13**	**02/01/13**	**130201S01**

Parameter	SAMPLE CONC	SPIKE ADDED	MS CONC	MS %REC	MSD CONC	MSD %REC	%REC CL	RPD	RPD CL	Qualifiers
Tetrachloroethene	ND	50.00	39.09	78	43.09	86	45-150	10	0-20	
Toluene	ND	50.00	46.42	93	51.87	104	75-120	11	0-20	
1,2,4-Trichlorobenzene	ND	50.00	46.61	93	54.94	110	65-135	16	0-20	
1,1,1-Trichloroethane	ND	50.00	44.80	90	49.56	99	65-130	10	0-20	
Hexachloro-1,3-Butadiene	ND	50.00	43.76	88	49.93	100	50-140	13	0-20	
1,1,2-Trichloroethane	ND	50.00	45.13	90	52.35	105	75-125	15	0-20	
Trichloroethene	ND	50.00	43.81	88	49.50	99	70-125	12	0-20	
1,2,3-Trichloropropane	ND	50.00	44.28	89	52.27	105	75-125	17	0-20	
Vinyl Chloride	ND	50.00	38.90	78	43.51	87	50-145	11	0-20	
p/m-Xylene	ND	100.0	94.57	95	107.4	107	75-130	13	0-20	
o-Xylene	ND	50.00	49.90	100	56.10	112	80-120	12	0-20	
Methyl-t-Butyl Ether (MTBE)	ND	50.00	46.93	94	54.53	109	65-125	15	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: 02/01/13
Work Order No: 13-02-0014
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
ES016	**Aqueous**	**GC/MS OO**	**02/04/13**	**02/04/13**	**130204S01**

Parameter	SAMPLE CONC	SPIKE ADDED	MS CONC	MS %REC	MSD CONC	MSD %REC	%REC CL	RPD	RPD CL	Qualifiers
Acetone	ND	50.00	95.75	192	98.45	197	40-140	3	0-20	3
Benzene	ND	50.00	51.57	103	47.73	95	80-120	8	0-20	
Bromodichloromethane	ND	50.00	52.75	106	49.20	98	75-120	7	0-20	
Bromoform	ND	50.00	56.99	114	53.76	108	70-130	6	0-20	
Bromomethane	ND	50.00	56.01	112	46.32	93	30-145	19	0-20	
2-Butanone	ND	50.00	60.34	121	54.65	109	30-150	10	0-20	
Carbon Tetrachloride	ND	50.00	52.07	104	48.02	96	65-140	8	0-20	
Chlorobenzene	ND	50.00	53.31	107	48.79	98	80-120	9	0-20	
Chloroethane	ND	50.00	54.22	108	49.81	100	60-135	8	0-20	
Chloroform	ND	50.00	51.47	103	47.54	95	65-135	8	0-20	
Chloromethane	ND	50.00	43.76	88	41.36	83	40-125	6	0-20	
Dibromochloromethane	ND	50.00	53.64	107	49.14	98	60-135	9	0-20	
1,2-Dibromo-3-Chloropropane	ND	50.00	51.73	103	45.08	90	50-130	14	0-20	
1,2-Dibromoethane	ND	50.00	55.57	111	50.49	101	80-120	10	0-20	
1,2-Dichlorobenzene	ND	50.00	55.01	110	50.41	101	70-120	9	0-20	
1,3-Dichlorobenzene	ND	50.00	54.25	108	50.21	100	75-125	8	0-20	
1,4-Dichlorobenzene	ND	50.00	53.73	107	49.39	99	75-125	8	0-20	
1,1-Dichloroethane	ND	50.00	48.94	98	45.78	92	70-135	7	0-20	
1,2-Dichloroethane	ND	50.00	50.20	100	46.95	94	70-130	7	0-20	
1,1-Dichloroethene	ND	50.00	43.82	88	41.04	82	70-130	7	0-20	
c-1,2-Dichloroethene	ND	50.00	52.24	104	49.27	99	70-125	6	0-20	
t-1,2-Dichloroethene	ND	50.00	52.27	105	48.70	97	60-140	7	0-20	
1,2-Dichloropropane	ND	50.00	53.02	106	48.59	97	75-125	9	0-20	
c-1,3-Dichloropropene	ND	50.00	55.94	112	51.60	103	70-130	8	0-20	
t-1,3-Dichloropropene	ND	50.00	49.89	100	45.96	92	55-140	8	0-20	
Ethylbenzene	ND	50.00	56.70	113	52.02	104	75-125	9	0-20	
Methylene Chloride	ND	50.00	49.24	98	45.39	91	55-140	8	0-20	
4-Methyl-2-Pentanone	ND	50.00	53.53	107	52.09	104	60-135	3	0-20	
Styrene	ND	50.00	58.53	117	52.87	106	65-135	10	0-20	
1,1,1,2-Tetrachloroethane	ND	50.00	55.57	111	50.01	100	80-130	11	0-20	
1,1,2,2-Tetrachloroethane	ND	50.00	6.699	13	4.454	9	65-130	40	0-20	3,4

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: 02/01/13
Work Order No: 13-02-0014
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
ES016	**Aqueous**	**GC/MS OO**	**02/04/13**	**02/04/13**	**130204S01**

Parameter	SAMPLE CONC	SPIKE ADDED	MS CONC	MS %REC	MSD CONC	MSD %REC	%REC CL	RPD	RPD CL	Qualifiers
Tetrachloroethene	ND	50.00	81.63	163	75.10	150	45-150	8	0-20	3
Toluene	ND	50.00	53.83	108	49.91	100	75-120	8	0-20	
1,2,4-Trichlorobenzene	ND	50.00	57.83	116	50.54	101	65-135	13	0-20	
1,1,1-Trichloroethane	ND	50.00	52.92	106	49.36	99	65-130	7	0-20	
Hexachloro-1,3-Butadiene	ND	50.00	55.51	111	49.05	98	50-140	12	0-20	
1,1,2-Trichloroethane	ND	50.00	52.58	105	47.85	96	75-125	9	0-20	
Trichloroethene	ND	50.00	89.55	179	84.22	168	70-125	6	0-20	3
1,2,3-Trichloropropane	ND	50.00	53.47	107	47.43	95	75-125	12	0-20	
Vinyl Chloride	ND	50.00	48.47	97	44.64	89	50-145	8	0-20	
p/m-Xylene	ND	100.0	113.5	113	104.1	104	75-130	9	0-20	
o-Xylene	ND	50.00	58.92	118	53.54	107	80-120	10	0-20	
Methyl-t-Butyl Ether (MTBE)	ND	50.00	53.56	107	49.79	100	65-125	7	0-20	

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RPD - Relative Percent Difference , CL - Control Limit

Calscience Environmental Laboratories, Inc.

Quality Control - LCS/LCS Duplicate

Environmental Science International, Inc.		Date Received:	N/A
354 Uluniu Street, Suite 304		Work Order No:	13-02-0014
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
099-14-497-15	**Aqueous**	**ICP/MS 03**	**02/01/13**	**02/04/13**	**130201L02D**

Parameter	SPIKE ADDED	LCS CONC	LCS %REC	LCSD CONC	LCSD %REC	%REC CL	RPD	RPD CL	Qualifiers
Lead	100.0	98.36	98	99.38	99	80-120	1	0-20	

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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:	13-02-0014
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
099-15-516-26	**Aqueous**	**GC 45**	**02/04/13**	**02/05/13**	**130204B14**

Parameter	SPIKE ADDED	LCS CONC	LCS %REC	LCSD CONC	LCSD %REC	%REC CL	RPD	RPD CL	Qualifiers
TPH as Diesel	4000	4209	105	4206	105	60-132	0	0-11	

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

Date Received: N/A
Work Order No: 13-02-0014
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
099-15-148-8	**Aqueous**	**GC/MS AAA**	**02/04/13**	**02/05/13**	**130204L11**

Parameter	SPIKE ADDED	LCS CONC	LCS %REC	LCSD CONC	LCSD %REC	%REC CL	RPD	RPD CL	Qualifiers
Naphthalene	2.000	1.964	98	1.974	99	21-133	1	0-25	
2-Methylnaphthalene	2.000	2.176	109	2.150	107	21-140	1	0-25	
1-Methylnaphthalene	2.000	2.150	108	2.142	107	20-140	0	0-25	
Acenaphthylene	2.000	2.001	100	2.025	101	33-145	1	0-25	
Acenaphthene	2.000	1.940	97	1.975	99	55-121	2	0-25	
Fluorene	2.000	2.128	106	2.147	107	59-121	1	0-25	
Phenanthrene	2.000	2.162	108	2.175	109	54-120	1	0-25	
Anthracene	2.000	1.930	97	1.935	97	27-133	0	0-25	
Fluoranthene	2.000	2.169	108	2.159	108	26-137	0	0-25	
Pyrene	2.000	2.486	124	2.453	123	45-129	1	0-25	
Benzo (a) Anthracene	2.000	2.639	132	2.625	131	33-143	1	0-25	
Chrysene	2.000	2.337	117	2.329	116	17-168	0	0-25	
Benzo (k) Fluoranthene	2.000	2.627	131	2.647	132	24-159	1	0-25	
Benzo (b) Fluoranthene	2.000	2.670	133	2.597	130	24-159	3	0-25	
Benzo (a) Pyrene	2.000	2.435	122	2.415	121	17-163	1	0-25	
Indeno (1,2,3-c,d) Pyrene	2.000	2.330	116	2.338	117	25-175	0	0-25	
Dibenz (a,h) Anthracene	2.000	2.243	112	2.289	114	25-175	2	0-25	
Benzo (g,h,i) Perylene	2.000	2.267	113	2.266	113	25-157	0	0-25	

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

Date Received: N/A
Work Order No: 13-02-0014
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
099-13-057-6	**Aqueous**	**GC/MS OO**	**02/01/13**	**02/01/13**	**130201L01**

Parameter	SPIKE ADDED	LCS CONC	LCS %REC	LCSD CONC	LCSD %REC	%REC CL	RPD	RPD CL	Qualifiers
Acetone	50.00	63.88	128	57.49	115	40-140	11	0-20	
Benzene	50.00	50.29	101	44.85	90	80-120	11	0-20	
Bromodichloromethane	50.00	54.16	108	47.74	95	75-120	13	0-20	
Bromoform	50.00	59.12	118	52.80	106	70-130	11	0-20	
Bromomethane	50.00	46.92	94	41.36	83	30-145	13	0-20	
2-Butanone	50.00	58.36	117	50.94	102	30-150	14	0-20	
Carbon Tetrachloride	50.00	51.26	103	46.17	92	65-140	10	0-20	
Chlorobenzene	50.00	52.42	105	47.01	94	80-120	11	0-20	
Chloroethane	50.00	52.91	106	47.84	96	60-135	10	0-20	
Chloroform	50.00	51.26	103	46.53	93	65-135	10	0-20	
Chloromethane	50.00	43.72	87	39.59	79	40-125	10	0-20	
Dibromochloromethane	50.00	54.85	110	49.59	99	60-135	10	0-20	
1,2-Dibromo-3-Chloropropane	50.00	52.98	106	50.46	101	50-130	5	0-20	
1,2-Dibromoethane	50.00	55.29	111	51.42	103	80-120	7	0-20	
1,2-Dichlorobenzene	50.00	55.07	110	48.78	98	70-120	12	0-20	
1,3-Dichlorobenzene	50.00	55.22	110	48.14	96	75-125	14	0-20	
1,4-Dichlorobenzene	50.00	53.38	107	47.98	96	75-125	11	0-20	
1,1-Dichloroethane	50.00	49.91	100	45.37	91	70-135	10	0-20	
1,2-Dichloroethane	50.00	50.66	101	45.12	90	70-130	12	0-20	
1,1-Dichloroethene	50.00	44.22	88	39.05	78	70-130	12	0-20	
c-1,2-Dichloroethene	50.00	53.00	106	48.01	96	70-125	10	0-20	
t-1,2-Dichloroethene	50.00	52.01	104	47.33	95	60-140	9	0-20	
1,2-Dichloropropane	50.00	52.76	106	47.46	95	75-125	11	0-20	
c-1,3-Dichloropropene	50.00	56.26	113	50.92	102	70-130	10	0-20	
t-1,3-Dichloropropene	50.00	51.40	103	46.56	93	55-140	10	0-20	
Ethylbenzene	50.00	55.68	111	49.97	100	75-125	11	0-20	
Methylene Chloride	50.00	50.22	100	45.73	91	55-140	9	0-20	
4-Methyl-2-Pentanone	50.00	54.02	108	53.18	106	60-135	2	0-20	
Styrene	50.00	57.70	115	51.37	103	65-135	12	0-20	
1,1,1,2-Tetrachloroethane	50.00	54.96	110	48.81	98	80-130	12	0-20	
1,1,2,2-Tetrachloroethane	50.00	53.84	108	48.76	98	65-130	10	0-20	

RPD - Relative Percent Difference , CL - Control Limit

Return to Contents

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: 13-02-0014
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
099-13-057-6	**Aqueous**	**GC/MS OO**	**02/01/13**	**02/01/13**	**130201L01**

Parameter	SPIKE ADDED	LCS CONC	LCS %REC	LCSD CONC	LCSD %REC	%REC CL	RPD	RPD CL	Qualifiers
Tetrachloroethene	50.00	49.02	98	42.19	84	45-150	15	0-20	
Toluene	50.00	53.16	106	47.42	95	75-120	11	0-20	
1,2,4-Trichlorobenzene	50.00	57.56	115	52.08	104	65-135	10	0-20	
1,1,1-Trichloroethane	50.00	52.63	105	46.97	94	65-130	11	0-20	
Hexachloro-1,3-Butadiene	50.00	54.99	110	48.08	96	50-140	13	0-20	
1,1,2-Trichloroethane	50.00	53.21	106	48.60	97	75-125	9	0-20	
Trichloroethene	50.00	51.83	104	45.11	90	70-125	14	0-20	
1,2,3-Trichloropropane	50.00	52.77	106	49.16	98	75-125	7	0-20	
Vinyl Chloride	50.00	46.51	93	42.00	84	50-145	10	0-20	
p/m-Xylene	100.0	112.3	112	100.4	100	75-130	11	0-20	
o-Xylene	50.00	57.68	115	52.20	104	80-120	10	0-20	
Methyl-t-Butyl Ether (MTBE)	50.00	54.47	109	50.84	102	65-125	7	0-20	
Gasoline Range Organics	1000	1007	101	1062	106	80-120	5	0-20	

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

Date Received: N/A
Work Order No: 13-02-0014
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
099-13-057-5	**Aqueous**	**GC/MS OO**	**02/04/13**	**02/04/13**	**130204L01**

Parameter	SPIKE ADDED	LCS CONC	LCS %REC	LCSD CONC	LCSD %REC	%REC CL	RPD	RPD CL	Qualifiers
Acetone	50.00	67.27	135	57.57	115	40-140	16	0-20	
Benzene	50.00	45.55	91	46.28	93	80-120	2	0-20	
Bromodichloromethane	50.00	49.55	99	49.67	99	75-120	0	0-20	
Bromoform	50.00	55.22	110	55.34	111	70-130	0	0-20	
Bromomethane	50.00	43.27	87	43.20	86	30-145	0	0-20	
2-Butanone	50.00	49.03	98	50.67	101	30-150	3	0-20	
Carbon Tetrachloride	50.00	47.77	96	48.10	96	65-140	1	0-20	
Chlorobenzene	50.00	47.25	94	48.15	96	80-120	2	0-20	
Chloroethane	50.00	48.74	97	49.19	98	60-135	1	0-20	
Chloroform	50.00	46.70	93	47.15	94	65-135	1	0-20	
Chloromethane	50.00	41.43	83	41.22	82	40-125	1	0-20	
Dibromochloromethane	50.00	49.80	100	51.14	102	60-135	3	0-20	
1,2-Dibromo-3-Chloropropane	50.00	49.18	98	52.32	105	50-130	6	0-20	
1,2-Dibromoethane	50.00	49.44	99	50.84	102	80-120	3	0-20	
1,2-Dichlorobenzene	50.00	48.69	97	49.77	100	70-120	2	0-20	
1,3-Dichlorobenzene	50.00	48.80	98	49.96	100	75-125	2	0-20	
1,4-Dichlorobenzene	50.00	48.34	97	49.24	98	75-125	2	0-20	
1,1-Dichloroethane	50.00	45.23	90	45.92	92	70-135	2	0-20	
1,2-Dichloroethane	50.00	45.76	92	46.13	92	70-130	1	0-20	
1,1-Dichloroethene	50.00	39.52	79	40.08	80	70-130	1	0-20	
c-1,2-Dichloroethene	50.00	47.45	95	48.42	97	70-125	2	0-20	
t-1,2-Dichloroethene	50.00	47.22	94	47.53	95	60-140	1	0-20	
1,2-Dichloropropane	50.00	48.31	97	49.14	98	75-125	2	0-20	
c-1,3-Dichloropropene	50.00	52.65	105	53.06	106	70-130	1	0-20	
t-1,3-Dichloropropene	50.00	45.61	91	46.99	94	55-140	3	0-20	
Ethylbenzene	50.00	49.76	100	50.64	101	75-125	2	0-20	
Methylene Chloride	50.00	44.15	88	45.23	90	55-140	2	0-20	
4-Methyl-2-Pentanone	50.00	48.24	96	49.97	100	60-135	4	0-20	
Styrene	50.00	51.11	102	52.37	105	65-135	2	0-20	
1,1,1,2-Tetrachloroethane	50.00	49.85	100	51.42	103	80-130	3	0-20	
1,1,2,2-Tetrachloroethane	50.00	46.24	92	48.68	97	65-130	5	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: 13-02-0014
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
099-13-057-5	**Aqueous**	**GC/MS OO**	**02/04/13**	**02/04/13**	**130204L01**

Parameter	SPIKE ADDED	LCS CONC	LCS %REC	LCSD CONC	LCSD %REC	%REC CL	RPD	RPD CL	Qualifiers
Tetrachloroethene	50.00	42.79	86	43.81	88	45-150	2	0-20	
Toluene	50.00	47.97	96	48.54	97	75-120	1	0-20	
1,2,4-Trichlorobenzene	50.00	51.98	104	52.13	104	65-135	0	0-20	
1,1,1-Trichloroethane	50.00	48.14	96	48.97	98	65-130	2	0-20	
Hexachloro-1,3-Butadiene	50.00	49.87	100	49.23	98	50-140	1	0-20	
1,1,2-Trichloroethane	50.00	47.04	94	47.86	96	75-125	2	0-20	
Trichloroethene	50.00	46.90	94	46.87	94	70-125	0	0-20	
1,2,3-Trichloropropane	50.00	45.90	92	47.96	96	75-125	4	0-20	
Vinyl Chloride	50.00	44.01	88	44.08	88	50-145	0	0-20	
p/m-Xylene	100.0	100.4	100	102.5	102	75-130	2	0-20	
o-Xylene	50.00	51.59	103	52.73	105	80-120	2	0-20	
Methyl-t-Butyl Ether (MTBE)	50.00	49.62	99	51.22	102	65-125	3	0-20	
Gasoline Range Organics	1000	1245	125	1226	123	80-120	2	0-20	X

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RPD - Relative Percent Difference , CL - Control Limit

Calscience Environmental Laboratories, Inc.

Sample Analysis Summary Report

WORK ORDER #: 13-02-0014

Lab Sample Number	Client Sample ID	Method	Extraction	Date/Time Analyzed	Chemist ID	Instrument	Analytical Location
1-K	ES016	EPA 6020	EPA 3020A T	02/4/2013 16:55	598	ICP/MS 03	1
1-O	ES016	EPA 8270C SIM PA	EPA 3510C	02/5/2013 17:34	449	GC/MS AA	1
1-L	ES016	EPA 8015B (M)	EPA 3510C	02/5/2013 2:45	682	GC 45	1
1-B	ES016	GC/MS / EPA 8260	EPA 5030C	02/4/2013 14:10	486	GC/MS OO	2
2-G	ES017	EPA 6020	EPA 3020A T	02/4/2013 16:58	598	ICP/MS 03	1
2-I	ES017	EPA 8270C SIM PA	EPA 3510C	02/5/2013 18:00	449	GC/MS AA	1
2-L	ES017	EPA 8015B (M)	EPA 3510C	02/5/2013 3:02	682	GC 45	1
2-B	ES017	GC/MS / EPA 8260	EPA 5030C	02/4/2013 17:15	486	GC/MS OO	2
3-G	ES018	EPA 6020	EPA 3020A T	02/4/2013 17:01	598	ICP/MS 03	1
3-I	ES018	EPA 8270C SIM PA	EPA 3510C	02/5/2013 18:26	449	GC/MS AA	1
3-L	ES018	EPA 8015B (M)	EPA 3510C	02/5/2013 3:20	682	GC 45	1
3-B	ES018	GC/MS / EPA 8260	EPA 5030C	02/4/2013 17:42	486	GC/MS OO	2
4-A	ESTrip	GC/MS / EPA 8260	EPA 5030C	02/1/2013 20:00	486	GC/MS OO	2

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

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Calscience Environmental Laboratories, Inc.

Glossary of Terms and Qualifiers

Work Order Number: 13-02-0014

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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Calscience Environmental Laboratories, Inc.

7440 Lincoln Way, Garden Grove, CA 92841-1427 • (714) 895-5494

Other CA office locations: Concord and San Luis Obispo

For courier service / sample drop off information, contact sales@calscience.com or call us.

CHAIN OF CUSTODY RECORD

WO # / LAB USE ONLY: **13-02-0014**

Date 1/30/13

Page 1 of 1

LABORATORY CLIENT: Environmental Science International

ADDRESS: 354 Uluniu St. #304

CITY Kailua STATE Hi ZIP 96734

TEL: 808-261-0740 E-MAIL: RCHONG@esciencei.com; DFEHER@esciencei.com

CLIENT PROJECT NAME / NUMBER: Red Hill LTM 112066

P.O. NO.:

PROJECT CONTACT: Robert Chong

SAMPLER(S): (PRINT)

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 (8015)	TPH (d) or DRO ~~(8015)~~ (8015)	TPH ( )	BTEX / MTBE (8260) or ( )	VOCs (8260)	Oxygenates (8260)	En Core / Terra Core Prep (5035)	SVOCs (8270)	Pesticides (8081)	PCBs (8082)	~~PAHs PNAs (8310) or~~ (8270) sim	T22 Metals (6010B/747X)	Cr(VI) [7196 or 7199 or 218.6]	lead (6020)				
1	ES016	1/30/13	0800	water	10	X	X	X	X	X			X						X			X				
2	ES016 MS/MSD	1/30/13	0800	water	10	X	X	X	X	X			X						X			X				
3	ES017	1/30/13	0930	water	10	X	X	X	X	X			X						X			X				
4	ES018	1/30/13	1100	water	10	X	X	X	X	X			X						X			X				
5	ES Trip	1/30/13	0700	water	3		X		X																	
~~BL~~	~~ES 010~~	~~1/30/13~~		water	10	X	X	X	X	X			X						X			X				
C																										
2/1/13																										

Relinquished by: (Signature) 1/30/13	Received by: (Signature/Affiliation)	Date:	Time:
Relinquished by: (Signature)	Received by: (Signature/Affiliation)	Date: 2/1/13	Time: 1045
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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004

ORIGIN ID:HNLA

UNITED STATES US

SHIP DATE: 30JAN13
ACTWGT: 51.7 LB
CAD: /POS1322
DIMS: 29x17x15 IN

BILL RECIPIENT

SAMPLE CONTROL
CALSCIENCE ENVIRON
7440 LINCOLN WAY

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

FedEx Express

J1310121219012G

1 of 2
8704 7942 2465
MASTER ##

FRI - 01 FEB A1
** 2DAY **

VZ APVA

92841
CA-US SNA

ORIGIN ID:HNLA

UNITED STATES US

SHIP DATE: 30JAN13
ACTWGT: 71.7 LB
CAD: /POS1322
DIMS: 29x17x15 IN

BILL RECIPIENT

TO SAMPLE CONTROL
CALSCIENCE ENVIRON
7440 LINCOLN WAY

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

FedEx Express

J1310121219012G

2 of 2
MPS# 7955 5020 6803
0681
Mstr# 8704 7942 2465
0215

FRI - 01 FEB A1
** 2DAY **

VZ APVA

92841
CA-US SNA

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Calscience Environmental Laboratories, Inc.

WORK ORDER #: 13-02-0 0 1 4

SAMPLE RECEIPT FORM

Cooler 1 of 2

CLIENT: ESI

DATE: 02/01/13

TEMPERATURE: Thermometer ID: SC2 (Criteria: 0.0 °C – 6.0 °C, not frozen except sediment/tissue)

Temperature 2.1 °C - 0.2 °C (CF) = 1.9 °C ☑ Blank ☐ Sample

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

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

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

Ambient Temperature: ☐ Air ☐ Filter Initial: AP

CUSTODY SEALS INTACT:

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

☐ Sample ☐_____ ☐ No (Not Intact) ☑ Not Present Initial: [illegible]

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 ☑VOAh (-4) ☐VOA**na₂** ☐125AGB ☐125AGB**h** ☐125AGB**p** ☐1AGB ☐1AGB**na₂** ☐1AGB**s**

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

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

Air: ☐Tedlar® ☐Canister **Other:** ☐_____ **Trip Blank Lot#:** 12120B **Labeled/Checked by:** RS

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

Preservative: **h:** HCL **n:** HNO_3 **na₂:** $Na_2S_2O_3$ **na:** NaOH **p:** H_3PO_4 **s:** H_2SO_4 **u:** Ultra-pure **znna:** $ZnAc_2$+NaOH **f:** Filtered **Scanned by:** VC

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Calscience Environmental Laboratories, Inc.

WORK ORDER #: 13-02-[0][0][1][4]

SAMPLE RECEIPT FORM

Cooler 2 of 2

CLIENT: ESI

DATE: 02/01/13

TEMPERATURE: Thermometer ID: SC2 (Criteria: 0.0 °C – 6.0 °C, not frozen except sediment/tissue)

Temperature 2.4 °C - 0.2 °C (CF) = 2.2 °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: JH

CUSTODY SEALS INTACT:

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

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

SAMPLE CONDITION:	Yes	No	N/A
Chain-Of-Custody (COC) document(s) received with samples	☑	☐	☐
COC document(s) received complete	☑ JPS 2/1/13	☑	☐
☑ 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	☑ JPS 2/1/13	☑	☐
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:** PS

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

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:** JC

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APPENDIX D

Historical Groundwater Exceedance Trends

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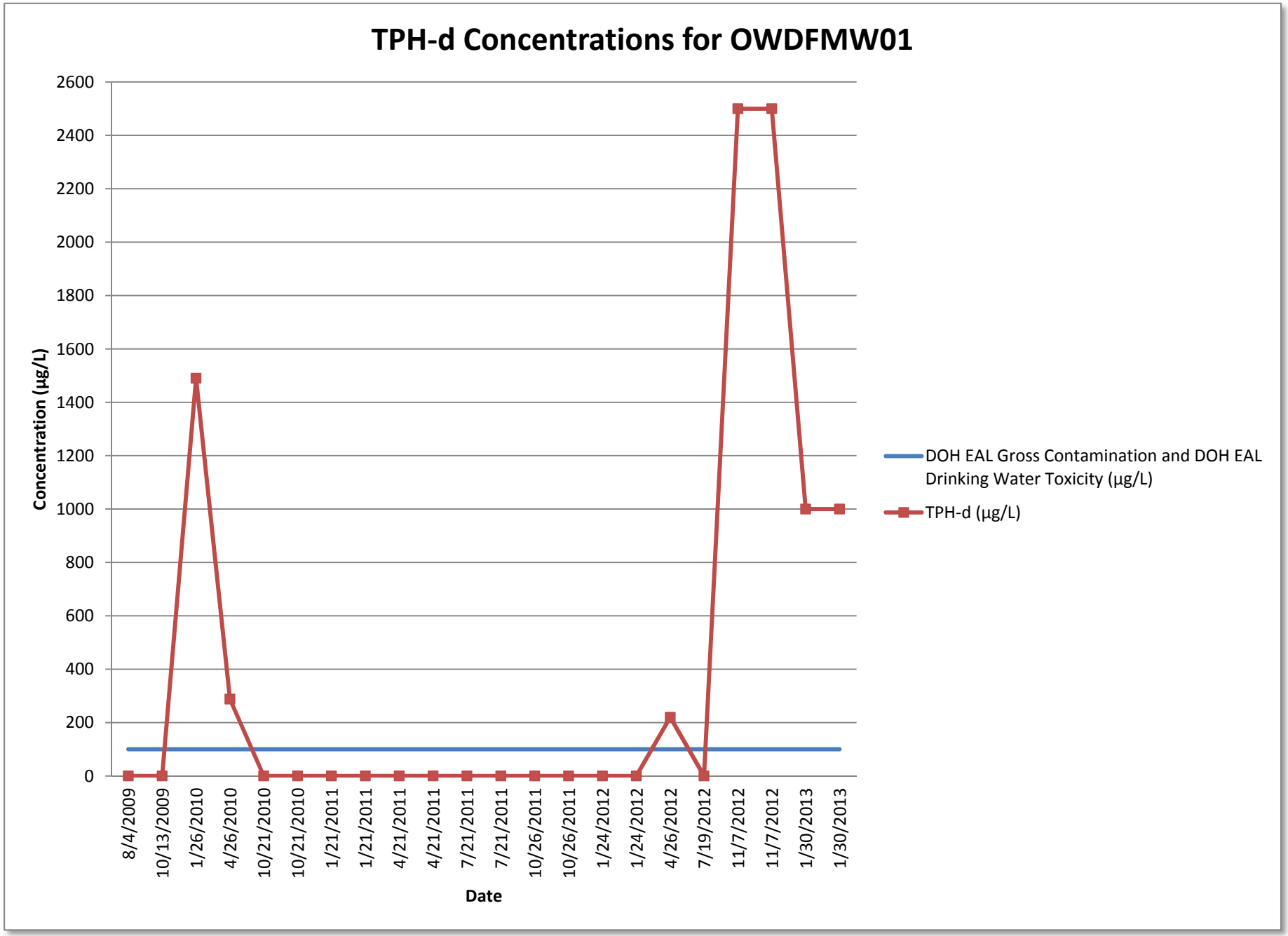
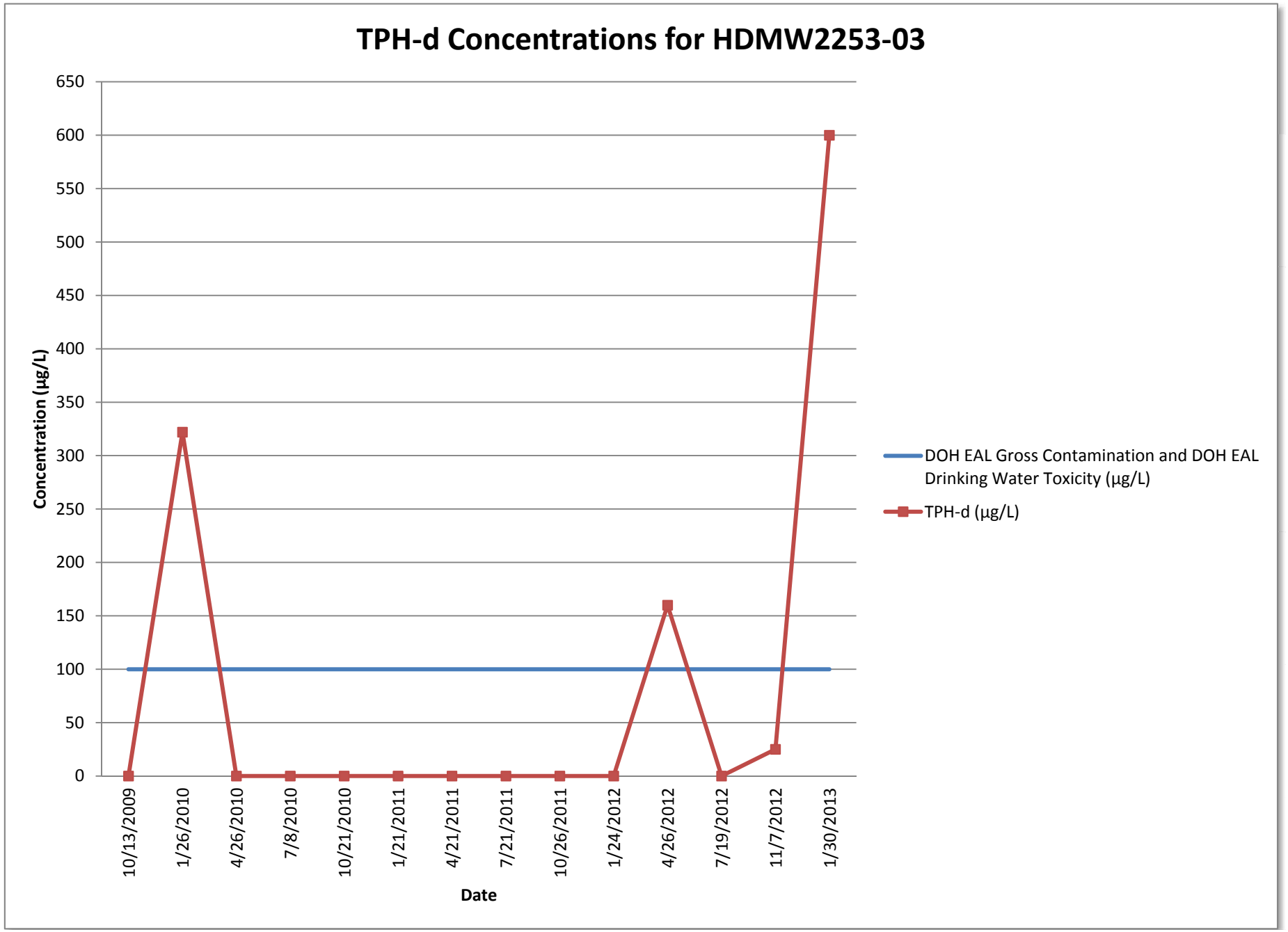

TPH-d Concentrations for OWDFMW01
Concentration (µg/L)
2600
2400
2200
2000
1800
1600
1400
1200
1000
800
600
400
200
0
8/4/2009
10/13/2009
1/26/2010
4/26/2010
10/21/2010
10/21/2010
1/21/2011
1/21/2011
4/21/2011
4/21/2011
7/21/2011
7/21/2011
10/26/2011
10/26/2011
1/24/2012
1/24/2012
4/26/2012
7/19/2012
11/7/2012
11/7/2012
1/30/2013
1/30/2013
Date
DOH EAL Gross Contamination and DOH EAL Drinking Water Toxicity (µg/L)
TPH-d (µg/L)


TPH-d Concentrations for HDMW2253-03
650
600
550
500
450
400
350
300
250
200
150
100
50
0
Concentration (µg/L)
10/13/2009
1/26/2010
4/26/2010
7/8/2010
10/21/2010
1/21/2011
4/21/2011
7/21/2011
10/26/2011
1/24/2012
4/26/2012
7/19/2012
11/7/2012
1/30/2013
Date
DOH EAL Gross Contamination and DOH EAL Drinking Water Toxicity (µg/L)
TPH-d (µg/L)

APPENDIX E

Waste Disposal Manifest

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NON-HAZARDOUS WASTE MANIFEST

1. Generator ID Number	2. Page 1 of	3. Emergency Response Phone	4. Waste Tracking Number
HIR 000 050 401	1	808-206-9989	000019546

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) HIC8553-02
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.	HQ <300 ppm PH=7					

13. Special Handling Instructions and Additional Information
9b1: NR 2008 9b1: TOTAL HALOGEN: < 400ppm HQ

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.

GENERATOR

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 02 Day 26 Year 13

INT'L

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

TRANSPORTER

16. Transporter Acknowledgment of Receipt of Materials

Transporter 1 Printed/Typed Name: [illegible] W WAHILANI — Signature: [signature] — Month 02 Day 26 Year 13

Transporter 2 Printed/Typed Name: Claude Agao — Signature: Claude Agao — Month 03 Day 05 Year 13

DESIGNATED FACILITY

17. Discrepancy

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

Manifest Reference Number:

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

Facility's Phone:

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

HQ test given to Unitek as CONSOLIDATED MANIFEST #41139

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

Printed/Typed Name: P. ACHAMBAU — Signature: [signature] — Month 03 Day 06 Year 2013

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