

Tank 5 Quarterly Release Response Report Red Hill Bulk Fuel Storage Facility JBPHH, Oahu, Hawaii

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Executive Summary

Navy Region Hawaii (NRH) prepared this Quarterly Release Response Report in accordance with the State of Hawaii Department of Health (DOH) Underground Storage Tank (UST) Technical Guidance Manual (DOH, 2000) and in response to the DOH release response letters dated February 12, 2014 and February 26, 2014 for the Red Hill Bulk Fuel Storage Facility. The objective of this report is to describe the actions taken by the Navy between January and March 2016 in response to the fuel reportedly released from Tank 5 in January 2014.

Soil vapor and groundwater samples continue to be collected from locations inside the Red Hill tunnel system. Groundwater samples are also collected from locations outside the Red Hill tunnel system. Laboratory analytical results continue to indicate the drinking water at Red Hill is in compliance with all Federal and State regulations and safe for human consumption.

The Navy continues to perform work to ensure the drinking water around the Facility remains safe. Future release response actions include determining the feasibility of alternatives for investigating and remediating releases from the Facility and continuing efforts to monitor and characterize the flow of groundwater around the Facility.

1.0 Introduction

As required by Hawaii Administrative Rules 11-281-80.1, Release Response Reporting, this Quarterly Release Response Report presents the following information:

- 1) All release response actions taken pursuant to subchapter 7 after the last reported date;
- 2) A plan for future release response actions to be taken; and
- 3) Information required pursuant to section 11-281-78.1.

This report presents a summary of the release response activities performed from January 1 through March 31, 2016 at the Red Hill Bulk Fuel Storage Facility (hereinafter referred to as “the Facility”) located at Joint Base Pearl Harbor-Hickam (JBPHH), Oahu, Hawaii.

1.1 Statement of Purpose

Release response actions were performed to address a fuel release observed in Tank 5.

1.2 Previous Reports

The following documents were previously submitted to DOH:

- Release confirmation information for Tank 5 as Navy Region Hawaii (NRH) letter 5090 Ser N45/044 dated January 23, 2014
- Initial Release Response Report, enclosed with NRH letter 5090 Ser N45/320 dated April 24, 2014
- Quarterly Release Response Report enclosed with NRH letter 5090 Ser N45/563 dated July 22, 2014
- Quarterly Release Response Report enclosed with NRH letter 5090 Ser N45/929 dated November 10, 2014
- Quarterly Release Response Report enclosed with NRH letter 5090 Ser N45/121 dated January 21, 2015
- Quarterly Release Response Report enclosed with NRH letter 5090 Ser N45/322 dated April 20, 2015
- Quarterly Release Response Report enclosed with NRH letter 5090 Ser N45/573 dated July 17, 2015
- Quarterly Release Response Report enclosed with NRH letter 5090 Ser N45/812 dated October 16, 2015
- Quarterly Release Response Report enclosed with NRH letter 5090 Ser N45/0411 dated January 13, 2016

2.0 Background

The following sections provide a description of the site and information on the Facility.

2.1 Site Description

The Facility is located on federal government land (zoned F1- Military and Federal), located in Halawa Heights, approximately 2.5 miles northeast of Pearl Harbor. It is located on a low ridge on the western edge of the Koolau Mountain Range that divides Halawa Valley from Moanalua Valley. The Facility 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 (msl) (Environmental Science International, Inc., 2014).

The Facility is bordered on the west by the United States (U.S.) Coast Guard reservation, on the south by residential neighborhoods, and on the east by Moanalua Valley. The Facility is bordered on the north by Halawa Correctional Facility and Halawa Industrial Park, which includes private businesses and a former bus facility. A quarry is located less than a quarter mile away to the northwest.

2.2 Facility Information

The Facility contains eighteen (18) active and two (2) inactive bulk fuel field-constructed underground storage tanks (USTs), which are operated by Naval Supply Systems Command (NAVSUP) Fleet Logistics Center (FLC) Pearl Harbor (formerly Fleet and Industrial Supply Center). The Facility was constructed by the U.S. Government in the early 1940s. Twenty (20) USTs and a series of tunnels were constructed to supply fuel to the Navy. Each UST has a capacity of approximately 12.5 million gallons. The Facility is located approximately 100 feet above the basal aquifer. The USTs contain jet fuel propellant-5 (JP-5), JP-8, and marine diesel fuel (F-76). Tank 5 is used to store JP-8.

Four (4) groundwater monitoring wells (wells RHMW01, RHMW02, RHMW03, and RHMW05) are located within the lower access tunnel, and one (1) sampling point (RHMW2254-01) is located at Red Hill Shaft. Sampling point RHMW2254-01 is located inside the infiltration gallery of the Department of the Navy (Navy) Well 2254-01. Navy Well 2254-01 is located down-gradient of the USTs and provides potable water to the JBPHH Water System, which serves approximately 65,200 military customers. Naval Facilities Engineering Command (NAVFAC) Public Works Department operates the infiltration gallery and Navy Well 2254-01.

Five (5) groundwater monitoring wells (RHMW04, RHMW06, RHMW07, HDMW2253-03, and OWDFMW01) are located outside of the Facility tunnel system. Monitoring well RHMW04 is located by the Navy firing range. Well HDMW2253-03 is located at the Halawa Correctional Facility (outside the Facility) and well OWDFMW01 is located at the former Oily Waste Disposal Facility, near Adit 3.

3.0 Groundwater and Soil Vapor Monitoring

The following sections describe activities that were performed to monitor the groundwater and soil vapor beneath Tank 5 from January 1 through March 31, 2016.

3.1 Oil/Water Interface Measurements

The water level at each well was gauged and measured for the presence of light non-aqueous phase liquids (LNAPLs) using an interface meter. The interface meter was lowered into the wells and sampling point to determine the depth of water to the nearest 0.01 foot, and the existence of any immiscible layers (LNAPL).

Oil/water interface measurements were taken at monitoring wells RHMW01, RHMW02, RHMW03, and RHMW05 in January, February, and March 2015. No LNAPL was detected.

3.2 Soil Vapor Monitoring

Soil vapor samples were collected and analyzed in the field for volatile organic compound (VOC) concentrations using a photo-ionization detector (PID). Soil vapor monitoring points (SVMPs) were given a SV prefix, followed by the associated tank number, and then the location under the tank: “S” for shallow or front of the UST, “M” for mid depth or middle of the UST, and “D” for deep or outer edge of the UST.

A conservative approach to assess the integrity of the associated tank system is to measure if VOC concentrations exceed 280,000 parts per billion by volume (ppbv) in soil vapor monitoring probes beneath tanks containing JP-5 or JP-8, or 14,000 ppbv in soil vapor monitoring probes beneath tanks containing marine diesel fuel (TEC, 2010). These values are 50 percent of the calculated vapor concentration from fuel-saturated water.

Soil vapor monitoring was performed at all active and accessible tanks in January, February, and March 2016. Soil vapor VOC concentrations at Tank 5 were above the action level of 280,000 ppbv during the January, February, and March monitoring events. Soil vapor VOC concentrations at all other active and accessible tanks were about 10 to 600 times below the action levels, with no consistent trending.

Soil vapor sampling results from March 2008 through March 2016 are presented in Appendix A.

3.3 Groundwater Sampling and Analysis

Groundwater samples were collected from sampling point RHMW2254-01 and monitoring wells located inside and outside the Red Hill lower access tunnel in January 2016. All groundwater samples were analyzed for petroleum constituents.

Analytical results for wells RHMW01, RHMW02, and RHMW03 were compared to site specific risk based levels (SSRBLs) for total petroleum hydrocarbons as diesel fuel (TPH-d) and benzene (TEC, 2008). Groundwater analytical results were also compared to DOH Environmental Action

Levels (EALs) for sites where groundwater is a current or potential drinking water source (DOH, 2011).

3.3.1 Inside Tunnel Wells

Groundwater samples were collected from four (4) groundwater monitoring wells (wells RHMW01, RHMW02, RHMW03, and RHMW05) located within the lower access tunnel, and one (1) sampling point (RHMW2254-01) located at Red Hill Shaft. A summary of sampling activities and laboratory analytical results were provided in a separate groundwater monitoring report.

3.3.2 Outside Tunnel Wells

Groundwater samples were collected from five (5) groundwater monitoring wells (RHMW04, RHMW06, RHMW07, HDMW2253-03, and OWDFMW01) located outside of the Facility tunnel system. A summary of sampling activities and laboratory analytical results were provided in a separate groundwater monitoring report.

3.4 Drinking Water Sampling

Drinking water samples were collected from the Red Hill Shaft post-treatment regulatory compliance sampling point (360-011, Tap Outside Chlorine Building) on September 15, 2015, December 15 and 21, 2015, and March 22, 2016. Samples were analyzed for Lead, JP-8, and contaminants listed in the Transition Plan. A drinking water sample was also collected from the Red Hill Shaft pre-treatment regulatory compliance sampling point (360-001, Red Hill Shaft Pumphead) on December 16, 2015 and analyzed for TPH-o and contaminants listed in the Transition Plan.

U.S. Environmental Protection Agency (EPA) Methods 524.2 (VOCs), 525.2 (SVOCs), 8015B (JP-8 and TPH-o), and 200.8 (Lead) were used and all analyses were conducted by labs certified by the DOH State Laboratories Division.

Sample test results for the September and December 2015 events were below detectable levels and acceptable for distribution. Sample test results for the March 2016 event will be available in April 2016.

A summary of the drinking water sampling is provided in Table 1.

4.0 Continued Groundwater and Soil Vapor Monitoring

Based on discussions with DOH, continued monitoring of the groundwater and soil vapor will be conducted as follows:

- Oil/water interface measurements – quarterly
- Soil vapor sampling – monthly
- Groundwater sampling and analysis – quarterly

Monitoring results will be submitted to DOH for each sampling event.

**TABLE 1 - RED HILL DRINKING WATER SHAFT SAMPLING
TRANSITION PLAN FOR TANK 5 RED HILL RELEASE FROM EMERGENCY RESPONSE TO REMEDIATION
AS AMENDED ON FEBRUARY 13, 2014**

Sample Date	360-011, Tap Outside CL2 Bldg			Pumphead, 360-001			Detections and Comments
	524.2; 525.2	8015B	200.8	524.2; 525.2	8015B	200.8	
1/14/2014	ND	ND	-	-	-	-	8015B analysis originally conducted with high MRL (10 mg/l), follow up with lower MRL outside of 14-day hold time
1/16/2014	Bromoform	ND	-	ND	ND	-	8015B analysis originally conducted with high MRL (10 mg/l), follow up with lower MRL outside of 14-day hold time. Bromoform detected in the 524.2 analysis for the 360-011 sample.
1/21/2014	Bromoform, Dibromochloromethane	ND	-	-	-	-	Bromoform, Dibromochloromethane detected
1/28/2014	Bromoform, Bromodichloromethane, Dibromochloromethane	ND	-	-	-	-	Bromoform, Bromodichloromethane, Dibromochloromethane were detected.
2/11/2014	Bromoform, Dibromochloromethane	ND	5.2 ppb	-	-	3.7 ppb	Bromoform, Dibromochloromethane, and Lead were detected. Result for lead at old post-chlorination sampling point was ND.
2/28/2014	N/A	-	ND	-	-	ND	Not required by UC Monitoring plan, not submitted to DOH. Result for lead at old post-chlorination sampling point was 10 ppb.
3/11/2014	Bromoform	ND	ND	-	-	ND	Bromoform was detected. Result for lead at old post-chlorination sampling point was ND.
4/8/2014	ND	ND	ND	-	-	ND	No contaminants detected.
5/13/2014	-	-	ND	-	-	-	Sampled for lead at 360-011 only. Lead not detected.
6/10/2014	-	-	ND	-	-	-	Sampled for Lead at 360-011 only. Lead not detected
7/8/2014	ND	ND	ND	-	-	-	Sampled for 524.2, 525.2, 8015B, Lead at 360-011. No contaminants detected.
10/7/2014*	ND	ND	ND	-	-	-	Sampled for 524.2, 525.2, 8015B, Lead at 360-011. No contaminants detected.
1/21/2015	Bromoform, Dibromochloromethane	ND	ND	-	-	-	Sampled for 524.2, 525.2, 8015B, Lead at 360-011. Detected bromoform, dibromochloromethane.
4/7/2015	ND	ND	ND	-	-	-	Sampled for 524.2, 525.2, 8015B, Lead at 360-011. No contaminants detected.
6/16/2015	ND	ND	ND	-	-	-	Sampled for 524.2, 525.2, 8015B, Lead at 360-011. No contaminants detected.
9/15/2015	ND	ND	ND	-	-	-	Sampled for 524.2, 525.2, 8015B, Lead at 360-011. No contaminants detected.
12/15/2015, 12/21/2015	ND	ND	ND	-	-	-	Sampled for 524.2, 525.2, 8015B, Lead at 360-011. No contaminants detected.
12/16/2015	-	-	-	ND ¹	ND	-	Sampled for 524.2, 525.2, 8015B at 360-001. No contaminants detected.

EPA Method 524.2 for volatile organic compounds (VOCs)

EPA Method 525.2 for semi-volatile organic compounds

EPA Method 8015 for JP8 (C8-C18) gas chromatograph

EPA Method 200.8 for lead

¹ - One time sample to analyze for TPH-o. Detection levels less than or equal to MRLs.

* Received DOH approval to change sample date from 10/14/14 to 10/7/14

VOCs tested (EPA Method 524.2)

Benzene	trans-1,2-Dichloroethylene	1,2,4-Trichlorobenzene
Carbon tetrachloride	Dichloromethane	1,1,1-Trichloroethane
Chlorobenzene	1,2-Dichloropropane	1,1,2-Trichloroethane
1,2-Dichlorobenzene	Ethylbenzene	Trichloroethylene
1,4-Dichlorobenzene	Naphthalene (unregulated)	Vinyl chloride
1,2-Dichloroethane	Styrene	Xylenes, Total
1,1-Dichloroethylene	Tetrachloroethylene	
cis-1,2-Dichloroethylene	Toluene	

SVOCs tested (EPA Method 525.2)

Benzo(a)pyrene
Di(2-ethylhexyl)adipate
Di(2-ethylhexyl)phthalate
Acenaphthene (unregulated)
Acenaphthylene (unregulated)
Anthracene (unregulated)
Phenanthrene (unregulated)
Fluoranthene (unregulated)
Pyrene (unregulated)

5.0 Continued Drinking Water Sampling

In accordance with the approved Transition Plan, drinking water sampling will continue on a quarterly schedule at the entry point to the distribution system (360-011 Tap Outside Chlorine Building). Samples will be analyzed using the following analytical methods:

- VOCs – EPA 524.2
- SVOCs – EPA 525.2
- Gas Chromatography for JP-8 – EPA 8015
- Lead – EPA 200.8

6.0 Planned Future Release Response Actions

The Navy and DLA negotiated with the EPA and DOH (the “Regulatory Agencies”) release response actions that will be pursued. Future release response actions include determining the feasibility of alternatives for investigating and remediating releases from the Facility and continuing efforts to monitor and characterize the flow of groundwater around the Facility. A Work Plan/Scope of Work that describes the future release response actions is being prepared and will be submitted pursuant to the Red Hill Administrative Order on Consent to the Regulatory Agencies for approval.

7.0 Public Notifications

The Navy provided notifications to the public through the following document:

- Red Hill Update Stakeholder Letter of February 17, 2016
- Facts About Red Hill Trifold Brochure of March 1, 2016

Copies of these documents are included as Appendix B.

8.0 Conclusions and Recommendations

Results of oil/water interface measurements, groundwater sampling and analysis, and drinking water sampling and analysis indicate the release of JP-8 from Tank 5 has not impacted the Red Hill Shaft.

Additional release response actions have been negotiated with the EPA and DOH to protect the drinking water sources located down-gradient of the Facility.

The next quarterly release response report will be submitted in July 2016 and will cover the release response actions completed between April and June 2016.

9.0 References

DOH, 2000, Technical Guidance Manual for Underground Storage Tank Closure and Release Response, Environmental Management Division, Solid and Hazardous Waste Branch, Underground Storage Tank Section, March 2000.

DOH, 2011, Evaluation of Environmental Hazards at Sites with Contaminated Soil and Groundwater, Environmental Management Division, Fall 2011, revised January 2012.

DOH, 2013, Technical Guidance Manual for the Implementation of the Hawaii State Contingency Plan, Office of Hazard Evaluation and Emergency Response, Interim Final, March 2013.

Environmental Science International, Inc., 2014, Final Third Quarter 2014 – Quarterly Groundwater Monitoring Report, Inside Tunnel Wells, Red Hill Bulk Fuel Storage Facility, Prepared for Department of the Navy, Naval Facilities Engineering Command, Hawaii, JBPHH, Hawaii, September 2014.

Hawaii Administrative Rules, Title 11, Chapter 281, Underground Storage Tanks, August 2013.

TEC, 2007, Final Technical Report, Red Hill Bulk Fuel Storage Facility, Prepared for Department of the Navy, Commander Naval Facilities Engineering Command, Pacific, Pearl Harbor, Hawaii, August 2007.

TEC, 2008, Final Groundwater Protection Plan, Red Hill Fuel Storage Facility, Prepared for Navy Region Hawaii, Pearl Harbor, Hawaii, January 2008, revised December 2009 and August 2014.

TEC, 2010, Final Soil Vapor Sampling Monitoring Analysis Letter Report, February 1, 2010.

Appendix A
Soil Vapor Sampling Results through March 2016

Appendix B
Public Notifications

