Underground Storage Tank System Inspection Report

Bulk Fuel Storage Systems Including Red Hill and the Airport Hydrant System Serving Joint Base Pearl Harbor-Hickam

August 17, 2022

U.S. ENVIRONMENTAL PROTECTION AGENCY
REGION 9
75 Hawthorne
Street San Francisco,
CA 94105

US EPA REGION 9 UNDERGROUND STORAGE TANK INSPECTION REPORT

Inspection Date(s):	February 28 to March 4, 2022	**Inspection Announced:** Yes	
Time:	**Entry:** 08:00 (HST)	**Exit:** 5:00 (HST)	
Media:	Underground Storage Tanks		
Regulatory Program(s)	RCRA Subtitle I: Underground Storage Tanks		
Company Name:	Department of the Navy		
Facility or Site Name:	Bulk Fuel Storage Systems Including Red Hill and the Airport Hydrant System Serving Joint Base Pearl Harbor-Hickam		
Facility Location:	Joint Base Pearl Harbor Hickam		
(city, state, zip code)	Pearl Harbor Hawaii, HI 96860		
Mailing address:	Building 1757 (Administrative Offices)		
(city, state, zip code)	Pearl Harbor Hawaii, HI 96860		
County:	Honolulu		
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	(b) (6), Deputy Director, Fuel and Facility at NAVSUP Fleet Logistics Center Pearl Harbor – (b) (6)		
Facility/Site Identifier:	HDOH Site ID: 9-102771		
NAICS:	92811 – National Security		
SIC:	9711 – National Security		

Facility/Site Personnel Participating in Inspection:

Name	Title	Phone	Email
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(b) (6)	Director, NAVSUP	(b) (6)	(b) (6)
(b) (6)	Deputy Director	(b) (6)	(b) (6)
(b) (6)	Commander, NAVFAC Red Hill Program Director	(b) (6)	(b) (6)
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I. INTRODUCTION

Purpose of the Inspection

During the week of February 28 through March 4, 2022, the United States Environmental Protection Agency (EPA) Region 9, Enforcement Compliance Assurance Division (ECAD) conducted an inspection of the bulk fuel storage systems including Red Hill and the Airport Hydrant System Serving Joint Base Pearl Harbor-Hickam (JBPHH). The inspection was conducted with a team that included the EPA Region 9 Underground Storage Tank (UST) inspectors, a subject matter expert from EPA's Office of Underground Storage Tanks (OUST), EPA's Red Hill Project Coordinator, and inspectors with the Hawaii Department of Health (HDOH). The purpose of the onsite inspection was to determine the operational compliance of JBPHH with the State of Hawaii's approved UST program (the Hawaii Administrative Rules, HAR Chapter11-280.1 [40 CFR Part 280]). This inspection builds on the HDOH October 2020 inspection.

Federal regulations for the management of USTs storing petroleum or hazardous substances were first published in 1988. In January 2000, the State of Hawaii promulgated rules requiring owners and operators of UST facilities to, among other things, report suspected or confirmed releases from USTs. Effective September 30, 2002, EPA granted final approval for Hawaii's UST program to operate as the Federal rules regarding USTs. On July 15, 2015, EPA published revisions to the 1988 UST regulations. These regulations included new requirements for field-constructed USTs, airport hydrant systems, secondary containment and operator training. In 2018, Hawaii promulgated rules to conform with EPA's 2015 revisions to the UST regulations. On October 18, 2018, Hawaii submitted to EPA an application for approval of its revisions. On March 7, 2022, EPA granted final approval to the Hawaii to operate its revised UST Program for petroleum and hazardous substances.

Prior to EPA's approval of Hawaii's revised UST program, and at the time of the onsite inspection, field constructed USTs and airport hydrant systems were still deferred under the Hawaii's 2002 approved UST program from most of the technical requirements for USTs. Upon EPA's March 7, 2022, approval of Hawaii's revised UST program, however, this deferral was lifted. This report documents the EPA's inspection findings and identifies compliance concerns, including concerns that have arisen since the deferral was lifted.

This UST inspection report is not an investigation report for the causes of previous fuel releases.

The EPA Region 9 UST inspection team included the following:

- S. Bobby Ojha, US EPA Region 9, UST Inspector
- Rick Sakow, US EPA Region 9, UST Inspector
- Gabriela Carvalho, U.S. EPA Region 9, Red Hill Project Coordinator
- Russ Brauksieck, EPA Headquarters, Office of Underground Storage Tanks

HDOH UST inspectors Nicole Okino and Hugh Myers accompanied the EPA during the entire inspection.

Opening Conference

The UST inspection team arrived at JBPHH at 8 AM on February 28, 2022, for an announced inspection. The opening conference included the inspection team and JBPHH representatives. The EPA inspectors presented credentials to JBPHH representatives and explained that the inspection included both a records review and a walk-through of the bulk fuel storage systems including Red Hill and the Airport Hydrant System Serving Joint Base Pearl Harbor-Hickam.

During the weeklong inspection the UST inspection team documented observations in detail within the JBPHH Inspection Checklist (see Attachment A).

EPA Region 9 UST inspector Rick Sakow took digital photographs during the inspection to provide reference documentation of UST conditions observed. A detailed photograph log, including all photographs taken during the inspection is included in Attachment B.

JBPHH Facility Description

The inspection of the bulk fuel storage systems at JBPHH included the USTs at the Red Hill Facility serving the Airport Hydrant System at Joint Base Pearl Harbor-Hickam. The Red Hill Facility has 24 USTs (20 12.5-million-gallon bulk fuel storage tanks and four 400,000-gallon fuel surge tanks), numerous aboveground storage tanks (ASTs), and associated piping and equipment. The 20 bulk fuel storage tanks are positioned at the highest elevation within the Red Hill Facility, located within the Red Hill Ridge of the Ko'olau Mountain Range. The four fuel surge tanks are adjacent to the pumphouse located downhill from the 20 bulk fuel storage tanks. The Navy constructed the USTs from 1940 to 1943. The bulk fuel storage tanks are comprised of concrete lined with steel with no secondary containment. The bulk fuel storage tanks are used to store petroleum products until they are ready for distribution. Petroleum is dispensed from the bulk fuel storage tanks through pipelines via gravity flow to the point of distribution at Pearl Harbor or Hickam Airfield. The UST system also has carbon steel, single wall piping that connects the bulk fuel storage tanks to filling and dispensing stations at various piers and to a truck loading rack located along Pearl Harbor's shoreline. A pumphouse near the base of the Red Hill Facility provides the pressure required to deliver fuel to the USTs. Four fuel surge tanks adjacent to the pumphouse provide equalization for pipeline pressure and mitigate the operational issues that could result from the downhill flow of fluids due to the elevation difference across the system (more than 300 feet when the tanks are filled to the maximum allowable fluid level). A pipeline that is approximately three miles in length transfers fuels from the Pump House to the Hickam Airfield. The Hickam Airfield includes four ASTs which feed two separate airport hydrant loops with two underground product recovery tanks with an estimated volume of 2000 gallons and 4000 gallons and a Truck Unloading and Loading Rack.

History of Fuel Releases

The Navy provided the UST inspection team with a spreadsheet of documented fuel releases at the Red Hill Facility between 1947 and 2014, with a reported total of 244,433 gallons of released fuel during the 67-year period (see Attachment C). In January 2014, 27,000 gallons of fuel was released, as described in the Navy's "About Red Hill" website (see Attachment D). According to Navy personnel, two fuel releases occurred at the Red Hill Facility during May 6 - 7, and November 20 - 21, 2021. The Navy launched an investigation into the root causes of these two

releases. The Navy's Command Investigation for the May 2021 Release (Attachment E) indicates that 1,618 gallons of JP-5 (jet fuel) was released in the lower Red Hill tunnel during the May 2021 event. According to the Command Investigation, additional engineering analysis is needed to determine the root cause of the May 6 pipeline event. The Navy's Site Characterization Plan report for the November 2021 Release reports that approximately 19,000 gallons of a JP-5 (jet fuel) released in the Adit 3 Tunnel on November 20, 2021 (see Attachment F). Information about additional fuel losses at the Red Hill Facility not described above are included in the HDOH Superseding Emergency Order, dated May 6, 2022, which requires defueling and closure of the fuel storage operations at the Red Hill Facility (see Attachment I).

Clean Inspect Repair Process for Temporarily Closed Tanks

During the UST inspection, Navy personnel explained that Tanks 1 and 19 are out of service and Tank 1 is being evaluated to determine if secondary containment could be added to the 20 bulk fuel storage tanks at the Red Hill Facility. Navy personnel referred to Tank 19 as the "Show Tank" that is used for display purposes. At any given time, four of the bulk fuel storage tanks are empty and undergo the Clean-Inspect-Repair (CIR) process. According to Navy personnel, the American Petroleum Institute (API) standard 653 is implemented to evaluate the integrity of the bulk fuel storage tanks. If the structural integrity of a tank is in question when modifications, alterations, and reconstruction – such as adding tank welds and patches to tank bottom floors – are made, this means a repair as defined in HAR § 11-280.1-12 was made, and HAR § 11-280.1-33 applies. The Navy submitted notifications to HDOH to change the status of repaired tanks to "in-use" status for Surge Tanks 1, 3 and 4 and Bulk Fuel Tank 5 (see Attachment J). The notifications describe the following repairs made to the tanks: welds, repairs to inlet / outlet nozzles, addition of new steel floor, the addition of shell patch plates and a new stilling well and drain line. Since welding on the tanks was needed to complete the CIR process, the structural integrity of the tanks was in question and hence the welding on the tanks is considered a repair. The Navy tank notifications in Attachment J contain redactions and do not specify which type of testing (i.e., 0.5 gallons per hour or 0.1 gallons per hour) occurred for the repaired tanks. EPA's regulations at 40 CFR § 280.33(d)(3) allows for the use of the Subpart K release detection method testing (0.5 gallons per hour) for repaired field-constructed tanks. The current HAR does not include the 40 CFR § 280.33(d)(3) provision. As the direct implementing agency, HDOH may require the use of Subpart D release detection method testing (0.1 gallons per hour) for repaired field-constructed tanks, per HAR § 11-280.1-43(3). Without information on the specific testing that was completed on the repaired tank, the UST inspection team was unable to determine if the requirement of HAR § 11-280.1-43(3) had been met.

II. OBSERVATIONS

On the morning of February 28, 2022, the UST inspection team met with (b) (6), Red Hill Facility Regional Program Director, and (b) (6), NAVFAC Hawaii Compliance and Red Hill Compliance Lead, at the security gate to JBPHH. Upon the UST inspection team's arrival, the Navy provided an introductory presentation on the JBPHH's operations, and the UST inspection team proceeded according to the proposed schedule for the week. Over the course of the week, the UST inspection team inspected the main areas of the Bulk Fuel Storage System, including, but not limited to the following areas: Red Hill Tank Farm Upper and Lower Tank Galleries, Underground Pumphouse (UGPH), Main Pumphouse, Surge Tanks next to UGPH, Operations Room, Harbor Tunnel, Surge Tunnel, Hotel Pier, Fuel Oil Reclamation Tank 311, Aqueous Film Forming Foam

(AFFF) Retention Tank and equipment areas, Upper Tank Farm (AST farm) and Truck Loading Racks. The UST inspection team also inspected the portion of the Bulk Fuel Storage System from the UGPH to the Hickam Airfield, including but not limited to the following areas: Commercial tank truck loading and off-loading areas, field-erected and shop-built ASTs, Rectifier 3, portions of the piping runs between the pumphouse and Hickam, Diamond Head and Ewa Product Recovery Tanks, Diamond Head and Ewa Pump houses, four hydrant pits, two valve pits and the Hickam Airfield hydrant fuel system.

Rectifiers

The UST inspection team collected voltage and current readings from the easily accessible rectifiers located near the upper tank farm and along buried pipelines between the UGPH and Hickam Airfield. Many of the rectifiers read zero voltage and current. JBPHH personnel explained that rectifiers are checked every month using a multimeter because some of the meters on the rectifiers do not function properly. The UST inspection team observed that many of the rectifiers in the downhill portion of the Facility exhibited significant changes in voltage thereby demonstrating that, some of the impressed current systems on the piping system were not functioning properly.

Two Sumps not being treated as Underground Storage Tanks

The UST inspection team identified two sumps in the lower tunnel (Main Containment Sump for Fuel Oil Reclamation and Zone 7 Sump for Fuel Oil Reclamation), see photos below, that were not included in the Navy's May 15, 2019, UST permit application submitted to HDOH (Attachment K). These sumps meet the definition of a "Tank," because they are stationary devices designed to contain an accumulation of regulated substances and constructed of non-earthen materials (e.g., concrete, steel, plastic) that provide structural support, per HAR § 11-280.1-12. The volumetric capacities of the two sumps were undetermined at the time of the inspection. The Navy was unable to demonstrate that these two USTs were in compliance with the tank tightness testing and other UST requirements.

Figure 1: Main Containment Sump for Fuel Oil Reclamation

Figure 2: Zone 7 Sump for Fuel Oil Reclamation

Incorrect Fuel Type on AFHE Monitor for Tank 15

The UST inspection team noted that the Automatic Fuel Handling Equipment (AFHE) for Tank 15 at the Red Hill Facility indicated an incorrect fuel type. The AFHE monitor for Tank 15 indicated Tank 15 holds JP-5 (jet fuel). The May 19, 2019, Navy UST Permit Application for Red Hill Bulk Fuel Storage stated that Tank 15 held marine diesel (see Attachment K). HDOH inspector Hugh Myers stated that this discrepancy was also noted during HDOH's inspection of JBPHH in fall of 2020. During the EPA inspection, Navy personnel updated its system information, and the correct fuel type was later observed on the AFHE monitor for Tank 15.

Inaccurate Fuel Volume on AFHE Monitor for Tank 17

The AFHE monitor indicated that Tank 17 at the Red Hill Facility held 5 and 8/16th inches of fuel during the inspection. However, Tank 17 was undergoing the CIR process and held no fuel. NAVFAC personnel explained this was a calibration error and added that the fuel level sensor's lowest measurement is 12 inches.

Overfill Prevention Equipment

The UST inspection team did not observe any overfill prevention equipment for the Product Recovery Tanks (PRTs) at Diamond Head and Ewa. The Diamond Head and Ewa PRTs must have overfill prevention equipment installed and inspected once every three years, as required by HAR § 11-280.1-35(a)(3).

Spill Bucket Testing

The UST inspection team observed a spill bucket at the Hickam Airfield, for the Ewa PRT and noted spill bucket testing has not occurred for the fuel port used to receive fuel. The spill bucket needs to be tested once every 365 days, as required by HAR § 11-280.1-35(a)(1)(B).

Other Components

The UST inspection team visited the Kuahua Truck Loading Rack (TLR) on March 2, 2022. Fuels are dispensed to trucks at the TLR. No fuel is added to the system at the TLR. The UST inspection team observed secondary containment structures at the TLR, including curbing, grading of concrete, and a central sump. All observed structures appeared to be in good condition with no major debris or visible cracking. The UST inspection team also observed the presence of multiple visible and audible alarms at the TLR; however, the UST inspection team did not test the alarms during the inspection.

Documentation Review

During the week of February 28, 2022, the UST inspection team reviewed various records, including operator training records. The Navy maintains all records on-site. Although all UST related records were available at the time of the UST inspection, the UST inspection team was unable to perform a thorough review of the reports during the week of the inspection due to time limitations. Records and documents maintained for the JBPHH's UST systems were generally in order and readily accessible.

Closing Conference

On March 4, 2022, the inspection closed with an exit conference that included representatives from the EPA, the Navy and HDOH. During the closing conference, the UST inspection team discussed the preliminary observations made during the walk-through of JBPPH.

SECTION III – AREAS OF NON-COMPLIANCE (AON)

The following table summarizes the findings and observations of EPA's on-site inspection and follow-up review of records and documents provided by the Navy. Areas of noncompliance (AON) pertain to areas or issues identified by EPA that may have potential compliance implications but are neither inclusive nor exclusive of all such potential areas or issues.

The AON reference supporting documents, including photographs taken during the inspection.

Areas of Non-Compliance

AON	Regulatory Citation(s)	Findings / Supporting Notes	Evidence / References
1.	Inadequate Tank Release Detection **HAR § 11-280.1-41(a)(2)(A)** **[40 CFR § 280.252(d)(1)]** *Tanks installed before July 15, 2018, that are part of an airport hydrant fuel distribution system or a UST system with field-constructed tanks, and that are not field-constructed tanks with a capacity greater than 50,000 gallons, to be monitored for releases at least every thirty-one days using one of the methods listed in section 11-280.1-43(4) to (9)*	The Navy has not demonstrated that it has monitored for releases of two double-walled USTs, referred to as the Diamond Head and Ewa PRTs, at the Hickam Airfield, and two USTs in the lower tunnel (Main Containment Sump for Fuel Oil Reclamation and Zone 7 Sump for Fuel Oil Reclamation). The HDOH Notice of Violation and Order No. 21-UST-EA-01 states that Diamond Head tank has a capacity of 2,000 gallons and was installed on or about July 2010, and the Ewa tank has a capacity of 4,000 gallons and was installed on or about May 2006. Since these tanks were installed before July 15, 2018, are part of an airport hydrant fuel distribution system, and have a capacity of less than or equal to fifty thousand (50,000) gallons, they need to be monitored with release detection at least every thirty-one (31) days using one of the methods listed in section 11-280.1-43(4) to (9).	**Attachment A:** JBPHH Facility EPA R9 UST Inspection Checklist
2.	Release detection recordkeeping: **HAR § 11-280.1-45(2)** **[40 CFR § 280.34(b)]** *All UST system owners and*	Release detection records were not available for two USTs in the lower tunnel (the the Main Containment Sump for Fuel Oil	**Attachment A:** JBPHH Facility EPA R9 UST Inspection Checklist

AON	Regulatory Citation(s)	Findings / Supporting Notes	Evidence / References
	operators must maintain records in accordance with section 11-280.1-34 demonstrating compliance with all applicable requirements of this subchapter.	Reclamation and Zone 7 Sump for Fuel Oil Reclamation). Release detection records were also not available for the PRTs at Diamond Head and Ewa Tanks.	
3.	Overfill Prevention Equipment **HAR § 11-280.1-35(a)(3)** **[40 CFR § 280.35(a)(2)]** *Overfill prevention equipment must be inspected at least once every three years.* **HAR 11-280.1-35(b)(1)** **[40 CFR § 280.35(b)]** *All records of testing or inspection must be maintained for three years.*	At the time of the finalization of this inspection report, the EPA inspection team could not determine if overfill prevention equipment testing for the PRTroduct Recovery Tanks at Diamond Head and Ewa was inspected every three years. There was no documentation available to demonstrate this requirement was met. Navy personnel were unaware of this requirement at the time of the inspection.	**Attachment A:** JBPHH Facility EPA R9 UST Inspection Checklist
4.	**HAR § 11-280.1-35(b)(1)** **[40 CFR § 280.35(b)]** *All records of testing or inspection must be maintained for three years.*	No records were available to demonstrate that overfill prevention equipment was inspected once every three years. Navy personnel were unaware of this requirement at the time of the inspection.	**Attachment A:** JBPHH Facility EPA R9 UST Inspection Checklist
5.	Periodic Operation and Maintenance Walkthrough Inspections **HAR § 11-280.1-36(a)(4)** **[40 CFR § 280.252(c)]** *To properly operate and maintain UST systems, beginning not later than July 15, 2019, owners and operators must conduct walkthrough inspections that, at a minimum, check the following equipment as specified below:* *(4) For airport hydrant systems, at least once every thirty-one days if confined space entry according to the Occupational Safety and Health Administration is not required or at least annually if confined space entry is required (see 29 C.F.R. part 1910):*	The Navy was not conducting adequate walk though inspections. Several Hickam Airfield hydrant pits contained liquids with noticeable odors of petroleum. Since there was liquid in the hydrant pit, Navy personnel were unable to check it for leaks and in the future must keep it dry to check for leaks.	**Attachment A:** JBPHH Facility EPA R9 UST Inspection Checklist **Attachment B:** EPA R9 UST Photographs and Photo Log

AON	Regulatory Citation(s)	Findings / Supporting Notes	Evidence / References
	(A) Hydrant pits: *(i) Visually check for any damage;* *(ii) Remove any liquid or debris; and* *(iii) Check for any leaks* *(B) Hydrant piping vaults: Check for any hydrant piping leaks.*		
6.	Spill Bucket Testing **HAR § 11-280.1-35(a)(1)(B)** **[40 CFR § 280.35(a)(1)(ii)]** *Spill prevention equipment must be tested every 365 days.*	The Navy was not conducting testing on its spill bucket equipment on its PRT-Ewa. Navy personnel were unaware of this requirement at the time of the inspection.	**Attachment A:** JBPHH Facility EPA R9 UST Inspection Checklist **Attachment B:** EPA R9 UST Photographs and Photo Log

SECTION IV – LIST OF ATTACHMENTS

Attachment A:	JBPHH Facility – EPA R9 UST Inspection Checklist
Attachment B:	EPA R9 UST Photographs and Photo Log
Attachment C:	Documented fuel releases at Red Hill 1947-2014
Attachment D:	US Navy Webpage, "About Red Hill"
Attachment E:	Navy Command Investigation for the May 2021 Release Report
Attachment F:	Site Characterization Plan for November 2021 Release
Attachment G:	HDOH Notice of Violation and Order NOVO No. 21-UST-EA-01
Attachment H:	Navy Press Conference December 7, 2021
Attachment I:	HDOH Emergency Order, dated May 6, 2022
Attachment J:	JBPHH Notifications to HDOH to Return Repaired Tanks to In Service (partially redacted)
Attachment K:	Navy UST permit application for Red Hill Bulk Fuel Storage Facility (partially redacted)