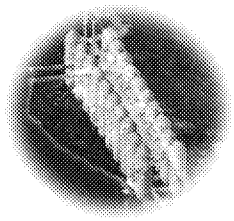

Status Update March 2016

Red Hill Underground Fuel Storage Facility

Implementation of the Administrative Consent Agreement between the Navy and Defense Logistics Agency and Hawaii Department of Health and US EPA for

Environmental Investigation, Cleanup and Environmental Performance

The Navy's Red Hill Bulk Fuel Storage Facility, located near Pearl Harbor, provides fuel for military operations in the Pacific. Originally built in the 1940s, the unique facility includes 20 large underground fuel storage tanks with a facility-wide capacity of approximately 250 million gallons of fuel. A fuel release of up to 27,000 gallons from Tank 5 in January 2014 led to a comprehensive plan to minimize the threat of future leaks and protect groundwater resources around the facility. This and other periodic updates are intended to keep the public informed on major progress being made to protect public health and the environment at the Red Hill facility.

Background

Legally Enforceable Agreement

On September 28, 2015, the Hawaii Department of Health and the U.S. Environmental Protection Agency (Regulatory Agencies) finalized an enforceable Administrative Order on Consent with the U.S. Navy and Defense Logistics Agency. The order requires the Navy and the Defense Logistics Agency to implement numerous activities to address fuel releases and implement infrastructure improvements to protect human health and the environment.

The required work is outlined in a Statement of Work that covers eight areas: Project Planning and Management; Tank Inspection, Repair, and Maintenance Procedures; Tank Upgrade Alternatives; Release Detection / Tank Tightness Testing; Corrosion and Metal Fatigue Practices; Investigation and Remediation of Releases; Groundwater Protection and Evaluation; and Risk / Vulnerability Assessment.

Several project documents are now available on the Regulatory Agencies' websites at www.epa.gov/red-hill and http://health.hawaii.gov/shwb/ust-red-hill-project-main/. Periodic updates will also be provided to the public via email, website updates, and public meetings.

Significant progress made during week long scoping meetings

From November 30th to December 4th at Pearl Harbor, the Regulatory Agencies, their technical experts, the Navy and Defense Logistics Agency, Naval contractors, and representatives from the Hawaii State Department of Land and Natural Resources met for scoping meetings on the Statement of Work.

Draft reports on the Release Detection/Tank Tightness Testing and the Corrosion and Metal Fatigue Practices are due in April. The draft scopes of work for the Investigation and Remediation of Releases and Groundwater Protection and Evaluation are due in May. Scoping work for Tank Inspection, Repair, and Maintenance Procedures and Tank Upgrade Alternatives is expected to be completed by spring 2016, and the scoping for the Risk / Vulnerability Assessment will be completed in early summer 2016.

Environmental Assessments

Drinking water and groundwater monitoring continue to indicate drinking water is safe

Public water systems that supply drinking water to Oahu residents are required to routinely test drinking water for contaminants. All drinking water supplies in the vicinity of Red Hill continue to meet all federal drinking water standards, known as Maximum Contaminant Levels.

The Navy has been regularly testing the groundwater at the Red Hill facility since 2005. There are no federal or state standards set for contaminants in groundwater rather the State of Hawaii has established Environmental Action Levels and in some cases, Site Specific Risk Based Levels for certain monitoring

locations in areas where more in-depth assessment is required.

Samples of groundwater taken at the 10 monitoring locations at and around the Red Hill facility have rarely exceeded the relevant state action levels or risk-based levels. For example, the groundwater monitoring well near Red Hill Tank #5 (well RHMW02) has exceeded state risk based levels only three times over 46 quarters of sampling since 2005 (10/22/2008, 1/15/2014, and 4/20/2015).

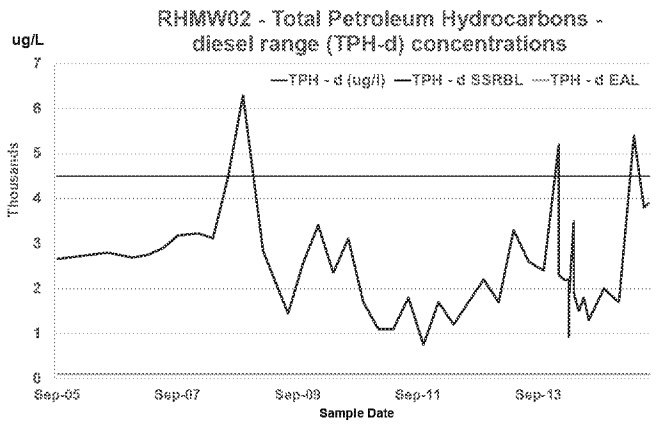

Figure 1 – TPH-diesel concentrations at Monitoring well #2 (RHMW02), 2005 - 2014

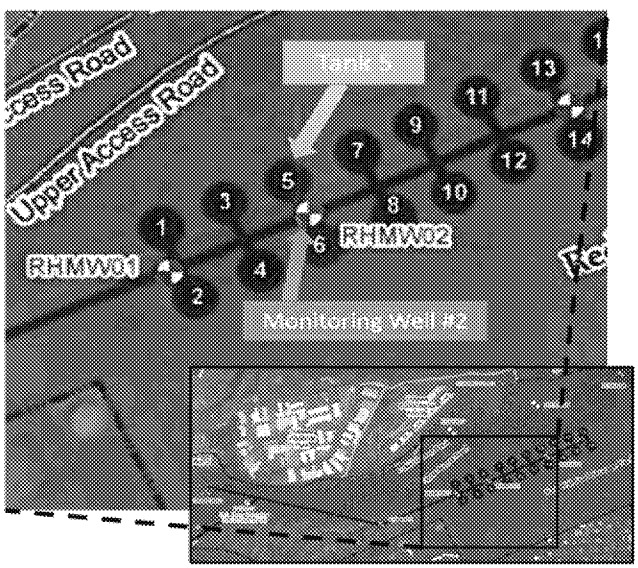

Figure 2 - Location of Tank 5 and Monitoring Well #2 (RHMW02)

Approximately 3,000 feet down gradient from the tanks is the Navy drinking water supply well nearest to the Red Hill facility. This drinking water source has never exceeded any drinking water standards, and since quarterly sampling began in 2005, this well had detected concentrations of Total Petroleum Hydrocarbons – diesel (TPH-d) in only seven samples, all below the state environmental action level of 100 ug/L.

More detailed information on groundwater monitoring results can be found at www.epa.gov/red-hill. Information on the Navy's drinking water testing can be found at http://www.cnic.navy.mil/content/cnic/cnic_hq/regions/cnrh/om/environmental/red-hill-tank/_jcr_content/par1/pdfdownload_2/file.res/hi_2015_jbphh_wqrpt_final_27May15.pdf and information on Honolulu Board of Water Supply drinking water testing can be found at http://www.boardofwatersupply.com/cssweb/display.cfm?sid=1081.

Preliminary agreement reached on the location for the next four new groundwater monitoring wells

New groundwater monitoring wells to the north, west and south of the tanks at the Red Hill facility are planned to be installed beginning in 2016. These new wells will supply additional data to identify the presence of contamination, better characterize groundwater flow, and guide future investigations. The new wells will be sampled for the same compounds and at the same frequency (quarterly) as the existing wells. The need for more groundwater monitoring wells in addition to the four new locations will be assessed after the new wells undergo two rounds of sampling.

There are currently 10 monitoring locations, three directly under the tanks. The existing wells and four new groundwater wells will enhance the ability to assess whether any existing contamination under the facility is moving away from the Red Hill tanks and towards drinking water supplies. The nearest drinking water well is located about ½ mile west of the tanks and operated by the Navy.

Better understanding of Red Hill geology and groundwater flow a top priority

Defining flow patterns of subsurface groundwater and understanding the geology of the area is essential to investigating contamination at the Red Hill facility. Although the Navy has performed previous investigations, improving and updating our understanding of the regional geology and groundwater flow is a critical need to support future decisions at Red Hill and this work will be an early priority.

Further investigations will be done to improve the accuracy of past Navy subsurface groundwater models that will support future decisions at Red Hill. A more complete investigation of the geology is needed before considering drilling to locate any liquid fuel that may still be under and adjacent to the Red Hill tanks. While some may believe the Navy should immediately begin drilling to find and remove fuel, without a better understanding of the area's complex geology, an unintended consequence may be the creation of pathways that speed the flow of contaminants into the groundwater.

The results of this work will be used to refine the groundwater flow model and will enable the Navy to better predict the potential movement of contaminants. These models will aid in decisions to be made on the feasibility and necessity of recovering any leaked fuel. At this time there is no indication that contamination from Red Hill tanks has migrated significantly towards any drinking water supplies.

Tank Improvements

Fourteen tank upgrade alternatives evaluated - six options will undergo in-depth study

The Navy presented a preliminary study of tank upgrade alternatives and 14 alternatives were identified for evaluation. Nine of the 14 alternatives were double-wall containment systems and the remaining five were single-wall containment systems.

After extensive discussions, six options were identified for in-depth study. The alternatives to be studied include: modifications to the current tank configuration, the current configuration plus coatings, complete replacement of the existing steel plates, construction of a new tank inside the existing tank, and construction of a double-walled tank without an accessible outer wall using regular steel or stainless steel. Additionally, an upgrade to piping in the lower tank nozzle is being evaluated.

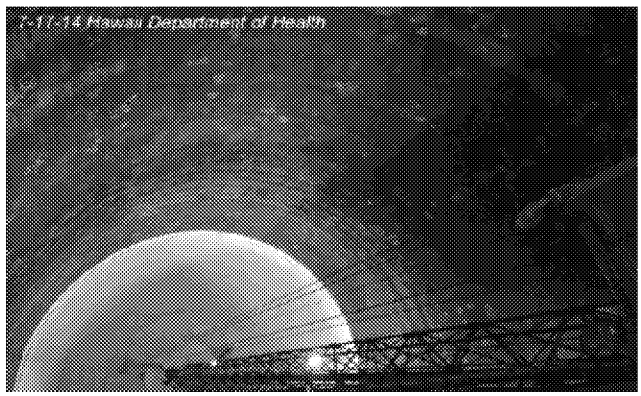

Figure 3- Inside of Tank 5

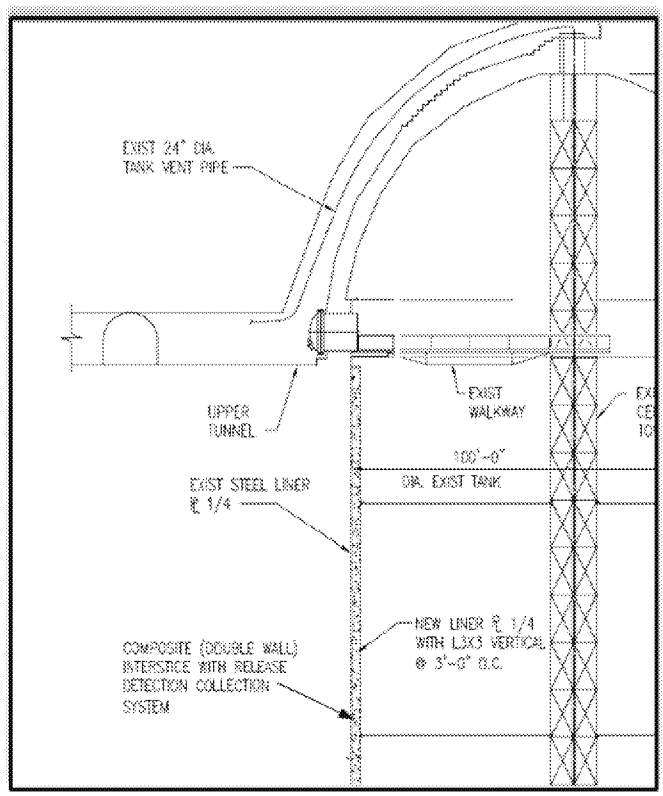

Figure 4- Composite Tank Concept

The studies will also evaluate the unique inspection, maintenance and repair procedures needed with each tank upgrade alternative to prevent leaks and ensure

proper performance. These procedures can be as important as the infrastructure installed.

Navy making extensive changes to quality management procedures since Tank 5 release

The Navy is developing new technical specifications for tank inspection and repair operations, and is changing its contracting procedures to improve construction quality management. The Navy acquired additional funds to increase oversight (i.e. quality assurance) of the tank inspection and repair procedures and this increased oversight will be implemented on future tank maintenance work. The Regulatory Agencies are also consulting with experts to further improve the Navy's tank inspection, maintenance, and repair processes for both the current tank design and any future tank improvements.

The actions are a result of what is believed to be the primary contributor to the fuel release from Tank 5 - issues with the tank inspection and repair work and associated contractor quality control procedures. Additionally, there was a lack of independent review to verify the work performed by Navy contractors in Tank 5.

Individual welds inside Tank 5 were not independently inspected. Procedures related to project-wide welding techniques and specifications were not adequately reviewed by independent experts, and contractor employee compliance with their own quality control procedures was not verified.

The other six tanks that underwent a maintenance procedure similar to Tank 5 did not experience problems. Repair records from the six other tanks are being reviewed to better understand the different procedures employed.

Navy's infrastructure improvements proceeding

Several immediate infrastructure improvements are already underway: the addition of containment doors to halt fuel movement in the event of a catastrophic equipment failure, new fire suppression systems, and enhanced contractor quality control and Navy quality assurance procedures. The Navy will continue to evaluate improvement options and provide recommendations to the Regulatory Agencies this spring.

Expertise

Regulatory Agency outside experts

Red Hill presents many unique challenges that require specialized expertise. To meet these challenges, the Regulatory Agencies assembled the following team of outside experts to support the oversight of work to be performed by the Navy.

Donald Bussey is a hydrogeologist with over 30 years of experience working on projects in geologic settings similar to Red Hill. Don is an U.S. EPA employee with the Office of Land and Environmental Management's Emergency Response Team in Las Vegas, NV.

Philip Myers of PEMY Consulting, LLC, is a chemical engineer formerly with Chevron. Phil has decades of experience in the design, operation, and maintenance of large fuel storage facilities. He helped to develop many of the industry standards currently used worldwide to ensure the integrity of fuel storage vessels.

Douglas Schwarm is the chief engineer of Atlas Geotechnical. Doug has experience with the design and construction of large-scale industrial projects in the oil and gas industry around the world.

Don Thomas is a geochemist with the University of Hawaii and currently serves as director of the Center for the Study of Active Volcanoes in Hilo. Don's over 40 years of experience studying Hawaii geology will be invaluable in understand groundwater flow in the area around Red Hill.

Navy to expand team of experts for a risk and vulnerability assessment

The Navy will hire additional experts for developing a risk and vulnerability assessment required for the Red Hill facility.

Unlike a typical environmental risk assessment, which usually only evaluates health risks posed by contaminants in the environment, the Red Hill risk and vulnerability assessment will also evaluate the probabilities of various scenarios that could release fuel into the surrounding environment such as human error, mechanical failures, fires, or seismic events. The assessment will evaluate the likelihood of fuel releases from each scenario and their consequences, providing important information to aid in modeling the movement of contaminants and tank upgrades.

Next Steps

Key new work planned for the next 90 days

The Navy is on schedule to submit several key deliverables and reports for Regulatory Agency review in the next three months. This includes the Current Fuel Release Monitoring Systems Report and the Corrosion and Metal Fatigue Practices Report as well as scopes of work for investigation and remediation of releases and groundwater protection and evaluation. Other work products related to the tank infrastructure will follow soon after.

For Further Information

www.epa.gov/red-hill

www.health.hawaii.gov/shwb/ust-red-hill-project-main/

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