Final
Second Quarter 2015 - Quarterly Groundwater Monitoring Report Outside Tunnel Wells

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

DOH Facility ID No.: 9-102271
DOH Release ID No.: 990051, 010011, 020028, and 140010

August 2015

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

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

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Prepared for:

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400 Marshall Road
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Prepared by:

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Prepared under:

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FINAL
SECOND QUARTER 2015 - 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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Contract Number: N62742-12-D-1853
Contract Task Order: 0002

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TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

APPENDICES

ACRONYMS AND ABBREVIATIONS

ACRONYMS/ ABBREVIATIONS	DEFINITION/MEANING
COPC	Contaminant of Potential Concern
CCV	Continuing Calibration Verification
DLNR	State of Hawaii Department of Land and Natural Resources
DoD	Department of Defense
DOH	State of Hawaii Department of Health
DON	Department of the Navy
EAL	Environmental Action Level
EPA	Environmental Protection Agency
ESI	Environmental Science International, Inc.
F-76	Marine Diesel Fuel
ICAL	Initial Calibration
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
QSM	Quality Systems Manual
RHSF	Red Hill Bulk Fuel Storage Facility
RPD	Relative Percent Difference
SAP	Sampling and Analysis Plan
TCE	Trichloroethylene
TEC	The Environmental Company, Inc.
TPH	Total Petroleum Hydrocarbons
TPH-d	Total Petroleum Hydrocarbons as diesel
TPH-g	Total Petroleum Hydrocarbons as gasoline
TPH-o	Total Petroleum Hydrocarbons as oil
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 groundwater monitoring report presents the results of the second quarter 2015 groundwater sampling event, conducted on April 22 and 23, 2015, 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, 020028, and 140010.

The groundwater sampling was conducted as part of the long-term groundwater and soil vapor monitoring program at the RHSF and concurrent with release response activities initiated at Tank 5 in January 2014, for Naval Supply Systems Command Fleet Logistics Center [NAVSUP FLC] Pearl Harbor (formerly Fleet and Industrial Supply Center), 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, Inc. [ESI].

On April 22 and 23, 2015, ESI personnel collected groundwater samples from five outside tunnel monitoring wells (wells OWDFMW01, HDMW2253-03, RHMW04, RHMW06, and RHMW07). One primary and one duplicate groundwater sample were collected from well OWDFMW01. All groundwater samples were analyzed for petroleum constituents. Analytical results were compared to DOH Tier 1 Environmental Action Levels [EALs]. A summary of the analytical results is provided below.

- **HDMW2253-03** – The only analytes detected in groundwater were Total Petroleum Hydrocarbons [TPH] as diesel [TPH-d] (13 micrograms per liter [µg/L]), and TPH as oil [TPH-o] (55 µg/L), benzo[a]anthracene (0.0032 µg/L), toluene (0.070 µg/L), and lead (0.078 µg/L). The concentrations did not exceed the DOH Tier 1 EALs. With the exception of one possibly erroneous result obtained during the event in April 2014, TPH-d concentrations have not exceeded the DOH Tier 1 EAL in well HDMW2253-03 since January 2013.
- **OWDFMW01** – Concentrations of TPH-d (120 µg/L in both primary and duplicate samples) and TPH-o (110 and 140 µg/L) were detected above their respective DOH Tier 1 EALs. The TPH-d concentration exceeded the DOH Tier 1 EAL for the first time since April 2014; however, TPH-d concentrations in this well have been generally decreasing since an increase in November 2012. The April 2015 event was the first time TPH-o was detected in this well; however, the detection limits of previous results from 2011 and 2012 exceeded the DOH Tier 1 EAL. The laboratory identified a mismatch between the chromatographic profiles of the samples from OWDFMW01 and the standard used in the quantitation of TPH-d and TPH-o by Method 8015. The mismatch between the chromatographic profiles and the standard, and the high bias represented by contamination in the Method Blanks results in a significant decrease in the accuracy of the results. Due to the high bias and inaccuracy, the actual TPH-o concentration may be below the DOH Tier 1 EAL. Lead (0.036 and 0.038 µg/L) and several Volatile Organic Compounds [VOCs] and polycyclic aromatic

hydrocarbons [PAHs] were also detected; however, none of the detected concentrations exceeded their respective DOH Tier 1 EALs. Due to the consistent high hydrogen activity (pH) and presence of acetone in well OWDFMW01, it is possible there are issues with the well construction or some other isolated condition resulting in sample data that may not accurately represent the groundwater conditions at the site.

- **RHMW04** – The only analytes detected in groundwater were TPH-o (25 µg/L), lead (0.006 µg/L), and several PAHs. The concentrations did not exceed their respective DOH Tier 1 EALs. This is the first time that samples from well RHMW04 were analyzed for TPH-o.
- **RHMW06** – The only analytes detected in groundwater were TPH-d (20 µg/L), TPH-o (47 µg/L), benzo[a]anthracene (0.0028 µg/L), bromodichloromethane (0.0039 µg/L), and lead (0.006 µg/L). The concentrations did not exceed their respective DOH Tier 1 EALs.
- **RHMW07** – The only analytes detected in groundwater were TPH-d (26 µg/L), TPH-o (47 µg/L), benzo[a]anthracene (0.0027 µg/L), fluorene (0.0042 µg/L), phenanthrene (0.0072 µg/L), and lead (0.006 µg/L). The concentrations did not exceed their respective DOH Tier 1 EALs.

During the April 2015 sampling event, TPH-d and TPH-o were detected at concentrations above their respective DOH Tier 1 EALs in OWDFMW01. The TPH-d concentration was below the DOH Tier 1 EAL during the January 2015 event; the samples were not analyzed for TPH-o during that event. The groundwater contaminant concentrations in the other wells remained at low concentrations and did not change significantly since the previous sampling event (January 2015), or were not detected. No contaminants of potential concern [COPCs] in wells HDMW2253-03, RHMW04, RHMW06 or RHMW07 were detected at concentrations above their respective DOH Tier 1 EALs.

Based on a suspected 2014 release at the RHSF and the results of the recent groundwater sampling and analysis, continued groundwater monitoring at the RHSF is recommended. If the TPH-d concentrations significantly increase, the monitoring frequency should be increased to monthly, even though wells RHMW04, RHMW06, RHMW07, HDMW2253-03, and OWDFMW01 are not included in the RHSF Groundwater Protection Plan.

SECTION 1 – INTRODUCTION

This quarterly groundwater monitoring report presents the results of the second quarter 2015 groundwater sampling event conducted on April 22 and 23, 2015, 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, 2013). The DOH Facility ID number for the RHSF is 9-102271. The DOH Release ID numbers are 990051, 010011, 020028, and 140010.

The groundwater sampling was conducted as part of the long-term groundwater and soil vapor monitoring program at the RHSF for NAVSUP FLC Pearl Harbor, under NAVFAC Contract Number N62742-12-D-1853. The sampling was conducted in accordance with the approved WP/SAP and WP/SAP Technical Addendum prepared by ESI (ESI, 2012; 2015c).

1.1 SITE DESCRIPTION

The RHSF is located on federal government land (zoned F1 - Military and Federal), located in Halawa Heights, approximately 2.5 miles northeast of Pearl Harbor (Figure 1). It is located on a low ridge on the western edge of the Koolau Mountain Range that divides Halawa Valley from Moanalua Valley. The RHSF is bordered on the north by Halawa Correctional Facility and private businesses, on the southwest by the United States of America [U.S.] Coast Guard reservation, on the south by residential neighborhoods, and on the east by Moanalua Valley. A quarry is located less than a quarter mile away to the northwest. The RHSF occupies 144 acres of land and the majority of the site is at an elevation of approximately 200 to 500 feet above mean sea level.

The RHSF contains 18 active and 2 inactive USTs, which are operated by NAVSUP FLC Pearl Harbor. 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.

Five groundwater monitoring wells (wells RHMW04, RHMW06, RHMW07, 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); well OWDFMW01 is located at the former Oily Waste Disposal Facility near Adit 3; and wells RHMW04, RHMW06, and RHMW07 are located on the north side of the RHSF along the road to the Navy Firing Range. Four groundwater monitoring wells (wells RHMW01, RHMW02, RHMW03, and RHMW05) are located within the RHSF lower access tunnel, and one sampling point (RHMW2254-01) is

located at Red Hill Shaft. Monitoring data for the four wells located inside the tunnel and one sampling point at Red Hill Shaft are included in a separate report.

As noted, monitoring wells RHMW01, RHMW02, RHMW03, and RHMW05 are located inside the underground tunnels. Sampling point RHMW2254-01 is located inside the infiltration gallery of the Department of the Navy [DON] drinking water supply Well 2254-01. DON Well 2254-01 is located approximately 2,400 feet downgradient of the USTs and provides potable water to the JBPHH Water System, which serves approximately 65,200 military customers. NAVFAC Public Works Department operates the infiltration gallery and DON Well 2254-01.

TABLE 1.1
Current Status of the USTs
Red Hill Bulk Fuel Storage Facility
April 2015 Quarterly Monitoring Report

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

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

1.2 PHYSICAL 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 RHSF, and in isolated exposures to the west, are pyroclastic deposits formed during eruptions from three Honolulu Volcanic Series vents, Salt Lake, Aliamanu, and Makalapa (Stearns and Vaksvik, 1935). Based on established geology and records of wells drilled at the RHSF (Stearns and Vaksvik, 1938), the RHSF is underlain by Koolau Volcanic Series basalts. The area of the RHSF is classified as *Rock Land*, where 25 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 aquifer types. The first and most important type, in terms of drinking water resources, is the basal aquifer. The basal aquifer exists as a lens of fresh water floating on and displacing seawater within the pore spaces, fractures, and voids of the basalt that forms the underlying mass of each Hawaiian island. In parts of Oahu, groundwater in the basal aquifer is confined by the overlying caprock and is under pressure. Waters that flow freely to the surface from wells that tap the basal aquifer are referred to as *artesian*.

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

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

The nearest drinking water supply well is the Red Hill Shaft Well 2254-01, located in the infiltration gallery within the RHSF. The Well 2254-01 is located approximately 2,400 feet downgradient of the USTs (Figure 2).

The nearest body of surface water is Halawa Stream, an ephemeral stream that is present along the north side of the RHSF. Except for the portion to the east of the Halawa Correctional Facility, the stream is contained by a concrete culvert. The stream is usually dry, but flows after periods of significant rainfall.

Wells HDMW2253-03, OWDFMW01, RHMW04, RHMW06, and RHMW07 are all located within 150 meters of a portion of Halawa stream. The distance of each well to Halawa Stream is presented in Table 1.2

TABLE 1.2
Distance of Wells to Halawa Stream
Red Hill Bulk Fuel Storage Facility
April 2015 Quarterly Monitoring Report

Well	Distance to Halawa Stream (meters)
HDMW2253-03	64.25
OWDFMW01	142.68
RHMW04	80.85
RHMW06	104.09
RHMW07	81.20

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 250 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 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 current 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 with concentrations that exceeded current 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 January 2010 (The Environmental Company, Inc. [TEC], 2010a).
- **OWDFMW01** – TPH-d was detected at a concentration above the DOH EALs for gross contamination and drinking water toxicity 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 current DOH EALs for gross contamination or drinking water toxicity. In Fall 2011, the DOH EALs were revised. The drinking water toxicity EAL for TPH-d decreased from 210 to 190 µg/L.

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, 2013a). The COPCs with concentrations that exceeded current DOH EALs are summarized below.

- **HDMW2253-03** – TPH-d was detected at concentrations 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.

In 2013, groundwater samples were collected from wells OWDFMW01 and HDMW2253-03. Samples were collected in January, April, July, and October 2013. TPH-d was detected at a concentration above the DOH EALs in samples collected from wells HDMW2253-03 and OWDFMW01 (ESI, 2013b, 2013c, 2013d, and 2014a). The COPCs with concentrations that exceeded current 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 January 2013.
- **OWDFMW01** – TPH-d was detected at concentrations above the DOH EALs for gross contamination and drinking water toxicity in all four quarters during 2013.

In 2014, groundwater samples were collected from wells OWDFMW01 and HDMW2253-03. Samples were collected in January, April, July, and October 2014. Well RHMW04 was also sampled in July and October 2014. TPH-d was detected at concentrations above the DOH EALs in samples collected from well OWDFMW01 in January and April 2014. TPH-d was also detected at a concentration above the DOH EALs in a sample collected from well HDMW2253-03 in April 2014; however, this was likely an erroneous result due to a switched

sample (ESI, 2014c, 2014d, 2014e, and 2015a). The COPCs with concentrations that exceeded current DOH EALs are summarized below.

- **HDMW2253-03** – TPH-d was detected at a concentration above the DOH EALs for both gross contamination and drinking water toxicity in April 2014. However, as discussed above, this was likely an erroneous result.
- **OWDFMW01** – TPH-d was detected at concentrations above the DOH EALs for gross contamination and drinking water toxicity in April 2014 and above only the EAL for gross contamination in January 2014.

In January 2014, an additional groundwater sampling was conducted at HDMW2253-03 in response to a suspected release from Tank 5. None of the COPC concentrations exceeded the current DOH EALs (ESI, 2014b).

Between August and October 2014, wells RHMW06 and RHMW07 were installed at the RHSF in order to develop a more robust groundwater monitoring network at the site (Battelle, 2015a). Both wells were sampled in October 2014. The PAH 2-methylnaphthalene was detected in the sample collected from well RHMW06. TPH-d, 2-methylnaphthalene, and acetone were detected in the sample collected from well RHMW07. None of the COPC concentrations exceeded the current DOH EALs for gross contamination or drinking water toxicity. In the well installation report, it was speculated that these detections may have been related to the drilling foam used during the installation of the wells.

In January 2015, groundwater samples were collected from wells OWDFMW01, HDMW2253-03, and RHMW04 (ESI, 2015b), and from wells RHMW06, and RHMW07 (Battelle, 2015b). None of the COPC concentrations exceeded the current DOH EALs for drinking water toxicity or gross contamination.

1.3.1 Previous Reports

The following groundwater monitoring reports for wells located outside the RHSF tunnel system were previously submitted to 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).
15. Groundwater Monitoring Report, January 2013 (submitted April 2013).
16. Groundwater Monitoring Report, April 2013 (submitted July 2013).
17. Groundwater Monitoring Report, July 2013 (submitted September 2013).
18. Groundwater Monitoring Report, October 2013 (submitted January 2014).
19. Groundwater Monitoring Report for Additional Sampling of HDMW2253-03, January 2014 (submitted February 2014).
20. Groundwater Monitoring Report, January 2014 (submitted April 2014).
21. Groundwater Monitoring Report, April 2014 (submitted June 2014).
22. Groundwater Monitoring Report, July 2014 (submitted September 2014).
23. Groundwater Monitoring Report, October 2014 (submitted January 2015).
24. Groundwater Monitoring Report, January 2015 (submitted March 2015).
25. Draft Monitoring Well Installation Report for RHMW06 and RHMW07, March 2015 (submitted March 2015).
26. Draft Technical Memorandum, Groundwater Sampling Event for RHMW06 and RHMW07, April 2015 (submitted April 2015)

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SECTION 2 – GROUNDWATER SAMPLING

On April 22 and 23, 2015, ESI personnel collected groundwater samples from five monitoring wells (wells OWDFMW01, HDMW2253-03, RHMW04, RHMW06, and RHMW07). A primary and duplicate groundwater sample were collected from well OWDFMW01. The samples were collected in accordance with the 2012 WP/SAP and the 2015 Technical Addendum (ESI, 2012; 2015c). The WP/SAP is consistent with DOH UST release response requirements (DOH, 2000); DON Procedure I-C-3, *Monitoring Well Sampling* (DON, 2007); and the Final 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 by ESI using a 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 any of the wells.

2.1 GROUNDWATER SAMPLING

Prior to collecting groundwater samples, the monitoring wells were purged of standing water in the well casings. Wells OWDFMW01 and HDMW2253-03 were purged using disposable bailers. Wells RHMW04, RHMW06, and RHMW07 contain dedicated bladder pumps which were used to purge the well and to collect samples. The monitoring wells were purged at rates of 0.14 to 1.02 liters per minute.

Water quality parameters were monitored on a periodic basis during well purging. The water quality parameters that were measured included 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 or dedicated bladder pump 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 new 0.45-micron filter.

All samples were labeled and logged on the Sample Inventory Log, placed in Ziploc™ bags and sealed, custody sealed, sealed with tape, placed in a cooler with wet ice, and logged onto the Chain-of-Custody form. The samples were labeled and logged in accordance with DON Procedure III-E, *Record Keeping, Sample Labeling, and Chain-of-Custody Procedures* (DON, 2007). All samples were shipped under Chain-of-Custody to the analytical laboratory and analyzed for the COPCs as described in Section 2.2.

2.2 ANALYTICAL RESULTS

The samples were analyzed for TPH as gasoline [TPH-g], TPH-d, and TPH-o using U.S. Environmental Protection Agency [EPA] Method 8015M; VOCs using EPA Methods 8260C, 8260C-SIM, and 8011; PAHs using EPA Method 8270C SIM; and dissolved lead using EPA Method 6020. Analytical results were compared to DOH Tier 1 EALs. Previously, results were only compared to DOH EALs for gross contamination and drinking water toxicity; however, beginning with this report, the DOH Final Groundwater Tier 1 EALs, which are the lowest concentration of aquatic habitat goals, gross contamination action levels, and drinking water toxicity action levels, will be used. In addition, DOH EALs for groundwater where surface water is greater than 150 meters from the site were previously used; however, it was determined that all outside tunnel wells are within 150 meters of Halawa Stream, located along the north side of the RHSF. Therefore, EALs for groundwater where surface water is less than 150 meters from the site will be used. The analytical results are described below and summarized in Table 2.1. A copy of the laboratory report is included as Appendix C.

For ease of reading, only analytical results for chemicals that have been detected since 2010 are presented in Table 2.1. A description of laboratory data qualifiers, definitions of the terms Method Detection Limit [MDL], Limit of Detection [LOD], and Limit of Quantitation [LOQ], and basic concepts of those terms are presented as Appendix D.

- **HDMW2253-03** – The only analytes detected in groundwater were TPH-d (13 µg/L), TPH-o (55 µg/L), benzo[a]anthracene (0.0032 µg/L), toluene (0.070 µg/L), and lead (0.078 µg/L). The concentrations did not exceed the DOH Tier 1 EALs.
- **OWDFMW01** – Concentrations of TPH-d (120 µg/L in both primary and duplicate samples) and TPH-o (110 and 140 µg/L) were detected above their respective DOH Tier 1 EALs. Lead (0.036 and 0.038 µg/L) and several VOCs and PAHs were also detected; however, none of the detected concentrations exceeded their respective DOH Tier 1 EALs.
- **RHMW04** – The only analytes detected in groundwater were TPH-o (25 µg/L), lead (0.006 µg/L), and several PAHs. The concentrations did not exceed their respective DOH Tier 1 EALs.
- **RHMW06** – The only analytes detected in groundwater were TPH-d (20 µg/L), TPH-o (47 µg/L), benzo[a]anthracene (0.0028 µg/L), bromodichloromethane (0.0039 µg/L), and lead (0.006 µg/L). The concentrations did not exceed their respective DOH Tier 1 EAL.
- **RHMW07** – The only analytes detected in groundwater were TPH-d (26 µg/L), TPH-o (47 µg/L), benzo[a]anthracene (0.0027 µg/L), fluorene (0.0042 µg/L), phenanthrene (0.0072 µg/L), and lead (0.006 µg/L). The concentrations did not exceed their respective DOH Tier 1 EALs.

2.2.1 Groundwater Contaminant Trends

The historical groundwater contaminant concentration trends for COPCs that exceeded the DOH Tier 1 EALs are illustrated in Appendix E. A table of cumulative historical groundwater

results is included as Appendix F. A summary of groundwater contaminant trends is provided below.

- **HDMW2253-03** – TPH-d was detected in this well at a concentration below the DOH Tier 1 EAL. With the exception of one possibly erroneous result obtained during the event in April 2014, TPH-d concentrations have not exceeded the DOH Tier 1 EAL in well HDMW2253-03 since January 2013.
- **OWDFMW01** – TPH-d and TPH-o were detected in both samples from this well at concentrations exceeding their respective DOH Tier 1 EALs. The TPH-d concentration exceeded the DOH Tier 1 EAL for the first time since April 2014; however, TPH-d concentrations in this well have been generally decreasing since an increase in November 2012. The April 2015 event was the first time TPH-o was detected in this well; however, the detection limits of previous results from 2011 and 2012 exceeded the DOH Tier 1 EAL. Concentrations of all other COPCs detected during this round of quarterly sampling were consistent with historical data.
- **RHMW04** – TPH-o was detected in this well at a concentration below the DOH Tier 1 EAL. This is the first time that a sample from well RHMW04 was analyzed for TPH-o. Concentrations of all other COPCs detected during this round of quarterly sampling were below the detection limits of the historical analytical results.
- **RHMW06** – This well was installed in September 2014 and first sampled in October 2014. During that event, only 2-methylnapthalene was detected and at a concentration below the DOH Tier 1 EAL. No COPCs were detected in January 2015. During the April 2015 sampling event, TPH-d, TPH-o, benzo[a]anthracene, bromodichloromethane, and lead were detected at concentrations below their respective DOH Tier 1 EALs. The detected concentrations were all below the detection limits used in the October 2014 event.
- **RHMW07** – This well was installed and first sampled in October 2014. During that October 2014 event, only TPH-d, 2-methylnaphthalene, and acetone were detected and concentrations were below their respective DOH Tier 1 EALs. No COPCs were detected in January 2015. During the April 2015 sampling event, TPH-d, TPH-o, benzo[a]anthracene, fluorene, phenanthrene, and lead were detected, and concentrations were below their respective DOH Tier 1 EALs. With the exception of phenanthrene, the detected concentrations were all below the detection limits used in the October 2014 event. The detected concentration of phenanthrene was below the LOD used in the October 2014 event.

2.3 WASTE DISPOSAL

The purged groundwater and decontamination water generated during sampling of the wells were placed 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 June 26, 2015, 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 G.

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TABLE 2.1
Analytical Results for Groundwater Sampling (April 22 and 23, 2015)
Red Hill Bulk Fuel Storage Facility
April 2015 Quarterly Monitoring Report

Method	Chemical	DOH EAL	OWDFMW01 (ES137)					HDMW2253-03 (ES136)					RHMW04 (ES139)					RHMW06 (ES140)					RHMW07 (ES141)				
			Results	Q	LOQ	LOD	DL	Results	Q	LOQ	LOD	DL	Results	Q	LOQ	LOD	DL	Results	Q	LOQ	LOD	DL	Results	Q	LOQ	LOD	DL
EPA 8015C	TPH-g	100	N.D.	U	50	25	13	N.D.	U	50	25	13	N.D.	U	50	25	13	N.D.	U	50	25	13	N.D.	U	50	25	13
	TPH-d	100	**120**	Z	53	21	12	13	J	50	20	11	N.D.	U	53	21	12	20	J	54	22	12	26	J	50	20	11
	TPH-o	100	**110**	ZB	110	53	20	55	JB	100	50	19	25	JB	110	53	20	47	JB	110	54	21	47	JB	100	50	19
EPA 8270D SIM	Acenaphthylene	30	N.D.	U	0.02	0.005	0.0034	N.D.	U	0.021	0.0052	0.0035	0.0037	J	0.02	0.005	0.0034	N.D.	U	0.021	0.0052	0.0035	N.D.	U	0.021	0.0052	0.0035
	Anthracene	0.73	N.D.	U	0.02	0.005	0.0036	N.D.	U	0.021	0.0052	0.0037	0.0051	J	0.02	0.005	0.0036	N.D.	U	0.021	0.0052	0.0037	N.D.	U	0.021	0.0052	0.0037
	Benzo[a]anthracene	0.027	0.0033	JB	0.02	0.005	0.0026	0.0032	JB	0.021	0.0052	0.0027	N.D.	U	0.02	0.005	0.0026	0.0028	JB	0.021	0.0052	0.0027	0.0027	JB	0.021	0.0052	0.0027
	Fluorene	3.9	0.0039	JX	0.02	0.005	0.0038	N.D.	U	0.021	0.0052	0.0039	0.006	J	0.02	0.005	0.0038	N.D.	U	0.021	0.0052	0.0039	0.0042	J	0.021	0.0052	0.0039
	1-Methylnaphthalene	2.1	0.023		0.02	0.005	0.0035	N.D.	U	0.021	0.0052	0.0036	N.D.	U	0.2	0.05	0.035	N.D.	U	0.021	0.0052	0.0036	N.D.	U	0.021	0.0052	0.0036
	2-Methylnaphthalene	2.1	0.017	J	0.02	0.005	0.0023	N.D.	U	0.021	0.0052	0.0024	N.D.	U	0.2	0.05	0.023	N.D.	U	0.021	0.0052	0.0023	N.D.	U	0.021	0.0052	0.0023
	Naphthalene	17	0.025		0.02	0.005	0.0038	N.D.	U	0.021	0.0052	0.0039	N.D.	U	0.2	0.05	0.038	N.D.	U	0.021	0.0052	0.0039	N.D.	U	0.021	0.0052	0.0039
	Phenanthrene	4.6	0.0075	J	0.02	0.005	0.005	N.D.	U	0.021	0.0052	0.0051	0.0069	J	0.02	0.005	0.005	N.D.	U	0.021	0.0052	0.0052	0.0072	J	0.021	0.0052	0.0052
EPA 8260C/ 8260-SIM/ 8011	1,2-Dichloroethane	0.15	0.01	J	0.02	0.015	0.0058	N.D.	U	0.02	0.015	0.0058	N.D.	U	0.02	0.015	0.0058	N.D.	U	0.02	0.015	0.0058	N.D.	U	0.02	0.015	0.0058
	Acetone	1,500	25		20	10	3.3	N.D.	U	20	10	3.3	N.D.	U	20	10	3.3	N.D.	U	20	10	3.3	N.D.	U	20	10	3.3
	Benzene	5	0.07	J	0.5	0.1	0.062	N.D.	U	0.5	0.1	0.062	N.D.	U	0.5	0.1	0.062	N.D.	U	0.5	0.1	0.062	N.D.	U	0.5	0.1	0.062
	Bromodichloromethane	0.12	N.D.	U	0.02	0.01	0.0034	N.D.	U	0.02	0.01	0.0034	N.D.	U	0.02	0.01	0.0034	0.0039	JB	0.02	0.01	0.0034	N.D.	U	0.02	0.01	0.0034
	Chloromethane	1.8	0.07	J	0.5	0.2	0.068	N.D.	U	0.5	0.2	0.068	N.D.	U	0.5	0.2	0.068	N.D.	U	0.5	0.2	0.068	N.D.	U	0.5	0.2	0.068
	Methyl ethyl ketone (2-Butanone)	7,100	N.D.	U	20	4	1.9	N.D.	U	20	4	1.9	N.D.	U	20	4	1.9	N.D.	U	20	4	1.9	N.D.	U	20	4	1.9
	Toluene	40	N.D.	U	0.5	0.1	0.054	0.07	J	0.5	0.1	0.054	N.D.	U	0.5	0.1	0.054	N.D.	U	0.5	0.1	0.054	N.D.	U	0.5	0.1	0.054
	Xylenes	20	N.D.	U	1	0.2	0.18	N.D.	U	1	0.2	0.18	N.D.	U	1	0.2	0.18	N.D.	U	1	0.2	0.18	N.D.	U	1	0.2	0.18
EPA 6020	Dissolved Lead	5.6	0.036		0.02	0.01	0.005	0.078		0.02	0.01	0.005	0.006	J	0.02	0.01	0.005	0.006	J	0.02	0.01	0.005	0.006	J	0.02	0.01	0.005

Only chemicals that have been detected since 2010 are presented in this table. All other results are included in the cumulative groundwater results table.
The data are in micrograms per liter (µg/L). Shaded values exceeded the DOH EALs.

DL	Detection Limit or Method Detection Limit (MDL)
DOH EAL	DOH Tier 1 Environmental Action Levels for groundwater where groundwater is a current drinking water source and is located within 150 meters of surface water (DOH, Fall 2011).
EPA	Environmental Protection Agency
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 / TPH-d / TPH-o	Total Petroleum Hydrocarbons as gasoline, diesel fuel, and oil
X	Possible high bias due to matrix interference.
U	Undetected at DL and is reported as less than the LOD.
Z	The chromatographic pattern was inconsistent with the profile of the reference fuel standard.
B	Analyte was present in the associated method blank.

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SECTION 3 – DATA QUALITY ASSESSMENT

A data quality assessment, which consists of a review of the overall groundwater sample collection and analysis process, was performed in order to determine whether the analytical data generated met the quality objectives for the project and if the data is usable for the intended purpose. The data quality assessment was performed in accordance with the approved WP/SAP (ESI, 2012). The field Quality Control program consisted of standardized sample collection and management procedures, and the collection of field duplicate samples, matrix spike [MS] samples, and trip blank samples. The laboratory quality assurance program consisted of the use of standard analytical methods and the preparation and analyses of MS/Matrix Spike Duplicate [MSD] samples, surrogate spikes, blanks, and Laboratory Control Samples [LCSs]/Laboratory Control Sample Duplicates [LCSDs].

3.1 DATA VALIDATION AND ASSESSMENT

The objective of data validation is to provide data of known quality for project decisions. Data quality is judged in terms of Precision, Accuracy, Representativeness, Completeness, Comparability, and Sensitivity [PARCCS]. A number of factors may affect the quality of data, including: sample collection methods, sample analysis methods, and adherence to established procedures for sample collection, preservation, management, shipment, and analysis.

Precision

Precision is defined as the reproducibility of replicate measurements. Precision is evaluated by Relative Percentage Difference [RPD] of field duplicate, LCS/LCSD, and MS/MSD results. Field duplicate and MS/MSD samples were collected at a rate of approximately 25% of project samples. Field duplicates were sent to the laboratory along with the primary samples.

The RPDs of detected analytes for the primary and field duplicate samples (ES137 and ES138) are provided in Table 3.1. An RPD of less than 50% for duplicate pairs is required by the DON *Project Procedures Manual* to be considered acceptable (DON, 2007). Fluorene, benzene, and chloromethane were only detected in the primary sample at concentrations below the LODs and were assigned RPDs of 200%. These analytes were only detected at levels that are significantly lower than the DOH EALs. Therefore, the usability of the data is not impacted. The RPDs for duplicate sample pairs for all other analytes met acceptance criteria.

The laboratory did not have sufficient sample volume left to analyze an MSD sample for TPH-d. However, field duplicate RPDs were within control limits and indicated that there were no matrix effects that negatively influenced overall precision.

Accuracy

Accuracy is defined as the degree of conformity of a measurement to a standard or true value. Accuracy is evaluated through measurement of the percent recovery of an analyte in a reference standard or spiked sample. Accuracy limits for surrogates, laboratory control spike, MS, and MSD samples are either prescribed by the Department of Defense [DoD] or

established by the individual laboratory. The acceptance criteria for accuracy are dependent on the analytical method and are based on historical laboratory or DoD data.

Similarly, the fairly large error inherent to the analysis of diesel- and oil-range hydrocarbons by EPA Method 8015 should be considered when results are compared to each other, to action levels, and to results from previous sampling events. Any comparative analysis of the results should take into consideration the fairly wide method acceptance limits as per DoD Quality Systems Manual [QSM] 5.0 (36-132%).

Additionally, results for TPH-d and TPH-o in samples ES137 and ES138 were flagged “Z” by the laboratory to indicate that the chromatographic profile did not resemble a petroleum product. This may point to decreased accuracy of results. Because TPH-d and TPH-o in these samples were detected at levels slightly exceeding the DOH EALs, the data should be used with caution.

The result for fluorene in sample ES137 was flagged “X” to indicate a possible high bias due to matrix interference. As the concentration detected was well below the DOH EAL, this should not affect project decisions.

The MS and MSD recoveries for 1,1,2,2-tetrachloroethane were below the control limits. The spikes were performed on a sample (ES137) collected from well OWDFMW01 and recoveries were extremely low (9% and 1% respectively). A review of data from past events indicated that the analyte consistently recovered extremely low from MS/MSDs performed on samples collected from this well. Acceptable recovery of the analyte from the LCS confirmed that the issue was restricted to the matrix. Since pH values of the groundwater in well OWDFMW01 were high, it was hypothesized that the low spike recovery was due to chemical degradation of 1,1,2,2-tetrachloroethane by base-catalyzed dehydrochlorination to trichloroethylene [TCE]. The rate of chemical degradation (via base catalyzed hydrolysis or dehydrochlorination) of other chlorinated analytes on the project target list spiked into the MS/MSD would be expected to be much lower and therefore not observed. The high recovery of the chemical degradation product of this reaction, TCE, from the MS/MSD supported the suggested explanation. Therefore, the failure to recover 1,1,2,2-tetrachloroethane from the MS/MSDs did not affect the usability of the dataset significantly. The analyte is not a fuel related contaminant and the effect described above should be restricted to samples with high pH (OWDFMW01 only, in this case). When pH levels drop, the effect is expected to disappear.

Similarly, recoveries of chloroethane, 1,1-dichloroethane, and *trans*-1,2-dichloroethylene from MS/MSD samples were high, indicating a potential high bias for these analytes. Benzene was also recovered high from the MS, although only marginally. The MSD for benzene was within limits. Of these analytes, only benzene was detected (in sample ES137), and at a concentration that was significantly lower than the DOH EAL. Consequently, the high biases for these compounds did not significantly affect data usability.

The surrogate spike recovery for 1,4-difluorobenzene was slightly above the control limit in all samples, indicating a potential, although slight, high bias for TPH-g results. TPH-g was not

detected in any of the samples; therefore, a slight high bias should not affect data usability. The surrogate spike recovery for dibromofluoromethane (8260-SIM) in sample ES141 was slightly above the control limit, indicating a possible high bias for VOCs; however, no target analytes were detected in the sample, and data usability should not be affected.

The laboratory indicated initial calibration [ICAL] and continuing calibration verification [CCV] exceedances for VOCs (8260 and 8260-SIM) that may have an impact on data quality. The affected analytes were 1,2-dibromo-3-chloropropane, chloromethane, bromomethane, acetone, 2-butanone, TCE, 4-methyl-2-pentanone, and bromoform. The ICAL issues indicated increased error and potentially decreased sensitivity for the affected analytes. The CCV failures indicated low bias for the data. The EPA method 8260 LOD (0.80 µg/L) for 1,2-dibromo-3-chloropropane was already above the EAL (0.040 µg/L). Consequently, it is unknown whether the analyte was present in groundwater at a concentration between the EAL and the LOD. The additional inaccuracy of the analysis did not significantly change the data usability considerations already described in the Sensitivity section of this report. For all other analytes the lack of accuracy did not impact project decisions because none of the analytes were detected near or above the EAL.

For EPA Method 8260 (including 8260-SIM) analysis the DoD QSM 5.0 requires a closing CCV to be recorded after the end of every batch run. Due to an oversight, the laboratory did not record a closing CCV for the sample batch. Therefore, verification of the calibration over the entire sample batch run was not possible. Nevertheless, the run was compliant with DoD QSM 4.2 requirements. All other required QC sample analyses for calibration verification were completed and were used to evaluate data quality.

All other calibration QC-data, MS/MSD, LCS/LCSD, and surrogate spike recoveries were within acceptable recovery limits. The data accuracy for this monitoring event is considered acceptable.

Representativeness

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

Representativeness is also evaluated through the compliance with the standardized sample holding time and sample preservation methods, and through the analysis of blank samples, including method blank and trip blank samples.

For this sampling event, analysis by EPA Method 8011 was performed 4 days out of hold time; therefore, the associated results may be biased low due to loss of VOCs and were flagged “J” to indicate this bias. Because of this issue, the two 8011 analytes, 1,2-dibromoethane and 1,2-dibromo-3-chloropropane were also reported by EPA Method 8260-SIM and 8260,

respectively, using analysis that was performed within the holding time. Concentrations of 1,2-dibromoethane and 1,2-dibromo-3-chloropropane were not detected by either analysis. However, for 1,2-dibromo-3-chloropropane results by EPA method 8260 the LOD (0.80 µg/L) was above the EAL (0.040 µg/L). Consequently, it is unknown whether the analyte was present in the groundwater at a concentration between the EAL and the LOD. Because 1,2-dibromo-3-chloropropane is not a fuel related analyte, the impact on project decisions is negligible. Sample holding time and sample preservation for all other analytical methods were consistent with EPA guidance.

For this sampling event, one trip blank was included in the cooler containing samples for VOC and TPH-g analysis to assess the potential for contamination during sample transport. Methylene chloride, chloroform, and bromodichloromethane were detected in the trip blank at low concentrations. Additionally, methylene chloride and bromodichloromethane were detected at similar concentrations in the method blank, indicating that the contamination was caused by the laboratory. However, because methylene chloride and chloroform were not detected in any of the field samples, their presence in the trip blank was irrelevant. Bromodichloromethane was detected in RHMW06 at a concentration below those detected in the method and trip blanks, indicating that the result was likely an artifact of laboratory contamination. Because the level of contamination was significantly lower than the action level for the analyte, the effect on the usability of the data is negligible.

Additionally, TPH-o and benz[a]anthracene were detected in the method blank at concentrations below their respective LOQs. All results below five times the concentrations in the method blanks were flagged “B” to indicate that they may be artifacts of laboratory contamination. Benz[a]anthracene was detected in all project samples, but the concentrations were so low that their impact on data usability is insignificant. On the other hand, TPH-o was detected in well OWDFMW01 (ES137 and ES138) at levels (110 and 140 µg/L) slightly above the EAL (100 µg/L). Because these levels were still in a range that may have been affected by the laboratory contamination, the usability of the data may be compromised and the results should be used with caution.

The consistently high pH (10 to 13) observed over several sampling events in well OWDFMW01 is atypical for the groundwater in the area and suggests, along with the presence of acetone, that there may be a deficiency in the concrete or bentonite sealing materials used in the construction of the well, or some other localized condition in the vicinity of the well. Consequently, the associated sample data may not accurately represent the conditions of the groundwater at the site.

With the qualifications noted above, the groundwater sample data are considered representative of the groundwater quality at the site. A summary of the trip blank results is provided in Table 3.1.

Completeness

Completeness is defined as the overall percentage of valid analytical results (including estimated results) compared to the total number of analytical results reported by the laboratory. No data were rejected for this project, and therefore the completeness goal for this project (90%) was successfully met. The laboratory provided data for 1,2-dibromoethane by EPA method 8260-SIM in addition to the data by EPA method 8011, to provide confirmation of 8011 results associated with exceeded hold-times. Both datasets are usable and consistent with each other. The additional data do not impact data usability.

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. With the exceptions noted below, the results are considered comparable within this data set and with the data collected from previous sampling events. The field and laboratory personnel followed standard operating procedures.

All samples collected from wells OWDFMW01, HDMW2253-03, and RHMW04 from October 2010 to and including February 2015 were analyzed by Calscience Environmental Laboratories in Garden Grove, CA (now Eurofins Calscience). Samples collected from wells RHMW06 and RHMW07 in October 2014 and January 2015 were analyzed by APPL Laboratories, Inc. of Clovis, CA and EMAX Laboratories of Torrance, CA. Samples collected from all five wells in April 2015 were analyzed by ALS Environmental in Kelso, WA. Analytical MDLs, LODs, and LOQs were lower for most analytes than they had been prior to this event, and several VOCs and PAHs were detected during the April 2015 event at concentrations that would have been below previous LODs and therefore not detected. The method used to analyze 1,2-dichloroethane, bromodichloromethane, dibromochloromethane, and 1,1,2,2-tetrachloroethane was changed from 8260 to 8260-SIM to improve sensitivity. Correspondingly, analysis of 1,2-dibromo-3-chloropropane and 1,2-dibromoethane was switched from 8260 to 8011 for the same reason. The significantly improved reporting limits should be considered when results are compared to data from previous events.

Additionally, during the April 2015 event, TPH-o was added to the analyte list. There are very few previous TPH-o results to compare this data to.

Between August 2009 and July 2010, naphthalene was analyzed for by both EPA Methods 8260B and 8270C-SIM, and beginning in October 2010, only results using EPA Method 8270C-SIM were reported. Naphthalene was not detected in groundwater from either well HDMW2253-03 or OWDFMW01 until November 2012 and has never been detected in RHMW04; however, when both methods were used for samples collected from inside well RHMW02, concentrations of naphthalene detected by EPA Method 8260B were generally two to

three times higher than those detected by EPA Method 8270C-SIM. We assume this is due to the better preservation of VOCs associated with the use of EPA Method 8260B. This suggests that the naphthalene results provided by EPA Method 8270C-SIM may be biased low. Naphthalene concentrations in samples collected beginning in October 2010 were analyzed using EPA Method 8270C-SIM and results may be biased low. However, naphthalene concentrations in project samples have been orders of magnitude below DOH EALs, and this potential low bias should not affect project decisions.

TPH-g analysis of project samples through July 2010 was performed using EPA Method 8015. Between October 2010 and January 2015, EPA Method 8260B was used. Beginning with this April 2015 event, EPA Method 8015 was used again. There was no event where both methods were used; consequently, there is no way to directly compare the results obtained by the two methods and to assess potential bias. However, there is no reason to believe that using either method should bias the data, and the TPH-g data for all events should be comparable.

Other than the lower detection limits, the addition of TPH-o to the analyte list, and the naphthalene bias discussed above, no other issues with comparability were identified. The results are considered comparable within this data set and with the data collected from recent sampling events.

Sensitivity

The LOQs are established by the laboratory based on the LODs or instrument detection limits, historical data, and EPA limits established for the various methods. The LOQs and LODs for samples may require adjustment by the laboratory due to matrix interference or if high levels of target analytes necessitate dilution before analysis. Matrix interference and sample dilutions have the effect of decreasing sensitivity and increasing the LOQs/LODs.

The laboratory indicated multiple initial calibration QC exceedances for VOCs that may have an impact on sensitivity. The affected analytes were 1,2-dibromo-3-chloropropane (8260), acetone, 2-butanone, TCE, and 4-methyl-2-pentanone. The Method Reporting Limit check samples for these analytes indicated that the sensitivity of the analyses was acceptable.

3.2 Data Assessment and Usability Conclusions

The PARCCS criteria were evaluated, and with some exceptions, all criteria were met. Results associated with QC data that failed acceptance criteria are discussed in detail in section 3.1 of this report. Data quality issues that need to be taken into account for project decisions are summarized below.

The MS/MSD recoveries of 1,1,2,2-tetrachloroethane were very low and are likely affected by the high pH in well OWDFMW01. This suggests that the high pH causes the chemical degradation of 1,1,2,2-tetrachloroethane in this well. Given that the degradation product, TCE, was not detected in the well at or above its LOD (0.10 µg/L), it is unlikely that

1,1,2,2-tetrachloroethane is a contaminant of concern for well OWDFMW01, and this is unlikely to affect data usability.

The analysis by EPA Method 8011 was performed four days out of hold time which resulted in a potential low bias. As a result, the two 8011 analytes, 1,2-dibromoethane and 1,2-dibromo-3-chloropropane, were also reported by EPA Method 8260-SIM and 8260, respectively, using analyses that were performed within the holding time. Neither analyte was detected. However, for 1,2-dibromo-3-chloropropane results by EPA Method 8260 the LOD (0.80 µg/L) was above the EAL (0.040 µg/L). Because 1,2-dibromo-3-chloropropane is not a fuel related analyte the effect on project decisions is negligible.

TPH-d and TPH-o results in samples ES137 and ES138 were impacted by decreased accuracy due to the mismatch between the chromatographic profiles of the samples and the standard used for quantitation. The fairly large error inherent to the analysis of diesel- and oil-range hydrocarbons by EPA method 8015 only augmented the impact of the inaccuracy created by the chromatographic profiles. Because TPH-d and TPH-o in these samples were detected at levels slightly exceeding the DOH EALs, a decision whether the analyte exceeded the DOH EAL in the well at the time of sampling could not be made.

TPH-o was detected in well OWDFMW01 (ES137 and ES138) at levels (110 and 140 µg/L) slightly above the DOH Tier 1 EAL (100 µg/L). Contamination of samples at the laboratory created a high bias for TPH-o, therefore, it is not known how much of the analyte was actually present in the groundwater and how much was added by laboratory contamination, and whether the compound was present at levels above the DOH Tier 1 EAL.

Finally, it should be noted that analytical MDLs, LODs, and LOQs decreased for the April 2015 sampling event compared to monitoring data from October 2010 through February 2015 due to a change of laboratories and the utilization of alternative methods. Analytes that were detected during the current event and were not detectable during past events include chloromethane, 1,2-dichloroethane, and benzene in Well OWDFMW01; and multiple PAHs in several wells. Consequently, these analytes may have been present at the currently detected concentrations during previous events without being detected and do not necessarily indicate any trend. All newly detected analytes were below their respective DOH EALs.

The data assessment concludes that all data generated during this event are usable for the intended purpose, with the limitations described above.

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TABLE 3.1
Quality Control Results for Groundwater Sampling (April 22 and 23, 2015)
Red Hill Bulk Fuel Storage Facility
April 2015 Quarterly Monitoring Report

Method	Chemical	DOH EAL	OWDFMW01 (ES137)					OWDFMW01 (ES138) (Dup)					RPD Duplicate (%)	ES Trip				
			Results	Q	LOQ	LOD	DL	Results	Q	LOQ	LOD	DL		Results	Q	LOQ	LOD	DL
EPA 8015C	TPH-g	100	N.D.	U	50	25	13	N.D.	U	50	25	13	NA	N.D.	U	50	25	13
	TPH-d	100	**120**	Z	53	21	12	**120**	Z	53	21	12	0.00	-	-	-	-	-
	TPH-o	100	**110**	ZB	110	53	20	**140**	ZB	110	53	20	24.00	-	-	-	-	-
EPA 8270D SIM	Acenaphthene	20	N.D.	U	0.020	0.0050	0.0044	N.D.	U	0.020	0.0050	0.0044	NA	-	-	-	-	-
	Acenaphthylene	30	N.D.	U	0.020	0.0050	0.0034	N.D.	U	0.020	0.0050	0.0034	NA	-	-	-	-	-
	Anthracene	0.73	N.D.	U	0.020	0.0050	0.0036	N.D.	U	0.020	0.0050	0.0036	NA	-	-	-	-	-
	Benzo[a]anthracene	0.027	0.0033	JB	0.020	0.0050	0.0026	0.0029	JB	0.020	0.0050	0.0026	12.90	-	-	-	-	-
	Benzo[g,h,i]perylene	0.10	N.D.	U	0.020	0.0050	0.0029	N.D.	U	0.020	0.0050	0.0029	NA	-	-	-	-	-
	Benzo[a]pyrene	0.014	N.D.	U	0.020	0.0050	0.0043	N.D.	U	0.020	0.0050	0.0043	NA	-	-	-	-	-
	Benzo[b]fluoranthene	0.092	N.D.	U	0.020	0.0050	0.0041	N.D.	U	0.020	0.0050	0.0041	NA	-	-	-	-	-
	Benzo[k]fluoranthene	0.4	N.D.	U	0.020	0.0050	0.0030	N.D.	U	0.020	0.0050	0.0030	NA	-	-	-	-	-
	Chrysene	0.35	N.D.	U	0.020	0.0050	0.0034	N.D.	U	0.020	0.0050	0.0034	NA	-	-	-	-	-
	Dibenzo[a,h]anthracene	0.0092	N.D.	U	0.020	0.0050	0.0025	N.D.	U	0.020	0.0050	0.0025	NA	-	-	-	-	-
	Fluoranthene	8	N.D.	U	0.020	0.020	0.010	N.D.	U	0.020	0.020	0.010	NA	-	-	-	-	-
	Fluorene	3.9	0.0039	JX	0.020	0.0050	0.0038	N.D.	U	0.020	0.0050	0.0038	200	-	-	-	-	-
	Indeno[1,2,3-cd]pyrene	0.92	N.D.	U	0.020	0.0050	0.0026	N.D.	U	0.020	0.0050	0.0026	NA	-	-	-	-	-
	1-Methylnaphthalene	2.1	0.023		0.020	0.0050	0.0035	0.020		0.020	0.0050	0.0035	13.95	-	-	-	-	-
	2-Methylnaphthalene	2.1	0.017	J	0.020	0.0050	0.0023	0.015	J	0.020	0.0050	0.0023	12.50	-	-	-	-	-
	Naphthalene	17	0.025		0.020	0.0050	0.0038	0.023		0.020	0.0050	0.0038	8.33	-	-	-	-	-
	Phenanthrene	4.6	0.0075	J	0.020	0.0050	0.0050	0.0064	J	0.020	0.0050	0.0050	15.83	-	-	-	-	-
	Pyrene	2	N.D.	U	0.020	0.010	0.0053	N.D.	U	0.020	0.010	0.0053	NA	-	-	-	-	-
EPA 8260C/ 8260-SIM/ 8011	1,1,1,2-Tetrachloroethane	0.52	N.D.	U	0.50	0.20	0.11	N.D.	U	0.50	0.20	0.11	NA	N.D.	U	0.50	0.20	0.11
	1,1,2,2-Tetrachloroethane	0.067	N.D.	U	0.020	0.015	0.0087	N.D.	U	0.020	0.015	0.0087	NA	N.D.	U	0.020	0.015	0.0087
	1,1,1-Trichloroethane	62	N.D.	U	0.50	0.20	0.075	N.D.	U	0.50	0.20	0.075	NA	N.D.	U	0.50	0.20	0.075
	1,1,2-Trichloroethane	5	N.D.	U	0.50	0.40	0.14	N.D.	U	0.50	0.40	0.14	NA	N.D.	U	0.50	0.40	0.14
	1,1-Dichloroethane	2.4	N.D.	U	0.50	0.20	0.077	N.D.	U	0.50	0.20	0.077	NA	N.D.	U	0.50	0.20	0.077
	1,1-Dichloroethylene	7	N.D.	U	0.50	0.20	0.08	N.D.	U	0.50	0.20	0.08	NA	N.D.	U	0.50	0.20	0.08
	1,2,3-Trichloropropane	0.6	N.D.	U	0.50	0.50	0.20	N.D.	U	0.50	0.50	0.20	NA	N.D.	U	0.50	0.50	0.20
	1,2,4-Trichlorobenzene	25	N.D.	U	2.0	0.30	0.096	N.D.	U	2.0	0.30	0.096	NA	N.D.	U	2.0	0.30	0.096
	1,2-Dibromo-3- chloropropane	0.04	N.D.	UJ	0.0096	0.0040	0.0036	N.D.	UJ	0.0096	0.0040	0.0036	NA	N.D.	UJ	0.0097	0.0040	0.0036
	1,2-Dibromoethane	0.04	N.D.	UJ	0.0096	0.0040	0.0030	N.D.	UJ	0.0096	0.0040	0.0030	NA	N.D.	UJ	0.0097	0.0040	0.0030
	1,2-Dichlorobenzene	10	N.D.	U	0.50	0.20	0.12	N.D.	U	0.50	0.20	0.12	NA	N.D.	U	0.50	0.20	0.12
	1,2-Dichloroethane	0.15	0.010	J	0.020	0.015	0.0058	0.0081	J	0.020	0.015	0.0058	20.99	N.D.	U	0.020	0.015	0.0058
	1,2-Dichloropropane	5	N.D.	U	0.50	0.20	0.095	N.D.	U	0.50	0.20	0.095	NA	N.D.	U	0.50	0.20	0.095
	1,3-Dichlorobenzene	5	N.D.	U	0.50	0.20	0.10	N.D.	U	0.50	0.20	0.10	NA	N.D.	U	0.50	0.20	0.10
	1,3-Dichloropropene (total of cis/trans)	0.43	N.D.	U	0.50	0.20	0.18	N.D.	U	0.50	0.20	0.18	NA	N.D.	U	0.50	0.20	0.18
	1,4-Dichlorobenzene	5	N.D.	U	0.50	0.20	0.12	N.D.	U	0.50	0.20	0.12	NA	N.D.	U	0.50	0.20	0.12
	Acetone	1,500	25		20	10	3.3	25		20	10	3.3	0.00	N.D.	U	20	10	3.3
	Benzene	5	0.070	J	0.50	0.10	0.062	N.D.	U	0.50	0.10	0.062	200	N.D.	U	0.50	0.10	0.062
	Bromodichloromethane	0.12	N.D.	U	0.020	0.010	0.0034	N.D.	U	0.020	0.010	0.0034	NA	0.021		0.020	0.010	0.0034
	Bromoform	80	N.D.	U	0.50	0.50	0.16	N.D.	U	0.50	0.50	0.16	NA	N.D.	U	0.50	0.50	0.16
	Bromomethane	8.7	N.D.	U	0.50	0.30	0.10	N.D.	U	0.50	0.30	0.10	NA	N.D.	U	0.50	0.30	0.10
	Carbon Tetrachloride	5	N.D.	U	0.50	0.20	0.096	N.D.	U	0.50	0.20	0.096	NA	N.D.	U	0.50	0.20	0.096
	Chlorobenzene	25	N.D.	U	0.50	0.20	0.11	N.D.	U	0.50	0.20	0.11	NA	N.D.	U	0.50	0.20	0.11
	Chloroethane	16	N.D.	U	0.50	0.20	0.16	N.D.	U	0.50	0.20	0.16	NA	N.D.	U	0.50	0.20	0.16
	Chloroform	70	N.D.	U	0.50	0.20	0.072	N.D.	U	0.50	0.20	0.072	NA	0.10	J	0.50	0.20	0.072
	Chloromethane	1.8	0.070	J	0.50	0.20	0.068	N.D.	U	0.50	0.20	0.068	200	N.D.	U	0.50	0.20	0.068
	cis-1,2-Dichloroethylene	70	N.D.	U	0.50	0.20	0.067	N.D.	U	0.50	0.20	0.067	NA	N.D.	U	0.50	0.20	0.067
	Dibromochloromethane	0.16	N.D.	U	0.020	0.010	0.0088	N.D.	U	0.020	0.010	0.0088	NA	N.D.	U	0.020	0.010	0.0088
	Ethylbenzene	30	N.D.	U	0.50	0.10	0.050	N.D.	U	0.50	0.10	0.050	NA	N.D.	U	0.50	0.10	0.050
	Hexachlorobutadiene	0.86	N.D.	U	2.0	0.30	0.11	N.D.	U	2.0	0.30	0.11	NA	N.D.	U	2.0	0.30	0.11
	Methyl ethyl ketone (2-Butanone)	7,100	N.D.	U	20	4	1.9	N.D.	U	20	4	1.9	NA	N.D.	U	20	4	1.9
	Methyl isobutyl ketone (4-Methyl-2-Pentanone)	170	N.D.	U	20	10	2.6	N.D.	U	20	10	2.6	NA	N.D.	U	20	10	2.6
	Methyl tert-butyl Ether	5	N.D.	U	0.50	0.30	0.11	N.D.	U	0.50	0.30	0.11	NA	N.D.	U	0.50	0.30	0.11
	Methylene chloride	4.8	N.D.	U	2.0	0.20	0.10	N.D.	U	2.0	0.20	0.10	NA	0.19	J	2.0	0.20	0.10
	Styrene	10	N.D.	U	0.50	0.20	0.089	N.D.	U	0.50	0.20	0.089	NA	N.D.	U	0.50	0.20	0.089
	Tetrachloroethylene	5	N.D.	U	0.50	0.20	0.099	N.D.	U	0.50	0.20	0.099	NA	N.D.	U	0.50	0.20	0.099
	Toluene	40	N.D.	U	0.50	0.10	0.054	N.D.	U	0.50	0.10	0.054	NA	N.D.	U	0.50	0.10	0.054
	trans-1,2- Dichloroethylene	100	N.D.	U	0.50	0.20	0.072	N.D.	U	0.50	0.20	0.072	NA	N.D.	U	0.50	0.20	0.072
	Trichloroethylene	5	N.D.	U	0.50	0.10	0.10	N.D.	U	0.50	0.10	0.10	NA	N.D.	U	0.50	0.10	0.10
	Vinyl chloride	2	N.D.	U	0.50	0.10	0.075	N.D.	U	0.50	0.10	0.075	NA	N.D.	U	0.50	0.10	0.075
	Xylenes	20	N.D.	U	1.0	0.20	0.18	N.D.	U	1.0	0.20	0.18	NA	N.D.	U	1.0	0.20	0.18
EPA 6020	Dissolved Lead	5.6	0.036		0.020	0.010	0.005	0.038		0.020	0.010	0.005	5.41	-	-	-	-	-

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

- Not Analyzed
DL Detection Limit or Method Detection Limit (MDL)
DOH EAL DOH Tier 1 Environmental Action Levels for groundwater where groundwater is a current drinking water source and is located within 150 meters of surface water (DOH, Fall 2011).
EPA Environmental Protection Agency
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
B Analyte was present in the associated method blank.
NA Both results for duplicate pair were non-detect, no RPD calculations.
N.D. Not Detected
Q Qualifiers
TPH-g / TPH-d / TPH-o Total Petroleum Hydrocarbons as gasoline, diesel fuel, and oil
X Possible high bias due to matrix interference.
U Undetected at DL and is reported as less than the LOD.
Z The chromatographic fingerprint does not resemble a petroleum product.

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SECTION 4 – SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

This quarterly monitoring report presents the results of groundwater sampling conducted on April 22 and 23, 2015, 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, 020028, and 140010.

The groundwater sampling was conducted as part of the long-term groundwater and soil vapor monitoring program at the RHSF for NAVSUP FLC Pearl Harbor, under NAVFAC Contract Number N62742-12-D-1853. The sampling was conducted in accordance with the approved WP/SAP and Technical Addendum prepared by ESI.

ESI personnel collected groundwater samples from five monitoring wells (wells HDMW2253-03, OWDFMW01, RHMW04, RHMW06, and RHMW07). One primary sample and one duplicate sample were collected from well OWDFMW01. A summary of the analytical results is provided below.

- **HDMW2253-03** – The only analytes detected in groundwater were TPH-d (13 µg/L), TPH-o (55 µg/L), benzo[a]anthracene (0.0032 µg/L), toluene (0.070 µg/L), and lead (0.078 µg/L). The concentrations did not exceed the DOH Tier 1 EALs.
- **OWDFMW01** – Concentrations of TPH-d (120 µg/L in both primary and duplicate samples) and TPH-o (110 and 140 µg/L) were detected above their respective DOH Tier 1 EALs. The mismatch between the chromatographic profiles of the samples from OWDFMW01 and the standard used in the quantitation of TPH-d and TPH-o by Method 8015, and the high bias represented by contamination in the Method Blanks resulted in a significant decrease in the accuracy of the results. Due to the high bias and inaccuracy, the actual TPH-o concentration may have been below the DOH Tier 1 EAL. Lead (0.036 and 0.038 µg/L) and several VOCs and PAHs were also detected; however, none of the detected concentrations exceeded their respective DOH Tier 1 EALs.
- **RHMW04** – The only analytes detected in groundwater were TPH-o (25 µg/L), lead (0.006 µg/L), and several PAHs. The concentrations did not exceed their respective DOH Tier 1 EALs.
- **RHMW06** – The only analytes detected in groundwater were TPH-d (20 µg/L), TPH-o (47 µg/L), benzo[a]anthracene (0.0028 µg/L), bromodichloromethane (0.0039 µg/L), and lead (0.006 µg/L). The concentrations did not exceed their respective DOH Tier 1 EALs.
- **RHMW07** – The only analytes detected in groundwater were TPH-d (26 µg/L), TPH-o (47 µg/L), benzo[a]anthracene (0.0027 µg/L), fluorene (0.0042 µg/L), phenanthrene (0.0072 µg/L), and lead (0.006 µg/L). The concentrations did not exceed their respective DOH Tier 1 EALs.

Groundwater Contaminant Trends

Historical groundwater contaminant concentration trends of COPCs that exceeded the DOH EALs are presented in Appendix E. A summary of groundwater contaminant trends for the five monitoring wells is provided below.

- **HDMW2253-03** – TPH-d was detected in this well at a concentration below the DOH Tier 1 EAL. With the exception of a possibly erroneous result obtained during the event in April 2014, TPH-d concentrations have not exceeded the DOH Tier 1 EAL in well HDMW2253-03 since January 2013.
- **OWDFMW01** – TPH-d and TPH-o was detected in both samples from this well at concentrations exceeding the DOH Tier 1 EAL. The TPH-d concentration exceeded the DOH Tier 1 EAL for the first time since April 2014; however, TPH-d concentrations in this well have been generally decreasing since an increase in November 2012. The April 2015 event was the first time TPH-o was detected in this well; however, the detection limits of previous results from 2011 and 2012 exceeded the DOH Tier 1 EAL. Concentrations of all other COPCs detected during this round of quarterly sampling were consistent with historical data.
- **RHMW04** – TPH-o was detected in this well at a concentration below the DOH Tier 1 EAL. This was the first time that samples from well RHMW04 were analyzed for TPH-o. Concentrations of all other COPCs detected during this round of quarterly sampling were below the detection limits of the historical analytical results.
- **RHMW06** – This well was installed in September 2014 and sampled in October 2014 and January 2015. During the October 2014 event, only 2-methylnapthalene was detected, at a concentration below the DOH Tier 1 EAL. No COPCs were detected during the January 2015 sampling event. During the April 2015 sampling event, TPH-d, TPH-o, benzo[a]anthracene, bromodichloromethane, and lead were detected at concentrations below their respective DOH Tier 1 EALs. The detected concentrations were all below the detection limits used in the October 2014 and January 2015 events.
- **RHMW07** – This well was installed in October 2014 and sampled in October 2014 and January 2015. During the October 2014 event, TPH-d, 2-methylnaphthalene, and acetone were detected at concentrations below their respective DOH Tier 1 EALs. No COPCs were detected during the January 2015 sampling event. During the April 2015 sampling event, TPH-d, TPH-o, benzo[a]anthracene, fluorene, phenanthrene, and lead were detected at concentrations below their respective DOH Tier 1 EALs. With the exception of phenanthrene, the detected concentrations were all below the detection limits used in the October 2014 event. The detected concentration of phenanthrene was below the LOD used in the October 2014 and January 2015 events.

Conclusions and Recommendations

During the April 2014 sampling event, TPH-d and TPH-o were detected at concentrations above their respective DOH Tier 1 EALs in OWDFMW01. The TPH-d concentration was below the DOH Tier 1 EAL during the previous January 2015 event; the samples were not

analyzed for TPH-o during the January 2015 event. The groundwater contaminant concentrations in the other wells remained at low concentrations and did not change significantly since the previous sampling event (January 2015), or were not detected. No COPCs in wells HDMW2253-03, RHMW04, RHMW06 or RHMW07 were detected at concentrations above their respective DOH Tier 1 EALs.

Acetone has been detected in well OWDFMW01 at low concentrations occasionally since October 2010 and then in every groundwater sampling event since April 2013. The well also has an unnaturally high pH in the range of 10 to 13. As discussed in Section 3, these conditions are likely unrelated to a release from the USTs at RHSF and may be a result of a deficiency in the well sealing material or another condition isolated to the immediate area of the well. This suggests that the associated sample data may not accurately represent the conditions of the groundwater at the site.

Based on a suspected 2014 release at the RHSF and the results of the recent groundwater sampling and analysis, continued groundwater monitoring at the RHSF is recommended. If the TPH-d concentrations significantly increase, the monitoring frequency should be increased to monthly, even though wells RHMW04, RHMW06, RHMW07, HDMW2253-03, and OWDFMW01 are not included in the RHSF Groundwater Protection Plan.

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SECTION 5 – FUTURE WORK

Future work includes the third quarter 2015 groundwater monitoring, which is tentatively scheduled for July 2015. A quarterly groundwater monitoring report will be prepared to document the sampling.

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FIGURES

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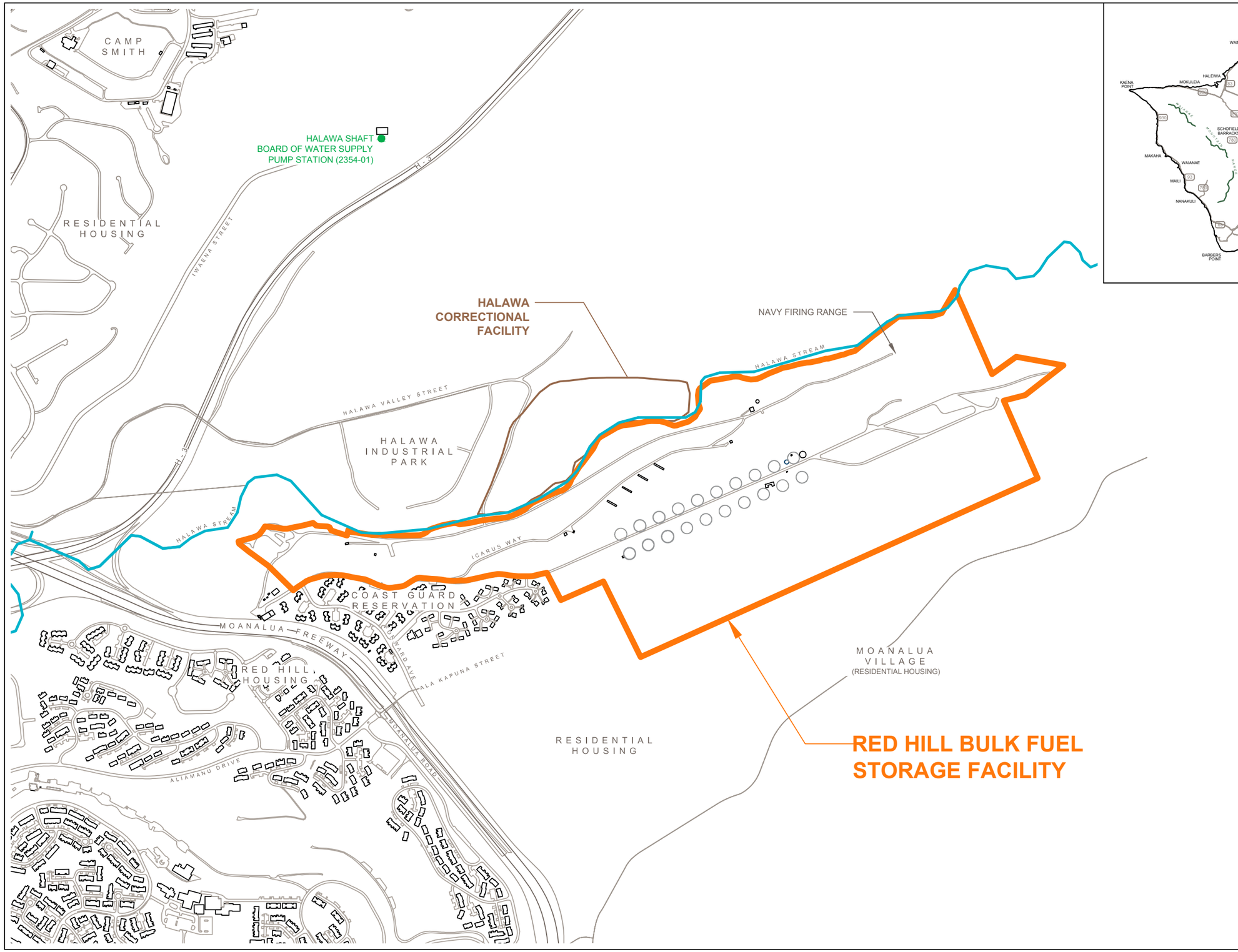

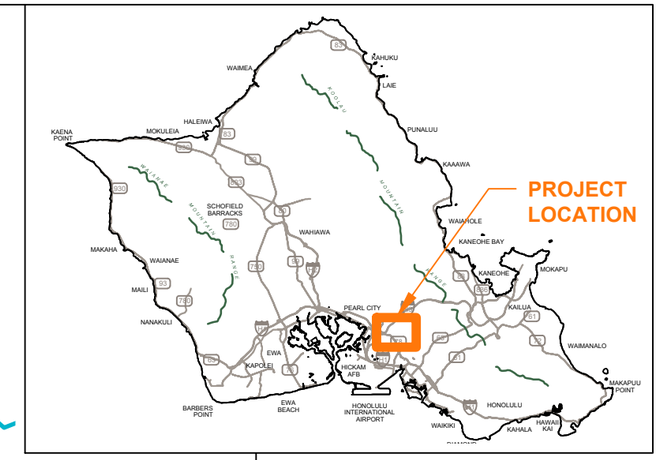

NOTES

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

SOURCES

Pearl Harbor Base Map

Navy GIS files

NORTH

GRAPHIC SCALE

900 0 900

Scale in Feet

FIGURE 1

SITE LOCATION

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

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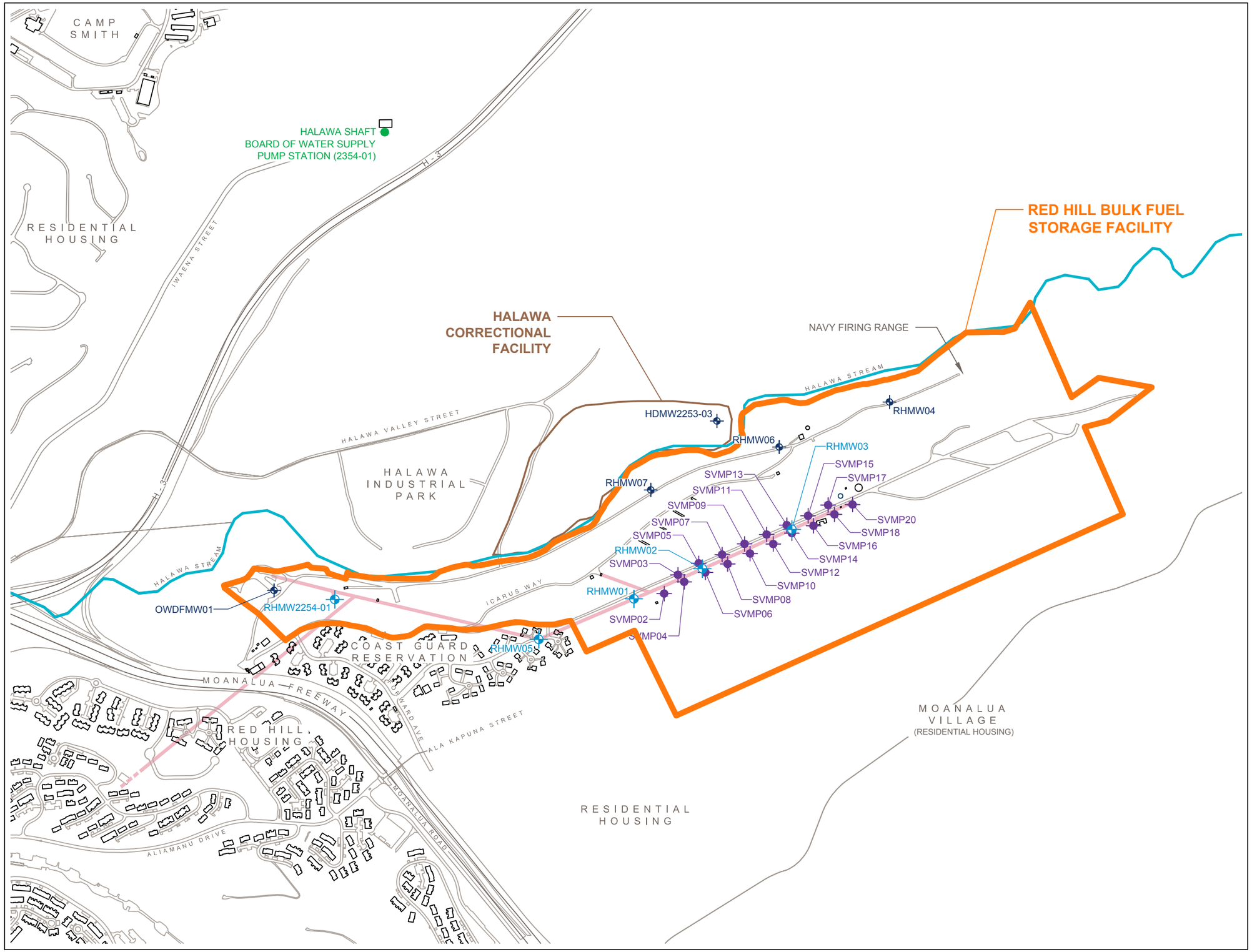

LEGEND

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

NOTES

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SOURCES

Pearl Harbor Base Map

Navy GIS files

Well Installation Report, Battelle, March 2015

NORTH

GRAPHIC SCALE

800 0 800

Scale in Feet

FIGURE 2

SITE LAYOUT

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

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APPENDIX A

Groundwater Sampling Logs

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Groundwater Sampling Log

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

Initial Water Level: 120.68 ft Date: 4/22/2015 Time: 1028

Total Depth of Well: 144.74 ft Personnel Involved: Kirk Markle, Jeff Hattemer

Length of Saturated Zone: 24.06 ft Weather Conditions: Hot, sunny

Volume of Water to be Removed: 7.0 L Method of Removal: Disposable Hand Bailer

Water Level After Purging: 121.32 ft Pumping Rate: 0.51 L/min

Well Purge Data:

Time	Volume Removed	pH	Conductivity (mS/cm)	DO (mg/l)	Temperature	Salinity	Redox (ORP) (mV)
1124	0.0 L	11.21	3.274	2.27	24.35	-	-170.1
1127	1.9 L	11.22	3.276	2.02	24.02	-	-168.2
1130	3.8 L	11.21	3.270	2.00	24.28	-	-159.3
1133	4.7 L	11.12	3.759	2.17	24.39	-	-158.6
1135	5.7 L	11.16	3.262	1.83	24.41	-	-164.7
1137	6.6 L	11.16	3.270	2.45	24.31	-	-158.1
1139	7.6 L	11.12	3.254	2.63	24.33	-	-159.1

Sample Withdrawal Method: Disposable Hand Bailer

Appearance of Sample:

Color: Clear

Turbidity: Low

Sediment: White Particles

Other: None

Laboratory Analysis Parameters and Preservatives: TPH-g, -d, -o - 8015; VOCs - 8260, 8260 SIM, 8011; PAHs - 8270 SIM; lead - 6020

Number and Types of Sample Containers: 24 - 40ml VOAs, 8 - 1L amber jar, 4 - 250ml HDPE

Sample Identification Numbers: ES137, ES137MS/MSD [1100]; ES138 [1200]

Decontamination Procedures: Triple Rinsed

Notes: YSI did not have salinity parameter

Sampled by: Kirk Markle, Jeff Hattemer

Sampled Delivered to: ALS Transporters: FedEx

Date: 4/24/2015 Time: 1300

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: 206.67 ft Date: 1/29/2015 Time: 844

Total Depth of Well: 1575 ft Personnel Involved: Kirk Markle, Jeff Hattemer

Length of Saturated Zone: 1368 ft Weather Conditions: Overcast

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

Water Level After Purging: 206.67 ft Pumping Rate: 0.14 L/min

Well Purge Data:

Time	Volume Removed	pH	Conductivity (mS/cm)	DO (mg/l)	Temperature	Salinity	Redox (ORP) (mV)
855	0.0 L	7.00	0.509	8.42	22.20	-	-79.6
904	1.0 L	6.59	0.473	0.03	22.22	-	-60.7
913	2.0 L	6.58	0.472	0.02	22.33	-	-62.8
920	3.0 L	6.54	0.469	0.03	22.31	-	-64.3
924	4.0 L	6.54	0.471	0.02	22.29	-	-55.6
928	5.0 L	6.57	0.469	0.02	22.32	-	-63.8

Sample Withdrawal Method: Disposable Hand Bailer

Appearance of Sample:

Color: Tan

Turbidity: Low

Sediment: Tiny rust flakes

Other: None

Laboratory Analysis Parameters and Preservatives: TPH-g, -d, -o - 8015; VOCs - 8260, 8260 SIM, 8011; PAHs - 8270 SIM; lead - 6020

Number and Types of Sample Containers: 8 - 40ml VOAs, 3 - 1L amber jar, 1 - 250ml HDPE

Sample Identification Numbers: ES136 [0930]

Decontamination Procedures: Triple Rinsed

Notes: YSI did not have salinity parameter.

Sampled by: Kirk Markle, Jeff Hattemer

Sampled Delivered to: ALS Transporters: FedEx

Date: 4/24/2015 Time: 1300

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: RHMW04 Location: Red Hill Bulk Fuel Storage Facility Project No.: 114017

Initial Water Level: 294.43 ft Date: 4/22/2015 Time: 1320

Total Depth of Well: 305 ft Personnel Involved: Kirk Markle, Jeff Hattemer

Length of Saturated Zone: 10.6 ft Weather Conditions: Overcast

Volume of Water to be Removed: 8.0 L Method of Removal: Dedicated Bladder Pump

Water Level After Purging: 293.88 ft Pumping Rate: 0.44 L/min

Well Purge Data:

Time	Volume Removed	pH	Conductivity (mS/cm)	DO (mg/l)	Temperature	Salinity	Redox (ORP) (mV)
1326	0.0 L	8.56	0.334	8.97	24.69	-	71.5
1330	1.0 L	8.19	0.429	8.66	22.93	-	44.5
1332	2.0 L	7.42	0.424	7.34	22.38	-	63.9
1334	3.0 L	6.95	0.325	8.60	22.45	-	102.8
1336	4.0 L	6.91	0.455	8.50	22.15	-	78.5
1338	5.0 L	6.81	0.455	8.46	22.09	-	78.2
1340	6.0 L	6.79	0.455	8.44	22.03	-	65.9
1342	7.0 L	6.81	0.455	8.44	22.11	-	61.1
1344	8.0 L	6.83	0.454	8.42	22.11	-	59.1

Sample Withdrawal Method: Dedicated Bladder Pump

Appearance of Sample:

Color: Clear

Turbidity: None

Sediment: None

Other: None

Laboratory Analysis Parameters and Preservatives: TPH-g, -d, -o - 8015; VOCs - 8260, 8260 SIM, 8011; PAHs - 8270 SIM; lead - 6020

Number and Types of Sample Containers: 8 - 40ml VOAs, 3 - 1L amber jar, 1 - 250ml HDPE

Sample Identification Numbers: ES139 [1415]

Decontamination Procedures: Triple Rinsed

Notes: YSI did not have salinity parameter.

Sampled by: Kirk Markle, Jeff Hattemer

Sampled Delivered to: ALS Transporters: FedEx

Date: 4/24/2015 Time: 1300

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: RHMW06 Location: Red Hill Bulk Fuel Storage Facility Project No.: 114017

Initial Water Level: 241.59 ft Date: 4/22/2015 Time: 845

Total Depth of Well: 264.4 ft Personnel Involved: Kirk Markle, Jeff Hattemer

Length of Saturated Zone: 22.8 ft Weather Conditions: Partly Cloudy

Volume of Water to be Removed: 114 L Method of Removal: Dedicated Bladder Pump

Water Level After Purging: 241.67 ft Pumping Rate: 0.79 L/min

Well Purge Data:

Time	Volume Removed	pH	Conductivity (mS/cm)	DO (mg/l)	Temperature	Salinity	Redox (ORP) (mV)
900	0 L	7.96	1.760	8.67	25.00	-	-41.4
918	11 L	6.80	1.875	5.40	22.71	-	-7.2
930	23 L	6.84	1.872	5.37	22.69	-	-9.4
947	34 L	6.88	1.862	6.78	22.90	-	-11.4
957	45 L	6.88	1.850	5.38	22.80	-	-4.5
1009	57 L	6.88	1.842	5.45	22.77	-	3.4
1023	68 L	6.90	1.818	6.41	22.93	-	11.4
1037	80 L	6.90	1.783	5.55	22.71	-	10.9
1055	91 L	6.91	1.745	5.40	22.78	-	10.0
1110	102 L	6.95	1.702	6.69	22.69	-	8.8
1124	114 L	6.94	1.676	5.21	22.87	-	5.7

Sample Withdrawal Method: Dedicated Bladder Pump

Appearance of Sample:

Color: Clear

Turbidity: Low

Sediment: None

Other: None

Laboratory Analysis Parameters and Preservatives: TPH-g, -d, -o - 8015; VOCs - 8260, 8260 SIM, 8011; PAHs - 8270 SIM; lead - 6020

Number and Types of Sample Containers: 8 - 40ml VOAs, 3 - 1L amber jar, 1 - 250ml HDPE

Sample Identification Numbers: ES140 [1130]

Decontamination Procedures: Triple Rinsed

Notes: YSI did not have salinity parameter

Sampled by: Kirk Markle, Jeff Hattemer

Sampled Delivered to: ALS Transporters: FedEx

Date: 4/24/2015 Time: 1300

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: RHMW07 Location: Red Hill Bulk Fuel Storage Facility Project No.: 114017

Initial Water Level: 198.40 ft Date: 4/23/2015 Time: 1155

Total Depth of Well: 218.1 ft Personnel Involved: Kirk Markle, Jeff Hattemer

Length of Saturated Zone: 19.7 ft Weather Conditions: Partly Cloudy

Volume of Water to be Removed: 98 L Method of Removal: Dedicated Bladder Pump

Water Level After Purging: 200.18 ft Pumping Rate: 1.02 L/min

Well Purge Data:

Time	Volume Removed	pH	Conductivity (mS/cm)	DO (mg/l)	Temperature	Salinity	Redox (ORP) (mV)
1203	0 L	7.21	1.921	3.99	23.09	-	-28.4
1218	11 L	6.99	1.925	1.19	22.94	-	-45.6
1230	23 L	7.02	1.905	0.79	22.92	-	-51.5
1238	34 L	7.10	1.811	0.81	22.99	-	-62.7
1249	45 L	7.16	1.715	2.02	23.00	-	-74.5
1259	57 L	7.13	1.635	0.51	22.87	-	-83.9
1309	68 L	7.13	1.535	0.48	22.96	-	-83.9
1319	80 L	7.13	1.459	0.80	23.01	-	-85.2
1333	91 L	7.13	1.355	0.33	22.94	-	-87.2
1340	99 L	7.13	1.304	0.55	23.10	-	-84.2

Sample Withdrawal Method: Dedicated Bladder Pump

Appearance of Sample:

Color: Clear

Turbidity: Low

Sediment: None

Other: None

Laboratory Analysis Parameters and Preservatives: TPH-g, -d, -o - 8015; VOCs - 8260, 8260 SIM, 8011; PAHs - 8270 SIM; lead - 6020

Number and Types of Sample Containers: 8 - 40ml VOAs, 3 - 1L amber jar, 1 - 250ml HDPE

Sample Identification Numbers: ES141 [1400]

Decontamination Procedures: Triple Rinsed

Notes: YSI did not have salinity parameter

Sampled by: Kirk Markle, Jeff Hattemer

Sampled Delivered to: ALS Transporters: FedEx

Date: 4/24/2015 Time: 1300

Capacity of Casing (Gallons/Linear Feet)

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

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APPENDIX B

Field Notes

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Location RHSF Date 4/22/15

Project / Client NAVFAC

Purpose: GW sampling
Personnel: JLt, KM
Weather: Sunny
0800 @ Red Hill. Drop off drums. Safety meeting.
0815 Meet DLNR @ Prison.
Gauge HDMW 2253-03
DTW = 208.16' btoc
Hand bail #DMW 2253-03
0930 Collected sample ES136
Gauge on DFMW 01. DTW = 120.68' btoc
Hand bail well.
1100 Collected samples ES137, ES137 MS/MSD, and ES138 (dupe @ 1200).
1215 Lunch
1245 Return to RHSF
Gauge RHMW04. DTW = 294.43' btoc.
Purge RHMW04 w/ dedicated bladder pump.
1415 Collected sample ES139.
Pull out ~~with~~ ~~pump~~ pump and tubing from RHMW04
Put tubing in trash

Location RHSF Date 4/22/15

Project / Client NAVFAC

Put pump and cable in to plastic bag
Drop off water in drum
1515 Done cleaning up. Depart site. to buy more ice for samples.

JLt
4/22/15

Location RHSF Date 4/23/15

Project / Client NAVFAC

Purpose: GW sampling
Personnel: JLL, KM
Weather: Partly cloudy
0800 @ RHSF, Safety meeting
0820 Set up @ R11MW06
0845 Gauge R11MW06. DTW=241.59' btoc.
1130 Collected sample ES140
Purged 30 gal.
1145 Set up @ R11MW07
Gauge R11MW07. DTW= 198.40' btoc.
1400 Collected sample ES141.
1415 Pulled out pump R11MW07.
1420 Dumped water in drum @ OWS. 1 drum - 55 gal generated during this event.
1430 Meet Tracie Sober and hand off samples
1445 Depart site to return nitrogen tanks.

JL
4/23/15

Location Date

Project / Client

APPENDIX C

Laboratory Reports
(included on attached CD)

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APPENDIX D

Fact Sheet, Quantitation and Detection

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Fact Sheet: Detection and Quantitation — What Project Managers and Data Users Need to Know

As a Project Manager or decision-maker, you may use environmental data to accomplish one or more of the following tasks:

- Determine whether a chemical substance is present in an environmental sample at or above some threshold value or action level;
- Verify that a pollutant concentration remains below a permit limit;
- Evaluate potential risks to human health or the environment;
- Monitor changes in concentrations of contaminants; or
- Determine the effectiveness of remediation activities.

Making correct decisions in these cases often depends on the ability of an analytical method to detect and measure extremely low concentrations of a substance.

This fact sheet has been prepared to: 1) provide Project Managers and data users with basic information about detection and quantitation concepts; and 2) acquaint the reader with detection and quantitation terminology and requirements contained in the *DoD Quality Systems Manual for Environmental Laboratories (DoD QSM)*, Version 4.1. This information should help clarify the uncertainty associated with reporting low-concentration data. It should also help project teams understand the importance of selecting analytical methods that are sensitive enough for their intended uses, i.e., capable of generating reliable data (data of known precision and bias) at the project-specific decision levels.

Measures of Sensitivity — Basic Concepts

The following terms are used to describe the routine sensitivity of analytical procedures:

- DL – Detection Limit
- LOD – Limit of Detection
- LOQ – Limit of Quantitation

All measures of sensitivity are specific to the analyte, sample matrix, test method, instrumentation, and analyst/laboratory performance. Therefore, analytical performance must be demonstrated for each variable (e.g., it is possible that two "identical" instruments from the same manufacturer may exhibit different sensitivities).

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. In other words, if a substance is detected at or above the DL, it can be reliably stated (with 99% confidence) that the analyte is present (there is a 1% chance that the analyte is not present (a false positive)). Note that for reporting purposes, any result at or above the DL must also meet qualitative identification criteria required by the test method. Although a result at or above the DL indicates that the analyte is present, the absence of a result at or above the DL is inconclusive (i.e., one cannot confidently state whether the analyte is present or absent), because the false negative rate at the DL is 50%.

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 a 99% confidence level. In other words, if a sample has a true concentration at the LOD, there is a minimum probability of 99% of reporting a "detection" (a measured value $\geq$ DL) and a 1% chance of reporting a non-detect (a false negative).

The failure to obtain a "detection" should be reported as "<LOD," because the false negative rate at the LOD is 1%. Reporting the sample result as "<DL" is inappropriate because, as stated above, the false negative rate at the DL is 50%.

The Limit of Quantitation (LOQ) is the lowest concentration of a substance that produces a quantitative result within specified limits of precision and bias. The LOQ is typically larger than the LOD (but may be equal to the LOD, depending upon the acceptance limits for precision and bias); therefore, the following is true:

$$DL < LOD \leq LOQ$$

Quantitative results can only be achieved at or above the LOQ. Measurements between the DL and the LOQ assure the *presence* of the analyte with confidence, but their numeric values are estimates.

Types of Procedures for Estimating Sensitivity

Numerical estimates of the DL, LOD, or LOQ for a specific analyte, matrix, and method can be calculated using various statistical procedures, which involve spiking reagent water or other specific matrix with low concentrations of the analyte of interest. At this time, unfortunately, universally accepted statistical procedures do not exist.

The estimator that has been most commonly used by environmental laboratories is the EPA Method Detection Limit (MDL), which is an approximation of the DL. EPA has defined the MDL as the "minimum concentration of a substance that can be measured and reported with 99% confidence that the analyte concentration is greater than zero, and is determined from analysis of a sample in a given matrix containing the analyte."[1] Calculating the MDL at 99% confidence means there is a 1% probability that a sample having a result at or above the MDL is a false positive. The EPA MDL was designed to protect against false positives.

Uses and Limitations of the MDL

When performed correctly and consistently, MDLs determined using the EPA procedure can be useful for comparing different laboratories' performance using the same methods, or the performance of different methods within the same laboratory. Laboratories typically determine the MDL in reagent water, resulting in a "best-case" MDL, which provides limited information about method performance on real-world samples.

The EPA MDL procedure has been criticized as a poor estimator of the DL for the following reasons:

1. It is a single laboratory, short-term estimator that fails to account for analytical bias, changing instrument conditions, or analyst skill.
2. It assumes uniform variance across all possible spike concentrations, failing to account for the fact that variance increases at higher concentrations.
3. It assumes that measured values at the spike concentration are normally distributed. By using this procedure and spiking at very low concentrations, laboratories have been able to calculate MDLs that cannot be achieved in practice.

DoD QSM Requirements

For the reasons discussed in the previous paragraph, the DoD QSM requires that laboratories verify measures of method sensitivity, in terms of the LOD and LOQ, at least quarterly. Requirements for the LOD and the LOQ are contained in DoD QSM Boxes D-13 and D-14, respectively, which follow:

[1] 40 Code of Federal Regulations (CFR) Part 136, Appendix B, rev. 1.11.

Box D-13

Limit of Detection (LOD): Determination and Verification (Requirement)

A laboratory shall establish a detection limit (DL) using a scientifically valid and documented procedure for each suite of analyte-matrix-method, including surrogates. The detection limit shall be used to determine the LOD for each analyte and matrix as well as for all preparatory and cleanup methods routinely used on samples, as follows:

After each detection limit determination, the laboratory must immediately establish the LOD by spiking a quality system matrix at approximately two to three times the detection limit (for a single-analyte standard) or one to four times the detection limit (for a multi-analyte standard). This spike concentration establishes the LOD. It is specific to each combination of analyte, matrix, method (including sample preparation), and instrument configuration. The LOD must be verified quarterly. The following requirements apply to the initial detection limit/LOD determinations and to the quarterly LOD verifications.

- The apparent signal to noise ratio at the LOD must be at least three and the results must meet all method requirements for analyte identification (e.g., ion abundance, second-column confirmation, or pattern recognition.) For data systems that do not provide a measure of noise, the signal produced by the verification sample must produce a result that is at least three standard deviations greater than the mean method blank concentrations.
- If a laboratory uses multiple instruments for a given method the LOD must be verified on each.
- If the LOD verification fails, then the laboratory must repeat the detection limit determination and LOD verification at a higher concentration or perform and pass two consecutive LOD verifications at a higher concentration and set the LOD at the higher concentration.
- The laboratory shall maintain documentation for all detection limit determinations and LOD verifications.

Box D-14

Limit of Quantitation (LOQ): Establishment and Verification of LOQ (Requirement)

For DoD projects, the LOQ must be set within the calibration range prior to sample analysis. At a minimum, the LOQ must be verified quarterly.

The laboratory procedure for establishing the LOQ must empirically demonstrate precision and bias at the LOQ. The LOQ and associated precision and bias must meet client requirements and must be reported. If the method is modified, precision and bias at the new LOQ must be demonstrated and reported.

Establishing Project-Specific Requirements for Method Sensitivity

Project teams should establish their project-specific requirements for method sensitivity in terms of a Reporting Limit (RL) for each analyte and matrix. As defined in the DoD QSM, the RL is the lowest concentration value specified by the client that meets project requirements for reporting quantitative data with known precision and bias for a specific analyte in a specific matrix. The LOQ cannot be greater than the RL, if precision and bias of the RL and LOQ are the same. If the LOQ for a particular analytical method or laboratory cannot meet the RL, then a project team has three options:

1. Improve analyst performance or modify the method to achieve a lower LOQ.
2. Select a different method with an LOQ less than or equal to the RL.
3. Raise the RL.

Please note that precision and bias must be taken into consideration when assessing the LOQ versus the RL. Also note that data below the RL can be reported; however they are estimated values if less than the LOQ.

Reporting and Flagging Analytical Data

Although data reporting and flagging requirements are project-specific, all reported LOD and LOQ shall be adjusted for the size of sample aliquots, concentration/dilution factors, and percent solids. In addition, the following example (based on Box 47 of DoD QSM Version 4.1) illustrates the proper use of the "U" and "J" data qualifier flags for non-detect and estimated analytical results, respectively.

U – Analyte was not detected and is reported as less than the LOD or as defined by the client. The LOD has been adjusted for any dilution or concentration of the sample (* see Example, below).

J – The reported result is an estimated value (e.g., matrix interference was observed or the analyte was detected at a concentration outside the quantitation range, see Box 33).

Example: DL = 2, LOD = 4, LOQ = 20, and RL = 30 with the precision and bias of the LOQ meeting those of the RL and all samples are undiluted.

Sample #1:	Analytical result: Non-detect	Reported result: <4 U
Sample #2:	Analytical result: 3	Reported result: 3 J
Sample #3:	Analytical result: 10	Reported result: 10 J
Sample #4:	Analytical result: 20	Reported result: 20
Sample #5:	Analytical result: 30	Reported result: 30

Understanding and Documenting Uncertainty for Low-Concentration Data

As mentioned above, detection and quantitation limits are laboratory specific. Following are some steps Project Managers can take to document measurement uncertainty for low concentration data.

- As part of the laboratory selection process, provide the laboratory with project-specific RLs, including precision and bias, for each analyte and matrix. Ask the laboratory to provide its DL, LOD, and LOQ with associated precision and bias for each target analyte, in each matrix of concern (e.g., reagent water, clean sand, etc.), and verify that these values meet project-specific RLs. Request laboratory SOPs for establishing the DL and for establishing and verifying the LOD and LOQ.
- Ask the laboratory to verify the LOD by processing an LOD verification check sample with each batch of samples. This is a quality control sample that is spiked at a concentration at or slightly above the LOD to evaluate whether the analyte of interest is in fact "detectable" in the matrix of interest. To confidently report non-detects, set the reporting for non-detects to less than the LOD.
- If the project involves the collection of unusual or difficult matrices, or if the project-specific RL is near the LOQ, ask the laboratory to verify the LOQ in the project-specific matrix by analyzing a minimum of four replicate samples with known concentrations at the LOQ.
- Review the raw data (e.g., chromatograms) for low-concentration data. If a result is reported above the DL, make sure that the signal-to-noise ratio is at least 3.
- Compare sample results with blank results. If sample results (including chromatograms) cannot be distinguished from blank results, then they are not meaningful.

APPENDIX E

Historical Groundwater Exceedance Trends

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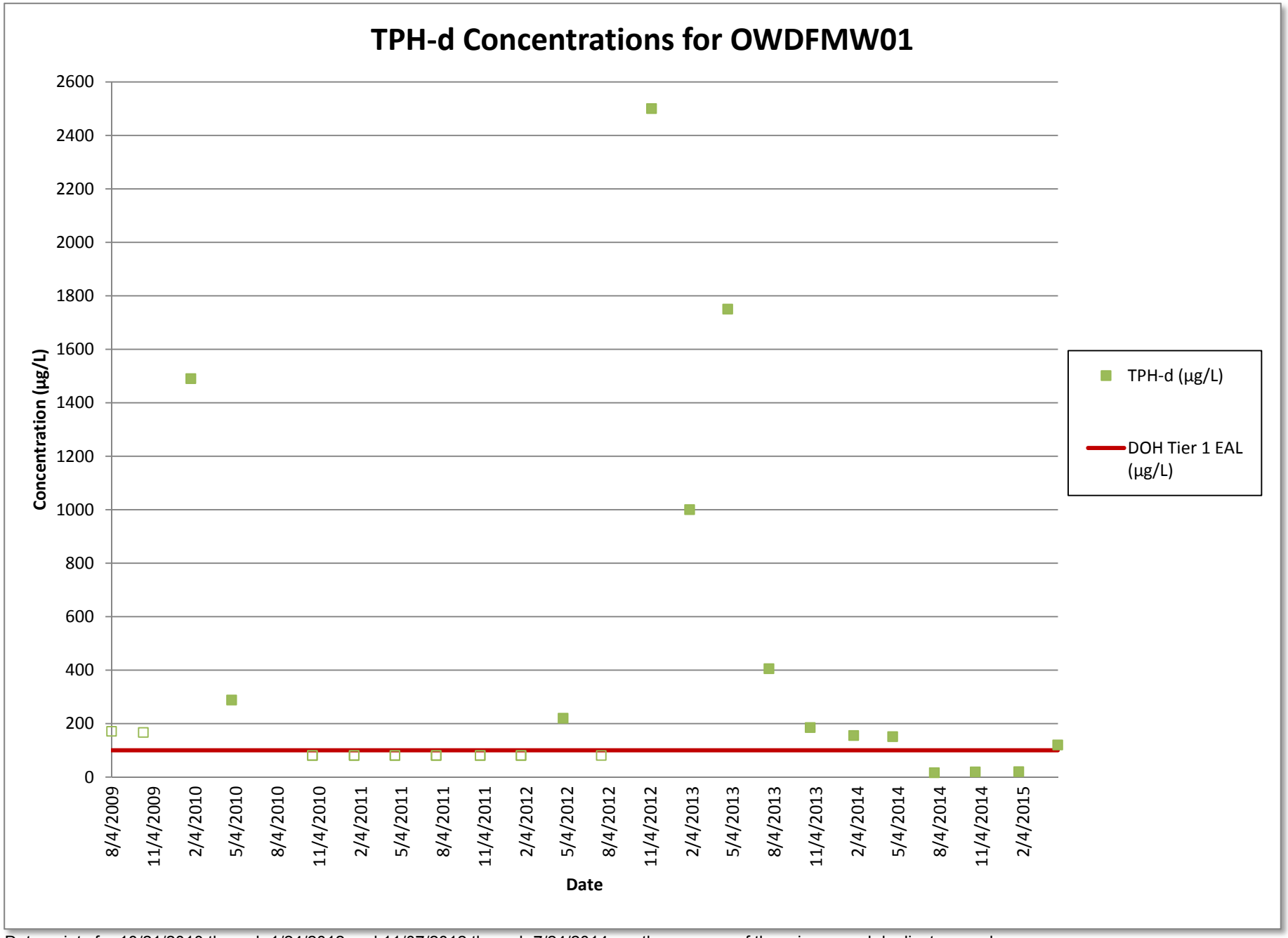

Data points for 10/21/2010 through 1/24/2012 and 11/07/2012 through 7/24/2014 are the average of the primary and duplicate samples.
Unfilled boxes indicate non-detections. Method detection limits (MDLs) are shown for 2009, and limits of detection (LODs) are shown from January 2010 on.

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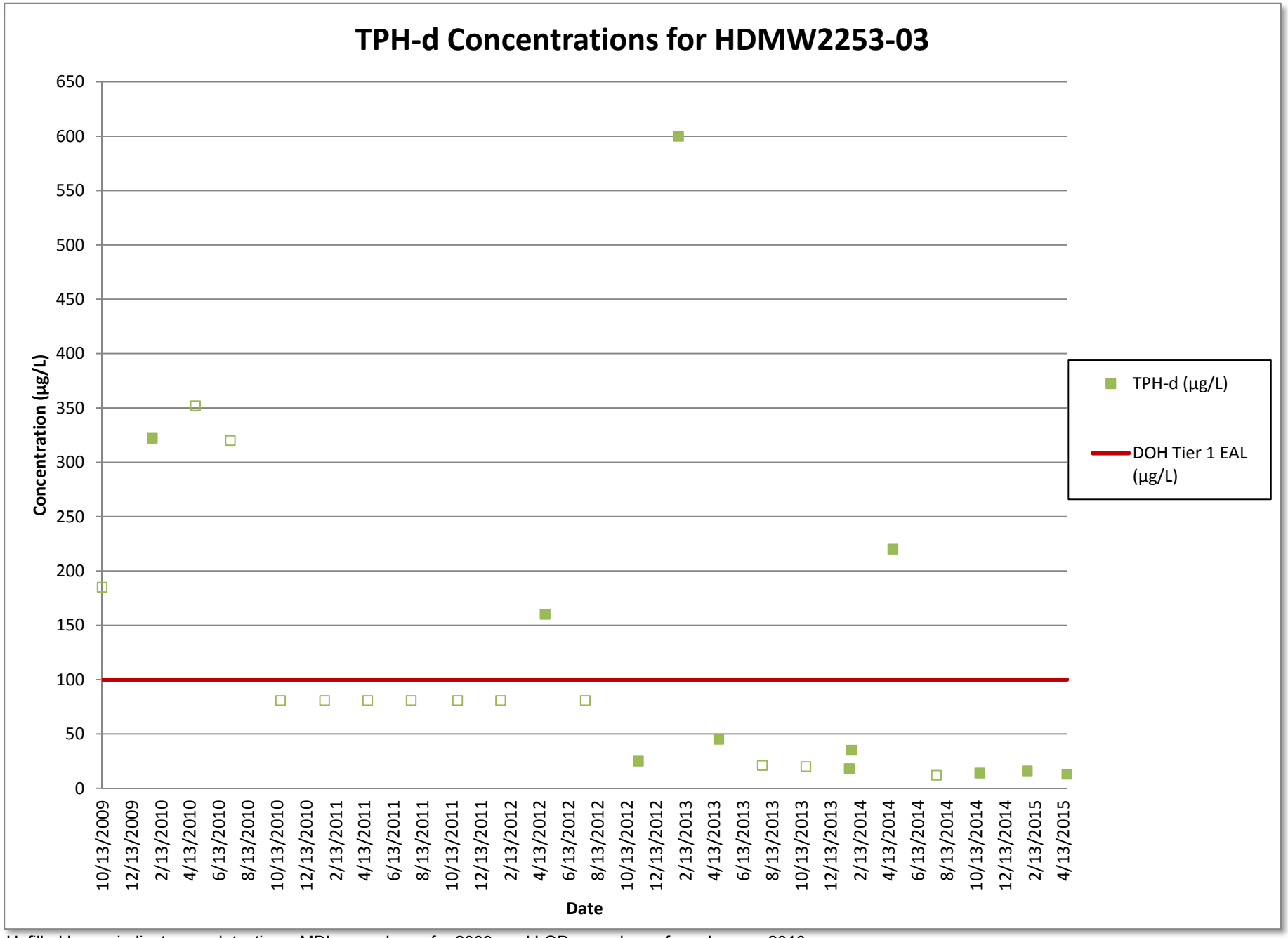

Unfilled boxes indicate non-detections. MDLs are shown for 2009, and LODs are shown from January 2010 on.

4/23/2014 - A review of the chromatograms and historical data concluded the TPH-d subsample for HDMW2253-03 and the duplicate sample for OWDFMW-01 were likely switched during this event. The TPH-d concentration for the OWDFMW-01 duplicate sample was 32 ug/L.

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APPENDIX F

Cumulative Groundwater Results

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Cumulative Groundwater Measurements and Analytical Results for Outside-Tunnel Wells
Red Hill Bulk Fuel Storage Facility

Well Name	Sample ID	Date Sampled	8015C						8260B																											
			TPH-d		TPH-g		TPH-o		TPH-g		1,1,1-Trichloroethane		1,1,2-Trichloroethane		1,1-Dichloroethane		1,1-Dichloroethylene		1,2,3-Trichloropropane		1,2,4-Tricholorobenzene		1,2-Dibromo-3-chloropropane		1,2-Dibromoethane		1,2-Dichlorobenzene		1,2-Dichloroethane		1,2-Dichloropropane		1,3-Dichlorobenzene	
			(µg/l)		(µg/l)		(µg/l)		(µg/l)		(µg/l)		(µg/l)		(µg/l)		(µg/l)		(µg/l)		(µg/l)		(µg/l)		(µg/l)		(µg/l)		(µg/l)		(µg/l)		(µg/l)	
For wells < 150 m from surface water	-	-																																		
DOH Tier 1 EALs (for locations < 150m from surface water)	-	-	**100**		**100**		**100**		**100**		**62**		**5.0**		**2.4**		**7.0**		**0.6**		**25**		**0.04**		**0.04**		**10**		**0.15**		**5.0**		**5.0**	
OWDFMW01	OWDFMW01-WG-01	8/4/2009[a]	<171	U	<30.0	U	-		-		<0.310	U	<0.310	U	<0.310	U	<0.310	U	<0.310	U	<0.310	U	<0.620	U	<0.310	U	<0.310	U	<0.150	U	<0.310	U	<0.310	U
	OWDFMW01-WG-02	10/13/2009[ab]	<167	U	<30	U	-		-		<0.31	U	<0.31	U	<0.31	U	-	U	<0.31	U	<0.31	U	<0.62	U	<0.31	U	<0.31	U	<0.15	U	<0.31	U	<0.31	U
	OWDFMW01-WG-03	1/26/2010	**1,490**		<60.0	U	**-**		-		<0.620	U	<0.620	U	<0.620	U	<0.620	U	<0.620	U	<0.620	U	<1.24	U	<0.620	U	<0.620	U	<0.300	U	<0.620	U	<0.620	U
	OWDFMW01-WG-04	4/26/2010	**288**	**J**	<60.0	U	**-**		-		<0.620	U	<0.620	U	<0.620	U	<0.620	U	<0.620	U	<0.620	U	<1.24	U	<0.620	U	<0.620	U	<0.300	U	<0.620	U	<0.620	U
	ES007	10/21/2010	<80.8	U	-		-		<12.12	U	<0.28	U	<0.40	U	<0.38	U	<0.60	U	<0.78	U	<0.42	U	<1.52	U	<0.40	U	<0.34	U	<0.28	U	<0.34	U	<0.22	U
	ES008	10/21/2010*	<80.8	U	-		-		<12.12	U	<0.28	U	<0.40	U	<0.38	U	<0.60	U	<0.78	U	<0.42	U	<1.52	U	<0.40	U	<0.34	U	<0.28	U	<0.34	U	<0.22	U
	ES017	1/21/2011	<80.8	U	-		-		<12.12	U	<0.28	U	<0.40	U	<0.38	U	<0.60	U	<0.78	U	<0.42	U	<1.52	U	<0.40	U	<0.34	U	<0.28	U	<0.34	U	<0.22	U
	ES018	1/21/2011*	<80.8	U	-		-		<12.12	U	<0.28	U	<0.40	U	<0.38	U	<0.60	U	<0.78	U	<0.42	U	<1.52	U	<0.40	U	<0.34	U	<0.28	U	<0.34	U	<0.22	U
	ES029	4/21/2011	<80.8	U	-		-		<12.12	U	<0.28	U	<0.40	U	<0.38	U	<0.60	U	<0.78	U	<0.42	U	<1.52	U	<0.40	U	<0.34	U	<0.28	U	<0.34	U	<0.22	U
	ES031	4/21/2011*	<80.8	U	-		-		<12.12	U	<0.28	U	<0.40	U	<0.38	U	<0.60	U	<0.78	U	<0.42	U	<1.52	U	<0.40	U	<0.34	U	<0.28	U	<0.34	U	<0.22	U
	ES044	7/21/2011	<80.8	U	-		< 212.0	U	<12.12	U	<0.28	U	<0.40	U	<0.38	U	<0.60	U	<0.78	U	<0.42	U	<1.52	U	<0.40	U	<0.34	U	<0.28	U	<0.34	U	<0.22	U
	ES045	7/21/2011*	<80.8	U	-		< 212.0	U	<12.12	U	<0.28	U	<0.40	U	<0.38	U	<0.60	U	<0.78	U	<0.42	U	<1.52	U	<0.40	U	<0.34	U	<0.28	U	<0.34	U	<0.22	U
	ES055	10/26/2011	<80.8	U	-		-		<12.12	U	<0.28	U	<0.40	U	<0.38	U	<0.60	U	<0.78	U	<0.42	U	<1.52	U	<0.40	U	<0.34	U	<0.28	U	<0.34	U	<0.22	U
	ES056	10/26/2011*	<80.8	U	-		-		<12.12	U	<0.28	U	<0.40	U	<0.38	U	<0.60	U	<0.78	U	<0.42	U	<1.52	U	<0.40	U	<0.34	U	<0.28	U	<0.34	U	<0.22	U
	ES058	1/24/2012	<80.8	U	-		< 212.0	U	<12.12	U	<0.28	U	<0.40	U	<0.38	U	<0.60	U	<0.78	U	<0.42	U	<1.52	U	<0.40	U	<0.34	U	<0.28	U	<0.34	U	<0.22	U
	ES059	1/24/2012*	<80.8	U	-		< 212.0	U	<12.12	U	<0.28	U	<0.40	U	<0.38	U	<0.60	U	<0.78	U	<0.42	U	<1.52	U	<0.40	U	<0.34	U	<0.28	U	<0.34	U	<0.22	U
	ES077	4/26/2012	**220**	**++**	-		-		<12.12	U	<0.28	U	<0.40	U	<0.38	U	<0.60	U	<0.78	U	<0.42	U	<1.52	U	<0.40	U	<0.34	U	<0.28	U	<0.34	U	<0.22	U
	ES084	7/19/2012	<80.8	U	-		-		<12.12	U	<0.28	U	<0.40	U	<0.38	U	<0.60	U	<0.78	U	<0.42	U	<1.52	U	<0.40	U	<0.34	U	<0.28	U	<0.34	U	<0.22	U
	ES008	11/7/2012	**2,500**	**HD**	-		**-**		**17**	**BU,B**	<0.50	BU,U	<0.50	U	<0.50	U	<0.50	U	<1.0	U	<1.0	U	<5.0	U	<0.50	U	<0.50	U	<0.50	U	<0.50	U	<0.50	U
	ES007	11/7/2012*	**2,500**	**HD**	-		**-**		<30	BU,U	<0.50	BU,U	<0.50	U	<0.50	U	<0.50	U	<1.0	U	<1.0	U	<5.0	U	<0.50	U	<0.50	U	<0.50	U	<0.50	U	<0.50	U
	ES016	1/30/2013	**1,000**		-		**-**		<30	U	<0.50	U	<0.50	U	<0.50	U	<0.50	U	<1.0	U	<1.0	U	<5.0	U	<0.50	U	<0.50	U	<0.50	U	<0.50	U	<0.50	U
	ES017	1/30/2013*	**1,000**		-		**-**		<30	U	<0.50	U	<0.50	U	<0.50	U	<0.50	U	<1.0	U	<1.0	U	<5.0	U	<0.50	U	<0.50	U	<0.50	U	<0.50	U	<0.50	U
	ES025	4/24/2013	**1,900**	**HD**	-		**-**		<30	U	<0.50	U	<0.50	U	<0.50	U	<0.50	U	<1.0	U	<1.0	U	<2.0	U	<0.50	U	<0.50	U	<0.50	U	<0.50	U	<0.50	U
	ES026	4/24/2013*	**1,600**	**HD**	-		**-**		<30	U	<0.50	U	<0.50	U	<0.50	U	<0.50	U	<1.0	U	<1.0	U	<2.0	U	<0.50	U	<0.50	U	<0.50	U	<0.50	U	<0.50	U
	ES034	7/24/2013	**470**	**HD**	-		**-**		<30	U	<0.50	U	<0.50	U	<0.50	U	<0.50	U	<1.0	U	<1.0	U	<2.0	U	<0.50	U	<0.50	U	<0.50	U	<0.50	U	<0.50	U
	ES035	7/24/2013*	**340**	**HD**	-		**-**		<30	U	<0.50	U	<0.50	U	<0.50	U	<0.50	U	<1.0	U	<1.0	U	<2.0	U	<0.50	U	<0.50	U	<0.50	U	<0.50	U	<0.50	U
	ES043	10/23/2013	**170**	**HD**	-		**-**		**17**	**B,J**	< 0.50	U	< 0.50	U	< 0.50	U	< 0.50	U	< 1.0	U	< 1.0	U	< 2.0	U	< 0.50	U	< 0.50	U	< 0.50	U	< 0.50	U	< 0.50	U
	ES044	10/23/2013*	**200**	**HD**	-		**-**		**14**	**B,J**	< 0.50	U	< 0.50	U	< 0.50	U	< 0.50	U	< 1.0	U	< 1.0	U	< 2.0	U	< 0.50	U	< 0.50	U	< 0.50	U	< 0.50	U	< 0.50	U
	ES053	1/27/2014	**170**	**HD**	-		**-**		**26**	**B,J**	< 0.50	U,IH	< 0.50	U	< 0.50	U	< 0.50	U	< 1.0	U	< 1.0	U	< 2.0	U	< 0.50	U	< 0.50	U	< 0.50	U	< 0.50	U	< 0.50	U
	ES054	1/27/2014*	**140**	**HD**	-		**-**		**23**	**B,J**	< 0.50	U,IH	< 0.50	U	< 0.50	U	< 0.50	U	< 1.0	U	< 1.0	U	< 2.0	U	< 0.50	U	< 0.50	U	< 0.50	U	< 0.50	U	< 0.50	U
	ES086	4/23/2014	**270**	**HD**	-		**-**		<30	U	<0.50	U	<0.50	U	<0.50	U	<0.50	U	<1.0	U	<1.0	U	<2.0	U	<0.50	U	<0.50	U	<0.50	U	<0.50	U	<0.50	U
	ES087**	4/23/2014*	**32**	**HD**	-		**-**		**31**	**B,J**	<0.50	U	<0.50	U	<0.50	U	<0.50	U	<1.0	U	<1.0	U	<2.0	U	<0.50	U	<0.50	U	<0.50	U	<0.50	U	<0.50	U
	ES109	7/24/2014	**17**	**HD,J**	-		**-**		<30	U	<0.50	U	<0.50	U	<0.50	U	<0.50	U	<1.0	U	<1.0	U	<2.0	U	<0.50	U	<0.50	U	<0.50	U	<0.50	U	<0.50	U
	ES110	7/24/2014*	**15**	**HD,J**	-		**-**		<30	U	<0.50	U	<0.50	U	<0.50	U	<0.50	U	<1.0	U	<1.0	U	<2.0	U	<0.50	U	<0.50	U	<0.50	U	<0.50	U	<0.50	U
	ES121	10/22/2014	**19**	**HD,J**	-		**-**		<30	U	<0.50	U	<0.50	U	<0.50	U	<0.50	U	<1.0	U	<1.0	U	<2.0	U	<0.50	U	<0.50	U	<0.50	U	<0.50	U	<0.50	U
	ES122	10/22/2014*	**19**	**HD,J**	-		**-**		<30	U	<0.50	U	<0.50	U	<0.50	U	<0.50	U	<1.0	U	<1.0	U	<2.0	U	<0.50	U	<0.50	U	<0.50	U,IH	<0.50	U	<0.50	U
	ES121X	1/26/2015	**24**	**HD,J**	-		**-**		<30	U	<0.50	U	<0.50	U	<0.50	U	<0.50	U	<1.0	U	<1.0	U	<2.0	U	<0.50	U	<0.50	U	<0.50	U	<0.50	U	<0.50	U
	ES122X	1/26/2015*	**16**	**HD,J**	-		**-**		<30	U	<0.50	U	<0.50	U	<0.50	U	<0.50	U	<1.0	U	<1.0	U	<2.0	U	<0.50	U	<0.50	U	<0.50	U	<0.50	U	<0.50	U
	ES137	4/22/2015	**120**	**Z**	<25	U	**110**	**B,Z**	**-**		<0.20	U	<0.40	U	<0.20	U	<0.20	U	<0.50	U	<0.30	U	<0.80	U	<0.20	U	<0.20	U	**-**		<0.20	U	<0.20	U
	ES138	4/22/2015*	**120**	**Z**	<25	U	**140**	**B,Z**	**-**		<0.20	U	<0.40	U	<0.20	U	<0.20	U	<0.50	U	<0.30	U	<0.80	U	<0.20	U	<0.20	U	**-**		<0.20	U	<0.20	U

Well Name	Sample ID	Date Sampled	8260B																													
			1,3-Dichloropropene (total of cis/trans)		1,4-Dichlorobenzene		Acetone		Benzene		Bromodichloromethane		Bromoform		Bromomethane		Carbon Tetrachloride		Chlorobenzene		Chloroethane		Chloroform		Chloromethane		cis-1,2-Dichloroethylene		Dibromochloromethane	
			(µg/l)		(µg/l)		(µg/l)		(µg/l)		(µg/l)		(µg/l)		(µg/l)		(µg/l)		(µg/l)		(µg/l)		(µg/l)		(µg/l)		(µg/l)		(µg/l)	
For wells < 150 m from surface water	-	-																														
DOH Tier 1 EALs (for locations < 150m from surface water)	-	-	0.43		5.0		1500		5.0		0.12		80		8.7		5.0		25		16		70		1.8		70		0.16	
OWDFMW01	OWDFMW01-WG-01	8/4/2009[a]	<0.310	U	<0.150	U	<3.10	U	**0.470**		<0.150	U	<0.310	U	<0.940	U	<0.310	U	<0.150	U	<0.310	U	<0.300	U	<0.310	U	<0.310	U	<0.150	U
	OWDFMW01-WG-02	10/13/2009[ab]	<0.15	U	<0.15	U	<3.1	U	<0.12	U	<0.15	U	<0.31	U	<0.94	U	<0.31	U	<0.15	U	<0.31	U	<0.30	U	<0.31	U	<0.31	U	<0.15	U
	OWDFMW01-WG-03	1/26/2010	<0.620		<0.300	U	<6.20	U	<0.240	U	<0.300	U	<0.620	U	<1.88	U	<0.620	U	<0.300	U	<0.620	U	<0.600	U	<0.620	U	<0.620	U	<0.300	U
	OWDFMW01-WG-04	4/26/2010	<0.620		<0.300	U	<6.20	U	<0.240	U	<0.300	U	<0.620	U	<1.88	U	<0.620	U	<0.300	U	<0.620	U	<0.600	U	<0.620	U	<0.620	U	<0.300	U
	ES007	10/21/2010	<0.36	U	<0.38	U	**1.4**	**J**	<0.32	U	<0.28	U	<0.28	U	<0.48	U	<0.20	U	<0.42	U	<0.42	U	<0.14	U	<0.62	U	<0.32	U	<0.38	U
	ES008	10/21/2010*	<0.36	U	<0.38	U	<1.90	U	<0.32	U	<0.28	U	<0.28	U	<0.48	U	<0.20	U	<0.42	U	<0.42	U	<0.14	U	<0.62	U	<0.32	U	<0.38	U
	ES017	1/21/2011	<0.36	U	<0.38	U	<1.90	U	**0.54**	**J**	<0.28	U	<0.28	U	<0.48	U	<0.20	U	<0.42	U	<0.42	U	<0.14	U	<0.62	U	<0.32	U	<0.38	U
	ES018	1/21/2011*	<0.36	U	<0.38	U	<1.90	U	**0.69**	**J**	<0.28	U	<0.28	U	<0.48	U	<0.20	U	<0.42	U	<0.42	U	<0.14	U	<0.62	U	<0.32	U	<0.38	U
	ES029	4/21/2011	<0.36	U	<0.38	U	<1.90	U	<0.32	U	<0.28	U	<0.28	U	<0.48	U	<0.20	U	<0.42	U	<0.42	U	<0.14	U	<0.62	U	<0.32	U	<0.38	U
	ES031	4/21/2011*	<0.36	U	<0.38	U	<1.90	U	**0.29**	**J**	<0.28	U	<0.28	U	<0.48	U	<0.20	U	<0.42	U	<0.42	U	<0.14	U	<0.62	U	<0.32	U	<0.38	U
	ES044	7/21/2011	<0.36	U	<0.38	U	<1.90	U	<0.32	U	<0.28	U	<0.28	U	<0.48	U	<0.20	U	<0.42	U	<0.42	U	<0.14	U	<0.62	U	<0.32	U	<0.38	U
	ES045	7/21/2011*	<0.36	U	<0.38	U	<1.90	U	<0.32	U	<0.28	U	<0.28	U	<0.48	U	<0.20	U	<0.42	U	<0.42	U	<0.14	U	<0.62	U	<0.32	U	<0.38	U
	ES055	10/26/2011	<0.36	U	<0.38	U	<1.90	U	<0.32	U	<0.28	U	<0.28	U	<0.48	U	<0.20	U	<0.42	U	<0.42	U	<0.14	U	<0.84	U	<0.32	U	<0.38	U
	ES056	10/26/2011*	<0.36	U	<0.38	U	<1.90	U	**0.28**	**J**	<0.28	U	<0.28	U	<0.48	U	<0.20	U	<0.42	U	<0.42	U	<0.14	U	<0.84	U	<0.32	U	<0.38	U
	ES058	1/24/2012	<0.36	U	<0.38	U	<1.90	U	**0.70**	**J**	<0.28	U	<0.28	U	<0.48	U	<0.20	U	<0.42	U	<0.42	U	<0.14	U	<0.84	U	<0.32	U	<0.38	U
	ES059	1/24/2012*	<0.36	U	<0.38	U	<1.90	U	**0.58**	**J**	<0.28	U	<0.28	U	<0.48	U	<0.20	U	<0.42	U	<0.42	U	<0.14	U	<0.84	U	<0.32	U	<0.38	U
	ES077	4/26/2012	<0.36	U	<0.38	U	**2.8**	**J**	**0.71**	**J**	<0.28	U	<0.28	U	<0.48	U	<0.20	U	<0.42	U	<0.42	U	<0.14	U	<0.84	U	<0.32	U	<0.38	U
	ES084	7/19/2012	<0.36	U	<0.38	U	**2.3**	**J**	**1.3**		<0.28	U	<0.28	U	<0.48	U	<0.20	U	<0.42	U	<0.42	U	<0.14	U	<0.62	U	<0.32	U	<0.38	U
	ES008	11/7/2012	<0.50	U	<0.50	U	<10	U	**0.38**	**BU,J**	<0.50	U	<1.0	U	<5.0	U	<0.50	U	<0.50	U	<5.0	U	<0.50	U	<5.0	U	<0.50	U	<0.50	U
	ES007	11/7/2012*	<0.50	U	<0.50	U	<10	U	**0.49**	**BU,J**	<0.50	BU,J	<1.0	U	<5.0	U	<0.50	U	<0.50	U	<5.0	U	<0.50	U	<5.0	U	<0.50	U	<0.50	U
	ES016	1/30/2013	<0.50	U	<0.50	U	**17**	**J,ICH**	**0.39**	**J**	<0.50	U	<1.0	U	<5.0	U	<0.50	U	<0.50	U	<5.0	U	<0.50	U	<5.0	U	<0.50	U	<0.50	U
	ES017	1/30/2013*	<0.50	U	<0.50	U	<10	U,ICH	**0.17**	**J**	<0.50	U	<1.0	U	<5.0	U	<0.50	U	<0.50	U	<5.0	U	<0.50	U	<5.0	U	<0.50	U	<0.50	U
	ES025	4/24/2013	<0.50	U	<0.50	U	**84**	**ICH**	**0.82**	**J**	<0.50	U	<1.0	U	<5.0	U	<0.50	U	<0.50	U	<5.0	U	<0.50	U	<2.0	U	<0.50	U	<0.50	U
	ES026	4/24/2013*	<0.50	U	<0.50	U	**86**	**ICH**	**0.67**	**J**	<0.50	U	<1.0	U	<5.0	U	<0.50	U	<0.50	U	<5.0	U	<0.50	U	<2.0	U	<0.50	U	<0.50	U
	ES034	7/24/2013	<0.50	U	<0.50	U	**88**		**0.42**	**J**	<0.50	U	<1.0	U	<5.0	U	<0.50	U	<0.50	U	<5.0	U	<0.50	U	<2.0	U	<0.50	U	<0.50	U
	ES035	7/24/2013*	<0.50	U	<0.50	U	**83**		**0.44**	**J**	<0.50	U	<1.0	U	<5.0	U	<0.50	U	<0.50	U	<5.0	U	<0.50	U	<2.0	U	<0.50	U	<0.50	U
	ES043	10/23/2013	<0.50	U	< 0.50	U	**44**	**ICH**	< 0.50	U	< 0.50	U	< 1.0	U	< 5.0	U	< 0.50	U	< 0.50	U	< 5.0	U	< 0.50	U	< 2.0	U,IJ	< 0.50	U	< 0.50	U
	ES044	10/23/2013*	<0.50	U	< 0.50	U	**38**	**ICH**	**0.17**	**J**	< 0.50	U	< 1.0	U	< 5.0	U	< 0.50	U	< 0.50	U	< 5.0	U	< 0.50	U	< 2.0	U,IJ	< 0.50	U	< 0.50	U
	ES053	1/27/2014	<0.50	U,IH	< 0.50	U	**19**	**J**	**0.15**	**J**	< 0.50	U	< 1.0	U	< 5.0	U,IH	< 0.50	U,IH	< 0.50	U	< 5.0	U,IH	< 0.50	U	< 2.0	U	< 0.50	U	< 0.50	U
	ES054	1/27/2014*	<0.50	U,IH	< 0.50	U	**18**	**J**	<0.50	U	< 0.50	U	< 1.0	U	< 5.0	U,IH	< 0.50	U,IH	< 0.50	U	< 5.0	U,IH	< 0.50	U	< 2.0	U	< 0.50	U	< 0.50	U
	ES086	4/23/2014	<0.50	U,ICH	<0.50	U	**11**	**J,IH,ICH**	<0.50	U	<0.50	U	<1.0	U	<5.0	U	<0.50	U	<0.50	U	<5.0	U	<0.50	U	<2.0	U	<0.50	U	<0.50	U
	ES087**	4/23/2014*	<0.50	U,ICH	<0.50	U	**12**	**J,IH,ICH**	<0.50	U	<0.50	U	<1.0	U	<5.0	U	<0.50	U	<0.50	U	<5.0	U	<0.50	U	<2.0	U	<0.50	U	<0.50	U
	ES109	7/24/2014	<0.50	U	<0.50	U	**6.4**	**J,IH,ICH**	<0.50	U	<0.50	U	<1.0	U	<5.0	U	<0.50	U	<0.50	U	<5.0	U	<0.50	U	<2.0	U	<0.50	U	<0.50	U
	ES110	7/24/2014*	<0.50	U	<0.50	U	**9.8**	**J,IH,ICH**	<0.50	U	<0.50	U	<1.0	U	<5.0	U	<0.50	U	<0.50	U	<5.0	U	<0.50	U	<2.0	U	<0.50	U	<0.50	U
	ES121	10/22/2014	<0.50	U	<0.50	U	**7.7**	**J,ICH**	<0.50	U	<0.50	U	<1.0	U	<5.0	U	<0.50	U	<0.50	U	<5.0	U	<0.50	U	<2.0	U	<0.50	U	<0.50	U
	ES122	10/22/2014*	<0.50	U	<0.50	U	**8.6**	**J,ICH**	<0.50	U	<0.50	U	<1.0	U	<5.0	U	<0.50	U	<0.50	U	<5.0	U	<0.50	U	<2.0	U,IJ	<0.50	U	<0.50	U
	ES121X	1/26/2015	<0.50	U	<0.50	U	**13**	**J**	<0.50	U	<0.50	U	<1.0	U	<5.0	U,IH	<0.50	U	<0.50	U	<5.0	U	<0.50	U	<2.0	U	<0.50	U	<0.50	U
	ES122X	1/26/2015*	<0.50	U	<0.50	U	**13**	**J**	<0.50	U	<0.50	U	<1.0	U	<5.0	U,IH	<0.50	U	<0.50	U	<5.0	U	<0.50	U	<2.0	U	<0.50	U	<0.50	U
	ES137	4/22/2015	<0.20	U	<0.20	U	**25**		**0.070**	**J**	-		<0.50	U	<0.30	U	<0.20	U	<0.20	U	<0.20	U	<0.20	U	**0.070**	**J**	<0.20	U	-	
	ES138	4/22/2015*	<0.20	U	<0.20	U	**25**		<0.10	U	-		<0.50	U	<0.30	U	<0.20	U	<0.20	U	<0.20	U	<0.20	U	<0.20	U	<0.20	U	-	

Well Name	Sample ID	Date Sampled	8260B																															
			Ethylbenzene		Hexachlorobutadiene		Methyl ethyl ketone (2-Butanone)		Methyl isobutyl ketone (4-Methyl-2-Pentanone)		Methyl tert-butyl Ether		Methylene chloride		Napthalene		Styrene		Tetrachloroethane, 1,1,1,2-		Tetrachloroethane, 1,1,2,2-		Tetrachloroethylene		Toluene		trans-1,2-Dichloroethylene		Trichloroethylene		Vinyl chloride		Xylenes (total)	
			(µg/l)		(µg/l)		(µg/l)		(µg/l)		(µg/l)		(µg/l)		(µg/l)		(µg/l)		(µg/l)		(µg/l)		(µg/l)		(µg/l)		(µg/l)		(µg/l)		(µg/l)		(µg/l)	
For wells < 150 m from surface water	-	-																																
DOH Tier 1 EALs (for locations < 150m from surface water)	-	-	**30**		**0.86**		**7,100**		**170**		**5.0**		**4.8**		**17**		**10**		**0.52**		**0.067**		**5.0**		**40**		**100**		**5.0**		**2.0**		**20**	
OWDFMW01	OWDFMW01-WG-01	8/4/2009[a]	<0.310	U	<0.310	U	<3.10	U	<3.10	U	<1.50	U	<1.00	U	<0.620	U	<0.310	U	<0.150	U	<0.150	U	<0.310	U	<0.310	U	<0.310	U	<0.310	U	<0.310	U	<0.620	U
	OWDFMW01-WG-02	10/13/2009[ab]	<0.31	U	<0.31	U	<3.1	U	<3.1	U	-		<1	U	<0.62	U	<0.31	U	<0.15	U	<0.15	U	<0.31	U	<0.31	U	<0.31	U	<0.31	U	<0.31	U	<0.62	U
	OWDFMW01-WG-03	1/26/2010	<0.620	U	<0.620	U	<6.20	U	<6.20	U	<3.00	U	<2.00	U	<1.24	U	<0.620	U	<0.300	U	<0.300	U	<0.620	U	<0.620	U	<0.620	U	<0.620	U	<0.620	U	<1.24	U
	OWDFMW01-WG-04	4/26/2010	<0.620	U	<0.620	U	<6.20	U	<6.20	U	<3.00	U	<2.00	U	<1.24	U	<0.620	U	<0.300	U	<0.300	U	<0.620	U	<0.620	U	<0.620	U	<0.620	U	<0.620	U	<1.24	U
	ES007	10/21/2010	<0.46	U	<0.38	U	<1.20	U	<3.80	U	<0.38	U	<0.70	U	-		<0.50	U	<0.26	U	<0.20	U	<0.30	U	<0.34	U	<0.38	U	<0.32	U	<0.46	U	<0.38	U
	ES008	10/21/2010*	<0.46	U	<0.38	U	<1.20	U	<3.80	U	<0.38	U	<0.70	U	-		<0.50	U	<0.26	U	<0.20	U	<0.30	U	<0.34	U	<0.38	U	<0.32	U	<0.46	U	<0.38	U
	ES017	1/21/2011	<0.46	U	<0.38	U	<1.20	U	<3.80	U	<0.38	U	<0.70	U	-		<0.50	U	<0.26	U	<0.20	U	<0.30	U	<0.34	U	<0.38	U	<0.32	U	<0.46	U	<0.38	U
	ES018	1/21/2011*	<0.46	U	<0.38	U	<1.20	U	<3.80	U	<0.38	U	<0.70	U	-		<0.50	U	<0.26	U	<0.20	U	<0.30	U	<0.34	U	<0.38	U	<0.32	U	<0.46	U	<0.38	U
	ES029	4/21/2011	<0.46	U	<0.38	U	<1.20	U	<3.80	U	<0.38	U	<0.70	U	-		<0.50	U	<0.26	U	<0.20	U	<0.30	U	**0.21**	**J**	<0.38	U	<0.32	U	<0.46	U	**0.39**	**J**
	ES031	4/21/2011*	<0.46	U	<0.38	U	<1.20	U	<3.80	U	<0.38	U	<0.70	U	-		<0.50	U	<0.26	U	<0.20	U	<0.30	U	<0.34	U	<0.38	U	<0.32	U	<0.46	U	<0.38	U
	ES044	7/21/2011	<0.46	U	<0.38	U	<1.20	U	<3.80	U	<0.38	U	<0.70	U	-		<0.50	U	<0.26	U	<0.20	U	<0.30	U	<0.34	U	<0.38	U	<0.32	U	<0.46	U	<0.38	U
	ES045	7/21/2011*	<0.46	U	<0.38	U	<1.20	U	<3.80	U	<0.38	U	<0.70	U	-		<0.50	U	<0.26	U	<0.20	U	<0.30	U	<0.34	U	<0.38	U	<0.32	U	<0.46	U	<0.38	U
	ES055	10/26/2011	<0.46	U	<0.38	U	<1.20	U	<3.80	U	<0.52	U	<0.70	U	-		<0.50	U	<0.26	U	<0.20	U	<0.48	U	<0.34	U	<0.38	U	<0.32	U	<0.46	U	<0.38	U
	ES056	10/26/2011*	<0.46	U	<0.38	U	<1.20	U	<3.80	U	<0.52	U	<0.70	U	-		<0.50	U	<0.26	U	<0.20	U	<0.48	U	<0.34	U	<0.38	U	<0.32	U	<0.46	U	<0.38	U
	ES058	1/24/2012	<0.46	U	<0.38	U	<1.20	U	<3.80	U	<0.52	U	<0.70	U	-		<0.50	U	<0.26	U	<0.20	U	<0.48	U	<0.34	U	<0.38	U	<0.32	U	<0.46	U	<0.38	U
	ES059	1/24/2012*	<0.46	U	<0.38	U	<1.20	U	<3.80	U	<0.52	U	<0.70	U	-		<0.50	U	<0.26	U	<0.20	U	<0.48	U	<0.34	U	<0.38	U	<0.32	U	<0.46	U	<0.38	U
	ES077	4/26/2012	<0.46	U	<0.38	U	<1.20	U	<3.80	U	<0.52	U	<0.70	U	-		<0.50	U	<0.26	U	<0.20	U	<0.48	U	<0.34	U	<0.38	U	<0.32	U	<0.46	U	<0.38	U
	ES084	7/19/2012	<0.46	U	<0.38	U	**1.0**	**J**	<3.80	U	<0.38	U	<0.70	U	-		<0.50	U	<0.26	U	<0.20	U	<0.30	U	<0.34	U	<0.38	U	<0.32	U	<0.46	U	<0.38	U
	ES008	11/7/2012	<0.50	U	<0.50	U	<5.0	U	<5.0	U	<0.50	U	<1.0	U	-		<0.50	U	<0.50	U	<0.50	U	<0.50	U	<0.50	U	<0.50	U	<0.50	U	<0.50	U	<1	U
	ES007	11/7/2012*	<0.50	U	<0.50	U	<5.0	U	<5.0	U	<0.50	U	<1.0	U	-		<0.50	U	<0.50	U	<0.50	U	<0.50	U	<0.50	U	<0.50	U	<0.50	U	<0.50	U	<1	U
	ES016	1/30/2013	<0.50	U	<0.50	U	<5.0	U	<5.0	U	<0.50	U	<1.0	U	-		<0.50	U	<0.50	U	<0.50	U	<0.50	U	<0.50	U	<0.50	U	<0.50	U	<0.50	U	<1	U
	ES017	1/30/2013*	<0.50	U	<0.50	U	<5.0	U	<5.0	U	<0.50	U	<1.0	U	-		<0.50	U	<0.50	U	<0.50	U	<0.50	U	<0.50	U	<0.50	U	<0.50	U	<0.50	U	<1	U
	ES025	4/24/2013	<0.50	U	<0.50	U	<5.0	U	<5.0	U	<0.50	U	<1.0	U	-		<0.50	U	<0.50	U	<0.50	U	<0.50	U	<0.50	U	<0.50	U	<0.50	U	<0.50	U	<1.0	U
	ES026	4/24/2013*	<0.50	U	<0.50	U	<5.0	U	<5.0	U	<0.50	U	<1.0	U	-		<0.50	U	<0.50	U	<0.50	U	<0.50	U	<0.50	U	<0.50	U	<0.50	U	<0.50	U	<1.0	U
	ES034	7/24/2013	<0.50	U	<0.50	U	<5.0	U	<5.0	U	<0.50	U	<1.0	U	-		<0.50	U	<0.50	U	<0.50	U	<0.50	U	<0.50	U	<0.50	U	<0.50	U	<0.50	U	<1.0	U
	ES035	7/24/2013*	<0.50	U	<0.50	U	<5.0	U	<5.0	U	<0.50	U	<1.0	U	-		<0.50	U	<0.50	U	<0.50	U	<0.50	U	<0.50	U	<0.50	U	<0.50	U	<0.50	U	<1.0	U
	ES043	10/23/2013	< 0.50	U	< 0.50	U	< 5.0	U,ICH	< 5.0	U	< 0.50	U	< 1.0	U	-		< 0.50	U	< 0.50	U	< 0.50	U	< 0.50	U	< 0.50	U	< 0.50	U	< 0.50	U	< 0.50	U	<1.0	U
	ES044	10/23/2013*	< 0.50	U	< 0.50	U	< 5.0	U,ICH	< 5.0	U	< 0.50	U	< 1.0	U	-		< 0.50	U	< 0.50	U	< 0.50	U	< 0.50	U	< 0.50	U	< 0.50	U	< 0.50	U	< 0.50	U	<1.0	U
	ES053	1/27/2014	< 0.50	U	< 0.50	U	< 5.0	U	< 5.0	U	< 0.50	U	< 1.0	U	-		< 0.50	U	< 0.50	U	< 0.50	U	< 0.50	U	< 0.50	U	< 0.50	U	< 0.50	U	< 0.50	U	<1.0	U
	ES054	1/27/2014*	< 0.50	U	< 0.50	U	< 5.0	U	< 5.0	U	< 0.50	U	< 1.0	U	-		< 0.50	U	< 0.50	U	< 0.50	U	< 0.50	U	< 0.50	U	< 0.50	U	< 0.50	U	< 0.50	U	<1.0	U
	ES086	4/23/2014	<0.50	U	<0.50	U	<5.0	U,ICH	<5.0	U	<0.50	U	<1.0	U	-		<0.50	U	<0.50	U	<0.50	U	<0.50	U	<0.50	U	<0.50	U,ICH	<0.50	U	<0.50	U	<1.0	U
	ES087**	4/23/2014*	<0.50	U	<0.50	U	<5.0	U,ICH	<5.0	U	<0.50	U	<1.0	U	-		<0.50	U	<0.50	U	<0.50	U	<0.50	U	<0.50	U	<0.50	U,ICH	<0.50	U	<0.50	U	<1.0	U
	ES109	7/24/2014	<0.50	U	<0.50	U	<5.0	U	<5.0	U	<0.50	U	<1.0	U	-		<0.50	U	<0.50	U	<0.50	U	<0.50	U	<0.50	U	<0.50	U	<0.50	U	<0.50	U	<1.0	U
	ES110	7/24/2014*	<0.50	U	<0.50	U	<5.0	U	<5.0	U	<0.50	U	<1.0	U	-		<0.50	U	<0.50	U	<0.50	U	<0.50	U	<0.50	U	<0.50	U	<0.50	U	<0.50	U	<1.0	U
	ES121	10/22/2014	<0.50	U	<0.50	U	<5.0	U,ICH	<5.0	U	<0.50	U	<1.0	U	-		<0.50	U	<0.50	U	<0.50	U	<0.50	U	<0.50	U	<0.50	U	<0.50	U	<0.50	U	<1.0	U
	ES122	10/22/2014*	<0.50	U	<0.50	U	<5.0	U,ICH	<5.0	U	<0.50	U	<1.0	U	-		<0.50	U	<0.50	U	<0.50	U	<0.50	U	<0.50	U	<0.50	U	<0.50	U	<0.50	U	<1.0	U
	ES121X	1/26/2015	<0.50	U	<0.50	U	<5.0	U	<5.0	U	<0.50	U	<1.0	U	-		<0.50	U	<0.50	U	<0.50	U	<0.50	U	<0.50	U	<0.50	U	<0.50	U	<0.50	U	<1.0	U
	ES122X	1/26/2015*	<0.50	U	<0.50	U	<5.0	U	<5.0	U	<0.50	U	<1.0	U	-		<0.50	U	<0.50	U	<0.50	U	<0.50	U	<0.50	U	<0.50	U	<0.50	U	<0.50	U	<1.0	U
	ES137	4/22/2015	<0.10	U	<0.30	U	<4.0	U	<10	U	<0.30	U	<0.20	U	-		<0.20	U	<0.20	U	-		<0.20	U	<0.10	U	<0.20	U	<0.10	U	<0.10	U	<0.20	U
	ES138	4/22/2015*	<0.10	U	<0.30	U	<4.0	U	<10	U	<0.30	U	<0.20	U	-		<0.20	U	<0.20	U	-		<0.20	U	<0.10	U	<0.20	U	<0.10	U	<0.10	U	<0.20	U

Well Name	Sample ID	Date Sampled	8260SIM										8011				8270C															
			1,2-Dibromoethane		1,2-Dichloroethane		Bromodichloromethane		Dibromochloromethane		Tetrachloroethane, 1,1,2,2-		1,2-Dibromo-3-chloropropane		1,2-Dibromoethane		Acenaphthene		Acenaphthylene		Anthracene		Benzo[a]anthracene		Benzo[g,h,i]perylene		Benzo[a]pyrene		Benzo[b]fluoranthene		Benzo[k]fluoranthene	
			(µg/l)		(µg/l)		(µg/l)		(µg/l)		(µg/l)		(µg/l)		(µg/l)		(µg/l)		(µg/l)		(µg/l)		(µg/l)		(µg/l)		(µg/l)		(µg/l)		(µg/l)	
For wells < 150 m from surface water	-	-																														
DOH Tier 1 EALs (for locations < 150m from surface water)	-	-	**0.04**		**0.15**		**0.12**		**0.16**		**0.067**		**0.04**		**0.04**		**20**		**30**		**0.73**		**0.027**		**0.10**		**0.014**		**0.092**		**0.40**	
OWDFMW01	OWDFMW01-WG-01	8/4/2009[a]	-		-		-		-		-		-		-		<0.0164	U	<0.0164	U	<0.0164	U	<0.0164	U	<0.0164	U	<0.0164	U	<0.0164	U	<0.0164	U
	OWDFMW01-WG-02	10/13/2009[ab]	-		-		-		-		-		-		-		<0.0168	U	<0.0168	U	<0.0168	U	<0.0168	U	<0.0168	U	<0.0168	U	<0.0168	U	<0.0168	U
	OWDFMW01-WG-03	1/26/2010	-		-		-		-		-		-		-		<0.0320	U	<0.0320	U	<0.0320	U	<0.0320	U	<0.0320	U	<0.0320	U	<0.0320	U	<0.0320	U
	OWDFMW01-WG-04	4/26/2010	-		-		-		-		-		-		-		<0.0352	U	<0.0352	U	<0.0352	U	<0.0352	U	<0.0352	U	<0.0352	U	<0.0352	U	<0.0352	U
	ES007	10/21/2010	-		-		-		-		-		-		-		<0.12	U	<0.12	U	<0.10	U	<0.14	U	<0.16	U	<0.14	U	<0.12	U	<0.14	U
	ES008	10/21/2010*	-		-		-		-		-		-		-		<0.12	U	<0.12	U	<0.10	U	<0.14	U	<0.16	U	<0.14	U	<0.12	U	<0.14	U
	ES017	1/21/2011	-		-		-		-		-		-		-		<0.12	U	<0.12	U	<0.10	U	<0.14	U	<0.16	U	<0.14	U	<0.12	U	<0.14	U
	ES018	1/21/2011*	-		-		-		-		-		-		-		<0.12	U	<0.12	U	<0.10	U	<0.14	U	<0.16	U	<0.14	U	<0.12	U	<0.14	U
	ES029	4/21/2011	-		-		-		-		-		-		-		<0.12	U	<0.12	U	<0.10	U	<0.14	U	<0.16	U	<0.14	U	<0.12	U	<0.14	U
	ES031	4/21/2011*	-		-		-		-		-		-		-		<0.12	U	<0.12	U	<0.10	U	<0.14	U	<0.16	U	<0.14	U	<0.12	U	<0.14	U
	ES044	7/21/2011	-		-		-		-		-		-		-		<0.12	U	<0.12	U	<0.10	U	<0.14	U	<0.16	U	<0.14	U	<0.12	U	<0.14	U
	ES045	7/21/2011*	-		-		-		-		-		-		-		<0.12	U	<0.12	U	<0.10	U	<0.14	U	<0.16	U	<0.14	U	<0.12	U	<0.14	U
	ES055	10/26/2011	-		-		-		-		-		-		-		<0.12	U	<0.12	U	<0.10	U	<0.14	U	<0.16	U	<0.14	U	<0.12	U	<0.14	U
	ES056	10/26/2011*	-		-		-		-		-		-		-		<0.12	U	<0.12	U	<0.10	U	<0.14	U	<0.16	U	<0.14	U	<0.12	U	<0.14	U
	ES058	1/24/2012	-		-		-		-		-		-		-		<0.12	U	<0.12	U	<0.10	U	<0.14	U	<0.16	U	<0.12	U	<0.12	U	<0.14	U
	ES059	1/24/2012*	-		-		-		-		-		-		-		<0.12	U	<0.12	U	<0.10	U	<0.14	U	<0.16	U	<0.12	U	<0.12	U	<0.14	U
	ES077	4/26/2012	-		-		-		-		-		-		-		<0.12	U	<0.12	U	<0.10	U	<0.14	U	<0.16	U	<0.12	U	<0.12	U	<0.14	U
	ES084	7/19/2012	-		-		-		-		-		-		-		<0.12	U	<0.12	U	<0.10	U	<0.14	U	<0.16	U	<0.14	U	<0.12	U	<0.14	U
	ES008	11/7/2012	-		-		-		-		-		-		-		<0.050	U	<0.050	U	<0.050	U	<0.050	U	<0.050	U	<0.050	U	<0.050	U	<0.050	U
	ES007	11/7/2012*	-		-		-		-		-		-		-		<0.050	U	<0.050	U	<0.050	U	<0.050	U	<0.050	U	<0.050	U	<0.050	U	<0.050	U
	ES016	1/30/2013	-		-		-		-		-		-		-		<0.050	U	<0.050	U	<0.050	U	<0.050	U	<0.050	U	<0.050	U	<0.050	U	<0.050	U
	ES017	1/30/2013*	-		-		-		-		-		-		-		<0.050	U	<0.050	U	<0.050	U	<0.050	U	<0.050	U	<0.050	U	<0.050	U	<0.050	U
	ES025	4/24/2013	-		-		-		-		-		-		-		<0.051	U	<0.051	U	<0.051	U	<0.051	U	<0.051	U	<0.051	U	<0.051	U	<0.051	U
	ES026	4/24/2013*	-		-		-		-		-		-		-		<0.050	U	<0.050	U	<0.050	U	<0.050	U	<0.050	U	<0.050	U	<0.050	U	<0.050	U
	ES034	7/24/2013	-		-		-		-		-		-		-		<0.050	U	<0.050	U	<0.050	U	<0.050	U	<0.050	U	<0.050	U	<0.050	U	<0.050	U
	ES035	7/24/2013*	-		-		-		-		-		-		-		<0.048	U	<0.048	U	<0.048	U	<0.048	U	<0.048	U	<0.048	U	<0.048	U	<0.048	U
	ES043	10/23/2013	-		-		-		-		-		-		-		< 0.049	U	< 0.049	U	< 0.049	U	< 0.049	U	< 0.049	U	< 0.049	U	< 0.049	U	< 0.049	U
	ES044	10/23/2013*	-		-		-		-		-		-		-		< 0.049	U	< 0.049	U	< 0.049	U	< 0.049	U	< 0.049	U	< 0.049	U	< 0.049	U	< 0.049	U
	ES053	1/27/2014	-		-		-		-		-		-		-		<0.050	U	<0.050	U	<0.050	U	<0.050	U	<0.050	U	<0.050	U	<0.050	U	<0.050	U
	ES054	1/27/2014*	-		-		-		-		-		-		-		<0.050	U	<0.050	U	<0.050	U	<0.050	U	<0.050	U	<0.050	U	<0.050	U	<0.050	U
	ES086	4/23/2014	-		-		-		-		-		-		-		<0.049	U	<0.049	U	<0.049	U	<0.049	U	<0.049	U	<0.049	U	<0.049	U	<0.049	U
	ES087**	4/23/2014*	-		-		-		-		-		-		-		<0.050	U	<0.050	U	<0.050	U	<0.050	U	<0.050	U	<0.050	U	<0.050	U	<0.050	U
	ES109	7/24/2014	-		-		-		-		-		-		-		<0.051	U	<0.051	U	<0.051	U	<0.051	U	<0.051	U	<0.051	U	<0.051	U	<0.051	U
	ES110	7/24/2014*	-		-		-		-		-		-		-		<0.050	U	<0.050	U	<0.050	U	<0.050	U	<0.050	U	<0.050	U	<0.050	U	<0.050	U
	ES121	10/22/2014	-		-		-		-		-		-		-		<0.052	U	<0.052	U	<0.052	U	<0.052	U	<0.10	U	<0.052	U	<0.052	U	<0.052	U
	ES122	10/22/2014*	-		-		-		-		-		-		-		<0.052	U	<0.052	U	<0.052	U	<0.052	U	<0.10	U	<0.052	U	<0.052	U	<0.052	U
	ES121X	1/26/2015	-		-		-		-		-		-		-		<0.052	U	<0.052	U	<0.052	U	<0.052	U	<0.10	U	<0.052	U	<0.052	U	<0.052	U
	ES122X	1/26/2015*	-		-		-		-		-		-		-		<0.051	U	<0.051	U	<0.051	U	<0.051	U	<0.10	U	<0.051	U	<0.051	U	<0.051	U
	ES137	4/22/2015	<0.010	U	**0.010**	**J**	<0.010	U	<0.010	U	<0.015	U	<0.0040	UJ	<0.0040	UJ	<0.0050	U	<0.0050	U	<0.0050	U	**0.0033**	**B,J**	<0.0050	U	<0.0050	U	<0.0050	U	<0.0050	U
	ES138	4/22/2015*	<0.010	U	**0.0081**	**J**	<0.010	U	<0.010	U	<0.015	U	<0.0040	UJ	<0.0040	UJ	<0.0050	U	<0.0050	U	<0.0050	U	**0.0029**	**B,J**	<0.0050	U	<0.0050	U	<0.0050	U	<0.0050	U

Well Name	Sample ID	Date Sampled	8270C																						6020	
			Chrysene		Dibenzo[a,h]anthracene		Fluoranthene		Fluorene		Ideno[1,2,3-cd]pyrene		1-Methylnaphthalene		2-Methylnaphthalene		Naphthalene		Phenanthrene		Pyrene		Dissolved Lead	
			(µg/l)		(µg/l)		(µg/l)		(µg/l)		(µg/l)		(µg/l)		(µg/l)		(µg/l)		(µg/l)		(µg/l)		(µg/l)	
For wells < 150 m from surface water	-	-																								
DOH Tier 1 EALs (for locations < 150m from surface water)	-	-	**0.35**		**0.0092**		**8.0**		**3.9**		**0.092**		**2.1**		**2.1**		**17**		**4.6**		**2.0**		**5.6**	
OWDFMW01	OWDFMW01-WG-01	8/4/2009[a]	<0.0164	U	<0.0164	U	<0.0164	U	<0.0164	U	<0.0164	U	<0.0164	U	<0.0164	U	<0.0339	U	<0.0164	U	<0.0164	U	<0.310	U
	OWDFMW01-WG-02	10/13/2009[ab]	<0.0168	U	<0.0168	U	<0.0168	U	<0.0168	U	<0.0168	U	<0.0168	U	<0.0168	U	<0.0346	U	<0.0168	U	<0.0168	U	<0.31	U
	OWDFMW01-WG-03	1/26/2010	<0.0320	U	<0.0320	U	<0.0320	U	<0.0320	U	<0.0320	U	<0.0320	U	<0.0320	U	<0.0664	U	<0.0320	U	<0.0320	U	<0.620	U
	OWDFMW01-WG-04	4/26/2010	<0.0352	U	<0.0352	U	<0.0352	U	<0.0352	U	<0.0352	U	<0.0352	U	<0.0352	U	<0.0730	U	<0.0352	U	<0.0352	U	<0.620	U
	ES007	10/21/2010	<0.10	U	<0.10	U	<0.16	U	<0.12	U	<0.14	U	<0.12	U	<0.12	U	<0.10	U	<0.14	U	<0.16	U	**0.60**	
	ES008	10/21/2010*	<0.10	U	<0.10	U	<0.16	U	<0.12	U	<0.14	U	<0.12	U	<0.12	U	<0.10	U	<0.14	U	<0.16	U	**0.57**	
	ES017	1/21/2011	<0.10	U	<0.10	U	<0.16	U	<0.12	U	<0.14	U	<0.12	U	<0.12	U	<0.10	U	<0.14	U	<0.16	U	<0.22	U
	ES018	1/21/2011*	<0.10	U	<0.10	U	<0.16	U	<0.12	U	<0.14	U	<0.12	U	<0.12	U	<0.10	U	<0.14	U	<0.16	U	<0.22	U
	ES029	4/21/2011	<0.10	U	<0.10	U	<0.16	U	<0.12	U	<0.14	U	<0.12	U	<0.12	U	<0.10	U	<0.14	U	<0.16	U	<0.22	U
	ES031	4/21/2011*	<0.10	U	<0.10	U	<0.16	U	<0.12	U	<0.14	U	<0.12	U	<0.12	U	<0.10	U	<0.14	U	<0.16	U	<0.22	U
	ES044	7/21/2011	<0.10	U	<0.10	U	<0.16	U	<0.12	U	<0.14	U	<0.12	U	<0.12	U	<0.10	U	<0.14	U	<0.16	U	**0.27**	**J**
	ES045	7/21/2011*	<0.10	U	<0.10	U	<0.16	U	<0.12	U	<0.14	U	<0.12	U	<0.12	U	<0.10	U	<0.14	U	<0.16	U	**0.43**	**J**
	ES055	10/26/2011	<0.10	U	<0.10	U	<0.16	U	<0.12	U	<0.14	U	<0.12	U	<0.12	U	<0.10	U	<0.14	U	<0.16	U	**0.19**	**J**
	ES056	10/26/2011*	<0.10	U	<0.10	U	<0.16	U	<0.12	U	<0.14	U	<0.12	U	<0.12	U	<0.10	U	<0.14	U	<0.16	U	<0.22	U
	ES058	1/24/2012	<0.10	U	<0.10	U	<0.16	U	<0.12	U	<0.14	U	<0.12	U	<0.12	U	<0.10	U	<0.14	U	<0.16	U	**0.20**	**J**
	ES059	1/24/2012*	<0.10	U	<0.10	U	<0.16	U	<0.12	U	<0.14	U	<0.12	U	<0.12	U	<0.10	U	<0.14	U	<0.16	U	**0.11**	**J**
	ES077	4/26/2012	<0.10	U	<0.10	U	<0.16	U	<0.12	U	<0.14	U	<0.12	U	<0.12	U	<0.10	U	<0.14	U	<0.16	U	<0.22	U
	ES084	7/19/2012	<0.10	U	<0.10	U	<0.16	U	<0.12	U	<0.14	U	<0.12	U	<0.12	U	<0.10	U	<0.14	U	<0.16	U	<0.22	U
	ES008	11/7/2012	<0.050	U	<0.050	U	<0.050	U	<0.050	U	<0.050	U	<0.050	U	<0.050	U	**0.025**	**J**	<0.050	U	<0.050	U	<0.20	U
	ES007	11/7/2012*	<0.050	U	<0.050	U	<0.050	U	<0.050	U	<0.050	U	<0.050	U	<0.050	U	**0.035**	**J**	<0.050	U	<0.050	U	<0.20	U
	ES016	1/30/2013	<0.050	U	<0.050	U	<0.050	U	<0.050	U	<0.050	U	<0.050	U	<0.050	U	**0.032**	**J**	<0.050	U	<0.050	U	<0.20	U
	ES017	1/30/2013*	<0.050	U	<0.050	U	<0.050	U	<0.050	U	<0.050	U	<0.050	U	<0.050	U	**0.039**	**J**	<0.050	U	<0.050	U	<0.20	U
	ES025	4/24/2013	<0.051	U	<0.051	U	<0.051	U	<0.051	U	<0.051	U	<0.051	U	<0.051	U	**0.063**	**J**	<0.051	U	<0.051	U	<0.200	U
	ES026	4/24/2013*	<0.050	U	<0.050	U	<0.050	U	<0.050	U	<0.050	U	<0.050	U	<0.050	U	**0.068**	**J**	<0.050	U	<0.050	U	<0.200	U
	ES034	7/24/2013	<0.050	U	<0.050	U	<0.050	U	<0.050	U	<0.050	U	<0.050	U	<0.050	U	**0.081**	**J**	<0.050	U	<0.050	U	<0.200	U
	ES035	7/24/2013*	<0.048	U	<0.048	U	<0.048	U	<0.048	U	<0.048	U	<0.048	U	<0.048	U	**0.12**	**J**	<0.048	U	<0.048	U	<0.200	U
	ES043	10/23/2013	< 0.049	U	< 0.049	U	< 0.049	U	< 0.049	U	< 0.049	U	< 0.049	U	< 0.049	U	< 0.049	U	< 0.049	U	< 0.049	U	<0.200	U
	ES044	10/23/2013*	< 0.049	U	< 0.049	U	< 0.049	U	< 0.049	U	< 0.049	U	< 0.049	U	< 0.049	U	< 0.049	U	< 0.049	U	< 0.049	U	<0.200	U
	ES053	1/27/2014	<0.050	U	<0.050	U	<0.050	U	<0.050	U	<0.050	U	<0.050	U	<0.050	U	**0.093**	**J**	<0.050	U	<0.050	U	<0.200	U
	ES054	1/27/2014*	<0.050	U	<0.050	U	<0.050	U	<0.050	U	<0.050	U	<0.050	U	<0.050	U	**0.085**	**J**	<0.050	U	<0.050	U	**0.114**	**J**
	ES086	4/23/2014	<0.049	U	<0.049	U	<0.049	U	<0.049	U	<0.049	U	<0.049	U	<0.049	U	**0.035**	**J**	<0.049	U	<0.049	U	**0.156**	**J**
	ES087**	4/23/2014*	<0.050	U	<0.050	U	<0.050	U	<0.050	U	<0.050	U	<0.050	U	<0.050	U	**0.035**	**J**	<0.050	U	<0.050	U	<0.200	U
	ES109	7/24/2014	<0.051	U	<0.051	U	<0.051	U	<0.051	U	<0.051	U	<0.051	U	<0.051	U	**0.031**	**J**	<0.051	U	<0.051	U	<0.200	U
	ES110	7/24/2014*	<0.050	U	<0.050	U	<0.050	U	<0.050	U	<0.050	U	<0.050	U	<0.050	U	**0.027**	**J**	<0.050	U	<0.050	U	<0.200	U
	ES121	10/22/2014	<0.052	U	<0.052	U	<0.052	U	<0.052	U	<0.052	U	<0.10	U	<0.052	U	**0.047**	**J**	<0.052	U	<0.052	U	**0.206**	**J**
	ES122	10/22/2014*	<0.052	U	<0.052	U	<0.052	U	<0.052	U	<0.052	U	<0.10	U	<0.052	U	<0.052	U	<0.052	U	<0.052	U	**0.129**	**J**
	ES121X	1/26/2015	<0.052	U	<0.052	U	<0.052	U	<0.052	U	<0.052	U	<0.10	U	<0.052	U	<0.052	U	<0.052	U	<0.052	U	<0.200	U
	ES122X	1/26/2015*	<0.051	U	<0.051	U	<0.051	U	<0.051	U	<0.051	U	<0.10	U	<0.051	U	<0.051	U	<0.051	U	<0.051	U	<0.200	U
	ES137	4/22/2015	<0.0050	U	<0.0050	U	<0.020	U	**0.0039**	**JX**	<0.0050	U	**0.023**		**0.017**	**J**	**0.025**		**0.0075**	**J**	<0.010	U	**0.036**	
	ES138	4/22/2015*	<0.0050	U	<0.0050	U	<0.020	U	<0.0050	U	<0.0050	U	**0.020**		**0.015**	**J**	**0.023**		**0.0064**	**J**	<0.010	U	**0.038**	

Well Name	Sample ID	Date Sampled	8015C						8260B																									
			TPH-d		TPH-g		TPH-o		TPH-g		1,1,1-Trichloroethane		1,1,2-Trichloroethane		1,1-Dichloroethane		1,1-Dichloroethylene		1,2,3-Trichloropropane		1,2,4-Tricholorobenzene		1,2-Dibromo-3-chloropropane		1,2-Dibromoethane		1,2-Dichlorobenzene		1,2-Dichloroethane		1,2-Dichloropropane		1,3-Dichlorobenzene	
			(µg/l)		(µg/l)		(µg/l)		(µg/l)		(µg/l)		(µg/l)		(µg/l)		(µg/l)		(µg/l)		(µg/l)		(µg/l)		(µg/l)		(µg/l)		(µg/l)		(µg/l)		(µg/l)	
For wells < 150 m from surface water	-	-																																
DOH Tier 1 EALs (for locations < 150m from surface water)	-	-	**100**		**100**		**100**		**100**		**62**		**5.0**		**2.4**		**7.0**		**0.6**		**25**		**0.04**		**0.04**		**10**		**0.15**		**5.0**		**5.0**	
HDMW2253-03	HDMW2253-03-WG-02	10/13/2009[ab]	<185	U	<30	U	-		-		<0.31	U	<0.31	U	<0.31	U	-	U	<0.31	U	<0.31	U	<0.62	U	<0.31	U	<0.31	U	<0.15	U	<0.31	U	<0.31	U
	HDMW2253-03-WG-03	1/26/2010	**322**	**J**	<60.0	U	-		-		<0.620	U	<0.620	U	<0.620	U	<0.620	U	<0.620	U	<0.620	U	<1.24	U	<0.620	U	<0.620	U	<0.300	U	<0.620	U	<0.620	U
	HDMW2253-03-WG-04	4/26/2010	<352	U	<60.0	U	-		-		<0.620	U	<0.620	U	<0.620	U	<0.620	U	<0.620	U	<0.620	U	<1.24	U	<0.620	U	<0.620	U	<0.300	U	<0.620	U	<0.620	U
	HDMW2253-03-WG-05	7/8/2010	<320	U	<60.0	U	-		-		<0.620	U	<0.620	U	<0.620	U	<0.620	U	<0.620	U	<0.620	U	<1.24	U	<0.620	U	<0.620	U	<0.300	U	<0.620	U	<0.620	U
	ES006	10/21/2010	<80.8	U	-		-		<12.12	U	<0.28	U	<0.40	U	<0.38	U	<0.60	U	<0.78	U	<0.42	U	<1.52	U	<0.40	U	<0.34	U	<0.28	U	<0.34	U	<0.22	U
	ES016	1/21/2011	<80.8	U	-		-		<12.12	U	<0.28	U	<0.40	U	<0.38	U	<0.60	U	<0.78	U	<0.42	U	<1.52	U	<0.40	U	<0.34	U	<0.28	U	<0.34	U	<0.22	U
	ES028	4/21/2011	<80.8	U	-		-		<12.12	U	<0.28	U	<0.40	U	<0.38	U	<0.60	U	<0.78	U	<0.42	U	<1.52	U	<0.40	U	<0.34	U	<0.28	U	<0.34	U	<0.22	U
	ES043	7/21/2011	<80.8	U	-		< 212.0	U	<12.12	U	<0.28	U	<0.40	U	<0.38	U	<0.60	U	<0.78	U	<0.42	U	<1.52	U	<0.40	U	<0.34	U	<0.28	U	<0.34	U	<0.22	U
	ES053	10/26/2011	<80.8	U	-		-		<12.12	U	<0.28	U	<0.40	U	<0.38	U	<0.60	U	<0.78	U	<0.42	U	<1.52	U	<0.40	U	<0.34	U	<0.28	U	<0.34	U	<0.22	U
	ES057	1/24/2012	<80.8	U	-		< 212.0	U	<12.12	U	<0.28	U	<0.40	U	<0.38	U	<0.60	U	<0.78	U	<0.42	U	<1.52	U	<0.40	U	<0.34	U	<0.28	U	<0.34	U	<0.22	U
	ES076	4/26/2012	**160**	**++**	-		-		<12.12	U	<0.28	U	<0.40	U	<0.38	U	<0.60	U	<0.78	U	<0.42	U	<1.52	U	<0.40	U	<0.34	U	<0.28	U	<0.34	U	<0.22	U
	ES083	7/19/2012	<80.8	U	-		-		<12.12	U	<0.28	U	<0.40	U	<0.38	U	<0.60	U	<0.78	U	<0.42	U	<1.52	U	<0.40	U	<0.34	U	<0.28	U	<0.34	U	<0.22	U
	ES009	11/7/2012	**25**	**HD,J**	-		-		**15**	**BU,B**	<0.50	BU,U	<0.50	U	<0.50	U	<0.50	U	<1.0	U	<1.0	U	<5.0	U	<0.50	U	<0.50	U	<0.50	U	<0.50	U	<0.50	U
	ES018	1/30/2013	**600**		-		-		<30	U	<0.50	U	<0.50	U	<0.50	U	<0.50	U	<1.0	U	<1.0	U	<5.0	U	<0.50	U	<0.50	U	<0.50	U	<0.50	U	<0.50	U
	ES027	4/24/2013	**45**	**J**	-		-		<30	U	<0.50	U	<0.50	U	<0.50	U	<0.50	U	<1.0	U	<1.0	U	<2.0	U	<0.50	U	<0.50	U	<0.50	U	<0.50	U	<0.50	U
	ES036	7/24/2013	< 21	U	-		-		<30	U	<0.50	U	<0.50	U	<0.50	U	<0.50	U	<1.0	U	<1.0	U	<2.0	U	<0.50	U	<0.50	U	<0.50	U	<0.50	U	<0.50	U
	ES045	10/23/2013	< 20	U	-		-		**15**	**B,J**	< 0.50	U	< 0.50	U	< 0.50	U	< 0.50	U	< 1.0	U	< 1.0	U	< 2.0	U	< 0.50	U	< 0.50	U	< 0.50	U	< 0.50	U	< 0.50	U
	ES051	1/22/2014	**18**	**HD,J**	-		-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	ES052	1/22/2014*	**18**	**HD,J**	-		-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	ES055	1/27/2014	**35**	**HD,J**	-		-		**27**	**B,J**	< 0.50	U,IH	< 0.50	U	< 0.50	U	< 0.50	U	< 1.0	U	< 1.0	U	< 2.0	U	< 0.50	U	< 0.50	U	< 0.50	U	< 0.50	U	< 0.50	U
	ES088**	4/23/2014	**220**	**HD**	-		-		**27**	**B,J**	<0.50	U	<0.50	U	<0.50	U	<0.50	U	<1.0	U	<1.0	U	<2.0	U	<0.50	U	<0.50	U	<0.50	U	<0.50	U	<0.50	U
	ES111	7/23/2014	<12	U	-		-		<30	U	<0.50	U	<0.50	U	<0.50	U	<0.50	U	<1.0	U	<1.0	U	<2.0	U	<0.50	U	<0.50	U	<0.50	U	<0.50	U	<0.50	U
	ES120	10/22/2014	**14**	**HD,J**	-		-		<30	U	<0.50	U	<0.50	U	<0.50	U	<0.50	U	<1.0	U	<1.0	U	<2.0	U	<0.50	U	<0.50	U	<0.50	U	<0.50	U	<0.50	U
	ES128	1/29/2015	**16**	**HD,J**	-		-		<30	U	<0.50	U	<0.50	U	<0.50	U	<0.50	U	<1.0	U	<1.0	U	<2.0	U	<0.50	U	<0.50	U	<0.50	U	<0.50	U	<0.50	U
	ES136	4/22/2015	**13**	**J**	<25	U	**55**	**B,J**	-		<0.20	U	<0.40	U	<0.20	U	<0.20	U	<0.50	U	<0.30	U	<0.80	U	<0.20	U	<0.20	U	-		<0.20	U	<0.20	U

Well Name	Sample ID	Date Sampled	8260B																											
			1,3-Dichloropropene (total of cis/trans)		1,4-Dichlorobenzene		Acetone		Benzene		Bromodichloromethane		Bromoform		Bromomethane		Carbon Tetrachloride		Chlorobenzene		Chloroethane		Chloroform		Chloromethane		cis-1,2-Dichloroethylene		Dibromochloromethane	
			(µg/l)		(µg/l)		(µg/l)		(µg/l)		(µg/l)		(µg/l)		(µg/l)		(µg/l)		(µg/l)		(µg/l)		(µg/l)		(µg/l)		(µg/l)		(µg/l)	
For wells < 150 m from surface water	-	-																												
DOH Tier 1 EALs (for locations < 150m from surface water)	-	-	0.43		5.0		1500		5.0		0.12		80		8.7		5.0		25		16		70		1.8		70		0.16	
HDMW2253-03	HDMW2253-03-WG-02	10/13/2009[ab]	<0.15	U	<0.15	U	<3.1	U	<0.12	U	<0.15	U	<0.31	U	<0.94	U	<0.31	U	<0.15	U	<0.31	U	<0.3	U	<0.31	U	<0.31	U	<0.15	U
	HDMW2253-03-WG-03	1/26/2010	<0.620		<0.300	U	<6.20	U	<0.240	U	<0.300	U	<0.620	U	<1.88	U	<0.620	U	<0.300	U	<0.620	U	<0.600	U	<0.620	U	<0.620	U	<0.300	U
	HDMW2253-03-WG-04	4/26/2010	<0.620		<0.300	U	<6.20	U	<0.240	U	<0.300	U	<0.620	U	<1.88	U	<0.620	U	<0.300	U	<0.620	U	<0.600	U	<0.620	U	<0.620	U	<0.300	U
	HDMW2253-03-WG-05	7/8/2010	<0.620		<0.300	U	<6.20	U	<0.240	U	<0.300	U	<0.620	U	<1.88	U	<0.620	U	<0.300	U	<0.620	U	<0.600	U	<0.620	U	<0.620	U	<0.300	U
	ES006	10/21/2010	<0.36	U	<0.38	U	<1.90	U	<0.32	U	<0.28	U	<0.28	U	<0.48	U	<0.20	U	<0.42	U	<0.42	U	<0.14	U	<0.62	U	<0.32	U	<0.38	U
	ES016	1/21/2011	<0.36	U	<0.38	U	<1.90	U	<0.32	U	<0.28	U	<0.28	U	<0.48	U	<0.20	U	<0.42	U	<0.42	U	<0.14	U	<0.62	U	<0.32	U	<0.38	U
	ES028	4/21/2011	<0.36	U	<0.38	U	<1.90	U	**0.42**	**J**	<0.28	U	<0.28	U	<0.48	U	<0.20	U	<0.42	U	<0.42	U	<0.14	U	<0.62	U	<0.32	U	<0.38	U
	ES043	7/21/2011	<0.36	U	<0.38	U	<1.90	U	<0.32	U	<0.28	U	<0.28	U	<0.48	U	<0.20	U	<0.42	U	<0.42	U	<0.14	U	<0.62	U	<0.32	U	<0.38	U
	ES053	10/26/2011	<0.36	U	<0.38	U	<1.90	U	**0.92**	**J**	<0.28	U	<0.28	U	<0.48	U	<0.20	U	<0.42	U	<0.42	U	<0.14	U	<0.84	U	<0.32	U	<0.38	U
	ES057	1/24/2012	<0.36	U	<0.38	U	<1.90	U	<0.32	U	<0.28	U	<0.28	U	<0.48	U	<0.20	U	<0.42	U	<0.42	U	<0.14	U	<0.84	U	<0.32	U	<0.38	U
	ES076	4/26/2012	<0.36	U	<0.38	U	<1.90	U	**0.20**	**J**	<0.28	U	<0.28	U	<0.48	U	<0.20	U	<0.42	U	<0.42	U	<0.14	U	<0.84	U	<0.32	U	<0.38	U
	ES083	7/19/2012	<0.36	U	<0.38	U	<1.90	U	<0.32	U	<0.28	U	<0.28	U	<0.48	U	<0.20	U	<0.42	U	<0.42	U	<0.14	U	<0.62	U	<0.32	U	<0.38	U
	ES009	11/7/2012	<0.50	U	<0.50	U	<10	U	<0.50	U	<0.50	U	<1.0	U	<5.0	U	<0.50	U	<0.50	U	<5.0	U	<0.50	U	<5.0	U	<0.50	U	<0.50	U
	ES018	1/30/2013	<0.50	U	<0.50	U	<10	U	<0.50	U	<0.50	U	<1.0	U	<5.0	U	<0.50	U	<0.50	U	<5.0	U	<0.50	U	<5.0	U	<0.50	U	<0.50	U
	ES027	4/24/2013	<0.50	U	<0.50	U	<10	U	<0.50	U	<0.50	U	<1.0	U	<5.0	U	<0.50	U	<0.50	U	<5.0	U	<0.50	U	<2.0	U	<0.50	U	<0.50	U
	ES036	7/24/2013	<0.50	U	<0.50	U	<10	U	<0.50	U	<0.50	U	<1.0	U	<5.0	U	<0.50	U	<0.50	U	<5.0	U	<0.50	U	<2.0	U	<0.50	U	<0.50	U
	ES045	10/23/2013	<0.50	U	< 0.50	U	< 10	U, ICH	< 0.50	U	< 0.50	U	< 1.0	U	< 5.0	U	< 0.50	U	< 0.50	U	< 5.0	U	< 0.50	U	< 2.0	U,IJ	< 0.50	U	< 0.50	U
	ES051	1/22/2014	-	-	-	-	-	-	<0.50	U	-		-		-		-		-		-		-		-		-		-	
	ES052	1/22/2014*	-	-	-	-	-	-	<0.50	U	-		-		-		-		-		-		-		-		-		-	
	ES055	1/27/2014	<0.50	U,IH	< 0.50	U	<10	U	< 0.50	U	< 0.50	U	< 1.0	U	< 5.0	U,IH	<0.50	U,IH	< 0.50	U	< 5.0	U,IH	< 0.50	U	< 2.0	U	< 0.50	U	< 0.50	U
	ES088**	4/23/2014	<0.50	U,ICH	<0.50	U	<10	U,IH,ICH	<0.50	U	<0.50	U	<1.0	U	<5.0	U	<0.50	U	<0.50	U	<5.0	U	<0.50	U	<2.0	U	<0.50	U	<0.50	U
	ES111	7/23/2014	<0.50	U	<0.50	U	<10	U,IH,ICH	<0.50	U	<0.50	U	<1.0	U	<5.0	U	<0.50	U	<0.50	U	<5.0	U	<0.50	U	<2.0	U	<0.50	U	<0.50	U
	ES120	10/22/2014	<0.50	U	<0.50	U	<10	U,ICH	<0.50	U	<0.50	U	<1.0	U	<5.0	U	<0.50	U	<0.50	U	<5.0	U	<0.50	U	<2.0	U	<0.50	U	<0.50	U
	ES128	1/29/2015	<0.50	U	<0.50	U	<10	U,IJ	<0.50	U	<0.50	U	<1.0	U	<5.0	U,IH	<0.50	U	<0.50	U	<5.0	U	<0.50	U	<2.0	U	<0.50	U	<0.50	U
	ES136	4/22/2015	<0.20	U	<0.20	U	<10	U	<0.10	U	-		<0.50	U	<0.30	U	<0.20	U	<0.20	U	<0.20	U	<0.20	U	<0.20	U	<0.20	U	-	

Well Name	Sample ID	Date Sampled	8260B																															
			Ethylbenzene		Hexachlorobutadiene		Methyl ethyl ketone (2-Butanone)		Methyl isobutyl ketone (4-Methyl-2-Pentanone)		Methyl tert-butyl Ether		Methylene chloride		Napthalene		Styrene		Tetrachloroethane, 1,1,1,2-		Tetrachloroethane, 1,1,2,2-		Tetrachloroethylene		Toluene		trans-1,2-Dichloroethylene		Trichloroethylene		Vinyl chloride		Xylenes (total)	
			(µg/l)		(µg/l)		(µg/l)		(µg/l)		(µg/l)		(µg/l)		(µg/l)		(µg/l)		(µg/l)		(µg/l)		(µg/l)		(µg/l)		(µg/l)		(µg/l)		(µg/l)		(µg/l)	
For wells < 150 m from surface water	-	-																																
DOH Tier 1 EALs (for locations < 150m from surface water)	-	-	**30**		**0.86**		**7,100**		**170**		**5.0**		**4.8**		**17**		**10**		**0.52**		**0.067**		**5.0**		**40**		**100**		**5.0**		**2.0**		**20**	
HDMW2253-03	HDMW2253-03-WG-02	10/13/2009[ab]	<0.31	U	<0.31	U	<3.1	U	<3.1	U	-		<1	U	<0.62	U	<0.31	U	<0.15	U	<0.15	U	<0.31	U	<0.31	U	<0.31	U	<0.31	U	<0.31	U	<0.62	U
	HDMW2253-03-WG-03	1/26/2010	<0.620	U	<0.620	U	<6.20	U	<6.20	U	<3.00	U	<2.00	U	<1.24	U	<0.620	U	<0.300	U	<0.300	U	<0.620	U	<0.620	U	<0.620	U	<0.620	U	<0.620	U	<1.24	U
	HDMW2253-03-WG-04	4/26/2010	<0.620	U	<0.620	U	<6.20	U	<6.20	U	<3.00	U	<2.00	U	<1.24	U	<0.620	U	<0.300	U	<0.300	U	<0.620	U	<0.620	U	<0.620	U	<0.620	U	<0.620	U	<1.24	U
	HDMW2253-03-WG-05	7/8/2010	<0.620	U	<0.620	U	<6.20	U	<6.20	U	<3.00	U	<2.00	U	<1.24	U	<0.620	U	<0.300	U	<0.300	U	<0.620	U	<0.620	U	<0.620	U	<0.620	U	<0.620	U	<1.24	U
	ES006	10/21/2010	<0.46	U	<0.38	U	<1.20	U	<3.80	U	<0.38	U	<0.70	U	-		<0.50	U	<0.26	U	<0.20	U	<0.30	U	<0.34	U	<0.38	U	<0.32	U	<0.46	U	<0.38	U
	ES016	1/21/2011	<0.46	U	<0.38	U	<1.20	U	<3.80	U	<0.38	U	<0.70	U	-		<0.50	U	<0.26	U	<0.20	U	<0.30	U	<0.34	U	<0.38	U	<0.32	U	<0.46	U	<0.38	U
	ES028	4/21/2011	<0.46	U	<0.38	U	<1.20	U	<3.80	U	<0.38	U	<0.70	U	-		<0.50	U	<0.26	U	<0.20	U	<0.30	U	<0.34	U	<0.38	U	<0.32	U	<0.46	U	<0.38	U
	ES043	7/21/2011	<0.46	U	<0.38	U	<1.20	U	<3.80	U	<0.38	U	<0.70	U	-		<0.50	U	<0.26	U	<0.20	U	<0.30	U	<0.34	U	<0.38	U	<0.32	U	<0.46	U	<0.38	U
	ES053	10/26/2011	<0.46	U	<0.38	U	<1.20	U	<3.80	U	<0.52	U	<0.70	U	-		<0.50	U	<0.26	U	<0.20	U	<0.48	U	<0.34	U	<0.38	U	<0.32	U	<0.46	U	<0.38	U
	ES057	1/24/2012	<0.46	U	<0.38	U	<1.20	U	<3.80	U	<0.52	U	<0.70	U	-		<0.50	U	<0.26	U	<0.20	U	<0.48	U	<0.34	U	<0.38	U	<0.32	U	<0.46	U	<0.38	U
	ES076	4/26/2012	<0.46	U	<0.38	U	<1.20	U	<3.80	U	<0.52	U	<0.70	U	-		<0.50	U	<0.26	U	<0.20	U	<0.48	U	<0.34	U	<0.38	U	<0.32	U	<0.46	U	<0.38	U
	ES083	7/19/2012	<0.46	U	<0.38	U	<1.20	U	<3.80	U	<0.38	U	<0.70	U	-		<0.50	U	<0.26	U	<0.20	U	<0.30	U	<0.34	U	<0.38	U	<0.32	U	<0.46	U	<0.38	U
	ES009	11/7/2012	<0.50	U	<0.50	U	<5.0	U	<5.0	U	<0.50	U	<1.0	U	-		<0.50	U	<0.50	U	<0.50	U	<0.50	U	<0.50	U	<0.50	U	<0.50	BU,U	<0.50	U	<1	U
	ES018	1/30/2013	<0.50	U	<0.50	U	<5.0	U	<5.0	U	<0.50	U	<1.0	U	-		<0.50	U	<0.50	U	<0.50	U	<0.50	U	<0.50	U	<0.50	U	<0.50	U	<0.50	U	<1	U
	ES027	4/24/2013	<0.50	U	<0.50	U	<5.0	U	<5.0	U	<0.50	U	<1.0	U	-		<0.50	U	<0.50	U	<0.50	U	<0.50	U	<0.50	U	<0.50	U	<0.50	U	<0.50	U	<1.0	U
	ES036	7/24/2013	<0.50	U	<0.50	U	<5.0	U	<5.0	U	<0.50	U	<1.0	U	-		<0.50	U	<0.50	U	<0.50	U	<0.50	U	<0.50	U	<0.50	U	<0.50	U	<0.50	U	<1.0	U
	ES045	10/23/2013	< 0.50	U	< 0.50	U	< 5.0	U,ICH	< 5.0	U	< 0.50	U	< 1.0	U	-		< 0.50	U	< 0.50	U	< 0.50	U	< 0.50	U	< 0.50	U	< 0.50	U	< 0.50	U	< 0.50	U	<1.0	U
	ES051	1/22/2014	< 0.50	U	-		-		-		-		-		-		-		-		-		-		< 0.50	U	-		-		-		<1.0	U
	ES052	1/22/2014*	< 0.50	U	-		-		-		-		-		-		-		-		-		-		< 0.50	U	-		-		-		<1.0	U
	ES055	1/27/2014	< 0.50	U	< 0.50	U	< 5.0	U	< 5.0	U	< 0.50	U	< 1.0	U	-		< 0.50	U	< 0.50	U	< 0.50	U	< 0.50	U	< 0.50	U	< 0.50	U	< 0.50	U	< 0.50	U	<1.0	U
	ES088**	4/23/2014	<0.50	U	<0.50	U	<5.0	U,ICH	<5.0	U	<0.50	U	<1.0	U	-		<0.50	U	<0.50	U	<0.50	U	<0.50	U	<0.50	U	<0.50	U,ICH	<0.50	U	<0.50	U	<1.0	U
	ES111	7/23/2014	<0.50	U	<0.50	U	<5.0	U	<5.0	U	<0.50	U	<1.0	U	-		<0.50	U	<0.50	U	<0.50	U	<0.50	U	<0.50	U	<0.50	U	<0.50	U	<0.50	U	<1.0	U
	ES120	10/22/2014	<0.50	U	<0.50	U	<5.0	U,ICH	<5.0	U	<0.50	U	<1.0	U	-		<0.50	U	<0.50	U	<0.50	U	<0.50	U	**3.8**		<0.50	U	<0.50	U	<0.50	U	<1.0	U
	ES128	1/29/2015	<0.50	U	<0.50	U	<5.0	U	<5.0	U	<0.50	U	<1.0	U	-		<0.50	U	<0.50	U	<0.50	U	<0.50	U	<0.50	U	<0.50	U	<0.50	U	<0.50	U	<1.0	U
	ES136	4/22/2015	<0.10	U	<0.30	U	<4.0	U	<10	U	<0.30	U	<0.20	U	-		<0.20	U	<0.20	U	-		<0.20	U	**0.070**	**J**	<0.20	U	<0.10	U	<0.10	U	<0.20	U

Well Name	Sample ID	Date Sampled	8260SIM										8011				8270C															
			1,2-Dibromoethane		1,2-Dichloroethane		Bromodichloromethane		Dibromochloromethane		Tetrachloroethane, 1,1,2,2-		1,2-Dibromo-3-chloropropane		1,2-Dibromoethane		Acenaphthene		Acenaphthylene		Anthracene		Benzo[a]anthracene		Benzo[g,h,i]perylene		Benzo[a]pyrene		Benzo[b]fluoranthene		Benzo[k]fluoranthene	
			(µg/l)		(µg/l)		(µg/l)		(µg/l)		(µg/l)		(µg/l)		(µg/l)		(µg/l)		(µg/l)		(µg/l)		(µg/l)		(µg/l)		(µg/l)		(µg/l)		(µg/l)	
For wells < 150 m from surface water	-	-																														
DOH Tier 1 EALs (for locations < 150m from surface water)	-	-	**0.04**		**0.15**		**0.12**		**0.16**		**0.067**		**0.04**		**0.04**		**20**		**30**		**0.73**		**0.027**		**0.10**		**0.014**		**0.092**		**0.40**	
HDMW2253-03	HDMW2253-03-WG-02	10/13/2009[ab]	-		-		-		-		-		-		-		<0.0169	U	<0.0169	U	<0.0169	U	<0.0169	U	<0.0169	U	<0.0169	U	<0.0169	U	<0.0169	U
	HDMW2253-03-WG-03	1/26/2010	-		-		-		-		-		-		-		<0.0500	U	<0.0500	U	<0.0500	U	<0.0500	U	<0.0500	U	<0.0500	U	<0.0500	U	<0.0500	U
	HDMW2253-03-WG-04	4/26/2010	-		-		-		-		-		-		-		<0.0348	U	<0.0348	U	<0.0348	U	<0.0348	U	<0.0348	U	<0.0348	U	<0.0348	U	<0.0348	U
	HDMW2253-03-WG-05	7/8/2010	-		-		-		-		-		-		-		<0.0348	U	<0.0348	U	<0.0348	U	<0.0348	U	<0.0348	U	<0.0348	U	<0.0348	U	<0.0348	U
	ES006	10/21/2010	-		-		-		-		-		-		-		<0.12	U	<0.12	U	<0.10	U	<0.14	U	<0.16	U	<0.14	U	<0.12	U	<0.14	U
	ES016	1/21/2011	-		-		-		-		-		-		-		<0.12	U	<0.12	U	<0.10	U	<0.14	U	<0.16	U	<0.14	U	<0.12	U	<0.14	U
	ES028	4/21/2011	-		-		-		-		-		-		-		<0.12	U	<0.12	U	<0.10	U	<0.14	U	<0.16	U	<0.14	U	<0.12	U	<0.14	U
	ES043	7/21/2011	-		-		-		-		-		-		-		<0.12	U	<0.12	U	<0.10	U	<0.14	U	<0.16	U	<0.14	U	<0.12	U	<0.14	U
	ES053	10/26/2011	-		-		-		-		-		-		-		<0.12	U	<0.12	U	<0.10	U	<0.14	U	<0.16	U	<0.14	U	<0.12	U	<0.14	U
	ES057	1/24/2012	-		-		-		-		-		-		-		<0.12	U	<0.12	U	<0.10	U	<0.14	U	<0.16	U	<0.12	U	<0.12	U	<0.14	U
	ES076	4/26/2012	-		-		-		-		-		-		-		<0.12	U	<0.12	U	<0.10	U	<0.14	U	<0.16	U	<0.12	U	<0.12	U	<0.14	U
	ES083	7/19/2012	-		-		-		-		-		-		-		<0.12	U	<0.12	U	<0.10	U	<0.14	U	<0.16	U	<0.14	U	<0.12	U	<0.14	U
	ES009	11/7/2012	-		-		-		-		-		-		-		<0.050	U	<0.050	U	<0.050	U	<0.050	U	<0.050	U	<0.050	U	<0.050	U	<0.050	U
	ES018	1/30/2013	-		-		-		-		-		-		-		<0.050	U	<0.050	U	<0.050	U	<0.050	U	<0.050	U	<0.050	U	<0.050	U	<0.050	U
	ES027	4/24/2013	-		-		-		-		-		-		-		<0.052	U	<0.052	U	<0.052	U	<0.052	U	<0.052	U	<0.052	U	<0.052	U	<0.052	U
	ES036	7/24/2013	-		-		-		-		-		-		-		<0.047	U	<0.047	U	<0.047	U	<0.047	U	<0.047	U	<0.047	U	<0.047	U	<0.047	U
	ES045	10/23/2013	-		-		-		-		-		-		-		< 0.050	U	< 0.050	U	< 0.050	U	< 0.050	U	< 0.050	U	< 0.050	U	< 0.050	U	< 0.050	U
	ES051	1/22/2014	-		-		-		-		-		-		-		-		-		-		-		-		-		-		-	
	ES052	1/22/2014*	-		-		-		-		-		-		-		-		-		-		-		-		-		-		-	
	ES055	1/27/2014	-		-		-		-		-		-		-		<0.051	U	<0.051	U	<0.051	U	<0.051	U	<0.051	U	<0.051	U	<0.051	U	<0.051	U
	ES088**	4/23/2014	-		-		-		-		-		-		-		<0.051	U	<0.051	U	<0.051	U	<0.051	U	<0.051	U	<0.051	U	<0.051	U	<0.051	U
	ES111	7/23/2014	-		-		-		-		-		-		-		<0.053	U	<0.053	U	<0.053	U	<0.053	U	<0.053	U	<0.053	U	<0.053	U	<0.053	U
	ES120	10/22/2014	-		-		-		-		-		-		-		<0.051	U	<0.051	U	<0.051	U	<0.051	U	<0.10	U	<0.051	U	<0.051	U	<0.051	U
	ES128	1/29/2015	-		-		-		-		-		-		-		<0.053	U	<0.053	U	<0.053	U	<0.053	U	<0.11	U	<0.053	U	<0.053	U	<0.053	U
	ES136	4/22/2015	<0.010	U	<0.015	U	<0.010	U	<0.010	U	<0.015	U	<0.0040	UJ	<0.0040	UJ	<0.0052	U	<0.0052	U	<0.0052	U	**0.0032**	**B,J**	<0.0052	U	<0.0052	U	<0.0052	U	<0.0052	U

Well Name	Sample ID	Date Sampled	8270C																						6020	
			Chrysene		Dibenzo[a,h]anthracene		Fluoranthene		Fluorene		Ideno[1,2,3-cd]pyrene		1-Methylnaphthalene		2-Methylnaphthalene		Naphthalene		Phenanthrene		Pyrene		Dissolved Lead	
			(µg/l)		(µg/l)		(µg/l)		(µg/l)		(µg/l)		(µg/l)		(µg/l)		(µg/l)		(µg/l)		(µg/l)		(µg/l)	
For wells < 150 m from surface water	**-**	**-**																								
DOH Tier 1 EALs (for locations < 150m from surface water)	**-**	**-**	**0.35**		**0.0092**		**8.0**		**3.9**		**0.092**		**2.1**		**2.1**		**17**		**4.6**		**2.0**		**5.6**	
HDMW2253-03	HDMW2253-03-WG-02	10/13/2009[ab]	<0.0169	U	<0.0169	U	<0.0169	U	<0.0169	U	<0.0169	U	<0.0169	U	<0.0169	U	<0.035	U	<0.0169	U	<0.0169	U	<0.31	U
	HDMW2253-03-WG-03	1/26/2010	<0.0500	U	<0.0500	U	<0.0500	U	<0.0500	U	<0.0500	U	<0.0500	U	<0.0500	U	<0.103	U	<0.0500	U	<0.0500	U	<0.620	U
	HDMW2253-03-WG-04	4/26/2010	<0.0348	U	<0.0348	U	<0.0348	U	<0.0348	U	<0.0348	U	<0.0348	U	<0.0348	U	<0.0720	U	<0.0348	U	<0.0348	U	<0.620	U
	HDMW2253-03-WG-05	7/8/2010	<0.0348	U	<0.0348	U	<0.0348	U	<0.0348	U	<0.0348	U	<0.0348	U	<0.0348	U	**0.0596**	**J**	<0.0348	U	<0.0348	U	<0.620	U
	ES006	10/21/2010	<0.10	U	<0.10	U	<0.16	U	<0.12	U	<0.14	U	<0.12	U	<0.12	U	<0.10	U	<0.14	U	<0.16	U	**0.56**	
	ES016	1/21/2011	<0.10	U	<0.10	U	<0.16	U	<0.12	U	<0.14	U	<0.12	U	<0.12	U	<0.10	U	<0.14	U	<0.16	U	<0.22	U
	ES028	4/21/2011	<0.10	U	<0.10	U	<0.16	U	<0.12	U	<0.14	U	<0.12	U	<0.12	U	<0.10	U	<0.14	U	<0.16	U	<0.22	U
	ES043	7/21/2011	<0.10	U	<0.10	U	<0.16	U	<0.12	U	<0.14	U	<0.12	U	<0.12	U	<0.10	U	<0.14	U	<0.16	U	**0.12**	**J**
	ES053	10/26/2011	<0.10	U	<0.10	U	<0.16	U	<0.12	U	<0.14	U	<0.12	U	<0.12	U	<0.10	U	<0.14	U	<0.16	U	**0.90**	
	ES057	1/24/2012	<0.10	U	<0.10	U	<0.16	U	<0.12	U	<0.14	U	<0.12	U	<0.12	U	<0.10	U	<0.14	U	<0.16	U	**0.19**	**J**
	ES076	4/26/2012	<0.10	U	<0.10	U	<0.16	U	<0.12	U	<0.14	U	<0.12	U	<0.12	U	<0.10	U	<0.14	U	<0.16	U	**0.71**	
	ES083	7/19/2012	<0.10	U	<0.10	U	<0.16	U	<0.12	U	<0.14	U	<0.12	U	<0.12	U	<0.10	U	<0.14	U	<0.16	U	<0.22	U
	ES009	11/7/2012	<0.050	U	<0.050	U	<0.050	U	<0.050	U	<0.050	U	<0.050	U	<0.050	U	<0.050	U	<0.050	U	<0.050	U	<0.20	U
	ES018	1/30/2013	<0.050	U	<0.050	U	<0.050	U	<0.050	U	<0.050	U	<0.050	U	<0.050	U	**0.037**	**J**	<0.050	U	<0.050	U	<0.20	U
	ES027	4/24/2013	<0.052	U	<0.052	U	<0.052	U	<0.052	U	<0.052	U	<0.052	U	<0.052	U	**0.16**	**J**	<0.052	U	<0.052	U	**0.102**	**J**
	ES036	7/24/2013	<0.047	U	<0.047	U	<0.047	U	<0.047	U	<0.047	U	<0.047	U	<0.047	U	**0.030**	**J**	<0.047	U	<0.047	U	<0.200	U
	ES045	10/23/2013	< 0.050	U	< 0.050	U	< 0.050	U	< 0.050	U	< 0.050	U	< 0.050	U	< 0.050	U	**0.041**	**J**	< 0.050	U	< 0.050	U	<0.200	U
	ES051	1/22/2014	-		-		-		-		-		<0.051	U	<0.051	U	<0.051	U	-		-		-	
	ES052	1/22/2014*	-		-		-		-		-		<0.051	U	<0.051	U	<0.051	U	-		-		-	
	ES055	1/27/2014	<0.051	U	<0.051	U	<0.051	U	<0.051	U	<0.051	U	<0.051	U	<0.051	U	**0.064**	**J**	<0.051	U	<0.051	U	<0.200	U
	ES088**	4/23/2014	<0.051	U	<0.051	U	<0.051	U	<0.051	U	<0.051	U	<0.051	U	<0.051	U	<0.051	U	<0.051	U	<0.051	U	<0.200	U
	ES111	7/23/2014	<0.053	U	<0.053	U	<0.053	U	<0.053	U	<0.053	U	<0.053	U	<0.053	U	<0.053	U	<0.053	U	<0.053	U	<0.200	U
	ES120	10/22/2014	<0.051	U	<0.051	U	<0.051	U	<0.051	U	<0.051	U	<0.10	U	<0.051	U	<0.051	U	<0.051	U	<0.051	U	**0.101**	**J**
	ES128	1/29/2015	<0.053	U	<0.053	U	<0.053	U	<0.053	U	<0.053	U	<0.11	U	<0.053	U	<0.053	U	<0.053	U	<0.053	U	<0.200	U
	ES136	4/22/2015	<0.0052	U	<0.0052	U	<0.021	U	<0.0052	U	<0.0052	U	<0.0052	U	<0.0052	U	<0.0052	U	<0.0052	U	<0.011	U	**0.078**	

Well Name	Sample ID	Date Sampled	8015C						8260B																							
			TPH-d		TPH-g		TPH-o		TPH-g		1,1,1-Trichloroethane		1,1,2-Trichloroethane		1,1-Dichloroethane		1,1-Dichloroethylene		1,2,3-Trichloropropane		1,2,4-Tricholorobenzene		1,2-Dibromo-3-chloropropane		1,2-Dibromoethane		1,2-Dichlorobenzene		1,2-Dichloroethane		1,2-Dichloropropane		1,3-Dichlorobenzene	
			(µg/l)		(µg/l)		(µg/l)		(µg/l)		(µg/l)		(µg/l)		(µg/l)		(µg/l)		(µg/l)		(µg/l)		(µg/l)		(µg/l)		(µg/l)		(µg/l)		(µg/l)		(µg/l)	
For wells < 150 m from surface water	**-**	**-**																														
DOH Tier 1 EALs (for locations < 150m from surface water)	**-**	**-**	**100**		**100**		**100**		**100**		**62**		**5.0**		**2.4**		**7.0**		**0.6**		**25**		**0.04**		**0.04**		**10**		**0.15**		**5.0**		**5.0**	
RHMW04	RHMW04GW01	9/19/2005[b]	**338**		<50.0	U	-		-		-		-		-		-		-		-		-		-		-		-		-		-	
	RHMW04-WG-01	8/4/2009[a]	<157	U	<30.0	U	-		-		<0.310	U	<0.310	U	<0.310	U	<0.310	U	<0.310	U	<0.310	U	<0.620	U	<0.310	U	<0.310	U	<0.150	U	<0.310	U	<0.310	U
	RHMWA01-WG-01	8/4/2009*[a]	<161	U	<30.0	U	-		-		<0.310	U	<0.310	U	<0.310	U	<0.310	U	<0.310	U	<0.310	U	<0.620	U	<0.310	U	<0.310	U	<0.150	U	<0.310	U	<0.310	U
	RHMW04-WG-02	10/13/2009[ab]	<169	U	<30	U	-		-		<0.31	U	<0.31	U	<0.31	U	-		<0.31	U	<0.31	U	<0.62	U	<0.31	U	<0.31	U	<0.15	U	<0.31	U	<0.31	U
	RHMWA01-WG-02	10/13/2009*[ab]	<174	U	<30	U	-		-		<0.31	U	<0.31	U	<0.31	U	-		<0.31	U	<0.31	U	<0.62	U	<0.31	U	<0.31	U	<0.15	U	<0.31	U	<0.31	U
	RHMW04-WG-03	1/26/2010	<334	U	<60.0	U	-		-		<0.620	U	<0.620	U	<0.620	U	<0.620	U	<0.620	U	<0.620	U	<1.24	U	<0.620	U	<0.620	U	<0.300	U	<0.620	U	<0.620	U
	RHMWA01-WG-03	1/26/2010*	<330	U	<60.0	U	-		-		<0.620	U	<0.620	U	<0.620	U	<0.620	U	<0.620	U	<0.620	U	<1.24	U	<0.620	U	<0.620	U	<0.300	U	<0.620	U	<0.620	U
	RHMW04-WG-04	4/26/2010	<348	U	<60.0	U	-		-		<0.620	U	<0.620	U	<0.620	U	<0.620	U	<0.620	U	<0.620	U	<1.24	U	<0.620	U	<0.620	U	<0.300	U	<0.620	U	<0.620	U
	RHMWA01-WG-04	4/26/2010*	<352	U	<60.0	U	-		-		<0.620	U	<0.620	U	<0.620	U	<0.620	U	<0.620	U	<0.620	U	<1.24	U	<0.620	U	<0.620	U	<0.300	U	<0.620	U	<0.620	U
	ES112	7/23/2014	**17**	**HD,J**	<60.0	U	-		<30	U	<0.50	U	<0.50	U	<0.50	U	<0.50	U	<1.0	U	<1.0	U	<2.0	U	<0.50	U	<0.50	U	<0.50	U	<0.50	U	<0.50	U
	ES119	10/29/2014	<12	U	-		-		<30	U	<0.50	U	<0.50	U	<0.50	U	<0.50	U	<1.0	U	<1.0	U	<2.0	U	<0.50	U	<0.50	U	<0.50	U	<0.50	U	<0.50	U
	ES129	1/29/2015	**10**	**HD,J**	-		-		<30	U	<0.50	U	<0.50	U	<0.50	U	<0.50	U	<1.0	U	<1.0	U	<2.0	U	<0.50	U	<0.50	U	<0.50	U	<0.50	U	<0.50	U
	ES139	4/22/2015	<21	U	<25	U	**25**	**B,J**	**-**		<0.20	U	<0.40	U	<0.20	U	<0.20	U	<0.50	U	<0.30	U	<0.80	U	<0.20	U	<0.20	U	**-**		<0.20	U	<0.20	U

Well Name	Sample ID	Date Sampled	8260B																											
			1,3-Dichloropropene (total of cis/trans)		1,4-Dichlorobenzene		Acetone		Benzene		Bromodichloromethane		Bromoform		Bromomethane		Carbon Tetrachloride		Chlorobenzene		Chloroethane		Chloroform		Chloromethane		cis-1,2-Dichloroethylene		Dibromochloromethane	
			(µg/l)		(µg/l)		(µg/l)		(µg/l)		(µg/l)		(µg/l)		(µg/l)		(µg/l)		(µg/l)		(µg/l)		(µg/l)		(µg/l)		(µg/l)		(µg/l)	
For wells < 150 m from surface water	**-**	**-**																												
DOH Tier 1 EALs (for locations < 150m from surface water)	**-**	**-**	**0.43**		**5.0**		**1500**		**5.0**		**0.12**		**80**		**8.7**		**5.0**		**25**		**16**		**70**		**1.8**		**70**		**0.16**	
RHMW04	RHMW04GW01	9/19/2005[b]	-		-		-		<0.50	U	-		-		-		-		-		-		-		-		-		-	
	RHMW04-WG-01	8/4/2009[a]	-		<0.150	U	<3.10	U	<0.120	U	<0.150	U	<0.310	U	<0.940	U	<0.310	U	<0.150	U	<0.310	U	<0.300	U	<0.310	U	<0.310	U	<0.150	U
	RHMWA01-WG-01	8/4/2009*[a]	-		<0.150	U	<3.10	U	**0.250**	**J**	<0.150	U	<0.310	U	<0.940	U	<0.310	U	<0.150	U	<0.310	U	<0.300	U	<0.310	U	<0.310	U	<0.150	U
	RHMW04-WG-02	10/13/2009[ab]	-		<0.15	U	<3.1	U	<0.12	U	<0.15	U	<0.31	U	<0.94	U	<0.31	U	<0.15	U	<0.31	U	<0.3	U	<0.31	U	<0.31	U	<0.15	U
	RHMWA01-WG-02	10/13/2009*[ab]	-		<0.15	U	<3.1	U	<0.12	U	<0.15	U	<0.31	U	<0.94	U	<0.31	U	<0.15	U	<0.31	U	<0.3	U	<0.31	U	<0.31	U	<0.15	U
	RHMW04-WG-03	1/26/2010	-		<0.300	U	<6.20	U	<0.240	U	<0.300	U	<0.620	U	<1.88	U	<0.620	U	<0.300	U	<0.620	U	<0.600	U	<0.620	U	<0.620	U	<0.300	U
	RHMWA01-WG-03	1/26/2010*	-		<0.300	U	<6.20	U	<0.240	U	<0.300	U	<0.620	U	<1.88	U	<0.620	U	<0.300	U	<0.620	U	<0.600	U	<0.620	U	<0.620	U	<0.300	U
	RHMW04-WG-04	4/26/2010	-		<0.300	U	<6.20	U	<0.240	U	<0.300	U	<0.620	U	<1.88	U	<0.620	U	<0.300	U	<0.620	U	<0.600	U	<0.620	U	<0.620	U	<0.300	U
	RHMWA01-WG-04	4/26/2010*	-		<0.300	U	<6.20	U	<0.240	U	<0.300	U	<0.620	U	<1.88	U	<0.620	U	<0.300	U	<0.620	U	<0.600	U	<0.620	U	<0.620	U	<0.300	U
	ES112	7/23/2014	<0.50	U	<0.50	U	<10	U,IH,ICH	<0.50	U	<0.50	U	<1.0	U	<5.0	U	<0.50	U	<0.50	U	<5.0	U	<0.50	U	<2.0	U	<0.50	U	<0.50	U
	ES119	10/29/2014	<0.50	U	<0.50	U	<10	U,ICH	<0.50	U	<0.50	U	<1.0	U	<5.0	U,IJ	<0.50	U	<0.50	U	<5.0	U	<0.50	U	<2.0	U	<0.50	U	<0.50	U
	ES129	1/29/2015	<0.50	U	<0.50	U	<10	U,IJ	<0.50	U	<0.50	U	<1.0	U	<5.0	U,IH	<0.50	U	<0.50	U	<5.0	U	<0.50	U	<2.0	U	<0.50	U	<0.50	U
	ES139	4/22/2015	<0.20	U	<0.20	U	<10	U	<0.10	U	-		<0.50	U	<0.30	U	<0.20	U	<0.20	U	<0.20	U	<0.20	U	<0.20	U	<0.20	U	-	

Well Name	Sample ID	Date Sampled	8260B																															
			Ethylbenzene		Hexachlorobutadiene		Methyl ethyl ketone (2-Butanone)		Methyl isobutyl ketone (4-Methyl-2-Pentanone)		Methyl tert-butyl Ether		Methylene chloride		Napthalene		Styrene		Tetrachloroethane, 1,1,1,2-		Tetrachloroethane, 1,1,2,2-		Tetrachloroethylene		Toluene		trans-1,2-Dichloroethylene		Trichloroethylene		Vinyl chloride		Xylenes (total)	
			(µg/l)		(µg/l)		(µg/l)		(µg/l)		(µg/l)		(µg/l)		(µg/l)		(µg/l)		(µg/l)		(µg/l)		(µg/l)		(µg/l)		(µg/l)		(µg/l)		(µg/l)	
For wells < 150 m from surface water	**-**	**-**																																
DOH Tier 1 EALs (for locations < 150m from surface water)	**-**	**-**	**30**		**0.86**		**7,100**		**170**		**5.0**		**4.8**		**17**		**10**		**0.52**		**0.067**		**5.0**		**40**		**100**		**5.0**		**2.0**		**20**	
RHMW04	RHMW04GW01	9/19/2005[b]	<0.50	U	-		-		-		<0.50	U	-		-		-		-		-		-		<0.50	U	-		<0.50	U	-		<0.50	U
	RHMW04-WG-01	8/4/2009[a]	<0.310	U	<0.310	U	<3.10	U	<3.10	U	-		<1.00	U	<0.620	U	<0.310	U	<0.150	U	<0.150	U	<0.310	U	<0.310	U	<0.310	U	<0.310	U	<0.310	U	<0.620	U
	RHMWA01-WG-01	8/4/2009*[a]	<0.310	U	<0.310	U	<3.10	U	<3.10	U	-		<1.00	U	<0.620	U	<0.310	U	<0.150	U	<0.150	U	<0.310	U	<0.310	U	<0.310	U	<0.310	U	<0.310	U	<0.620	U
	RHMW04-WG-02	10/13/2009[ab]	<0.31	U	<0.31	U	<3.1	U	<3.1	U	-		<1	U	<0.62	U	<0.31	U	<0.15	U	<0.15	U	<0.31	U	<0.31	U	<0.31	U	<0.31	U	<0.31	U	<0.62	U
	RHMWA01-WG-02	10/13/2009*[ab]	<0.31	U	<0.31	U	<3.1	U	<3.1	U	-		<1	U	<0.62	U	<0.31	U	<0.15	U	<0.15	U	<0.31	U	<0.31	U	<0.31	U	<0.31	U	<0.31	U	<0.62	U
	RHMW04-WG-03	1/26/2010	<0.620	U	<0.620	U	<6.20	U	<6.20	U	-		<2.00	U	<1.24	U	<0.620	U	<0.300	U	<0.300	U	<0.620	U	<0.620	U	<0.620	U	<0.620	U	<0.620	U	<1.24	U
	RHMWA01-WG-03	1/26/2010*	<0.620	U	<0.620	U	<6.20	U	<6.20	U	-		<2.00	U	<1.24	U	<0.620	U	<0.300	U	<0.300	U	<0.620	U	<0.620	U	<0.620	U	<0.620	U	<0.620	U	<1.24	U
	RHMW04-WG-04	4/26/2010	<0.620	U	<0.620	U	<6.20	U	<6.20	U	-		<2.00	U	<1.24	U	<0.620	U	<0.300	U	<0.300	U	<0.620	U	<0.620	U	<0.620	U	<0.620	U	<0.620	U	<1.24	U
	RHMWA01-WG-04	4/26/2010*	<0.620	U	<0.620	U	<6.20	U	<6.20	U	-		<2.00	U	<1.24	U	<0.620	U	<0.300	U	<0.300	U	<0.620	U	<0.620	U	<0.620	U	<0.620	U	<0.620	U	<1.24	U
	ES112	7/23/2014	<0.50	U	<0.50	U	<5.0	U	<5.0	U	<0.50	U	<1.0	U	-		<0.50	U	<0.50	U	<0.50	U	<0.50	U	<0.50	U	<0.50	U	<0.50	U	<0.50	U	<1.0	U
	ES119	10/29/2014	<0.50	U	<0.50	U	<5.0	U	<5.0	U	<0.50	U	<1.0	U	-		<0.50	U	<0.50	U	<0.50	U	<0.50	U	<0.50	U	<0.50	U	<0.50	U	<0.50	U	<1.0	U
	ES129	1/29/2015	<0.50	U	<0.50	U	<5.0	U	<5.0	U	<0.50	U	<1.0	U	-		<0.50	U	<0.50	U	<0.50	U	<0.50	U	<0.50	U	<0.50	U	<0.50	U	<0.50	U	<1.0	U
	ES139	4/22/2015	<0.10	U	<0.30	U	<4.0	U	<10	U	<0.30	U	<0.20	U	-		<0.20	U	<0.20	U	-		<0.20	U	<0.10	U	<0.20	U	<0.10	U	<0.10	U	<0.20	U

Well Name	Sample ID	Date Sampled	8260SIM										8011				8270C															
			1,2-Dibromoethane		1,2-Dichloroethane		Bromodichloromethane		Dibromochloromethane		Tetrachloroethane, 1,1,2,2-		1,2-Dibromo-3-chloropropane		1,2-Dibromoethane		Acenaphthene		Acenaphthylene		Anthracene		Benzo[a]anthracene		Benzo[g,h,i]perylene		Benzo[a]pyrene		Benzo[b]fluoranthene		Benzo[k]fluoranthene	
			(µg/l)		(µg/l)		(µg/l)		(µg/l)		(µg/l)		(µg/l)		(µg/l)		(µg/l)		(µg/l)		(µg/l)		(µg/l)		(µg/l)		(µg/l)		(µg/l)		(µg/l)	
For wells < 150 m from surface water	-	-																														
DOH Tier 1 EALs (for locations < 150m from surface water)	-	-	**0.04**		**0.15**		**0.12**		**0.16**		**0.067**		**0.04**		**0.04**		**20**		**30**		**0.73**		**0.027**		**0.10**		**0.014**		**0.092**		**0.40**	
RHMW04	RHMW04GW01	9/19/2005[b]	-		-		-		-		-		-		-		<0.57	U	<0.57	U	<0.57	U	<0.057	U	<0.11	U	<0.11	U	<0.057	U	<0.11	U
	RHMW04-WG-01	8/4/2009[a]	-		-		-		-		-		-		-		<0.0162	U	<0.0162	U	<0.0162	U	<0.0162	U	<0.0162	U	<0.0162	U	<0.0162	U	<0.0162	U
	RHMWA01-WG-01	8/4/2009*[a]	-		-		-		-		-		-		-		<0.0167	U	<0.0167	U	<0.0167	U	<0.0167	U	<0.0167	U	<0.0167	U	<0.0167	U	<0.0167	U
	RHMW04-WG-02	10/13/2009[ab]	-		-		-		-		-		-		-		<0.0172	U	<0.0172	U	<0.0172	U	<0.0172	U	<0.0172	U	<0.0172	U	<0.0172	U	<0.0172	U
	RHMWA01-WG-02	10/13/2009*[ab]	-		-		-		-		-		-		-		<0.0169	U	<0.0169	U	<0.0169	U	<0.0169	U	<0.0169	U	<0.0169	U	<0.0169	U	<0.0169	U
	RHMW04-WG-03	1/26/2010	-		-		-		-		-		-		-		<0.0326	U	<0.0326	U	<0.0326	U	<0.0326	U	<0.0326	U	<0.0326	U	<0.0326	U	<0.0326	U
	RHMWA01-WG-03	1/26/2010*	-		-		-		-		-		-		-		<0.0338	U	<0.0338	U	<0.0338	U	<0.0338	U	<0.0338	U	<0.0338	U	<0.0338	U	<0.0338	U
	RHMW04-WG-04	4/26/2010	-		-		-		-		-		-		-		<0.0352	U	<0.0352	U	<0.0352	U	<0.0352	U	<0.0352	U	<0.0352	U	<0.0352	U	<0.0352	U
	RHMWA01-WG-04	4/26/2010*	-		-		-		-		-		-		-		<0.0352	U	<0.0352	U	<0.0352	U	<0.0352	U	<0.0352	U	<0.0352	U	<0.0352	U	<0.0352	U
	ES112	7/23/2014	-		-		-		-		-		-		-		<0.052	U	<0.052	U	<0.052	U	<0.052	U	<0.052	U	<0.052	U	<0.052	U	<0.052	U
	ES119	10/29/2014	-		-		-		-		-		-		-		<0.050	U	<0.050	U	<0.050	U	<0.050	U	<0.099	U	<0.050	U	<0.050	U	<0.050	U
	ES129	1/29/2015	-		-		-		-		-		-		-		<0.052	U	<0.052	U	<0.052	U	<0.052	U	<0.10	U	<0.052	U	<0.052	U	<0.052	U
	ES139	4/22/2015	<0.010	U	<0.015	U	<0.010	U	<0.010	U	<0.015	U	<0.0040	UJ	<0.0040	UJ	<0.0050	U	**0.0037**	**J**	**0.0051**	**J**	<0.0050	U	<0.0050	U	<0.0050	U	<0.0050	U	<0.0050	U

Well Name	Sample ID	Date Sampled	8270C																						6020	
			Chrysene		Dibenzo[a,h]anthracene		Fluoranthene		Fluorene		Ideno[1,2,3-cd]pyrene		1-Methylnaphthalene		2-Methylnaphthalene		Naphthalene		Phenanthrene		Pyrene		Dissolved Lead	
			(µg/l)		(µg/l)		(µg/l)		(µg/l)		(µg/l)		(µg/l)		(µg/l)		(µg/l)		(µg/l)		(µg/l)		(µg/l)	
For wells < 150 m from surface water	**-**	**-**																								
DOH Tier 1 EALs (for locations < 150m from surface water)	**-**	**-**	**0.35**		**0.0092**		**8.0**		**3.9**		**0.092**		**2.1**		**2.1**		**17**		**4.6**		**2.0**		**5.6**	
RHMW04	RHMW04GW01	9/19/2005[b]	<0.11	U	<0.057	U	<0.28	U	<0.28	U	<0.057	U	<0.28	U	<0.28	U	<0.28	U	<0.57	U	<0.28	U	-	
	RHMW04-WG-01	8/4/2009[a]	<0.0162	U	<0.0162	U	<0.0162	U	<0.0162	U	<0.0162	U	<0.0162	U	<0.0162	U	<0.0335	U	<0.0162	U	<0.0162	U	<0.310	U
	RHMWA01-WG-01	8/4/2009*[a]	<0.0167	U	<0.0167	U	<0.0167	U	<0.0167	U	<0.0167	U	<0.0167	U	<0.0167	U	<0.0344	U	<0.0167	U	<0.0167	U	<0.310	U
	RHMW04-WG-02	10/13/2009[ab]	<0.0172	U	<0.0172	U	<0.0172	U	<0.0172	U	<0.0172	U	<0.0172	U	<0.0172	U	<0.0356	U	<0.0172	U	<0.0172	U	<0.31	U
	RHMWA01-WG-02	10/13/2009*[ab]	<0.0169	U	<0.0169	U	<0.0169	U	<0.0169	U	<0.0169	U	<0.0169	U	<0.0169		<0.0348	U	<0.0169	U	<0.0169	U	<0.31	U
	RHMW04-WG-03	1/26/2010	<0.0326	U	<0.0326	U	<0.0326	U	<0.0326	U	<0.0326	U	<0.0326	U	<0.0326	U	<0.0674	U	<0.0326	U	<0.0326	U	<0.620	U
	RHMWA01-WG-03	1/26/2010*	<0.0338	U	<0.0338	U	<0.0338	U	<0.0338	U	<0.0338	U	<0.0338	U	<0.0338	U	<0.0696	U	<0.0338	U	<0.0338	U	<0.620	U
	RHMW04-WG-04	4/26/2010	<0.0352	U	<0.0352	U	<0.0352	U	<0.0352	U	<0.0352	U	<0.0352	U	<0.0352	U	<0.0730	U	<0.0352	U	<0.0352	U	<0.620	U
	RHMWA01-WG-04	4/26/2010*	<0.0352	U	<0.0352	U	<0.0352	U	<0.0352	U	<0.0352	U	<0.0352	U	<0.0352	U	<0.0730	U	<0.0352	U	<0.0352	U	<0.620	U
	ES112	7/23/2014	<0.052	U	<0.052	U	<0.052	U	<0.052	U	<0.052	U	<0.052	U	<0.052	U	<0.052	U	<0.052	U	<0.052	U	<0.200	U
	ES119	10/29/2014	<0.050	U	<0.050	U	<0.050	U	<0.050	U	<0.050	U	<0.099	U	<0.050	U	<0.050	U	<0.050	U	<0.050	U	<0.200	U
	ES129	1/29/2015	<0.052	U	<0.052	U	<0.052	U	<0.052	U	<0.052	U	<0.10	U	<0.052	U	<0.052	U	<0.052	U	<0.052	U	<0.200	U
	ES139	4/22/2015	<0.0050	U	<0.0050	U	<0.020	U	**0.0060**	**J**	<0.0050	U	<0.0050	U	<0.0050	U	<0.0050	U	**0.0069**	**J**	<0.010	U	**0.006**	**J**

Well Name	Sample ID	Date Sampled	8015C						8260B																									
			TPH-d		TPH-g		TPH-o		TPH-g		1,1,1-Trichloroethane		1,1,2-Trichloroethane		1,1-Dichloroethane		1,1-Dichloroethylene		1,2,3-Trichloropropane		1,2,4-Tricholorobenzene		1,2-Dibromo-3-chloropropane		1,2-Dibromoethane		1,2-Dichlorobenzene		1,2-Dichloroethane		1,2-Dichloropropane		1,3-Dichlorobenzene	
			(µg/l)		(µg/l)		(µg/l)		(µg/l)		(µg/l)		(µg/l)		(µg/l)		(µg/l)		(µg/l)		(µg/l)		(µg/l)		(µg/l)		(µg/l)		(µg/l)		(µg/l)		(µg/l)	
For wells < 150 m from surface water	**-**	**-**																																
DOH Tier 1 EALs (for locations < 150m from surface water)	**-**	**-**	**100**		**100**		**100**		**100**		**62**		**5.0**		**2.4**		**7.0**		**0.6**		**25**		**0.04**		**0.04**		**10**		**0.15**		**5.0**		**5.0**	
RHMW06	RHMW06-GW-01	10/21/2014	<86	U	<20	U	<86	U	-		<0.30	U	<0.50	U	<0.30	U	<0.50	U	<1.00	U	<0.50	U	<1.00	U	<0.50	U	<0.30	U	<0.100	U	<0.30	U	<0.30	U
	RHMW06-GW-02	1/23/2015[d]	<76	U	<20	U	<76	U	-		<0.30	U	<0.50	U	<0.30	U	<0.50	U	<1.00	U	<0.50	U	<1.00	U	<0.50	U	<0.30	U	<0.100	U	<0.30	U	<0.30	U
	ES140	4/23/2015	**20**	**J**	<25	U	**47**	**B,J**	-		<0.20	U	<0.40	U	<0.20	U	<0.20	U	<0.50	U	<0.30	U	<0.80	U	<0.20	U	<0.20	U	-		<0.20	U	<0.20	U
RHMW07	RHMW07-GW-01	10/20/2014	**57**	**J**	<20	U	<78	U	-		<0.30	U	<0.50	U	<0.30	U	<0.50	U	<1.00	U	<0.50	U	<1.00	U	<0.50	U	<0.30	U	<0.100	U	<0.30	U	<0.30	U
	RHMW07-GW-01FD	10/20/2014	**66**	**J**	<20	U	<77	U	-		<0.30	U	<0.50	U	<0.30	U	<0.50	U	<1.00	U	<0.50	U	<1.00	U	<0.50	U	<0.30	U	<0.100	U	<0.30	U	<0.30	U
	RHMW07-GW-02	1/22/2015[d]	<75	U	<20	U	<75	U	-		<0.30	U	<0.50	U	<0.30	U	<0.50	U	<1.00	U	<0.50	U	<1.00	U	<0.50	U	<0.30	U	<0.100	U	<0.30	U	<0.30	U
	RHMW07-GW-02FD	1/22/2015[d*]	<81	U	<20	U	<81	U	-		<0.30	U	<0.50	U	<0.30	U	<0.50	U	<1.00	U	<0.50	U	<1.00	U	<0.50	U	<0.30	U	<0.100	U	<0.30	U	<0.30	U
	ES141	4/23/2015	**26**	**J**	<25	U	**47**	**B,J**	-		<0.20	U	<0.40	U	<0.20	U	<0.20	U	<0.50	U	<0.30	U	<0.80	U	<0.20	U	<0.20	U	-		<0.20	U	<0.20	U

Well Name	Sample ID	Date Sampled	8260B																											
			1,3-Dichloropropene (total of cis/trans)		1,4-Dichlorobenzene		Acetone		Benzene		Bromodichloromethane		Bromoform		Bromomethane		Carbon Tetrachloride		Chlorobenzene		Chloroethane		Chloroform		Chloromethane		cis-1,2-Dichloroethylene		Dibromochloromethane	
			(µg/l)		(µg/l)		(µg/l)		(µg/l)		(µg/l)		(µg/l)		(µg/l)		(µg/l)		(µg/l)		(µg/l)		(µg/l)		(µg/l)		(µg/l)		(µg/l)	
For wells < 150 m from surface water	**-**	**-**																												
DOH Tier 1 EALs (for locations < 150m from surface water)	**-**	**-**	**0.43**		**5.0**		**1500**		**5.0**		**0.12**		**80**		**8.7**		**5.0**		**25**		**16**		**70**		**1.8**		**70**		**0.16**	
RHMW06	RHMW06-GW-01	10/21/2014	<0.30	U	<0.30	U	<2.00	U	<0.200	U	<0.30	U	<0.30	U	<0.50	U	<0.100	U	<0.50	U	<0.50	U	<0.20	U	<0.50	U	<0.30	U	<0.30	U
	RHMW06-GW-02	1/23/2015[d]	<0.30	U	<0.30	U	<2.00	U	<0.200	U	<0.30	U	<0.30	U	<0.50	U	<0.100	U	<0.50	U	<0.50	U	<0.20	U	<0.50	U	<0.30	U	<0.30	U
	ES140	4/23/2015	<0.20	U	<0.20	U	<10	U	<0.10	U	-		<0.50	U	<0.30	U	<0.20	U	<0.20	U	<0.20	U	<0.20	U	<0.20	U	<0.20	U	-	
RHMW07	RHMW07-GW-01	10/20/2014	<0.30	U	<0.30	U	**1.9**	**J**	<0.200	U	<0.30	U	<0.30	U	<0.50	U	<0.100	U	<0.50	U	<0.50	U	<0.20	U	<0.50	U	<0.30	U	<0.30	U
	RHMW07-GW-01FD	10/20/2014	<0.30	U	<0.30	U	**1.7**	**J**	<0.200	U	<0.30	U	<0.30	U	<0.50	U	<0.100	U	<0.50	U	<0.50	U	<0.20	U	<0.50	U	<0.30	U	<0.30	U
	RHMW07-GW-02	1/22/2015[d]	<0.30	U	<0.30	U	<2.00	U	<0.200	U	<0.30	U	<0.30	U	<0.50	U	<0.100	U	<0.50	U	<0.50	U	<0.20	U	<0.50	U	<0.30	U	<0.30	U
	RHMW07-GW-02FD	1/22/2015[d*]	<0.30	U	<0.30	U	<2.00	U	<0.200	U	<0.30	U	<0.30	U	<0.50	U	<0.100	U	<0.50	U	<0.50	U	<0.20	U	<0.50	U	<0.30	U	<0.30	U
	ES141	4/23/2015	<0.20	U	<0.20	U	<10	U	<0.10	U	-		<0.50	U	<0.30	U	<0.20	U	<0.20	U	<0.20	U	<0.20	U	<0.20	U	<0.20	U	-	

Well Name	Sample ID	Date Sampled	8260B																															
			Ethylbenzene		Hexachlorobutadiene		Methyl ethyl ketone (2-Butanone)		Methyl isobutyl ketone (4-Methyl-2-Pentanone)		Methyl tert-butyl Ether		Methylene chloride		Napthalene		Styrene		Tetrachloroethane, 1,1,1,2-		Tetrachloroethane, 1,1,2,2-		Tetrachloroethylene		Toluene		trans-1,2-Dichloroethylene		Trichloroethylene		Vinyl chloride		Xylenes (total)	
			(µg/l)		(µg/l)		(µg/l)		(µg/l)		(µg/l)		(µg/l)		(µg/l)		(µg/l)		(µg/l)		(µg/l)		(µg/l)		(µg/l)		(µg/l)		(µg/l)		(µg/l)		(µg/l)	
For wells < 150 m from surface water	**-**	**-**																																
DOH Tier 1 EALs (for locations < 150m from surface water)	**-**	**-**	**30**		**0.86**		**7,100**		**170**		**5.0**		**4.8**		**17**		**10**		**0.52**		**0.067**		**5.0**		**40**		**100**		**5.0**		**2.0**		**20**	
RHMW06	RHMW06-GW-01	10/21/2014	<0.50	U	<0.30	U	<2.00	U	<5.00	U	<0.52	U	<1.00	U	-		<0.50	U	<0.30	U	<0.30	U	<0.30	U	<0.30	U	<0.30	U	<0.30	U	<0.10	U	<0.30	U
	RHMW06-GW-02	1/23/2015[d]	<0.50	U	<0.30	U	<2.00	U	<5.00	U	<0.52	U	<1.00	U	-		<0.50	U	<0.30	U	<0.30	U	<0.30	U	<0.30	U	<0.30	U	<0.30	U	<0.10	U	<0.30	U
	ES140	4/23/2015	<0.10	U	<0.30	U	<4.0	U	<10	U	<0.30	U	<0.20	U	-		<0.20	U	<0.20	U	-		<0.20	U	<0.10	U	<0.20	U	<0.10	U	<0.10	U	<0.20	U
RHMW07	RHMW07-GW-01	10/20/2014	<0.50	U	<0.30	U	<2.00	U	<5.00	U	<0.52	U	<1.00	U	-		<0.50	U	<0.30	U	<0.30	U	<0.30	U	<0.30	U	<0.30	U	<0.30	U	<0.10	U	<0.30	U
	RHMW07-GW-01FD	10/20/2014	<0.50	U	<0.30	U	<2.00	U	<5.00	U	<0.52	U	<1.00	U	-		<0.50	U	<0.30	U	<0.30	U	<0.30	U	<0.30	U	<0.30	U	<0.30	U	<0.10	U	<0.30	U
	RHMW07-GW-02	1/22/2015[d]	<0.50	U	<0.30	U	<2.00	U	<5.00	U	<0.52	U	<1.00	U	-		<0.50	U	<0.30	U	<0.30	U	<0.30	U	<0.30	U	<0.30	U	<0.30	U	<0.10	U	<0.30	U
	RHMW07-GW-02FD	1/22/2015[d*]	<0.50	U	<0.30	U	<2.00	U	<5.00	U	<0.52	U	<1.00	U	-		<0.50	U	<0.30	U	<0.30	U	<0.30	U	<0.30	U	<0.30	U	<0.30	U	<0.10	U	<0.30	U
	ES141	4/23/2015	<0.10	U	<0.30	U	<4.0	U	<10	U	<0.30	U	<0.20	U	-		<0.20	U	<0.20	U	-		<0.20	U	<0.10	U	<0.20	U	<0.10	U	<0.10	U	<0.20	U

Well Name	Sample ID	Date Sampled	8260SIM										8011				8270C																	
			1,2-Dibromoethane		1,2-Dichloroethane		Bromodichloromethane		Dibromochloromethane		Tetrachloroethane, 1,1,2,2-		1,2-Dibromo-3-chloropropane		1,2-Dibromoethane		Acenaphthene		Acenaphthylene		Anthracene		Benzo[a]anthracene		Benzo[g,h,i]perylene		Benzo[a]pyrene		Benzo[b]fluoranthene		Benzo[k]fluoranthene	
			(µg/l)		(µg/l)		(µg/l)		(µg/l)		(µg/l)		(µg/l)		(µg/l)		(µg/l)		(µg/l)		(µg/l)		(µg/l)		(µg/l)		(µg/l)		(µg/l)		(µg/l)	
For wells < 150 m from surface water	**-**	**-**																																
DOH Tier 1 EALs (for locations < 150m from surface water)	**-**	**-**	**0.04**		**0.15**		**0.12**		**0.16**		**0.067**		**0.04**		**0.04**		**20**		**30**		**0.73**		**0.027**		**0.10**		**0.014**		**0.092**		**0.40**	
RHMW06	RHMW06-GW-01	10/21/2014	-		-		-		-		-		<0.019	U	<0.020	U	<0.011	U	<0.011	U	<0.011	U	<0.011	U	<0.011	U	<0.011	U	<0.011	U	<0.011	U
	RHMW06-GW-02	1/23/2015[d]	-		-		-		-		-		<0.019	U	<0.020	U	<0.010	U	<0.010	U	<0.010	U	<0.010	U	<0.010	U	<0.010	U	<0.010	U	<0.010	U
	ES140	4/23/2015	<0.010	U	<0.015	U	**0.0039**	**B,J**	<0.010	U	<0.015	U	<0.0040	UJ	<0.0040	UJ	<0.0052	U	<0.0052	U	<0.0052	U	**0.0028**	**B,J**	<0.0052	U	<0.0052	U	<0.0052	U	<0.0052	U
RHMW07	RHMW07-GW-01	10/20/2014	-		-		-		-		-		<0.019	U	<0.020	U	<0.0096	U	<0.0096	U	<0.0096	U	<0.0096	U	<0.0096	U	<0.0096	U	<0.0096	U	<0.0096	U
	RHMW07-GW-01FD	10/20/2014	-		-		-		-		-		<0.019	U	<0.020	U	<0.010	U	<0.010	U	<0.010	U	<0.010	U	<0.010	U	<0.010	U	<0.010	U	<0.010	U
	RHMW07-GW-02	1/22/2015[d]	-		-		-		-		-		<0.019	U	<0.020	U	<0.011	U	<0.011	U	<0.011	U	<0.011	U	<0.011	U	<0.011	U	<0.011	U	<0.011	U
	RHMW07-GW-02FD	1/22/2015[d*]	-		-		-		-		-		<0.019	U	<0.020	U	<0.010	U	<0.010	U	<0.010	U	<0.010	U	<0.010	U	<0.010	U	<0.010	U	<0.010	U
	ES141	4/23/2015	<0.010	U	<0.015	U	<0.010	U	<0.010	U	<0.015	U	<0.0040	UJ	<0.0040	UJ	<0.0052	U	<0.0052	U	<0.0052	U	**0.0027**	**B,J**	<0.0052	U	<0.0052	U	<0.0052	U	<0.0052	U

Well Name	Sample ID	Date Sampled	8270C																						6020	
			Chrysene		Dibenzo[a,h]anthracene		Fluoranthene		Fluorene		Ideno[1,2,3-cd]pyrene		1-Methylnaphthalene		2-Methylnaphthalene		Naphthalene		Phenanthrene		Pyrene		Dissolved Lead	
			(µg/l)		(µg/l)		(µg/l)		(µg/l)		(µg/l)		(µg/l)		(µg/l)		(µg/l)		(µg/l)		(µg/l)		(µg/l)	
For wells < 150 m from surface water	-	-																								
DOH Tier 1 EALs (for locations < 150m from surface water)	-	-	**0.35**		**0.0092**		**8.0**		**3.9**		**0.092**		**2.1**		**2.1**		**17**		**4.6**		**2.0**		**5.6**	
RHMW06	RHMW06-GW-01	10/21/2014	<0.011	U	<0.011	U	<0.011	U	<0.011	U	<0.011	U	<0.011	U	**0.0064**	**J**	<0.053	U	<0.011	U	<0.011	U	<0.80	U
	RHMW06-GW-02	1/23/2015[d]	<0.010	U	<0.010	U	<0.010	U	<0.010	U	<0.010	U	<0.010	U	<0.010	U	<0.052	U	<0.010	U	<0.010	U	<0.40	U
	ES140	4/23/2015	<0.0052	U	<0.0052	U	<0.021	U	<0.0052	U	<0.0052	U	<0.0052	U	<0.0052	U	<0.0052	U	<0.0052	U	<0.011	U	**0.006**	**J**
RHMW07	RHMW07-GW-01	10/20/2014	<0.0096	U	<0.0096	U	<0.0096	U	<0.0096	U	<0.0096	U	<0.0096	U	**0.0084**	**J**	<0.048	U	<0.0096	U	<0.0096	U	<0.80	U
	RHMW07-GW-01FD	10/20/2014	<0.010	U	<0.010	U	<0.010	U	<0.010	U	<0.010	U	<0.010	U	**0.0060**	**J**	<0.050	U	<0.010	U	<0.010	U	<0.80	U
	RHMW07-GW-02	1/22/2015[d]	<0.011	U	<0.011	U	<0.011	U	<0.011	U	<0.011	U	<0.011	U	<0.011	U	<0.055	U	<0.011	U	<0.011	U	<0.40	U
	RHMW07-GW-02FD	1/22/2015[d*]	<0.010	U	<0.010	U	<0.010	U	<0.010	U	<0.010	U	<0.010	U	<0.010	U	<0.050	U	<0.010	U	<0.010	U	<0.40	U
	ES141	4/23/2015	<0.0052	U	<0.0052	U	<0.021	U	**0.0042**	**J**	<0.0052	U	<0.0052	U	<0.0052	U	<0.0052	U	**0.0072**	**J**	<0.011	U	**0.006**	**J**

Notes:
* duplicate samples
** - Samples ES087 and ES088 possibly switched prior to analysis.
HDOH, Tier 1 Environmental Action Levels, Table D-1a. Groundwater Action Levels (Groundwater IS a current or potential drinking water resource, surface water body IS located within 150 meters of release site).
Background historical data are from February 2005 to July 2012.
Non-detects (from October 2012 and on) are the LOD values.
a - Used MDL values for non-detects
b - MRL values were used for non-detects
d - no analytical lab reports available, used summary table from DOH Quarterly GW Reports
µg/l - micrograms per liter
Grey highlight - exceeds EALs
Bold - detected values
B - analyte was present in the associated method blank
BU - sample analyzed after holding time expired
ICH - Initial calibrtn. verif. recov. above 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 - indicates an estimated value
U - indicates that the compound was analyzed for but not detected at or above the stated limit. The stated limit is the LOD unless otherwise specified.
HD, Z, ++ - the chromatographic pattern was inconsistent with the profile of the reference fuel standard
X - possible high bias due to matrix interference

APPENDIX G

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
NOT APPLICABLE	1	808-206-3989	000026180

5. Generator's Name and Mailing Address

COMNAVRBG , NAVE H W I, CODE PRJ42
400 MARSH , ATTN: ALI SMITH
IRPHU, HI

Generator's Site Address (if different than mailing address)

HIC 00415 04-3
RED HILL BULK FUEL STORAGE FACILITY
AIEA, HI 96701

Generator's Phone: 01 4.1-7837

6. Transporter 1 Company Name

PACIFIC COMMERCIAL SERVICES, LLC 808-545-4599

U.S. EPA ID Number: HID 982 040 578

7. Transporter 2 Company Name

UNITED SOLUTIONS 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

UNITED SOLUTIONS, INC.
9 MI LOOP
HI
808-

U.S. EPA ID Number: H I D 9 8 2 4 4 3 7 1 5

Facility's Phone:

	9. Waste Shipping Name and Description	10. Containers No.	10. Containers Type	11. Total Quantity	12. Unit Wt./Vol.	
	1. NON-RCRA HAZARDOUS WASTE NOT REGULATED BY DOT (RCRA DECONTAMINATION WATER)	001	DM	000150	G	NON-RCRA
	2.					
	3.					
	4.					

13. Special Handling Instructions and Additional Information

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 ACCORDING TO APPLICABLE GOVERNMENT REGULATIONS. I FURTHER CERTIFY THAT IF THIS IS USED OIL IT IS SUBJECT TO REGULATION UNDER 40 CFR PART 279; THAT IT CONTAINS NO MORE THAN 50 PPM, AND THAT IT HAS NOT BEEN CONTAMINATED WITH CARCINOGEN CLEANERS, BRAKE SPRAY, FREON, CHLORINATED SOLVENTS OR OTHER HAZARDOUS MATERIALS AND/OR HAZARDOUS WASTES

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

Generator's/Offeror's Printed/Typed Name	Signature	Month	Day	Year
[illegible]	[illegible]	[illegible]	27	15

15. International Shipments ☐ Import to U.S. ☐ Export from U.S. Port of entry/exit:

Transporter Signature (for exports only): Date leaving U.S.:

16. Transporter Acknowledgment of Receipt of Materials

Transporter 1 Printed/Typed Name	Signature	Month	Day	Year
[illegible]	[illegible]			

Transporter 2 Printed/Typed Name	Signature	Month	Day	Year
		[illegible]	[illegible]	15

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

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

Printed/Typed Name	Signature	Month	Day	Year

GENERATOR | INT'L | TRANSPORTER | DESIGNATED FACILITY

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