

Tank 5 Quarterly Release Response Report

Red Hill Bulk Fuel Storage Facility

JBPHH, Oahu, Hawaii

DOH Facility ID No. 9-102271
DOH Release ID No. 140010

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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 (Facility). The objective of this report is to describe the actions taken by the Navy between June and September 2021 in response to the fuel reportedly released from Tank 5 in January 2014.

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

The Navy continues to perform work to ensure drinking water 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.

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1.0 Introduction

As required by Hawaii Administrative Rules 11-280.1-65.2, Release Response Reporting, this Quarterly Release Response Report presents the following information pertaining to the January 2014 release from Tank 5, DOH Release ID No. 140010:

- 1) All release response actions taken pursuant to subchapter 6 after the last reported date;
- 2) A plan for future release response actions to be taken; and
- 3) Information required pursuant to section 11-280.1-65.1.

This report presents a summary of these release response activities performed June 12 through September 10, 2021 at the Red Hill Bulk Fuel Storage Facility (hereinafter referred to as “the Facility”) located at Joint Base Pearl Harbor-Hickam (JBPHH), Oahu, Hawaii.

Additional supplemental monitoring is ongoing in response to the May 6, 2021 pipeline breach that occurred in the tunnel and will continue to be monitored and reported separately through the supplemental monitoring program.

1.1 Statement of Purpose

Release response actions presented in this report were performed to address a fuel release observed from Tank 5 in January 2014.

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

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- 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
 - Quarterly Release Response Report enclosed with NRH letter 5090 Ser N45/0508 dated April 13, 2016
 - Quarterly Release Response Report enclosed with NRH letter 5090 Ser N45/0583 dated July 28, 2016
 - Quarterly Release Response Report enclosed with NRH letter 5090 Ser N45/0658 dated October 24, 2016
 - Quarterly Release Response Report enclosed with NRH letter 5090 Ser N45/0422 dated January 27, 2017
 - Quarterly Release Response Report enclosed with NRH letter 5090 Ser N45/0489 dated April 24, 2017
 - Quarterly Release Response Report enclosed with NRH letter 5090 Ser N45/0552 dated July 24, 2017
 - Quarterly Release Response Report enclosed with NRH letter 5090 Ser N45/0627 dated October 23, 2017
 - Quarterly Release Response Report enclosed with NRH letter 5090 Ser N45/0410 dated January 19, 2018
 - Quarterly Release Response Report enclosed with NRH letter 5090 Ser N45/0492 dated April 19, 2018
 - Quarterly Release Response Report enclosed with NRH letter 5090 Ser N45/0553 dated July 18, 2018
 - Quarterly Release Response Report enclosed with NRH letter 5090 Ser N45/0630 dated October 16, 2018
 - Quarterly Release Response Report enclosed with NRH letter 5090 Ser N45/0403 dated January 11, 2019
 - Quarterly Release Response Report enclosed with NRH letter 5090 Ser N45/0403 dated April 15, 2019
 - Quarterly Release Response Report enclosed with NRH letter 5090 Ser N45/0590 dated July 12, 2019
 - Quarterly Release Response Report enclosed with NRH letter dated October 9, 2019
 - Quarterly Release Response Report enclosed with NRH letter dated January 9, 2020
 - Quarterly Release Response Report enclosed with NRH letter dated April 8, 2020

- Quarterly Release Response Report enclosed with NRH letter dated July 7, 2020
- Quarterly Release Response Report enclosed with NRH letter dated September 30, 2020
- Quarterly Release Response Report enclosed with NRH letter dated January 4, 2021
- Quarterly Release Response Report enclosed with NRH letter dated March 19, 2021
- Quarterly Release Response Report enclosed with NRH letter dated June 25, 2021

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 a mix of F1- Military and Federal and P-1 Restricted Preservation districts) in south-central Oahu, approximately 2.5 miles northeast of Pearl Harbor. It is located on a low ridge on the western edge of the Ko'olau Mountain Range that divides Hālawā Valley from Moanalua Valley. The Facility occupies 144 acres of land and the majority of the ground surface of the site lies at an elevation of approximately 200 to 500 feet above mean sea level (msl) (AECOM Technical Services, Inc., 2018).

The Facility is bordered on the southwest by residential neighborhoods and the United States (U.S.) Coast Guard reservation, on the southeast by residential neighborhoods in Moanalua Valley, and on the northeast by preservation land. The Facility is bordered on the north by Hālawā Correctional Facility and Hālawā 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 fourteen (14) active and six (6) 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 currently contain Jet Fuel Propellant No. 5 (JP-5), North Atlantic Treaty Organization (NATO)-grade F-24 jet fuel, or Marine Diesel Fuel (F-76). Tank 5 was used to store Jet Fuel Propellant No. 8 (JP-8) and now stores F-24.

Five (5) groundwater monitoring wells (wells RHMW01, RHMW01R, 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) Supply Well 2254-01.

Seventeen (17) groundwater monitoring wells (RHMW04, RHMW06, RHMW07, RHMW08, RHMW09, RHMW10, RHMW11, RHMW12, RHMW12A, RHMW13, RHMW14, RHMW15, RHMW16, RHMW16A, RHMW19, OWDFMW01, and HDMW2253-03) are located outside of the Facility tunnel system. Well OWDFMW01 is located at the former Oily Waste Disposal Facility, near Adit 3, and wells RHMW11, RHMW12, RHMW12A, RHMW14, and HDMW2253-03 are located at the Hālawā Correctional Facility (outside the Red Hill Facility boundary).

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 June 12 through September 10, 2021.

3.1 Oil/Water Interface Measurements

The water level 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 groundwater monitoring wells located within the lower access tunnel 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 groundwater monitoring wells RHMW01, RHMW02, RHMW03, and RHMW05 in June and July 2021. In August 2021, oil/water interface measurements were taken at groundwater monitoring wells RHMW01R, RHMW02, RHMW03, and RHMW05. No LNAPL was observed.

RHMW01R is a newly constructed well, installed in May 2021 to replace RHMW01. Beginning in August 2021, oil/water interface measurements were initiated at RHMW01R and discontinued at RHMW01.

Additional supplemental monitoring is ongoing in response to the May 6, 2021 pipeline breach that occurred in the tunnel and will continue to be monitored and reported separately through the supplemental monitoring program.

A summary of interface measurements through August 2021 is presented in Appendix A.

3.2 Soil Vapor Monitoring

Monthly 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.

Between the March and April soil vapor monitoring events, it was discovered that two SVMPs at Tank 10 were tracked as SV10S and SV10D from 2008 to 2015, and SV10S and SV10M from 2015 to 2020. In addition, the two SVMPs at Tank 11 were tracked as SV11M and SV11D from 2008 to 2020. As a result, the SVMPs were revised to SV10S and SV10M/D at Tank 10 and SV11S and SV11M/D at Tank 11. A note has been added to the soil vapor graphs stating that “M/D” monitoring points were constructed to screen both middle and deep depth intervals along the respective underground storage tank.

One of the methods that the Navy uses to assess the integrity of the associated tank system is to measure if VOC concentrations exceed a specific VOC concentration. Currently the concentration criteria are 280,000 parts per billion by volume (ppbv) in soil vapor monitoring probes beneath tanks containing jet fuels (JP-5 or F-24), or 14,000 ppbv in soil vapor monitoring probes beneath tanks containing marine diesel fuel (F-76) (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 June, July, and August 2021. Soil vapor VOC concentrations at Tank 5 were below the concentration criterion of 280,000 ppbv during all three monitoring events. During the same monitoring events, soil vapor VOC concentrations at all other active and accessible tanks were below the concentration criteria, with no consistent positive trend.

Additional supplemental monitoring is ongoing in response to the May 6, 2021 pipeline breach that occurred in the tunnel. SVMPs at Tanks 17 through 20 are believed to have been impacted by clean-up activities, resulting in increases in soil vapor VOC concentrations observed during the May 2021 monthly monitoring event. Soil vapor VOC concentrations at Tanks 17 through 20 were below the 280,000 ppbv concentration criterion and will continue to be monitored and reported separately through the supplemental monitoring program.

Monthly soil vapor sampling results from January 2014 through August 2021 are presented in Appendix B.

3.3 Groundwater Sampling and Analysis

Groundwater samples were collected from 22 monitoring locations within the Red Hill groundwater monitoring network in July 2021. Groundwater samples were collected from sampling point RHMW2254-01 located at Red Hill Shaft, 15 single-screen monitoring wells within the Facility boundary (wells RHMW01 through RHMW10, RHMW01R, RHMW16, RHMW16A, RHMW19, and OWDFMW01), the Hālawā Deep Monitor Well (HDMW2253-03) and RHMW12A at the Hālawā Correctional Facility, 2 multilevel monitoring wells (RHMW11 and RHMW14) located at the Hālawā Correctional Facility, and 2 multilevel monitoring wells (RHMW13 and RHMW15) located within the Facility boundary.

The Third Quarter 2021 - Quarterly Groundwater Monitoring Report, which summarizes sampling activities and laboratory analytical results, will be submitted under separate cover.

3.4 Drinking Water Sampling

Drinking water sampling was performed monthly as requested by the DOH letter of June 16, 2020. This sampling was performed on June 24 and July 29, 2021. After completion of the twelfth required monthly sample collected on July 29, 2021, the DOH issued a letter to the Navy dated September 1, 2021 approving Navy's request to return to the quarterly 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), and before chlorine was added to the water supply at the Red Hill Shaft Pump-head, RHMW2254-01 (360-001, pre-chlorination sample).

According to DOH's request, samples were analyzed using the following analytical methods:

- VOCs – EPA 524.2
- SVOCs – EPA 525.2
- Gas Chromatography for JP-8/F-24 – EPA 8015
- Lead – EPA 200.8
- Dissolved Organic Carbon – SM 5310C, SM5310B, or EPA 9060A

Additional supplemental drinking water monitoring is ongoing in response to the May 6, 2021 pipeline breach that occurred in the tunnel and will continue to be monitored and reported separately through the supplemental monitoring program.

Drinking water sampling results are compiled and submitted separately as requested by DOH SDWB and EPA via formal correspondence.

4.0 Continued Groundwater and Soil Vapor Monitoring

Continued monitoring of the groundwater and soil vapor will be conducted as follows:

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

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

5.0 Continued Drinking Water Sampling

In accordance with DOH letter dated September 1, 2021, quarterly drinking water sampling will resume in October to coincide with the fourth quarter groundwater sampling event.

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 revised Work Plan/Scope of Work that describes the future release response actions was submitted pursuant to the Red Hill Administrative Order on Consent to the Regulatory Agencies in November 2016. Conditional approval was received from the Regulatory Agencies in December 2016.

The following documents were submitted for regulatory review:

- Monitoring Well Installation Work Plan Addendum No. 2 in August 2017
- Groundwater Flow Model Progress Report 02 in August 2017
- Groundwater Flow Model Progress Report 03 in December 2017
- Sentinel Well Network Development Plan in December 2017
- Risk Based Decision Criteria Development Plan in December 2017
- Technical Memorandum, Testing and Verification of Packer Integrity at RHMW11 in February 2018
- Seismic Profiling to Map Hydrostratigraphy in the Red Hill Area in March 2018
- Groundwater Flow Model Progress Report 04 in April 2018
- Conceptual Site Model Report and Groundwater Protection and Evaluation Considerations Report in July 2018
- Groundwater Flow Model Progress Report 05 in August 2018
- Groundwater Flow Model Progress Report 06 in December 2018
- Groundwater Flow Model Progress Report 07 in April 2019
- Conceptual Site Model Report Revision 01 in June 2019
- Groundwater Flow Model Progress Report 08 in August 2019
- Groundwater Flow Model Progress Report 09 in December 2019
- Groundwater Flow Model Progress Report 10 in March 2020
- Groundwater Flow Model Report in March 2020
- Investigation and Remediation of Releases Report in March 2020
- Errata for Conceptual Site Model Report, Revision 01, of June 2019 in April 2020
- Technical Memorandum, Evaluation of Chromatograms for Understanding TPH Detections in Monitoring Wells in September 2020

Approval by the Regulatory Agencies of these documents will guide future release response actions.

7.0 Public Notifications

In August 2021, the Navy provided a Tank Upgrade Alternative and Release Detection Decision Document (TUA DD) Supplemental document to EPA and DOH. A copy of the news release and fact sheet is included in Appendix C.

On September 1, 2021, the Navy provided the 3rd Quarter 2021 Red Hill Bulk Fuel Storage Facility Public Information Update on the Commander, Navy Region Hawaii website. A copy of the news release is included in Appendix C.

8.0 Conclusions and Recommendations

Results of 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 near the Facility.

The next Tank 5 quarterly release response report will be submitted in December 2021 and will cover release response actions pertaining to the January 2014 release completed between September and December 2021.

9.0 References

AECOM Technical Services, Inc., 2018, *Final First Quarter 2018 – Quarterly Groundwater Monitoring Report, Red Hill Bulk Fuel Storage Facility*, Prepared for Department of the Navy, Naval Facilities Engineering Command, Hawaii, JBPHH, Hawaii, July 2018.

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

DOH, 2017, *Evaluation of Environmental Hazards at Sites with Contaminated Soil and Groundwater*, Environmental Management Division, Fall 2017.

DOH, 2020, *Red Hill Shaft Drinking Water Sample Results and Analysis, Joint Base Pearl Harbor-Hickam (JBPHH) Public Water System (PWS 360)*. Letter from: Keith E. Kawaoka, Deputy Director for Environmental Health, to: Captain Marc R. Delao, Regional Engineer, Navy Region Hawaii, attention: CDR Darrel E. Frame. June 16.

DOH, 2021, *Hawaii Administrative Rules, Title 11, Chapter 11-280.1, Underground Storage Tanks*, July 2021.

DOH, 2021, *Request to revise water quality monitoring at Red Hill Shaft Source (Pre- and Post-Chlorination), Joint Base Pearl Harbor-Hickam Water System (PWS 360)*. Letter from: Joanna L. Sato, Acting Chief, Safe Drinking Water Branch, to: Captain James G. Meyer, Regional Engineer, Navy Region Hawaii, attention: Sherri R. Eng. September 1.

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
Oil/Water Interface Measurements
January 2014 through August 2021

Appendix B
Soil Vapor Sampling Results through August 2021

Appendix C
Public Notifications