



United States Environmental Protection Agency  
Office of Enforcement and Compliance Assurance  
Office of Criminal Enforcement, Forensics and Training

National Enforcement Investigations Center

NEICVP1463E02

**NEIC CIVIL INVESTIGATION REPORT**  
**Aliamanu Military Reservation Public Water System**  
Schofield Barracks, Hawaii 96857

**Investigation Date:**  
April 7, 2022

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## INVESTIGATION OVERVIEW

### PROJECT OBJECTIVE

U.S. Environmental Protection Agency (EPA) Region 9 (Region) requested EPA's National Enforcement Investigations Center (NEIC) to conduct a Safe Drinking Water Act (SDWA) compliance investigation of the Aliamanu Military Reservation public water system (AMR PWS), located at 745 Wright Avenue, Schofield Barracks, Hawaii 96857. The investigation assessed the AMR PWS's compliance with SDWA regulations found in 40 Code of Federal Regulations (CFR) Part 141.

Table 1 lists the project team members.

Table 1. PROJECT TEAM MEMBERS		
Team Member	Organization	Project Role
Hannah Branning	NEIC	Project manager
David Parker	NEIC	Field team member

### FACILITY CONTACT INFORMATION

Table 2 lists the primary facility contacts.

Table 2. FACILITY CONTACT INFORMATION		
Name, Title	Phone No.	Email Address
██████████, US Army Garrison Hawaii Directorate of Public Works (USAG-HI-DPW), Director	██████████	██████████
██████████, USAG-HI-DPW, Engineering Division Chief	██████████	██████████
██████████, USAG-HI-DPW, Environmental Division Chief	██████████	██████████
██████████, USAG-HI-DPW, Acting Utilities Chief	██████████	██████████
██████████, USAG-HI-DPW, Water Treatment Plant Supervisor	██████████	██████████
██████████, USAG-HI-DPW, Water Systems Engineer	██████████	██████████
██████████, USAG-HI-DPW, Water Plant Work Leader	██████████	██████████
██████████, USAG-HI-DPW, Safe Drinking Water Program Manager	██████████	██████████
██████████, USAG-HI-DPW, Safe Drinking Water Program Specialist	██████████	██████████

## BACKGROUND

The AMR PWS is a community water system (PWS identification No. HI0000337) located on a U.S. military housing base adjacent to Joint Base Pearl Harbor-Hickam serving approximately 6,406 people with 1,090 service connections. The system serves the residents of the Aliamanu and Red Hill housing areas located on AMR. USAG-HI-DPW owns and operates the AMR PWS. The Hawaii Department of Health (HDOH) administers the Public Water System Supervision Program in Hawaii and has been granted primary enforcement responsibility (i.e., primacy) under the Safe Drinking Water Act.

The AMR PWS consecutive system receives wholesale treated drinking water from the Joint Base Pearl Harbor-Hickam PWS (JBPHH PWS). The AMR PWS consists of a distribution system with three AMR-owned ground storage tanks.

According to EPA's Enforcement and Compliance History Online (ECHO), the AMR PWS has not experienced a regulatory violation since January 2019. Violation data prior to January 2019 is not available in ECHO.

According to NAVFAV Hawaii staff, on May 6, 2021, a valve opening operation was incorrectly executed during a fuel mixing operation between tank 18 and tank 20 in the Red Hill bulk fuel storage facility. A compression wave caused the end of the main fuel line to violently displace, which caused the lateral line for tank 20 to shear off, spilling an unknown amount of jet propellant-5 (JP-5) fuel. The spilled JP-5 fuel reached a sump pump for collecting aqueous firefighting foam (AFFF) and was pumped into the 14-inch overhead AFFF polyvinyl chloride (PVC) recovery pipe system.

According to the NAVFAC Hawaii "Initial Release Response Report," on November 20, 2021, a worker operating a trolley in the lower access tunnel ("Adit 3") of the Red Hill bulk fuel storage facility cracked a clean-out valve for the overhead AFFF recovery pipe approximately 400 feet east of the Adit 3 Red Hill pumping station, spilling an estimated 9,000 gallons of JP-5 fuel and water mixture. The JP-5 fuel mixture poured onto the concrete tunnel floor to the trolley tracks and traveled approximately 750 feet over the underlying water development tunnel to a low spot in the tunnel. The JP-5 fuel mixture accumulated in a groundwater sump that prevents flooding in the access tunnel. The JP-5 fuel mixture was then transferred via a sump pump to the groundwater sump drain holding tank and a connected sump drain leach tank located outside the Adit 3 tunnel. At some point, the JP-5 fuel mixture in the Adit 3 tunnel entered a nearby Hume drain, leaching the JP-5 fuel mixture into the underlying basalt bedrock, and entered the Red Hill water development tunnel.

On November 21, 2021, the Navy public affairs office issued a media release to the public and AMR regarding the JP-5 fuel spill, stating that "personnel responded to what was initially

assessed as a water leak shortly after 1700 (5:00 pm) on November 20, 2021. This pipe is not connected to the Red Hill Fuel tanks or main fuel pipelines, all of which are secure. Overnight, the release began to contain some amount of fuel which increased into Sunday (November 21, 2021) morning. Approximately 14,000 gallons of a mix of water and fuel was contained in the lower tunnel (Adit 3) and has been recovered and transferred to an above-ground storage tank as of midday Sunday. The Navy made initial notification to the Department of Health Saturday night (November 20, 2021) and is providing updates Sunday. There are no signs or indication of any releases to the environment and the drinking water remains safe to drink.”

According to the NAVFAC Hawaii “Initial Release Response Report,” on December 2, 2021, tubing connected to a photoionization detector (PID) was lowered into the Red Hill shaft, resulting in a maximum reading of 110 parts per million by volume (ppmv) of volatile organic compounds (VOCs). A bailer sample was also collected from the Red Hill shaft and a sheen with fuel bubbles floating on the surface was noticed, indicating fuel had reached the water development tunnel. The Navy public affairs office issued a media release to the public and AMR that petroleum products had been detected in the Red Hill well and the level of the petroleum hydrocarbons in the well were roughly 4 to 10 times below the HDOH action level.

On December 2, 2021, the Army authorized evacuation of personnel, dependents, and employees impacted by the water contamination in the AMR and Red Hill housing areas.

On December 11, 2021, AMR PWS staff stated that USAG-HI met with the U.S. Army Corps of Engineers (US-ACOE) to discuss additional water treatment options.

In late December of 2021, AMR PWS staff stated that USAG-HI and US-ACOE decide to move forward with installation of granulated activated carbon (GAC) filters on the entry points to the AMR PWS distribution system from the JBPHH PWS.

On February 28, 2022, HDOH approved the installation of the GAC filter system on the entry point from JBPHH PWS’s S-1 and S-2 tanks.

On March 16, 2022, the GAC filters were in placed into operation.

On March 28, 2022, HDOH approved the installation of the GAC filter system on the entry point from JBPHH PWS’s Red Hill tanks.

## **FACILITY OPERATIONS SUMMARY**

The AMR PWS is a consecutive system that receives wholesale treated drinking water from the JBPHH PWS. Under normal conditions, water for the Aliamanu and Red Hill housing areas is chlorinated and fluorinated at three JBPHH PWS sources (Waiawa shaft, Halawa shaft, and Red

Hill shaft) and then stored in two JBPHH PWS 6-million-gallon ground storage tanks (S-1 and S-2) and two JBPHH PWS 250,000-gallon Red Hill ground storage tanks. Treated water then passes through a master meter on the outlet pipe from the tanks and enters the AMR distribution system.

Currently, treated water from the JBPHH PWS's S-1 and S-2 tanks enters the AMR PWS point of entry and undergoes additional treatment through two-stage GAC filtration, with two treatment units operating in parallel. Once the water passes through the filters, it is disinfected with sodium hypochlorite before it is split between two storage tanks. The GAC filters on the entry point from the JBPHH PWS Red Hill tanks were not in service at the time of the inspection. AMR PWS is currently testing the filters, as the JBPHH PWS has concerns about water pressure in the event water is needed for the AFFF system at the Red Hill bulk fuel storage site.

### **FIELD ACTIVITIES SUMMARY**

NEIC conducted the on-site inspection on April 7, 2022. The NEIC inspection team consisted of Hannah Branning and David Parker. Maria Alberty and Emma Young from EPA Region 9 also participated in the inspection. Whit Somerall from HDOH was also present during the inspection. Photographs taken by NEIC during the inspection are found in **Appendix A**. NEIC conducted an inspection of the JBPHH PWS from April 4-8, 2022 (report NEICVP1463E01).

On April 7, 2022, NEIC inspectors conducted an opening meeting and presented credentials to [REDACTED], USAG-HI-DPW director. On April 7, 2022, NEIC inspectors conducted a closing meeting with USAG-HI-DPW and HDOH representatives. Lists of the meeting attendees are found in **Appendix B**.

NEIC assessed the AMR PWS's compliance with the SDWA. The assessment included detailed discussions about and field observations of the distribution system, finished water storage, pumps, pumping facilities and controls, monitoring, reporting, data verification, system management and operation, and operator compliance with state requirements. The assessment also included a review of records, including system maps and schematic diagrams, monitoring records, customer complaint logs, public notifications, engineering evaluations, and standard operating procedures.

## INVESTIGATION OBSERVATIONS

NEIC identified the following observations during the SDWA compliance inspection. NEIC field team members discussed all observations with facility representatives during the closeout meeting.

These observations are not final compliance determinations. EPA Region 9 will make the final compliance determinations based on its review of this report and other technical, regulatory, and facility information.

<b>Observation 1</b>
<b>Observation Summary:</b> NEIC inspectors observed the GAC treatment supports on the base of the S-1 tank, unlabeled pipes indicating direction and flow, unlabeled chemical injection points, and improperly stored chemicals.
<b>Citation:</b> <i>Title 11 Chapter 20 Hawaii Administrative Rules Section 38 (§11-20-38)</i> <i>Additives</i> <i>(d) The use of any chemical, material, or product in drinking water treatment or supply shall conform to the manufacturer's instructions or recommendations for use, maximum dosage, application rates, installation, restrictions, and any other conditions imposed by the product certification organization accredited by the American National Standards Institute or the director.</i>
<b>Evidence:</b> NEIC inspector observations AMR PWS staff interviews <b>Appendix A – NEIC Inspection Photographs</b>
<b>Description of Observation:</b> The AMR PWS installed GAC treatment in response to the November 20, 2021, JP-5 fuel spill and contamination of the Red Hill shaft ( <b>Appendix A – Photo P4070074.JPG</b> ). NEIC inspectors observed the support beams for the influent piping to the GAC filters sitting on the foundation for the JBPHH PWS S-1 tank ( <b>Appendix A – Photo P4060055.JPG</b> ). On May 2, 2022, HDOH notified NEIC inspectors that the supports had been removed from the tank foundation.  NEIC inspectors observed no labeling of pipes indicating contents, direction of flow, or chemical injection points ( <b>Appendix A – Photo P4070075.JPG and Photo P4070076.JPG</b> ). The contractor for the AMR PWS stated the new ductile iron piping would indicate flow direction and chemical injection points once installed.  NEIC inspectors observed two sodium hypochlorite tanks sitting in direct sunlight ( <b>Appendix A – Photo P4070077.JPG</b> ). During the NEIC inspection, the AMR PWS contractor stated that sun shields would be installed to protect the tanks from sunlight in the next 3 weeks.  NEIC inspectors observed a black trash bag taped to the influent and effluent booster pump connections in an attempt to maintain a sanitary seal ( <b>Appendix A – Photo P4070078.JPG</b> ).

## Observation 2

**Observation Summary:** NEIC inspectors observed multiple instances of tank integrity issues, erosion issues, vegetation growth, corrosion of pipes, and access issues that were noted on previous HDOH sanitary surveys.

### Citation:

*Title 11 Chapter 20 Hawaii Administrative Rules Section 29.5 (§11-20-29.5)*

*Capacity demonstration and evaluation*

*(b) A public water system with adequate technical capacity has at least the following items:*

*(4) An adequate infrastructure replacement plan which includes estimates of the useful life and plans for the eventual replacement of the public water system's infrastructure, including:*

*(A) Wells;*

*(B) Pumping facilities;*

*(C) Storage tanks;*

*(D) Treatment facilities; and*

*(E) Distribution system (pipes, valves, meters, etc.)*

### Evidence:

NEIC inspector observations

AMR PWS staff interviews

**Appendix A** – NEIC Inspection Photographs

**Appendix C** – 2016 HDOH Sanitary Survey Report

**Appendix D** – 2021 HDOH Sanitary Survey Report

### Description of Observation:

Central Tank (referred to as the “Middle Tank” in HDOH sanitary surveys)

NEIC inspectors observed exposed rebar from the tank walls (**Appendix A** – Photo P4070082.JPG). This observation was noted on the 2016 HDOH sanitary survey (**Appendix C**).

NEIC inspectors observed severe pitting in the concrete walls of the tank (**Appendix A** – Photo P4070083.JPG). This observation was noted on the 2016 HDOH sanitary survey (**Appendix C**).

NEIC inspectors observed vegetation with a root system growing in the wall seam (**Appendix A** – Photo P4070084.JPG).

NEIC inspectors observed the combined inlet and outlet pipe was severely corroded with rust and pitting and thick vegetation growing around the foundation of the tank (**Appendix A** – Photo P4070085.JPG). This observation was noted on the 2021 HDOH sanitary survey (**Appendix D**). On May 9, 2022, EPA Region 9 notified NEIC inspectors that the AMR PWS had applied a rust inhibitor to the central tank piping to slow down corrosion as an interim remedy on April 29, 2022.

NEIC inspectors observed erosion around the base of booster pump #1 and that booster pump piping to both pump #1 and #2 was rusted and pitting (**Appendix A** – Photo P4070086.JPG). This observation was noted on the 2021 HDOH sanitary survey (**Appendix D**). On May 9, 2022, EPA Region 9 notified NEIC inspectors that the AMR PWS had applied a rust



**Observation 2**

inhibitor to the central tank piping to slow down corrosion as an interim remedy on April 29, 2022.

NEIC inspectors observed that the access ladder hatch hinge was broken and could not be closed and that the ladder hatch had no lock (**Appendix A** – Photo P4070087.JPG). This observation was noted on the 2021 HDOH sanitary survey (**Appendix D**). On May 9, 2022, EPA Region 9 notified NEIC inspectors that the AMR PWS had repaired the access ladder hatch and secured it with a new lock on May 3, 2022.

NEIC inspectors observed that the tank overflow was full of debris and a hole in the screen had been previously repaired with silicone (**Appendix A** – Photo P4070088.JPG). This observation was noted on the 2021 HDOH sanitary survey (**Appendix D**).

North Tank

NEIC inspectors observed floating particles on the surface of the finished water in the tank (**Appendix A** – Photo P4070080.JPG). This observation was noted on the 2021 HDOH sanitary survey (**Appendix D**). On May 9, 2022, EPA Region 9 notified NEIC inspectors that the AMR PWS staff had removed floating particles from the north tank on April 29, 2022.

Erosion of the hillside behind the tank has resulted in partial coverage of the tank roof and walls with soil and grass. NEIC inspectors also observed vegetation growth around the base of the tank (**Appendix A** – Photo P4070081.JPG). AMR PWS staff stated a contractor was going to assess the tank roof and the hillside erosion issues.

NEIC inspectors observed exposed rebar on the roof of the tank. This observation was noted on the 2021 HDOH sanitary survey (**Appendix D**).

South Tank

NEIC inspectors observed exposed rebar on the roof of the tank (**Appendix A** – Photo P4070090.JPG). This observation was noted on the 2021 HDOH sanitary survey (**Appendix D**).

**Observation 3**

**Observation Summary:** The AMR PWS is unable to isolate ground storage tanks from service for cleaning or repairs due to a lack of redundancy in the system.

**Citation:**

*Title 11 Chapter 20 Hawaii Administrative Rules Section 29.5 (§11-20-29.5)*

*Capacity demonstration and evaluation*

*(b) A public water system with adequate technical capacity has at least the following items:*

*(2) Adequate water source(s), including:*

*(A) Sufficient water available to serve all customers or water users based on the public water system's average daily and peak water usage, and the system's treated water output;*

**Evidence:**

NEIC inspector observations

**Description of Observation:** The AMR PWS cannot isolate the north, central, and south tanks from service for cleaning or repairs due to a lack of redundancy in the system.

**Observation 4**

**Observation Summary:** NEIC inspectors observed severely corroded high-pressure pumps to the south tank.

**Citation:**

*Title 11 Chapter 20 Hawaii Administrative Rules Section 29.5 (§11-20-29.5)*

*Capacity demonstration and evaluation*

*(b) A public water system with adequate technical capacity has at least the following items:*

*(4) An adequate infrastructure replacement plan which includes estimates of the useful life and plans for the eventual replacement of the public water system's infrastructure, including:*

*(A) Wells;*

*(B) Pumping facilities;*

*(C) Storage tanks;*

*(D) Treatment facilities; and*

*(E) Distribution system (pipes, valves, meters, etc.)*

**Evidence:**

NEIC inspector observations

**Appendix A** – NEIC Inspection Photographs

**Appendix D** – 2021 HDOH Sanitary Survey Report

**Description of Observation:** NEIC inspectors observed that the high-pressure pumps that push treated, finished water to the south tank were severely corroded with rust and pitting. Evidence of previous oil leaks from the pumps was present (**Appendix A** – Photo P4070079.JPG). This finding was noted on the 2021 HDOH sanitary survey (**Appendix D**).

**Observation 5**

**Observation Summary:** The AMR PWS does not have an emergency interconnection or a valve exercise program.

**Citation:**

*Title 11 Chapter 20 Hawaii Administrative Rules Section 29.5 (§11-20-29.5)*

*Capacity demonstration and evaluation*

*(b) A public water system with adequate technical capacity has at least the following items:*

*(2) Adequate water source(s), including:*

*(A) Sufficient water available to serve all customers or water users based on the public water system's average daily and peak water usage, and the system's treated water output;*

*(B) Sufficient water resources for the future, based on the maximum flow or pumping capacity of each source and a five year or more projected growth rate study which shall be submitted;*

*(C) Adequate protection of water source(s) or watershed(s), based on the identification of existing and potential contamination hazards as required under the source water protection program and a description of how a protective area will be maintained around the source(s) or the watershed(s); and*

*(D) Contracts or agreements to obtain water when the water source(s) are not owned by the public water system, and contracts or agreements for supplementary water sources for systems affected by drought. The contracts*

<b>Observation 5</b>
<i>and agreements shall be identified, and copies shall be provided if requested by the director</i>
<b>Evidence:</b> NEIC field inspection notes AMR PWS staff interviews
<b>Description of Observation:</b> The AMR PWS does not have an emergency interconnection with another water system. All water is purchased from the JBPHH PWS, which is currently utilizing one source.

<b>Observation 6</b>
<b>Observation Summary:</b> The AMR PWS could not produce a distribution system valve exercise program.
<b>Citation:</b> <i>Title 11 Chapter 20 Hawaii Administrative Rules Section 29.5 (§11-20-29.5) Capacity demonstration and evaluation (b) A public water system with adequate technical capacity has at least the following items: (4) An adequate infrastructure replacement plan which includes estimates of the useful life and plans for the eventual replacement of the public water system's infrastructure, including: (A) Wells; (B) Pumping facilities; (C) Storage tanks; (D) Treatment facilities; and (E) Distribution system (pipes, valves, meters, etc.); (5) An adequate operation plan which shows that the public water system has: (C) Adequate preventive and corrective maintenance program to identify, schedule, perform, and record inspections, repairs, and replacements in a timely manner.</i>
<b>Evidence:</b> NEIC inspector observations AMR PWS staff interviews
<b>Description of Observation:</b> According to [REDACTED] USAG-HI-DPW acting utilities chief, the AMR PWS does not have a current distribution system valve exercise program. The last time [REDACTED] recalled exercising the distribution system valves was in 2008.

<b>Observation 7</b>
<b>Observation Summary:</b> The AMR PWS has only five certified water treatment plant operators and only three certified distribution operators to cover the Army's four PWSs.
<b>Citation:</b> <i>Title 11 Chapter 25 Hawaii Administrative Rules Section 2.50 (§11-25-2.50) Public water system operation and management (a) This chapter applies to all community and non-transient noncommunity public water systems. (1) Each public water system covered by this chapter shall be under the responsible charge of an operator(s) holding a valid certification equal to or greater than the classification of the water treatment plant (WTP) or distribution system (DS);</i>

**Observation 7**

- (2) All operating personnel making daily process control or system integrity decisions about water quality or quantity that affect public health shall be certified; and*  
*(3) A designated certified operator shall be available for each operating shift.*

*(b) This chapter applies to all WTPs in community and non-transient noncommunity public water systems and all WTPs serving surface water or ground water under the direct influence of surface water. All WTPs covered by this chapter shall be operated by certified WTP operators. Each WTP shall at all times be under the responsible charge of an operator holding a valid certification equal to or greater than the WTP classification.*

*(c) All fluoridation facilities shall be operated by certified operators who have received board-approved fluoridation training.*

*(d) Each DS shall at all times be under the responsible charge of an operator holding a valid certification equal to or greater than the DS classification.*

**Evidence:**

NEIC field inspection notes

AMR PWS staff interviews

**Appendix E – AMR PWS Certified Operators**

**Description of Observation:** According to AMR PWS records, only five certified water treatment plant operators and one supervisor cover the Army's four PWSs. If a certified water treatment plant operator is out for an extended period of time, the AMR PWS does not have an adequate number of operators to run the Army's four PWSs. At the time of the NEIC inspection, two certified water treatment plant operators were out.

According to AMR PWS records, only three certified distribution system operators and one supervisor cover the Army's four PWS distribution systems. The number of distribution system operators is not adequate to cover the Army's four PWS distribution systems.