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IN THE UNITED STATES DISTRICT COURT
DISTRICT OF HAWAI‘I

	ELECTRONICALLY FILED
BOARD OF WATER SUPPLY, CITY AND COUNTY OF HONOLULU, Plaintiff, vs. UNITED STATES OF AMERICA, Defendant.	CIVIL NO. _____ (Federal Tort Claims Act; Hawai‘i Environmental Response Law) **COMPLAINT; JURY DEMAND; SUMMONS**

COMPLAINT

Plaintiff BOARD OF WATER SUPPLY, CITY AND COUNTY OF HONOLULU (“BWS”), by and through its attorneys, and pursuant to the provisions of the Federal Tort Claims Act, Title 28, U.S.C. §§ 1346(b), 2671, *et seq*., files this complaint against Defendant UNITED STATES OF AMERICA for negligence, nuisance, and trespass resulting in damages where the government of the United States of America, if a private party, would be liable to the BWS. The

BWS also asserts a claim against the United States for violation of the Hawai‘i Environmental Response Law ("**HERL**"), Hawai‘i Revised Statutes chapter 128D.

This case involves tortious conduct by the United States of America, and more specifically, the United States Department of the Navy ("**Navy**"), in causing and/or allowing contaminant releases to enter O‘ahu's EPA-designated sole source aquifer, impacting the water resources upon which the BWS relies and the BWS water distribution system. The Navy has caused, allowed, and/or failed to contain releases into the environment of substantial but indeterminate quantities of jet propellant fuel, per- and polyfluoroalkyl substances ("**PFAS**"), and other contaminants (collectively, "**Contaminants**" or "**Released Contaminants**") that have entered the sole source aquifer ("**Contaminant Releases**") from which the BWS withdraws potable groundwater for public use and consumption. This complaint seeks to hold the United States and the Navy accountable for its Contaminant Releases of any nature that have impacted and/or threatened the BWS's water supply and caused the BWS both to shut down its impacted infrastructure and to incur fees, costs, and expenses to respond to the Navy's Contaminant Releases, both actual and threatened.

I. INTRODUCTION

KA WAI OLA – WATER FOR LIFE

1. Ka Wai Ola, Water for Life, is the BWS's guiding principle, its declaration of the importance of water, and a reflection of the BWS's commitment as steward of this precious resource to ensure a safe, dependable, and affordable water supply for present and future generations of the people of Hawai‘i.

2. Hawaiian Proverb ‘Ōlelo No‘eau #2802 captures the significance and importance of clean water to life in Hawai‘i: "Ua ka ua, ola ka nohona o ka ‘āina kula," which translates to "The rain pours, life comes to the plains." Simply put, clean water is essential for life and to the BWS's mission.

3. Consistent with that Proverb, Article XI, Section 9 of the Hawai‘i State Constitution enshrines these principles and guarantees the citizens of Hawai‘i the substantive "right to a clean and healthful environment," including clean and healthful groundwater.

4. The BWS is a municipal entity that maintains and operates a drinking water distribution system, including, among other assets, the Hālawa Shaft and certain ‘Aiea and Hālawa drinking water wells. The BWS's Hālawa Shaft (2354-01), ‘Aiea Wells 1 and 2 (2355-06 and 2355-07), and Hālawa Wells 1, 2 and 3 (2255-39, 2255-37, and 2255-38) are hereinafter referred to as the "**Impacted Water Sources**."

5. The BWS's Impacted Water Sources draw from the Southern Oʻahu Basal Aquifer (the "**Aquifer**"), an EPA-designated sole source aquifer that provides the majority of potable water for Oʻahu, Hawaiʻi. Because the BWS draws its water supply from an EPA-designated sole source aquifer, the BWS lacks reasonably available alternative drinking water sources.

6. The BWS's Impacted Water Sources are all located less than two miles from the Red Hill Bulk Fuel Storage Facility ("**Red Hill Facility**" or "**Facility**") operated by the Navy. The Facility is located in a highly complex and sensitive geologic environment directly above the Aquifer.

7. The Navy utilizes the same Aquifer as the BWS to supply potable water to Navy personnel and their family members working and living at Joint Base Pearl Harbor-Hickam ("**JBPHH**") through the Navy's Red Hill Shaft (2254-01), ʻAiea-Hālawa Shaft (2255-32), and Waiawa Shaft (2558-010).

8. The groundwater beneath and surrounding the Red Hill Facility is hydraulically connected to the BWS's groundwater supply, such that groundwater contamination by the Navy is likely to travel to and impact the BWS's Impacted Water Sources, contaminating the water supply from which the BWS draws and impairing its ability to provide clean, potable drinking water to its ratepayers, consumers, and users. Indeed, hydraulic studies completed by the United States Geological Survey in 2018, 2021, and 2022 demonstrate that pumping from the

Navy's Red Hill Shaft is hydraulically connected to the BWS's nearby Hālawa Shaft.

9. For decades, the Red Hill Facility has supported United States military operations in the Pacific by all branches of service. It was originally constructed in the early 1940s to provide fuel for United States armed forces during World War II and has been in continuous use until recently.

10. The Red Hill Facility consists of 20 enormous underground storage tanks ("**Tanks**" or "**USTs**"), each 250 feet tall and 100 feet in diameter and capable of storing 12.5 million gallons of fuel. The Tanks were built into cavities mined within a volcanic mountain ridge (Red Hill, or Kapūkakī as it is known among native Hawaiians) near Pearl Harbor to keep the facility hidden and safe from aerial attack. These Tanks were designed and constructed with the tank bottoms only approximately 100 feet above the Aquifer.

11. The size and scope of the Tanks are unprecedented. By way of example, a typical gas station holds around 25,000 gallons of fuel; the Red Hill Facility could store *10,000 times* that amount—250,000,000 gallons of fuel.

12. While the Navy historically assured the residents and visitors of Oʻahu that the Red Hill Facility did not pose any risks to drinking water supplies, the Navy's wrongful and tortious actions have caused, and continue to cause, contamination of the Aquifer, forcing the BWS to incur significant and substantial

expenses to respond to the Navy's actual and threatened Contaminant Releases from multiple components of the Red Hill Facility—including from the Tanks, connected underground piping, underground ancillary equipment, and containment system (collectively, the "**Tank System**" or "**UST System**").

13. On information and belief, the Tank System has been leaking for decades, with more recent releases exacerbating further this environmental crisis. The Navy has negligently failed to inspect, maintain, and operate the Tank System, causing and contributing to the Contaminant Releases.

14. At least 76 fuel release incidents have occurred at the Red Hill Facility dating back to the late 1940s, potentially involving in excess of one million gallons of fuel released into the environment. On information and belief, the actual quantity is substantially higher based on the Navy's failure to properly inspect and maintain the Tank System, investigate its releases, and accurately quantify Released Contaminants.

15. In January 2014, the Navy released into the environment approximately 27,000 gallons of fuel from one of the fuel tanks (Tank 5). In response, the Navy and the Defense Logistics Agency ("**DLA**") (an operator of the Facility with the Navy and the owner of the fuel stored at the Facility) entered into an Administrative Order on Consent ("**AOC**") in September 2015 with the Hawai'i Department of Health ("**DOH**") and the U.S. Environmental Protection Agency

("**EPA**") requiring the Navy to conduct certain investigations and other work to address the numerous fuel releases from the Facility. The AOC designates the BWS as a "Subject Matter Expert" concerning the Aquifer and the Navy's deliverables under the AOC, demonstrating the BWS's direct interest in and impact from the Navy's Contaminant Releases. The AOC has remained in effect until the present because of the Navy's inability to comply with the terms of the AOC.

16. In May 2019, the Navy submitted an application seeking a five-year permit to operate the Red Hill Facility, including its UST System, as required under Hawai'i law. The BWS, as well as the Sierra Club of Hawai'i, objected to the Navy's application as interested parties and requested a contested case hearing because, among other things, the Navy failed to demonstrate that its Tank System would not leak and negatively impact the Aquifer. In February 2021, a contested case hearing was held. However, because another substantial Contaminant Release occurred at the Red Hill Facility in May 2021, the proceeding remained open.

17. Despite the Navy's assurances to the contrary, the Navy continued to release Contaminants into the environment, including the following known events:

a. In May 2021, a release of approximately 20,000 gallons of jet fuel occurred in the Red Hill Facility lower access tunnel during refilling of one of the tanks.

b. In July 2021, a corrosion-induced hole in a pipeline led to a fuel release at the Red Hill Facility's Kilo Pier.

c. On November 20, 2021, as a result of the Navy's negligent conduct, the Navy's fire suppression system at the Red Hill Facility released approximately 19,000 gallons of jet fuel. Residents of JBPHH reported illnesses and other concerns about their drinking water, but the Navy steadfastly disputed any health risks and assured residents that the water was safe for drinking and other potable water uses.

d. On November 29, 2022, the Navy released into the environment approximately 1,300 gallons of fire suppression foam (Aqueous Film Forming Foam ("**AFFF**")) concentrate liquid at the Adit 6 near the top of a tunnel at the Red Hill Facility. The released foam concentrate liquid contained "forever chemicals" known as PFAS. As discussed below, this was not an isolated incident. On December 7, 2019, a spill of up to 1,500 gallons of AFFF was released from the Red Hill Facility into the environment, requiring the surrounding contaminated soil to be excavated. Then, on September 29, 2020, the fire suppression system in an underground pump house at the Red Hill Facility was activated due to "inadvertent triggering" of the fire suppression system. As a result, approximately 5,000 gallons of AFFF concentrate liquid was released. On October 26, 2021, a water pipeline ruptured releasing 300,000 gallons of water at the Red Hill Fuel Oil Recovery Facility. Navy officials believe that AFFF could have been absorbed in the soil from the December 7, 2019 AFFF incident and mixed with the water from the 300,000-gallon release on October 26, 2021.

18. The Navy was spectacularly wrong about its November 20, 2021 release, including how it characterized and reported the cause and extent of the contamination. Indeed, the November 20, 2021 release caused the Navy to cease operation of both its Red Hill Shaft drinking water source (the primary source from which it supplied JBPHH drinking water) and its ʻAiea-Hālawa Shaft drinking water source. Both the Navy's Red Hill and ʻAiea-Hālawa Shafts ("**Navy**

Impacted Water Sources") have not supplied water to their water systems serving JBPHH since the contamination crisis in November 2021. ʻAiea-Hālawa Shaft has remained shut off since then. Red Hill Shaft is pumping to discharge into the Hālawa Stream after granular activated carbon (GAC) filtration in an attempt to capture petroleum contamination in the Aquifer. JBPHH's water system is supplied by its only remaining drinking water source—the Waiawa Shaft.

19. For at least a decade, the Navy has admitted its responsibility for groundwater contamination in the area of the Red Hill Facility. As the Navy stated in an internal 2010 Audit Service assessment: (a) "Groundwater contamination exists around the underground storage tanks (USTs) at [the Red Hill Facility] because of irregular maintenance and insufficient inspection over the life of the fuel tanks"; and (b) "[T]he Navy cannot detect slow, chronic fuel releases from the [Red Hill Facility] tanks because current methods are not effective for that purpose." (Aug. 16, 2010 Naval Audit Service, Audit Report at 9). The Navy and the regulators recognized that the Red Hill Facility posed a risk to the Navy's Red Hill Shaft, requiring the development of a groundwater protection plan in or around 2007. Indeed, nearly all rock cores taken below each of the 20 Tanks in the 1990s showed evidence of fuel contamination, indicating clear evidence of leaks from the Red Hill Facility.

20. The Navy admitted its responsibility for the devastating May and November 2021 releases, stating in a 2022 Command Investigation Report that, among other things:

a. "On 6 May 2021, Red Hill operators improperly executed a fuel transfer procedure, resulting in two piping joint ruptures and a subsequent JP-5 fuel spill. Although unknown at the time, a fire suppression system sump pump transferred most of the fuel into a retention line, where it remained until 20 November 2021."

b. "On 20 November 2021, as established in the Cavanaugh Report, a Red Hill watch stander inadvertently struck a low point drain valve in the AFFF retention line with the passenger cart of a train, cracking the PVC pipe and spilling up to 19,377 gallons of fuel deposited there on 6 May. Up to 5,542 gallons of fuel remain unrecovered, with some portion of that fuel contaminating the Red Hill well and the Navy drinking water distribution system."

c. "The contamination of drinking water from the Red Hill Shaft was the result of the Navy's ineffective immediate responses to the 6 May and 20 November 2021 fuel releases at the Red Hill [Facility], and failure to resolve with urgency deficiencies in system design and construction, system knowledge, and incident response training. These deficiencies endured due to seams in accountability and a failure to learn from prior incidents that falls unacceptably short of Navy standards for leadership, ownership, and the safeguarding of our communities."

21. The Navy is working to reactivate the Navy Impacted Water Sources to provide potable water to the JBPHH water systems, but only after it installs a temporary water treatment system designed to filter Released Contaminants, including TPH (total petroleum hydrocarbons), PAH (polycyclic aromatic hydrocarbons), and PFAS (per- and polyfluoroalkyl substances). Upon

information and belief, the estimated cost to construct and install the temporary water treatment system for the Navy's Red Hill Shaft alone will exceed $500 million, with an estimated annual cost of $15 million to maintain and operate this temporary system.

22. Given the Navy's numerous releases, the need to discontinue use of its Navy Impacted Water Sources, the consistently inaccurate and unreliable information disseminated by the Navy about its Contaminant Releases, that the BWS shares the Aquifer with the Navy, and the close proximity and hydraulic connectivity between the BWS Impacted Water Sources and the Navy Impacted Water Sources, the BWS was compelled to shut down in response to the November 2021 releases its own Hālawa Shaft (closest to the Red Hill Facility) as well as certain ʻAiea and Hālawa drinking water wells to protect its water supply and prevent, limit, and mitigate the Navy's Contaminants entering its water supply. The BWS has incurred significant damages to date and expects to incur significant additional costs in the future as a direct, natural, and foreseeable result of the Navy's actions.

23. In response to the Navy's releases, the DOH issued two emergency orders requiring the defueling and permanent closure of the Red Hill Facility. On June 2, 2023, the Navy, the DLA, and the EPA executed an administrative consent order requiring the defueling and closure of the Facility.

24. While these actions address the future of the Red Hill Facility and the Navy's drinking water system, they fail to adequately address the Released Contaminants remaining in the environment. Nor do they make the BWS whole for the necessary shutdown of its Impacted Water Sources or ensure that the BWS will have access to safe and dependable drinking water in the future for the benefit of its customers and other users.

25. Moreover, the Navy has continuously failed to comply with the 2015 AOC. In particular, despite the passage of almost 10 years, the Navy has failed to, among other things, properly create the required groundwater flow and contaminant fate and transport models necessary to perform remediation and inform the public—including the BWS—of the health risks to their drinking water from the Navy's Contaminant Releases. Instead, the Navy has generated objectively flawed and ineffective models criticized by the EPA, the DOH, and the BWS, while unnecessarily redacting and withholding from the public (including the BWS) basic data concerning its Contaminant Releases, the hydrogeology in the area of the Facility, and the fate and transport of the Contaminants that the Navy has repeatedly released to the environment.

26. While the Navy has publicly stated that it is taking accountability for its failings at the Red Hill Facility, it has refused to accept its liability to the BWS or compensate the BWS for the significant damages the Navy caused the BWS to

incur, and continue to incur, as a result of the Navy's wrongful and tortious conduct.

II. JURISDICTION AND VENUE

27. This Court has subject matter jurisdiction pursuant to 28 U.S.C. § 1331, as the BWS's claims arise under the laws of the United States. This Court also has jurisdiction to grant relief in this action pursuant to 28 U.S.C. § 1346(b)(1), as the BWS brings claims under the Federal Tort Claims Act ("**FTCA**").

28. The Court has supplemental jurisdiction over the BWS's HERL claim pursuant to 28 U.S.C. § 1367, as it is related to claims in the action within the Court's original jurisdiction and forms part of the same case or controversy.

29. Venue is proper in the District of Hawai'i pursuant to 28 U.S.C. § 1402(b) because the United States is a defendant, and this is the judicial district where a substantial part of the events or omissions giving rise to the claim occurred, and a substantial part of the property that is the subject of the action is situated.

30. Under the FTCA, the United States is liable for injury caused by the tortious and wrongful acts and omissions of its employees while acting within the course and scope of their office or employment, under the circumstances where the United States, if a private person, would be liable to the BWS. The United States

is liable for the actions and inactions of the Navy and DLA at issue in this litigation.

31. The United States may be served with process in accordance with Rule 4(i) of the Federal Rules of Civil Procedure. Service is effected by serving a copy of the Summons and Complaint on the United States Attorney for the District of Hawai‘i by certified mail, return receipt requested at their office:

United States Attorney's Office
ATTN: Civil Process Clerk
300 Ala Moana Blvd., # 6-100
Honolulu, HI 96850

32. Service is also effected by serving a copy of the Summons and Complaint on Pamela Bondi, Attorney General of the United States by certified mail, return receipt requested at:

The United States Attorney General's Office
ATTN: Civil Process Clerk
950 Pennsylvania Avenue, NW
Washington, DC 20530-0001

III. THE PARTIES

33. Plaintiff BWS was created by Act 96 of the 1929 Legislature and is a financially self-sufficient, semi-autonomous agency of the City and County of Honolulu. The BWS manages O‘ahu's municipal drinking water systems, depends on groundwater resources in aquifers, and provides residents with safe and dependable water service at a reasonable cost.

34. Defendant is the United States of America. The United States Department of Defense ("**DOD**") is an executive branch department of the United States government. The United States Department of the Navy is a branch of the DOD. The Defense Logistics Agency is a combat logistics support agency of the DOD. The Defense Logistics Agency and its respective employees, agents, and persons under their direction or supervision are referenced collectively herein as "**DLA**." The United States Department of the Navy and its respective employees, agents, and persons under their direction or supervision are referenced collectively herein as "**Navy**." Those entities are collectively referenced as "**the United States**."

IV. FACTS

A. Board of Water Supply, City and County of Honolulu

35. The BWS is the largest municipal drinking water utility in the State of Hawai‘i and is responsible for managing O‘ahu's municipal water sources and distribution system.

36. The BWS distributes an average of approximately 145 million gallons of potable water each day to roughly one million customers on O‘ahu. To ensure that the water it distributes is safe and potable, the BWS carefully and proactively manages and tests its water resources and associated system of approximately 2,100 miles of pipeline that service nearly every community on O‘ahu.

37. The BWS has a Public Trust responsibility to protect the water resources that it manages. Public Trust is the principle enshrined in the Hawai‘i Constitution and state law recognizing that water is held in trust by the State of Hawai‘i for present and future generations. “For the benefit of present and future generations, the State and its political subdivisions shall conserve and protect Hawai‘i’s natural beauty and all natural resources, including land, water, air, minerals, and energy sources, and shall promote the development and utilization of these resources in a manner consistent with their conservation and in furtherance of the self-sufficiency of the State. All public natural resources are held in trust by the State for the benefit of the people.” Haw. Const. art. XI, § 1.

38. The Revised Charter of the City and County of Honolulu, Article VII, Sections 7-103 and 7-117, empowers and obligates the BWS to manage, control, and operate its water systems and infrastructure and to take appropriate legal actions to protect the State’s drinking water resources and the interests of the BWS and its constituents.

39. State policy for water resources in Hawai‘i is likewise directed toward achieving the highest water quality consistent with maximum benefit to the people of the State and “shall be liberally interpreted to obtain maximum beneficial use of the waters of the State ….” Haw. Rev. Stat. (“**H.R.S.**”) § 174C-2(c). Pertinent here, drinking water is the highest beneficial use of groundwater.

40. The State of Hawai‘i Environmental Policy states that it is the policy of the state to "[c]onserve the natural resources, so that land, water, mineral, visual, air and other natural resources are protected by controlling pollution, by preserving or augmenting natural resources, and by safeguarding the State's unique natural environmental characteristics in a manner which will foster and promote the general welfare, create and maintain conditions under which humanity and nature can exist in productive harmony, and fulfill the social, economic, and other requirements of the people of Hawai‘i." H.R.S. § 344-3.

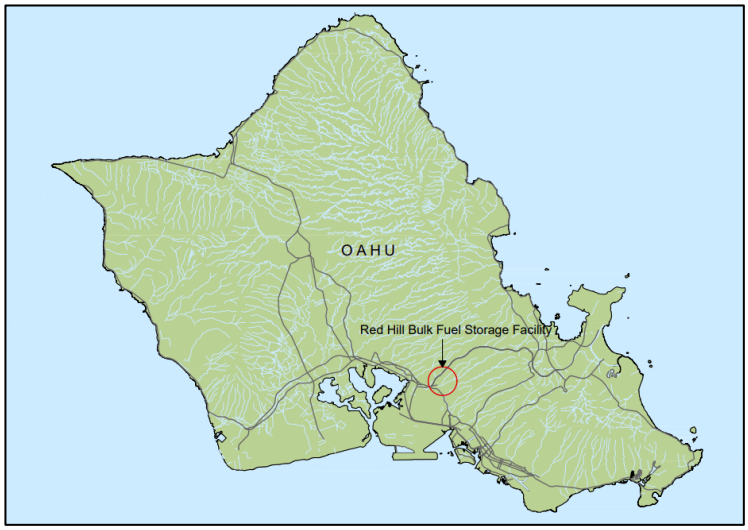
41. H.R.S. § 344-4(2)(A) and (D) further identify state environmental policy, stating that it is state policy to "[e]ncourage management practices which conserve and fully utilize all natural resources" and "[e]ncourage management practices which conserve and protect watersheds and water sources, forest, and open space areas."

42. The BWS thus has constitutional and statutory duties to protect all of its water sources, including the Impacted Water Sources, from the Navy's Released Contaminants and to refrain from distributing water impacted by those Contaminants. These duties require the BWS, in response to the Navy's Contaminant Releases and threatened releases, to thoroughly investigate its water resources and to shut down its Impacted Water Sources, if necessary or

appropriate, to conserve, protect, and safeguard groundwater in the Aquifer for the benefit of the public and the environment.

B. History and Description of the Red Hill Bulk Fuel Storage Facility

43. The Red Hill Facility is located on the island of O‘ahu approximately 2.5 miles northeast of Pearl Harbor.



(Red Hill Bulk Fuel Storage Facility Final Technical Report, Aug. 2007, at Figure 1-1).

44. The Red Hill Facility occupies approximately 144 acres of land along the western edge of the Ko‘olau Mountain Range situated on a topographic ridge that divides the Hālawa Valley and the Moanalua Valley.

45. The Red Hill Facility consists of twenty field-constructed underground storage tanks. Each UST is approximately 250 feet tall, 100 feet in diameter, and provides a fuel storage capacity of up to 12.5 to 12.7 million gallons of jet or marine fuel.

46. The Red Hill Facility includes seven miles of tunnels with twenty-nine miles of pipelines, ventilation systems with air intakes and exhaust portals, a pumphouse, control room, surge tanks, slop oil and oil recovery facility, and a pier that can fuel ships. It also includes the Navy's Red Hill Shaft, which serves as a drinking water source for the JBPHH.

47. The "Red Hill Facility," as used herein, broadly refers to the entire facility, including the 20 underground storage tanks, tunnels, above and underground pipelines and associated valves, underground drain systems, ventilation systems, pumphouse, control room, surge tanks and associated piping, holding tanks, leach tank system, slop oil and oil recovery facility, Oily Waste Disposal Facility (EPA Facility ID# HI4170090076), and the Red Hill Shaft. The term includes any component of the Facility where Contaminants were released.

48. The Navy generally stored fuel in 14 or 15 of the USTs, with a total capacity of over 187 million gallons of fuel. Prior to the December 2021 Emergency Order requiring the Navy to cease all operations at the Red Hill Facility and defuel the operational USTs, two of the USTs (Tanks 1 and 19) were empty and no longer in active use. Another four USTs were empty as part of the Navy's clean, inspect, and repair program.

49. The Navy stored Jet Propulsion Fuel No. 5 (JP-5), Jet Propulsion Fuel No. 8 (JP-8), and marine diesel (F-76) at the Red Hill Facility. Historic fuel

storage has included diesel oil, Navy Special Fuel Oil, Navy distillate (ND), F-76, aviation gas, motor gas, JP-5, and JP-8.

50. Marine diesel and jet fuels in general, "and Jet Propulsion Fuels 5 and 8 (JP-5 and JP-8) in particular, are composed of a broad, dynamic and heterogenous mixture of chemical constituents. Chronic exposure to these constituents can be harmful to human health. The rates at which these constituents naturally degrade in the environment are highly variable." (2015 AOC at 6). Further, upon information and belief, JP-5 stored at the Red Hill Facility also contained various additives, including de-icing agents.

51. The Navy stored at the Facility approximately 27 percent of all the Navy fuel in the Pacific, 16 percent of all the Navy fuel worldwide, and 5 percent of all DOD fuel. It provided fuel to support the Navy, U.S. Air Force, U.S. Marine Corps, U.S. Army, Hawai‘i Army National Guard, and U.S. Coast Guard.

52. The USTs are connected to three pipelines that run for approximately 2.5 miles through an underground access tunnel to the underground pumphouse at JBPHH. A pumping station within the underground pumphouse controls tank filling and dispenses fuel to ships and Hickam Airfield. Fuel is also unloaded at fueling piers at Pearl Harbor and pumped inland and uphill to the USTs, and, when needed, the fuel stored in the USTs could be moved from the Red Hill Facility to Pearl Harbor via gravity.

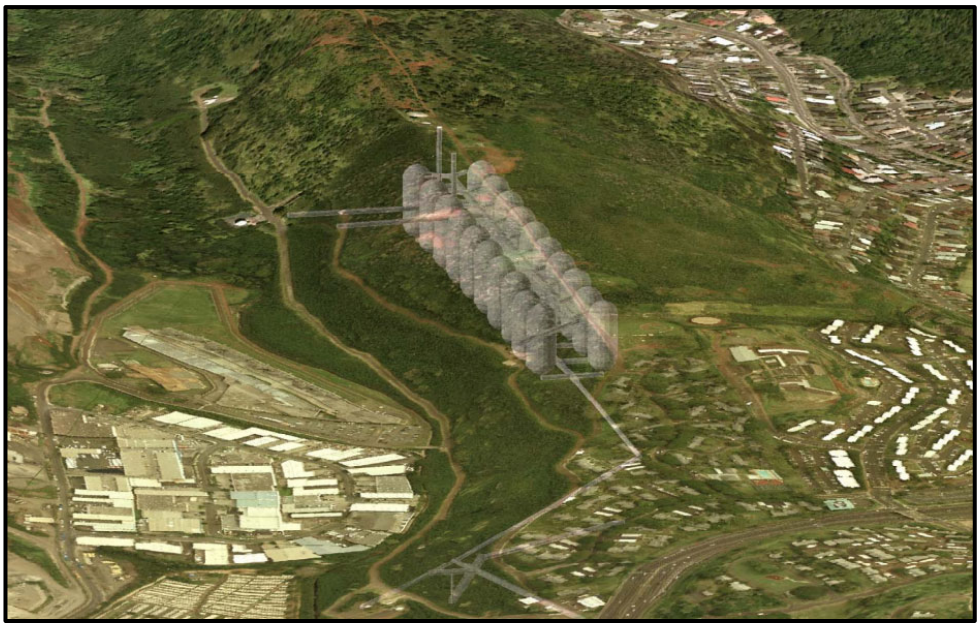
53. The Red Hill Facility, including the upper and lower underground access tunnels where the USTs can be accessed, utilizes a fire suppression system containing AFFF to extinguish fires, especially those involving flammable liquids such as fuel. AFFF contains PFAS. Upon information and belief, AFFF has been stored at the Red Hill Facility since the 1960s. Currently, there is an active and ongoing CERCLA (Comprehensive Environmental Response, Compensation, and Liability Act) investigation at the Red Hill Facility, which is being overseen by the EPA and the DOH relating (at a minimum) to PFAS.

54. In March 2022, the DOD announced the closure of the Red Hill Facility. Since that time, the Navy has removed the vast majority of the fuel from the USTs. The USTs therefore are no longer a component of a facility that is used for national security purposes.

C. Construction, Maintenance, and Condition of the USTs

55. Construction of the Red Hill Facility began in secret in December 1940, and its existence remained hidden until it was declassified in 1995.

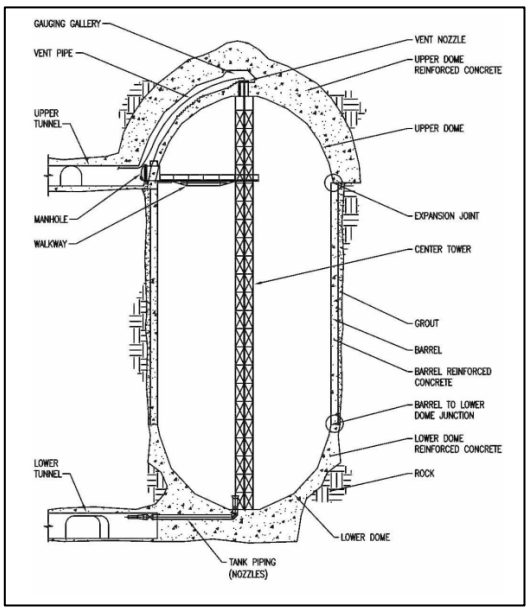
56. The USTs were constructed in parallel series of two rows sloping south by southwest towards Pearl Harbor.



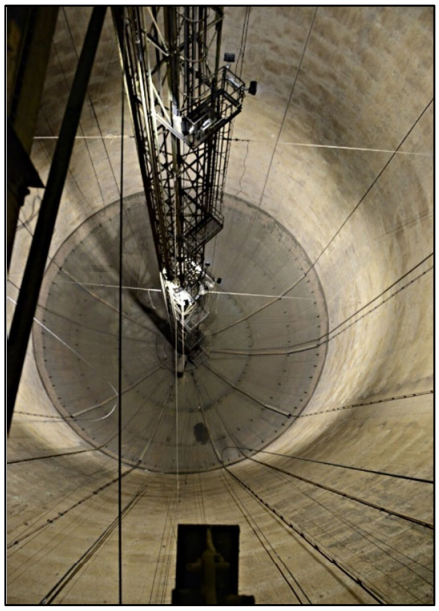
(Red Hill Facility USTs and surrounding infrastructure, Red Hill Bulk Fuel Storage Facility Final Technical Report, Aug. 2007, at Figure 1-3).

57. The Tanks were constructed by mining into the mountain ridge to create cavities for concrete tanks lined with ¼-inch and ½-inch steel plates welded together. The exterior of the steel plate liners, as well as their concrete shells, could not be accessed or inspected for corrosion, and were not adequately repaired, maintained, or upgraded since the original construction nearly 80 years ago. In December 2021, a DOH Hearing Officer found that the "combination of the manual nature of the inspections, the dependence on the ability/competence of individual inspectors, the presence of an internal coating on the steel liner, the difficult working conditions, and the sheer size of the facility" were "detrimental to adequate, consistent, and reliable inspections and inspections results, which are required to prevent releases from the [tanks]." (DOH Hearing Officer's Proposed

Decision and Order, Findings of Fact, and Conclusions of Law (Dec. 27, 2021) 14 (¶ 64(f)), affirmed by DOH, Final Decision, Order, Findings of Fact, and Conclusions of Law (Jan. 3, 2022) ("**12/27/2021 Decision**")).



*Graphic of Red Hill UST, Red Hill Tank Closure Plan Analysis of Alternatives & Concept Design to Close in Place, Dec. 20, 2022, Fig. 1.



*Inside view of Red Hill UST, https://www.Hawaiipublicradio.org/local-news/2022-05-31/red-hill-fuel-tanks-need-repairs-before-draining-navy-military

58. In order to uphold Hawai'i constitutional requirements of public trust and a "clean and healthful environment," all Hawai'i operators, including the Navy, are subject to Hawai'i state law, statutes, and regulations related to environmental policy.

59. As the owner and operator of the Red Hill UST System, the Navy had a continuing obligation to comply with various regulatory requirements, including but not limited to, the following:

a. "(b) Underground storage tank and tank system standards shall include, but are not limited to the following specifications: (1) The tank and tank system shall be designed, constructed, installed, upgraded, *maintained, repaired, and operated to prevent releases of the stored regulated substances* for the operational life of the tank or tank system…" H.R.S. § 342L-32 (emphasis added).

b. "The department, pursuant to chapter 91, shall adopt standards of performance for maintaining a release detection system, including, but not limited to, inventory control, tightness testing, and any other methods designed to identify releases from the underground storage tank or tank system in a manner consistent with the protection of human health and the environment." H.R.S. § 342L-33.

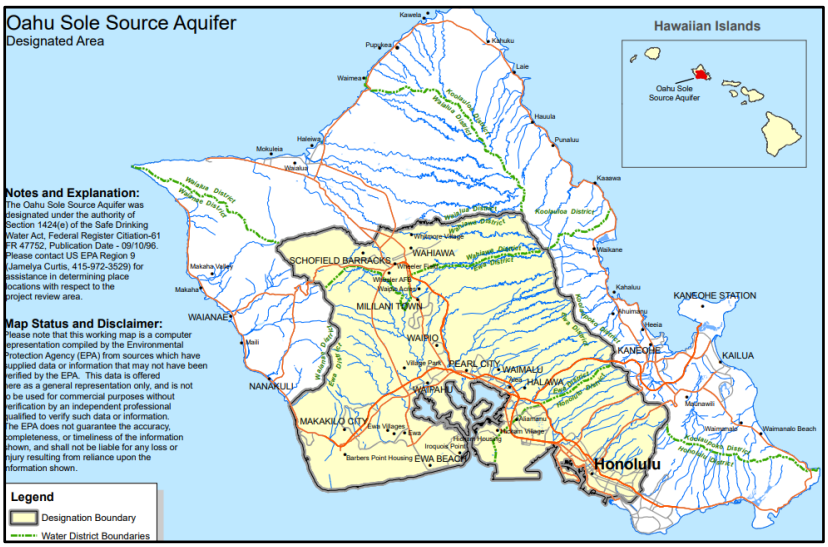
Consequently, the Navy has at all relevant times been required to maintain and operate its tanks and tank systems "to prevent releases of the stored regulated substances for the operational life of the tank or tank system" and to "maintain[] a release detection system, including, but not limited to, inventory control, tightness testing, and any other methods designed to identify releases from the underground storage tank or tank system in a manner consistent with the protection of human health and the environment." H.R.S. §§ 342L-32 & 33.

60. Despite these requirements, an internal Navy audit found that groundwater contamination around the Tanks exists due to "irregular maintenance" and "insufficient inspection" over the life of the Tanks, and that the Navy cannot detect and mitigate the fuel releases in a timely manner. (Aug. 16, 2010 Naval Audit Service, Audit Report).

61. All or substantially all of the 20 USTs have released Contaminants as evidenced by the Navy's own soil vapor monitoring, diagonal borings under the USTs, identification of staining beneath 19 USTs, groundwater monitoring well data, investigations, and internal documents. Further, rock, vapor, and groundwater samples have shown that fuel has migrated from the Facility through the environment and into the Aquifer. And as discussed more fully below, there have been numerous fuel releases from the USTs dating back to the 1940s, resulting in migration of Contaminants to the Aquifer.

D. O'ahu's Irreplaceable Sole Source Aquifer

62. According to the EPA, the Southern O'ahu Basal Aquifer (also known as the O'ahu Sole Source Aquifer and depicted in yellow in the image below) is the "principal source of drinking water" for the island, which "[i]f contaminated, would create a significant hazard to public health." 52 Fed. Reg. at 45497.



63. The Aquifer includes the basal aquifer beneath the Red Hill Facility and was designated a Sole Source Aquifer in 1987 under Section 1424(e) of the Safe Drinking Water Act (52 Fed. Reg. 45496). The Aquifer is characterized as unconfined, flank-type and has at all relevant times been used as a drinking water source. The Aquifer contains fresh water, with less than 250 milligrams per liter of chloride.

64. The Aquifer has a high vulnerability to contamination.

65. The "sole source" designation signifies that there are no alternative drinking water source(s) that could physically, legally, and economically supply all those who depend on the aquifer for fresh water.

66. The Aquifer is an irreplaceable source of fresh water.

67. The bottoms of the USTs are located only approximately 100 feet above the Aquifer.

E. Hydrogeology In and Around the Red Hill Facility

68. The hydrogeologic environment that underlies the Red Hill Facility is highly complex, sensitive, and uncertain.

69. The subsurface environment includes various geological formations that are intermixed and form complex pathways for fluids and vapors, including the Released Contaminants, to move through the subsurface and ultimately reach the Aquifer below the Red Hill Facility. For instance, the geologic rock formation

underlying the Red Hill Facility is comprised of a series of fractured rock layers formed from basaltic lava flows. The basaltic section consists of interbedded ʻaʻā and pāhoehoe lava flows. These lava flows vary in thickness, orientation, and porosity. Because of the layered nature of the lavas, fluid flow generally prefers to follow the layers rather than moving vertically through the layers. Vertical ground water flow is typically achieved through secondary porosity features (rock fractures) and within dipping distinct clinker zones of varying thicknesses that can be interbedded and connected vertically down dip.

70. The BWS has analyzed the publicly available information on hydrogeology, groundwater flow, and contaminant fate and transport at and from the Red Hill Facility, the environment in the vicinity of the Facility, the Aquifer, and past and potential future fuel releases from the UST System. The BWS has reached the following determinations, each of which was communicated to the Navy:

a. "The complex subsurface, characterized by a complicated network of high-speed pathways that can distribute the contaminants, does not prevent the fuel constituents from reaching the Sole Source Aquifer."

b. "These lavas, clinker zones, and lava tubes are found intermixed, forming complex pathways for fluids to move through the subsurface."

c. "Fractured, volcanic rocks have unique characteristics in that water and contaminants (liquid and vapor) travel in discrete

> pathways that may be highly spatially variable, fragmented, and discontinuous, and directionally dependent."
>
> d. "The fact that the released fuel is present in the environment and can reach the Sole Source Aquifer is apparent from an examination of rock cores removed from under the Tank Farm, evaluation of vapor sampling results, and analysis of groundwater trend data."

(Evaluation of Hydrology, Groundwater Flow and Contaminant Fate and Transport, Red Hill Bulk Fuel Storage Facility, Golder Associates Inc., Dec. 29, 2020, at ii, 7, 9, 21).

72. The groundwater beneath and in the area of the Red Hill Facility is hydraulically connected to groundwater the BWS accesses through its Impacted Water Sources.

73. Synoptic studies performed by the United States Geological Survey in 2018, 2021, and 2022 have shown a hydraulic connection (indicating movement of groundwater and contaminants) between the Navy's Red Hill Shaft and the BWS's Hālawa Shaft during interval pumping.

74. Further, in July 2019, the DOH analyzed groundwater flow paths in the Moanalua, Red Hill Facility, and Hālawa regions and determined that groundwater flows northwest from the Red Hill Facility toward and into the BWS's Hālawa Shaft.

> The groundwater elevation contours beneath the Red Hill Ridge and beneath the Hālawa-ʻAiea area indicate that at least where the penetration of the saprolite into aquifer is either shallow or non-existent, **the relative**

> **groundwater elevations indicate groundwater flow to the northwest. More specifically, the groundwater contouring strongly suggests that the flow direction beneath the upper part of the facility is to the northwest**. This observation is in direct contrast to the Navy's expectation that the water flows along the shortest mauka to makai path from the high elevation recharge areas to the coast.

(DOH, Hawai'i Department of Health Evaluation of Groundwater Flow Paths in the Moanalua, Red Hill and Hālawa Regions, Rev. 2, July 2019) (emphasis added). The BWS's Impacted Water Sources are northwest of the Facility.

F. The Navy's and the BWS's Drinking Water Sources

75. The Navy's JBPHH water distribution system, which supplies water to over 93,000 military service members and families housed at JBPHH, draws water from the Aquifer.

76. The JBPHH water distribution system originally relied on three sources: Red Hill Shaft, 'Aiea-Hālawa Shaft, and Waiawa Shaft.

77. The Navy's Red Hill Shaft is located approximately 3,400 feet southwest and hydraulically downgradient from the Red Hill Facility mid-point. Prior to the Navy shutting it down, the Red Hill Shaft was the primary source of potable water that fed into the JBPHH water distribution system. It was constructed as a tunnel near the water table and is designed to collect freshwater from near the surface of the Aquifer.

78. Prior to being shut down, the Navy's 'Aiea-Hālawa Shaft served as an alternate water source for the JBPHH system. It is located 2.04 miles (10,778 feet) northwest and hydraulically downgradient from the Red Hill Facility mid-point.

79. The Navy's Waiawa Shaft is located 5.68 miles (29,990 feet) northwest from the Red Hill Facility mid-point. At this time, the Waiawa Shaft is the only active drinking water source for JBPHH, supplying all drinking water to the base since December 2021.

80. While the Navy and the BWS have separate distribution systems, they obtain their water from the same Aquifer. The BWS has five (5) drinking water sources in close proximity to the Red Hill Facility: (1) Hālawa Shaft; (2) Hālawa Wells; (3) 'Aiea Gulch Wells; (4) 'Aiea Wells; and (5) Moanalua Wells. (See below for map showing the BWS's water sources in close proximity to the Red Hill Facility, outlined in black)

81. The BWS's Hālawa Shaft was the largest single water source on Oʻahu, supplying approximately 20% of the water to Metropolitan Honolulu—Moanalua Valley to Hawaiʻi Kai, including Waikīkī. On average, 10 to 12 million gallons per day were pumped into a water system serving about 450,000 people (residents and visitors). As stated herein, the Navy's tortious conduct and Contaminant Releases forced the BWS to shut down the Hālawa Shaft.

82. The BWS's Hālawa Shaft is located 0.94 miles (4,966 feet) northwest and hydraulically downgradient from the Red Hill Facility mid-point. It is also only 1.45 miles (7,670 feet) away from the Navy's ʻAiea-Hālawa Shaft water well.

83. The BWS's Hālawa Wells are located 1.64 miles (8,680 feet) miles northwest and hydraulically downgradient from the Red Hill Facility mid-point.

84. The BWS's ʻAiea Gulch Wells are located 1.61 miles (8,493 feet) northwest and hydraulically downgradient from the Red Hill Facility mid-point.

85. The BWS's ʻAiea Wells are located 1.98 miles (10,500 feet) northwest and hydraulically downgradient from the Red Hill Facility mid-point.

86. The BWS's Moanalua Wells are located 1.32 miles (7,000 feet) southwest and hydraulically downgradient of the Red Hill Facility mid-point.

G. Contaminant Releases from the Red Hill Facility to the Environment

87. There have been numerous episodic releases from the Red Hill Facility over the past 80 years.

88. Fuel releases have been a constant threat since the Red Hill Facility became operational in the 1940s and have continued to occur at least as recently as November 2021.

89. There have been at least 76 fuel release incidents at the Red Hill Facility potentially involving in excess of one million gallons of fuel.

90. According to the DOH, it is "[m]ore likely than not" that the Navy has "understate[d] the true number of releases [and] total volume of fuel actually released" from the Red Hill Facility.

91. According to news reports, during a March 2014 joint legislative committee hearing at the State Capitol, Hawai‘i's then-Deputy Health Director Gary Gill stated that, "[i]n 1998, in a study presented to the Department of Health, (the Navy) estimated that cumulatively up until that point, as much as 1.2 million gallons of fuel from this facility may have leaked."

92. In November 2023, the Red Hill Water Alliance Initiative, a coalition of State of Hawai‘i and City and County of Honolulu officials, reported that the volume of fuel released from the Red Hill Facility over its 80-year lifespan was significantly higher—roughly 1.94 million gallons.

93. Upon information and belief, the Navy also acknowledged in a release issued in summer 2024 that approximately "1.94 million gallons may have leaked from the facility during its history."

94. Examples of releases between 1943 and 1998 from the UST System for which the Navy has records (or partial records) include the following:

a. In October of 1947, the Navy reports a "Tell-tale leak noted, unknown amount" at Tank 2, after which the UST was emptied;

b. In July 1948, the Navy reported a leak at Tank 16, however, "no details" were provided (in May 1949, the Bechtel Corporation issued a report indicating that 1,100 barrels (or approximately 35,000 gallons) leaked from Tank 16 during this same time period);

c. In July of 1949, Tank 16 released approximately 11,000 gallons over eleven (11) days, but the Navy has "no additional information";

d. In December of 1949, Tank 16 released approximately 18,000 gallons over four (4) days, but the Navy had "no information on when leakage was stopped";

e. Between April and May of 1958, "[a]pproximately 1500 gallons leaked from" Tank 9;

f. Between August 1964 and September 1967, "[v]arious leaks" were detected at Tank 1, but the Navy had no information on the "quantity of leakage";

g. In June 1969, Tank 17 was leaking at a rate of approximately 1 gallon per 1.5 minutes;

h. Between August 1970 and April 1972, Tank 1 experienced "[u]nexplained fuel drops amounting to 31,294 gallons";

i. Between May 1975 and August 1978, Tank 1 again experienced "[u]nexplained fuel drops," this time "amounting to 32,765 gallons";

j. In January, July, September, and October of 1981, the Navy reported the discovery of "severe" and other leaks in Tanks, 10,

13, 15, and 16 following tank repair projects, but the Navy had "no details"; and

k. In 1998, the Navy reported finding "holes in the steel liner during a tank maintenance project" for Tank 19.

(Naval Facilities Eng'g Command, Red Hill Bulk Fuel Storage Facility Final Groundwater Protection Plan at ES-3 at 3-2 through 3-5 (2008)). The Navy has therefore had actual notice that the Tank System persistently released Contaminants for decades, yet the Navy failed to take appropriate measures to investigate, identify, and stop the more recent Contaminant Releases.

95. The Navy's 2008 Groundwater Protection Plan, which was developed to mitigate the potential impact of the Navy's fuel releases from the Red Hill Facility to the groundwater system, noted that "other releases may have occurred that are not reflected in the histories above. However, the accuracies of these tests are not known and in some cases leakage through gate valves has been determined as the cause of unexplained changes in fuel levels."

96. In 2010, the Navy issued an audit report summarizing its findings and recommendations regarding the Red Hill Facility and the Navy's ability to manage it within applicable environmental standards. Among other things, the Navy found (all emphases added):

a. **"[T]he Navy cannot detect slow, chronic fuel releases** from the [Red Hill Facility] tanks because current methods are not effective for that purpose."

b. "**Groundwater contamination exists around the underground storage tanks** (USTs) at [the Red Hill Facility] **because of irregular maintenance and insufficient inspection over the life of the fuel tanks**."

c. "Additionally, **the Navy cannot provide assurance that slow, chronic fuel releases can be detected and mitigated in a timely manner and that recent increases in contaminant levels have not impacted other water sources** in the [Red Hill Facility] area."

d. "[P]revious site investigations have shown evidence of past fuel releases that have resulted in contamination of the rock bed, soil, and groundwater surrounding the [Red Hill Facility] tanks."

e. "This testing is conducted at four monitoring wells (three beneath the [Red Hill] facility; one at the Navy Well) (see Exhibit E). The testing results at all four monitoring wells indicate that the **groundwater has been contaminated by various chemical constituents, such as total petroleum hydrocarbons (TPH) and naphthalene**, which are found in petroleum based fuels."

f. "Tank 6 was inspected in 1998, and five flaws requiring repair were found. However, 8 years later, another inspection was performed on Tank 6 using the modified-API 653 method. This inspection method included scanning 100 percent of the tank barrel and extension and resulted in 476 flaws requiring repair before the tank could be returned to service (tanks are temporarily taken out of service during inspection and repair)."

(Aug. 16, 2010 Naval Audit Service, Audit Report at 9, 11, 14).

97. In 2014, the Navy stated that "[p]revious environmental Site Investigations (SIs) at the [Red Hill] Facility showed that past inadvertent releases have contaminated the fractured basalt, basal groundwater, and soil vapor beneath the Facility with petroleum hydrocarbons." (Naval Facilities Eng'g Command,

Interim Update Red Hill Bulk Fuel Storage Facility Final Groundwater Protection Plan at ES-1 (2014)).

98. The Navy thus acknowledges that it has caused, allowed, or experienced additional releases of Contaminants beyond what it has disclosed. The BWS believes and therefore avers that the released volumes of Contaminants substantially exceed what the Navy has reported.

i. January 2014 Release Incident

99. In January 2014, the Navy reported a release into the environment of approximately 27,000 gallons of JP-8 jet fuel from Tank 5 ("**2014 Release Incident**") during filling of Tank 5.

100. Alarms were triggered during the filling, but operators presumed the alarms were falsely activated and did not immediately react.

101. Although the release occurred between December 12, 2013 and January 6, 2014, the Navy did not orally report the release to the DOH until January 13, 2014.

102. The Navy waited until January 23, 2014 to provide written notification to the DOH of this substantial fuel release.

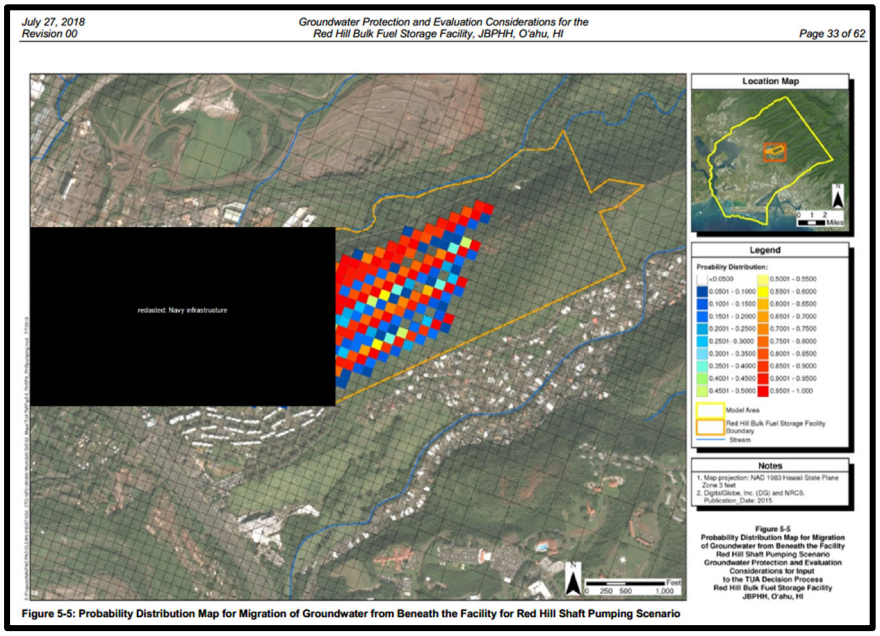
103. The fuel release from Tank 5 caused the BWS to incur costs and take responsive actions to address the potential impacts to its drinking water resources. The BWS had to stop pumping at certain of its well stations for several days,

implement new, rigorous water quality testing protocols, and install a groundwater monitoring well intended to assist in the detection of potential petroleum contamination from the Red Hill Facility.

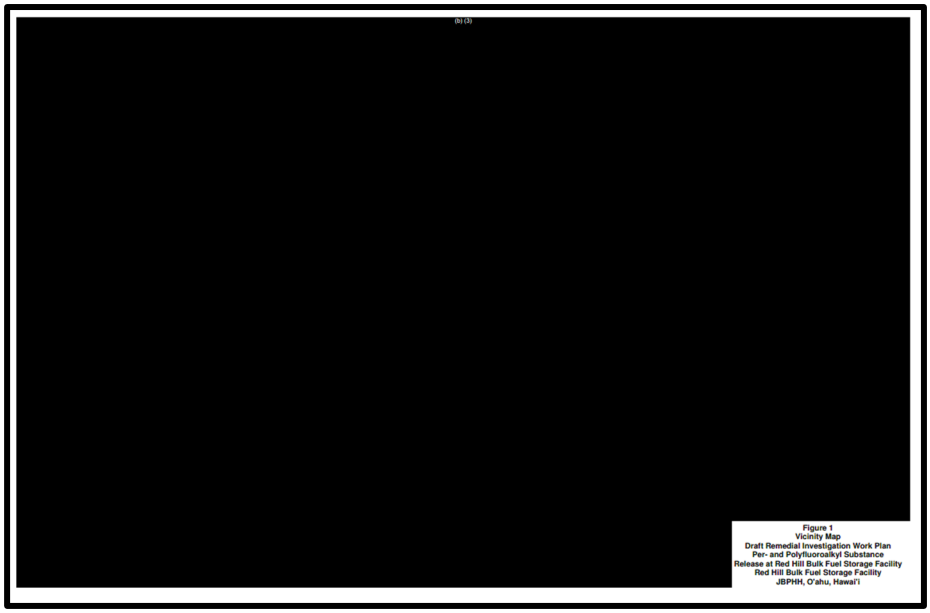
104. On February 25, 2014, the BWS wrote a letter to the Navy regarding concerns about "the numerous past fuel releases" from the Red Hill Facility and "its impact on an irreplaceable groundwater aquifer that we all depend on for our potable water supply." The BWS explained that the Aquifer that supplies the Navy's Red Hill Shaft also supplies the BWS's Moanalua Wells station to the south. The BWS Hālawa Shaft pumping station is also located less than a mile northwest of the Red Hill Facility. The BWS further explained that "[i]n the event our Hālawa Shaft and Moanalua Well stations are affected by the contamination under [the Red Hill Facility], costly treatment will be required that can be avoided today by remediating the petroleum contamination already there and installing additional groundwater monitoring wells to track any contamination that migrates from the site towards other wells in the area." The Navy did not remediate the petroleum contamination or install a sufficient number of groundwater wells to track contamination.

105. In the following months, the BWS submitted formal requests for information to the Navy seeking documentation regarding, among other things, Red Hill Facility tank material, construction, historical fuel releases, including

volume released, and information concerning groundwater flow beneath and around the Red Hill Facility. The Navy failed to provide requested documentation and heavily redacted what was made publicly available on the regulatory agencies' websites. Below are just a couple examples of documents the Navy unnecessarily unredacted:



(July 27, 2018, Groundwater Protection and Evaluation Considerations for the Red Hill Bulk Fuel Storage Facility, Figure 5-5).



(June 2024, Draft Remedial Investigation Work Plan Per- and Polyfluoroalkyl Substances Release Red Hill Fuel Bulk Storage Facility, Figure 1).

106. According to news reports, Gary Gill, then-Deputy Director for Environmental Health at the DOH, explained that the 2014 Release Incident provided an opportunity "to get a good handle on what's happened in the past, and make sure nothing like this happens again." The Navy failed to do so.

ii. 2015 Administrative Order on Consent

107. In response to the 2014 Release Incident, the Navy, the DLA, the EPA, and the DOH entered into the AOC and Statement of Work ("**SOW**") on September 28, 2015, that required the Navy and DLA to implement various measures to respond to that Incident, prior releases and potential future releases "to protect drinking water, natural resources, human health, and the environment." ("**2015 AOC**," ¶ 1(a)). "The primary objectives of this AOC are to take steps to

ensure that the groundwater resource in the vicinity of the Facility is protected and to ensure that the Facility is operated and maintained in an environmentally protective manner." (*Id*., ¶ 1(b)). The parties thereto acknowledged that the 2015 AOC was "protective of human health and the environment, and is in the public interest." (*Id*., ¶ 1(d)).

108. The DOH considered the "actions Navy and DLA have agreed to perform in accordance with this AOC [to be] necessary to address potential impacts to human health, safety and the environment, as envisioned by HRS §§ 340E-4, 342D-9, 342D-10, 342D-11, 342L-8, 342L-9 and 342L-52, due to historical, recent and potential future releases at the Facility." (2015 AOC, ¶ 5(a)(x)).

109. The SOW for the 2015 AOC stated that the "primary objectives of the AOC and this SOW are to take steps to ensure that the groundwater resource in the vicinity of the Facility is protected and to ensure that the Facility is operated and maintained in an environmentally protective manner." (SOW, p.1).

110. The 2015 AOC expressly recognized that the BWS's Hālawa Shaft and Moanalua Well are "part of a public water system…near the Facility." (2015 AOC, ¶ 4(m), (n)).

111. As stated in the SOW, the parties to the AOC and SOW intended "to seek the technical advice of subject matter experts, *such as the Honolulu Board of*

Water Supply and the Hawai‘i Department of Land and Natural Resources, as needed, for *scoping and review of key deliverables*. The Parties shall take actions that facilitate sharing of information with subject matter experts….” (SOW, p.2, § 1.1) (emphases added). The Navy failed and refused to adequately facilitate sharing of information with the BWS.

112. Among other actions, the SOW required the Navy and the DLA to “refine the existing groundwater flow model and improve the understanding of the direction and rate of groundwater flow within the aquifers around the Facility” within 24 months from “the approval of the Groundwater Flow Model Report Scope of Work.” (2015 SOW, ¶¶ 7.1, 7.1.3). The Navy failed to adequately comply with this requirement, and has yet to provide a refined, reliable groundwater flow model.

113. The SOW required the Navy and the DLA to “submit a Contaminant Fate and Transport Model Report to the Regulatory Agencies for approval” within 180 days from their approval of the Groundwater Flow Model Report. (2015 SOW, ¶ 7.2.3). The Navy failed to adequately comply with this critical requirement.

114. The SOW required the Navy and the DLA to submit a Groundwater Monitoring Well Network Report with recommendations for the number and location of monitoring wells, including new monitoring wells. (2015 SOW,

¶¶ 7.3.3-7.3.5). The Navy and the DLA failed to identify and install the number of monitoring wells necessary in sufficient locations to determine the extent of contamination or the fate and transport of the Released Contaminants.

115. The Navy and DLA have failed to, among other things, develop either a reliable, predictive groundwater flow model or a contaminant fate and transport model. The BWS received certain information relating to the two models, but the Navy and the DLA failed to provide the underlying data files and redacted information necessary for the BWS to fully evaluate the reliability or accuracy of the models. Based on the BWS's review of the redacted model reports and publicly available supporting information, they are grossly flawed, contrary to known data, and unreliable. As a result, the BWS had to continue its protective measures to prevent the Contaminant Releases from entering the BWS's Impacted Water Sources.

116. Pursuant to the AOC, the Navy proceeded to drain Tank 5 and collected samples from existing monitoring wells. Results around Tank 5 confirmed a spike in levels of hydrocarbons in soil vapor and groundwater, further demonstrating that one or more Contaminant Releases had occurred.

117. As part of the AOC, the Navy and the DLA agreed to submit a Risk and Vulnerability Assessment Report to the EPA and the DOH for approval. (2015 SOW, ¶ 8.3). The Navy's Assessment Report established that the Navy

could not prevent contaminant releases from the Red Hill Facility into the environment, concluding the following:

a. There was a greater than 27% probability of an acute sudden release of between 1,000 and 30,000 gallons of fuel from the Red Hill Facility each year, with an expected annual release of 1,960 gallons.

b. There was a greater than 34% probability of a sudden release of more than 120,000 gallons of fuel from the Red Hill Facility within the next 100 years.

c. The expected volume of chronic, undetected fuel releases from the Red Hill Facility was 5,803 gallons per year.

(Quantitative Risk and Vulnerability Assessment Phase 1 (Internal Events without Fire and Flooding) Red Hill Bulk Fuel Storage Facility Report, Nov. 12, 2018, at ES-3 – ES-5).

iii. The Navy's Application to Operate the Red Hill Facility

118. Effective July 15, 2018, the DOH adopted Hawai'i Administrative Rules ("**HAR**") Chapter 11-280.1, requiring USTs and UST Systems like those at the Red Hill Facility to be subject to permitting requirements by July 15, 2019. HAR §§ 280.1-10(a)(1)(A), 280.1-323(a).

119. By letter received by the DOH on May 23, 2019, as corrected June 12, 2019, the Navy submitted an application seeking a five-year permit to operate the Red Hill Facility, including its UST System. Because of the concerns about contamination of O'ahu's sole source Aquifer, including the Navy's ongoing fuel

releases at the Red Hill Facility, the BWS, as well as the Sierra Club of Hawai‘i, notified the DOH that they were objecting to the Navy's permit application and requested a contested case hearing.

120. At a hearing that took place from February 1, 2021 to February 8, 2021, witnesses for the Navy, the BWS, and the Sierra Club presented sworn testimony and exhibits entered into the record. Following the February 2021 hearing, another significant Contaminant Release occurred at the Red Hill Facility in May 2021. As a result, the proceeding remained open to allow for additional information and testimony related to that release.

iv. May 6, 2021 Release Incident

121. Despite purported actions taken by the Navy as part of its efforts to comply with the 2015 AOC, on May 6, 2021, fuel was released from the Red Hill Facility during the refueling of Tank 20 ("**May 2021 Release Incident**").

122. Red Hill Facility operators failed to follow proper valve opening and closing sequences during the refilling of Tank 20, resulting in two piping joint ruptures and subsequent release of JP-5 fuel inside the Red Hill Facility's lower access tunnel in the vicinity of Tanks 18 and 20.

123. On May 7, 2021, the Navy issued a press release stating "approximately 1,000 gallons of fuel was released during a fuel transfer and properly collected by the fuel containment system." According to Navy Captain

James "Gordie" Meyer, "Our containment system functioned as designed to keep the fuel contained within our facility, **with no indication that fuel was released to the environment**." (emphasis added). As explained below, the Navy was seriously wrong.

124. On or about October 14, 2021, the Navy issued a public report containing findings of its investigation into the May 2021 Release Incident.

125. In its October 2021 Investigation Report, the Navy revised its estimate of released jet fuel from 1,000 to 1,618 gallons.

126. Despite assuring the DOH and the public that fuel lost during the May 2021 Release Incident did not reach the environment, the Navy now admitted that it only recovered 1,580 of the 1,618 gallons of released fuel, with the balance released into the environment.

127. On October 26, 2021, the Navy issued a formal press release advising that its investigation determined that "operator error" caused the May 2021 Release Incident, and reiterated that 1,618 gallons of jet fuel (JP-5) was released from a pipeline inside the Red Hill Facility and that all but 38 gallons was recovered.

128. On October 28, 2021, Navy Captain James Meyer assured members of the State of Hawai‘i Fuel Tank Advisory Committee that the Navy could safely operate the Red Hill Facility going forward.

129. Although known at the time, the Navy failed to address the fact that an inventory ledger from the May 2021 Release Incident "indicated a fuel loss of approximately 20,000 gallons," because the Navy "did not deem it relevant."

v. November 20, 2021 Release Incident

130. On November 20, 2021, another Contaminant Release occurred from the Red Hill Facility ("**November 2021 Release Incident**"). A Red Hill Facility employee operating a 3.5-ton train cart negligently struck the valve of a fire suppression PVC discharge pipe, cracking the valve and spilling approximately 19,000 gallons of JP-5 fuel trapped in the discharge pipe since the May 2021 Release Incident. The released jet fuel traveled along a concrete floor tunnel and collected in a groundwater sump and a sanitary sewer tank. A photo of the release is below.

(Photo located at: https://www.civilbeat.org/2022/07/watch-fuel-spewed-full-blast-into-red-hill-tunnel-in-november/; taken by "rover who hit the Red Hill pipeline valve with a cart"; see video of release at: https://youtu.be/GEGohRlLrSA).

131. The fire suppression discharge pipe was designed to transport AFFF following activation for fire suppression from the area of the lower access tunnel under the USTs to the AFFF retention tank.

132. Although the material specification for the fire suppression discharge pipe mandated use of steel pipe, the Navy constructed the pipe with a combination of PVC and steel as a cost saving measure.

133. AFFF is used to extinguish highly flammable or combustible fires, such as fires involving gas tankers and refineries.

134. AFFF contains PFAS—hazardous substances commonly referred to as "forever chemicals."

135. PFAS leaches from soil to groundwater and is highly mobile and water soluble, making groundwater and surface water particularly vulnerable to contamination. A major source of human exposure to PFAS is through ingestion of contaminated drinking water.

136. On November 21, 2021, the Navy issued a press release concerning the November 2021 Release Incident, claiming that only "14,000 gallons of a mix of water and fuel" was released from a drain line for the fire suppression system,

that the water/fuel mixture "was contained in the lower tunnel" at the Red Hill Facility, and that "[t]here are no signs or indication of any releases to the environment, and the drinking water remains safe to drink."

137. On November 22, 2021, the Navy issued another press release, once again claiming that "14,000 gallons of water and fuel mixture" was contained and that there were "no signs or indication of any releases to the environment and the drinking water remains safe."

138. On November 28, 2021, the Navy advised the public that it was investigating "reports of a chemical smell in drinking water at several homes in some of the military housing areas" around the Red Hill Facility.

139. That same day, without alerting the BWS, the Navy ceased operation of its Red Hill Shaft drinking water source and implemented an emergency response to address the ongoing drinking water contamination. The Navy did not provide any information to the BWS concerning the reasons for that action, the health risk to the sole-source Aquifer, or protective measures that the BWS should take.

140. On November 29, 2021, Navy Captain Erik Spitzer, the commander of JBPHH, sent a message to all military housing residents "that there are no immediate indications that the water is not safe," adding that "[m]y staff and I are drinking the water on base this morning, and many of my team live in housing and

drink and use the water as well." (https://www.today.com/news/Hawaii-drinking-water-petroleum-water-found-t241906).

141. In contrast, on November 29, 2021, the DOH issued a press release advising "all Navy water system users [to] avoid using the water for drinking, cooking or oral hygiene." The DOH further advised "Navy water system users who detect a fuel odor from their water [to] avoid using the water for drinking, cooking, bathing, dishwashing, laundry or oral hygiene (brushing teeth, etc.)."

142. The DOH repeated those warnings in press releases over subsequent days. (Dec. 8, 2021, DOH Press Release entitled "Petroleum Contamination Reported in Navy's ʻAiea Hālawa Shaft"; Dec. 10, 2021, DOH Press Release entitled "Hawaiʻi Department of Health Confirms High Levels of Petroleum Contamination in Navy's Red Hill Shaft").

143. On November 30, 2021, the Navy informed the BWS for the first time that the Red Hill Shaft had been shut off two days earlier.

144. Because the BWS has a public trust responsibility to protect the water resources that it manages, and in the interest of protecting the public's health and safety, the BWS immediately reduced the pumping capacity of its own Hālawa Shaft by 50% due to the Navy-released Contaminants present in the Aquifer from which the BWS pumped groundwater.

145. On December 2, 2021, the Navy observed a "fuel smell and a sheen on top of the water in the Red Hill well." A sample was then taken from the Red Hill well and analyzed, with preliminary results confirming that the fuel in the water "was consistent with the carbon signature of JP-5."

146. On December 2, 2021, the BWS shut down its nearby Hālawa Shaft in an effort to prevent or limit migration of the contaminated groundwater from the Red Hill Facility toward and into the Shaft. The Navy's releases were a substantial factor, and in fact, caused the BWS to shut down the Hālawa Shaft.

147. The Navy would later admit that, by shutting down the Red Hill Shaft, other potable water sources—including the BWS's Hālawa Shaft-could draw in contaminated groundwater. During a hearing in December 2021, Navy witness Sherri Eng confirmed that if the BWS had not shut off its Hālawa Shaft, the contaminated groundwater would have traveled "west" in the direction of the Hālawa Shaft.

148. The next day, on December 3, 2021, the Navy shut off its nearby ʻAiea-Hālawa Shaft to prevent further contamination from the November 2021 Release Incident.

149. On December 5, 2021, the DOH sampled the Navy's Red Hill Shaft. The water sampling results indicated that the amount of diesel (total petroleum hydrocarbons, or TPH-d) was as high as 140,000 micrograms per liter (µg/l), 350

times the DOH's environmental action level ("**EAL**") then in effect for drinking water toxicity. The TPH-g levels (other fuel) were reported as high as 20,000 µg/l, which is more than 65 times higher than the DOH's EAL of 300 µg/l that was in effect at that time.

150. Faced with the reality of the widespread contamination caused by the Navy, on December 5, 2021, Navy Captain Erik Spitzer issued a public apology for misleading the servicemembers and families living on the base, stating that his words were "not the compassionate and validating words I wish were used, and I regret I did not tell our families not to drink the water." (https://www.facebook.com/JBPHH/posts/268832461948727).

151. The Navy's consistent failure to properly characterize and disclose the release and its public health risk reinforced the BWS's need to take its own protective measures in response to the Navy's Released Contaminants, especially given the Navy's history of Contaminant Releases, failure to disclose the scope and extent of the Released Contaminants, failure to comply with the 2015 AOC, and refusal to provide basic groundwater flow and fate and transport data to the BWS. Relatedly, an internal Navy investigation recognized that Navy Captain Erik Spitzer's message to residents was one of four "key friction points" that negatively impacted the public's trust in the Navy. (2022 Command Investigation at 82) ("This immediate turn around in messaging, along with the report three days later

that the Red Hill well was secured prior to the CO's message to families, combined to hurt public trust"). Just as the public lost trust in the Navy based on the Navy's actions, so too did the BWS.

152. On December 6, 2021, the DOH issued an Emergency Order ("**December 2021 Emergency Order**") requiring the Navy to immediately suspend fuel storage operations at the Red Hill Facility, expeditiously install a drinking water treatment system at the Navy's Red Hill Shaft, and promptly take action to defuel the Red Hill UST System.

153. According to the December 2021 Emergency Order, "[o]n or about November 28, 2021, the [Navy] began receiving complaints from water users from the [Navy's] water system regarding a gas or fuel odor from their drinking water. On or about December 2, 2021, the [Navy] identified the source of fuel contamination to be the Red Hill Shaft, one of the drinking water sources that services the [Navy's] water system. As of December 3, 2021, the [DOH] received nearly 500 complaints, mostly from residents or customers serviced by the [Navy's] water system complaining of fuel or chemical smell from their drinking water. There are no on-site remedies available to treat the water prior to distribution." (December 2021 Emergency Order at 2).

154. In further support of the December 2021 Emergency Order, the DOH made the following additional findings, highlighting the unreliable nature of not

only the Navy's public disclosures regarding the Contaminant Releases, but also the Navy's investigations and putative corrective actions (all emphases added):

a. The Navy "has *consistently been unable* to submit [2015] AOC deliverables to the satisfaction of the [DOH]."

b. "The 2021 incidences *directly refute* the [Navy's] claims in the Tank Upgrade Alternatives Decision Document that the Red Hill 'system of systems' is protective of groundwater. The [Navy's] tank upgrade proposal recommends continuing current design and operation. The Regulatory Agencies disapproved the [Navy's] submission in 2020 and the [Navy's] resubmission is *significantly flawed and fails to adequately address key regulatory concerns*."

c. "*The [Navy's] Groundwater Flow Model outputs do not match important field conditions, and therefore are unreliable for decision-making*."

d. "*Beginning no later than 2018, the Regulatory Agencies have repeatedly and consistently provided, and [the Navy] has consistently rejected, significant technical corrective comment on the [Navy's] Conceptual Site Model, the purpose of which is to describe the hydrogeologic site conditions*, and [the Navy's] *preliminary Groundwater Flow Models, the purpose of which is to determine groundwater movement as may be related to contaminant transport. The deficiencies in both models have not been adequately addressed*."

e. "The Investigation and Remediation of Releases report is based on the [Navy's] groundwater flow model and therefore *cannot be accepted* as an appropriate long-term remedy for all types of future releases. Thus, *significant progress to mitigate the risk of future releases has not been made*."

f. "In addition, *water quality data show significant increases in total petroleum hydrocarbon as oil detections at Red Hill Shaft and relative increases around the Bulk Fuel Storage Tanks*. While the May 6 incident is a possible cause of the increase, the

size of the impact area shown in the well data *does not appear to correlate with the [Navy's] description of the incident* (release of 38 gallons to the environment—far less than would be expected given the increased concentrations observed in the well field since the May 6 event). *This type of uncertainty diminishes timely and accurate identification of risk and associated response measures*."

g. "Given the number of incidences that have occurred at the Facility within the last year, and in view of the current drinking water contamination, *the [Navy] has not demonstrated that immediate and appropriate response actions are available*, and therefore cannot ensure that immediate and appropriate response actions will be available should another release occurs in the future. *The risk of any additional contaminants in the aquifer or lack of immediate action now may exacerbate the current situation and further jeopardize our aquifer system*."

(December 2021 Emergency Order at 3-4).

155. On December 7, 2021, Carlos Del Toro, Secretary of the Navy, issued a formal Memorandum for the Chief of Naval Operations suspending operations at the Red Hill Facility ("**December 2021 Directive**"). The December 2021 Directive stated:

> The recent incident at Joint Base Pearl Harbor-Hickam, in which military housing units and other facilities received tap water containing petroleum products is not acceptable. . . . Therefore, I am directing, under your leadership, the following actions:
>
> 1. The cessation of all operations at the Red Hill Underground Storage Tanks until the investigation into the cause of the incident is complete;
>
> 2. *The continuing isolation of the Red Hill and Halawa wells which we operate*, until the water distribution main and all affected homes and buildings have been flushed and can be supplied with potable water that meets EPA drinking water standards;

> 3. Evaluate acquisition of a drinking water treatment system or systems at the Red Hill Shaft to ensure the distribution of drinking water conforms to standards prescribed by the Safe Drinking Water Act and applicable regulations and to minimize the movement of any contaminant plume;
>
> 4. Within 30 calendar days, the Navy will consult with a qualified independent third party to assess operations and system integrity of the Red Hill Underground Storage Tank Facility to determine design and operational deficiencies that may impact the environment and to develop a work plan and implementation schedule to conduct necessary repairs and make necessary changes in operations to address any deficiencies identified in the assessment. Corrective actions shall be performed as expeditiously as possible; and
>
> 5. Following the independent third party assessment, the Navy will approve a final work plan and implementation schedule and will expeditiously perform work and make necessary changes in operations.

(https://www.secnav.navy.mil/smallbusiness/Redhill/SEVNAV%20Memo.PDF) (emphasis added).

156. On December 7, 2021, despite its historic inability to safely operate the Red Hill Facility, and its poisoning of the Aquifer, the Navy notified the DOH that it was contesting the December 2021 Emergency Order. On December 13 and 14, 2021, the Sierra Club and the BWS, respectively, intervened in the contested case because of the undeniable health and environmental risks created by the Navy's contamination, including to the BWS's own water resources.

157. On December 8, 2021, the BWS learned for the first time of contamination of the Navy's 'Aiea-Hālawa Shaft. The amount of diesel (total petroleum hydrocarbons, or TPH-d) in samples from the Navy's water distribution

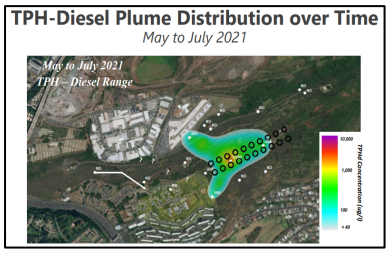
system at its ʻAiea-Hālawa Shaft were more than double the state-approved levels for drinking water at that time.

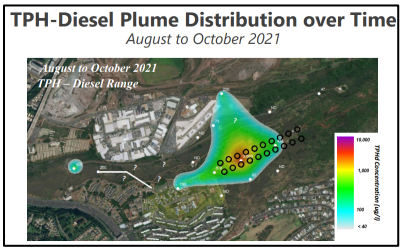
158. That same day, the BWS shut down its nearby ʻAiea Wells (Units 1 and 2) and Hālawa Wells (Units 1, 2, and 3) in response. Given the hydrogeologic connectivity of the Aquifer, the BWS discontinued use of the wells both because of the contamination risk but also to prevent the wells from serving as migration devices to draw and/or capture the Navy's Released Contaminants toward and into the BWS's Impacted Water Sources. The Navy's releases caused the shutdown of the BWS's ʻAiea and Hālawa Wells.

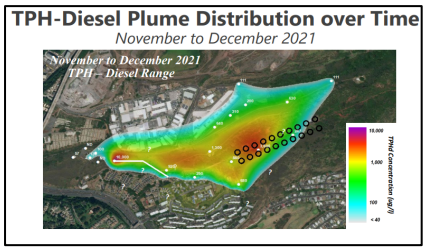
159. The BWS was forced to shut down its Impacted Water Sources, based on the location of the Impacted Water Sources in relation to Red Hill and the Navy's Impacted Water Sources, the known presence of harmful Released Contaminants proximate to the BWS's Impacted Water Sources, the known ability of contaminants to move through the Aquifer in the direction of the BWS's Impacted Water Sources, and the fact that the Navy had shut down its own Impacted Water Sources, thereby impacting the flow of groundwater. The BWS's decision was made even more imperative given, among other things: (a) the Navy's inability to safety operate the Red Hill Facility; (b) the Navy's long history of Contaminant Releases from the Facility into the environment; (c) the Navy's failure to remediate past Contaminant Releases; and (d) the Navy's failure to

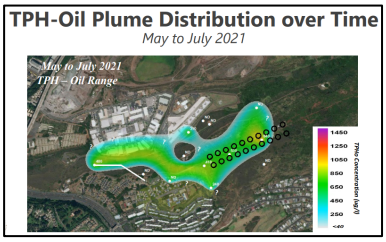
adequately advise and share information with the BWS (as well as the public as whole) regarding the cause, scope, and extent of the Contaminant Releases from the Facility.

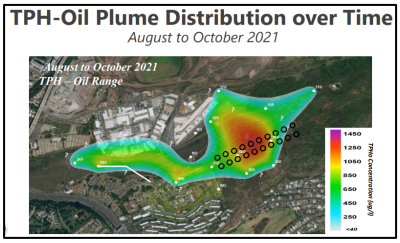
160. In 2022, the DOH captured in plume maps the significant, widespread contamination caused by the November 2021 Release Incident. As seen below, extensive plumes of TPH-contaminated groundwater spread outward from the Red Hill Facility from May to December 2021 (red color indicating higher concentrations of TPH detected).

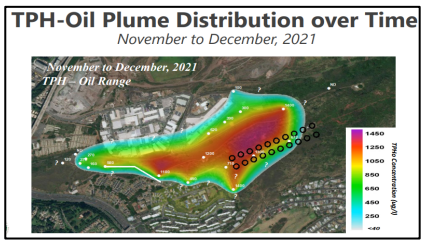












161. On December 27, 2021, the Hearing Officer issued a 32-page decision upholding the December 2021 Emergency Order in its entirety. The Hearing Officer described the Red Hill Facility as a "metaphorical ticking timebomb." (12/27/2021 Decision).

162. The Hearing Officer further found:

a. "A release that has already occurred that has damaged human health or the environment and that is not resolved to DOH's satisfaction constitutes 'an imminent peril to human health and safety or the environment.'" (12/27/2021 Decision, COL 18).

b. "Historical releases have adversely impacted the environment as is evidenced by detection of fuel and fuel constituents in the Navy's drinking water supply, the groundwater under the Red Hill Facility, and the soil vapor monitoring probes in the rocks beneath the facility." (FOF 30).

c. "The Red Hill Facility, as currently configured and operated, constitutes an imminent peril to human health and safety or the environment." (COL 35).

d. The November 2021 Release Incident was a "humanitarian and environmental emergency and disaster." (FOF 39).

e. "[T]he Navy does not yet know the full extent of the health effects of the contamination. People whose homes received contaminated water from the Navy's water system had suffered stomach aches, vomiting, nausea, diarrhea, skin rashes, sore throats, burning eyes, headaches, and difficulty breathing, including illnesses requiring emergency medical attention. People are still suffering mental and emotional effects from their experiences." (FOF 43).

f. "The water is not yet clean," "[t]he environment has not yet been remediated," "[t]he humanitarian response is ongoing," "[t]he environmental response is ongoing," "[*t]he Navy does not know exactly how the environment has been damaged or the full extent of the damage," and "[t]he Navy does not know the exact long-term consequences of the November 2021 Release to humans or to the environment*." (FOF 50-53, 56-57) (emphasis added).

g. "Continued operation of the Red Hill Facility, as it is currently configured and operated, poses an imminent threat to human health and safety or the environment." (FOF 59).

h. "*The Navy is not reliable with respect to monitoring whether leaks are occurring, determining how much fuel is released into the environment when leaks occur, and ascertaining threats*." (FOF 68) (emphasis added).

i. "There are pathways for fuel to travel from the Red Hill Facility to the environment at large." (FOF 77).

j. "***Fuel released from the Red Hill Facility presents a risk to the groundwater underlying the Red Hill Facility and the sole source aquifer generally***." (FOF 78) (emphasis added).

k. "That the *November 2021 Release and the aftermath constitute an imminent peril to human health and safety or the environment is a fact established by the preponderance of the evidence*." (FOF 104) (emphasis added).

163. On January 3, 2022, the DOH affirmed the Hearing Officer's decision and adopted the requirements of the December 2021 Emergency Order ("**January 2022 Final Order**").

164. On February 2, 2022, the Navy filed challenges in Federal District Court and Hawai‘i Circuit Court to the January 2022 Final Order.

165. On March 7, 2022, Secretary of Defense Lloyd J. Austin III issued a memorandum directing "the Secretary of the Navy, in coordination with the Commander of the United States Indo-Pacific Command, to take all steps necessary to defuel and permanently close the Red Hill Bulk Fuel Storage Facility."

166. On April 4, 2022, the United States of America entered into a stipulation with the DOH, the BWS, and the Sierra Club in federal court (1:22-cv-00051 DKW-RT) in which the United States committed to "defuel and permanently close the twenty Underground Storage Tanks at the Red Hill Bulk Fuel Storage Facility … and the pipelines that are ordinarily used to transport fuel between these tanks and the underground pumphouse."

167. On April 20, 2022, the Navy notified the DOH that it would be withdrawing its UST System permit application for the Red Hill Facility because it intended to "defuel and close the 20 underground storage tanks at Red Hill, the pipelines ordinarily used to transport fuel between the tanks and the underground pumphouse, and the four surge tanks and their appurtenant piping."

168. In April 2022, the Navy withdrew its challenges to the December 2021 Emergency Order and January 2022 Final Order.

169. On May 6, 2022, both the December 2021 Emergency Order and January 2022 Final Order were withdrawn pursuant to HAR § 11-1-21(c) and replaced with a May 2022 Final Emergency Order.

170. The May 2022 Final Emergency Order required the Navy to provide a plan and schedule for the defueling and permanent closure of the Red Hill Facility.

171. The May 2022 Final Emergency Order, among other things, used the findings of fact and conclusions of law issued by the Hearing Officer on December 27, 2021 to find that:

a. "*The Red Hill Facility*, as configured and operated by [the Navy], poses an *imminent and ongoing peril to human health and safety and the environment*. The 20 underground bulk fuel storage tanks ("20 Tanks") at the Red Hill Facility must be safely and expeditiously defueled and the 20 Tanks and their associated four surge tanks and piping system(s) closed in accordance with chapter 11-280.1, HAR. To address the imminent and ongoing peril to human health and safety and the environment presented by the Red Hill Facility, the defueling of the Facility must be completed at the earliest date consistent with safe defueling." (May 2022 Emergency Order at 2) (emphasis added).

b. "[The Navy] acknowledges the need to safely defuel and permanently close the 20 Tanks, 4 surge tanks, and associated piping system(s)." (*Id*. at 4).

172. On June 2, 2023, the Navy, the DLA, and the EPA executed an administrative consent order requiring the defueling and closure of the Red Hill Facility.

173. On March 29, 2024, the Navy reported that it had completed defueling of all fuel within the UST System at Red Hill Facility capable of being removed by gravity. An estimated 64,000 gallons of non-flowable fuel still remained in tank bottoms along with sludge and will require a facility modification such as pipe removal to access.

174. The Navy claims all USTs at the Red Hill Facility will be cleaned and pipelines removed—thereby allowing for removal of non-flowable residual fuel—by September 30, 2027 in connection with the Red Hill Facility closure process.

H. The Navy Has Admitted Liability for the Releases.

175. Officers at the highest level of the Navy have admitted (at a minimum) that the Navy is responsible for the May and November 2021 Release Incidents and ensuing drinking water contamination crisis.

176. On June 13, 2022, then Vice Chief of Naval Operations Admiral William Lescher finalized a command investigation into the May and November 2021 Release Incidents ("**2022 Command Investigation Report**").

177. The 2022 Command Investigation Report concluded that "[t]he contamination of drinking water from the Red Hill Shaft was the result of the Navy's ineffective immediate responses to the 6 May and 20 November 2021 fuel releases at the Red Hill [Facility], and failure to resolve with urgency deficiencies in system design and construction, system knowledge, and incident response training."

178. The Command Investigation Report, which attached the Navy's 1/14/2022 Command Investigation Report prepared by Rear Admiral Christopher J. Cavanaugh, then identified a number of negligent human errors in its Findings of

Fact and Opinions that caused the Release Incidents, including, but not limited to (all emphases added):

a. "On 6 May 2021, *Red Hill operators improperly executed a fuel transfer procedure*, resulting in two piping joint ruptures and a subsequent JP-5 fuel spill. Although unknown at the time, a fire suppression system sump pump transferred most of the fuel into a retention line, where it remained until 20 November 2021." (FOF 41, Cavanaugh Report).

b. "*While not recognized at the time of the incident or during post-incident assessments*, the fire suppression system Sump 1 pumps ran on 6 May 2021 and transferred up to 19,377 gallons of JP5 fuel into the fire suppression system retention line." (Supplemental FOF 18, Command Investigation Report).

c. "On 20 November 2021, as established in the Cavanaugh Report, a *Red Hill watch stander inadvertently struck a low point drain valve in the AFFF retention line with the passenger cart of a train, cracking the PVC pipe and spilling up to* ***19,377 gallons of fuel*** deposited there on 6 May. Up to 5,542 gallons of fuel remain unrecovered, *with some portion of that fuel contaminating the Red Hill well and the Navy drinking water distribution system*." (Supplemental FOF at 25).

d. "*The proximate cause of the fuel spill on 6 May 2021 was human error*. The CRO and pump operator took *intentional shortcuts* when transitioning between procedures. *Their improper valve operations* resulted in drawing a vacuum in the JP-5 line, then rapidly pressurizing it. This pressure surge caused mechanical failure of two piping joints. This opinion is consistent with a root cause analysis conducted by Austin Brockenbrough and Associates, LLC, a private engineering and consulting firm." (Opinion 1, Cavanaugh Report).

e. "The FLC Pearl Harbor Fuels Department *does not have adequate defense in depth against human error*." (Opinion 2).

f. "The decrease in tank inventory of nearly 20,000 gallons of fuel coincident with the 6 May 2021 spill s*hould have prompted a more critical and through investigation* by FLC Pearl Harbor supervisors." (Opinion 7).

g. "The FLC Pearl Harbor CO during and after the 6 May 2021 fuel spill *failed to act in order to understand the causes or effects of the spill, or to validate that Fuels Department was safe to continue operations*." (Opinion 13).

h. "The FLC Pearl Harbor Deputy Fuels Director *failed to direct the safe and effective operation* of Fuels Department." (Opinion 14).

i. "The proximate cause of the fuel spilled from the fire suppression system retention line on 20 November 2021 was a *failure to properly account for the fuel spilled on 6 May 2021 (human error*), as discussed above." (Opinion 20).

j. "The Red Hill rover *inadvertently* struck the drain valve hand wheel with the passenger cart of a train, causing the PVC pipe to crack and leak. This train is used to transit the tunnel system and *likely contacted the valve hand wheel multiple times, weakening and finally cracking the pipe*. FLC Pearl Harbor conducted a preliminary inquiry regarding this event, and the report postulates *excessive speed* may have caused the train to jump. The investigation team assesses it is more likely that the weight of fuel in the 14-inch diameter PVC pipe caused it to sag over time. Worn paint on the hand wheel suggests the train rubbed against it on several occasions." (Opinion 21).

k. "The fire suppression system is *poorly designed and has not been properly maintained*. Portions of the return line are constructed of steel and others are constructed of PVC, which is vulnerable to damage in an industrial environment." (Opinion 22).

l. "FLC Pearl Harbor personnel *were not trained or equipped to stop the source of the fuel spill*. *A low level of knowledge* of the fire suppression system by initial responders *resulted in*

*confusion, inaccurate reporting, and ineffective action*s." (Opinion 23).

m. "Leaders at the scene *failed to communicate* the seriousness of the incident." (Opinion 27).

n. "*The proximate cause of contaminated drinking water was a failure to properly respond to the fuel spill on 20 November 2021* (*human error*)." (Opinion 30).

179. As noted, the Command Investigation Report found that the design of the AFFF fire suppression system inside the Red Hill Facility significantly deviated from required code by using PVC instead of steel for most of the retention line, which "contributed to the November spill and subsequent water contamination."

180. Although the Navy identified the deviation from the specification requirement to use steel for the retention line in June 2017, it decided to retain the majority of the PVC pipe as "primarily due to the excessive cost to replace the pipe with steel."

181. The Command Investigation Report ultimately found that the "[t]otal fuel spilled in the May [2021] spill was 20,957 gallons, [the] maximum amount transferred to the AFFF retention system was 19,377 gallons, and total fuel that remains unrecovered is 5,542 gallons," despite originally claiming that only 1,000 gallons was released.

I. Navy Secretarial Letters of Censure

182. The Navy's conduct was so egregious that, on September 28, 2023, Secretary of the Navy Carlos Del Toro issued secretarial letters of censure to three retired Navy admirals and seven Navy captains in leadership positions at the Red Hill Facility both before and during the November 2021 Release Incident, acknowledging that the Navy's "leadership failings" caused the November 2021 Release Incident and ensuing drinking water contamination crisis.

183. Secretary Del Toro censured retired Rear Admiral Peter Stamatopoulos, former commander of Naval Supply Systems Command, for, among other things:

a. "[N]egligently approv[ing] an insufficient investigation of the 6 May 2021 fuel spill at Red Hill," acknowledging that "[t]he failure to fully account for the fuel spilled in the 6 May 2021 incident was the primary source of the 20 November 2021 fuel spill."

b. "[N]egligently fail[ing] to adequately perform [his] duties" at Fleet Logistics Center Pearl Harbor, acknowledging that "[t]he inadequate response to the 20 November 2021 fuel spill was the primary cause of the drinking water contamination."

(9/28/2023 Stamatopoulos Censure Letter).

184. Secretary Del Toro censured retired Rear Admiral John Korka, who commanded Navy Facilities Engineering Command Pacific from May 2018 to September 2019 for, among other things:

a. "[F]ail[ing] to identify and mitigate against lack of oversight of contracting and installation of a critical system at Red Hill which contributed to the fuel spill and subsequent contamination of the water distribution system."

(9/28/2023 Korka Censure Letter).

185. Secretary Del Toro censured retired Rear Admiral Timothy Kott, commander of Navy Region Hawai'i during the November 2021 fuel release, for, among other things:

a. "[N]egligently fail[ing] to coordinate a training plan and execute fuel spill drills or exercises at Red Hill," acknowledging that "[t]his failure contributed to the inadequate response to the 20 November 2021 fuel spill at Red Hill, which was the primary cause of the drinking water contamination."

b. "[N]egligently fail[ing] to adequately deploy [his] environmental management team and conduct an independent environmental risk assessment during the 20 November 2021 fuel spill at Red Hill," acknowledging that had Rear Admiral Kott "ensured a proper environmental risk analysis, the risk to the drinking water system could have been identified before the first reports of contamination."

c. *"[N]egligently fail[ing] to notify the public that the Red Hill well had been secured," acknowledging that the Navy "had a duty to timely communicate that pertinent information to the public" and that "[t]his delay in reporting negatively impacted public trust*…." (emphasis added).

(9/28/2023 Kott Censure Letter).

186. Secretary Del Toro censured these Navy admirals and seven other Navy captains for their "leadership failings" at the Red Hill Facility. In the press release announcing the censures, Secretary Del Toro explained that "[w]hat

happened was not acceptable" and that "[t]aking accountability is a step in restoring the trust in our relationship with the community." (9/28/2023 Censure Press Release).

J. The Navy Withholds Critical Information on the Extent of the Contamination and Migration Caused By the Red Hill Facility Releases.

187. Following the spill of November 2021, the BWS repeatedly asked the Navy to be transparent with the BWS and the public regarding its investigation and findings concerning the impacts of the contamination caused by the fuel releases from the Red Hill Facility. While Navy leadership publicly assured transparency, it repeatedly stonewalled and ignored the BWS despite the Navy's actual knowledge of the health and environmental risks posed by its Contaminant Releases to the BWS's Impacted Water Sources.

188. On December 16, 2021, for example, the BWS sent a letter to the Navy asking the Navy to publicly release the results of its water quality testing and analytical reports by the Navy's contract laboratory since the May 2021 Release Incident. The Navy failed to completely do so. The BWS cannot determine whether the Navy has released all the groundwater data (in unredacted form) associated with the May and November 2021 Release Incidents.

189. Because the Navy failed to timely provide critical data within its control to better understand the fate and transport of Released Contaminants in

order to protect the Aquifer and the BWS's Impacted Water Sources, the BWS sent numerous follow-up requests, including on January 5, 2022, August 18, 2022, and September 29, 2022. While the Navy provided some of the requested information, the Navy failed to respond to the vast majority of the BWS's requests for data and information, forcing the BWS to send another follow up letter on November 30, 2022.

190. On November 29, 2022, the Navy released into the environment approximately 1,300 gallons (originally reported as 1,100 gallons by the Navy) of PFAS-containing fire suppression concentrate in a tunnel near the Red Hill Facility. Yet in a letter dated December 8, 2022 to the BWS, the EPA and the DOH did not disclose that fire suppression *concentrate* was released. Rather, the letter stated AFFF *foam* was released. The DOH's December 2, 2022 press release to the public also failed to mention that AFFF *concentrate* was released, similarly stating it was *foam*. AFFF concentrate looks like water rather than foamy material and is far more dangerous than AFFF foam.

191. The November 2022 release of AFFF concentrate, however, was not an isolated incident. On December 7, 2019, a spill of up to 1,500 gallons of AFFF was released from the Red Hill Facility into the environment, requiring the surrounding contaminated soil to be excavated. The Navy, however, waited until 2023 to disclose this incident to the EPA. Then, on September 29, 2020, the fire

suppression system in an underground pump house at the Red Hill Facility was activated due to "inadvertent triggering" of the fire suppression system. At the time, the Navy advised the DOH that no AFFF concentrate was released. The Navy would later admit that 5,000 gallons of this concentrate was actually released. While the Navy claims the chemicals did not reach the environment surrounding the pump house, the floor of the pump house is made of porous concrete, creating a likely path of migration. Then, on October 26, 2021, a water pipeline ruptured releasing 300,000 gallons of water at the Red Hill Fuel Oil Recovery Facility. Upon information and belief, AFFF could have been absorbed in the soil from the December 7, 2019 AFFF incident and mixed with the water from the 300,000-gallon release on October 26, 2021. Three days later, on October 29, 2021, the Navy began draining the fuel, AFFF, and water mixture from the Fuel Oil Recovery Facility into remediation tanks. According to the Navy, the fuel, AFFF, and water mixture was not fully contained.

192. On November 30, 2022, the BWS sent a letter to the EPA and the DOH asking that the agencies demand the Navy immediately begin weekly testing of the Navy's monitoring wells and Red Hill Shaft for PFAS. Shortly thereafter, the BWS reached out directly to the Navy and requested its sampling data from the November 29, 2022 PFAS-related release.

193. On December 15, 2022, the BWS asked the Navy if the BWS could collect samples from the Navy's water wells to gain necessary information about the contamination plume caused by the Red Hill Facility Contaminant Releases. The BWS sought to determine whether the Navy was continuing to release Contaminants such that the BWS's pumping of its Impacted Water Sources could pull in those Contaminants. On December 19, 2022, the Navy refused access to sampling.

194. On January 10, 2023, the BWS sent a letter to the DOD expressing grave concern regarding the Navy's lack of transparency in response to the November 29, 2022 release of approximately 1,300 gallons of PFAS-containing AFFF, as well as the Navy's detection of PFAS in groundwater samples taken in 2020 and 2021 from the Navy's water distribution system. The Navy intentionally withheld vital water quality information from the BWS and the public, and, on information and belief, failed to comply with DOD guidance regarding PFAS reporting and AFFF spill response handling. The BWS therefore requested that the DOD instruct the Navy to, among other things, conduct weekly testing of the Navy Red Hill monitoring wells and Red Hill Shaft for PFAS, as well as provide all past and future PFAS testing results.

195. On March 31, 2023, the BWS issued two press releases advising that it had detected PFAS in its Moanalua and Hālawa Wells.

196. On May 1, 2023, the BWS again contacted the EPA and the DOH regarding the Navy's lack of transparency and unwillingness to provide the requested data and information regarding the November 29, 2022 release of PFAS-containing AFFF. As the largest municipal drinking water utility in Hawai'i, the BWS reminded the agencies that the BWS has a constitutional trust responsibility to protect the water resources it manages. To do so, the BWS needs accurate and timely information regarding past and future threats created by the Navy's Contaminant Releases to the groundwater resources the BWS must protect.

197. Despite the BWS's repeated requests, the Navy failed to uphold its promises of transparency and deprived the BWS of water quality and hydrogeologic information solely within the Navy's possession and control.

198. On February 12, 2024, the BWS sent a letter to the DOD requesting unredacted information regarding the Navy's investigations into the Contaminant Releases, citing the completion of Red Hill Facility defueling and the BWS's need for water quality and hydrogeologic information solely within the Navy's possession and control. ("On December 15, 2023, the Navy completed work to defuel the [Red Hill Facility] of 104.6 million gallons of fuel. … Now that the fuel has largely been removed from [the Red Hill Facility] and the facility is being decommissioned, there is no longer any basis to cite defense-sensitive critical

infrastructure as the reason to deny access and redact the contents of reports on [the Red Hill Facility]").

199. Due to the Navy's failure to respond, the BWS sent a follow up request on March 5, 2024, that the Navy also ignored.

200. On August 21, 2024, the BWS sent a letter to the Navy advising that the BWS detected PAHs at its 'Aiea Wells.

201. PAHs are found in various industrial emissions and fuel sources, including jet fuel, and continuing exposure to the chemicals creates risks of cancer.

202. In the August 21 Letter, the BWS reiterated that it was forced to stop pumping these wells on December 8, 2021 as a result of the November 2021 Release Incident. Additionally, the BWS had recently commented on the Navy's draft PFAS Release Remediation Investigation Work Plan, which was developed in response to the Navy's 2022 releases of AFFF. The recent PAH detections at the 'Aiea Wells, coupled with the Navy's refusal to disclose the extent of the PFAS contamination, reinforced the urgent need for the BWS to shut down the 'Aiea Wells and understand the full extent of past Contaminant Releases so the BWS could take appropriate protective measures. The BWS again implored the Navy to disclose requested information, including, among other things, groundwater sampling and analysis of all Red Hill Facility monitoring wells, both on and off-site.

203. On September 24, 2024, the BWS wrote again to the DOD and the Navy to follow up on its numerous past requests for unredacted information relating to the defueling and closure of the Red Hill Facility and the Navy's JBPHH water system.

204. The Navy has either entirely failed to respond to certain of the BWS's requests for data and information or it provided heavily redacted data and reports without including maps showing the area's underground geology, the location of monitoring wells and corresponding tables with sampling data.

205. Information, data, and documents concerning the Navy's Contaminant Releases, water quality at and near the Red Hill Facility, groundwater sampling results, and hydrogeology at and in the vicinity of the Facility are solely within the Navy's possession and control and unavailable to the BWS through other sources.

206. The Navy's Contaminant Releases caused the BWS to shut down its Impacted Water Sources and incur costs and expenses to investigate and take protective measures against, as best it can, the impact of the Navy's Contaminant Releases on the BWS's Impacted Water Sources.

207. Since the Navy's catastrophic release of jet fuel in November 2021, the Navy has kept its Red Hill Shaft and ʻAiea-Hālawa Shaft out of service. As a result, the JBPHH water distribution system has been solely sourced by its primary well, the Navy's Waiawa Shaft, located over 6 miles from the Red Hill Facility.

During this same time period, the BWS necessarily kept its nearby Hālawa Shaft, Hālawa Wells, and ʻAiea Wells out of service in response to the Navy's Contaminant Releases to minimize or prevent the BWS from drawing the Released Contaminants into its water sources.

K. The Navy Has Failed to Develop an Acceptable Groundwater Flow Model and Subsequent Fate and Transport Model.

208. While the Navy has reportedly completed studies of the subsurface environment and the resulting contamination it caused, those studies are wholly inadequate to understand the ultimate fate and transport of the Released Contaminants that have been released from the Facility.

209. Significantly, the Navy has failed to install, or exercise reasonable efforts to install, groundwater monitoring wells in priority locations requested by the BWS and the Red Hill Water Alliance Initiative to the northwest of the property where the BWS's Hālawa Shaft is located, and to the west, where the BWS's Hālawa Wells and ʻAiea Wells are located.

210. In September 2024, the Navy submitted a Groundwater Model Report ("**2024 Model Report**") representing the latest in a series of deficient deliverables required under the 2015 AOC.

211. The purpose of the 2024 Model Report was to, among other things, estimate contaminant fate and transport for past releases from the Red Hill Facility, as well as potential releases from the previously in-service USTs. It also sought to

respond to concerns by regulators in their disapproval of the Navy's prior attempts to characterize the subsurface environment underlying the Facility.

212. While the 2024 Model Report provided some additional data points regarding groundwater flow in and around the Red Hill Facility, it failed to fully, adequately, and appropriately address the regulators' concerns, and still does not sufficiently characterize the subsurface environment.

213. Moreover, the Navy failed and refused to provide the BWS with the complete 2024 Model Report, including the model files that purportedly support the findings contained therein. As a result, the BWS cannot validate or rely on the Navy's model.

214. The Navy—without explanation—again heavily redacted numerous groundwater data points–both in the text of the 2024 Model Report, as well as in the supporting maps, necessary to determine the accuracy and reliability of the Navy's findings regarding groundwater flow in and around the Facility.

215. On February 18, 2025, the EPA provided initial comments on the 2024 Model Report based on the technical review of the EPA's consultants. While the EPA recognized that the Navy made progress on characterizing groundwater flow, the EPA identified deficiencies and inaccuracies in the Navy's analyses and data. The EPA did not accept the 2024 Model Report.

216. On March 13, 2025, the DOH commented on the Navy's 2024 Model Report, identifying numerous deficiencies that needed to be addressed. The DOH first recognized "the Navy's inability over the last decade to provide a [groundwater flow model] that accurately represents known aquifer behaviors and real-world data." The DOH then explained that the "critical issues we currently face are determining the nature and extent of past releases, identifying potential remedial options, and evaluating potential risk." The DOH found that the Navy's 2024 Model Report "cannot be used to answer any of these questions."

217. Simply put, the Navy's 2024 Model Report cannot be used for its intended purpose, and the Navy has deprived the BWS and the public of necessary technical data to evaluate and respond to the Navy's Contaminant Releases. Despite the Navy having nearly a decade to fulfill the modeling requirements under the 2015 AOC, the Navy has failed to adequately characterize the groundwater flow in and around the Red Hill Facility and failed to identify the likely fate and transport of the Contaminants it negligently released into the environment.

L. Additional Impacts to the BWS's Impacted Water Sources

218. In addition to the impacts on the BWS's Impacted Water Sources identified above, the BWS has detected the following in its groundwater monitoring wells in and around the Red Hill Facility:

a. In March 2022, TPH and PAHs were detected in the BWS groundwater monitoring well BWS2253-J1, which is located near the Facility border, southwest of the Tank System.

b. In March 2022, TPH and PAHs were detected in the BWS ground water monitoring well DH-43. DH-43 is located in the Moanalua Valley. DH-43 is located approximately 1,500 feet southeast of the Red Hill Facility, and approximately 1 mile from the BWS's Moanalua Wells.

c. In May 2022, TPH and PAHs were again detected in the BWS's groundwater monitoring well DH-43.

d. In July and September 2022, PAHs were detected in the BWS's groundwater monitoring well BWS2253-J1.

e. In May 2025, TPH was detected in the BWS's groundwater monitoring well BWS2253-J1.

f. In May 2025, PFAS was detected in the BWS's groundwater monitoring well DH-43.

219. The BWS also detected the following PAHs and PFAS impacts to its water sources, including its Impacted Water Sources:

a. In December 2022, PFAS was detected in a sample collected from the Hālawa Shaft. Samples collected from the Hālawa Shaft in April 2020 and April 2021 did not indicate the presence of PFAS.

b. In every month from January through April 2023, PFAS was detected in Hālawa Wells 1 and 2.

c. In every month from June 2023 through April 2024, PFAS was detected in Hālawa Wells 1 and 2.

d. In every month from June 2024 through May 2025, PFAS was detected in Hālawa Wells 1 and 2.

e. In April 2023, PAHs were detected in the BWS's Hālawa Well 1.

f. In every month from September 2024 through May 2025, PFAS was detected in the Hālawa Shaft.

g. In March, June, July, October, and November 2023, PFAS was detected in the Moanalua Wells.

h. In March 2024, PFAS was detected in the Moanalua Wells.

i. In June 2024, PFAS was detected in the ʻAiea Wells 1 and 2.

M. <u>The Navy's Negligent Conduct Caused the BWS Significant Damages.</u>

220. As a direct and foreseeable result of the improper, negligent and/or tortious acts and omissions of the Navy, the BWS has suffered significant monetary damages, including but not limited to the loss of use of its Hālawa Shaft, ʻAiea Wells, and Hālawa Wells, additional costs and expenses associated with those wells and other BWS wells whose operation was impacted by the shutdown of the BWS Impacted Water Sources, and investigation fees, costs, and expenses.

221. Specifically, the BWS has incurred additional fees, costs, and expenses to respond to the Navy's Contaminant Releases and because of the failure of the United States, the Navy, their employees, and agents to timely and appropriately disclose necessary data, information, and documents relating to those Releases, including, but not limited to fees, costs, and expenses for the following that the BWS would not otherwise have incurred:

a. Implementing rigorous water quality testing protocols at certain of its drinking water well stations;

b. Planning for permitting, and designing the installation of additional groundwater monitoring wells in the vicinity of the Facility;

c. Increasing pumping at certain of its other drinking water well stations in an effort to temporarily replace lost water production capacity;

d. Planning for permitting, and designing alternate water supply wells to replace the production capacity lost from the loss of use of the BWS Impacted Water Sources;

e. Performing water treatment research and studies to determine the technology, equipment, staffing, and operations necessary to remove Released Contaminants from potable water;

f. Paying for contractors to assist with responding to the releases, including, without limitation, conducting geoscientific, engineering, and other technical analyses;

g. Paying for additional BWS staff time to assist with responding to the releases, including, without limitation, adjustments to water system operations, water sample collection, contract laboratory services, financial record keeping and reporting, risk management, and emergency response actions; and

h. Ongoing work related to the foregoing during the pendency of this litigation.

222. The costs incurred or committed by the BWS to date to address the lost use of Hālawa Shaft, ʻAiea Wells (Units 1 and 2), and Hālawa Wells (Units 1, 2, and 3), enhanced water quality testing, development of additional groundwater monitoring wells, lost water production replacement, development of alternate

water supply wells, evaluation of contamination removal technology, and associated BWS staff and consultant costs exceeds $24 million dollars. And those costs are continuing. The BWS will incur additional costs if it must purchase and construct a water treatment facility to remediate the Released Contaminants.

223. To the extent the BWS must replace the BWS's Hālawa and ʻAiea Water Sources because of the Navy's Contaminant Releases, the estimated cost to do so ranges between $1.18 and $1.43 billion dollars.

224. The BWS reserves the right to identify additional damages it has or will incur.

COUNT I – NEGLIGENCE

225. The BWS incorporates by reference the foregoing paragraphs as if set forth at length herein.

226. Under Hawaiʻi law, a negligence claim requires: (1) a duty recognized by law that the defendant owed to the plaintiff; (2) a breach of the duty; (3) that the defendant's breach was a substantial factor in bringing about the plaintiff's harm; and (4) actual damages.

227. The United States, through the Navy and the DLA, owns and operates the Red Hill Facility and is liable for their tortious conduct.

228. The United States has a duty to exercise reasonable care in the operation and maintenance of the Red Hill Facility.

229. The United States has a duty not to endanger the health or safety of the public and the environment, not to injure groundwater and other natural resources used by the BWS, and not to interfere with the use of those resources by others, including the BWS.

230. The United States has a duty not to interfere with or contaminate the BWS's Impacted Water Sources, including its water shafts, wells, and equipment.

231. The BWS, as a municipal authority drawing groundwater from the same Aquifer as the Navy to distribute to the BWS's ratepayers, customers, and other users, was a foreseeable plaintiff to whom the Navy owed a duty to refrain from releasing Contaminants into the environment that enter or could enter the BWS's Impacted Water Sources.

232. The United States breached the duty to exercise reasonable care by, among other things:

a. Failing to properly maintain the UST System in compliance with applicable statutory and regulatory requirements, resulting in preventable leaks, spills, and releases;

b. Failing to properly monitor, inspect, and repair the UST System and prevent Contaminant Releases from the UST System;

c. Failing to prevent, properly respond to, and remediate the numerous releases that occurred at the Red Hill Facility, including, but not limited to the May 2021 and November 2021 Release Incidents;

d. Failing to adhere to proper procedures and valve sequencing, causing the May 2021 Release Incident;

e. Failing to implement necessary and appropriate corrective actions after the May 2021 Release Incident and prior releases into and throughout the environment;

f. Failing to adequately investigate the release of fuel into the fire suppression retention line, including the failure to oversee the investigations of independent contractors;

g. Failing to take corrective action when it knew or should have known of the fuel buildup in the fire suppression discharge pipe after the May 2021 Release Incident to mitigate or prevent the November 2021 Release Incident;

h. Failing to install steel piping and/or to replace PVC piping with steel piping for the fire suppression discharge pipe;

i. Failing to operate with reasonable or due care the Facility's train car, causing it to strike the valve of a fire suppression PVC discharge pipe and release jet fuel that was negligently discharged into and subsequently stored in the fire suppression retention line;

j. Releasing Contaminants into the same Aquifer from which the BWS draws water for its distribution system;

k. Releasing Contaminants into the environment that entered and/or threatened the BWS's Impacted Water Sources;

l. Damaging the BWS's property, including its water wells and equipment; and

m. Other negligent conduct to be determined through discovery.

233. These failures were substantial factors in causing Contaminants to enter the Aquifer where the BWS draws its water supply, and in turn impacting and/or threatening the BWS's Impacted Water Sources and distribution system.

234. As a direct and proximate cause of the Navy's breach of the duty of care, the BWS has suffered substantial damages, which include, but are not limited to, the loss of use of its Hālawa Shaft, ʻAiea Wells, and Hālawa Wells, the cost to replace and/or remediate those Impacted Water Sources and/or treat contaminated groundwater, fees, costs, and expenses relating to the unavailability of those Impacted Water Sources and need to increase pumping from other sources, along with other compensable damages.

235. The Navy's actual and threatened releases were a substantial factor, and in fact the only reason the BWS shut down its Hālawa Shaft, ʻAiea Wells, and Hālawa Wells in December 2021 in response to the Navy's Contaminant Releases.

236. The BWS is entitled to actual damages in an amount to be determined at trial sufficient to compensate the BWS for the negligence of the United States.

COUNT II – NUISANCE

237. The BWS incorporates by reference the foregoing paragraphs as if set forth at length herein.

238. The BWS is, and during all pertinent times was, in lawful possession of its Impacted Water Sources, wells, and equipment, and had the right to use them in managing Oʻahu's municipal water resources and distribution system and in withdrawing water from the Aquifer.

239. The United States owned and materially controlled the Red Hill Facility in close proximity to the BWS's water wells and equipment and had actual knowledge of the BWS's use of the Aquifer to obtain and distribute potable drinking water to the public.

240. Through the conduct described herein, the United States created, contributed to, and/or maintained a nuisance; that is, releasing Contaminants into O'ahu's Sole Source Aquifer, and in turn, impacting and/or threatening the BWS's Impacted Water Sources and distribution system.

241. The United States is liable for creating a condition that interfered with the BWS's free use, possession, or enjoyment of its property, including its Impacted Water Sources, wells, and equipment.

242. The United States has impaired the BWS's right to use and enjoy its property by allowing numerous Contaminant Releases from the Red Hill Facility into the environment, including the Aquifer from which the BWS draws its water supply for its distribution system.

243. The nuisance caused by the United States has also created significant health risks associated with contamination of the Aquifer that supplies the BWS's distribution system.

244. The United States knowingly, recklessly, and/or negligently engaged in conduct that unreasonably interferes with the BWS's property rights.

245. The United States knew or should have known that the Contaminant Releases from the Facility would enter the Aquifer that supplies the BWS's distribution system.

246. As a direct and proximate result of the United States' tortious acts or omissions, the BWS suffered, now suffers, and will continue to suffer damages, including the loss of use of its water wells and equipment, need to develop replacement water sources, increased operating costs, and other fees, costs and expenses related to the Navy's releases and the BWS's response thereto.

247. The United States has failed to abate the nuisance.

248. The United States' improper, reckless and/or negligent operation of the Red Hill Facility constitutes a series of recurring abatable nuisances, which the United States failed to remedy within a reasonable period of time, and for which the United States is liable to the BWS.

249. Because the United States of America interfered with the BWS's free use, possession, or enjoyment of its property, including its wells and equipment, the BWS is entitled to damages in an amount to be determined at trial.

COUNT III - TRESPASS

250. The BWS incorporates by reference the foregoing paragraphs as if set forth at length herein.

251. The United States operated the Red Hill Facility and stored millions of gallons of Contaminants in the USTs and also used Contaminants, such as PFAS, lead, and VOCs, in its operations.

252. During the relevant time period, the United States recklessly or negligently released at least hundreds of thousands of gallons of Contaminants, including petroleum hydrocarbons and PFAS, into the environment, contaminating O‘ahu’s Sole Source Aquifer, the same aquifer that supplies the BWS’s distribution system.

253. The Contaminants physically invaded the Aquifer that supplies the BWS’s distribution system.

254. The Contaminants released into the environment by the Navy impacted and/or threatened the BWS’s Impacted Water Sources and distribution system.

255. The Contaminants interfered with the BWS’s ability to use, possess, and enjoy its Impacted Water Sources, wells, and equipment.

256. The BWS has not consented to, and does not consent to, the invasion of the Aquifer that supplies the BWS’s distribution system by Contaminants released from the Red Hill Facility.

257. The BWS is, and during all pertinent times was, in lawful possession of its Impacted Water Sources, wells, and equipment, and had the right to use them in managing O‘ahu’s municipal water resources and distribution system.

258. The United States’ invasions are continuing and ongoing, and each separate invasion of Contaminants constitutes a new trespass each time Contaminants are detected in the Aquifer that supplies the BWS’s distribution system and impacts the BWS’s Impacted Water Sources.

259. As a direct, proximate, and foreseeable result of the United States’ trespasses, the BWS has suffered, now suffers, and will continue to suffer invasion of its property rights and damages to its Impacted Water Sources, wells, and equipment.

260. Because of the United States’ trespasses, the BWS has incurred, and will continue to incur expenses and other damages in an amount to be proven at trial.

COUNT IV - VIOLATION OF HERL, H.R.S. §§ 128D-1, 5, 6 AND 8

261. The BWS incorporates by reference the foregoing paragraphs as if set forth at length herein.

262. The United States, through its agencies (including the Navy and the DLA), at all times material to this lawsuit, owned and operated the Red Hill

Facility, staffed its facilities and vehicles with its agents, servants, and employees, and stored petroleum hydrocarbon products and PFAS-containing products there.

263. The United States is a "person" as defined in H.R.S. § 128D-1.

264. The United States is an "owner" or "operator" as defined in H.R.S. § 128D-1.

265. The United States is a covered person and "Potentially Responsible Party" under HERL.

266. The Red Hill Facility is a "facility" as defined in H.R.S. § 128D-1.

267. The United States released and/or threatened to release hazardous substances (as defined in H.R.S. § 128D-1) into the environment, thereby contaminating O'ahu's Sole Source Aquifer that supplies the BWS's distribution system, and in turn impacting and/or threatening the BWS's Impacted Water Sources and distribution system.

268. As stated herein, the United States by its conduct did willfully, knowingly or recklessly fail to comply with the provisions of H.R.S. § 128D-8(b).

269. As a result, the BWS has sustained damages, as stated more fully herein.

270. The response costs incurred by the BWS were necessary and consistent with H.R.S. Chapter 128D, the State Contingency Plan of the State of

Hawai‘i as set forth in HAR Chapter 451, and other applicable administrative rules of the State of Hawai‘i.

271. The United States is liable to the BWS for all costs of removal and remedial actions under H.R.S. § 128D-6.

272. The United States is liable to the BWS for injury to, destruction of, loss of, or loss of use of natural resources, including the reasonable costs of assessing such injury, destruction, or loss resulting from such releases under H.R.S. § 128D-6.

273. The United States is liable for any other necessary costs of response incurred by the BWS under H.R.S. §§ 128D-5, 6 and 8.

V. NO EXCEPTIONS TO FTCA APPLY

274. The BWS incorporates by reference the foregoing paragraphs as if set forth at length herein.

275. The BWS's claims are not subject to any of the exceptions set forth in 28 U.S.C. § 2680.

276. None of the United States' actions described herein arose under the government's discretionary decisions or subject to policy decisions.

277. The BWS is not an enlisted person and therefore, has not assumed the inherent risks or uncertainties associated with military service.

278. The United States, including the Navy, and their respective employees, agents, and persons under their direction or supervision, failed to exercise due care in the execution of its duties as described herein.

VI. LIABILITY OF UNITED STATES

279. This case is commenced and prosecuted against the United States of America in compliance with Title 28 U.S.C. §§ 2671–80, the Federal Tort Claims Act, based on the Navy's and the DLA's conduct. Liability of the United States is predicated specifically on 28 U.S.C. § 2674 because the resulting damages for which the Complaint is made were proximately caused by the negligence, wrongful acts or omissions of representatives, employees, or agents of the United States of America working for the Navy and the DLA, while acting within the scope of their office, employment, or agency under circumstances where the United States of America, if a private person, would be liable to the BWS in the same manner and to the same extent as a private individual.

280. Through the Federal Tort Claims Act, the United States has waived its sovereign immunity for the acts and omissions described here. *E.g., Evans v. United States*, 876 F.3d 375, 380 (1st Cir. 2017), *cert. denied*, 139 S. Ct. 81 (2018).

281. The United States has also waived its sovereign immunity with respect to HERL for the acts and omissions described here, including in connection with the removal and remedial action required as a result of the Navy's wrongful

and negligent conduct. *See* CERCLA § 120(a)(4), 42 U.S.C. § 9620(a)(4) ("State laws concerning removal and remedial action, including State laws regarding enforcement, shall apply to removal and remedial action at facilities owned or operated by a department, agency, or instrumentality of the United States . . . ."). *E.g., Port of Tacoma v. Todd Shipyards Corp.*, No. C08-5132BHS, 2008 WL 4454136, at * 7 (W.D. Wash. Sept. 30, 2008) (acknowledging waiver of sovereign immunity under Washington's CERCLA analogue for facilities currently operated by the federal government); *City of Fresno v. United States*, 709 F. Supp. 2d 888, 908 (acknowledging waiver of sovereign immunity under California's CERCLA analogue for facilities owned and operated by federal government); *see also United States v. Com. of Pa. Dep't Env't Res.*, 778 F. Supp. 1328, 1330 (M.D. Pa. 1991).

VII. CONDITIONS PRECEDENT

282. Pursuant to 28 U.S.C. § 2675(a), on October 24, 2023, the BWS timely presented its claims to the United States Department of Navy by submitting form SF-95 to the Office of the Judge Advocate General, Tort Claims Unit Norfolk, 9620 Maryland Avenue, Suite 205, Norfolk, Virginia 23511-2949, via Federal Express and E-Mail (tortclaimsunit@us.navy.mil). *See* Forms SF-95 and cover letter, attached as Exhibit 1.

283. On December 20, 2023, Kevin L. Walker, Tort Claims Paralegal, Tort Claims Unit Norfolk, Office of the Judge Advocate General, Department of the Navy, acknowledged receipt of the BWS's claims.

284. On January 10, 2025, the Navy wholly denied the BWS's claim under the Federal Tort Claims Act. The Navy's denial started the six-month statute of limitations period applicable to the BWS's Federal Tort Claims Act claim. *See* Exhibit 2.

285. The BWS has exhausted its administrative remedies under the Federal Tort Claims Act and has fully complied with the statutory prerequisites for bringing this tort action against the United States.

VIII. DAMAGES

286. As a result of the wrongful or negligent conduct of the United States of America, including the United States Department of the Navy and Defense Logistics Agency and their respective employees, agents or representatives, the BWS has sustained damages including:

a. Fees, costs and expenses to respond to Contaminant Releases from the Red Hill Facility, including the investigation and mitigation of the impacts and installation of monitoring wells;

b. Loss of Use of the BWS's Impacted Water Sources due to the Navy's Contaminant Releases;

c. Fees, costs and expenses to increase production from the BWS's water sources that were not impacted by the Navy's Contaminant Releases;

d. The cost to replace the Impacted Water Sources impacted by the Navy's Contaminant Releases;

e. The restoration of the BWS's groundwater to its pre-impact condition or to remediate the groundwater, including, but not limited to, damages for the costs to construct, operate, and maintain a water treatment facility to treat contaminated groundwater caused by the Navy's Contaminant Releases;

f. Past and future loss of enjoyment of property;

g. Prejudgment and post-judgment interest as provided by law, at the maximum legal rate; and

h. Such other and further relief to which the BWS may be justly entitled.

PRAYER FOR RELIEF

WHEREFORE, for the foregoing reasons, the BWS seeks the following relief:

a. Judgment in favor of the BWS and against the United States on each and every Count;

b. Compensatory damages, in an amount to be determined at trial;

c. Damages for the fees, costs and expenses incurred by the BWS to respond to the Contaminant Releases from the Red Hill Facility;

d. Damages associated with investigation and mitigation of impacts caused by the Navy's Contaminant Releases from the Red Hill Facility, including but not limited to the installation and operation of monitoring wells;

e. Damages associated with investigation, design, and construction replacement water sources;

f. Damages and/or civil penalties under the Hawai‘i Environmental Resource Law;

g. Damages associated with loss of use of the BWS's Impacted Water Sources;

h. Prejudgment and post-judgment interest as provided by law, at the maximum legal rate; and

i. Such other and further relief to which the BWS may be justly entitled.

Date: July 01, 2025

Respectfully submitted,

KOBAYASHI SUGITA & GODA

By: */s/ Joseph A. Stewart*
JOSEPH A. STEWART
STEPHEN G.K. KANESHIRO
REECE Y. TANAKA

Attorneys for Plaintiff
BOARD OF WATER SUPPLY,
CITY AND COUNTY OF HONOLULU

IN THE UNITED STATES DISTRICT COURT

DISTRICT OF HAWAII

BOARD OF WATER SUPPLY, CITY AND COUNTY OF HONOLULU, Plaintiff, vs. UNITED STATES OF AMERICA, Defendant.	CIVIL NO. _____ DEMAND FOR JURY TRIAL

DEMAND FOR JURY TRIAL

Plaintiff BOARD OF WATER SUPPLY, CITY AND COUNTY OF HONOLULU, hereby demands a jury trial on all issues so triable. This demand is made pursuant to Rule 38 of the Federal Rules of Civil Procedure.

Date: July 01, 2025

KOBAYASHI SUGITA & GODA

By: */s/ Joseph A. Stewart*
JOSEPH A. STEWART
STEPHEN G.K. KANESHIRO
REECE Y. TANAKA

Attorneys for Plaintiff
BOARD OF WATER SUPPLY,
CITY AND COUNTY OF HONOLULU

EXHIBIT 1

Morgan Lewis

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October 24, 2023

VIA FEDEX AND EMAIL (TORTCLAIMSUNIT@NAVY.MIL)

Office of the Judge Advocate General
Tort Claims Unit Norfolk
9620 Maryland Ave. Suite 205
Norfolk, VA 23511-2949

Re: Notification of Incident and Claim for Damages under the Federal Tort Claims Act – Honolulu Board of Water Supply

Dear Counsel:

Our office represents the Honolulu Board of Water Supply ("BWS") in its response to the disastrous impacts from fuel releases at the United States Department of the Navy's ("Navy") Red Hill Bulk Fuel Storage Facility on the island of Oahu, Hawaii, including its claims against the Navy for damages arising from the drinking water contamination crisis caused by such releases. Pursuant to 28 U.S.C. § 2675(a) and 28 C.F.R. § 14.2(a), we hereby provide notification of incidents that create liability under the Federal Tort Claims Act ("FTCA") and present a demand for monetary damages in the amount of $1,208,494,494.45. These damages resulted from the tortious conduct of the Navy and/or its personnel acting within the scope of their employment, including property damage, loss use of property, and other costs incurred by the BWS to respond to fuel releases from the Red Hill facility.

The BWS' FTCA claims concern an unprecedented dereliction of the Navy's duty to fulfill its role as a responsible steward of the environment and to protect its servicemembers, their families, the State of Hawaii's irreplaceable water resources, and the BWS' critical drinking water infrastructure. The Navy does not deny that it is responsible for causing this catastrophe, but it must make its victims, including the BWS, whole for the unprecedented harm it has inflicted upon the people of Oahu. The importance of the issues to be decided in these claims cannot be overstated – they may well dictate whether Oahu's critical water resources will be secured or whether the considerable damages to the BWS' water distribution operations will continue to jeopardize the people of Hawaii's access to safe, affordable, and dependable drinking water.

The Navy's operations at the Red Hill facility have resulted in numerous releases of fuel and other hazardous substances, including a devastating fuel release in November 2021, that have contaminated the environment, damaged Oahu's irreplaceable sole-source groundwater aquifer, fouled the drinking water that its own servicemembers and their families depend upon for their health and safety, and forced the shutdown of several key BWS drinking water wells. The damages inflicted upon the BWS as a direct result of the Navy's wrongful conduct include, among

other things: the loss of use of the BWS' Halawa Shaft and other Aiea and Halawa drinking water wells; implementation of enhanced water quality testing and protocols; development of additional Red Hill groundwater monitoring wells; replacement of the lost water production from other sources; development of alternate water supply wells; evaluation of fuel-removing water treatment technologies; and associated BWS staff and consultant costs. We expect the Navy to reimburse the BWS for these damages.

Enclosed please find administrative claims we are filing on the BWS' behalf under the FTCA. The claims consist of: (1) an Authority to File Claim form; (2) an Attorney Authorization form; (3) a Standard Form 95 (SF-95); and (4) an Attachment to the SF-95 detailing, among other things, the basis of the claims. We are submitting these claims on behalf of the BWS without the benefit of formal discovery. As such, the claims reflect the BWS' knowledge, information, and belief as of the date this notice is provided. The BWS expressly reserves the right to amend or supplement its claims on the basis of information identified after the presentation of these claims, including, without limitation, in connection with any discovery that might be completed in a future legal action.

Please do not hesitate to contact me or my colleague, David K. Brown, if you have any questions or require additional information.

Sincerely,

Ella Foley Gannon

EFG/dkb
Enclosures

Authority to File Claim

To: Department of the Navy
Office of the Judge Advocate General
Tort Claims Unit Norfolk
9620 Maryland Avenue, Suite 205
Norfolk, Virginia 23511-2949

This form is used to document the fact that the officer or agent signing the Standard Form 95 is authorized to act on behalf of the company or corporation filing the claim. This form may not be signed by the person signing the Standard Form 95.

Date: 10/23/2023

The undersigned is Chair of the Honolulu Board of Water Supply
(Position: i.e. President, Secretary, etc.)

of Honolulu Board of Water Supply, 630 S Beretania St., Honolulu, HI 96843
(Name and address of corporation or company)

and in such capacity has access to the books and records of

Honolulu Board of Water Supply
(Name of corporation or company)

Ernest Y.W. Lau, P.E. is
(Name of Agent signing claim)

Manager & Chief Engineer of
(Position of Agent)

Honolulu Board of Water Supply
(Name of Corporation or company)

and has the power and authority to file, adjust and settle claims for and on behalf of Honolulu Board of Water Supply as its duly authorized agent.

Signature*

* This form must be signed by someone other than the person signing the Standard Form 95.

For Subrogation: This form should NOT be signed by your insured.

Attorney Authorization

To: Department of the Navy
Office of the Judge Advocate General
Tort Claims Unit Norfolk
9620 Maryland Avenue, Suite 205
Norfolk, Virginia 23511-2949

I, Honolulu Board of Water Supply **, hereby designate and authorize**
(Claimant)

Ella Foley Gannon and David K. Brown **, associated with the law office of**
(Name of Attorney)

Morgan, Lewis & Bockius LLP **to represent me and continue any**
(Name of Law Firm)

and all claims which have been filed or will be filed arising from:

The fuel releases at the United States Department of the Navy's Red Hill Bulk Fuel Storage Facility on the
(Description of Incident)
island of Oahu, Hawaii, and damages that arose from the drinking water contamination crisis caused by such releases,

which occurred on November 30, 2021.
(Date of Incident)

Executed this 23rd **day of** October**, 20**23**, at**

Honolulu, HI

Signature of Claimant

CLAIM FOR DAMAGE, INJURY, OR DEATH

INSTRUCTIONS: Please read carefully the ıctions on the reverse side and supply information requested on both sides of this form. Use additional sheet(s) if necessary. See reverse side for additional instructions.

FORM APPROVED
OMB NO. 1105-0008

1. Submit to Appropriate Federal Agency:

Office of the Judge Advocate General
Tort Claims Unit Norfolk
9620 Maryland Ave. Suite 205
Norfolk, VA 23511-2949

2. Name, address of claimant, and claimant's personal representative if any. (See instructions on reverse). Number, Street, City, State and Zip code.

See Attachment.

3. TYPE OF EMPLOYMENT	4. DATE OF BIRTH	5. MARITAL STATUS	6. DATE AND DAY OF ACCIDENT	7. TIME (A.M. OR P.M.)
☐ MILITARY ☒ CIVILIAN	N/A	N/A	See Attachment.	See Attachment.

8. BASIS OF CLAIM (State in detail the known facts and circumstances attending the damage, injury, or death, identifying persons and property involved, the place of occurrence and the cause thereof. Use additional pages if necessary).

See Attachment.

9. **PROPERTY DAMAGE**

NAME AND ADDRESS OF OWNER, IF OTHER THAN CLAIMANT (Number, Street, City, State, and Zip Code).

Claimant is the owner of the property.

BRIEFLY DESCRIBE THE PROPERTY, NATURE AND EXTENT OF THE DAMAGE AND THE LOCATION OF WHERE THE PROPERTY MAY BE INSPECTED. (See instructions on reverse side).

See Attachment.

10. **PERSONAL INJURY/WRONGFUL DEATH**

STATE THE NATURE AND EXTENT OF EACH INJURY OR CAUSE OF DEATH, WHICH FORMS THE BASIS OF THE CLAIM. IF OTHER THAN CLAIMANT, STATE THE NAME OF THE INJURED PERSON OR DECEDENT.

N/A

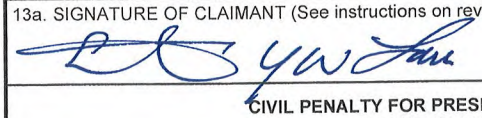
11. **WITNESSES**

NAME	ADDRESS (Number, Street, City, State, and Zip Code)
See Attachment.	See Attachment.

12. (See instructions on reverse). **AMOUNT OF CLAIM** (in dollars)

12a. PROPERTY DAMAGE	12b. PERSONAL INJURY	12c. WRONGFUL DEATH	12d. TOTAL (Failure to specify may cause forfeiture of your rights).
1,208,494,494.45	0.00	0.00	1,208,494,494.45

I CERTIFY THAT THE AMOUNT OF CLAIM COVERS ONLY DAMAGES AND INJURIES CAUSED BY THE INCIDENT ABOVE AND AGREE TO ACCEPT SAID AMOUNT IN FULL SATISFACTION AND FINAL SETTLEMENT OF THIS CLAIM.

13a. SIGNATURE OF CLAIMANT (See instructions on reverse side).	13b. PHONE NUMBER OF PERSON SIGNING FORM	14. DATE OF SIGNATURE
	(808) 748-5061	10/23/2023

CIVIL PENALTY FOR PRESENTING FRAUDULENT CLAIM

The claimant is liable to the United States Government for a civil penalty of not less than $5,000 and not more than $10,000, plus 3 times the amount of damages sustained by the Government. (See 31 U.S.C. 3729).

CRIMINAL PENALTY FOR PRESENTING FRAUDULENT CLAIM OR MAKING FALSE STATEMENTS

Fine, imprisonment, or both. (See 18 U.S.C. 287, 1001.)

INSURANCE COVERAGE

In order that subrogation claims may be adjudicated, it is essential that the claimant provide the following information regarding the insurance coverage of the vehicle or property.

15. Do you carry accident Insurance? [x] Yes If yes, give name and address of insurance company (Number, Street, City, State, and Zip Code) and policy number. [ ] No

See attachment. Claimant contends that its own insurance may not be the subject of subrogation claims since the United States Government is the sole cause of the property damage that is the subject of this claim.

16. Have you filed a claim with your insurance carrier in this instance, and if so, is it full coverage or deductible? [ ] Yes [x] No

17. If deductible, state amount.

See attachment for full deductible/retention information.

18. If a claim has been filed with your carrier, what action has your insurer taken or proposed to take with reference to your claim? (It is necessary that you ascertain these facts).

N/A

19. Do you carry public liability and property damage insurance? [x] Yes If yes, give name and address of insurance carrier (Number, Street, City, State, and Zip Code). [ ] No

Public liability: Vantapro Specialty Insurance Company, 199 Water Street, 24th Floor New York, NY 10038
Property: ACE American Insurance Company, 436 Walnut Street, Philadelphia, PA 19106

INSTRUCTIONS

Claims presented under the Federal Tort Claims Act should be submitted directly to the "appropriate Federal agency" whose employee(s) was involved in the incident. If the incident involves more than one claimant, each claimant should submit a separate claim form.

Complete all items - Insert the word NONE where applicable.

A CLAIM SHALL BE DEEMED TO HAVE BEEN PRESENTED WHEN A FEDERAL AGENCY RECEIVES FROM A CLAIMANT, HIS DULY AUTHORIZED AGENT, OR LEGAL REPRESENTATIVE, AN EXECUTED STANDARD FORM 95 OR OTHER WRITTEN NOTIFICATION OF AN INCIDENT, ACCOMPANIED BY A CLAIM FOR MONEY DAMAGES IN A **SUM CERTAIN** FOR INJURY TO OR LOSS OF PROPERTY, PERSONAL INJURY, OR DEATH ALLEGED TO HAVE OCCURRED BY REASON OF THE INCIDENT. THE CLAIM MUST BE PRESENTED TO THE APPROPRIATE FEDERAL AGENCY WITHIN **TWO YEARS** AFTER THE CLAIM ACCRUES.

Failure to completely execute this form or to supply the requested material within two years from the date the claim accrued may render your claim invalid. A claim is deemed presented when it is received by the appropriate agency, not when it is mailed.

If instruction is needed in completing this form, the agency listed in item #1 on the reverse side may be contacted. Complete regulations pertaining to claims asserted under the Federal Tort Claims Act can be found in Title 28, Code of Federal Regulations, Part 14. Many agencies have published supplementing regulations. If more than one agency is involved, please state each agency.

The claim may be filled by a duly authorized agent or other legal representative, provided evidence satisfactory to the Government is submitted with the claim establishing express authority to act for the claimant. A claim presented by an agent or legal representative must be presented in the name of the claimant. If the claim is signed by the agent or legal representative, it must show the title or legal capacity of the person signing and be accompanied by evidence of his/her authority to present a claim on behalf of the claimant as agent, executor, administrator, parent, guardian or other representative.

If claimant intends to file for both personal injury and property damage, the amount for each must be shown in item number 12 of this form.

The amount claimed should be substantiated by competent evidence as follows:

(a) In support of the claim for personal injury or death, the claimant should submit a written report by the attending physician, showing the nature and extent of the injury, the nature and extent of treatment, the degree of permanent disability, if any, the prognosis, and the period of hospitalization, or incapacitation, attaching itemized bills for medical, hospital, or burial expenses actually incurred.

(b) In support of claims for damage to property, which has been or can be economically repaired, the claimant should submit at least two itemized signed statements or estimates by reliable, disinterested concerns, or, if payment has been made, the itemized signed receipts evidencing payment.

(c) In support of claims for damage to property which is not economically repairable, or if the property is lost or destroyed, the claimant should submit statements as to the original cost of the property, the date of purchase, and the value of the property, both before and after the accident. Such statements should be by disinterested competent persons, preferably reputable dealers or officials familiar with the type of property damaged, or by two or more competitive bidders, and should be certified as being just and correct.

(d) **Failure to specify a sum certain will render your claim invalid and may result in forfeiture of your rights.**

PRIVACY ACT NOTICE

This Notice is provided in accordance with the Privacy Act, 5 U.S.C. 552a(e)(3), and concerns the information requested in the letter to which this Notice is attached.

A. *Authority:* The requested information is solicited pursuant to one or more of the following: 5 U.S.C. 301, 28 U.S.C. 501 et seq., 28 U.S.C. 2671 et seq., 28 C.F.R. Part 14.

B. *Principal Purpose:* The information requested is to be used in evaluating claims.

C. *Routine Use:* See the Notices of Systems of Records for the agency to whom you are submitting this form for this information.

D. *Effect of Failure to Respond:* Disclosure is voluntary. However, failure to supply the requested information or to execute the form may render your claim "invalid."

PAPERWORK REDUCTION ACT NOTICE

This notice is solely for the purpose of the Paperwork Reduction Act, 44 U.S.C. 3501. Public reporting burden for this collection of information is estimated to average 6 hours per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to the Director, Torts Branch, Attention: Paperwork Reduction Staff, Civil Division, U.S. Department of Justice, Washington, DC 20530 or to the Office of Management and Budget. Do not mail completed form(s) to these addresses.

Answer 2: Claimant

Claimant

Honolulu Board of Water Supply
ATTN: Ernest Y.W. Lau, P.E., Authorized Agent
Public Service Building (PSB)
630 South Beretania Street
Honolulu, Hawaii 96843

Attorneys

Dana M.O. Viola
Jeff A. Lau
Department of the Corporation Counsel
530 South King Street, Room 110
Honolulu, Hawaii 96813

Ella Foley Gannon
Morgan, Lewis & Bockius LLP
One Market, Spear Street Tower
San Francisco, CA 94105

David K. Brown
Morgan, Lewis & Bockius LLP
300 South Grand Avenue, Twenty-Second Floor
Los Angeles, CA 90071-3132

Answer 6: Date and Day of Incident; When Claim Accrued

The Honolulu Board of Water Supply ("BWS") discovered the potential for impacts to its property on November 30, 2021. On November 20 and 21, 2021, a release of a then reported 14,000-gallon mixture of water and fuel occurred from the United States Department of the Navy's ("Navy") fire suppression system at the Red Hill Bulk Fuel Storage Facility ("Red Hill"). *See* Exh. A, Command Investigation into the 6 May 2021 and 20 November 2021 Incidents at Red Hill Bulk Fuel Storage Facility, (June 13, 2022) (hereinafter "Command Investigation Report"). On November 21, 2021, the Navy issued a press release stating that the water/fuel mixture "was contained in the lower tunnel" at Red Hill and "[t]here are no signs or indication of any releases to the environment, and the drinking water remains safe to drink." On November 28, 2021, the Navy, without informing the BWS, elected to shut off its Red Hill Shaft drinking water well and implement an emergency response to address the ongoing drinking water contamination crisis. On November 30, 2021, the BWS was informed that the Red Hill Shaft drinking water well had been shut off two days prior and immediately reduced the pumping capacity of its own Halawa Shaft drinking water well by 50% due to the contamination present in the sole-source groundwater aquifer from which the well drew water. On December 2, 2021, the BWS was forced to shut off its nearby Halawa Shaft drinking water well due to the fuel released by the Navy at Red Hill. On December 8, 2021, the BWS was informed about contamination of

the Navy's Aiea-Halawa Shaft drinking water well and immediately shut off its nearby Aiea Wells (Units 1 and 2) and Halawa Wells (Units 1, 2, and 3) drinking water wells.

Answer 7: Time (A.M. or P.M.)

The BWS was informed of the Navy's decision to shut off its Red Hill Shaft drinking water well at some time on November 30, 2021.

Answer 8: Basis of Claim

The Navy is responsible for a massive environmental and human health crisis caused by releases of petroleum and other hazardous substances that occurred at the Red Hill facility in November 2021 and thereafter. This emergency is ongoing and unresolved. The Navy's failure to meet the requisite standard of care to prevent or timely and appropriately respond to the fuel releases at Red Hill inflicted considerable harm upon the people of Hawaii, including the BWS. The tortious conduct of the Navy, its officers, and/or its personnel acting within the scope of their employment have unquestionably injured the BWS and resulted in compensable damages under the FTCA.

A. Fuel Releases from the Red Hill Bulk Fuel Storage Facility

The Navy's Red Hill facility is located on the island of Oahu, Hawaii, approximately 2.5 miles northeast of Pearl Harbor, occupying approximately 144 acres of land along the western edge of the Koolau Range situated on a topographic ridge that divides the Halawa Valley and the Moanalua Valley. Consisting of 20 colossal World War II vintage USTs with the capacity to hold over 200 million gallons of fuel, the Red Hill facility sits directly and a mere 100 feet above Oahu's federally designated, irreplaceable sole-source groundwater aquifer, the Southern Oahu Basal Aquifer, from which the BWS supplies more than three quarters of the total island-wide water supply. In 1987, the United States Environmental Protection Agency ("EPA") determined that this aquifer is the "principal source of drinking water" for the island, and that "[i]f contaminated, would create a significant hazard to public health." Southern Oahu Basal Aquifer in the Pearl Harbor Area at Oahu; Principal Source Aquifer Determination, 52 Fed. Reg. 45496, at 45497 (Nov. 30, 1987).

It is undisputed that numerous episodic releases from the Red Hill facility have occurred and that the Navy's operations at Red Hill have contaminated the environment, damaged Oahu's critical drinking water resources, fouled the drinking water that its own servicemembers and their families depend upon for their health and safety, and forced the shutdown of several key drinking water wells. *See generally* Command Investigation Report. Most notably, in November 2021, fuel trapped in Red Hill's fire-suppression system was released by the Navy into the environment. Over the next week, an enormous volume of fuel and water, which still has not been reasonably quantified, made its way into the Navy's Red Hill Shaft—a drinking-water source for U.S. military personnel on Oahu. Upon further investigation, the Navy detected fuel constituents in the Red Hill Shaft more than 500 times the level the Hawaii Department of Health ("DOH") considers safe. Even more concerning, this contamination has migrated to other drinking water receptors. The Navy also detected petroleum in its Aiea-Halawa Shaft drinking water well, which is located approximately 1.5 miles from the BWS' Halawa Shaft, and the

Navy continues to regularly detect petroleum in the monitoring wells designed to identify contamination migrating from the Red Hill facility.

The sheer magnitude of the damages caused by the Navy's drinking water contamination crisis is staggering. Men, women, children, and pets drank and used the contaminated water from the Navy's water distribution system. Navy-supplied drinking water was poisoned with fuel, homes smelled like gas stations, people became physically ill, pets became sick, and the lives of thousands of Oahu residents were seriously upended. As a result, the Navy elected to shut off its Red Hill Shaft drinking water well, the primary well from which it supplied Joint Base Pearl Harbor-Hickam drinking water, and its Aiea-Halawa Shaft drinking water well. The BWS had no choice but to take responsive action of its own to prevent contamination from the Red Hill facility from entering the BWS water distribution system, including, among other things, shutting down its own Halawa Shaft as well as certain Aiea and Halawa drinking water wells. To date, at least eight water supply wells have been shut off to prevent further contamination of drinking water sources, including the Navy's Red Hill Shaft and Aiea-Halawa Shaft drinking water wells, and the BWS' Halawa Shaft, Aiea Wells (Units 1 and 2) and Halawa Wells (Units 1, 2, and 3) drinking water wells.

In response to this crisis, the DOH, the state agency with the statutory authority to regulate Red Hill, issued two emergency orders that collectively require the defueling and permanent closure of the Red Hill facility. The federal government, albeit belatedly, agreed. On March 7, 2022, Secretary of Defense Lloyd J. Austin III announced the Navy's intent to permanently defuel and shut down the Red Hill facility. On June 2, 2023, the Navy, the Defense Logistics Agency, and the EPA executed an administrative consent order requiring the defueling and closure of the Red Hill facility. While these actions address the future of the Red Hill facility and the Navy's drinking water system; unfortunately, none of these measures sufficiently address the contamination already in the environment, nor do they ensure that the BWS will be made whole for the forced shutdown of its own drinking water wells or that the people of Oahu will have access to safe and dependable drinking water in the future.

B. Honolulu Board of Water Supply

The BWS is the largest municipal drinking water utility in the State of Hawaii and is responsible for managing Oahu's municipal water resources and distribution system. The department is a financially self-sufficient, semi-autonomous agency of the City and County of Honolulu. The BWS' stated mission is to provide safe, dependable, and affordable water now and into the future. The BWS distributes an average of approximately 145 million gallons of potable water per day to around one million people on Oahu. To ensure the water it distributes is safe and potable, the BWS carefully and proactively manages its intricate system of wells and approximately 2,100 miles of pipeline servicing nearly every community on Oahu.

The BWS has a public trust responsibility to protect the water resources that it manages and to preserve the rights of present and future generations in the waters of the State. Public Trust is the principle embedded in the Hawaii Constitution and state law that recognizes that water is held in trust by the State of Hawaii for present and future generations. Pursuant to the Hawaii State Constitution, Article XI, Section 1, "[f]or the benefit of present and future generations, the State and its political subdivisions shall conserve and protect Hawaii's natural

beauty and all natural resources, including land, water, air, minerals, and energy sources, and shall promote the development and utilization of these resources in a manner consistent with their conservation and in furtherance of the self-sufficiency of the State. All public natural resources are held in trust by the State for the benefit of the people." The Revised Charter of the City and County of Honolulu, Article VII, Sections 7-103 and 7-117, empowers the BWS to manage, control, and operate its water systems and infrastructure and to take appropriate legal actions to protect the State's drinking water resources and the interests of the BWS and its constituents.

The BWS' underground water sources include, among others, its Halawa and Aiea drinking water wells. Nestled in the Halawa Valley is one of Oahu's most vital water sources, the Halawa Shaft. It is among the largest of the BWS' drinking water wells and, prior to the Navy's drinking water contamination crisis, one of the BWS' primary water supply shafts. When operational, Halawa Shaft extracted between approximately 8 and 14 million gallons of potable water per day and provided nearly a quarter of the water supplied to metropolitan Honolulu. When operational, the BWS Aiea Wells (Units 1 and 2) and Halawa Wells (Units 1, 2, and 3) drinking water wells extracted approximately 3.5 million gallons of potable water per day, collectively. The Navy's fuel releases into the environment forced the BWS to shut down each of these critical components of its drinking water extraction and distribution system.

In addition to shutting down these drinking water wells, the BWS has incurred other necessary costs to respond to the Navy's releases from Red Hill. Specifically, the BWS has been forced to implement enhanced water quality testing and protocols at certain of its well stations, develop additional groundwater monitoring wells in the vicinity of Red Hill, temporarily replace the lost water production from its Halawa and Aiea drinking water wells by increasing its reliance upon other water sources, develop alternate water supply wells to make up for the lost water production from its Halawa and Aiea drinking water wells, evaluate the technology, equipment, staffing, and operations to remove fuel contamination from water, and pay for associated BWS' staff and consultant costs.

C. Navy Liability Cannot Be Disputed

At the highest level, the Navy has admitted that it is responsible for the November 2021 fuel release and ensuing drinking water contamination crisis. On June 13, 2022, then Vice Chief of Naval Operations Admiral William Lescher finalized a command investigation into the Red Hill fuel release incidents, concluding that "[t]he contamination of drinking water from the Red Hill Shaft was the result of the Navy's ineffective immediate responses to the 6 May and 20 November 2021 fuel releases at [] Red Hill[], and failure to resolve with urgency deficiencies in system design and construction, system knowledge, and incident response training." *See* Command Investigation Report at 1. The Navy's conduct was so egregious that, on September 28, 2023, Secretary of the Navy Carlos Del Toro issued secretarial letters of censure to three retired Navy admirals and seven Navy captains in leadership positions at Red Hill both before and during the November 2021 fuel release and drinking water contamination crisis acknowledging that the Navy's "leadership failings" caused the November 2021 fuel release and ensuing drinking water contamination crisis. *See* Exh. B, SECNAV Takes Accountability Actions Following Red Hill Investigation (Sept. 28, 2023) (hereinafter "Censure Press Release"); Exh. C, Secretarial Letter of Censure (hereinafter "Censure Letter").

Specifically, Secretary Del Toro censured retired Rear Admiral Peter Stamatopoulos, former commander of Naval Supply Systems Command, for, among other things:

- "[N]egligently approv[ing] an insufficient investigation of the 6 May 2021 fuel spill at Red Hill," acknowledging that "[t]he failure to fully account for the fuel spilled in the 6 May 2021 incident was the primary source of the 20 November 2021 fuel spill."
- "[N]egligently fail[ing] to adequately perform [his] duties" at Fleet Logistics Center Pearl Harbor, acknowledging that "[t]he inadequate response to the 20 November 2021 fuel spill was the primary cause of the drinking water contamination."

Secretary Del Toro censured retired Rear Admiral John Korka, who commanded Navy Facilities Engineering Command Pacific from May 2018 to September 2019 for, among other things:

- "[F]ailing to identify and mitigate against lack of oversight of contracting and installation of a critical system at Red Hill which contributed to the fuel spill and subsequent contamination of the water distribution system."

Secretary Del Toro censured retired Rear Admiral Timothy Kott, commander of Navy Region Hawaii during the November 2021 fuel release for, among other things:

- "[N]egligently fail[ing] to coordinate a training plan and execute fuel spill drills or exercises at Red Hill," acknowledging that "[t]his failure contributed to the inadequate response to the 20 November 2021 fuel spill at Red Hill, which was the primary cause of the drinking water contamination."
- "[N]egligently fail[ing] to adequately deploy [his] environmental management team and conduct an independent environmental risk assessment during the 20 November 2021 fuel spill at Red Hill," acknowledging that had Rear Admiral Kott "ensured a proper environmental risk analysis, the risk to the drinking water system could have been identified before the first reports of contamination."
- "[N]egligently fail[ing] to notify the public that the Red Hill well had been secured," acknowledging that the Navy "had a duty to timely communicate that pertinent information to the public" and that "[t]his delay in reporting negatively impacted public trust…."

Secretary Del Toro's censured these Navy admirals and seven other Navy captains for their "leadership failings" at Red Hill. In the press release announcing the censures, Secretary Del Toro explained that "[w]hat happened was not acceptable" and that "[t]aking accountability is a step in restoring the trust in our relationship with the community." *See* Censure Press Release.

While admitting responsibility and beginning to take accountability for the Red Hill drinking water contamination crisis is an important first step for the Navy, words are not enough. The Navy's tortious conduct includes the confessed negligence as well as nuisance and trespass, and the resulting damages are compensable under the FTCA. The next move the Navy must take is making its victims, including the BWS, whole for the considerable harm it has inflicted upon them. The BWS has suffered significant property loss and other damages as a direct result of the Navy's wrongful acts and omissions causing the November 2021 fuel release and drinking water contamination crisis. The Navy must now compensate the BWS for the resultant harms.

This is not intended to be an exhaustive list of all possible causes of action.

Answer 9: Property Damage

Please see the facts described in Answer 8 (Basis of Claim) above. As a direct result of the wrongful acts and omissions of the federal government, its employees, and/or its contractors, the BWS suffered significant property damage, including the loss of use of its Halawa Shaft, Aiea Wells, and Halawa Wells drinking water wells, as well as other compensable damages from the loss of use of these drinking water wells caused by the contamination from the Red Hill facility. Specifically, the BWS has incurred additional fees and costs to respond to the releases from the Red Hill facility due to the failure of the federal government and its agents to timely and appropriately meet the requisite standard of care in preventing and/or responding to these releases, including, among other things:

- Implementing rigorous water quality testing protocols at certain of its drinking water well stations;
- Planning for and designing the installation of additional groundwater monitoring wells in the vicinity of Red Hill;
- Increasing pumping at certain of its other drinking water well stations to attempt to temporarily replace lost water production capacity;
- Planning for and designing alternate water supply wells to replace the production capacity lost from the loss of use of the Halawa Shaft, Aiea Wells, and Halawa Wells drinking water wells;
- Performing water treatment research and studies to determine the technology, equipment, staffing, and operations that may be required to remove fuel contamination from water;
- Paying for contractors to assist with responding to the releases, including, without limitation, conducting geoscientific, engineering, and other technical analyses; and
- Paying for additional BWS staff time assist with responding to the releases, including, without limitation, adjustments to water system operations, water sample collection, contract laboratory services, financial record keeping and reporting, risk management, and emergency response actions.

The estimated cost to replace the BWS' Halawa and Aiea drinking water wells is between $1,183,506,516 and $1,431,023,514. *See* Exh. D, Accurate Estimating Services, New Fresh Water Wells Construction Project: Statement of Probable Construction Cost (Oct. 19, 2023); Exh. E, SJ Construction Consulting, LLC, Cost Estimate for Honolulu Board of Water Supply Replacement Production Wells, Water Conveyance Tunnel, and Pipelines (Oct. 20, 2023). The costs incurred or committed by the BWS to date to address the lost use of Halawa Shaft, Aiea Wells (Units 1 and 2) and Halawa Wells (Units 1, 2, and 3) drinking water wells, enhanced water quality testing, development of additional groundwater monitoring wells, lost water production replacement, development of alternate water supply wells, evaluation of contamination removal technology, and associated BWS staff and consultant costs is $24,987,978.02. *See* Exh. F, Declaration of Raelynn Nakabayashi (Oct. 23, 2023).

This is not intended to be an exhaustive list of all possible injuries or damages.

Answer 11: Witnesses

Potential witnesses include BWS personnel, such as Ernest Y.W. Lau, P.E., Manager and Chief Engineer, Erwin M. Kawata, Deputy Manager, and Raelynn Nakabayashi, Executive Assistant; Navy, United States Department of Defense ("DOD"), and military personnel, civilian employees, and contractors stationed at or in the vicinity of the Red Hill facility where the releases occurred; other military personnel, civilian employees, and contractors of the DOD, EPA, and DOH who were involved with the responses to the releases from the Red Hill facility and/or who had contact with or reviewed records related to the responses to the releases from the Red Hill facility; and the numerous individuals on the Navy water distribution system who were exposed to the contamination resulting from the releases from the Red Hill facility.

BWS witnesses can be contacted via counsel at the contact information specified in Answer 2 (Claimant) above.

Specific Navy, DOD, and/or other witnesses of the November 20, 2021 fuel release and/or response include the following personnel and/or positions identified by acronym in the June 13, 2022 Final Endorsement of the "Command Investigation into the 6 May 2021 and 20 November 2021 Incidents at Red Hill Bulk Fuel Storage Facility" and supplement thereto (*see* Exh. A):

- COMPACFLT or PACFLT COM
- OPNAV N4
- JBPHH CO or CO JBPHH
- JBPHH CDO
- JBPHH PWO
- PACFLT Force Surgeon
- CNRH or CNRH COM
- JBPHH Environmental Program Director
- NAVFAC HI UEM Branch for Potable Water Commodity Manager
- Commander, NAVFAC PAC
- CRO
- NAVFAC HI Construction Manager
- (NAVSUP) FLC PH Facilities Division general engineer
- NAVFAC HI PMO Director
- NAVSUP Deputy Fuels Director or
- FLC PH Deputy Fuels Director
- NOSC-R
- CNRH PAO
- NAVSUP FLC PH CO or FLCPH CO or FLC PH CO
- NAVFAC HI CO
- CNRH COS
- JBPHH IEPD

- PACFLT DCOM
- PACFLT GA
- (NAVSUP) FLC PH XO
- (NAVSUP) FLC PH Engineering Technician
- (NAVSUP) FLC PH Fuels Intern
- NAVSUP N4
- CNRH Environmental Director
- COMNAVSUP
- COM INDOPACOM
- (NAVSUP) NPO Deputy OIC
- PACFLT N4
- (NAVSUP) FLC PH Control Division Supervisory Management Analyst
- DLA Energy East Pacific Commanding Officer
- (NAVSUP) FLC PH Business Department Director
- NAVFAC HI Chief Engineer
- NAVFAC HI Environmental Business Line Leader
- (NAVSUP) FLC PH Lead Regional Fuel Engineer
- NAVFAC EXWV Technical Director
- (NAVSUP) FLC PH Fuels Department Engineering Technician
- PACFLT CDO
- CNRH Deputy Environmental Director
- JBPHH IEPD
- PACFLT DMHQ
- NAVFAC HI PMO, Deputy Fields Director
- CNRH PHEO
- NAVFACPAC COM
- PACFLT Surgeon
- PACFLT CMO
- NAVFAC HI Ops Officer
- SECNAV CNO
- SECNAV
- JBPHH N4
- JBPHH UEM Division Director
- JBPHH UEM Water Commodity Manager
- JBPHH Deputy PWO
- JBPHH Drinking Water Distribution System Operator
- NAVFAC HI Utility Management Branch Potable Water Commodity Manager
- PACFLT PAO

As a result of the redactions applied to these documents by the Navy and the general use of acronyms and/or personnel titles to identify specific individuals, the BWS is unable at this time to provide actual names or addresses of these potential witnesses. *See generally* Command Investigation Report.

This is not intended to be an exhaustive list of possible witnesses.

Answers 15, 16 and 17: Insurance

Vantapro Specialty Insurance Company, 199 Water Street, 24th Floor, New York, NY 10038.

- Policy No. 5155-0042-00 (7/1/20-7/1/21):
  - Deductible/retention: $750,000 retained limit each occurrence.
- Policy No. 5155-0042-01 (7/1/21-7/1/22):
  - Deductible/retention: $1,000,000 retained limit each occurrence.

Ironshore Specialty Insurance Company, 175 Berkeley Street, Boston, MA 02116.

- Policy No. ISPILLSCAWJI001 (7/1/21-7/1/24):
  - Deductible/retention: $250,000 deductible per incident.

ACE American Insurance Company, 436 Walnut Street, Philadelphia, PA 19106.

- Policy No. EUTN18213060 (7/1/20-7/1/21) & EUTN18227563 (7/1/21-7/1/22):
  - Deductible/retention: various deductibles.

EXHIBIT A

DEPARTMENT OF THE NAVY
VICE CHIEF OF NAVAL OPERATIONS
2000 NAVY PENTAGON
WASHINGTON DC 20350-2000

5830
Ser N09/22U100552
13 Jun 22

FINAL ENDORSEMENT on RDML Christopher J. Cavanaugh, USN ltr 5830 of 14 Jan 22

From: Vice Chief of Naval Operations
To: File

Subj: COMMAND INVESTIGATION INTO THE 6 MAY 2021 AND 20 NOVEMBER 2021 INCIDENTS AT RED HILL BULK FUEL STORAGE FACILITY

Encl: (1) RADM James Waters, USN, ltr 5830 of 14 Apr 22
(2) Commander, U.S. Pacific Fleet Task Order of 262215ZAPR22

1. I reviewed the subject investigation (Cavanaugh report) as supplemented by Enclosure (1) along with the first endorsement and related comments. The contamination of drinking water from the Red Hill Shaft was the result of the Navy's ineffective immediate responses to the 6 May and 20 November 2021 fuel releases at the Red Hill Bulk Fuel Storage Facility (Red Hill), and failure to resolve with urgency deficiencies in system design and construction, system knowledge, and incident response training. These deficiencies endured due to seams in accountability and a failure to learn from prior incidents that falls unacceptably short of Navy standards for leadership, ownership, and the safeguarding of our communities.

2. This investigation characterizes the primary and proximate factors that caused the 2021 events, providing the foundation for a comprehensive approach to safeguarding the environment and executing the Secretary of Defense's decision to defuel Red Hill. I approve the findings of fact, opinions, and recommendations of both investigating officers as modified by the first endorsement and the following:

a. Opinion 18 is modified to delete the phrase "as a formal release notice" from the second sentence of the opinion.

b. Recommendations 35, 43 and 49 of the Cavanaugh report are modified to read: "Review the expired DLA-NAVSUP, NAVSUP-CNIC, NAVSUP-NAVFAC, and DLA-NAVFAC MOAs and establish a comprehensive five-party MOA between DLA-Energy, NAVSUP, NAVFAC, CNIC and U.S. Army Corps of Engineers regarding roles and responsibilities, including the assignment of Engineering Agents and appropriate Programmatic Authority informed by the Deputy Chief of Naval Operations for Fleet Readiness and Logistics' review of Shore command and control."

c. The following Cavanaugh report enclosures are updated:

Subj: COMMAND INVESTIGATION INTO THE 6 MAY 2021 AND 20 NOVEMBER 2021 INCIDENTS AT RED HILL BULK FUEL STORAGE FACILITY

(1) Enclosure (39) is updated to OPNAVINST 5450.348A, Mission, Functions, and Tasks of Commander, Naval Facilities Engineering Systems Command, dtd 23 Jun 2021.

(2) Enclosure (268) is updated to OPNAVINST 5450.339, Mission, Functions, and Tasks of Commander, Navy Installations Command, dtd 21 Apr 2011.

3. This report and endorsement are provided to the Navy Learning to Action Board (L2AB) to track implementation of, and continuing adherence to, the key recommendations from this investigation. The L2AB will also track the ongoing immediate actions highlighted below.

4. The immediate actions directed by the first endorsement and elsewhere provide interim risk control/solutions while deeper assessments are conducted. These include:

a. Commander, U.S. Pacific Fleet's Task Order on Red Hill Command and Control (Enclosure (2)) provides interim C2 structure. In addition to clarifying Red Hill command and control/accountability, the Task Order directs units responsible for specific aspects of Red Hill to implement corrective actions within specified time frames across the scope of recommendations contained in the Cavanaugh Report and Enclosure (1).

b. Deputy Chief of Naval Operations for Fleet Readiness and Logistics (OPNAV N4) review of all Navy Shore Command and Control to probe for other instances of the overly complex command and control structure identified in this report. This task includes review of the interim Red Hill command and control structure established by Commander, U.S. Pacific Fleet.

c. OPNAV N4 assessment of the material, operational and incident response readiness at all Navy Managed Defense Fuel Support Points.

d. NAVIG assessment of Echelon II Inspector General offices and development of a clear standard for follow-up of non-fully compliant assessments.

e. Environmental Director, Commander Navy Region Hawaii, Site Characterization Plan update based on the 22 April 2022 notification to DOH.

5. By separate letter, I designated Commander, U.S. Fleet Forces as the Consolidated Disposition Authority (CDA) to address any administrative or disciplinary actions as appropriate relating to military members identified in this investigation. The CDA has independent authority and discretion to review all relevant information, and, as deemed appropriate, to take administrative or disciplinary actions at all echelons. Separately, this report will be forwarded to commands with cognizance over civilian employees named in the report for action as appropriate and shared with the first supervisory Senior Executive Service supervisor in the chain of command.

6. Ongoing assessments of Red Hill include an Inspector General of the Department of Defense evaluation of the operation, maintenance, review and oversight of Red Hill, and the Naval

Subj: COMMAND INVESTIGATION INTO THE 6 MAY 2021 AND 20 NOVEMBER 2021 INCIDENTS AT RED HILL BULK FUEL STORAGE FACILITY

Facilities Engineering Systems Command third-party assessment of the fuel transfer system, condition of the fire suppression system, and preparation of a lifecycle sustainment plan, in accordance with section 318 of the National Defense Authorization Act for Fiscal Year 2022. A Naval Supply Systems Command-contracted Simpson Gumpertz & Heger third-party assessment of Red Hill was completed on 29 April 2022. Expeditious implementation of the recommendations from these assessments and this command investigation will guide a comprehensive approach to safe defueling operations at Red Hill.

7. Broader lessons spanning the imperative for clear command and control structure to drive strong Immediate Superior in Command ownership, strengthening the capability and capacity of installation commanders, and ensuring consistency in assessing and enforcing strong standards in system knowledge and incident response preparation are current actions.

8. While outside the scope of this investigation, I commend the strong efforts of the Joint Crisis Action Team that, in partnership with the State of Hawaii Department of Health and the Environmental Protection Agency, worked to restore safe drinking water for the Joint Base Pearl Harbor Hickam (JBPHH) community. This collaboration post-incident reinforces the critical importance of the Navy's relationship with the citizens of Hawaii and the imperative to earn their full faith and trust. We must act on both the specific recommendations and the broader lessons of this investigation with commitment and urgency.

9. Any questions or concerns may be directed to [redacted]

W. K. LESCHER
Admiral, U.S. Navy

Copy To:
OSD
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DoN OGC
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PACFLT
CNIC
COMNAVSUP
COMNAVFAC
Learning to Action Board
RDML Cavanaugh
RADM Waters

5830
15 Apr 2022

From: RADM James P. Waters III, USN
To: Vice Chief of Naval Operations

Subj: SUPPLEMENT TO COMMAND INVESTIGATION INTO THE 6 MAY 2021 AND 20 NOVEMBER 2021 INCIDENTS AT RED HILL BULK FUEL STORAGE FACILITY

Ref: (a) Convening Order Ser N09/22U100519 dtd 4 Mar 21
(b) VCNO Email RE: Red Hill Supplemental Extension Request dtd 30 Mar 22
(c) RDML Christopher J. Cavanaugh, USN ltr 5830 of 14 Jan 22

Encl: (1) Final Report

1. Reference (a), as modified by reference (b), directed an investigation to supplement reference (c).

2. The investigation team examined all factors and information related to the specific tasking identified in reference (a), as well as additional matters deemed relevant. Enclosure (1) is the directed report.

(b)(6)

J. P. WATERS III

Supplement to the Command Investigation into the 6 May 2021 and 20 November 2021 Incidents at Red Hill Bulk Fuel Storage Facility

15 April 2022

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I. Preliminary Statement

Pursuant to reference (a), this investigation examined the facts and circumstances surrounding the immediate response to incidents at the Red Hill Bulk Fuel Storage Facility (Red Hill) on 6 May 2021 (the "May spill") and 20 Nov 2021 (the "November spill"). This report is a supplement to reference (b), the command investigation completed by RDML Christopher J. Cavanaugh, USN on 14 January 2022 as endorsed by Commander, U.S. Pacific Fleet (COMPACFLT) in reference (c) (together, referred to herein as the "Cavanaugh Report").

This supplement is written as an integral part of a singular investigative effort and cannot be read separately from the Cavanaugh Report. The Cavanaugh Report serves as the foundation upon which to present additional matters pertaining to the same incidents. To that end, the findings of fact from the Cavanaugh Report as they relate to the tasking in reference (a) have been adopted in this supplement. For readability, the findings of fact in this supplement associated with the Navy's response to both spills are written in the order events occurred with an asterisk next to those findings and enclosures that were replicated from the Cavanaugh Report.

Notwithstanding the above, and in accordance with reference (a), a reconciliation of findings of fact between this supplement and the Cavanaugh Report is provided in section II. This investigation reviewed all findings of fact from the Cavanaugh Report that are germane to this supplement and where necessary, provided clarification, amplification, or reconciliation.

In addition to conducting a site visit of Red Hill, the investigation interviewed over 50 individuals and reviewed a significant amount of documentary evidence from multiple organizations to include reports, correspondence, policies, and other materials. All personnel and organizations cooperated fully and all relevant evidence was collected.

All explicit tasks delineated in reference (a) are addressed herein, and the following additional matters were identified as relevant and examined in greater detail: (1) Red Hill well configuration; (2) command and control (C2) of Red Hill; (3) AFFF system design, implementation, and maintenance; (4) understanding of the roughly 20,000 gallon volume discrepancy following the initial investigation into the 6 May spill; (5) closed circuit television system unavailability.

Drawing from the Cavanaugh Report and additional findings in this supplement, this investigation determined that the Navy's immediate response to both spills contributed to the contamination of Navy-provided drinking water in Hawaii. While there are several additional contributing factors described herein, the water system contamination was the result of human error primarily derived from insufficient human performance enhancement, assessment and feedback processes needed to support effective incident response actions and improper incident response C2. Consolidated exposure to risk existed via multiple avenues associated with Red Hill, however the C2 as practiced, to include ISIC oversight, was insufficient to identify

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accumulating risk and take actions to mitigate it. Finally, the November spill, which was the source of the contamination that reached the Red Hill well, was the result of human error exacerbated by poor Red Hill support system design and implementation.

Although this supplement runs through 7 December 2021, it is worth noting that during the course of this inquiry, the Department of Health for the State of Hawaii announced on 19 March 2022 that safe drinking water had been restored to all homes. This was the result of partnership and significant coordination across multiple stakeholders, working in collaboration with the State of Hawaii. While this supplement only tells the story up until 7 December 2021, the work that continued beyond 7 December 2021 accomplished the immediate mission of restoring clean drinking water to all residents and returning them to their homes.

II. Reconciliation of Findings

Pursuant to reference (a), the findings of fact in the Cavanaugh Report were reviewed in order to reconcile discrepancies with the findings of this supplement and to correct any errors that were discovered during the course of this inquiry. There were some findings from the Cavanaugh Report that required elaboration in order to complete the required tasking in reference (a). In those instances, the supplement incorporated the relevant findings from the Cavanaugh Report and added additional findings. There were also findings from the Cavanaugh Report that necessitate modification or correction, and those are recommended as follows:

a. Finding of Fact 2 is modified by substituting "oversight" in place of "oversight and direction" and "oversight and control" and replacing enclosure [8] with the current MOA between NAVSUP and NAVFAC effective as of 23 August 2017.

b. Finding of Fact 23 is modified to include additional CNRH responsibilities: "CNRH, as the ISIC to JBPHH exercises direct oversight of the installation. The JBPHH CO retains Title 10 responsibilities for safety, security, environmental stewardship, and protection of personnel and property on the installation, which extends to all fuel service and storage, including bulk fuel facilities aboard their installation."

c. Finding of Fact 25 is modified to include additional DLA responsibilities: "DLA is also responsible to perform end-to-end analysis of the risk and performance of the bulk petroleum supply chain."

d. Finding of Fact 31 is modified as follows: "An emergency oil pressure door is located at the end of the tank gallery in the lower access tunnel. The door is designed to automatically close when oil is detected in its sump (via a high-level float indicating the sump is full) or a nearby push button is activated. Closing of the door activates the fire alarm system which sets off audible and visual alarms throughout the facility and alerts the Federal Fire

Department. The door provides a fuel tight seal once closed and is designed to withhold the contents of one of the facility's storage tanks."

e. Finding of Fact 32 is modified to strike the second sentence and should read as follows: "A fire suppression system is installed to mitigate the risk of fire in the upper and lower access tunnels." This correction is due to the fact that AFFF system maintenance commenced on different portions of the system at different times and is further detailed within this report's findings of fact.

f. Finding of Fact 44 is modified to strike a comma in the second sentence which should read: "Tanks 17 and 18 were out of service for CIR maintenance, and tank 19 is permanently out of service because its capacity is not required."

g. Finding of Fact 206 is modified to replace the first sentence and should read as follows: "During the response, the CDO called the 24 /7 watch at the Waiawa pump station at 2130 and a NAVFAC Utilities and Energy Management employee responded to the scene at 2230. Upon arrival, he opened the door to the Red Hill well shaft and noted there was no fuel inside the door. He closed the door and left Red Hill shortly thereafter." This modification corrects that the NAVFAC employee that responded was not a supervisor and provides additional information.

h. Findings of Fact 38, 287 to 292 as well as Appendix C are modified to reflect the 6 April 2022 update to the quantities of fuel spilled, recovered, and potentially released to the environment. Key updated values, which are used within this report are: Total fuel spilled in the May spill was 20,957 gallons, maximum amount transferred to the AFFF retention system was 19,377 gallons, and total fuel that remains unrecovered is 5,542 gallons.

i. Finding of Fact 353 is modified as follows: "FLC Pearl Harbor is under the administrative control of NAVSUP and is assigned official additional duty to CNRH. Prior to 2020, CNRH submitted concurrent Fitness Reports on the FLC Pearl Harbor CO. The former CNRH discontinued this practice."

j. Finding of Fact 357 is modified by striking the last sentence and is modified as follows: "Per MOA between NAVSUP and NAVFAC, FLCs are responsible for providing oversight of bulk and aviation fueling operations and work functions. The MOA further establishes roles and responsibilities associated with NAVFAC Regional POL Engineers (RPEs) co-located with FLCs in support of sustainment, restoration, and modernization (SRM) programs."

k. Finding of Fact 358 is modified to substitute "10 subordinate commands" in place of "11 subordinate commands."

l. Finding of Fact 360 is modified to substitute "[Encls (37), (268)]" in place of "[Encl 37]."

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m. Finding of Fact 370 is modified to substitute "[Encl 38]" in place of "[Encl 31]."

n. Finding of Fact 372 is modified to substitute "[Encl 37]" in place of "[Encl 38]."

o. Finding of Fact 373 is modified as follows: "NAVFAC is an echelon 2 command, led by a Civil Engineer Corps Rear Admiral (O-8), with a headquarters in Washington, DC. NAVFAC is the immediate superior in command and assigned administrative control of four subordinate commands; NAVFAC Pacific, NAVFAC Atlantic, Navy Crane Center, and NAVFAC EXWC. The NAVFAC Commander reports for additional duty to CNIC as the Deputy Commander for Facilities and Environmental."

p. Finding of Fact 380 is modified to read: "COMNAVFACSYSOM, Pacific provides direct support to U.S. Pacific Fleet, and is additional duty to the Pacific Fleet Commander as the Fleet Civil Engineer. As Fleet Civil Engineer, NAVFACSYSCOM Pacific provides prioritization, general engineering and resource management advice and support for all facility and operational engineering matters to the Fleet Commander [Encls (264), (268)]."

q. Finding of Fact 387 is modified as follows: "NAVFAC EXWC is an echelon 3 major command, led by a Civil Engineer Corps CAPT (O-6). NAVFAC EXWC is located in Port Hueneme, California. NAVFAC is the immediate superior in command."

III. Findings of Fact

The Cavanaugh Report establishes a timeline of events from the May spill through the November spill and concludes with the decision to secure the Red Hill well. This supplement extends into the decision making and resulting steps following the November spill, which includes drinking water contamination.

Red Hill Overview

The Cavanaugh Report introduced key personnel and positions in the first section of the findings of fact. The below personnel are added based on their roles and responsibilities and their relevance to these events.

The Joint Base Pearl Harbor Hickam Commanding Officer (JBPHH CO) is responsible for safety, security, environmental stewardship, and protection of personnel and property on the installation. He or she enables maximum mission readiness of all tenant commands and activities by providing installation services, facilities support and quality of life programs. The commanding officer is CAPT Erik Spitzer and has been assigned to the position since July 2020. [Encl (42), (399), (403)]

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The JBPHH Public Works Officer (PWO) is assigned to directly support the installation commanding officer. He is primary duty to JBPHH and additional duty to Naval Facilities and Engineering Systems Command Hawaii (NAVFAC HI). The PWO is responsible for roughly 1,000 employees, all of which are NAVFAC HI employees but is the only NAVFAC position assigned directly under JBPHH. The PWO has roughly 30 naval officers reporting to him and the remainder are civilians. The primary responsibility is facility management, maintenance, and real property accountability for the installation. As a PWO supporting NAVFAC HI, he or she also supports reimbursable projects that are not CNIC owned. The PWO has an environmental team assigned, but there are other environmental personnel assigned to NAVFAC HI. Finally, the PWO has a Utilities and Energy Management (UEM) team assigned with responsibility for the Navy water distribution system, among other duties. The PWO for JBPHH is CAPT (b)(6) and has been in the position since late 2019. [Encl (43)]

The PACFLT Force Surgeon is responsible to support medical readiness in the PACFLT AOR and with the primary focus on operational support. CAPT (b)(6) is the PACLFT Surgeon and has been in the position since January 2020. [Encl (218)]

The Commander, Navy Region Hawaii (CNRH) Environmental Director, who also serves as the NAVFAC HI Environmental Business Line Leader, is responsible for executing the Navy Region Hawaii environmental program which is designed to protect human health and the environment. The position reports to the CNRH N4, who is also the NAVFAC HI CO. The position provides ground water modeling, development of conceptual site models, regulatory interface with the Environmental Protection Agency (EPA) and Hawaii Department of Health (DOH), and environmental sampling. (b)(6) has been serving in the position since August 2020. [Encls (40), (46), (47)]

The JBPHH Environmental Program Director reports to the JBPHH PWO and supervises the installation environmental team made up of NAVFAC HI environmental field technicians. (b)(6) has been in the position since 2017. [Encl (44)]

The NAVFAC HI UEM Branch for Potable Water Commodity Manager falls under NAVFAC HI Utility Management Branch and directly supports the JBPHH PWO. This position is responsible for all Navy water systems across Oahu. (b)(6) has served in this position since 2016. [Encls (172), (213)]

The Commander, NAVFAC PAC is RADM Dean VanderLey who relieved RDML John Adametz as the Commander in August 2021. RADM VanderLey has been in the position since. [Encl (125)]

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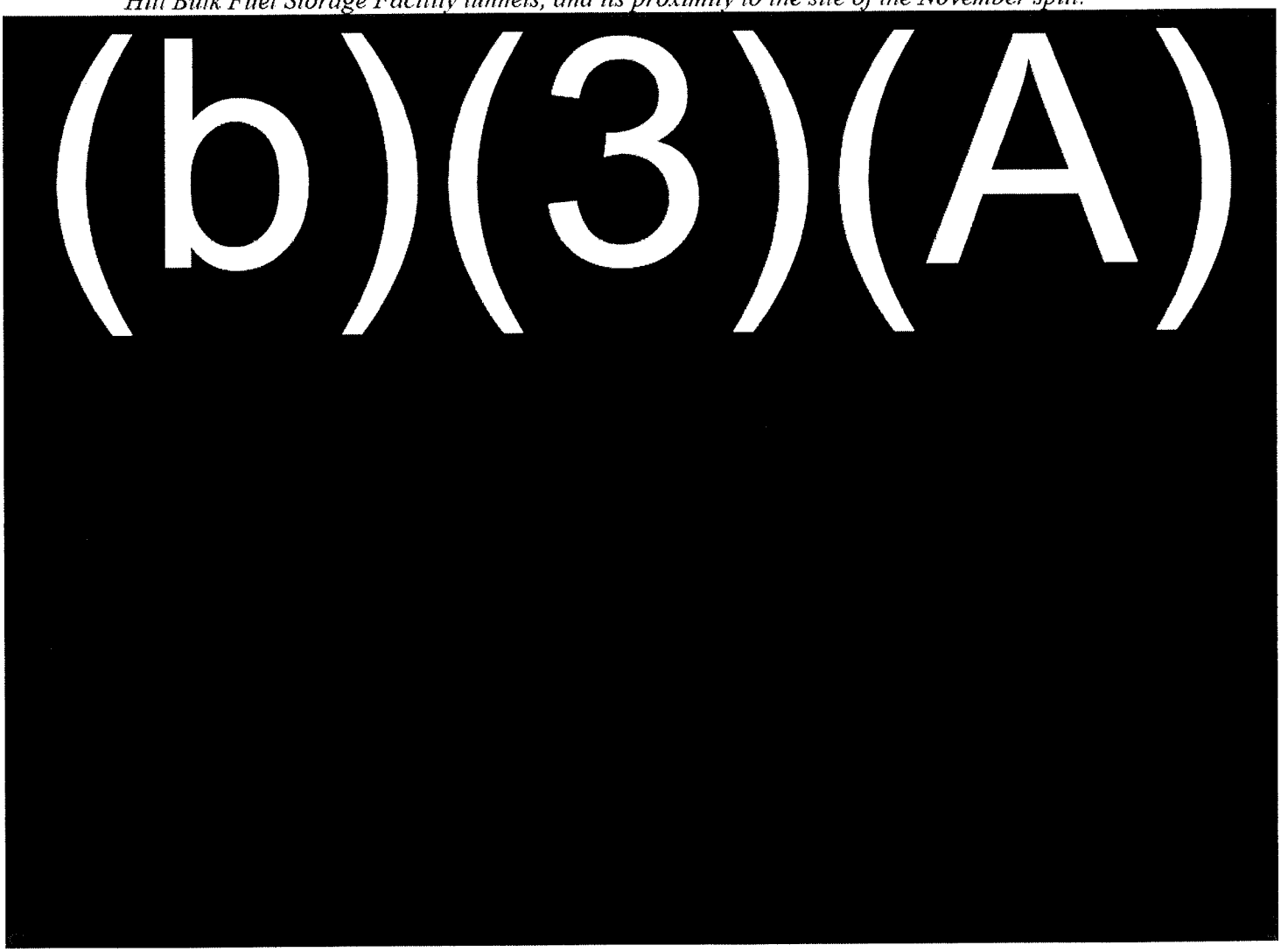
The Red Hill Well Overview

In order to best appreciate the decisions and chain of events that resulted in drinking water contamination, it is necessary to understand the Red Hill well, where it is situated inside the Red Hill Bulk Fuel Storage Facility tunnels, and its proximity to the site of the November spill.



1. The Red Hill well is described in various documents as the Red Hill Shaft, State well Number 3-2254-001, RHMW2254-01 (when used as a groundwater sampling point), and Navy Well 2254-01. This well feeds into the Navy's JBPHH Water System. [Encls (3)-(6)]

2. The Red Hill well is a Maui-type well, also known as a skimming well. This type of well requires excavation of a near-horizontal tunnel at a level appropriate to skim a thin freshwater

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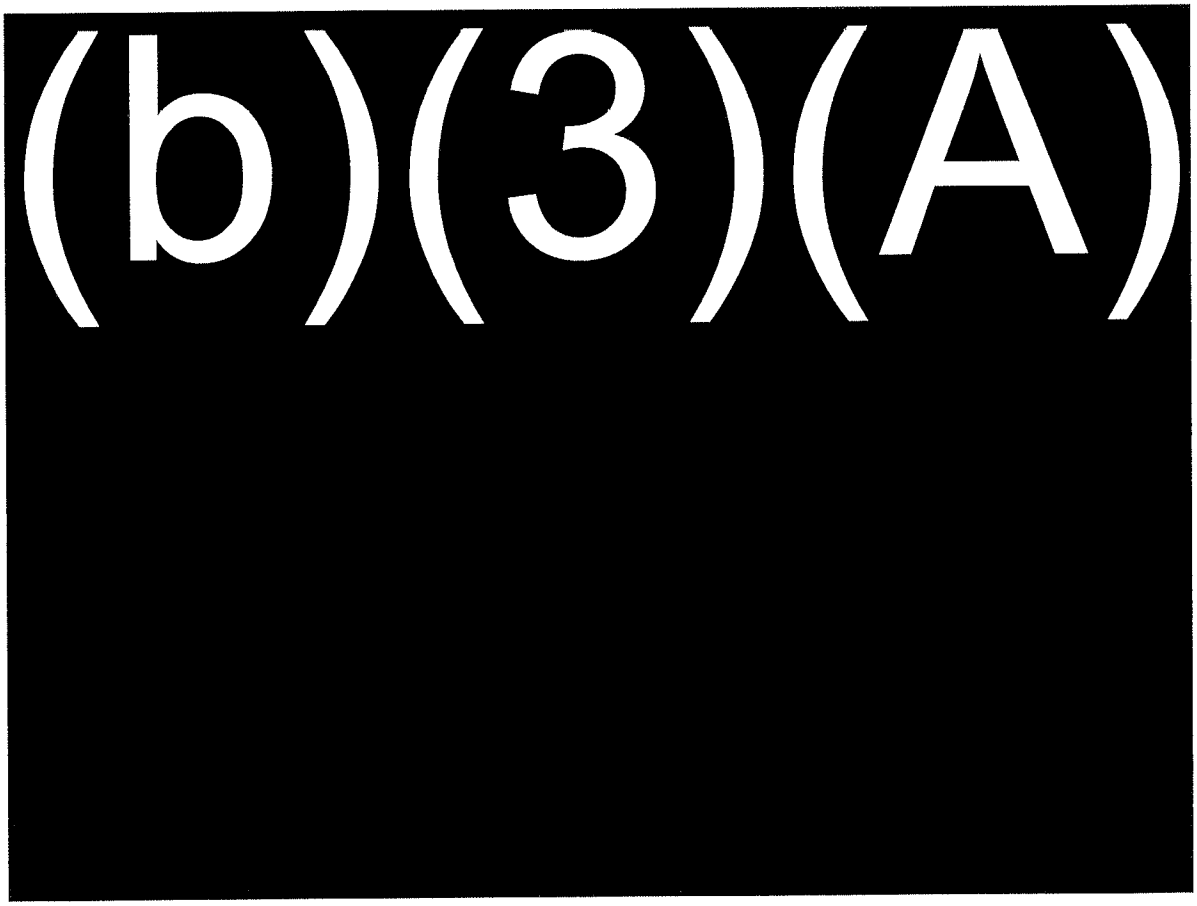
layer, known as a lens, sitting atop saltwater below it. The operator must be careful not to withdraw water too quickly and draw in salty water from below the freshwater layer, which would contaminate the well. [Encl (8)]

3. The Red Hill well is located (b)(3)(A) . [Encls (3), (9)]

4. The vertical well shaft is located within the Red Hill Pump Station, which is accessed via (b)(3)(A) . The access to the pump station is directly adjacent to the train tracks that were channeling spilled fuel to the groundwater sump during the November spill. [Encls (10)-(12)]



Red Hill well entrance with Pump Station sign to the right. The large pipe was installed to assist in flushing and was not present prior to December 2021.

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Lower Access Tunnel with AFFF retention line in top right (PVC pipe)

5. The entrance to the pump station is located (b)(3)(A) and 380 feet from the site of the ruptured Aqueous Film Forming Foam (AFFF) retention line low point drain inside the Red Hill lower access tunnel. The top of the well shaft is approximately (b)(3)(A) from the entrance of the pump station. [Encls (7), (9)]

6. Water is pumped from a 110-foot deep vertical well shaft with a bottom elevation of (b)(3)(A) sea level. [Encl (12)]

7. The well includes a horizontal water tunnel, known alternatively as a development tunnel or infiltration gallery, which is connected approximately 100 feet down the vertical well shaft. This horizontal developmental tunnel extends across the water table (b)(3)(A) . [Encls (4), (12)]

8. The bottom of the development tunnel is 3 feet below sea level and is 18 feet high by 6 feet wide. (b)(3)(A) [Encl (12)]

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9. The development tunnel crosses beneath the lower access tunnel, then turns south and passes under the lower access tunnel again. A lava tube cross cuts the water development tunnel about 300 feet before the end of the tunnel. The length of the lava tube is unknown. There is continuous water flow at the end of the water development tunnel. [Encls (9), (12)]

10. DOH has consistently expressed concern regarding the protection of the Red Hill well. The Navy regularly monitors Red Hill for contamination based on the Administrative Order on Consent and in accordance with the NAVFAC HI Groundwater Protection Plan. [Encls (3), (4)]

Response to the May spill, decision making, and key communications

On 6 May 2021, as established in the Cavanaugh Report, Red Hill operators improperly executed a fuel transfer procedure, resulting in two piping joint ruptures and a subsequent spill of Jet Propellant-5 (JP5) fuel inside the RHBFSF lower access tunnel in the vicinity of Tanks 18 and 20. The below findings of fact start from the point when the rupture and fuel spill initiated, in order to capture additional information within the context of the response to this spill. Wherever possible, events are presented in the order they occurred. Additionally, relevant findings of fact from the Cavanaugh Report have been included here for readability within the flow of events and are marked with an '' to indicate that they are from that report.*

11. The Red Hill rover was in the gauger station at the time of the incident. He heard a loud noise and immediately informed the Control Room Operator (CRO). [Encls (13)-(15)]*

12. As an emergency response, the operations order directed the watch team to stop the fuel transfer, contact the chain of command, and align the system to transfer fuel back to the source tank. [Encl (16)]*

13. At 1812, the CRO began isolating Tank 12. The CRO verified Tank 20 isolation valves closed, and the level in Tank 20 was not changing. He determined the spill was from the JP-5 pipeline and not a fuel tank. [Encls (13), (17)]*

14. At 1813, Tank 12 net volume drops 19,866 gallons (473 bbl) over 50 seconds. The tank is likely losing volume before this time, but the delayed response is due to the tank gauging's precision and the Automated Fuel Handling Equipment (AFHE) system polling frequency. [Encl (14)]

15. After donning personal protective equipment (PPE), the Red Hill rover walked through the gauger station door, near Tank 12, and into the lower access tunnel. He walked through the blast door near tank 18, saw fuel spraying in the vicinity of Tank 20, and noted the floor of Zone 7 was covered with fuel. [Encl (15)]*

16. The Red Hill rover observed the Zone 7 sump and fire suppression system Sump 1 were filled to their grates with fuel. He heard a pump running, which he assessed was the Zone 7

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sump pump. He had never heard the fire suppression system sump pumps operate, so he was not able to differentiate between different pumps in the area. [Encl (15)]*

17. The Red Hill rover closed the blast door, noting that a small quantity of fuel continued to leak through the door seal into the lower portion of the tunnel. After 5-10 minutes, he noticed fuel was no longer leaking under the door and assessed it was safe to re-enter Zone 7. Upon reentering Zone 7, the Red Hill rover saw fuel was no longer flowing from the Tank 20 pipe. He reported this observation to the CRO and evacuated the lower access tunnel via Adit 3. [Encls (14), (15), (17)]*

18. While not recognized at the time of the incident or during post-incident assessments, the fire suppression system Sump 1 pumps ran on 6 May 2021 and transferred up to 19,377 gallons of JP5 fuel into the fire suppression system retention line. Each of the four sump pumps has a 1,000-gallon per minute capacity, so this transfer could have occurred in less than five minutes. The elevation profile and capacity of the fire suppression system retention line allowed this volume of fuel to remain in the line without reaching the fire suppression system retention tank. [Encls (18)-(23)]

19. The AFFF retention line slopes down from an elevation of (b)(3)(A) sea level in the area under the bulk fuel storage tanks to a minimum elevation of (b)(3)(A) sea level approximately (b)(3)(A) and rises from there to the retention tank inlet at an elevation of 147 fcct above sea level. These elevation changes create a low area in the AFFF retention line capable of holding 30k to 40k gallons of fluid. [Encls (327)-(329)]

20. Shortly after the incident, the NAVFAC HI Construction Manager, (b)(6) was informed of the spill by an APTIM contractor who was on-site for Clean, Inspect, Repair (CIR) maintenance. The NAVFAC HI Construction Manager went to Red Hill and contacted an FLC PH Facilities Division general engineer, (b)(6) and the CDR (b)(6) NAVFAC HI Red Hill Program Management Office (NAVFAC HI PMO) Director. [Encls (24), (25)]*

21. At 1819, a Fuels Department Work Lead directed the pump operator to align valves to drain the JP-5 pipeline to surge tank 2, using the ruptured joint as a vent path. [Encls (13), (26)]*

22. At 1905, the pump operator commenced draining the JP-5 pipeline to Surge Tank 2. He completed this evolution at 1950. [Encl (13)]*

23. The Fuels Department Work Lead instructed the CRO to continue informing the chain of command. The CRO then sent the Deputy Fuels Director a text message. Once he saw the text message, the Deputy Fuels Director called the CRO and instructed him to contact the Federal Fire Department (Fed Fire). (b)(6) the Deputy Fuels Director attempted to call the Fuels Director, but he was unable to leave a voice message. [Encls (26)-(28)]*

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24. The Deputy Fuels Director called the FLC PH CO and notified him of the spill. The Deputy Fuels Director's initial report included his assessment that the spill was contained, and no fuel was released to the environment. [Encls (18), (27)]*

25. At 1937, the CRO notified Fed Fire of the spill. The Fed Fire logged the call as a "gasoline or other flammable liquid spill" and dispatched a unit at 1940. [Encls (28)-(30)]*

26. That evening, the Fuel Department Bulk Fuel Operations Supervisor called the NOSC Representative (NOSC-R), (b)(6) informing him of the spill at Red Hill and explaining it was contained in the lower access tunnel and sumps. No personnel at FLC PH requested assistance from the NOSC-R for spill response or cleanup. [Encl (31)]*

27. The responsibility of the NOSC-R, as delegated by CNRH, is to oversee the response to actual or potential Navy oil and hazardous substance (OHS) spills or releases within the CNRH area of responsibility. [Encls (31)-(33)]*

28. CNRH first learned of the fuel spill from an e-mail from the Hawaii News Now television station. CNRH Public Affairs Officer (PAO) took the lead for public affairs operations for response to the spill, per the CNRH Standard Organizations and Regulations Manual (SORM). CNRH coordinated public affairs actions with PACFLT Public Affairs (PA) and Commander, Navy Installations Command (CNIC) PA. A response to query (RTQ) was coordinated and chopped by CNRH PAO with the NAVSUP FLC PH CO, NAVFAC HI CO, CNRH COM and Chief of Staff (COS), and PACFLT PA. [Encls (34)-(37)]

29. Per the CNRH Oil and Hazardous Substance (OHS) Integrated Contingency Plan (ICP), the spilling activity fills functional roles for incident management in the Incident Command System when the spill is small. However, if cleanup is beyond the activity's capabilities, the activity is required to request assistance from CNRH. In those cases, the NOSC-R fills the role of Incident Commander and oversees a fully staffed CNRH Spill Management Team to manage the response. [Encl (39)]*

30. The FLC PH CO, in coordination with the NAVFAC HI CO and CNRH COS, determined the spill was contained and within his command's capabilities to respond. Further, he determined no fuel was released to environment. As a result, FLC PH maintained incident management responsibilities. [Encls (12), (31), (40)]*

31. At 1955, Fed Fire personnel arrived on-scene. [Encl (28), (29)]*

32. At 2113, Fed Fire turned the scene over to (b)(6) and departed the scene. (b)(6) did not reference being in charge, and Deputy Fuels Director and (b)(6) were both on the scene. Deputy Fuels Director confirmed there was no established incident command that evening. [Encls (26), (38), (41), (409)]

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33. The JBPHH CO, PWO, and Installation Environmental Program Director (IEPD) were not present at Red Hill that evening and did not know the extent of the release. [Encls (42)-(44)]

34. The FLC PH CO and NAVFAC HI CO did not respond on site. The FLC PH CO called CNRH COS and NAVFAC HI CO to report the incident but did not recall notifying anyone at the installation. [Encl (18)]

35. The NOSC-R was called but did not respond to the site per guidance from the NAVFAC HI PMO. The NOSC-R called and informed the CNRH Environmental Director. [Encls (18), (31), (41), (45)-(47), (409)]

36. After receiving a phone call from the CNRH PAO at approximately 2000 on 6 May 2021, CNRH COS contacted the FLC PH CO to inquire about the response at Red Hill. The FLC PH CO was aware of an incident but was unable to provide many details. CNRH COS then notified CNRH COM; the NAVFAC HI CO; and the PACFLT Director of Government Affairs (PACFLT GA), (b)(6) [Encl (54)]*

37. At approximately 2000, the Fuels Director became aware of the incident when she received a call from the NOSC-R. The NOSC-R reported that the Deputy Fuels Director and NAVFAC HI PMO Director were both on-scene. [Encls (31), (48)]*

38. The Fuels Director then called the Deputy Fuels Director, who informed her the spill occurred due to over-pressurization, and the Red Hill rover was evacuated. The Fuels Director did not go to Red Hill on 6 May 2021 based on a discussion with the Deputy Fuels Director. The Fuels Director was also in contact with the CRO, who was providing information about the amount of fuel recovered. [Encl (48)]*

39. The FLC PH CO initially went to the FLC PH Fuels Department building at JBPHH to obtain more information about the incident. He later met the FLC PH Executive Officer (XO) at the FLC PH headquarters building to discuss reporting requirements. The FLC PH CO, FLC PH XO, and NAVFAC HI CO did not go to Red Hill on 6 May 2021. [Encls (18), (45)]*

40. Upon arrival at Red Hill on 6 May, an FLC PH Engineering Technician, (b)(6) checked and gauged the fuel oil reclaimed (FOR) tank (tank 311). At 2030, the level in tank 311 had increased by 722 gallons and was stable. [Encls (20), (48)]*

41. From the tank gallery, the Engineering Technician noted that fire suppression system Sump 1 was filled to the grate with fuel. He checked the associated sump pump controllers for signs the pumps had activated. He noted they were in automatic mode with no audible indication and no lights illuminated. He also directed an APTIM contractor to check the fire suppression system retention tank, which was empty. [Encls (20), (21), (48), (49)]*

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42. Based on these observations, the Engineering Technician assessed the fire suppression system sump 1 pumps had not activated. If functioning properly, the pumps should have activated with a full sump. [Encls (20), (21), (50)]*

43. On 6 May, the contractor responsible for fire suppression system maintenance, *Hawaii Kinetix (Kinetix),* received a request for support from FLC PH to bypass the fire alarm system and monitor the fire pump to facilitate the cleanup. [Encl (51)]

44. At approximately 2200, the FLC PH CO, Fuels Director, and Deputy Fuels Director conducted a three-way conference call to coordinate follow-on actions. They agreed reports to Navy leadership and to regulators were required within 24 hours. [Encls (48), (52)]*

45. The Deputy Fuels Director visually estimated the amount of fuel spilled in the lower access tunnel was between 1,000 and 1,500 gallons. He recommended delaying cleanup until 7 May 2021, which the FLC PH CO approved. [Encls (48), (52)]*

46. A total of 1,580 gallons of fuel was recovered immediately following the 6 May 2021 spill. [Encl (53)]*

47. The FLC PH CO and NAVFAC HI CO subsequently informed CNRH and CNRH COS that the spill was from a ruptured piping joint and that the spill was contained. The FLC PH CO and NAVFAC HI CO assessed there was no need to immediately contact regulators since there was no release to the environment. CNRH COS and PACFLT GA agreed that formal notification could be made the following morning. [Encls (45), (54)]*

48. Early on the morning of 7 May 2021, prior to senior Navy leadership or congressional delegate notification, local media reported a fuel spill at Red Hill of approximately 1,000 gallons. [Encls (40), (45), (54)-(57))]*

49. At approximately 0700, the FLC PH CO ordered the Fuels Director to take the lead on notifications. The Fuels Director prepared a draft OPREP-3 message and a Naval Supply Systems Command (NAVSUP) Immediate CCIR report with assistance from the NOSC-R; the FLC PH Fuels Intern, LT (b)(6) and the FLC PH XO. [Encls (31), (48), (58), (59)] *

50. Between 0830 and 0840, the FLC PH CO made required incident notifications. He left a voicemail report to COMNAVSUP. He then successfully made voice reports to the NAVSUP COS, NAVSUP N4, and CNRH COS. [Encl (60)]*

51. At 0844, the FLC PH XO made a voice report to the NAVSUP Logistics Operations Center. [Encl (60)]*

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52. At approximately 0900 on 7 May, the NAVFAC HI PMO reached out to DOH to provide a courtesy notification regarding the activities overnight. He also offered DOH a tour of the site the following week. [Encls (46), (47), (61)-(64)]

53. At 0925 the CNRH Environmental Director directed the Environmental UST staff to make a courtesy call to the DOH UST point of contact for Red Hill as well, and the NOSC-R was asked to call DOH Hazard Evaluation and Emergency Response (HEER). During their conversation, HEER assigned a case number to the event. [Encl (46)]

54. At 1006, the FLC PH CO emailed COMNAVSUP a link to the local media release and stated "All released fuel was contained within the tunnel and recovered. No fuel was released into the environment." This assessment was based on visual observations alone. NAVFAC HI was unable to conduct soil vapor or groundwater monitoring until 10 May 2021, due to safety concerns. [Encls (65), (66)]*

55. On 7 May, there was a telephone call at 0900 between NAVFAC HI and both DOH and EPA. Although contained releases do not require immediate notification to regulators, contact was made for transparency. [Encl (61)]

56. On 7 May 2021, the Hawaii DOH On-Scene Coordinator, (b)(6) called the NOSC-R to ask why he had not notified her of the spill. The NOSC-R told (b)(6) there was no release to the environment, so reporting was not required. [Encl (31)]*

57. At 1200 NAVFAC HI CO directed the NOSC to submit the standard form paperwork required by the HEER office within 24 hours of an event. [Encls (46), (64)]

58. At 1323, based on information provided by FLC PH and CNRH, COMPACFLT (Acting), RADM Stephen Koehler, emailed Commander, United States Indo-Pacific Command (INDOPACOM) and Chief of Naval Operations, stating: "...the design of the lower access tunnel and the piping within prevents release to the environment via a network of drains and sumps...there was NO release to the environment." He also stated: "EPA reports no concerns due to no release to the environment...CNRH will initiate root cause analysis/investigation and facilitate repair of failed piping." [Encl (57)]*

59. On 7 May 2021, FLC PH Fuels Department reported to Defense Logistics Agency (DLA) that less than 1,000 gallons of fuel spilled. [Encl (68)]*

60. On 7 May 2021, FLC PH conducted an operational pause. This event was focused on damage assessment and cleanup. It was not focused on determining the cause of the incident or conducting training. [Encl (69)]*

61. On 7 or 8 May 2021, a FLC PH Facilities Division Engineering Technician contacted the fire suppression system contractor, *Kinetix*, to request an inspection of the fire suppression

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system. Fire suppression system Sump 1 remained filled with fuel. During the inspection, *Kinetix* concluded the pumps had not activated based on checking the Gamewell control panel, which is designed to record system activity. However, following the 20 November 2021 spill, *Kinetix* contractors assessed that the direct digital controller was not properly communicating with the Gamewell control panel. [Encls (20), (21)]*

62. On 7 May 2021, the Deputy Fuels Director directed the Control Division accounting team to conduct a post-spill inventory reconciliation. They noted that the AFHE system recorded a drop in tank 12 fuel level of 19,983 gallons between 1801 and 1818 on 6 May 2021. Additionally, a loss of 20,139 gallons was recorded in Fuels Manager Defense (FMD) for all JP-5 evolutions on 6 May 2021. [Encls (22), (70), (71)]*

63. On 7 May 2021, FLC PH Facilities Division engineers determined the volume of spilled fuel was equal to the volume of the main pipeline and cross piping above the damaged dresser coupling at tank 20. They calculated this volume as 1,016 gallons. At this point, they did not know the tank 18 dresser coupling was also damaged, because it was behind a maintenance partition. [Encl (72)]*

64. CNRH PA issued a press release on 7 May informing that Navy personnel responded to a reported release of fuel from a distribution pipeline inside the Red Hill Bulk Storage Facility on the evening of 6 May. The release stated that preliminary reports indicated approximately 1,000 gallons of fuel released during a fuel transfer and fuel was properly collected by the fuel containment system. The release also included that there were no leaks from fuel tanks and that the fuel release was detected immediately and the system worked as designed to collect, isolate and contain fuel safely. [Encls (34), (73)]

65. Following the first press release related to the spill, PACFLT was contacted by staff members from the Hawaii delegations requesting to review future press releases before they were sent. Up to that point, the review process for Red Hill related press releases included CNRH PAO, PACFLT PA, and PACFLT GA. NAVFAC HI PMO for Red Hill and CNRH Chief of Staff (COS) would often send press release information directly to PACFLT GA. CNRH would not release a Red Hill related message without PACFLT's approval. [Encl (74)]

66. On 7 May, NAVFAC HI CO emailed CNRH COS expressing concerns about how the investigation into the spill should be conducted. NAVFAC HI CO believed the investigation should not be led by FLC PH. [Encl (75)]

67. As part of the continued cleanup effort, FLC PH requested *Kinetix* to return on 10 May and repeat the same actions from 7 May in bypassing the fire alarm system and monitor fire pump to facilitate further clean up in the vicinity of the lower tunnel. [Encl (51)]

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68. On 12 May 2021, CNRH asked COMNAVSUP to conduct an external investigation into the events of 6 May 2021. He noted there was significant damage and had concerns about FLC PH's ability to conduct an adequate internal investigation. [Encls (54), (76)]*

69. On 12 May, COMNAVSUP emailed PACFLT COM informing him that he will be initiating a NAVSUP led investigation in support of CNRH into the spill at Red Hill, and is aligned with PACFLT GA, PACFLT N4, CNRH, NAVFAC, and DLA. [Encl (77)]

70. FLC PH requested *Kinetix* to return a final time on 13 May to return the fire alarm and fire suppression system back to normal because clean-up of the spill was complete. [Encl (51)]

71. On 13 May 2021, COMNAVSUP appointed Naval Petroleum Office (NPO) Deputy Officer in Charge (OIC), (b)(6) to conduct a command investigation into the facts and circumstances surrounding the 6 May 2021 fuel spill at Red Hill. The order noted that FLC PH was conducting its own administrative review and NAVFAC Engineering and Expeditionary Warfare Center (EXWC) was conducting a root cause analysis of the incident. The appointing order further instructed (b)(6) to conduct a review, validation, and consolidation of the FLC PH and NAVFAC EXWC efforts, in addition to the NAVSUP Headquarters-level investigation of the incident. The completed report, including opinions and recommendations, was due by 10 June 2021. This deadline was extended to 30 June 2021. [Encls (78), (79)]*

72. COMNAVSUP appointed the NPO Deputy OIC as the investigating officer, because the NPO OIC was conflicted, having already been appointed in March 2021 to investigate an FLC PH personnel matter. [Encls (80)-(82)]*

73. On 10 May DOH performed a Red Hill site visit and requested the addition of daily soil vapor monitoring to the ongoing sampling requirements of the AOC. Daily soil vapor readings continued through 9 June. [Encl (46)]

74. Following the release on 6 May, soil vapor monitoring was delayed in the ports under Tanks 17, 18, and 20 until they were remediated. When these ports were opened for sampling on 10 May, samplers noticed that they had been compromised by fuel. The Navy had to excavate soil, clean the probes, and change fittings to reduce the potential for false positives. [Encls (46), (83)]

75. On 12 May 2021, the FLC PH CO emailed COMNAVSUP, reporting the total quantity of fuel recovered was 557 gallons. He stated: "Levels in the sump tank have been holding steady to confidently state 557 as the quantity of the release." This was the last total reported to him by the Deputy Fuels Director. [Encls (57), (84), (85)]*

76. NAVFAC HI increased the sampling of their soil vapor monitoring ports from quarterly to daily for the week following 6 May 2021, and then weekly for the following four weeks. [Encls (86), (87)]*

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77. The following week, an FLC PH Facilities Division general engineer, (b)(6) discovered the dresser coupling for tank 18 had also been damaged during the 6 May 2021 incident. This discovery prompted a recalculation of the spilled fuel based on the volume of the main pipeline and cross piping above the damaged dresser coupling. They calculated this volume as 1,618 gallons. [Encls (88), (89)]*

78. On 26 May 2021, the FLC PH Control Division Supervisory Management Analyst, (b)(6) created a memorandum for the record (MFR) documenting a total inventory loss of 20,139 gallons in the FMD accountable property system of record. The MFR stated, "Per Operation Controller…this evolution was cancelled and did not occur. The 19,983 gallons was put into the pipeline and not accounted for inside any tank." [Encl (71)]*

79. Based on the Facilities Division engineering assessment on 17 May 2021, a volume of 1,618 gallons was accounted for as spilled, and a volume of 18,521 gallons was accounted for as having remained in the pipeline. The inventory discrepancy was reported to the Deputy Fuels Director, who reported this to the FLC PH CO. However, the FLC PH CO did not recall this report. [Encls (18), (53), (70), (71), (90)]*

80. Although not involved in the volume assessment at the time, when interviewed in March 2022 the DLA Energy East Pacific Commanding Officer assessed that it is impossible for fuel to be put or "packed" into the pipeline and subsequently not accounted for because the pipeline is assumed full in the FMD accountable property system. [Encls (91), (92)]

81. FLC PH's final determination from 6 May 2021 was 1,618 gallons spilled, with 1,580 gallons recovered. The FLC PH CO was not involved in any discussions regarding the final amount of fuel spilled. [Encls (18), (53), (71)]*

82. DOH held a Fuel Tank Advisory Committee (FTAC) meeting on 20 May to brief members on updates regarding the AOC and FTAC activities. NAVFAC HI CO provided a brief on the 6 May release and technical updates that had been completed since the last meeting. [Encl (93)]

83. On 21 May DOH conducted a site visit at Red Hill. They observed sampling and the pipeline rupture at Tank 18. DOH indicated they would be providing improvements to the monitoring plan the next week. [Encl (94)]

84. On 28 May 2021, the FLC PH Business Department Director issued a memorandum to the NPO Deputy OIC providing the findings of his Management Inquiry. The synopsis of the findings stated, based on the evidence collected from employee interviews and analysis of documents and records, that the Fuels Department received a rating of SATISFACTORY (with minor concerns) in the inquiry's three focus areas: (1) records management, (2) training and qualifications, and (3) inspections and preventive maintenance. The FLC PH Business Department Director noted the inquiry was not meant to be a root cause or technical analysis of

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the fuel release. The inquiry's focus was to ensure personnel are properly trained and to document whether inspections and preventive maintenance were conducted. [Encl (17)]*

85. During the investigation that followed the 6 May 2021 spill, the NAVFAC HI CO directed the NAVFAC HI Chief Engineer, (b)(6) to validate the amount of fuel lost. He shared concerns with (b)(6) that the calculations were based on an incorrect assumption that the pipeline was not pressurized, and therefore the loss calculation was too low. However, he did not revisit this concern until October, after the NPO Deputy OIC amended his investigation. [Encls (45), (78), (95), (96)]*

86. Although known to the NPO Deputy OIC at the time, he did not provide NAVFAC HI documents indicating the approximately 20,000 gallon loss of inventory reported in FMD on 6 May, when he requested assistance in validating the FLC PH calculations of fuel lost. [Encl (70]

87. Between 4 and 8 June 2021, total petroleum hydrocarbons oil and grease for Red Hill ground water monitoring well 03 increased above the Environmental Action Level. All follow-on samples were below the Environmental Action Level. [Encls (98), (99)]*

88. Between 3 and 4 June 2021, the NPO Deputy OIC provided an update to members of the PACFLT staff on the status of his investigation as well as his coordination with NAVFAC EXWC and FLC PH. [Encl (100)]

89. On 4 June 2021, CNRH COS requested additional input from the NPO Deputy OIC regarding the expected timeline to complete the command investigation. [Encl (101)]

90. Following coordination with the NPO Deputy OIC and members of the PACFLT staff, PACFLT COM provided a status update on the command investigation to Commander, U.S. INDOPACOM. [Encl (102)]

91. On 8 June 2021, the NPO Deputy OIC provided members of the PACFLT staff with an initial estimate on how much JP-5 was released to the environment and not recovered as well as a preliminary assessment on the potential impact it had on the environment. [Encl (103)]

92. On 9 June 2021, following further engagement with the PACFLT N40 team, the NPO Deputy OIC provided clarification on the estimated number of gallons released. PACFLT N40 acknowledged receiving the estimate and requested an update on when the NAVFAC HI chief engineer would be done validating the estimates. [Encl (104)]

93. On 9 June 2021, CNRH received a Release Confirmation and Request for Information from DOH, which changed the sampling requirements to soil vapor monitoring every two days and monitoring well sampling three times per week within the tunnel. [Encls (46), (47), (105)]

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94. On 10 June 2021, the NAVFAC HI Chief Engineer reviewed the initial estimates of the spill calculations and communicated his review to the NPO Deputy OIC and the NAVFAC HI PMO Director. [Encl (106)]

95. On 10 June 2021, the NAVFAC HI Chief Engineer validated the calculations of the FLC PH Facilities Division engineers. He concluded that the calculations were reasonable for a static system; however, he said these would not have been correct if the plant was pressurized. The NAVFAC HI PMO Director informed the NAVFAC HI Chief Engineer the pumps were off and the plant was not pressurized. This was confirmed by the FLC PH Facilities Division engineers. [Encl (78)]*

96. In his 10 June 21 validation of the calculations, the NAVFAC HI Chief Engineer states that "No information regarding post break pressure has been provided and therefore impossible to determine any additional lost fuel." Although the data was available in the AFHE system, the NAVFAC HI Chief Engineer was unaware, at the time, that the Tank 12 isolation valves were open for approximately 2 minutes following the pressure transient that damaged the pipeline. This applied pressure to the damaged pipeline based on the weight of fuel in Tank 12. [Encls (78), (14)]

97. On 11 June, the NPO Deputy OIC informed the PACFLT staff and the CNRH COS that the preliminary estimates on the number of gallons released from the May spill were validated by the NAVFAC HI Chief Engineer. [Encl (107)]

98. PACFLT GA stated that the PACFLT staff maintained a strong interest in the NPO Deputy OIC investigation from a government affairs perspective to stay informed and enable information flow to key government officials. [Encls (108)-(110)]

99. On 11 June 2021, NAVFAC HI CO, PACFLT N4, CNRH COS, and the NPO Deputy OIC discussed validating the spill numbers. [Encls (97), (101), (124), (177), (178)]

100. On 25 June 2021, the NPO Deputy OIC submitted his investigation report. The investigation focused on determining the cause of the 6 May 2021 fuel spill, how much was released, and the impact of the release on the environment. It noted each objective of the appointing order was met with the exception of validating the work of the engineering root cause analysis contracted by NAVFAC EXWC, which was not complete at that time. As part of the NAVSUP investigation, he interviewed a number of FLC PH personnel, including CROs, Red Hill rovers, and supervisory staff. [Encl (111)]*

101. Although known at the time, the NPO Deputy OIC did not include in his report the fact that the FMD inventory ledger from May 6 indicated a fuel loss of approximately 20,000 gallons because he did not deem it relevant. [Encl (97)]

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102. Following the 6 May incident, CNRH signed COMNAVREGHINST 3440.18: "COMNAVREG Hawaii Red Hill Bulk Fuel Storage Facility Emergency Response Notification Coordination Plan" as a supplemental guide for emergency response notification and coordination actions to take during a fuel, oil, or hazardous substance release as well as any other non-release related emergency situations within the Red Hill Storage Facility. [Encl (112)]

103. The NAVSUP investigation did not reveal a directly attributable cause for the 6 May 2021 fuel spill. The report stated that additional engineering analysis was needed. [Encl (78)]*

104. The NAVSUP investigation concurred with FLC PH's assessment of the quantity of fuel spilled on 6 May 2021. The NPO Deputy OIC, working with FLC PH Facilities Division engineers, determined 1,618 gallons spilled and 1,580 gallons were recovered. He concluded 37.9 gallons were released to the environment. The FLC PH CO was not aware of the 37.9 gallons released to the environment until after his change of command in August. On 1 October, NAVFAC HI Environmental Business Line Leader, (b)(6) forwarded a memorandum to the Hawaii DOH reporting 1,618 gallons spilled and 1,580 gallons recovered. [Encls (13), (97), (111), (113), (114)]*

105. A contested case hearing was held on 8 July to hear testimony on soil vapor monitoring following the 6 May pipeline discharge. [Encls (115, (116)]

106. Results of samples taken from the Red Hill well on 8 and 15 July as part of the ongoing monitoring program showed a detection of total petroleum hydrocarbons, oil (TPH-O) below the Environmental Action Level (EAL). When the samples were analyzed using the silica gel cleanup method, there were no detections. The sample taken on 29 July showed an estimated detection of TPH-O. This detection remained estimated following use of the silica gel cleanup procedure. These were reported to DOH on or around 24 September. [Encls (94), (98)]

107. Silica gel cleanup is intended to exclude naturally occurring organics from quantitative extractable petroleum hydrocarbon results. The process is based on the premise that most naturally occurring hydrocarbons are polar and will be captured by the activated silica gel. Examples of these organics include lipids, plant oils, humic acids, and fatty acids. However, silica gel will remove any polar organic compound, not just naturally occurring ones. This could include breakdown products from the weathering of petroleum hydrocarbons. DOH does not recognize the use of silica gel cleanup. [Encls (117), (118)]

108. On 13 July, the contested case post hearing briefs were submitted. The Navy requested that the permit move forward. [Encl (115)]

109. Samples taken from the Red Hill well on 5 and 26 August showed results for TPH-O that exceeded the EAL. TPH-O was also detected on 12 and 19 August but below the EAL. When the samples were analyzed using the silica gel cleanup method, there were no detections. These

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results were reported to DOH and discussed prior to 1 November. The EAL is not a health-based level and was not considered an immediate concern. [Encls (94), (98), (188)]

110. In August 2021, the new FLC PH CO and Fuels Director questioned the 6 May 2021 fuel spill calculations. Based on a discussion with the FLC PH Lead Regional Fuel Engineer, (b)(6) [redacted] they accepted his explanation that the drop in Tank 12 was consistent with fuel being repacked into the main pipeline. [Encls (121), (22)]*

111. In August the Navy submitted the Supplemental Tank Upgrade Alternatives document to the State as part of the continuing permitting process. [Encl (119)]

112. A sample taken from the Red Hill well on 1 September resulted in a detection below the EAL for TPH-O. When analyzed using the silica gel cleanup step, the detection decreased and became estimated. [Encl (98)]

113. On 7 September 2021, NAVFAC EXWC Technical Director, [redacted] (b)(6) issued a memorandum to the NPO Deputy OIC providing the results of a root cause analysis of damage during the 6 May 2021 event conducted by Austin Brockenbrough and Associates, LLC, a private engineering and consulting firm. Per NAVSUP guidance, the FLC PH CO was unable to release the root cause analysis report to the Fuels Department. FLC PH Fuels Department operators and engineers did not know the root cause of the 6 May 2021 spill until training conducted during an operational pause following a pressure transient event on 29 September 2021. The training consisted of one slide that focused on the operator error and mitigations implemented by the command. [Encls (14), (123)]*

114. As part of the root cause analysis, the written report produced a timeline of events of the entire incident. Within the timeline, the report identified a net volume drop of 473 barrels within approximately 50 seconds, which equates to 19,866 gallons. While this information was contained in the root cause analysis, none of the technical personnel that reviewed the report identified this as an issue worth exploring. [Encls (14), (124)-(129)]

115. EXWC stated that personnel from Austin Brockenbrough that were involved in drafting the root cause analysis did not highlight the 473 barrels beyond notating it in the timeline of the report. Personnel from Austin Brockenbrough had internal discussions about the 473 barrel drop, but did not communicate anything on the matter beyond what was in the report. Because the purpose of their report was to determine the engineering failures associated with the May spill, the 473 barrel drop was only important to them because it was the final time stamp of events where the analysis in the report terminated. [Encls (14), (124)-(129)]

116. On or about 10 September, the Hearing Officer recommended approval of the Red Hill Fuel Storage Facility operating permit. [Encl (130)]

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117. On 15 September 2021, the NPO Deputy OIC issued an amendment to his investigation to incorporate the engineering root cause analysis. The analysis concluded the double block and bleed valve of Tank 12 was opened, and a rapid inflow of fuel resulted in the collapse of a vacuum created by operator error. The resulting pressure wave displaced the piping, damaged the dresser couplings, and resulted in a level decrease of 473 barrels (19,866 gallons) in Tank 12. The only recommended corrective action was to reinforce training on operations orders. The investigation did not evaluate the effectiveness of the operations orders, training, and qualifications. Additionally, the investigation did not address the 19,866-gallon discrepancy or recommend accountability actions. [Encls (111), (131)-(133)]

118. Although contained within a single line item within an attachment to the root cause analysis, which is itself an attachment to the NPO Deputy OIC led investigation, the 19,866 gallon discrepancy was not called out in the main body of the report. Additionally, the investigation did not review or address the response to the May spill. [Encls (14), (111)]

119. On 17 September 2021, NAVSUP provided an update to PACFLT COM on the status of the NPO Deputy OIC report. NAVSUP informed that the report was complete and was amended to include the root cause analysis report from EXWC, and that the total fuel release was 1,618 gallons of which 1,580 gallons was recovered. [Encl (133)]

120. Samples taken from the Red Hill well on 15, 22, and 29 September showed detections of TPH-O. Following the silica gel cleanup method, the detections remained though the ones taken on 22 and 29 September became estimated. It should be noted that there were quality control concerns that bring these results into question. The analyte was found in the blank when all of these samples were analyzed. [Encl (98)]

121. On 17 September the CNRH Environmental Director sent an Initial Release Response Report to DOH in response to the 9 June NOI. [Encls (134), (135)]

122. Also on 17 September CNRH received a follow up Request for Information letter expressing DOH's concern that the investigation into 6 May was still ongoing and that the reporting DOH had reviewed so far was deficient. [Encl (136)]

123. On 28 September 2021, FLC PH CO briefed PACFLT COM and staff members on the NPO Deputy OIC report as well as an update on the Red Hill Operating permit. Following this brief, NAVFAC PAC initiated an additional report to capture the mitigation measures and follow-on repair actions to address the underlying engineering causes to the May spill. The additional mitigations report was tasked to EXWC to complete. [Encls (125), (127), (133)]

124. On 1 October 2021, PACFLT COM notified COM INDOPACOM of the results to the 6 May investigation. PACFLT GA initiated the process to coordinate notification to regulators and state officials. [Encl (133)]

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125. On 1 October 2021, CNRH issued a letter to DOH reporting the May spill investigation results (signed by CO NAVFAC HI / CNRH N4). Additionally, NAVFAC HI CO responded to the 9 June NOI from DOH and reported that the collection system functioned as designed and 1,618 gallons were released. [Encl (114)]

126. On 1 Oct 2021 at 1134, PACFLT GA sent an e-mail to professional staff members for the Hawaii congressional delegation, state government representatives, and city of Honolulu representatives providing an update on 6 May 2021 Red Hill spill investigation under review by PACFLT. PACFLT GA shared the findings that the spill was caused by operator error resulting in the release of 1,618 gallons with all but 38 gallons recovered. [Encl (137)]

127. In October 2021, after the root cause analysis and NAVSUP command investigation was finalized, the NAVFAC HI CO reiterated his concerns with the previous spill calculations, this time to the FLC PH CO. He was concerned the system was pressurized and the calculations were based on the system being under static conditions. The FLC PH CO informed the NAVFAC HI CO that the extra fuel was repacked into the main pipeline and that this was validated by the NAVFAC HI PMO Director. [Encls (45), (95)]*

128. Samples taken from the Red Hill well on 6 October resulted in an estimated TPH-O detection. There were no detections for the samples taken on 13, 20, or 26 October. When analyzed using the silica gel cleanup step, the detection decreased and became a non-detect. [Encl (233)]

129. Between June and September, various senior leaders from the PACFLT and CNRH staffs reviewed drafts of the NPO Deputy OIC investigation report. During the course of that review, members identified various deficiencies or concerns with the draft and generally assessed it was not thorough or well done. Of note, no one identified the discrepancy of the 20,000 gallons. While there were some discussions with the PACFLT legal office and senior leaders of the PACFLT staff on the appropriateness of communicating their issues or concerns about the draft report to NAVSUP, ultimately no one communicated these concerns or issues to NAVSUP prior to the investigation being closed out. On 14 October 2021, COMNAVSUP signed a close out endorsement on the NPO Deputy OIC investigation report of 15 September 2021. [Encls (11), (108), (109), (125), (138), (177), (178), (404)]

130. On 18 October 2021, NAVFAC PAC COM signed out a first endorsement of the 15 September 2021 NPO Deputy OIC report, which was addressed to Commander, U.S. Pacific Fleet. As part of this endorsement, NAVFAC PAC COM pulled together the root cause analysis and mitigation report that was produced by EXWC. The endorsement recommended that PACFLT COM approve the NPO Deputy OIC investigation of 15 September 2021 as well as the EXWC mitigations report and root cause analysis. [Encls (125), (139)]

131. On 20 Oct 2021, NAVFAC PAC COM provided a brief to PACFLT COM and members of the staff on the mitigations report along with the NPO Deputy OIC report of 15 September 2021.

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The brief included an overview of all investigations through present day along with a public release plan of the reports, which would happen just prior to the FTAC Hearing on 28 October 2021. [Encls (125), (140), (141)]

132. The 18 October 2021 close-out endorsement letter from NAVFAC PAC COM included a signature block for PACFLT COM to indicate a decision but it was never signed. During his interview, COMNAVFAC PAC stated that his endorsement to PACFLT COM was intended to create a record of actions to account for repairs but a more appropriate document would have been a memorandum for the record. [Encls (125), (140)]

133. On 26 October CNRH received a Notice of Violation and Order, No. 21-UST-EA-0 from DOH based on an inspection of the RHBFSF that occurred during the period of 3 September to 9 October 2020, approximately one year earlier. CNRH had not previously received notification of the inspection results. Violations did not include anything directly related to the events discussed herein and are being addressed by the Navy Litigation Office. [Encls (47), (142), (143)]

134. CNRH PA issued a press release on 26 Oct 2021 informing that the investigation determined operator error caused the release of 1,618 gallons of jet fuel (JP-5) from pipelines inside the Red Hill Bulk Storage Facility on 6 May. The press release said the Navy recovered all but 38 gallons of fuel and had implemented new procedures. The press release also said that copies of the investigation were provided to DOH and EPA. As part of this release, CNRH made available to the public redacted copies of the NPO Deputy OIC report, EXWC root cause analysis, and EXWC mitigation report. [Encls (35), (74), (144)]

135. On 28 October, the FTAC meeting received technical updates from CNRH COM and NAVFAC HI CO. This group met to provide updates on the current efforts of the AOC and FTAC and included an update on the 6 May spill. [Encl (145)]

136. Samples collected at the Red Hill well on 3 November did not detect petroleum hydrocarbons. Samples collected at the Red Hill well on 10 November showed an estimated detection of total petroleum hydrocarbons, diesel (TPH-D), which decreased to non-detect with silica gel cleanup. Samples collected on 17 November showed estimated detections of TPH-D and a detection of TPH-O below the EAL. After application of the silica gel cleanup step, these samples decreased to non-detect. [Encl (233)]

137. On 1 November, the four congressional members of the Hawaii delegation sent a letter to the Secretary of the Navy (SECNAV) to express increasing concern about the safety of fuel operations at Red Hill following reports about a fuel leak near Hotel Pier that occurred in March 2020. The letter expressed disappointment regarding the lack of communications with regulators, state officials, and the public and the Navy not being more forthcoming. [Encl (146)]

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138. On 9 November, the Honolulu Star Advertiser reported whistleblower allegations about Red Hill. The article states that Hawaii environmental regulators were informed that the Navy did not disclose there were holes and corrosion in the Red Hill fuel tanks during the state permitting process. [Encl (147)]

139. On 16 November there was a meeting between Navy representatives and DOH where the Navy proposed updating environmental monitoring requirements to address laboratory concerns (including lab availability, capacity, and turn around time) and reducing monitoring frequency. The decision was pending at the time of the 20 November release, at which point it was overcome by events. [Encl (148)]

Response to the November spill, decision making, and key communications through 7 December 2021

On 20 November 2021, as established in the Cavanaugh Report, a Red Hill watch stander inadvertently struck a low point drain valve in the AFFF retention line with the passenger cart of a train, cracking the PVC pipe and spilling up to 19,377 gallons of fuel deposited there on 6 May. Up to 5,542 gallons of fuel remain unrecovered, with some portion of that fuel contaminating the Red Hill well and the Navy drinking water distribution system.

As fuel from the damaged AFFF retention line flowed into the Red Hill tunnel near Adit 3, it ran downslope between the train tracks to the Adit 3 Y, where the flow was divided. A small portion flowed down the Harbor Tunnel and dissipated. The majority flowed toward Adit 3 and was deposited in the groundwater and CHT sumps approximately (b)(3)(A) *from the tunnel entrance. Following notification of the incident, the FLC PH CO and NAVFAC HI CO walked the length of the AFFF retention line, and noting its connection to fire suppression system Sump 1, realized the fuel in the pipeline originated from the 6 May 2021 spill.*

While the Cavanaugh Report provides a detailed accounting of the immediate response actions by personnel from FLC PH, the Federal Fire Department, and NAVFAC HI, the below findings of fact amplify some communications captured in the Cavanaugh Report, and expands the timeline to capture actions taken beyond 28 November. This section begins on 20 November just after 1650, at the point fuel was released from the AFFF retention line low point drain. Wherever possible, events are presented in the order they occurred and are divided into sections by day. Additionally, appropriate findings of fact from the Cavanaugh Report have been included here for readability within the flow of events and are marked with an '' to indicate that they are from that report.*

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20 November 2021

140. The CRO contacted FLC PH Fuels Department Engineering Technician, (b)(6) and reported water leaking out of the fire line. The Fuels Department Engineering Technician immediately called *Kinetix*. *Kinetix* dispatched a technician. [Encl (20)]*

141. Shortly after the first report to the CRO, the Red Hill rover reported that the leak smelled like fuel. The assistant CRO directed the Red Hill rover to attempt to identify what kind of liquid was coming from the pipe. [Encls (149), (150), (151)]*

142. At the scene, the Red Hill rover closed the ventilation door leading to the lower section of Adit 3. This did not prevent the flow of fluid from entering the section of the tunnel downgradient from the leak, due to a gap between the bottom of the door and the deck. The rover also unplugged the train to prevent any potential for a spark. He then attempted to locate a fire suppression system isolation valve to stem the flow of what he assessed as a fuel/water mixture, but was unable to find one. Meanwhile, the leak's location near an exhaust fan resulted in fuel vapors being blown into the outside environment. The Red Hill rover considered securing the exhaust fan next to the leaking low point drain, but he did not. [Encls (122), (149), (150)]*

143. The second Red Hill rover arrived on-scene, but both Red Hill rovers left shortly thereafter due to the buildup of fumes. Both Red Hill rovers exited via Adit 3. After exiting, the first Red Hill rover washed his eyes with water, because they were burning. He then re-entered Adit 3 and ascended to the upper tunnel via the elevator. He located and closed a fire suppression system supply line isolation valve at Adit 6 in the Red Hill upper tunnel, which had no effect on the leak. [Encl (150)]*

144. The Deputy Fuels Director, monitoring operations via a radio from home, overheard reports to the CRO. Once he heard reports of a fuel smell, he ordered the CRO to secure all fuel transfer operations and to call the Federal Fire Department. The Deputy Fuels Director contacted the Fuels Director, who notified the FLC PH CO of the incident. The Deputy Fuels Director arrived on-scene shortly thereafter. [Encl (27)]*

145. At 1718, the CRO contacted Fed Fire. Fed Fire assets were dispatched at 1720 and arrived at 1735. Fed Fire personnel noted a fuel odor at the entrance of Adit 3. A small team entered the tunnel and assessed the leak was not contained, as fuel continued to spill. Fed Fire then took air quality readings and established additional ventilation while FLC PH employees unsuccessfully attempted to isolate the leak. [Encls (149), (152)]*

146. The CNRH ROC called CNRH COS at approximately 1730 and informed him that Fed Fire had responded to Red Hill. CNRH COS then called the FLC PH CO, who informed him there was an ongoing leak at Red Hill that appeared to be water from a fire main. CNRH COS subsequently called the NAVFAC HI CO, who reported the same information. CNRH COS

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informed PACFLT GA, who asked him to notify Congressional Delegates (CODELs) and regulators. [Encls (54), (153)]*

147. At approximately 1745, the Deputy Fuels Director arrived on scene. During the drive to Red Hill, he smelled fuel from the H-3 interstate and, upon arrival, concluded the smell was coming from Red Hill. [Encls (122), (154)]*

148. The FLC Deputy Fuels Director stated that the groundwater sump in Adit 3 was not pumping fuel when he got to the scene, but it had been in automatic at the start of the release and was disabled prior to his arrival by FLC staff. This is contradicted by the statement of the FLC engineering technician who states that he secured the pumps after Fed Fire certified the area safe at approximately 2157. [Encls (20), (41), (156), (409)]

149. Although initial responders knew the spill was mostly fuel, the FLC PH CO and NAVFAC HI CO understood it to be water, based on the first reports they received. At 1815, they participated in a group text with the CNRH COS and informed him that the spill in progress at Red Hill was water. [Encls (45), (54), (121), (153), (157)]*

150. The FLC PH CO consulted the CNRH Red Hill Fuel Storage Facility (RHFSF) response plan in the Red Hill control room and understood that he needed to act to control, contain, and recover. However, the guidance was not specific to this type of incident, and the plan does not reference securing the Red Hill well. The FLC PH CO remained convinced of his ability to handle the response throughout the incident. [Encls (12), (158)]

151. While Fed Fire was establishing ventilation in Adit 3, the Fuels Department Engineering Technician accessed the lower access tunnel via Adit 5. He checked the low point drain of the fire suppression system retention pipeline at the main sump and found fuel in the line. He also isolated two valves in the fire suppression system retention line near the oil-tight door in the lower access tunnel. He then returned to the leak location where Fed Fire and FLC PH personnel were completing the safety evaluation. [Encl (20)]*

152. The acting CNRH Environmental Director, who is dual-hatted as the NAVFAC HI Red Hill Production Management Office (PMO) Director, was at the scene based on his primary duty as PMO. The CNRH Environmental Director was off island for leave from 20 November – 2 December. The FLCPH CO felt that if there was a concern regarding a release to the environment, the acting Environmental Director would have informed CNRH that the situation was not stable and/or manageable and the recovery efforts per the CNRH RHFSF response plan were not sufficient to mitigate a risk of release. [Encls (12), (47), (158), (159)]

153. At 1840, the NAVFAC HI PMO Director called the NOSC-R to notify him of a fire main break at Red Hill. The NAVFAC HI PMO Director relayed that only water spilled and asked the NOSC-R if they were required to report the incident. The NOSC-R advised a report was not required for a water spill. The NAVFAC HI PMO Director told the NOSC-R it did smell like

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fuel, but this was because the water was entering sumps and causing agitation. The NOSC-R also assessed the tunnel always smelled like fuel. [Encls (31), (160), (161), (162)]*

154. At 1942, with direction from the NAVFAC HI CO, the NAVFAC HI PMO Director texted the CNRH NOSC-R: "Please notify Hawaii DOH about the fire main break at Red Hill." Talking points were summarized as no required notification, no environmental issues or fuel leaks, and fire suppression line leak causing loss of pressure and the Fed Fire automatic response. The NAVFAC HI PMO Director indicated that the reason for reporting was a desire to over communicate, not because a formal report was required. The NOSC-R did not notify DOH due to the NAVFAC HI PMO Director calling back and telling him to hold off on reporting. [Encl (164)]*

155. The NOSC-R received no further communications until 2321, when he received a text from the NAVFAC HI PMO Director asking for Hawaii DOH contact information. The CNRH NOSC-R provided the number for the Hawaii DOH On-Scene Coordinator. The CNRH NOSC-R was not informed that the spill at Red Hill contained anything other than water with a smell of fuel. [Encls (31), (164)]*

156. The CNRH NOSC-R did not report to the scene and was not informed that the spill at Red Hill contained anything other than water. The NOSC still believed the spill was only water until his interview for the Cavanaugh report on 16 December. [Encls (31), (164), (165)]

157. At 1958, the FLC PH CO received updates indicating that the spill was not exclusively water. He then called the NAVFAC HI CO with these updates. The NAVFAC HI CO recommended CNRH COS wait on reporting to DOH in order to gain additional information. [Encls (45), (54), (121), (157), (163)]*

158. At FLC PH CO's direction, FLC PH XO made voice reports to the JBPHH Command Duty Officer (CDO), PACFLT CDO, and the CNRH ROC between 2000 and 2015. [Encls (112), (162), (167)]*

159. The FLC PH CO arrived at Adit 3 at approximately 2145. Shortly thereafter, he learned that the fluid was fuel and called the NAVFAC HI CO to inform him. The NAVFAC HI CO decided to go to Red Hill. [Encls (121), (163), (165)]*

160. At 2157, Fed Fire certified that the scene was safe to enter and informed responders that they did not have the capacity to assist with cleanup efforts. They departed the scene at 2215. [Encls (152), (156), (162), (166)]*

161. At 2157 the Fed Fire battalion chief on site made the determination that the space was safe for personnel using flammability and health readings, and the cleanup crew was already on site. Fed Fire also reported that the NAVSUP Deputy Fuels Director indicated NAVSUP was capable of addressing the spill from that point, which allowed Fed Fire to depart the scene at 2215. Fed

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Fire did not record by name who the scene was turned over to. [Encls (30), (152), (158), (166), (168)]

162. After Fed Fire departed, no one announced themselves as the incident commander. Reports indicate most leaders assumed the FLC PH Deputy Fuels Director was in charge, though some subordinates recall NAVFAC HI CO and/or the FLC PH CO being in charge. [Encls (41), (124), (158), (159), (168), (409)]

163. The CNRH RHFSF Response Plan states that the Commanding Officer of the spilling command has incident command, initial reporting responsibility, and the responsibility to elevate the response by requesting assistance if needed. However, the FLC PH CO did not announce himself as in charge at the scene and believed that the Deputy Fuels Director was in charge. [Encls (12), (46), (158), (159)]

164. FLC PH CO's position was that the situation was stable because the assessment by Fed Fire was that the fuel was contained in the lower tunnel and the situation was stable. [Encl (158)]

165. Leaders on site did not request a standup of the EOC or ROC because they believed the spill was contained within the tunnel with no impact to the environment. [Encls (27), (41), (45), (121), (124), (157), (158)]

166. Once the atmosphere was deemed safe, the Fuels Department Engineering Technician went past the fuel leak and secured power to the motor controllers for the CHT sump pumps and the groundwater sump pump near Adit 3. One of two CHT sump pumps was out of commission. After seeing fuel flowing into the CHT sump, he repositioned sand bags that were around the CHT sump to restrict flow into the sump. [Encls (20), (155)]*

167. After securing all sump pumps and closing associated discharge valves, fuel began to fill both sumps. Prior to securing power to the motor controllers, the Fuels Department Engineering Technician observed both pumps running. [Encl (20)]*

168. The FLC Deputy Fuels Director and FLC CO believed the groundwater sump discharged to a leach field underground near the Halawa stream (which is actually a cement spillway running adjacent to Adit 3) and that a release to the environment was possible. FLC checked the stream for a sheen or smell of fuel and found none, so they did not consider the spill a release to the environment. On or around 9 December NAVFAC discovered that the groundwater sump flows to a concrete underground tank which spills over into a leach field. Trees had to be removed to access the underground tank, but once accessed there was evidence of fuel. [Encls (41), (156), (157), (158), (409)]

169. During the response, the CDO called the 24 / 7 watch at the Waiawa pump station at 2130, and a NAVFAC UEM employee responded to the scene at 2230. He opened the door to the Red

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Hill well pump room, verified that there was no fuel inside the door and left Red Hill shortly thereafter. [Encls (27), (170), (171), (172)]

170. At approximately 2230, the NAVFAC HI CO arrived at the scene. [Encls (45), (165)]*

171. Between 2230 and 2330, both the FLC PH CO and the NAVFAC HI CO were at Red Hill, and response efforts were underway. During this time both COs knew that the leak was fuel and not water. [Encls (122), (157), (165)]*

172. When asked if he believed the ROC should have been engaged beyond the initial notification, the FLCPH CO said that the NAVFAC HI CO was there and could have made that decision in his capacity as CNRH N4 and as the senior CNRH officer present at the scene. [Encl (158)]

173. The FLCPH CO felt that if the NAVFAC HI CO had issues or concerns with the response actions, he was in direct communications with both CNRH and CNRH COS and would have communicated those concerns. [Encl (158)]

174. At approximately 2330, the FLC PH CO and NAVFAC HI CO made a voice report update to CNRH COM and CRNH COS. The report discussed recovery efforts and the contents of the fluid. The FLC PH CO and NAVFAC HI CO believe that they communicated that the fluid was mostly fuel. [Encls (55), (153), (157), (165)]*

175. CNRH COM and CNRH COS understood the 2330 report to mean that the fluid was water with a smell of fuel and that it was contained in the tunnel. The FLC PH CO later stated, in retrospect, that he may have used the word "contained," but intended to communicate that the spill was "stable and manageable." [Encls (54), (55), (157), (165)]*

176. At 2345, the acting CNRH Deputy Environmental Director called (b)(6) at DOH to report a water / fuel mixture spill in the tunnel. He was initially reluctant to call regulators before they were sure of the facts. [Encls (159), (173), (174)]

177. Although the Regional Environmental Coordinator, CNRH COM reported that he would not normally communicate with state regulators regarding Red Hill without ensuring alignment with PACFLT GA first, which was expressly not the intent of PACFLT GA. [Encls (108), (109), (175)]

178. The NAVFAC HI CO's biggest concerns during the spill were the groundwater sump pump and the CHT sump in Adit 3. He asked about this directly and was informed that FLC PH personnel had secured the pumps immediately. He was also told that the sump pump discharge location had been inspected to confirm the pumps had not activated. [Encls (45), (165)]*

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179. The FLC PH CO and Deputy Fuels Director were not concerned about the CHT sump, because they believed the sand bags had been in place around it prior to the incident. [Encl (157)]*

180. FLC PH Fuels Department provided vacuum trucks, and NAVFAC HI provided drivers because FLC PH operators had exceeded allowable work limits. [Encls (122), (162), (170), (176)]*

181. As part of the initial response, the Installation Environmental Program Director (IEPD) received a call from first responders requesting hoses from his team to pump out the spill. [Encl (44)]

182. At the time of the spill and subsequent clean up, there was no knowledge of the hume line drainage system that runs beneath the lower access tunnel and leads to the groundwater sump. [Encls (11), (124), (125), (158), (177)]

21 November 2021

183. CNRH COS notified CODEL staffs, the Office of the Governor of Hawaii, the Office of the Lieutenant Governor of Hawaii, and other state representatives regarding the spill. [Encls (108), (175), (178)]

184. On 21 November, the JBPHH environmental staff sent the day before by the IEPD to assist with pumping the fuel out of the tunnel complained to the IEPD about the strong smell of fuel. Some chose to wear their respirators while working in and near the tunnel. The environmental staff were told by FLC PH responders that the spill was water that contained fuel. [Encl (44)]

185. At no point was the IEPD told that the spill was essentially all fuel. A fuel spill would require a different response and he would have asked NAVFAC Safety personnel to respond. His team relied on FLC PH staff to communicate risks and ensure a proper response. [Encl (44)]

186. At 1000, CNRH COM emailed the PACFLT Deputy Commander (DCOM), RADM Blake Converse, stating, "The leak occurred roughly (b)(3)(A) downhill of the actual fuel tanks in the lower access tunnel and on the way to the tunnel leading to the underground pump station near the Harbor…All the fluid has been contained within the tunnel…It was originally reported as predominately water yesterday, becoming more fuel laden this morning, indicating that water and fuel may have separated over time in the pipe," and "There are no indications of this fluid releasing into the environment, including the groundwater." [Encls (162), (179), (180)]*

187. On the morning of 21 November 2021, CNRH COM toured Red Hill with the FLC PH CO. During the tour, the CO informed CNRH COM that the spill was contained in the tunnel and the tracks. Additionally, the FLC PH CO stated that he was concerned about the groundwater sump pump, as it led to the Halawa stream, but he did not believe this was an issue since the pumps

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were secured. During this visit, CNRH became aware that a significant amount of fuel on 6 May 2021 had been accounted for as having gone back into the pipeline. The FLC Fuels Department Deputy Director now believed that fuel went into the fire suppression system retention line and was the source of the fuel on 20 November 2021. [Encl (55)]*

188. During the tour CNRH COM noticed there was a fuel smell, but was informed by FLCPH CO and NAVFAC HI CO that it was a fuel/water mixture. [Encls (121), (124), (175)]

189. While CNRH COM was there, there was a discussion about how much fuel was in the AFFF retention line. Estimates were between 14,000 and 20,000 gallons. During that discussion, the Deputy Fuels Director said words to the effect of "that's where the 20,000 gallons of fuel went." The Deputy Fuels Director was referencing the discrepancy in fuel accounted for following the 6 May spill. This was the first time that CNRH COM heard of the discrepancy of 20,000 gallons of fuel from the inventory accounting. [Encl (175)]

190. By the early afternoon of 21 November 2021, FLC PH Fuels Department personnel erected a catchment below the still-leaking valve with a hose to direct fuel away from the ventilation fan and toward the Adit 3 sump area to facilitate continued recovery via vacuum truck. The leak had continued for approximately 21 hours after the event started before the rate of flow from the pipe allowed personnel to erect the catchment. [Encls (26), (157), (181)]

191. CNRH issued the first press release addressing to the spill at approximately 1618. The message was also posted to the CNRH and JBPHH Facebook pages. The release informed the public that the Navy was investigating the cause of the spill, which was approximately 14,000 gallons of a fuel / water mix that had been recovered and transferred to an above-ground storage tank. [Encls (34), (74), (182)]

192. At 1645 FLC PH released an OPREP-3 Navy Blue UNCLASS message to PACFLT, CNRH, NAVFAC HI and COMNAVSUPSYSCOM. A 3-inch pipe connected to a 14-inch AFFF retention line low point drain cracked in the vicinity of Red Hill Adit 3, lower tunnel access. All released fluid was contained in the lower tunnel. No known fluid was released to the environment. No impact to mission. [Encl (183)]

193. At approximately 1800 NAVFAC authorized the contractor, Pacific Commercial Services, Inc. (PCS) to provide cleanup support at Red Hill as requested by FLC PH. [Encl (184)]

194. NAVFAC HI CO told the acting CNRH Environmental Director to contact the EPA to notify them of the spill. The acting Director was not able to make contact with EPA but intended to follow up the next day. [Encls (159), (185)]

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22 November 2021

195. At 0313, FLC Pearl Harbor capped the fire suppression system retention pipeline low point drain when the flow had reduced to a manageable level. FLC PH personnel continued monitoring the site. [Encl (162)]

196. During the day on 22 November, PACFLT senior staff met to discuss the spill. Present at the meeting were PACFLT COM, DCOM, CNRH, FLC PH CO, NAVFAC HI CO, PACFLT GA, PACFLT DMHQ, and other senior leaders. [Encls (11), (125), (177)]

197. At this meeting, CNRH COM reported the working theory that the fuel from the AFFF retention line was 20,000 gallons of fuel that was unaccounted for from the 6 May spill. [Encls (11), (125), (177)]

198. This was the first time that senior leaders at PACFLT heard about the 20,000 gallon discrepancy in fuel inventory following the 6 May spill. [Encl (11)]

199. PACFLT COM expressed that he had lost confidence in the accuracy and completeness of the NAVSUP investigation into the 6 May spill and directed RDML Cavanaugh to investigate the 6 May and 20 November spills. [Encls (11), (186)]

200. CNRH COM provided a brief to Representatives Case and Kahele on the spill and centered the brief on the Navy's response and containment. The Representatives were given a tour of Red Hill and were shown the AFFF Zone 1 sump near Tanks 17 and 18, the beginning of the AFFF retention line, as well as the location of the 6 May spill. They were not taken to the location of the 20 November spill based on their schedule. [Encl (187)]

201. From 1330-1530, NAVFAC HI PMO, Deputy Fuels Director, and (b)(6) conducted a site visit with four staff members from DOH. The tour went through Adit 3 to the location of the broken AFFF retention line valve and summarized how flow travelled to the groundwater sump near Adit 3. [Encl (189)]

202. NAVFAC Staff confirmed to the DOH representatives that fuel did not flow on the surface into the Red Hill well pump room. [Encl (189)]

203. On the site visit, DOH requested that the Navy confirm there was no sheen in the Halawa stream. FLC staff confirmed that there was not. [Encl (189)]

204. At 1601, CNRH issued a press release saying the Navy stopped the release of the water and fuel mixture and continued to coordinate with and provide information to DOH and the EPA. There were no signs or indication of any release to the environment and the drinking water remained safe. [Encl (190)]

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205. That week, NAVFAC HI attempted to calculate the potential leak rate through the concrete. NAVFAC HI PMO completed an analysis and said that an insignificant amount could leak through the concrete given the amount of time the fuel was sitting on the deck. They did not discuss securing the well within that discussion. [Encl (124)]

23 November 2021

206. By 23 November, the FLC PH CO's concern was how to mitigate water entering the groundwater sump as it was no longer able to function as originally designed (i.e. discharging external to Adit 3 via the discharge line). The pump had been secured during the spill so it was possible the sump could overflow. FLC PH stationed a vacuum truck outside Adit 3 and started pulling material from the groundwater sump. They also set a 24/7 watch to make sure it was not overflowing. [Encl (158)]

207. At 0722, NAVFAC HI Environmental (NAVFAC HI EV) staff received an e-mail from U.S. Army Group – Hawaii, Department of Public Works – Environmental, requesting an update on the monitoring and current status of the water quality. This was a general inquiry and not in response to any reports of water quality issues. The email was forwarded to NAVFAC HI PA to coordinate a response through CNRH PA. The response was coordinated and returned to NAVFAC HI EV on 24 November. NAVFAC HI EV did not respond to the Army email until 29 November. [Encls (191), (192), (193), (194)]

208. At 1430, PACFLT COM and other PACFLT leadership toured Red Hill. Due to cleaning and remediation of the tunnel that occurred over the previous few days, there was no sign of a spill during the tour. [Encls (11), (158), (177), (195)]

209. The proximity of the well to the spill location was not apparent to any of the PACFLT team during the tour. [Encl (177)]

210. During the tour, PACFLT COM questioned the FLC PH CO and NAVFAC HI CO regarding the potential for environmental contamination. They said that there was no risk to the environment: fuel could not seep through the concrete tunnel; there was 100 feet of rock above the aquifer so no substantial amount of fuel could seep through; and fuel was collected in the groundwater sump and pumped out using trucks. [Encls (11), (124)]

211. PACFLT COM called Senator Hirono and told her that he had directed an investigation by a cross-functional team to examine all aspects of the 6 May and 20 November events. [Encl (196)]

24 November 2021

212. At some point in the week after the spill, there were internal discussions within NAVFAC HI about what should be done to monitor the environment. They discussed increasing the

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frequency of monitoring well sampling, including at the Red Hill well. However, the well was already scheduled to be sampled on 24 November and that was deemed sufficiently soon. [Encls (124), (158); (197)]

213. The scheduled Red Hill well water sample was taken from the low flow pump that takes water from two feet below the well water surface. This was sent to the mainland for expedited testing and results were returned on 3 December 2021. The TPH results were non-detect; however, there were estimated detections of three naphthalene compounds. Samples were not taken at the water surface. [Encls (124), (198), (241)]

214. On 24 November DOH sent a Notice of Interest (NOI) in a Release or Threatened Release of Hazardous Substances for the 20 November spill to CNRH. The NOI included requirements for additional sampling and development of work plans to remediate the area, among other items. CNRH emailed a sampling plan in response to the NOI on 29 November. [Encls (199), (200)]

25 November 2021

215. Thanksgiving holiday. With the exception of the FLC PH 24/7 watch stationed with a vacuum truck to make sure the groundwater sump was not overflowing beginning on 23 November, there was no activity at Adit 3 and the November spill site. [Encl (124), (158)]

26 November 2021

216. The FLC PH CO gave a verbal order to minimize fuel transfers to, from, and between the storage tanks located in Red Hill, effective 27 November. This order was given due to the ongoing investigation. [Encl (201)]

27 November 2021

217. At 1830, a PPV resident complaint was forwarded by the JBPHH CDO to the JBPHH Public Works Department (PWD) help desk, marking the first phone call (from a resident of Moanalua Terrace) complaining of a chemical smell in their water. This is the earliest report of the issue. There is no indication that action was taken beyond logging it. [Encls (194), (202), (203)]

218. Extensive social media research was conducted by the investigation team to determine if reports or references to chemical smells were posted between 20 and 27 November. There was no indication that there were earlier reports prior to this report to the JBPHH CDO. [Encl (204)]

219. From 20 November through 28 November, the JBPHH PWO's understanding was the spill was primarily water and maybe AFFF but could not recall any discussions during this period of time that touched on fuel as being a primary part of the spill. It was not until after reports of

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water contamination surfaced that the PWO first visited the area near the Adit 3 Y and the Red Hill well. During the intervening eight days, he could not recall conversations about any environmental issues that caused him concerns about risk of contamination of the well. [Encl (43)]

28 November 2021

220. The first calls received by the Army from Hickam Communities or AMR / Red Hill with water quality concerns were logged into the Hickam Communities, LLC, maintenance system on 28 November. [Encl (205)]

221. Phone calls from residents to the JBPHH PWD help desk complaining of a chemical / fuel smell in their water began at 0749 on 28 November and continued throughout the day. Thirty-seven calls were received that day. [Encls (10), (194), (202), (206), (207)]

222. All public works related calls to the JBPHH CDO or PPV help desk are routed to the PWD trouble desk, who take it for action. The CDO contacted the Drinking Water Distribution System Operator at approximately 0900 to investigate the reports of the smells in the water. [Encls (10), (194), (202), (206), (207)]

223. At approximately 1600, the JBPHH PWO informed the NAVFAC HI CO of the reports of a chemical/fuel smell in the water and also reported that utilities teams had been dispatched to the residences to verify chlorine levels were appropriate. After monitoring with handheld colorimeters and checking the chlorine dosage logs, the team determined the chlorine levels were consistent with those expected in the distribution system and reported this at 1609. [Encls (10), (43), (124), (208)]

224. The field team also tried to use a colorimetric test for fuel but it did not detect contamination. [Encl (10)]

225. While exploring the source of these complaints, the JBPHH PWO was informed that the 20 November spill was fuel. Up to this point he was not aware that fuel was spilled. [Encls (10), (43), (124), (208)]

226. NAVFAC HI visited four water storage tanks on the eastern side of the Navy distribution system (including the Red Hill storage tanks, S-1, and S-2) and could not smell any odor at the tanks. They also confirmed that the storage sites had not been tampered with. [Encls (10), (42), (43), (209)]

227. NAVFAC HI and Red Hill PMO visited three homes and confirmed a faint chemical / fuel smell in the water. [Encl (159)]

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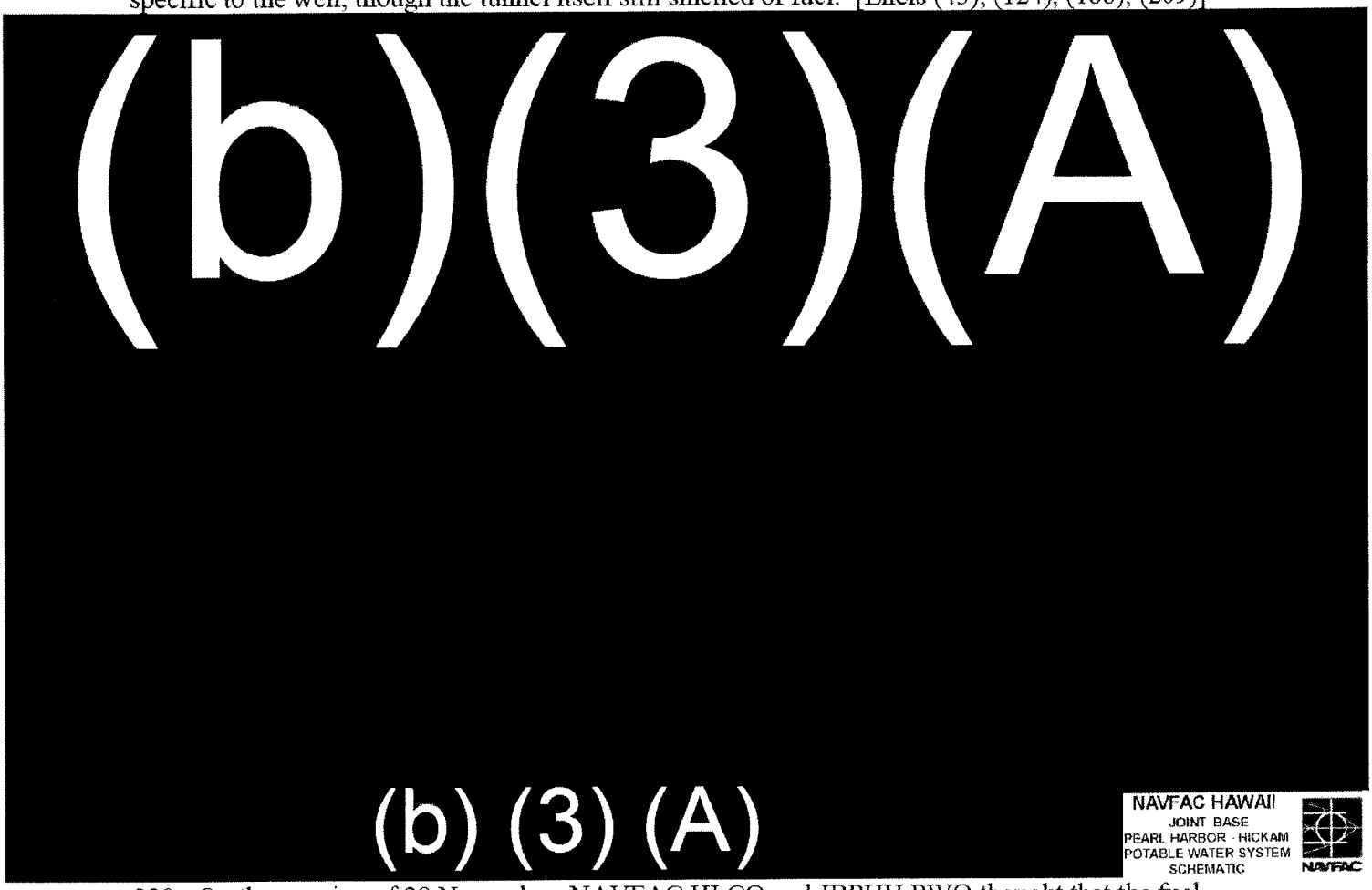
228. NAVFAC HI CO informed FLC PH CO of the reports. FLC PH CO met with NAVFAC HI CO at Adit 3 to investigate the well. FLC PH CO was there in a support role. The water distribution sites are owned by CNIC, but NAVFAC is the program manager / "owner" for maintenance of the system. [Encls (43), (158)]

229. The JBPHH PWO, NAVFAC HI CO, FLC PH CO and the UEM Potable Water Commodity Manager also went to the Red Hill well to conduct a visual inspection of the well. There was no visible fuel on the surface of the water and there was not a discernible odor of fuel specific to the well, though the tunnel itself still smelled of fuel. [Encls (43), (124), (188), (209)]



230. On the evening of 28 November, NAVFAC HI CO and JBPHH PWO thought that the fuel smell in the drinking water could be coming from the Red Hill well because the impacted housing areas were closest to the Red Hill well and they could not otherwise explain it. This assumption was made despite the fact that there was not data positively confirming contamination at that time. Environmental and Utility staff were not consulted. [Encls (43), (46), (124); (159), (175), (209), (210)]

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231. NAVFAC HI CO and JBPHH PWO called CNRH COM and recommended shutting off the well. CNRH COM concurred. The well was secured at approximately 1930 using the remote operating feature from the 24/7 Watch Office at the Navy's Waiawa well pump station. There was no discussion with Public Affairs to generate a press release about the closure. [Encls (43), (46), (124), (159), (175), (209), (210), (211)]

232. CNRH COM was not sure he had the authority to secure the well but felt it was the right thing to do, especially since the well only supplied about 15% of the water in the Navy distribution system. CNRH COM believed the consequences of shutting down the well were negligible to the Navy's ability to supply water. [Encl (175)]

233. FLC PH CO directed a trend analysis on the bulk fuel storage tanks to ensure there was no movement of fuel from the tanks, and gave an order to cease all movement of fuel in the system. [Encl (158)]

234. At 2133 CNRH issued a press release informing people that the Navy was investigating reports of a chemical smell in drinking water from some residences. The release said that there was no immediate indication that the water was not safe, and the Navy was continuing to investigate, test the water, visit homes, and investigate the drinking wells. This was the first press release related to the well contamination issue and did not reference the well being secured. [Encl (212)]

235. NAVFAC HI CO was able to personally smell a chemical/petroleum odor in the water at the NAVFAC HI HQ building around 2200. [Encl (10), (188)]

236. NAVFAC collected samples from the Red Hill well after it was secured. Samples were also taken from NAVFAC HI HQ in Building A4 and seven other locations. The only test available on-island, and therefore with a quick return, was total organic carbon (TOC) testing through the JBPHH environmental laboratory that tested to a reportable limit of 5 parts per million (PPM). Although not sensitive enough to detect fuel near the EPA limit, this was the most sensitive type of test that could be processed in Hawaii. [Encls (44), (124), (213)]

237. CNRH COM provided an update to PACFLT COM on the reports of fuel in the water and securing the well out of an abundance of caution in the early morning hours of 29 November. CNRH COM detailed efforts taken and the way forward to deal with the problem. [Encl (120)]

29 November 2021

238. JBPHH stood up their Emergency Operations Center (EOC) in response to the complaints. [Encls (42), (210)]

239. CNRH established the JBPHH Water Quality Crisis Action Team (CAT). [Encls (184), (210)]

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240. CNRH began "heat mapping" phone calls. [Encl (175)]

241. The results from screening level TOC samples collected by NAVFAC on the evening of 28 November were negative and were provided to DOH on Monday, 29 November. DOH was provided with water from these samples for their own screening tests. [Encls (44), (124), (213)]

242. JBPHH Public Works began a drinking water system flush in Eastern Housing, Ohana Nui, and Hickam via 12 fire hydrants. The locations were chosen by the Utilities Division based on system location and the proximity to empty space for the flushed water. Flushing secured at 1830 and re-commenced on 30 November, the next day. [Encl (211)]

243. Throughout the day, resident social media posts regarding smells of fuel in the water increased in number. [Encl (175)]

244. Fed Fire responded to a Pearl Harbor Child Development Center (CDC) following a report of a fuel smell in the water. Pierside CDC, Ford Island CDC, and Peltier CDC were all sampled in the week following 28 November. [Encl (202), (275)]

245. PACFLT COM briefed his staff at the Monday staff sync regarding the possibility of water contamination. Under his authority as Senior Officer Present in Hawaii, PACFLT COM assigned PACFLT DCOM to lead the PACFLT CAT for Red Hill. PACFLT COM's priorities for the task force were 1) take care of people, get the word out, and bound the problem; 2) clean up the drinking water; and 3) fix the well. The PACFLT Surgeon was part of the CAT as head of the Medical Working Group. [Encls (11), (214), (215), (216)]

246. PACFLT Surgeon contacted Navy and Marine Corps Public Health Center (NMCPHC) CO for assistance and expertise. He also reached out to the Navy Environmental Preventive Medicine Unit 6 on island, which falls under NMCPHC. [Encl (214)]

247. CNRH PA took the lead on communications with civilian media supported by JBPHH PA, PACFLT PA, and FLC PH PA. [Encls (34), (191), (217)]

248. On 29 November, NAVFAC HI environmental staff responded to the 23 November email from Army Public Works environmental staff inquiring about the status of the monitoring and water quality. In the reply, NAVFAC HI environmental staff advised that the spill was stopped and the water/fuel mixture was placed into an above ground storage tank. Additionally, the Navy was coordinating with DOH and EPA and that samples of the drinking water were being taken weekly. There were no impacts to the soil and the drinking water remained safe. CNRH PA, as well as FLC PH and NAVFAC HI reviewed and approved the response on 24 November. [Encls (34), (191), (217)]

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249. CNRH Environmental staff and PWO staff developed a sampling plan and began sending daily expedited samples to the mainland to be analyzed using the 8015/BTEX method. These tests allow a more sensitive detection of total petroleum hydrocarbons. [Encls (46), (124)]

250. At 1100 CNRH PA completed the JBPHH Water Quality Communication Plan working document. The communication plan was to be updated daily and coordinated with PACFLT, CNIC and CHINFO. The communication goals were to keep residents, families, base workers and anyone drinking Navy water informed on all actions and efforts to protect the water and individuals while reinforcing transparency of process and efforts. Themes, messages, audiences, timeline and tactics are included in the plan. [Encl (218)]

251. (b)(6) Deputy Director for Environmental Health at DOH, reported to CNRH that DOH was receiving complaints of a fuel / chemical smell in the water in Army housing at the Aliamanu Military Reservation (AMR). (b)(6) was unable to provide the number of calls received and said that DOH was going to recommend shutting down the entire Navy water system. [Encl (175)]

252. (b)(6) did not provide an analytical basis for shutting down the entire Navy water system, vice specific portions. Following the discussion with (b)(6) CNRH COM was concerned that they could not provide water to approximately 9,000 families if the recommendation from Hawaii DOH was adopted, so CNRH COM called JBPHH CO and directed him to begin finding drinking water sources and to prepare to contract for water services. [Encl (175)]

253. PACFLT DCOM spoke with (b)(6) regarding the situation at around 1200. (b)(6) reiterated the same concerns and DOH's prospective recommendation. PACFLT DCOM told her that they had bounded the locations and suggested figuring out what those neighborhoods are and putting out guidance focused on the problem areas. (b)(6) agreed that that made sense and acknowledged that she did not have the Navy's data. [Encl (11)]

254. PACFLT DCOM offered to provide the Navy's data and requested data from (b)(6) She said that she did not have data available; DOH was just getting calls. PACFLT DCOM then told CNRH COM that he needed CNRH people to work with DOH to get whatever data they had. Once it was known that the Army was receiving complaints, they requested the Army's data as well. PACFLT DCOM spoke with (b)(6) a couple of additional times during the afternoon in an attempt to reach alignment between DOH and Navy regarding the way forward and to send a joint press release on the situation. [Encl (11)]

255. At 1204, State Representative Aaron Johanson emailed NAVFAC HI PMO and (b)(6) reporting complaints from a constituent in Navy housing that there was jet fuel in her water and that she was able to set her drinking water on fire. NAVFAC HI PMO responded that the Navy was aware of the problems with water quality in housing and were collecting additional samples for analysis. (b)(6) and (b)(6) of DOH were also on the email, and (b)(6) was copied. [Encl (219)]

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256. At 1250 the JBPHH CO released a statement to base housing residents reinforcing his team's commitment to the health and safety of the residents, that there were no immediate indications that the water was not safe, and that he and his staff were drinking the base water. The statement was coordinated through CNRH PA and PACFLT, at least up through PACFLT PA, as well as through CNRH COM and CNRH COS. The statement was initially disseminated via an e-mail to the Project Directors at Ohana Military Communities and Hickam Communities to post on their resident portals. [Encl (35), (220)]

257. At approximately 1900 on 29 November, DOH issued a press release recommending all Navy water system users avoid using the water for drinking, cooking, or oral hygiene. Navy water system users who detect a fuel odor from their water should avoid using the water for drinking, cooking, bathing, dishwashing, laundry or oral hygiene (brushing teeth, etc.). [Encls (11), (175), (221)]

258. Following the DOH press release, at 2026 CNRH issued a press release saying that the Navy was working with DOH to resolve reports of a chemical odor in military housing, recommended that residents avoid ingestion as a cautionary measure if chemical or petroleum odors are present and that samples have not detected petroleum in initial testing. The Navy was moving forward to provide sources of drinking water to affected residents and to sample affected locations. [Encl (222)]

30 November

259. By 30 November, CNRH had received over 200 trouble calls to the EOC, with the areas of concern centering in six PPV neighborhoods: Radford Terrace, Halsey Terrace, Catlin Park, Doris Miller, Moanalua Terrace and Ohana Nui. [Encls (175), (224)]

260. At 0901, a message was posted to the JBPHH Facebook page saying that the EOC had stood up an information cell to receive calls from residents in military housing who have concerns about their water. The same message was also posted to the CNRH Facebook page. [Encl (223)]

261. CNRH COM conducted a phone call with Hawaii Lieutenant Governor Josh Green in the morning, updating him on actions being taken. Dr. Green expressed his support and offered assistance if needed. CNRH COM also provided updates to Representative Kahele and Honolulu Mayor Blangiardi. [Encls (175), (224)]

262. At 1221, PACFLT DCOM emailed the USARPAC COS requesting logistical support from the 25th Infantry Division (ID) to provide water trailers (10 x 2,000 gallon capacity) for JBPHH communities. Elements of the Army's 25th ID deployed to the Army housing areas and began distributing water to houses on 30 November. Encls (175), (225), (240)]

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263. At 1414, an update was provided via press release advising that the primary water distribution mains associated with the housing areas affected by possible potable water contamination had been flushed twice and a the third flush was ongoing. Residents were asked to run water in their homes to flush the individual lines to each residence. The public was also notified that no petroleum or contaminants had been detected in testing at affected sites or at wells and tanks; however, there remained a concern that residual contamination may exist in some of the water lines based on continued reports from residents. [Encls (226), (227)]

264. By 1600 on 30 November, the Navy set up four water distribution sites at the Main Pearl Harbor NEX Parking lot, Halsey Terrace Community Center, Catlin Park Community Center, and Ohana Nui. Community members were notified via press release at 2200, including JBPHH and CNRH Facebook posts at 2246. [Encls (175), (224), (228)]

265. In response to a request from DOH, NAVFAC HI PMO emailed the water system map, emergency action plan and groundwater protection plan to DOH. [Encl (229)]

266. A sample was taken for testing from the Red Hill Elementary School. This sample returned positive for TPH-O, which is characteristic of a heavier oil, not typical of JP-5. TPH-O is not an indicator of the presence of JP-5 fuel. [Encls (11), (214)]

267. In the evening of 30 November, four town hall events were held: 1 and 2) Hickam Theater (1800 and 1900), 3) Moanalua Terrace Community Center (1900), and 4) Halsey Terrace Community Center (1900). Participants included CNRH COM, PACFLT DCOM, NAVFACPAC COM, JBPHH CO and JBPHH Deputy. [Encls (175), (224), (230)]

268. At 2345, residents were notified that showers were available at JBPHH for those in affected military housing who had concerns with the water quality at their residences. [Encl (231)]

1 December

269. DOH and EPA representatives were invited to the PACFLT CAT team. (b)(6) and (b)(6) of DOH both joined the CAT meeting at 0800. [Encls (210), (214), (239)]

270. Results from the more comprehensive samples drawn on 29 November were received from the CONUS laboratory with 13 of the 14 samples reporting as non-detect. Only the Red Hill well had a detection of trace hydrocarbon constituents, but these were below threshold amounts. These samples were analyzed using a method that takes longer to complete but enables a lower detection limit. Labs with the ability to use this method and are certified by the State were not available in Hawaii. This is the first analytic data providing any indication that JP5 fuel was in the water. [Encls (11), (232), (241)]

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271. A sample taken from the Red Hill well on 1 December showed estimated detections for several petroleum hydrocarbons and total petroleum hydrocarbons, gas (TPH-G). TPH-D and TPH-O exceeded the EALs but decreased to non-detect after the use of silica gel cleanup. [Encl 233)]

272. Free water was made available for residents of base housing from the JBPHH NEX and Commissary. CNRH also directed JBPHH CO, FLC PH CO, and PACFLT N4 to acquire water from NEXCOM and Pepsi. [Encl (234)]

273. At 1334, CNRH PA launched the "Joint Base Pearl Harbor-Hickam Water Resources and Updates" webpage. The webpage and information went live on both the CNRH and JBPHH pages. [Encl (235)]

274. At 1556, CNRH issued a press release announcing an Army-hosted town hall event that night for AMR residents, provided updates on potable water availability, and updated JBPHH EOC phone numbers as well as website information. [Encl (236)]

275. Potable water trucks provided by the Army were stationed at the Halsey Terrace Community Center, NEX parking lot, Moanalua Terrace, Catlin Park Community Center, Hickam Makai Rec Center, and multiple locations in AMR Housing. [Encl (236)]

276. At 1603, CNRH PA provided updated information on available shower locations on JBPHH. [Encl (237)]

277. Following concerns from OPNAV, CNIC and NMCPHC water program and risk communication experts regarding the language used in initial releases to the public, CNIC HQ directed CNRH Environmental and the CNRH Public Health Emergency Officer (PHEO) to get PAO guidance from NMCPHC, the Navy's experts at risk communication in public health matters. [Encl (238)]

278. PACFLT Surgeon reached out to the Army Public Health Center to initiate dialogue and led an effort to develop a standardized form for short-term medical screening and documentation of exposure / symptoms. The CNRH PHEO participated in these efforts. [Encl (214)]

279. At 1900, PACFLT COM, PACFLT DCOM, CNRH COM and JBPHH CO, in coordination with the Army Garrison commander, conducted a town hall event at AMR. Deputy ASN (E, I & E) Balocki participated in the event. [Encl (239)]

2 December

280. PACLFT COM contacted Honolulu Mayor Blangiardi and updated him on situation. The mayor wanted to know how he could best support the Navy. [Encl (241)]

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281. USARPAC stood up Task Force Ohana and authorized their initial evacuation order to Army personnel in affected housing. They began placing residents into government procured lodging. The Army had a pre-existing contract as part of their COVID mitigation measures to leverage for the process of procuring large quantities of hotel rooms. There was no coordination with the Navy prior to the Army starting these initiatives. [Encls (175), (241)]

282. CNRH determined that the Navy needed a means to provide lodging and/or temporary lodging allowances (TLA) in order to provide Navy/JBPHH PPV residents similar services. [Encl (175)]

283. The PACFLT Surgeon stood up the Joint Health Services Working Group, which met daily to facilitate understanding and communication between joint and interagency medical leaders. Members included the DOH toxicologist (Dr. (b)(6)), as well as medical professionals from the Army, Air Force, INDOPACOM, and military treatment facility staff, as well as veterinarians, and others. PACFLT Surgeon credited the early recognition of the need for this coordination with the development of a cohesive sight picture for the medical community by the end of the first week. [Encl (214)]

284. The Joint Health Services Working Group began efforts to create the medical registry for potentially impacted individuals. [Encl (214)]

285. At 1505, a message was posted to the JBPHH and CNRH Facebook pages informing that the Military Family & Support Center had established an Emergency Family Assistance Center (EFAC) to assist affected personnel, including medical assistance. [Encl (223)]

286. At around 1600 the first Public Affairs Communications Plan was provided to CHINFO by PACFLT. PACFLT gave direction that there should be full transparency, to provide any information available and caveat it with the confidence level of that information if necessary. [Encls (241), (242), (243)]

287. The NAVFAC HI Ops Officer reported observations of a fuel smell and a sheen on top of the water in the Red Hill well. NAVFAC HI Utilities staff reported seeing a stain on the concrete wall of the well at approximately the elevation of the groundwater sump, which led to further investigation. Photoionization detector (PID) test results taken by contractor AECOM indicated hydrocarbon vapor above the waterline. From these observations, it was obvious there was fuel in the well before lab test results above the EPA limit were received. This is the first positive confirmation of fuel in the Red Hill well. [Encls (10), (124), (210), (244)]

288. A sample was taken from the Red Hill well on 2 December and analyzed. The preliminary results returned on 6 December and confirmed that the fuel in the water was consistent with the carbon signature of JP-5. [Encl 286)]

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289. During a HASC Readiness Subcommittee Hearing, Rep Kahele questioned VADM Williamson (OPNAV N4) on the Navy's response at Red Hill and called the situation "absolutely unacceptable." [Encl (245)]

290. At 1900 PACFLT DCOM, NAVFACPAC COM, CHRH, PACFLT Surgeon and NAVFAC HI CO conducted a Virtual Town Hall on JBPHH Facebook Live to provide updates on actions taken and services available and answer questions from residents. [Encl (246)]

291. At 2204, CNRH issued a press release saying the Navy detected petroleum products in Red Hill Well, and that the well had been secured since 28 November. This is the first public report that the well had been secured. [Encl (247)]

3 December

292. CNRH provided a letter to DOH confirming the release of approximately 14,000 gallons of a mix of water and fuel from a fire suppression drain line in the tunnel downhill of the Red Hill Bulk Fuel Storage Facility. [Encl (248)]

293. PACFLT COM provided an in-person brief for Representative Case and phone updates for the Governor of Hawaii, Senator Hirono, Senator Schatz, Representative Kahele and State Senate President Couchee. Updates centered on support to families, testing protocol, restoring confidence with community and commitment to investigate Red Hill associated events. [Encl (210)]

294. PACFLT COM also provided an email update to the Governor of Hawaii. PACFLT COM sent the Governor updates he had provided to SECNAV and CNO. PACFLT COM also provided water test sampling results. [Encl (241)]

295. PACFLT staff launched the JBPHH Water Updates web page that replaced the Region web page for sharing information. [Encl (249)]

296. At 1900, PACFLT DCOM, CNRH, PACFLT Surgeon, JBPHH CO and NAVFAC HI CO conducted a town hall at Hickam Theater to provide updates on actions taken and services available and to answer questions from residents. [Encl (250)]

297. At some point after 28 November, the FLC PH team noticed that the groundwater sump would reach a certain level, then stop filling even though the pump was secured and the discharge line isolated. They were unsure of where the water was going. It was then drained, and on 3 December it was ordered vacuumed out daily. [Encl (158)]

298. The Honolulu Board of Water Supply's (BWS) Halawa well is approximately (b)(3), (b)(3)(A) [redacted] The Board announced on 3 December that they had secured pumping from this well. [Encls (12), (271)]

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299. The Navy's Aiea Halawa shaft is (b)(3)(A) CNRH directed shut down of the Navy's Aiea Halawa shaft in an abundance of caution to prevent potential westward contaminant migration in the aquifer and because there were concerns over high chloride concentrations caused by saltwater intrusion. [Encls (11), (12), (43), (46), (251), (273)]

300. In addition to closure of the Red Hill and Aiea Halawa wells, the Honolulu BWS secured their interconnections with the Navy's system and removed the meters. [Encl (10)]

301. By the afternoon of 3 December, CNRH was able to execute options for both government procured lodging and authorization for individual procured lodging for service members, federal civilian employees and their dependents. [Encls (175), (252), (253)]

302. The JBPHH Deputy directed the CNIC web page to be updated and a Facebook posting with the JBPHH TLA Execution Plan. The TLA Execution Plan included the use of 16 phone lines at the Military & Family Support Center and JBPHH EOC, with walk-ins at the Military & Family Support Center Emergency Family Assistance Center also available. [Encls (175), (252), (254), (255), (256)]

303. In early December, CNRH Environmental negotiated with DOH to allow flushing of hydrants if the hydrants were monitored during the flush, sampled for TPH pre- and post-flushing, and the water ran onto land and not into the streets. JBPHH Public Works personnel failed to comply with these requirements by allowing the water to run into the street, resulting in a cease and desist order from DOH received on 3 December. This was followed by the requirement to use the 1 million gallon per day (MGD) granular activated carbon (GAC) units for flushing which began in mid-December. [Encls (47), (257)]

304. On 3 or 4 December CNRH engineer (b)(6) while looking at drawings of the Red Hill facility from the original construction, discovered the hume drain feeding into the groundwater sump that was impacted by the 20 November spill. This provided a path for fuel entering the sump to then travel under the tunnel floor and into the soil and rock below. This was the first indication of the most likely path from the fuel spill to the well. [Encls (143), (258), (394)]

4 December

305. On 4 December, PACFLT released an Execute Order establishing the responsibilities of cognizant Echelon 2 Navy commands to support the JBPHH community. The objectives were to restore safe drinking water and reestablish public confidence in the water supply system. [Encl (215)]

306. At 1100, following a press release notifying people of the event, PACFLT DCOM, CHRH COM, PACFLT Surgeon and NAVFAC HI CO conducted a Virtual Town Hall on JBPHH

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Facebook Live to provide updates on actions taken and services available, as well as to answer questions from residents. [Encls (259), (260)]

307. A screening level TOC sample taken from the Aliamanu Military Reserve Housing Area (Army) was the first to positively detect hydrocarbons in the distribution system. The results were below the EAL. [Encls (210), (260)]

308. CNRH received a formal Request for Records from DOH at 1643 requesting sampling plans, data, methodology, and analytical reports concerning groundwater and drinking water in response to the petroleum contamination event. The request applied to future records generated as well. [Encls (261), (262)]

5 December

309. Governor Ige and Hawaii's Congressional Delegation called for suspension of Red Hill operations in a statement to the public. [Encls (263), (264)]

310. SECNAV met with Representatives Courtney, Garamendi, and Kahele regarding the contamination of the water from Red Hill. [Encl (210)]

311. Hawaii State Representative Aaron Ling Johanson contacted CNRH PAO via e-mail asking how to best advise citizens seeking immediate relief / recourse. The CNRH PAO provided the PACFLT website and information on lodging procurement for military-affiliated individuals affected by the water-related health and safety concerns and categories of lodging procurement (TLA, temporary duty orders and government contracted lodging information). [Encl (265)]

312. Hawaii State Senator Glenn Wakai requested from the CNRH PAO a graphic of Red Hill Bulk Fuel Storage Facility showing how fuel is moved from the facility. The CNRH PAO contacted PACFLT GA, who directed coordination with the NAVFAC HI PMO Director to find a suitable graphic. [Encl (265)]

313. On 5 December a sample was taken from the Navy's Aiea Halawa well building from a sample point in the chlorination system. The results, returned on 8 December, showed elevated detections of petroleum hydrocarbons. The Navy determined that, because that well had been secured since 3 December and the sample was drawn from the non-operating chlorination system, the sample in question was not representative of the water in the well. Samples taken prior to the shutdown of the well showed no signs of contamination. PACFLT DCOM called the DOH Deputy Director and the Honolulu BWS Manager, (b)(6) to explain the situation. However, on 10 December the Honolulu BWS held a press conference announcing that contamination was found in the Navy's Aiea Halawa well. [Encls (11), (210), (272)]

314. At 1448, the JBPHH CO apologized via JBPHH Facebook post for the comments that he made in his 29 November assurance to families that the drinking water was safe. [Encl (223)]

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315. At 1500, SECNAV participated in a town hall event at the Hokulani Community Center. This event was also broadcast on the JBPHH Facebook page to provide residents updated information about the water issues. The event lasted almost five hours. [Encls (175), (266)]

316. CNRH received initial approval from DOH for divers to enter the Red Hill well. Mobile Diving and Salvaging Unit (MDSU) divers entered the well and could see fuel entering along the ceiling of the developmental shaft. This triggered the deployment of absorbent materials and the search for other ways to skim fuel from the surface of the water. Though they initially agreed to the diving operations, DOH ordered that diving stop on 8 December until a recovery plan was renegotiated. Permission was granted to continue on 9 December. [Encls (46), (47), (267)]

317. At 1947, CNRH COM was contacted by State Representative Bob McDermott raising a concern that qualified civilians who live in some off base housing have no point of contact for temporary lodging and assistance. CNRH COM thanked him for bringing the issues to his attention and informed him that CNRH was working to remove barriers and align resources while operating across many differing government directives covering each individual. [Encl (268)]

318. At 1957, a posting was made to the JBPHH and CNRH Facebook pages informing that the JBPHH Military Family & Support Center had licensed clinical counselors and chaplains available at the Emergency Family Assistance Center (EFAC) to assist anyone in need. [Encl (223)]

319. Following his response to Representative McDermott, CNRH COM directed personnel to take action to account for and take care of the federal employees / civilians, contractors, and retirees in the housing community. This included direction to set up a dedicated phone, resource, table or advocate to address each one of our non-uniformed members / dependents; update the web page with a tab for them; get people trained so that no person is told "no" or passed off to another phone number without a follow up. He also directed his CMC to reach out to Representative McDermott's office to get additional information. [Encl (269)]

320. The water line from Bishop Point (Hickam) to Iroquois Point, a neighborhood supplied by the Navy water distribution system, was secured due to resident complaints. The neighborhood continued to receive service from another Navy line, so they had access to water. [Encl (279)]

321. Joint Health Services Working Group finalized guidance for medical staff / providers on how to speak with concerned residents. [Encls (214), (280)]

322. CNRH sent a letter at 2116 to DOH acknowledging receipt of the 24 November Notice of Interest and expressing the intent to continue communication and coordination with DOH. [Encl (281)]

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323. Throughout the week of 29 November housing residents provided comments on the JBPHH Facebook page and made comments at the town halls reflecting concerns and frustrations with the water situation and lack of trust in the Navy's response. [Encl (270)]

6 December

324. SECNAV toured Red Hill with CNO, PACFLT COM, NAVFAC PAC, CNRH, FLC PH CO and NAVFAC HI CO, and also had lunch with Governor Ige. [Encls (210), (283)]

325. SECNAV participated in teleconference with the Hawaiian Congressional delegation. [Encls (210), (283)]

326. SECNAV, Chief of Naval Operations (CNO) and PACFLT DCOM conducted a joint press engagement at 1330 at the US PACFLT Headquarters. The event was advertised to the press via a media release on the previous day. [Encls (282), (283)]

327. On 6 Dec 2021 PACFLT COM and DCOM met with Governor Ige, DOH Director (b)(6) and (b)(6) [Encls (210), (283)]

328. Also on 6 December, DOH requested via email to collect samples at Navy facilities. In the affirmative reply, the CNRH Environmental Director requested that the Navy be allowed to conduct split sampling. Split sampling is conducted by taking two or more representative portions from one sample or subsample and analyzing them by different analysts or laboratories. Split samples are used to replicate the measurement of the variables of interest. The requested sampling was conducted on 7 December. [Encls (274-276)]

329. DOH emailed CNRH with an updated groundwater sampling plan to be in effect over the following two months. The request included timelines, analytes to be sampled for and sampling locations. CNRH responded with clarifying questions on 7 December. [Encl (277)]

330. At 1705, JBPHH and CNRH Facebook posts informed residents that partial TLA (meals only) was authorized for personnel residing and remaining in their base housing. Temporary lodging was approaching 1,200 families in hotels from an occupied home inventory of 4,801 in Navy / Hickam areas of concern. [Encls (223), (283)]

331. Beginning in the evening, a heavy rain event caused water to build up and pool in the area outside of Adit 3, which overflowed into the Adit 3 tunnel. During this event, the CHT tank outside of Adit 3 overflowed and fuel came out of the tank. At that point, personnel recognized that fuel had been pumped out of the CHT sump and into this CHT tank outside of Adit 3 during the 20 November spill. FEDFIRE was called and responded to the Fuel release. The EOC was already active and it was reported to them as well. Personnel from FLC PH attempted to notify the NOSC but were unable to reach him. FEDFIRE produced a report of their response to this event that characterized the incident as a fuel release. The CNRH Environmental Director

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reported that the overall flooding event was covered in the site characterization plan submitted to DOH on 8 December; however, the specific issue of the CHT tank overflowing fuel was not reported. Of note, the CNRH Environmental Director was unaware that the tank overflowed or that fuel was released until interviewed during this investigation in March. When subsequently questioned about the rationale for not reporting the CHT tank fuel release, the CNRH Environmental Director assessed that this did not trigger a formal release notice to regulators because she relied on the assessment from the FLC PH CO that there was not a release of fuel to the environment during the flooding event. However, as of 15 April 2022, the CNRH Environmental Director intends to discuss this matter with DOH at the next Site Characterization Discussion scheduled for 21 April 2022. [Encls (41), (47), (158), (278), (409), (410)]

332. A significant fuel smell was observed near Adit 3 during and immediately after the heavy rains. [Encl (43)]

333. At 1956, a JBPHH and CNRH Facebook post informed residents that all water distribution locations and Halsey Terrace shower and laundry facilities will cease operations due to the weather event. [Encl (223)]

334. DOH issued an order to the Navy to suspend operations at Red Hill Bulk Storage Facility, take measures to treat contaminated water at the Red Hill shaft and safely remove fuel from the 20 underground storage tanks. [Encls (210), (284)]

7 December

335. The Environmental team received first sample results from the Red Hill well, via fingerprint testing, confirming JP5 in the drinking water. [Encls (42), (210), (285), (286)]

336. CNRH responded to the 4 December formal Request for Records from DOH with sampling plans, sampling procedures, laboratory data, and initial sampling results. [Encl (287)]

337. On 7 December SECNAV issued an order to suspend Red Hill operations. [Encl (67)]

338. Shortly after CNRH secured the Red Hill well, the Office of the Judge Advocate General's Admiralty and Claims Division (Code 15) was in contact with PACFLT / CNRH to determine the potential impact of the this event. In the first week of December, Code 15 activated OJAG's disaster response plan and immediately began working with on-scene JAG personnel to provide support to the response effort, including the training of personnel assigned to support the Emergency Family Assistance Center (EFAC). A process was established for the intake and adjudication of personal property claims for damages from impacted military residents that was separate from the TLA reimbursement program. This process included the publication of a customized claims packet and a designated help desk in Norfolk with tailored hours to correspond with Hawaii Standard Time. In mid-December, Code 15 deployed an on-scene team to Hawaii to refine the process and provide additional on-site training to those acting as liaisons

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who would direct property damage claims inquiries to Code 15. Code 15 deployed a second time in January to re-iterate training to rotating JAG personnel as they arrived in Hawaii and to continue to refine the process in light of the evolving situation. To meet the Navy's commitment to provide support for all of those impacted, Code 15 also worked with CNIC to obtain Emergency and Extraordinary Expense (EEE) authorization to fund, among others items, payment of property damage claims from businesses and non-military claimants. The claims process for impacted residents and businesses continues through present day and will remain in place for the foreseeable future. [Encls (288), (289)]

Action by Fleet Logistics Center, Pearl Harbor to Communicate Manning Concerns

In light of the Cavanaugh Report opinion that the FLC PH "Fuels Department is undermanned at every level," this section explores the actions taken by FLC PH to communicate concerns about their Fuels Department manning, including what decisions were made in response and at what level of the chain of command. Because the vast majority of the FLC PH Fuels Department personnel are civilian, the findings of fact below primarily center on civilian manning. As such, the term "Full Time Equivalent (FTE)" is used to describe the number of full time (40hrs/wk) civilians a given civilian personnel budget is expected to support. The term "position" is used to describe the collective duties and responsibilities which require the services of a single civilian employee. A given civilian personnel budget provides the financial resources for the total pay and entitlements, including overtime pay, for all civilian employees filling positions within an organization. Finally, for simplicity, the term "billet" is used here only to refer to a post assigned to a uniformed military person and the term "manning" is used regardless of whether manning or manpower is being addressed, unless "manpower" is required in a formal title or name.

339. Today, the FLC PH Fuels Department is comprised of 89 civilian FTE and 3 military billets, with 94 civilians and 3 Navy Officers actually on board. DLA-E funds 88 FTE and NAVSUP funds the remaining 1 FTE. Including the Fuels Department, FLC PH is comprised of 354 civilian FTE and 39 military billets. As a point that was unable to be reconciled during the investigation, NAVSUP comptroller reports that there are 84 civilian FTE supporting Fuels Department with DLA-E funding 80.5 FTE and NAVSUP funding the remaining 3.5 FTE. [Encls (290-294)]

Background

Prior to 2014, the Fuels Department bulk fuel operations did not include operations at Hickam Air Force Base (AFB). As such, it is important to note that prior to that year the Fuels Department FTE was about half the size that it is today because the mission scope was smaller.

340. Navy is the only service that has fuel operations FTE funded by DLA-E. All other services provide manning from within their own service budgets. [Encls (92), (374)]

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341. All Fuels Department manning discussions identified in the last 25 years have involved civilian FTE. FLC PH has not requested any additional military billets for Fuels Department. [Encls (41), (293)-(298)]

342. Responsibility for Shore Manpower Requirements Determinations (SMRD) was decentralized and shifted to the BSOs on 14 October 1986. Responsibility for SMRD was recentralized to the Navy Manpower Analysis Center (NAVMAC) on 18 July 2021. Also, DLA does not provide manning guidance to the Navy for operation of DFSPs. [Encls (299), (301)-(303), (305)]

343. NAVSUP is BSO 23. [Encl (304)]

344. In Oct 1997, an Office of Management and Budget A-76 study was commissioned to assess the Fuels Department, which then consisted of 48 personnel on board. Although no longer permitted, A-76 studies were conducted to determine the most cost effective and efficient means of performing a given function in order to justify a government versus private contractor based operation. In Oct 2000, after 3 years, the A-76 study concluded that a Most Efficient Organization level of manning for the Fuels Department was 39.5 FTE. No evidence exists to document any action taken by FLC PH, NAVSUP, or DLA-E in response to the findings of the A-76 study. [Encls (307), (309)]

345. In Aug 2008, NAVSUP sponsored a Business Process Reengineering (BPR) Fuels Facilities study led by the consulting firm, Grant Thornton LLP. The Pearl Harbor Fuels Department was included in this study which concluded that they should be resourced at 47 FTE. Because DLA-E was already funding 47 FTE for Fuels Department, no action was taken based on the BPR. [Encls (295), (310), (313)]

346. In 2014, Pearl Harbor and Hickam AFB Fuels Operations merged to form JBPHH DFSP. Prior to the merger, the Navy funded 44 FTE for USAF fuels operations at Hickam AFB for various reasons and DLA-E funded 47 FTE for the Pearl Harbor Fuels Department. As a result of the merger, DLA-E agreed to fund 41 of the 44 Hickam AFB FTE, bringing the total for the JBPHH DFSP Fuels Department to 88 FTE funded by DLA-Energy. [Encls (92), (294), (295), (311), (312)]

347. In Oct 2017, due to increasing environmental compliance requirements pursuant to the Red Hill Administrative Order on Consent (AOC), FLC PH requested an increase of one FTE to support the addition of an environmental professional in FY18. This request was denied by DLA-E because they assessed that environmental monitoring and response actions are Service responsibilities. FLC PH did not elevate any concerns with this denial to NAVSUP or request assistance in adjudicating with DLA or in having NAVSUP fund the position. [Encls (92), (309), (313)]

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2019 to May spill

348. In Sep 2019, the FLCPH Executive Director (ED) created 26 additional civilian positions within Fuels Department. There was no corresponding request to increase the budgeted FTE from the approved 89 FTE (Note: one NAVSUP funded FTE had been added since 2014). Additionally, there is no evidence of a work-based analytic basis for the increase, it was a budget driven decision. Because, on average, about 15% of the Fuels Department positions are unfilled at any given time due to retirements, departures and the time required for the government hiring process, the ED believed that the budget associated with the 89 approved FTE could support 26 additional positions. The ED thus leveraged savings within the civilian budget based on unfilled positions to add positions so that the Fuels Department could hire additional civilians with the understanding that at any given time 15% of all positions would be unfilled. These additional positions, when filled, are known as "overhires." Hence, the total number of positions exceeded the authorized FTE. The ED created and filled the environmental position previously denied by DLA-E using an "overhire." [Encls (41), (290), (295-296)]

349. In Aug 2020, the FLC PH Business Director was hired and in Nov 2020, he reported to the NAVSUP Financial Management/Comptroller and the FLC PH ED the potential for a civilian manning budget over-execution due to Fuels Department excessive overtime. Fuels Department ultimately exceeded their planned overtime by 103% in 2020. [Encls (41), (299-300), (309), (314)]

350. In Jan 2021, DLA-E asked FLC PH and the Naval Petroleum Office (NPO) to explain the fact that FLC PH reported expenditures for 93 DLA-E funded FTE, vice their authorized 88 FTE, in their November 2020 Monthly Status Report. At this time, Fuels Department had 103 civilians on board. Although there is no evidence that any manning analysis was conducted, FLCPH reported as part of their answer that they "…could not operate safely and effectively with 88 FTE's." NPO directed FLC PH to reference the NAVSUP Financial Management/Comptroller Office guidance that any expenditures above 88 DLA-E funded FTE, are to be charged to the NAVSUP FTE budget and not the DLA-E FTE budget. There is no evidence of any other related communications between NAVSUP and FLC PH regarding any concern associated with safe and effective operations due to manning. [Encls (92), (309), (315), (316)]

May Spill to November Spill

351. In May 2021, FLC PH Business Director conducted a mid-year budget review with NAVSUP Financial Management/Comptroller (SUP01), and requested additional Fuels Department FTE as part of the POM process. SUP01 stated that new/additional requests for manning would not be accepted during the POM process. [Encls (299), (314), (317)]

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352. In Sep 2021, FLC PH Business Director raised concerns about the hiring process and their overtime overrun of 89% in 2021 to the FLC PH CO and FLC PH XO in preparation of the FY22 QTR 1 Financial Execution and Concerns Meeting hosted by SUP01. SUP01 subsequently cancelled the meeting. [Encls (41), (299), (300), (314)]

353. There is no evidence of any additional Fuels Department manning requests, or actions by FLC PH, NAVSUP, or DLA-E during this period. [Encls (41), (92), (293-295), (313)]

November Spill to Current

354. After 20 Nov 2021, the FLC PH Executive Director determined more personnel were needed to effectively operate due to emergency response requirements. On 22 Nov 2021, Fuels Department had 99 civilian personnel on board. FLC PH leadership initiated a request for a Shore Manpower Requirements Determination (SMRD) thru NAVMAC. [Encls (295), (318), (319)]

355. In Jan 2022, FLC PH Deputy Fuels Director reported difficulty completing Preventative Maintenance (PM) actions with current manning to FLC PH Executive Director. Approximately 300 PMs were done monthly in 2020/2021, and there had been a 300% increase in required PMs. [Encls (295), (314)]

356. In Jan 2022, based on FLC PH CO and FLC PH Executive Director identifying that a significant portion of FLC PH leadership time was spent responding to RFIs, a $2.5M contract was awarded to Pond & Co for Technical Writers to assist in that work. [Encl (313)]

357. In Jan 2022, NAVSUP directed a data call to all FLCs asking for a listing of authorized manning, overhires and additional requirements related to fuel operations. In response, FLC PH provided a manning document indicating need for increase of 35 Fuels Department civilian personnel. [Encls (92), (320)-(323)]

358. In Feb 2022, the FLC PH CO delivered a revised proposal and analysis to NAVSUP to support an increase of (17) Navy funded FTE and (36) DLA-E funded FTE as an update to the Jan 2022 request for additional civilian personnel. [Encls (308), (324-326)]

359. On 4 Mar 2022, NAVMAC received the request for FLC PH SMRD from the NAVSUP Total Force Division Director. [Encl (327)]

360. Due to the SECDEF directed closure of Red Hill, NAVSUP reprioritized the Fuels Department SMRD and postponed the requested date for the SMRD to 2nd QTR FY2024. [Encl (296)]

361. In Mar 22, the FLC PH Deputy Fuels Director stated that the current FTE for Fuels Department is not ideal due to the impending closure of Red Hill because he believes it will

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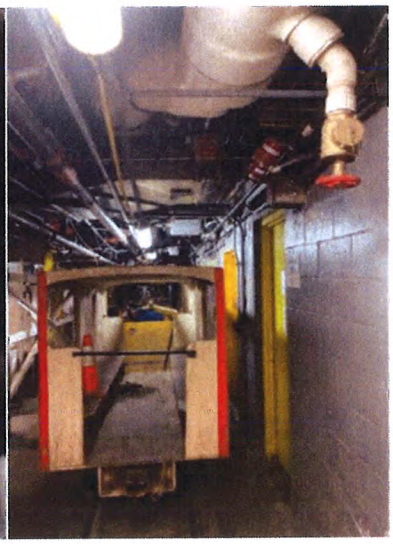
require an increase in manning due to the increased requirements for fuel transfers via barges, above ground fuel tanks and piers for overall Fuels Department operations. He believes that the SMRD should address this issue, but he has not been involved in the request. [Encl (41)]

AFFF System: Design, Install, Induction, Maintenance

As established in the Cavanaugh Report and updated herein, the AFFF fire suppression system retention line held up to 19,377 gallons of JP-5 fuel from the time of the May spill until the November spill, when a watch stander inadvertently struck a low point drain with the passenger cart of a train, cracking the pipe and spilling the fuel. The below findings of fact focus on the design, installation, induction, and maintenance associated with the AFFF retention line, sump pumps, tank and associated equipment (collectively referred to here as the AFFF waste system).

Cracked Low Point Drain



Train Passenger Cart

362. The requirement to upgrade Red Hill life safety systems to comply with DoD life safety standards was specified by DLA for the FY-15 National Defense Authorization Act. This upgrade was intended to provide various capabilities, to include: water fire sprinkler system in the upper access tunnel; automatic aqueous film forming foam (AFFF) & water fire suppression system in the lower tunnel; 350,000 gallon storage tank, two fire pumps, fire pump building, hydrants, and water supply lines; collection pits with sump pumps and an exterior 530,000 gallon retention tank for disposal of AFFF; repair for existing and additional oil tight doors along the tunnel; and several other safety related items. [Encl (328)]

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363. Prior to upgrading Red Hill life safety systems, there was not an AFFF sprinkler or drain system in the tunnel. [Encl (329)]

364. The AFFF retention line is designed to transport an AFFF foam/fuel solution following AFFF system activation for fire suppression from the area of the lower access tunnel under the bulk fuel storage tanks to the AFFF retention tank outside adit 3. Although not designed to be a dedicated fuel transportation system, the AFFF retention line was also designed to be an emergent fuel transmission line in the event of a catastrophic leak. [Encls (330)-(332)]

365. The AFFF retention line is a 14" pipe connecting five sumps, each with four pumps, in the floor of the Red Hill lower access tunnel (directly below the bulk fuel storage tanks) to an AFFF retention tank outside of Adit 3. The pipe is constructed of a combination of PVC and steel and runs approximately 0.9 miles end-to-end. It slopes down from an elevation of (b)(3)(A) sea level in the area under the bulk fuel storage tanks to a minimum elevation of (b)(3)(A) sea level approximately (b)(3)(A) and rises from there to the retention tank inlet at an elevation of 147 feet above sea level. These elevation changes create a low area in the AFFF retention line capable of holding 30k to 40k gallons of fluid. The original design required manual draining of this low area to vacuum trucks or portable containers via manual low point valves installed in the AFFF retention line following any activation of the AFFF waste system. [Encls (333)-(335)]

366. AFFF that contain per- and polyfluoroalkyl substances (PFAS) are typically used to extinguish highly flammable or combustible liquid Class B fires, such as fires involving gas tankers and oil refineries. Releases of AFFF should be minimized because PFAS are persistent in the environment, have been found to accumulate in the human body, and exposure to some PFAS compounds may lead to adverse health outcomes in humans. [Encl (371)]

367. PFAS are a group of man-made chemicals that includes perfluorooctanoic acid (PFOA), perfluorooctanesulfonic acid (PFOS) and many other chemicals. The Military Specification for AFFF was revised in 2017 to require significantly reduced PFOS and PFOA. Due to the age of the Red Hill AFFF system, it has only ever contained this new formulation. [Encls (46), (371), (372)]

368. The material specification for constructing AFFF foam solution piping is established by DoD Unified Facilities Code (UFC) 3-600-01, Fire Protection Engineering for Facilities, section 9-9.2.1, which mandates "schedule 40 steel pipe" for such piping. Foam concentrate piping is also required to be steel by this UFC, but is discussed separately in section 9-9.2.2. The requirement for the overall capabilities of the systems providing fire protection for underground vertical storage tanks in POL (fuel) facilities is established by UFC 3-460-01, section 2-14.3. However, it is UFC 3-600-01 that delineates material specifications for the construction of fire protection systems and is used as the primary reference for material requirements by the designer of record in the basis of design. [Encls (330), (336), (337)]

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369. The AFFF retention line was required by the government construction agent, NAVFAC PAC, and the designer of record to be constructed entirely of steel in the design specifications when the construction contract for this system was first awarded in 2015. [Encls (338)-(340)]

370. The government construction agent having contract oversight for the construction of the AFFF system was NAVFAC PAC - Contract title FY 15 P-1551 Upgrade Fire Suppression and Ventilation Systems, Red Hill Fuel Storage Facility (Contract number: N62742-11-D-0005). [Encls (332), (335), (342)]

371. On 26 Mar 13, the design contract for P-1551 was awarded to Insynergy Engineering, Inc (the designer of record). [Encl (342)]

372. On 25 Aug 15, the construction contract for P-1551 was awarded to Hensel Phelps, a general contractor and construction company (the construction contractor). [Encls (343), (344)]

373. On 5 Oct 15, site mobilization began and construction commenced in Jan 2016. [Encls (343), (344)]

374. On 28 Oct 15, just prior to starting construction, the construction contractor submitted RFI 0006 to NAVFAC PAC asking for clarification because their interpretation of the drawings and specifications provided by NAVFAC PAC indicated to them that the AFFF retention line, along with other lines in the AFFF system, was to be constructed of PVC. [Encl (345)]

375. On 15 Dec 15, a contract hire construction manager working on behalf of NAVFAC PAC responded to RFI 0006 by saying that the construction contractor should "proceed as per the proposal and identify in material submittals. No contract change required." There is no written record that he conferred with the responsible Design Manager or any other NAVFAC PAC government employee prior to this reply. [Encls (343), (345), (346), (348)]

376. On 24 Mar 16, the construction contractor provided a material submittal to NAVFAC PAC to document the purchase of general purpose plumbing materials. Although not indicated as such in this report, the materials listed included the PVC piping used to construct the AFFF retention line. [Encl (349)]

377. On 27 Jun 16, the construction contractor began installation of the AFFF retention line using PVC piping. [Encl (344)]

378. On 28 Jul 16, the low point drain plan was revised to provide equipment to drain the AFFF retention line low area into the ground water sump in the floor of the tunnel near the Adit 3 entrance. This plan would have replaced the groundwater sump pump with a new pump connected to the existing 6" ground water discharge pipe to transport AFFF retention line drainage out to a new manual hose connection at the Adit 3 entrance. The remainder of the

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existing 6" groundwater piping was to be capped and retired in place since it runs underground to a buried cement tank. [Encl (333)]

379. On 24 Aug 16, the construction contractor submitted RFI 0119 to NAVFAC PAC to ask if a secondary containment "jacket" was required on the underground portion of the PVC AFFF retention line. Within the narrative of the question, the contractor stated "Hensel Phelps is utilizing Yelomine [PVC] Pipe for the AFFF retention line." [Encl (350)]

380. On 30 Aug 16, NAVFAC PAC responded to RFI 0119 stating that a secondary containment "jacket" should be provided. Correspondence between the designer of record (DOR) and the NAVFAC PAC construction manager regarding RFI 0119 indicates that both were aware that the contractor was using PVC to construct the AFFF retention line. There is no indication that either took any action regarding the use of PVC piping. [Encls (350), (351)]

381. On 6 Jan 17, the construction contractor completed installation of the AFFF retention line. [Encl (344)]

382. On 12 Mar 17, following an owner/contractor meeting between NAVFAC PAC and Hensel Phelps, the construction contractor verbally confirmed their use of PVC piping for the construction of the AFFF retention line. [Encl (352)]

383. On 13 Mar 17, the construction contractor formally notified NAVFAC PAC, in writing, that they constructed the entire AFFF retention line with PVC vice Steel pipe. [Encl (353)]

Original AFFF Retention Line Piping in Immediate Area of an AFFF Sump

384. On 13 Apr 17, the contractor proposed a revised AFFF retention line low area drain plan which is a self-contained unit with new tank and sump pump to move AFFF retention line

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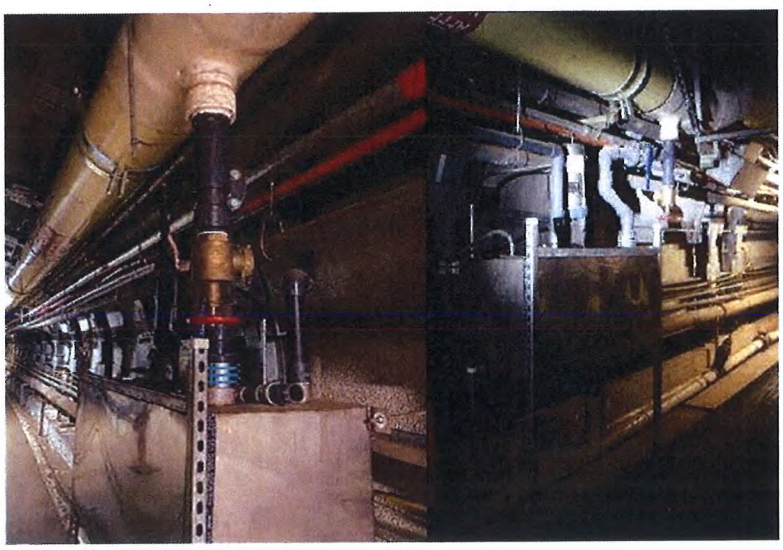
drainage out to a new manual hose connection at the Adit 3 entrance via new 3" PVC piping. This system does not utilize the groundwater sump system. This is the installed configuration today and is in close proximity to the Adit 3 groundwater sump, but does not connect with that sump. This system was not used to drain the AFFF retention line following the November spill. [Encl (354)]



Final Installed Low Point Drain System with PVC Retention Line

385. On 26 May 17, CO NAVFAC HI notified Commander, Navy Region Hawaii, NAVSUP Global Logistics Support, and Commander, NAVFAC PAC that the AFFF retention line was constructed of PVC vice steel. [Encl (355)]

386. On 30 May 17, NAVSUP Global Logistics Support notified DLA Installation Support that the AFFF retention line was constructed of PVC vice steel. [Encl (355)]

387. On 17 Jul 17, a NAVFAC Red Zone meeting to discuss AFFF system completion and turnover was attended by representatives of the construction contractor, NAVFAC PAC, NAVSUP, FLC PH, and the designer of record. This is the only record of Red Zone activity for the AFFF system retained in the construction file. Retention of Red Zone records, to include a completed checklist/POA&M, is required by B-1.6.11 NAVFAC Business Process Management System's Red Zone Process. [Encls (368)-(370)]

388. On 22 Sep 17, an investigation was completed by NAVFAC HI to document the detailed actions of the construction contractor and the government that led to the AFFF retention line being installed using PVC vice steel pipe. This report notes the following key points: 1) The AFFF retention line is a large exposed discharge line in an area considered to be an industrial

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space, where large equipment and materials are transported. Pipes and structures in this type of environment are susceptible to inadvertently being struck by a heavy object. In the event of impact, steel is far sturdier than PVC. 2) PVC is not acceptable for fuel because the gaskets used will break down when in contact with fuel. 3) PVC also presents an increased static electricity risk, and thus potential for explosion during fuel transportation. [Encls (330), (331)]

389. On 12 Oct 17, after identifying the deviation from the specification requirement to use steel for the retention line, the NAVSUP Navy Petroleum Office (NPO), in conjunction with NAVFAC PAC, DLA Installation Operations and the designer of record, proposed to replace the PVC pipe in the immediate area of the sumps with carbon steel pipe, while retaining the majority of PVC AFFF retention pipeline installed. Several additional modifications unrelated to piping material were also included in the proposal. Retaining the majority of the pipe as PVC was proposed primarily due to the excessive cost to replace the pipe with steel. Additionally, it was noted by DLA that the installed pumps were not designed to pump fuel. [Encls (332), (341)]

390. On 19 Oct 17, The NAVFAC PAC Fire Protection Engineer concurred with the NPO proposal. He notes that the modifications are accepted with the understanding that the retention line is primarily for the transport of foam-water and oil mixtures, its functionality may be limited to one-time use in the event that it is needed to pump 100% fuel in the event of a catastrophic fuel leak or if it is damaged by a large scale fire and that the liquid velocities in the pipeline up to the tank do not produce risk of static electricity build up. [Encl (341)]

391. On 21 Dec 17, commissioning testing was completed for the AFFF distribution system. [Encl (347)]

392. On 13 Jan 18, commissioning testing was completed on the AFFF waste system. All AFFF sump pumps were run satisfactorily by manipulating the float switches, but no water was pumped. [Encl (356)]

393. On 16 Jan 18, DLA Installation Operations proposed to maintain PVC pipe in the immediate area of the sump pumps, but continue to move forward with the non-material related modifications due to cost concerns. This was also based on the assumption that a fire would melt the wires powering the pumps before it would melt the PVC piping. [Encl (357)]

394. On 25 Jan 18, NAVSUP Energy and FLC PH concurred with DLA's updated proposal, contingent on the approval of the NAVFAC PAC Fire Protection Engineer. [Encl (341)]

395. On 31 Jan 18, the AFFF system, with the exception of the AFFF waste system, was accepted by NAVFAC PAC from the general contractor. This is the Beneficial Occupancy Date (BOD) for all AFFF components except the AFFF waste system. The initial maintenance contract for the AFFF system, with the exception of the AFFF waste system, took effect 5 months later on 1 Jul 18, and was later amended in July 2022 to cover the entire system. No NAVFAC Red Zone checklists are retained to describe system turnover. [Encls (358), (369)]

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396. On 1 Feb 18, the NAVFAC PAC Fire Protection Engineer discussed identified fire protection deficiencies within the new proposal not to replace PVC piping in the immediate area of the AFFF pumps with steel. [Encl (359)]

397. On 8 Feb 18, DLA counter-proposed changing the piping in the immediate area of the sump pumps to steel and adding fast acting sprinklers to protect the wiring for the pumps. [Encl (360)]

398. On 12 Feb 18, NAVFAC PAC Fire Protection Engineer concurred with the DLA counter-proposal and accepted the final plan to change retention line piping to steel in the immediate area of the sump pumps, while retaining PVC in all other areas. [Encl (360)]

399. On 15 Feb 18, Initial AFFF system O&M manuals were hand delivered to FLC PH by NAVFAC PAC. More comprehensive and integrated O&M manuals were requested by FLC PH. [Encl (361)]

400. On 22 June 18, design work was completed for the AFFF retention line modification previously approved on 12 Feb 18 by NAVFAC PAC. This modification was known as 'Change R'. [Encl (362)]

401. On 26 June 18, a request for proposal to install the Change R design was sent to Hensel Phelps. [Encl (362)]

402. On 2 Aug 18, the construction contractor provided a proposal to execute Change R to NAVFAC PAC. [Encl (362)]

403. In Jan 19, physical construction began on Change R after the construction contractor mobilized for the new work. [Encl (362)]

404. On 18 Jun 19, NAVFAC PAC processed a service request (SR) to initiate maintenance on the AFFF waste system which was soon to be completed. The SR was reported by a NAVFAC PAC facilities operations specialist with a FLCPH facilities engineer listed as the customer representative. [Encl (363)]

405. On 19 Jun 19, Change R was completed by the construction contractor. This is the configuration today. Commissioning testing was not performed again on the AFFF waste system. However, servicing was performed on the sump pumps (grease, rotation, cleaning) during connection of the new steel piping in the immediate area of the pumps. It was noted at the time that some of the pumps were seized due to lack of preventative maintenance, but were operational at the completion of servicing. [Encls (332), (362), (364)]

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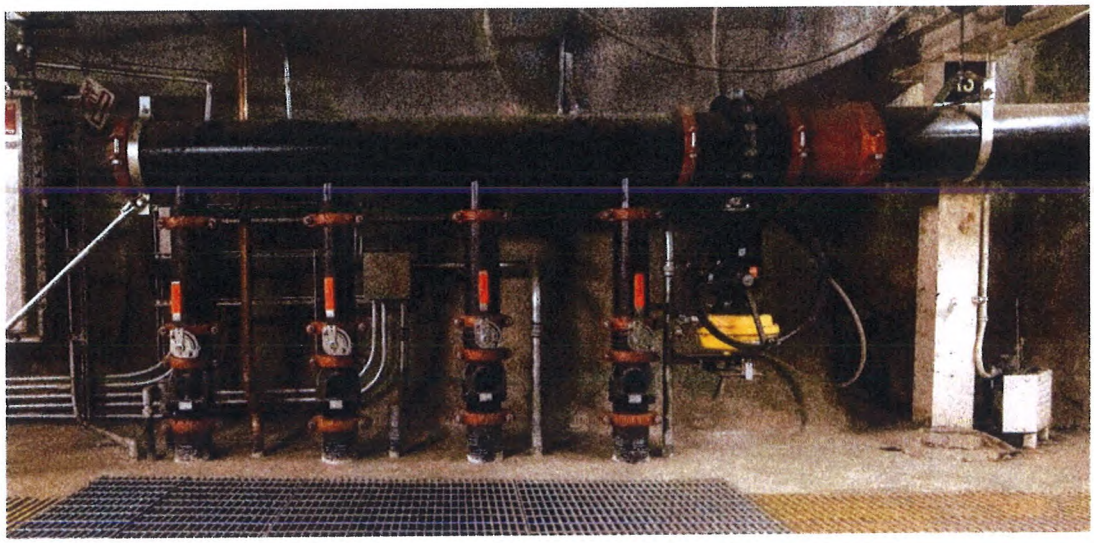

Final Change R Piping in Immediate Area of an AFFF Sump

406. On 2 July 19, the AFFF waste system was accepted by NAVFAC PAC from the general contractor. This is the BOD for the fully completed system. No NAVFAC Red Zone checklists are retained to describe system turnover. [Encls (358), (369)]

407. On 29 Aug 19, final Operations and Maintenance manuals were provided by NAVFAC PAC to FLC PH via DOD SAFE. [Encl (365)]

408. On 15 Apr 20, the AFFF system was inducted into the Navy's real property system when NAVFAC PAC submitted the Transfer and Acceptance of DoD Real Property form DD 1354 to Commander, JBPHH. Total project cost was reported as $57,958,837.63. [Encl (366)]

409. As recently as April 2021, personnel within FLC PH were still advocating for a maintenance contract to be placed on the AFFF waste system and expressed frustration with delays, which they attributed towards systemic failure associated with maintenance support for Red Hill fire suppression safety. [Encl (390)]

410. On 15 Jul 21, the AFFF waste system was added to the existing Red Hill fire suppression system maintenance contract, more than 2 years after the Service Request was entered to request the maintenance. The contract is held by *Kinetix* and this is the first maintenance contract for the AFFF waste system. Following this action, *Kinetix* commenced monthly inspections of the entire system, which included a visual inspection of the AFFF retention line. There were monthly inspections in July, August, September, October, and November prior to the 20 November incident with no deficiencies noted. [Encls (51), (358), (384), (385)]

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411. On 23 Dec 21, the first maintenance operating checks were performed on the AFFF sump pumps. This was the inaugural semi-annual maintenance for the AFFF waste system. All four zone 1 AFFF sump pumps failed the checks for various reasons. Three of the four were able to run in manual mode, but the "run" light for one of the three operational pumps failed to light. There is no record of any other operating checks on this system by *Kinetix*, or any other contractor overseen by NAVFAC, prior to this date. NAVFAC PAC is waiting for FLCPH to tell them what maintenance actions they desire to be done to correct identified deficiencies. [Encl (367)]

412. On 21 Jan 22, *Kinetix* reported results of follow-up testing of the AFFF sump pumps to NAVFAC HI. These tests checked to see if the installed float switches automatically started the pumps as designed. Two of the four zone 1 AFFF sump pumps were successfully activated, however they were not activated by the correct/expected float switch. [Encl (391)]

413. On 17 Mar 22, the final AFFF system property record cards are updated within the Navy's real property record system, internet Naval Facilities Assets Data Store (iNFADS). [Encl (366), (407)]

414. On 17 Mar 22, during a walkthrough of Red Hill, the supplement investigation team noted visual evidence of a foreign substance on the outside of the PVC AFFF retention line piping joints that appears to have seeped out.

Installed PVC AFFF Retention Line with Joint Seepage

Command and Control

The findings of fact from the Cavanaugh Report detail the nexus of stakeholders with command, control, and oversight roles related to Red Hill. The report assesses that the C2 of Red Hill is complex but fairly well defined as follows: (1) FLC PH is responsible for day-to-day operations; (2) NAVFAC HI is responsible for maintenance and repair contracts; (3) CNRH is responsible

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for environmental functions and incident response; and (4) DLA funds operations and maintenance.

Including the reconciliation noted in section II above, the supplement adopts the "Command Relationships and Responsibilities" findings of fact from the Cavanaugh Report (FoF 326 to 388). The below findings are added to provide additional specificity regarding the roles and responsibilities for DLA, NAVSUP, NAVFAC, and CNIC to illustrate the C2 as delineated by written policy and as practiced C2 in the field as it relates to the operations and maintenance Red Hill.

415. DLA is designated as the DoD EA for Bulk Petroleum and executes integrated material management responsibility for the Defense Working Capital Fund bulk petroleum supply chain by providing various functions to the point of sale which include procurement, transportation, storage, distribution, ownership, accountability, budgeting, infrastructure sustainment, restoration, and modernization. To execute these functions, DLA entered into various MOAs with the Navy that further delineate roles and responsibilities for the operations and maintenance of DFSPs, to include Red Hill. [Encls (91-92), (373)-(375)]

416. As part of an MOA between DLA and NAVSUP, NAVSUP FLCs are responsible for regional fuels engineering expertise for support and project oversight in managing the DWCF Fuel infrastructure, including submission of project deficiencies; coordinate with DLA and the "execution agents" for cradle-to-grave project development, execution and closeout; and ensure timing of Sustainment, Restoration and Modernization (SRM), Centrally Managed Program (CMP), recurring maintenance, deficiencies, Military Construction (MILCON), and demolition projects are coordinated to avoid workload conflicts or duplication. [Encls (33), (45), (91), (121), (157), (158), (159), (161), (174), (376), (380)]

417. As part of an MOA between DLA, NAVFAC, and NAVSUP for petroleum, oils and lubricants (POL) SRM of Navy capitalized facilities, NAVFAC is the primary "execution agent" for the Navy's POL SRM program funded by DLA. For non-CMP projects and maintenance, the Regional POL Engineer (RPE) (a NAVFAC HI employee embedded in FLC PH), based on input from FLC and operators, determines the best way to have work inducted, obtain scope, design, and contracts based on the need/requirement and capabilities at the installation. [Encls (159), (161), (174), (378)]

418. As part of an MOA between CNIC and NAVSUP for the management of Navy Bulk Fuel Facilities, Region Commanders must enter into and approve region agreements to execute the requirements of this MOA and installation Commanding Officers retain their Title 10 responsibilities for safety, security, environmental stewardship, and protection of personnel and property on the installation. These responsibilities extend to all fuel service and storage, including bulk fuel facilities, aboard the installation, remote areas and auxiliary activities under his or her command. NAVSUP acts as the "executive agent" for bulk fuel facility management

and fueling operations and has the ultimate authority and responsibility for ensuring "bulk fuel facility maintenance" is being performed. FLC is responsible for the bulk fuel facilities and must work with local NAVFAC leadership, typically the public works officer, concerning facility projects, maintenance, quality assurance inspections, contractor warranty issues, environmental support, and requirements affecting the installation. [Encl (377)]

419. NAVFAC and NAVSUP entered into an MOA for the facilities sustainment associated with DFSPs to establish the roles and responsibilities of the NAVFAC Regional Petroleum, Oil, and Lubricants (POL) Engineers (RPE) and the NAVSUP FLCs as they relate to the RPE function. The MOA establishes that the RPE shall be a NAVFAC forward-deployed asset located at the NAVSUP FLCs. [Encls (45), (121), (124), (157), (158), (165), (379)]

420. For fire protection systems ashore, as delineated in the applicable OPNAVINST, NAVFAC serves as the authority having jurisdiction for all matters related to these systems including maintenance, design, consultation, engineering surveys, and support. Other services include interpreting and enforcing design, construction, and maintenance criteria, as well as the United Facilities Criteria (UFC), and the uniform building codes. [Encls), (45), (121), (124), (157), (159), (161), (165), (174), (375), (400)]

421. The AOC, entered into by the Navy, DLA, and EPA, was designed to protect the ground water, establishes requirements for the Navy to implement environmental analyses and infrastructure improvements that are designed to protect human health and the environment, to include the drinking water. Paragraph 4 of the findings of fact section within the AOC articulates command relationships with respect to Red Hill, but the Navy did not consent to that portion of the order. [Encl (3)]

422. While onboard a naval installation, Commanding Officers and all other personnel shall conform to the orders of the installation commanding officer related to common or specific services which he or she may provide, which may include field operations, security, fire protection, safety, defense, sanitation, recreation and welfare. For Red Hill, the installation Commanding Officers retains authority over all Title 10 responsibilities for safety, security, environmental stewardship, and protection of personnel and property on the installation and the responsibilities extend to all fuel service and storage, including bulk fuel facilities, aboard the installation, remote areas and auxiliary activities under his or her command. [Encls (42), (43), (45), (54), (55), (121), (124), (157), (158), (165), (175), (178), (377), (403)]

Maintenance Management and Ownership

423. DLA Energy, as a subordinate entity within DLA, manages the end-to-end global defense supply chain and is the interface with the Navy in their operation of Red Hill. As part of the DLA Energy organization, the Facilities Sustainment Directorate (FSD) handles portions of the day to day actions, to include the funding of maintenance for Red Hill. The FSD team funds a

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Recurring Maintenance and Minor Repair (RMMR) program for Red Hill, managed by the Army Corps of Engineers, which provides systems and preventative type maintenance of fuel systems. For this type of maintenance, the FSD team assesses that FLC PH is responsible for identifying the deficiencies and maintenance needs but the RMMR program is set up so that a contractor comes out to execute the work without the need for a separate contracting action. [Encls (91), (92), (373)-(375)]

424. For maintenance responsibilities ashore, CNIC is mission funded to provide common base operating support (BOS) services, which normally requires each Navy installation to organize and maintain all Navy shore infrastructure in coordination with NAVFAC. To delineate these functions and support, OPNAVINST 11014.3 sets out the installation and tenant command responsibilities for maintenance by prescribing facility maintenance unit identification codes (MUIC), which are listed on every property record card. In the excepted cases where the installation is not the MUIC holder, the policy prescribes further guidance on establishing the responsible entity. The MUIC holders are responsible for determining and funding the appropriate level of preventive and corrective maintenance on facilities under their cognizance. In most cases, NAVFAC is the organization responsible for execution of preventive and corrective maintenance in support of the MUIC holder when appropriately funded for those services. [Encls (42), (45), (124), (125), (165), (401)]

425. The DFSP onboard Red Hill is part of JBPHH and falls under the cognizance of the installation Commanding Officer. The property record cards on file for the tanks, tunnels, rails, pipelines, utilities in the facility as well as land, roads and other above ground structures associated with Red Hill reflect various MUIC holders, but the primary entities are JBPHH (MUIC: N62813); and DLA (D33). Until March of 2022, the various property record cards for the AFFF system associated with the recent fuel leak specified either DLA or JBPHH as the MUIC holder, depending on the specific sub-system. In March of 2022, all property record cards associated with the AFFF system which previously listed JBPHH as MUIC holder were updated to list DLA as the MUIC holder. [Encls (42), (45), (124), (125), (165), (381), (401), (407)]

426. When asked who owns the program management for the sustainment and maintenance of the key fire protection components associated with the recent fuel leak, the JBPHH CO stated that his installation public works officer would support projects as requested by the tenant but that the JBPHH team was not responsible for the operations at Red Hill. The NAVFAC HI CO stated FLC PH has maintenance responsibility for all systems in the facility to include the fire protection systems but that there was an assumption by FLC PH that NAVFAC owned it. The NAVFAC HI CO stated that maintenance program management was not a NAVFAC HI responsibility because they had not been contracted by the MUIC holder. The FLC PH CO stated that CNIC is the real property owner and NAVFAC is the Navy's agent responsible for the maintenance. The FLC PH CO also highlighted that OPNAVINST 11320.23G specifies that fire protection systems ashore are an installation responsibility. [Encls (42), (43), (45), (121), (124) (157-159), (161), (165), (174)]

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427. When asked who owns the program management for the sustainment and maintenance of the key fire protection components associated with the recent fuel leak, CNIC defers to DLA and NAVSUP to appropriately delegate and assign these responsibilities to NAVSUP based on the 22 December 2015 MOA between DLA and NAVSUP. But CNIC stated the MOA between CNIC and NAVSUP places the maintenance responsibilities for Red Hill with FLC PH. NAVFAC assesses NAVSUP owns the program management for the sustainment and maintenance, but acknowledged ambiguity exists because the property record cards improperly reflected the fire protection components MUIC holder responsibilities were shared between CNIC and DLA, which has been corrected as of 17 March 2022 (DLA is now reflected as having MUIC responsibilities). NAVFAC also stated the Operation and Maintenance Manuals (O&Ms), training material and as-built drawings were provided by NAVFAC HI to FLC PH upon completion of the system, which NAVFAC considers a further indicator that FLC PH is the operator and maintenance manager of the system. NAVSUP stated that CNIC and CNRH owns the real estate, NAVFAC is responsible for the maintenance, and when it comes to fire protection systems ashore, NAVFAC is responsible for the maintenance of the system. [Encl (383)]

428. For support systems maintenance onboard a military installation such as the AFFF system at Red Hill, DLA stated CNIC owns the infrastructure and NAVFAC is responsible for the programmatic oversight and execution for this category of maintenance. From the DLA Energy program management perspective for identifying maintenance needs on non-fuel systems, DLA is only responsible for funding and the Navy is responsible for managing and executing the maintenance. DLA assessed that they view JBPHH as a single installation that includes Red Hill and therefore NAVFAC is responsible for the entire installation within the public works function as the Navy's service executing agent. [Encls (42), (45), (121), (124), (125), (157-159), (161), (165), (174), (332), (374), (375), (381), (384), (385)]

429. There are three Commanding Officers with a nexus to Red Hill, but all three have different missions, functions, tasks, roles, and responsibilities for the facility: JBPHH CO, NAVFAC HI CO, FLC PH CO. When asked which Commanding Officer is the clear owner of Red Hill when it comes to program management for the sustainment and maintenance of the fire protection system, the Commander of Naval Installations Command acknowledged that there is little clarity as it relates to authority, responsibility and accountability for owning, identifying and managing maintenance requirements for the fire protection system at Red Hill. The NAVFAC Commander assessed that there are documented and clear roles and responsibilities within the governing MOAs and OPNAVINST 11014.3, "Facility Maintenance Unit Identification Code Holder Responsibilities," which define that NAVSUP has primary responsibility for owning, identifying, and managing maintenance requirements for the fire protection system at Red Hill. The NAVSUP Commander assessed that there are documented and clear roles and responsibilities within the governing OPNAVINST 11320.23G, "Navy Fire and Emergency Service Program," which defines that NAVFAC has primary responsibility for owning, identifying, and managing maintenance requirements for the fire protection system at Red Hill. COMNAVSUP acknowledged there are varying levels of understanding of the roles and

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responsibilities in this space, with some lacking familiarity with the authorities and MOAs. COMNAVSUP also assessed there was never any effort by Navy to synchronize and harmonize all of the various authorities and MOAs to address the gaps and seams between mission partners. [Encls (383), (400)]

Environmental

430. CNIC, through Region Commanders and Installation Commanding Officers, is responsible for environmental readiness program management aboard Navy installations, with technical support from NAVFAC. JBPHH is the installation Commanding Officer responsible for installation environmental compliance for Red Hill. The Service component Regional Environmental Coordinator (REC) is responsible to coordinate environmental readiness issues for their respective Service, which includes communications with Federal, regional, State, and local agencies and officials on covered activities in the region. CNRH is the REC responsible for covered issues within Hawaii. [Encls (403), (405)]

431. When an oil or hazardous substance release occurs onboard a Navy installation, the designated NOSC-R for the Region is required to immediately take actions to ensure the installation or tenant command response is adequate for the scope of the release. [Encl (398)]

432. The CNRH Environmental Program Director assesses the NOSC needs to have a stronger role in reporting. The NOSC assessed that his GS level does not give him the necessary authority to carry out his emergency response and reporting responsibilities regarding Red Hill due to the sensitivity, high level interest and media attention. [Encl (31), (40), (46), (47)]

Emergency Management, Spill Response, and Training

433. All installations are required to maintain an installation emergency management (IEM) program to serve, in part, as a cross-functional program that integrates procedures and standards for all-hazards emergency preparedness, response, and recovery on Navy installations. The installation Commanding Officer is required to establish, maintain, and operate an Emergency Operations Center (EOC). The JBPHH CO stated that for Red Hill, there has never been an integrated response drill during his tenure and to his understanding, there is no requirement for him to serve as the Incident Commander for a spill. The JBPHH CO also highlighted that unlike most other installations, Fed Fire works directly for Region instead of the installation. To his knowledge, the JBPHH CO assessed that the installation would not be responsible for planning or executing a spill drill at Red Hill but would instead participate in a supporting role as directed by the NOSC. [Encls (42), (399)]

434. The Region Commander is required to designate a Regional Emergency Manager in writing and that individual maintains the regional emergency management program responsible for developing, coordinating, and executing the Navy IEM Program within the region's assigned geographical area, which includes training requirements. [Encl (399)]

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435. For spill responses, all Navy facilities must maintain contingency plans to combat releases or discharges of oil and minimize hazards to human health and the environment. Additionally, they must develop Navy On-Scene Coordinator plans in combination with facility response plans to provide sufficient detail and ensure the Navy can respond to spills. These plans must cover notifications, responsibilities, initial actions, resources, and other areas and be accompanied with extensive drills and exercises with specified documentation and recordkeeping. [Encl (405)]

436. CNRH provides Incident Command System training to its Crisis Action Team members. Representatives from Legal, Public Affairs, Operations, Region Engineer, Information Systems, and Financial Services among other relevant divisions. Representatives from FLC, NAVFAC (including CNRH N4) and the CNRH PHEO have not received training. [Encls (386), (387)]

437. For spill response plans, JBPHH maintains an environmental pollution and contamination appendix in the installation EOC that was last updated in August 2010. For CNRH, there is a spill response plan but it was developed by a third party contractor and has not yet been signed out by CNRH. CNRH serves as "Navy on Scene Coordinator" (NOSC) for emergency response for reported or identified oil spills throughout the Navy Hawaii Region. [Encls (175), (388), 389)]

438. Separate from the spill response plans from CNRH and JBPHH, there is the JBPHH Emergency Response Plan (ERP) for the well inside Red Hill. The ERP is not referenced in any of the spill response plans for CNRH and JBPHH. However, the CNRH Red Hill Storage Facility Response Plan discusses the drinking water well and groundwater inside Red Hill, but only references the Groundwater Protection Plan and monitoring plan – it does not mention Community Water System Emergency Response Plan. [Encls (4), (12), (5), (392)]

439. RDML Kott stated that in the event of a fuel spill, the entity responsible for taking incident command depends on where the spill takes place, but for a fuel spill inside Red Hill, it is not clear which entity is responsible. [Encl (175)]

440. CO JBPHH stated there has never been an integrated response drill in his tenure for Red Hill and that there was no requirement for him to serve as the Incident Commander for a spill. He also highlighted that unlike most other installations, Fed Fire works directly for CNRH as opposed to the installation. He assessed he would not be responsible for planning or executing a spill drill but would participate in a supporting role as directed by the CNRH NOSC. [Encl (42)]

441. For an emergency response such as the May and November spills, CO JBPHH assessed the lead is CNRH and FLC PH with support from NAVFAC. CO JBPHH acknowledged this arrangement is not consistent with most other installations, but he understands Red Hill was different. [Encl (42)]

442. The NAVFAC HI CO assessed that JPBHH has no significant role in responding to an incident at Red Hill. He stated that CNRH is collocated with JBPHH, and because of the

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visibility of Red Hill, CNRH has taken over any role the base would normally play. There is no reference or written authority that obviates JBPHH from the roles and responsibilities that an installation Commanding Officer owns to all tenants, to include Red Hill. [Encls (45), (124)]

443. The FED FIRE team was not trained on the Red Hill facility prior to either spill and did not have familiarity with the layout. They had to rely on the tenant for guidance during their response. FED FIRE was able to tour the Red Hill facility in February 2022 to increase their response capability. [Encl (168)]

444. Several key leaders, to include JBPHH CO, JBPHH Public Works Officer, and CNRH lacked awareness of the spill response plans associated with Red Hill. These same leaders shared an awareness to the lack of drills for a spill inside Red Hill but did not express any action had been taken to address this prior to the May or November spills. [Encls (42), (43), (175)]

445. In general, FLC employees do not participate in annual spill response training or drills. Only select supervisory staff were sent to Spill Prevention Control and Countermeasures inspection training so that they could disseminate the information. The FLC PH Environmental staff member did attend training and the worst-case spill scenario drill in the harbor in August 2021. [Encls (169), (393)]

446. JBPHH personnel interviewed assessed there is no specific spill instruction or spill plan for Red Hill that is maintained at the installation level and that Red Hill has been historically excluded from spill drills. However, the JBPHH IEPD stated CNRH Environmental previously conducted drills, tests, and large exercises involving the spill plan, but this had not occurred in quite some time. [Encls (43), (44), (46), (47), (209)]

447. The environmental staff at JBPHH includes a spill remediation team for spill cleanup, but the spill program management occurs at CNRH. [Encls (44), (46), (47)]

Responsibility for and Knowledge of Red Hill Well

448. CNIC has ownership of the well, but NAVFAC operates it. [Encls (43), (124), (125)]

449. The JBPHH CO has technical authority over securing the well. In addition, the Region N4, UEM Division Director, the UEM Water Commodity Manager, Deputy PWO, and PWO can secure the well if they determine there is a risk to the pumps, well, or water. [Encls (43), (124), (125)]

450. The proximity of the well to the spill location was not apparent to PACFLT leadership during their Red Hill tour on 23 November. [Encls (11), (171)]

451. The FLC CO was aware of the location of the pump station but not of the presence of the developmental tunnel that ran beneath the lower access tunnel. [Encls (121), (157), (158)]

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452. NAVFAC PAC and Federal Fire were not aware of the proximity of the well in relation to the 20 November event until much later. [Encls (125), (168)]

453. The JBPHH CO and CNRH Chief of Staff were not aware of the proximity of the well in relation to the 20 November release prior to December. [Encls (42), (178]

454. The Public Works Officer and Drinking Water Distribution System Operator were aware of the location of the well but were unaware of the significance of the fuel spill in the vicinity until 28 November. [Encls (43), (209)]

455. The PACFLT DCOM and Installation Environmental Program Director were not aware of the location of the well prior to the week of 29 November. [Encls (11), (44)]

456. The well and aquifer are listed in the CNRH Integrated Contingency Plan Appendix I as vulnerable to an uncontained fuel release within the lower access tunnel. [Encl (39)I]

457. The well is described at length in the CNRH Red Hill Fuel Storage Facility Response Plan, which clearly states that the groundwater flows from the Red Hill Facility toward the well. [Encl (12)]

458. In groundwater model simulations within the NAVFAC Groundwater Protection Plan (GWPP), an extended light non-aqueous-phase liquid (LNAPL) fuel plume of jet propellant (JP-5 or JP-8) within 1,099 feet of the well infiltration gallery resulted in benzene concentrations greater than the Federal maximum contaminant level (MCL) of 5 µg/L in the infiltration gallery. It was estimated that a release as small as 16,000 gallons of JP-5 near Tanks 1 or 2 could result in this condition. [Encl (4)]

459. The Groundwater Protection Plan acknowledges that a fuel release impacting the well may require construction of a water treatment facility to remove the contaminants at the wellhead. [Encl (4)]

460. The Groundwater Protection Plan states that it is required to be updated every five years. However, the initial plan was approved by DOH in 2008. The plan was updated in 2014 but not approved by the DOH. In a meeting with DOH and EPA on 1 Mar 2021, the Navy proposed updating the plan with an addendum to the 2008 version. [Encl (395)]

461. The JBPHH Risk and Resilience Assessment covers risks from natural hazards and malevolent acts but does not cover accidental releases. [Encl (6)]

462. The JBPHH Emergency Response Plan, Section 2.20.1 covers an appropriate response to a threat of or actual intentional introduction of contaminants into the potable water system. The steps listed were appropriate for the evening of 28 November. Of note, the ERP is not

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referenced in the CNRH spill response plan or the JBPHH contamination and spill appendix from the EOC. [Encl (5)]

463. If there is contamination in the well, the JBPHH Emergency Response Plan [ERP] requires the installation to isolate the shaft, and issue "Do Not Drink" notifications until the contaminant has been identified. [Encl (5)]

464. Leaders were unaware of and unfamiliar with the JBPHH Emergency Response Plan. CNRH and the acting CNRH Environmental Director were not aware of the Emergency Response Plan. However, they completed many of the steps outlined in Section 2.20.1 after 28 November. [Encls (5), (46), (47), (55), (159), (175)]

465. NAVFAC HI CO confirmed that the Drinking Water Emergency Response Plan was not consulted on the night of the 28th. The NAVFAC HI Utility Management Branch Potable Water Commodity Manager was aware that the JBPHH Risk and Resilience Assessment and Emergency Response Plans had been recently updated but did not think to access the plan on 28 November. [Encls (124), (209)]

Public Affairs

466. The CNRH Public Affairs Officer implements all Region public affairs programs for the Region involving external and internal matters, community relations activities, and special projects, as well as coordinates media relations, community relations, and internal information programs. The CNRH PAO coordinates and manages all Navy public affairs matters within the Region, beyond immediate command responsibility, which may attract media interest or requires coordination with other PA professionals in the INDOPACOM AOR, and advises and assists all Commanding Officers and collateral duty PAOs of tenant commands. For spill incidents, CNRH PAO takes the lead as public affairs support. [Encls (34), (406)]

467. Following the May spill, CNRH PAO assumed lead for all public affairs matters associated with the incident. JBPHH PAO had minimal involvement with the May spill. As part of the support, CNRH PAO generated a briefing card to be used by Navy leaders that contained information about the incident and to assist in responding to queries from media or the public. The briefing card was coordinated with FLC PH Commanding Officer, JBPHH Commanding Officer, NAVFAC HI CO, CNRH Chief of Staff, and PACFLT PAO. [Encls (34), (35), (74), (217), (242), (243)]

468. Following the November spill, CNRH PAO generated a press release that was provided to the public on 21 November. The release was coordinated by FLC PH CO, NAVFAC HI CO, CNRH COS, CNRH Commander and chopped by PACFLT PAO. The PACFLT PAO did not provide any additional support between 21 November and 28 November. [Encls (34), (35)]]

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469. On 28 November, following growing complaints about water, CNRH generated a press release to inform the public the Navy was investigating reports by residents experiencing an odor in their water. This was the first press release on the matter. It was generated by CNRH and chopped by PACFLT PAO. [Encls (34), (35), (74), (217), (242), (243)]

470. Between 28 November and 7 December, CNRH remained lead on all public affairs support for Red Hill. By 8 December PACFLT assumed the lead role. [Encls (34), (35), (74), (217), (242), (243)]

Distribution of Responsibility

471. As it relates to the various responsibilities, functions, synchronization, and oversight associated with Red Hill, RDML Kott assessed that the role of Pacific Fleet (PACFLT) was unclear. Unlike a ship where C2 and responsibility for incident command resides with a Commanding Officer, RDML Kott assessed there is no single entity that is responsible for Red Hill. He stated that CNRH communicated with State agencies regarding Red Hill but would not inform the State of anything without first coordinating with PACFLT. RDML Kott understood that (b)(6) (PACFLT GA) was the PACFLT point of contact on all matters associated with Red Hill. PACFLT's stated intent was to coordinate and communicate on all matters associated with Red Hill to ensure messaging alignment across the Navy and not to usurp the authority or responsibility by other Navy organizations. [Encls (43), 175)]

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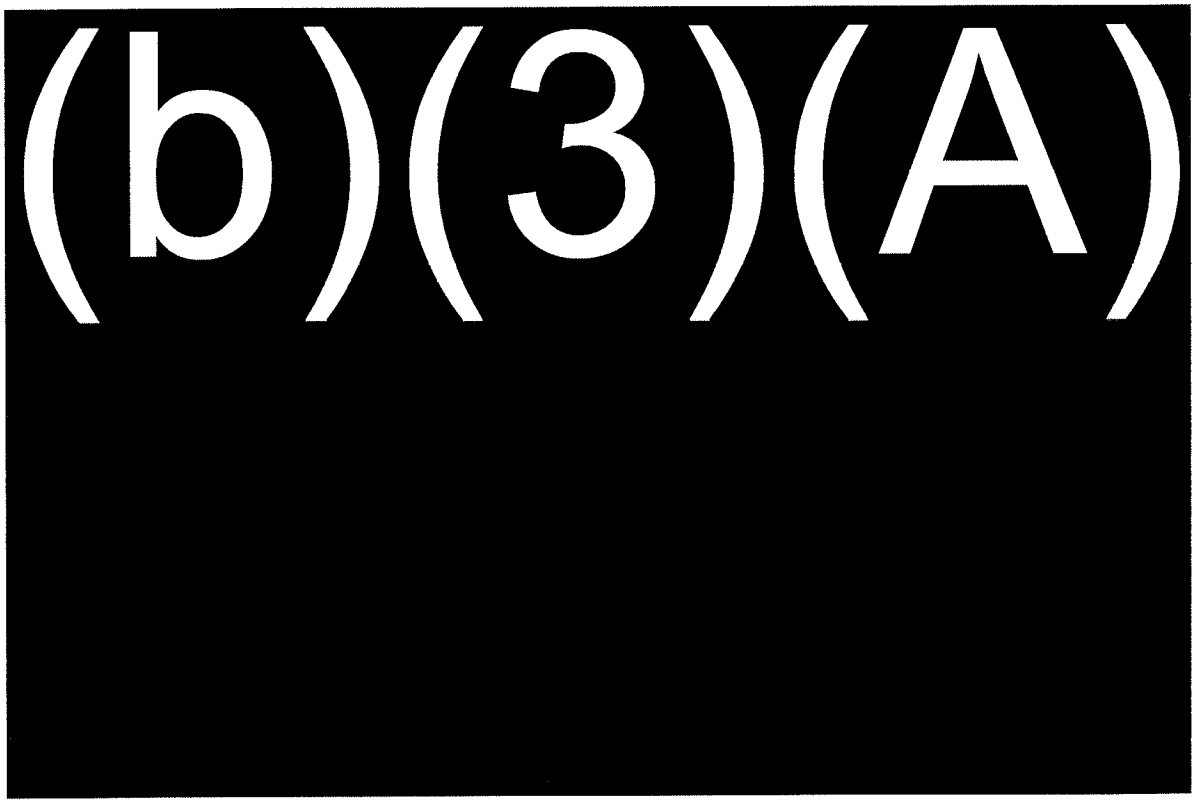
Camera System

472. There is a closed-circuit television (CCTV) inside Red Hill that was installed sometime prior to the May 2021 spill. However, camera footage for the May spill and November spill in Red Hill is not available. Of the 57 CCTV cameras installed throughout Red Hill, 44 are inoperable and 13 cameras are operable. Of the 13 operable cameras, none of them covered the areas inside Red Hill where both spills occurred. [Encls (396), (397), (375)]

473. Approximately five months prior to the May spill, FLC PH identified the CCTV system was not fully operable. In January 2021, FLC PH routed a request to DLA Energy FSD to fund replacement of the CCTV system. Although the appropriate authority within DLA Energy FSD approved the request prior to the May spill, a miscommunication resulted in FLC PH being erroneously informed that the CCTV system would not be funded. FLC PH did not elevate that disapproval notification for resolution. In January 2022, DLA Energy resolved the communication breakdown and committed to fund a replacement for the CCTV system. [Encls (396), (397), (375)]



CCTV Camera next to lateral pipeline adjacent to Tank 20

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IV. Opinions

The opinions contained in the supplement are, for the most part, separate and independent from the Cavanaugh Report. Most of the previous opinions are further supported by the findings of fact from this supplement, but with some exceptions noted herein. There are other opinions that, while still supportable, are further sharpened as a result of the findings and perspectives provided in the supplement. The below section, where it touches opinions from the Cavanaugh Report are appropriately qualified.

Comparison of the Immediate Response to the May and November Spills

There are three critical differences between the circumstances of the May and November spills that should be noted when comparing the responses to each: 1) the location (vicinity of tanks 18 and 20 in the lower access tunnel vs. tunnel in the vicinity of the Adit 3 Y near the Red Hill well); 2) the source (fuel pipe rupture during fuel movement [known to hold fuel] vs. PVC AFFF retention line rupture [thought to be empty]); 3) the duration (minutes vs. days).

1. The immediate responses to both spills were largely identical. In both cases, FLC PH watch standers quickly recognized the casualty, called for help, sought to shut the valve closest to the rupture, and evacuated the area; FEDFIRE responded, assessed the scene, and departed once they deemed the scene safe; the FLC PH Deputy Fuels Director managed actions at the scene and transitioned to recovery efforts as quickly as possible; incident command was not established; the NOSC-R did not arrive on scene to conduct an independent evaluation; neither the JBPHH Commanding Officer nor his Public Works Officer arrived on scene; the FLC PH and NAVFAC HI Commanding Officers contributed to a flawed and overly optimistic assessment that the fuel spill was contained; NAVFAC HI environmental spill response workers assisted in the cleanup with hoses and vacuum trucks; and the decision on how and what to report to DOH was compliant with required procedure, but did not rely on an independent assessment by those having environmental expertise, such as the NOSC-R. One notable difference was that notifications to State and Congressional stakeholders by Navy leaders was more organized and proactive in the November spill due to implementing a new CNRH notification instruction. Ultimately, both spill responses were equally and fundamentally flawed because they concluded with a significant amount of fuel unknowingly remaining outside of reported containment boundaries. [FF (11)-(64), (73)-(81), (102), (125), (140)-(213), (215), (430)-(456)]

2. There were no substantive differences in the immediate responses to the May and November spills because there was no learning or assessment with regard to response efforts following the May spill. Most troubling, there were no integrated spill response training or drill events conducted with installation and other support personnel between the May and November spills. Without such actions, there was no opportunity to understand the deficiencies, friction points, and challenges experienced by the combined team during the May spill. Therefore, key lessons were never learned and could not be compared to requirements and the plan in order to determine

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how best to adjust and improve. In turn, this thwarted any opportunity for human performance improvement, assessment and feedback that would have allowed for the enhancement of team performance. An effective spill response training and drill program would likely have revealed gaps and seams in the C2 as practiced, flaws in the assumptions about who would respond, and how the team diverged from requirements and the plan, which in turn would most certainly have improved the response to the November spill and possibly identified the risk to the Red Hill well before the drinking water distribution system was contaminated. [FF (11)-(64), (73)-(81), (102), (125), (140)-(213), (215), (430)-(456)]

Command and Control

The C2, as practiced for Red Hill, was complex and not understood across the spectrum. The findings of fact detail the various authorities on this point, but Appendix B is a visual illustration of the C2 as practiced, which provides insight as to its complexity.

3. As stated in the Cavanaugh Report, human error in failing to properly respond to the November spill is the primary cause of the contaminated drinking water. However, C2 as practiced is a proximate cause of the contaminated drinking water. Multiple stakeholders are required to come together to ensure mission accomplishment at Red Hill. Unfortunately, this multi-faceted C2 construct broke down in crisis because there was no individual identified as singularly responsible and accountable for incident response when the November spill occurred. The pressure of crisis produced fault lines stemming from overly complex and unclear lines of responsibility and accountability expressed in multiple lengthy, obtuse, outdated, and sometimes contradictory MOAs. In fact, even after the fact, the Region Commander was not able to identify the entity responsible for taking incident command for a spill at Red Hill. These fault lines, generated by the C2 as practiced, resulted in a response to the November spill that was "managed by committee" and failed to accurately communicate and address the risk to the drinking water well and surrounding environment. [FF (1)-(10), (152)-(182), (202)-(203), (206)-(207), (212)-(213), (415)-(471)]

4. Contrary to that which was practiced, C2 as prescribed in Navy regulations and instructions unambiguously identifies the installation Commanding Officer as the individual who is singularly responsible for all facets of an installation – and Red Hill is no exception. In response to both spills, of the three cognizant Commanding Officers, only the installation Commanding Officer had authority over all aspects of Red Hill, including the well and the response efforts. Additionally, CNRH failed to either formally relieve the installation commander of his responsibilities with respect to Red Hill, in writing, or exercise his ISIC responsibility to ensure that the installation Commanding Officer executed his unique authority over all aspects of Red Hill during the crises. Further, the significant involvement in and communications about both spill responses by CNRH, NAVFAC HI, and FLC PH, combined with an absence of pressure from CNRH for the installation Commanding Officer to get involved, fed the idea that any responsibility or accountability for Red Hill by the installation Commanding Officer had been

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abrogated. It is important to note that the idea that Red Hill is somehow different in this respect has permeated across multiple commands and was many years in the making. To be clear, the JBPHH Commanding Officer as well as CNRH inherited this misperception, they did not create it. Yet in spite of this long standing misperception, nothing relieved the installation Commanding Officer of his responsibility and accountability with respect to Red Hill. While there is no single Red Hill owner per se and the tenant Commanding Officers have authority and accountability unique to them, the JBPHH Commanding Officer was the single individual that held the authority and accountability to act comprehensively and decisively as the Incident Commander when the crises at Red Hill occurred. He did not exercise his unique authority, and that inaction contributed to contamination of the drinking water because the response was neither comprehensive nor effective. [FF (1)-(10), (26)-(30), (33), (35), (47), (53), (55)-(57), (66), (146), (150), (157)-(166), (172)-(175), (184), (415)-(471)]

5. Contributing to the above, the lines of responsibility for Red Hill between CNRH and JBPHH are not clear. Within the two organizations there is uncertainty as to who was responsible for some functions such as environmental oversight, emergency response, and communications. The NAVFAC HI relationship with both CNRH and JBPHH further exacerbates this problem through multiple dual hat relationships and the fact that all environmental program manager staff are NAVFAC HI Core employees at the Region level. The installation, therefore, only maintains field-level environmental staff and their supervision, who are also NAVFAC HI Core employees. This effectively reduces the sense of program responsibility and agency at the installation level. This has also resulted in the installation not having a tailored spill program of its own, as evidenced by the lack of a detailed spill instruction, program manager, or spill plan; forcing them to rely on guidance provided by the Region to address releases of all sizes. This further exacerbates the lack of engagement at the installation level and places an unusual level of responsibility on the Region for executing all aspects of a spill program. The fact that CNRH and JBPHH are headquartered in the same building and have nearly identical responsibility footprints (all except Pacific Missile Range Facility on Kauai) adds to the perception of overlap and contributed to the JBPHH CO assuming that his Red Hill responsibilities had been completely subsumed by higher headquarters. [FF (1)-(10), (26)-(30), (33), (35), (47), (53), (55)-(57), (66), (146), (150), (157)-(166), (172)-(175), (184), (415)-(471)]

6. There is no owner of maintenance program management for the Red Hill AFFF system. The instructions and references regarding responsibility for program management of support system maintenance in Red Hill are confusing and in some cases, contradictory. Further, the stated positions of the three key Echelon II Commanders (CNIC, NAVFAC, NAVSUP) regarding the AFFF system, in particular, are mutually exclusive and require formal resolution. That said, organizations subordinate to both NAVFAC and NAVSUP behaved in ways contrary to their stated positions at times, which further contributed to confusion regarding system ownership at the "deckplate." There is no record that NAVFAC PAC followed complete "NAVFAC Red Zone" procedures for AFFF system turnover which may have led FLC PH to believe that NAVFAC HI retained ownership. FLC PH received operations & maintenance manuals,

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requested more detailed manuals, called the AFFF system maintenance contractor for assistance following the May and November spills, and contributed to decisions in regards to modifying the AFFF retention line during construction, which in the aggregate, likely provided NAVFAC HI the impression that FLC PH accepted that they were the owner/customer of the system. A further indicator of chronic friction is that FLC PH engaged with NAVFAC HI over a lengthy period of time, and as recently as April 2021, expressing concerns regarding the lack of maintenance contract for the new AFFF system. [FF (168), (182)-(184), (219), (362)-(414), (416)-(420), (422)-(429), (472)-(473)]

7. The lack of maintenance program management for support systems had direct and deleterious impacts on the AFFF waste system, as well as other support systems. Although the AFFF distribution system waited five months from acceptance until it was under a maintenance contract, the AFFF waste system sat unattended and unmaintained for more than two years following acceptance by NAVFAC PAC in July 2019. The first operational checks of system pumps in Dec 2021 and Jan 2022 revealed significant and previously unknown deficiencies. Additionally, the time lag in maintaining the system most certainly contributed to the low level of knowledge demonstrated by FLC PH and NAVFAC personnel who were not able to effectively recognize that the system had pumped fuel and that fuel remained in the system. Further, monthly maintenance inspections of the retention line which began in July 2021, were another missed opportunity to identify that fuel remained in the retention line, especially considering that there is visual evidence of a foreign substance on the outside of the PVC pipe that appears to have seeped out. The impact of the lack of clear support system ownership can also be seen in the missteps associated with replacing the CCTV system, which prevented the ability to visually review what happened to the fuel piping during the May spill. Such impacts are further revealed in the fact that it took until 9 December (19 days) for the combined team to discover that the groundwater sump flows to a concrete underground tank which spills over into a leach field. Finally, the fact that it took until 3 or 4 December (two weeks) to discover that the hume drain existed as an integral part of the groundwater sump is further evidence of the impact brought by lack of ownership and associated lack of knowledge regarding Red Hill support systems. [FF (168), (182)-(184), (219), (362)-(414), (416)-(420), (422)-(429), (472)-(473)]

8. The Administrative Order on Consent (AOC) expresses an intent, within a voluntary construct, for the Navy's expected actions to protect drinking water, natural resources, human health, and the environment. It does not prescribe Navy C2, but it can be seen as placing CNRH in a lead role vis-à-vis Red Hill because CNRH signed the document on behalf of the Navy and it plainly states that CNRH "oversees all Navy supporting commands involved in the operation or maintenance of the Facility." While the Navy did not agree to the section that describes this role for CNRH, the C2 as practiced developed from misperceptions that the roles and responsibilities of those most directly accountable for protecting the drinking water (i.e., the installation commander and the installation public works officer) were superseded by CNRH as first in the line of defense for addressing environmental threats at Red Hill. As such, this helps to illustrate the importance of clearly identifying a single entity to be empowered and responsible for

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protecting drinking water and the environment. [FF (1)-(10), (33)-(35), (219), (73), (82), (135), (347), (415)-(471)]

9. Due to the unique nature of Red Hill and the environment surrounding it, PACFLT played a role to communicate and coordinate such that the Navy's efforts were synchronized and clearly understood by state and congressional stakeholders. This role evolved over many years in light of the multiple commands having responsibility for the operation and maintenance of the facility and surrounding property. However, the May and November spills reveal that a gap had developed between the communication and coordination functions performed by PACFLT and the operations, maintenance, and response functions performed in and around Red Hill by the various commands and their ISICs. This gap resulted in leaders not fully understanding or appreciating the accumulating risk due to the actual operations and support of the facility. Additionally, as a second order effect of the PACFLT focus on Red Hill, the commands that had various responsibilities with respect to Red Hill modified their expected behavior such that they did Red Hill things differently. As an example, the JBPHH CO reported that he clearly understood he was responsible in the event of a fuel spill in the harbor, but looked to CNRH for a fuel spill at Red Hill based on higher headquarters involvement. Although he is the Regional Environmental Coordinator, CNRH was reluctant to communicate with state regulators regarding Red Hill without concurrence from PACFLT. However, this was not the intent of the PACFLT team who sought awareness, rather than control, of regulator communications for the purposes of message alignment. [FF (58), (65), (69), (90)-(92), (97)-(99), (123)-(126), (129), (137), (177), (186), (196)-(199), (208)-(211), (422), (426)-(427), (429)-(471)]

10. When the PACFLT COM exercised his authority as Senior Officer Present on 29 November to establish a CAT and lead the combined response to the drinking water crisis, PACFLT, at the onset, stepped into the same tactical disadvantage that CNRH experienced. Without effective on-scene incident command led by the installation CO, PACFLT lacked the tactical, on the ground perspective that should have been derived from the experts most responsible for the systems, structures, and land impacted by the fuel spill. However, PACFLT was ultimately able to overcome these deficiencies in the subsequent days and successfully establish clear and decisive unity of effort through their leadership. While there were missteps in the initial days, PACFLT's involvement was the most consequential driver in resolving the drinking water crisis and supporting affected families. [FF (238)-(338), (466)-(470)]

AFFF System Design and Construction

While the Cavanaugh Report identified that the design of the AFFF system inside Red Hill deviated from required code by using PVC instead of steel for most of the retention line, the supplement uncovered additional facts that explain more fully how this deviation contributed to the November spill and subsequent water contamination.

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11. NAVFAC PAC oversight of the Red Hill AFFF waste system design and construction directly led to the final PVC AFFF retention line configuration. The flawed execution of project management in this case resulted in the Navy accepting a deficient product that ultimately failed following a type of fuel movement for which the system was originally designed as a contingency function, releasing fuel into the environment. The Design Manager (DM) was not assertive in providing guidance to the construction manager (CM) regarding best management practices and code enforcement and did not effectively oversee the CM. Moreover, the DM failed to take effective action to address the construction contractor's intent to install PVC after receiving their recommendation to do so prior to construction commencing. The CM, a contracted employee, made a critical decision without consulting the DM and without understanding the risk associated with allowing PVC to replace steel. After construction of the AFFF retention line commenced, but prior to completion, the CM missed another opportunity to stop installation of PVC piping when answering an RFI from the construction contractor that explicitly stated that PVC was being used for the AFFF retention line. Additionally, overall NAVFAC PAC oversight of the actual jobsite was lacking in that it failed to identify and question the presence and installation of a large quantity of PVC pipe over a period of months, which had no reasonable justification for being on the jobsite. Despite these failures within the construction management process, the improperly installed PVC piping was discovered after it was fully installed, but prior to the system being accepted by the government. This should have led to the removal of the PVC and replacement with the specified steel piping. However, NAVFAC PAC, in extensive consultation with NAVSUP (FLC PH & NPO) and DLA, approved the plan to maintain PVC piping in the majority of the AFFF waste system based on cost. This approval was reached in spite of understanding that the system would be one-time use in the event that it transported fuel, and without addressing the fact that it did not meet the applicable DoD UFC for transporting AFFF solution or identifying and mitigating other risks associated with using PVC in an industrial environment, to include the risk of being struck by a heavy object as occurred in November 2021. [FF (362)-(414), (416)-(417), (420)]

12. While human error, as described in the Cavanaugh Report, is the primary cause of the November spill, the fact that a large portion of the AFFF retention line was constructed using PVC was a proximate cause of the November spill. It is reasonable that steel pipe, as required by the DoD UFC, would have been less likely to sag under the weight of fuel contained within it, making it unlikely that the trolley would have struck the low point drain valve in that case. Even if struck by the trolley in the same manner as actually occurred, a steel retention line and low point drain would most likely not have ruptured, thereby preventing the spill. [FF (5), (18)-(19), (140), (362)-(414), (448)-(452)]

13. Lack of knowledge regarding the design of the low area in the AFFF retention line also contributed to the November spill. If those personnel who did the checks of the AFFF waste system following the May spill had understood that the system was designed and built in such a way that up to 40,000 gallons of fluid would be retained in the system and that manual draining of the low area was required following any operation that moved fluid, it is reasonable to expect

that they would have used the manual low point drains, or the installed low point drain system, to check for fuel in the piping. This lack of knowledge was exacerbated by the two years that the system sat unattended and unmaintained due to the lack of a maintenance program manager. [FF (5), (16), (18)-(22), (41)-(43), (61), (67), (70), (140), (189), (362)-(414), (448)-(452)]

The Red Hill Well

14. Three factors combined to result in there being no risk analysis, beyond a cursory look inside the pump room, and no decisions regarding the Red Hill well for eight days after the November spill initiated: 1) lack of understanding of the well by those in leadership; 2) lack of understanding of and sensitivity to the magnitude and specific location of the spill by those who understood the well; 3) lack of knowledge and proficiency regarding response and protection plans that address the risk to the well. When applied to the multi-party crisis C2 as practiced, the combined team was not able to appreciate the risk associated with a large fuel spill directly above a functioning drinking water well, or the minimal operational impact to the water distribution system of securing the well. That said, the action by Commander, Navy Region Hawaii to secure the well within the first few hours of him being made aware of a chemical smell in the drinking water in a few homes, and before any data verified fuel in the water, is commendable as it certainly prevented greater contamination of the drinking water distribution system. [FF (1)-(10), (200)-(205), (209), (219), (228)-(237), (287)-(288), (291), (304), (335), (433)-(465)]

15. It is unacceptable that the JBPHH Public Works Officer failed to respond to the November spill, which was in the immediate vicinity of a well for which he was responsible. And although the May spill occurred further away from the well, his absence from that event further exposes his lack of diligence for protecting the water system following a spill event. Importantly, he is charged to both operate the Navy water system and oversee the installation environmental team. As such, he should have detailed familiarity with and clear ownership of the Red Hill well, as well as environmental expertise at his disposal. The PWO shared that he thought the November spill only contained water and maybe some AFFF. Even if that were the case, AFFF released in the vicinity of a well would be just as urgent a concern as fuel given its hazardous nature. The PWO's absence was a significant factor in a delayed recognition of the risk that the spill posed to the drinking water system. Additionally, spill information did not naturally flow through the installation commander's staff, based on the Red Hill C2 as practiced. CNRH, who lacked the technical expertise on his staff regarding the well, was the focal point for information regarding the November spill and was lead on communications with regulators. When combined with the PWO's lack of presence at the scene of the spill, this resulted in him not being aware that the November spill contained fuel until after chemical smells were reported in drinking water on 28 November. Finally, another notable factor is that the standing Red Hill response plan, which identifies the well as a risk in the event of a spill, was held at the CNRH level. However, it was not understood or practiced by those expected to respond to a spill at Red Hill. Altogether, these factors combined to produce a significant missed opportunity in connecting the spill to the risk to

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the well. [FF (1)-(10), (33)-(35), (200)-(205), (209), (219), (223), (225), (228)-(237), (287)-(288), (291), (304), (335), (433)-(465)]

Communications

16. Based on a thorough review of the facts regarding communications by the Navy in response to the May and November spills, there was never an intent to mislead, lie, or obfuscate in any case. All communications were developed with the intent of being truthful based on the facts known at the time, all of which unfolded in a dynamic and fast developing environment. This is applicable for communications with military members and their families, regulators, state and congressional leaders, and the public. While there were missteps, all communications were developed and transmitted with the goal of transparency and ensuring that the receiver of the message was aware of the most up to date information available. This was made difficult by the rapidly accelerating drumbeat of information as the crisis unfolded. [FF (10), (52)-(53), (55)-(57), (73)-(74), (76), (81)-(83), (93), (102), (104)-(109), (111)-(112), (120)-(122), (124)-(126), (128), (133)-(139), (146), (153)-(157), (173)-(186), (194), (200)-(204), (214), (220)-(338), (433)-(470)]

17. Four key friction points in communications with the public negatively impacted public trust in the Navy following the discovery of fuel in the drinking water. First, there was a four day delay in reporting to the public that the Red Hill well was secured on Sunday, 28 November. There were certainly other Navy and DOH reports to the public regarding the potential for contamination in the drinking water during that time, but the revelation four days after the fact that the Navy saw the threat as serious enough to secure a water source gave some the impression that the Navy was trying to hide something and thus, it negatively impacted public trust. Of note, this delayed reporting on securing the Red Hill well was entirely due to an unintended disconnect between CNRH leadership and their Public Affairs team who were not aware of this development until 2 December. Second, the JBPHH CO's message to families on 29 November that the water was safe and that he and his staff were drinking it was followed, later that same day with competing press releases from DOH and CNRH that cautioned the public regarding hazards in the water. This immediate turn around in messaging, along with the report three days later that the Red Hill well was secured prior to the CO's message to families, combined to hurt public trust. Third, the misalignment in message and approach between the Navy and DOH caused confusion and hurt public trust, as seen on 29 November where press releases from the two organizations occurred less than two hours apart and differed considerably in recommendations to the public. It is important to note that there were strong, but unsuccessful efforts to reconcile the differences by both CNRH and the PACFLT DCOM ahead of these two competing press releases. Fourth and finally, the misalignment in message and approach between the Army and the Navy significantly hurt public trust because it created real differences in compensation and action, while also producing the perception that the Navy was lagging the Army's actions in taking care of families. In all but the first case, these friction points can be traced to differences in approach. The Navy was initially seeking data to show contamination

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before taking certain actions, as opposed to DOH and Army who assumed a different posture and did not wait for data to prove contamination. This difference in philosophy generated a very visible reality that the Navy was behind in taking care of affected and potentially affected persons in the earliest days of the drinking water crisis, despite its significant and largely effective efforts to proactively provide resources and support. [FF (10), (146), (153)-(157), (173)-(186), (194), (200)-(204), (214), (220)-(338), (433)-(470)]

18. Communications with regulators in response to the May and November spills met the requirements of all governing instructions and regulations based on the facts known at the time. However, based on the facts known as of 15 April 2022, the CHT tank overflow during the 6 December flooding event should have been reported [redacted] to regulators. The plan by CNRH to raise this issue at the 21 April Site Characterization Discussion is positive, but the delays associated with this matter are not reflective of full transparency. Notwithstanding the above, it is important to note that the relationship between the Navy and state and federal regulators regarding Red Hill, which developed over many years, had engendered a lack of partnership among the parties at times, as they worked through past challenging events. This sense by some Navy staff adversely impacted communication efforts by the Navy, resulting in a focus on compliance with requirements rather than striving to develop a close partnership in the common mission of protecting the environment. In the initial stages of both spills, communications with regulators remained as close as possible to baseline requirements, even when providing what key Navy personnel perceived as courtesy notifications. There was also an outsized focus on coordinating regulator communications with those going to State and Congressional stakeholders via PACFLT, creating a sense among Navy environmental personnel that they could not exercise initiative to more quickly communicate key facts to regulators about events at Red Hill. Moreover, the CNRH NOSC-R and other environmental personnel, as well as their leadership, demonstrated a consistent practice of not conducting an effective independent assessment of spill events in order to help inform regulator notifications. In the case of the December flooding event, it once again highlights that CNRH continues to rely on tenant command personnel to inform decisions on required actions with regulators without conducting independent verification, which is a significant vulnerability. It is important to note, however, that following the discovery of water contamination on 28 November, communications with regulators regarding data about the water system took on a much more open and free-flowing structure. A key example of this was water sample data, which was given to regulators in raw form before final results were provided from the lab doing the analysis. [FF (10), (52)-(53), (55)-(57), (73)-(74), (76), (81)-(83), (93), (102), (104)-(109), (111)-(112), (120)-(122), (124)-(126), (128), (133)-(139), (146), (153)-(157), (173)-(186), (194), (200)-(204), (214), (220)-(338), (433)-(471)]

Training

19. As described in the Cavanaugh Report, human error in failing to properly respond to the November spill is the primary cause of the drinking water contamination. However, the lack of

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sufficient human performance enhancement, assessment and feedback processes necessary to ensure readiness to respond to a complex spill inside of Red Hill was a proximate cause of the drinking water contamination. There is no evidence that the installation or the region had ever conducted comprehensive spill response training or even one drill to prepare for a spill at Red Hill. This lack of preparation even after the May spill, highlights this failure as that event should have served as a bellwether for key leaders to take action. An effective, coordinated training and drill plan should have the elements of formal instruction, practical demonstration, formal qualification, and certification events on a periodicity matched to the complexity of the mission. Failure at Red Hill was born out of a complex casualty in an unusual environment that required a multi-organization response, but was little understood and not practiced. It is likely that had the installation or CNRH run a rigorous integrated drill program, C2 seams would have undoubtedly been identified and corrected ahead of time. [FF (1)-(10), (29), (60), (102), (113), (117), (150), (152), (163), (265), (298)-(299), (430)-(471)]

20. The CNRH Red Hill response plan and other applicable spill emergency procedures require the spilling command to take charge initially and then determine if and when the casualty is beyond their capability. At that point they are expected to request additional assistance from the installation and/or region. With regards to a spill, there is no evidence that either FLC PH or NAVFAC HI key personnel received any training regarding the incident command system (ICS) or in recognizing the risks associated with threats to the environment, such as a major fuel spill. This lack of formal training yielded a lack of awareness and environmental insensitivity, likely contributing to the false sense of confidence both COs demonstrated in assessing that the spill was contained and that further assistance from the installation and/or region was not needed. Their confidence, in turn, transferred a false sense of security to CNRH and other senior leaders, affecting their actions in such a way that the causal chain that should have led to a more robust response was broken. [FF (1)-(10), (24), (26), (29)-(30), (47), (60), (102), (113), (117), (145), (150), (152), (155)-(156), (163)-(165), (174)-(180), (184)-(265), (298)-(299), (430)-(471)]

21. The Cavanaugh Report concluded that FLC PH personnel were not trained or equipped to stop the source of the November spill, however additional clarification is needed regarding the related opinion that responders defaulted to managing the spill. While accurate, FLC PH personnel did not default to managing the spill solely because the situation and available equipment prevented them from plugging the low point drain while fuel was flowing out of it, they were never prepared or expected to fight the casualty in that way. With noted exceptions, FLC PH watch standers during both spills responded as they were trained and equipped, which is to control the spill (shut the closest accessible valve), contain the spill, and then recover from the spill. The response capability of personnel at FLC PH for a large spill is thus limited because the expectation is that the shore installation support, who possess the expertise and resources, would augment them when necessary. That said, there were significant errors by FLC PH personnel, including the CO, in assuming and reporting the spill was contained in both cases. Additionally, failure to immediately secure the CHT and groundwater sump pumps in responding to the November spill was contrary to the goal of containing the spill. When combined with the lack of

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coordinated installation support, Navy leaders were not cognizant of the risk they were accepting with the FLC PH watch stander spill response posture of "control, contain, and recover" prior to both events, as opposed to a more training and equipment intensive posture where watch standers would be trained and equipped to fight a spill in the same manner that a Navy Sailor would stop flooding on a warship at sea. [FF (1)-(10), (24), (26), (29)-(30), (47), (60), (102), (113), (117), (145), (150), (152), (155)-(156), (163)-(165), (174)-(180), (184)-(265), (298)-(299), (430)-(471)]

Environmental Team

22. In response to the November spill, the on-scene leadership (FLC PH CO and NAVFAC HI CO) did not appropriately engage environmental subject matter experts and therefore did not recognize the environmental risk they were assuming in making and reporting best case assumptions regarding spill containment. The acting CNRH Environmental Director, who had no specific environmental training, was on-scene due to his primary duty as the NAVFAC HI PMO, but did not contribute substantively to advising on-scene leadership regarding environmental risk. It is unclear as to what role the acting CNRH Environmental Director played in response to the November spill, which may have led on-scene leaders to assume that his lack of action indicated a lack of environmental risk. In reality, CNRH spill plans require the commander of the spilling command to establish incident command and call in the appropriate environmental support as required. [FF (140)-(215), (429)-(471)]

23. The NOSC-R failed to personally ensure an adequate response to both the May and November spills. Further, given the ambiguity in initial reporting and volume of fluid described, he should have been on site during the November spill response. The NOSC-R had the training and expertise to more accurately assess the release, better knowledge of the environmental subject matter experts available for assistance, and access to standing spill response Basic Ordering Agreements (BOA) that may have resulted in a faster, more robust response and arresting of the release. His failure to report to the scene of the November spill, was compounded by the acting CNRH Environmental Director reporting to him inaccurately regarding the scope and contents of the spill and telling him he was not required at the scene. Because it was very quickly clear to the on-scene responders that the spill contained fuel, the NOSC-R should have been called to the site to advise the on-scene leaders and CNRH regarding environmental risk. [FF (1)-(10), (24), (26)-(30), (35)-(37), (47), (49), (53), (56)-(57), (60), (102), (113), (117), (145), (150), (152), (153)-(156), (163)-(165), (174)-(180), (184)-(265), (298)-(299), (430)-(471)]

24. The CNRH environmental program management team failed to go to the site and investigate the November spill, even after the magnitude of the spill was obvious during the week following the event. Contributing to this, the CNRH Environmental Director was off-island from 20 November through 2 December. Because it is impossible to adequately assess a spill's potential impact to the environment without being on site, the most experienced environmental subject matter experts missed a critical opportunity to observe the physical situation, question operators

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and responders regarding sumps, and potentially apply knowledge of the well's developmental tunnel directly below the spill to produce a better risk assessment that may have resulted in closure of the well before the water distribution system was contaminated. [FF (140)-(338)]

25. CNRH and JBPHH failed to implement the requirements of OPNAVINST 5090.1, chapter 21, to engage preventive medicine in determining risk and risk communication strategies once the water contamination became apparent on 28 November. Engaging the Navy and Marine Corps Public Health Center regarding public communications in a timely manner might have prevented some of the negative impacts to public trust. When the water system exceeded an action limit, specific language about health effects, at-risk populations, and possible actions consumers should take to mitigate risks were not included in public notifications as required. Additionally, public notices were not reviewed by BUMED, as required, prior to giving them as recommendations for release to the installation Commanding Officer. It is imperative that experts in human health and environmental risk communication be part of the team advising the Commander and the Public Affairs team. This was not done. That said, it should be noted that the PACFLT Surgeon recognized the importance of engaging the experts at NMCPHC and quickly began building contacts and communication with them at the formation of the PACFLT CAT and more effectively addressed this issue. [FF (214), (245)-(246), (277)-(278), (283), (290), (296), (306)]

26. As the drinking water compliance subject matter experts, the environmental team should have been intimately involved in decision making and public communication regarding the water contamination, however the CNRH Environmental Director reported that her involvement with public communications was only to provide raw data to leadership. The Environmental Director has the responsibility to interface directly with State and Federal environmental regulators, however, there were many people in leadership positions making contacts with the regulators during the drinking water crisis, which may have confused the regulators, resulted in miscommunication, encouraged diffusion of responsibility, and impacted trust. [FF (140)-(338)]

27. The Environmental team also missed critical opportunities for early validation of the water crisis. The Red Hill well samples collected on 24 November were collected from the standard sampling location, which is a low-flow pump that takes water two feet below the surface of the water. They did not take an additional bailer sample from the surface, which is where fuel would be expected to gather. When the 24 November sample results returned on 1 December, they were reported to leadership as non-detect for Total Petroleum Hydrocarbons (TPH). However, the same sample results indicated estimated detections of naphthalene. These detections were not mentioned in any of the reporting reviewed for this investigation and if further investigated may have provided earlier confirmation of fuel in the well. [FF (140)-(338)]

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Manning

28. When the Navy's centralized Shore Manpower Requirements Determination (SMRD) process was abolished by SECNAV in 1986, he directed the Navy to continue aggressive manning efficiency reviews that were to be performed by the various "claimants," which are formally known as Budget Submitting Offices (BSO). NAVSUP, as BSO 23, did not conduct any formal manning efficiency reviews or requirements determinations for FLC PH within the last 10 years. The most recent reviews were conducted in 1997 and 2008 by OMB and a NAVSUP funded private consultant, respectively. Significantly, these are both prior to the 2014 merger of fuels operations between Pearl Harbor and Hickam AFB. Additionally, DLA has not provided guidance to the services regarding DFSP manning requirements. There is, therefore, no current baseline requirement on which to base an assessment of whether or not FLC PH Fuels Department is manned correctly today. [FF (339)-(361), (415), (423), (425)-(429)]

29. After an exhaustive review of Fuels Department manning, it was not possible to reconcile the civilian FTE that FLC PH states that they are authorized for the Fuels Department with the civilian FTE that NAVSUP says they are authorized for the Fuels Department. NAVSUP states FLC PH Fuels Department is authorized 84 FTE vice the 89 FTE that FLC PH actually manages. The lack of a formal NAVSUP process to determine, request and adjudicate civilian manning requirements with specificity is the basis of this disconnect. As practiced, the manning process for Fuels Department is budget based rather than work requirements or position based and typically involves email and meetings between the FLC PH business office and either SUP01, SUP03 at NAVSUP or communications via the NAVSUP Financial Management Tool. [FF (339)-(361)]

30. Until 2022, FLC PH made only one formal request for one civilian FTE in the last 25 years. They did create several "overhire" positions during that time in order to more fully use the civilian personnel budget that they are allocated, but there is no evidence of a formal request for additional manning, or any substantive analysis to support such a request, had it been made. As such, there is no evidence of elevating manning concerns with the specificity necessary for NAVSUP, as ISIC, to make an informed risk decision. Additionally, in looking back the last decade, NAVSUP did not exercise their ISIC responsibility to ensure that FLC PH demonstrated appropriate analytic rigor in assessing their manning and that any concerns were formally adjudicated with a clear owner of the risk being assumed if a request was denied. [FF (339)-(361)]

31. Between the May and November spills, there is no evidence of work to add Fuels Department manning based on increased watch standing requirements added as a corrective action from the May spill. There was an attempt by the FLC PH Business Office Director to request manning within the POM process, but there is no evidence of any formal analysis used to support that request, which was subsequently denied by the ISIC. That denial appears to be

based on budget considerations and there is no evidence of an operational risk decision being made by the ISIC. [FF (339)-(361)]

32. Although some portion of Fuels Department FTE are funded by NAVSUP, there was a consistent theme found throughout the interview process at FLC PH and NAVSUP/NPO that DLA is expected to fund Fuels Department manning, with little evidence of consideration that NAVSUP could fund needed manning. For example, when DLA denied the 1 FTE for a new environmental person in FY18, there is no evidence that NAVSUP or FLC PH considered the option that NAVSUP provide an additional FTE for the billet. This is especially important considering that the reason DLA denied the request was the fact that DLA expects that function to be provided by the Navy. In spite of this, FLC PH hired the environmental person using their internal "overhire" process without NAVSUP or DLA involvement in the decision. [FF (339)-(361), (415), (423), (425)-(429)]

33. While the Cavanaugh Report opinion that FLC PH Fuels Department is undermanned at every level is based on interviews with FLC PH employees combined with deficiencies in Fuels Department processes identified in that investigation, there is not an analytic basis for the reports made by those FLC PH employees, nor is there evidence that relief was effectively sought from the ISIC. It is important to note, however, that FLC PH appears to have improved their manning processes and thinking since the November spill. Although there has already been a request for manning, an SMRD was formally requested from NAVMAC, which assumed centralized SMRD responsibility for the Navy in July 2021. Additionally, FLC PH has begun analysis in order to determine how many additional FTE are needed based on work requirements, and transparent communications with the ISIC are evident. [FF (339)-(361)]

May Spill Volume Miscalculation

34. As identified in the Cavanaugh Report, the failure to fully account for fuel spilled on 6 May (human error) is the primary cause of the November spill. However, there were many missed opportunities to identify or correct this error before the November spill that are important to understand. First and foremost, the Deputy OIC of NPO, the Navy's subject matter experts on bulk fuel accountability, in conducting the investigation of the May spill, understood in the course of that investigation that the installed fuel accountability system reported a loss of approximately 20,000 gallons and yet did not note that fact in his initial or final report. Second, the FLCPH CO (both the CO on 6 May and the next CO) understood this 20,000 gallon discrepancy and did not take appropriate action to address or report it, deciding instead to accept the flawed theory it was "packed in the pipe." These individuals are the most responsible for this missed opportunity. [FF (58), (66), (68)-(69), (71)-(72), (78)-(81), (84)-(86), (88)-(92), (94)-(101), (103)-(104), (110), (113)-(115), (117)-(119), (122)-(127), (129)-(132), (134)]

35. A second and lower tier of missed opportunity begins with the NAVFAC HI CO, who expressed reservations to the FLCPH CO about the engineering analysis used to resolve the

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discrepancy as late as October 2021, but did not report his concerns to anyone above him in the chain of command. The NAVFAC HI CO was right to have concerns regarding the fact that pressure in the fuel system was not accounted for in the accepted calculations, however he did not follow through to bring the problem to senior leader attention or demand action himself. The contractor hired by NAVFAC EXWC to conduct a root cause analysis of the May spill independently identified a drop of approximately 20,000 gallons from tank 12 that occurred in about one minute at the exact time of the May spill and included that fact within a table in their report, but this written finding went unnoticed by the NAVFAC EXWC team that reviewed the root cause analysis report upon receipt from the contractor. Further, when NAVFAC PAC initiated the Red Hill repair mitigations report to go along with the root cause analysis contracted by NAVFAC EXWC, there was another opportunity to notice the 20,000 gallon drop noted within the root cause analysis report. Moreover, NAVFAC PAC positively endorsed all three reports to PACFLT in October 2021, recommending they be approved. While not his intent, this endorsement communicated that the senior civil engineer in Hawaii was satisfied with the (b)(6) investigation and its findings, opinions and recommendations. However, after careful review of the matter, the intent of this endorsement was for the limited purpose of documenting, for the record, the material repair and mitigation efforts that were being executed in response to the material deficiencies identified within the (b)(6) investigation report and associated NAVFAC EXWC root cause analysis report. [FF (58), (66), (68)-(69), (71)-(72), (78)-(81), (84)-(86), (88)-(92), (94)-(101), (103)-(104), (110), (113)-(115), (117)-(119), (122)-(127), (129)-(132), (134)]

36. A third and the lowest tier of missed opportunity occurred when the command investigation was provided to several parties for review outside of NAVSUP, to include personnel within PACFLT N4, PACFLT GA, and the PACFLT DMHQ, who also did not identify the discrepancy. While these reviewers were looking at the reports from the perspective of impacts to PACFLT's Red Hill communication and coordination role and not with a critical eye towards technical issues within the report, it is fair to say that these were missed opportunities. [FF (58), (66), (68)-(69), (71)-(72), (78)-(81), (84)-(86), (88)-(92), (94)-(101), (103)-(104), (110), (113)-(115), (117)-(119), (122)-(127), (129)-(132), (134)]

37. In addition to the above missed opportunities from the investigation, it is also important to note that AFHE data was available to FLC and NAVFAC HI engineers that shows that the tank 12 isolation valves were open for approximately 2 minutes after the pressure transient is recorded in the system, indicating that the two damaged areas (including one (b)(3)(A)) were exposed to pressure from the full weight of fuel in tank 12 throughout that time. Additionally, the theory that fuel was "packed in the pipe" demonstrates a fundamental lack of engineering rigor and a gross misunderstanding of the installed fuel accountability system which uses tank levels, reported transactions, and an assumption that all fuel pipelines are full to report changes in the bulk fuel account. Thus, if there was room in a pipe for 20,000 gallons, that amount of fuel would have to increase level in a tank first because the pipe was full at the start, and thus would be accounted for. It is therefore, not possible for fuel to be lost from inventory unless there is a

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reported transaction out of the system, an error in the tank level system, or an uncontrolled release. A third party analysis by an engineering consulting firm would likely have identified this error, as demonstrated by Austin Brockenbrough and Associates, LLC which identifying it during their root cause analysis for NAVFAC EXWC, although not specifically tasked to look for it. But for this working theory of "packed in the pipe" gaining acceptance, more scrutiny would certainly have resulted. [FF (58), (66), (68)-(69), (71)-(72), (78)-(81), (84)-(86), (88)-(92), (94)-(101), (103)-(104), (110), (113)-(115), (117)-(119), (122)-(127), (129)-(132), (134)]

38. The Cavanaugh Report correctly identifies the (b)(6) Investigation as a fundamentally flawed investigative process that was inadequate. Most importantly, the NPO Deputy OIC, in spite of having adequate information provided, failed to accurately resolve the most critical and fundamental fact associated with the May spill – the volume of fuel spilled. If the volume discrepancy, which was known to the NPO Deputy OIC at the time of the investigation, had been plainly identified within his report, even if documented as resolved, senior leaders would likely have demanded a more formal resolution of the matter. Further, there were many individuals from various organizations that reviewed and identified other issues in the (b)(6) investigation as it progressed and before it was endorsed by COMNAVSUP, with a general consensus that it was not thorough or well done. While these issues pale in comparison to the failure to identify or report the discrepancy in the volume spilled, they should have been fed back to NAVSUP at the time they were noted, but were not. Finally, it is important to recall that this investigative process was first initiated by CNRH, who quickly recognized the significance of the May spill and the need for an outside inquiry. CNRH directly engaged COMNAVSUP to request they lead the investigation due to his level of concern over the severity of damage caused during the incident and his wariness towards FLC PH to conduct a thorough inquiry. However, by the end of the investigative process in September and October 2021, CNRH provided little input or critical assessment with regard to the investigation despite their interest and responsibilities in Red Hill, ultimately relegating themselves to facilitating the public release of the report prior to the FTAC hearing. [FF (58), (66), (68)-(69), (71)-(72), (78)-(82), (84)-(86), (88)-(92), (94)-(101), (103)-(104), (110), (113)-(115), (117)-(119), (122)-(127), (129)-(132), (134)-(135)]

Cavanaugh Report

39. Prior to the Secretary of Defense decision on 7 Mar 2022 to defuel and shut down Red Hill, ADM Paparo stated in his endorsement of the Cavanaugh Report that his recommended actions are "designed to ensure safe and effective operations at Red Hill, thereby setting the conditions for the Department of the Navy and Department of Defense to determine the nature and scope of future operations at Red Hill." Because ensuring safe and effective operations at Red Hill are required to either defuel or continue operations, his recommended actions, in conjunction with those of RDML Cavanaugh, should be viewed in that context, even though the decision to defuel has since been finalized. [FF (337)]

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V. Recommendations

1. Establish necessary material and operational conditions at Red Hill to support safe and effective defueling operations.

2. Realign the 'as practiced' leadership of Red Hill incident response to CO JBPHH. Provide training and support, as required, to ensure that the installation Commander is prepared to execute this responsibility.

3. Develop and implement an integrated spill response training and drill program that incorporates all organizations and individuals required to effectively respond to a fuel spill at Red Hill. This program should be led by the installation commander and overseen by the ISIC, CNRH.

4. Resolve the mutually exclusive positions across CNIC, NAVFAC and NAVSUP regarding AFFF system maintenance program management. In so doing, designate a single organization to be responsible for support system maintenance program management at Red Hill.

5. Audit the Red Hill AFFF system maintenance contract and modify it as necessary to ensure that it achieves all preventative maintenance required by the manufacturer, as described in system operations and maintenance manuals.

6. Inspect the entire Red Hill AFFF system to ensure compliance with required material specifications.

7. Audit NAVFAC PAC contracting processes and procedures to ensure compliance with Department of Defense and Navy contracting requirements, as well as commercial construction industry best practices.

8. Conduct a dedicated and broad review of CNRH, JBPHH, and NAVFAC HI environmental team knowledge and performance, including communications with regulators, in light of environmental law, policy, regulation and regulator best practices. Develop and execute an environmental team training, assessment, and feedback program. Include all personnel who have a role requiring expertise in protecting drinking water and the environment.

9. Develop guidance for commanders regarding environmental and public health risk management assumptions and actions to inform future crisis response efforts having a significant public nexus. Using the week of 28 November and the four key friction points noted above as a case study, provide strategies for bounding and communicating risk to the public within the context of limited or no analytic data during the early stages of such a crisis.

10. Revise the CNRH and Red Hill-specific response plans to incorporate specific actions associated with the Red Hill well and lessons learned from the Cavanaugh Report and this

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supplement. Plans recommended for review and update include the CNRH Integrated Contingency Plan, the CNRH Red Hill Fuel Storage Facility Response Plan, the Groundwater Protection Plan, the JBPHH Emergency Management Plan, the Community Water System Emergency Response Plan for JBPHH, the Community Water System Risk and Resilience Assessment for JBPHH, and any other plans designed to contribute to protecting drinking water and the environment.

APPENDIX A
Enclosures

1) VCNO ltr 5800 Ser N09/22U100519 of 4 March 2022
2) Email from VCNO to RADM James Waters, USN, Regarding Red Hill Supplemental Extension Request (30 March 2022)
3) Red Hill Administrative Order on Consent
4) NAVFAC PAC Interim Update on the Final Groundwater Protection Plan (August 2014)
5) Community Water System (PWS-360) Emergency Response Plan for Joint Base Pearl Harbor-Hickam (JBPHH), Pearl Harbor, Hawaii (June 2021)
6) Community Water System (PWS-360) Risk and Resilience Assessment for Joint Base Pearl Harbor-Hickam (JBPHH), Pearl Harbor, Hawaii (December 2020)
7) Image of Red Hill Site with Incident Locations and Distances (Received 11 April 2022)
8) Tumon-Maui Well Rehabilitation Project – An Application of Appropriate Technology: Then and Now (2013)
9) Site Plan Red Hill Bulk Fuel Storage Facility (Created 19 January 2022)
10) Interview Summary – (b)(6) 24 March 2022
11) Interview Summary – RADM Blake Converse, USN 19 March 2022
12) CNRH Red Hill Fuel Storage Facility Response Plan (August 2020)
13) DFSP Pearl Harbor Combined AFHE Event and Alarm Logs for 6 May 2021
14) Red Hill Root Cause Analysis Memo and Report Regarding 6 May 2021 JP-5 Spill (7 September 2021)
15) Interview Summary - (b)(6)
16) FLC Pearl Harbor Fuels Department Operations Orders (1 May - 20 November 2021)
17) NAVSUP Command Investigation Report Regarding 6 May 2021 JP-5 Spill
18) Interview Summary – CAPT Trent Kalp, SC, USN
19) Interview Summary – (b)(6)
20) Interview Summary – (b)(6)
21) Interview Summary – (b)(6)
22) Interview Summary – (b)(6)
23) Powerpoint of Red Hill AFFF Retention Sketch Revision 1 (Created: 22 November 2021)
24) Interview Summary – (b)(6)
25) Interview Summary – (b)(6)
26) Interview Summary – (b)(6)
27) Interview Summary – (b)(6)
28) FLC Pearl Harbor Timeline of Incident and Action 6 May 2021
29) FEDFIRE Red Hill NFIRS for 6 May 2021 Spill
30) Interview Summary – FEDFIRE
31) Interview Summary – (b)(6)
32) CNRH 5750 – Designation as FOSC Representative, NOSC Representative, and QI ICO (b)(6) (12 February 2021)
33) CNRH Integrated Contingency Plan - Core Plan (May 2014)
34) Interview Summary – Ms. (b)(6) (16 March 2022)
35) Interview Summary – Ms. (b)(6) (21 March 2022)

36) Email from Hawaii News Now Reporter to CNRH PAO – Query on Spill 6 May 2021
37) Email from CNRH PAO to Hawaii News Now – Response to Query 6 May 2021
38) Federal Fire Dispatch Report 6 May 2-21
39) CNRH Combined Integrated Contingency Plan (August 2018)
40) Interview Summary – [redacted]
41) Interview Summary – [redacted] (21 March 2022)
42) Interview Summary – CAPT [redacted], USN (22 March 2022)
43) Interview Summary – CAPT [redacted], CEC, USN (21 March 2022)
44) Interview Summary – [redacted] (23 March 2022)
45) Interview Summary – CAPT James "Gordie" Meyer, CEC, USN
46) Interview Summary – [redacted] (17 March 2022)
47) Interview Summary – [redacted] (24 March 2022)
48) Interview Summary – LCDR [redacted], SC, USN
49) Fire Suppression Reclamation System Record Drawings
50) P-1551 Design Drawings, Change R, (Signed 22 June 2018) (flattened and half size)
51) *Kinetix* Engagement MFR with Invoices
52) Three-Way Phone call with FLC PH CO, Deputy Fuels Director, and Fuels Director (6 May 2021)
53) FLC Pearl Harbor Fuels Department Estimates of Fuel Recovered
54) Interview Summary – [redacted], USN
55) Interview Summary – RDML Timothy Kott, USN
56) Interview Summary – [redacted]
57) CPF, COMNAVSUP, FLC Pearl Harbor CO Emails ICO 6 May 2021 JP-5 Spill
58) Interview Summary - CDR [redacted], SC, USN
59) Interview Summary – LT [redacted] SC, USN
60) Email from FLC Pearl Harbor XO with Reports (CCIRs and OPREPs) from 6 May 2021 Spill
61) Email from NAVFAC HI Red Hill PMO to DOH Regarding Phonecall this Morning (7 May 2021)
62) Email from NAVFAC HI Red Hill PMO to DOH Regarding Red Hill Status Update (7 May 2021)
63) Email from NAVFAC HI Red Hill PMO to DOH Regarding Tour of Red Hill Lower Access Tunnel (8 May 2021)
64) Email from NAVFAC HI Red Hill PMO to DOH Regarding Facts for Red Hill (7 May 2021)
65) Email from FLC PH CO to COMNAVSUP - Red Hill Fuel Release (7 May 2021)
66) Interview Summary – [redacted]
67) SECNAV ORDER IMMEDIATE ACTIONS RED HILL UNDERGROUND STORAGE TANKS 7 DEC
68) P-40 DFSP Pearl Harbor Red Hill Tank 20-001
69) FLC Pearl Harbor Training Timeline After 6 May 2021 Spill
70) Documentation Regarding Other Explanations For Missing 20,000 Gals (26 May 2021)
71) Inventory JP-5 MFR for 6 May 2021
72) FLC Pearl Harbor Fuels Department Estimated JP-5 Volume Release at Tanks 19 and 20 – 7 May 2021
73) CNRH Media Release 21-03, Navy Contains Fuel Release at Red Hill Bulk Fuel

Storage Facility (7 May 2021)
74) Interview Summary – [redacted] (21 March 2022)
75) Email from NAVFAC HI CO to NAVFAC HI Vice CO Regarding Investigation at Red Hill (8 May 2021)
76) Email from CNRH to NAVSUP ICO Red Hill Pipe Failure on 6 May 2021 (9 May 2021)
77) Email from NAVSUP to COMPACFLT Regarding Red Hill: NAVSUP Led Investigation (12 May 2021)
78) Enclosures to NAVSUP Command Investigation Report Regarding 6 May 2021 JP-5 Spill
79) Interview Summary – RADM John Korka, CEC, USN
80) NAVSUP Command Investigation of 13 August 2021
81) Interview Summary – Mr. [redacted]
82) Interview Summary – RADM Pete Stamatopoulos, SC, USN
83) Email from Site Director, DLA Installation Management, Indo-Pacific to NAVFAC HI Red Hill PMO Regarding Draft Email to PACFLT on Red Hill (13 May 2021)
84) Email from CAPT Kalp to Investigation Team Responding to RFI (557 gallons) (11 January 2022)
85) Email from CAPT Kalp to Investigation Team Responding to RFI (11 January 2022)
86) FLC Pearl Harbor and NAVFAC EV Red Hill Remedial Actions after 6 May 2021 Spill
87) 6 May 2021 and 20 November 2021 GW Sampling Plan as of 9 December 2022
88) Interview Summary – [redacted]
89) PowerPoint Presentation on Red Hill JP-5 Line Column Separation (Created: 28 June 2021)
90) Excel Spreadsheet with Estimated JP5 Line Volume Release (17 May 2021)
91) Interview Summary – CDR [redacted], SC, USN (19 March 2022)
92) Interview Summary – CDR [redacted], SC, USN (20 March 2022)
93) Fuel Tank Advisory Committee Agenda (20 May 2021)
94) Email from NAVFAC HI CO to CNRH Environmental Director Regarding Notice of Interest Sampling Results – 18 Nov (21 November 2021)
95) Email from FLC Pearl Harbor CO to NAVFAC Hawaii CO Regarding 6 May 2021 Spill Release and Recovery Calculations (5 October 2021)
96) Email from NPO Deputy OIC Regarding Draft Red Hill Investigation Deliverables (8 June 2021)
97) Interview Summary – [redacted]
98) Red Hill Notice of Interest - Sampling Results (10 May 2021 - 2 December 2021)
99) Email from FLC Pearl Harbor CO to COMNAVSUP Regarding Elevated GW Samples (30 June 2021)
100) Email from Deputy OIC, NAVSUP Naval Petroleum Office to PACFLT N4 Regarding Draft Red Hill Investigation Status Report (4 June 2021)
101) Email from CNRH COS to Deputy OIC, NAVSUP Naval Petroleum Office Regarding Draft Red Hill Investigation Status Report (4 June 2021)
102) Email from PACFLT to PACOM Regarding Info: Red Hill Update (4 June 2021)
103) Email from Deputy OIC, NAVSUP Naval Petroleum Office to PACFLT N4 Regarding Draft Red Hill Investigation Deliverables due 8 Jun 2021 (8 June 2021)
104) Email from Deputy OIC, NAVSUP Naval Petroleum Office to PACFLT N40 (9 June

2021)
105) DOH ltr U0636RK Release Confirmation and Request for Information of 9 June 2021
106) Email from FLC General Engineer to NAVFAC HI Red Hill PMO Regarding Review of Estimated Discharge Calculations for Red Hill (10 June 2021)
107) Email from Deputy OIC, NAVSUP Naval Petroleum Office to (b)(6) PACFLT N40 Regarding Draft Red Hill Investigation due 8 Jun 2021 (11 June 2021)
108) Interview Summary – (b)(6) (17 March 2022)
109) Interview Summary – (b)(6) (24 March 2022)
110) Email from PACFLT GA to PACFLT Staff Regarding Draft Red Hill Investigation (7 July 2021)
111) Amendment to NAVSUP Command Investigation Regarding 6 May 2021 JP-5 Spill
112) CNRHINST 3440.18 – CNRH Red Hill Bulk Fuel Storage Facility Emergency Response Notification Coordination Plan
113) DFSP Pearl Harbor AFHE Tank Data for 6 May 2021
114) Email from NAVFAC HI Regarding 6 May 2021 Spill Reporting Made to the DOH (11 January 2022)
115) Board of Water Supply Docket No. 19-UST-EA-01 Post-Hearing Memo of 13 July 2021
116) Email from (b)(6) to (b)(6) Regarding Red Hill Stakeholder Meeting of 08 July 2021 (9 July 2021)
117) Silica Gel Cleanup of Extractable Petroleum Hydrocarbons (drafted 3 July 2019)
118) San Francisco Bay Regional Water Quality Control Board, Petroleum Metabolites: Literature Review and Assessment Framework (27 June 2016)
119) Email from (b)(6) to (b)(6) Regarding Red Hill Stakeholder Meeting of 08 July 2021 (1 April 2022)
120) Email from CNRH to COMPACFLT Regarding (CUI) JBPHH Water Quality Update (29 November 21)
121) Interview Summary – CAPT Albert Hornyak, SC, USN
122) Interview Summary – LCDR (b)(6), SC, USN
123) FLC Pearl Harbor Fuels Department Qualifications and Training Programs
124) Interview Summary – CAPT James "Gordie" Meyer (18 March 2022)
125) Interview Summary – RADM Dean VanderLey, USN (17 March 2022)
126) Interview Summary – (b)(6) (29 March 2022)
127) Interview Summary – CAPT (b)(6) (23 March 2022)
128) Interview Summary – (b)(6) (25 March 2022)
129) Interview Summary – (b)(6) (28 March 2022)
130) Honolulu Star Advertiser, Approval of Red Hill Permit Recommended Despite Risks, 12 September 2021
131) Email from NAVSUP to CPF Regarding 6 May 2021 Spill (17 September 2021)
132) (CUI-AWP) Email from FLC Pearl Harbor CO to COMNAVSUP ICO Update to COM Regarding Red Hill Permit and 6 May 2021 Spill (28 September 2021)
133) (CUI-AWP) Email from FLC Pearl Harbor CO to COMNAVSUP ICO Update to COM Regarding Red Hill Permit and 6 May 2021 Spill – CPF to INDOPACOM (1 October 2021)
134) CNRH ltr 5000-45A Initial Release Response Report of 17 September 2021
135) NAVFAC HI, Initial Release Response Report, Pipeline Breach in Tunnel, Red Hill Bulk Fuel Storage Facility (September 2021)

136) DOH ltr U0915RK Follow Up on Request for Information Letter, dated June 9 2021 (17 September 2021)
137) Email from PACFLT GA to CODEL Regarding6 May Red Hill Spill Investigation Results (4 October 2021)
138) COMNAVSUP ltr 5830 Ser SUP00/078 of 14 October 2021
139) NAVFAC PAC ltr 5830 Ser 00/ of 18 October 2021
140) Red Hill Pipeline Way Forward COMPACFLT Endorsement Brief (given 20 October 2021)
141) Email from FLC PH CO to NAVSUP Regarding (CUI-AWP) Red Hill Investigation Report Update and Action (20 October 2021)
142) (CUI) Email from CPF to CNO and Follow-on Discuss with FLC Pearl Harbor CO, PACFLT N4, and COMNAVSUP (13 November 2021)
143) Email from CNRH Environmental Director to [redacted] Regarding Preview of Questions (24 March 2022)
144) CNRH Media Release 21-08, U.S Navy Identifies Operator Error as Cause of May 6 Fuel Release at Red Hill (26 October 2021)
145) Fuel Tank Advisory Committee Agenda (28 October 2021)
146) CODEL ltr Regarding Safety of Navy's Fuel Operations to SECNAV of 1 November 2021
147) Honolulu Star Advertiser, Hawaii Health Officials Say Whistleblower Alleges Navy Withheld Information about Red Hill from Regulators, 9 November 2021
148) Email from CNRH Environmental Compliance Manager to DOH Regarding Recommendations to Improve the Timeliness of the Current Red Hill Analytical Program (22 November 2021)
149) Interview Summary – [redacted]
150) Interview Summary – [redacted]
151) Interview Summary – [redacted]
152) FEDFIRE Red Hill NFIRS for 20 November 2021 Spill
153) Text Messages from 20 November 2021 between FLC Pearl Harbor CO, NAVFAC Hawaii CO, and CNRH COS
154) Recorded Interview ICO LCDR [redacted], SC, USN (Part 2) (9 December 2021)
155) Email from [redacted] on 13 January 2022
156) Interview Summary – [redacted] (Second Interview)
157) Interview Summary – CAPT Hornyak (2nd)
158) Interview Summary – CAPT Albert Hornyak, SC, USN (16 March 2022)
159) Interview Summary – CDR [redacted] USN (19 March 2022)
160) OPNAVINST 5090.1E – Environmental Readiness Program Manual (25 June 2021)
161) Interview Summary – CDR [redacted] CEC, USN
162) FLC Pearl Harbor Timeline of Events - 20 November 2021
163) Text Messages from 20 November 2021 with JBPHH PWO, NAVFAC HI OPS, NAVFAC HI CDO, and NAVFAC HI Red Hill PMO Director
164) Text Message Between the NOSC and NAVFAC Hawaii Red Hill PMO Director (20 November 2021)
165) Interview Summary – CAPT Gordie Meyer, CEC, USN (Second Interview)
166) OPNAVINST 11320.23G – Navy Fire and Emergency Services Program (4 February 2013)

167) COMNAVREGHICOMNAVSURGRUMIDPACINST 5214.1 - CNRH and CNSG MIDPAC CCIRs (21 January 2020)
168) Interview Summary – [redacted] (21 March 2022)
169) Interview Summary – [redacted] (21 March 2022)
170) Interview Summary – [redacted]
171) Interview Summary – [redacted]
172) Image of Waiawa Pump Station Logbook Entry dtd 20 November 2021
173) Email from NAVFAC HI Red Hill PMO to CNRH Red Hill PMO Regarding CPF Bi-monthly input due by Friday (23 November 2021)
174) Interview Summary – CDR [redacted] CEC, USN (Second Interview)
175) Interview Summary – RDML Timothy Kott, USN (16 March 2022)
176) Interview Summary – [redacted]
177) Interview Summary v RDML Dion English, SC, USN (19 March 2022)
178) Interview Summary – [redacted], USN (24 March 2022)
179) Email from FLC Pearl Harbor CO to COMNAVSUP Regarding 20 November 2021 Spill (22 November 2021)
180) Email from CNRH to PACFLT DCOM Regarding 20 November 2021 Spill (21 November 2021)
181) Interview Summary – [redacted]
182) CNRH Media Release 21-11, Navy Responds to a Release from a Fire Suppression Drain Line at Red Hill (21 November 2021)
183) FLC PH OPREP-3 Navy Blue Message 210320Z 22 November 2021
184) Email from NAVFAC HI Red Hill PMO to PCS HI Regarding Authorization to Proceed Red Hill Cleanup 21 November 21
185) Email from NAVFAC HI Red Hill PMO to CNRH Red Hill PMO Regarding Talking Points on Fire Suppression Line (21 November 2021)
186) Email from COMPACFLT to CNO Regarding Red Hill Fire Suppression Drain/Return Line Leak (23 November 2021)
187) Email from CNRH to COMPACFLT Regarding CUI: Summary of Discussion with Reps Case and Kahele re: Nov 20 Red Hill Fire Suppression Return Line Leak (22 November 2021)
188) Email from NAVFAC HI CO to NAVFAC PAC Regarding CUI: Water Distribution Summary (29 November 2021)
189) Email from NAVFAC HI Red Hill PMO to CNRH COS Regarding Site Visit with DOH (22 November 2021)
190) CNRH Media Release 21-12, Navy Stops Release of Water and Fuel Mixture (22 November 2021)
191) Interview Summary – [redacted] (22 March 2022)
192) Email from [redacted] to [redacted] Regarding: Navy Source Water – Latest Red Hill Fuel Incident (29 November 2021)
193) Email from CNRH PAO to JBPHH CO Regarding Joint Base Message for Distro to Ohana Military Communities and Hickam Communities (29 November 2021)
194) Interview Summary – [redacted] 23 March 2022
195) Email from NAVFAC HI CO to NAVFAC PAC Regarding ADM Paparo Red Hill Visit this Morning (23 November 2021)
196) Email from COMPACFLT to CNO Regarding INFO Sen Hirono Phone Call (23

November 2021)
197) Email from CNRH Environmental Director to DOH Regarding 24 November Sample Results (3 December 2021)
198) Email from NAVFAC HI CO to NAVFAC PAC and CNRH Regarding Specific CCIR: Let Me Know as soon as Water Sampling from 24 November is Received (3 December 2021)
199) Email from CNRH Environmental Compliance Manager to DOH Regarding Notice of Interest Sampling Plan- Release Case 20211120-2330 (29 November 2021)
200) DOH ltr Notice of Interest in a Release or Threatened Release of Hazardous Substances (24 November 2021)
201) Email from FLC PH CO, to (b)(6) RE Red Hill Operations (7 December 2021)
202) CDO Summary Report (28-29 November 2021)
203) Navy PPV data showing earliest calls re: smell (26-27 November 2021)
204) MFR WRT Social Media Review (20 March 2022)
205) Email from (b)(6) to (b)(6) Re: PPV Data Request (23 March 2022)
206) Email from (b)(6) to (b)(6) Re: PPV Data Request (22 March 2022)
207) Email from (b)(6) to (b)(6) Re: PPV Data Request (22 March 2022)
208) Email from NAVFAC HI CO to (b)(6) Summary of key text messages from multiple strings (28 November 2021)
209) Interview Summary – (b)(6) (22 March 2022)
210) CAT Official Timeline
211) Email from NAVFAC HI CO to RADM Dean VanderLey Re: JBPHH Potable Waters – End of Day 29 Nov 2021 (30 November 2021)
212) CNRH Media Release 21-13 Navy Investigation, Testing Water at JBPHH Family Housing (28 November 2021)
213) Email from NAVFAC HI Red Hill PMO Director to (b)(6) Re: water sample locations (29 November 2021)
214) Interview Summary – CAPT (b)(6) MC, USN (23 March 2022)
215) COMPACFLT EXORD DTG 040228Z DEC 21
216) COMPACFLT EXORD DTG 110411Z DEC 21
217) Interview Summary – (b)(6) (18 March 2022)
218) CNRH JBPHH Water Communication Plan (November-December 2021)
219) Email from NAVFAC HI Red Hill PMO Director to Representative Aaron Ling Johanson Re: Jet Fuel in the water (29 November 2021)
220) Email from JBPHH CO Joint Base Message for Distro to Ohana Military Communities and Hickam Communities (29 November 2021)
221) DOH press release (29 November 2021)
222) CNRH Media Release 21-14 Navy Working with DOH to Resolve Reports of Chemical Odor in Water (29 November 2021)
223) CNRH and JBPHH Facebook Posts (20 November – 7 December 2021)
224) Email from CNRH to COMPACFLT JBPHH Water Quality Update 11/30 (1 December 2021)

225) Email from COMPACFLT DCOM to USARPAC COS 25th ID Potable Water Production Capacity (30 November 2021)
226) CNRH Media Release 21-15 Navy Asks Housing Residents to Flush Water Taps Today (30 November 2021)
227) CNRH Community Information - JBPHH Update on Water Distribution Mains (30 November 2021)
228) CNRH Media Release 21-17, Navy Sets Water Distribution Plan for 1 Dec at Affected Housing, (30 November 2021)
229) Email from NAVFAC HI Red Hill PMO Director to (b)(6) Re: JBPHH Water System Map & EAP (1 December 2021)
230) CNRH Media Release 21-16, Navy Schedules Town Hall Meetings with Housing Communities (30 November 2021)
231) CNRH Community Information, Shower Availability on JBPHH, (30 November 2021)
232) Approved Lab List (31 May 2021)
233) NOI GW by Well Final Cumulative Data Table
234) Email from CNRH to JBPHH CO Re: FW: Bottled Water Planning Effort in Pearl Harbor (1 December 2021)
235) Email from (b)(6) to CNRH Web Page Up (1 December 2021)
236) CNRH Media Release 21-18 Navy Provides Updates for Military Housing Residents Impacted by Water (1 December 2021)
237) CNRH Community Information Updated Shower Availability on JBPHH (1 December 2021)
238) NAVFAC HI Red Hill PMO Director email CNIC HQ directs NMCPHC input
239) Email from JBPHH Water Quality CAT Team Update 12-01
240) Email from USARPAC CG to U.S. Army COS AMR/Red Hill Army Housing Water Issue (1 December 2021)
241) JBPHH Water Quality CAT Team Update 12-02
242) Interview Summary – CAPT (b)(6) (18 March 2022)
243) Interview Summary – CAPT (b)(6) (24 March 2022)
244) Email from NAVFAC HI CO to CNRH Fwd: BLUF: Potential source of fuel at Red Hill Shaft (2 December 2021)
245) Local News: Rep. Kahele to Armed Services Committee on Red Hill Water Contamination (2 December 2021) Subcommittee on Readiness Hearing, 2 December 2021
246) CNRH Media Release 21-19 Virtual Town Hall Meeting on JBPHH Facebook Page (2 December 2021)
247) CNRH Media Release 21-20 Navy Detects Petroleum Products in Red Hill Well (2 December 2021)
248) CNRH ltr 5090 Ser N45of 3 December 2021
249) Email from (b)(6) to PACFLT PAO JBPHH Water Update Page on cpf.navy.mil (3 December 2021)
250) CNRH Media Advisory 21-21, Town Hall Meeting (3 December 2021)
251) Halawa and Red Hill Shaft Closure 28 Nov 21/3 Dec 21 (19 February 2022)
252) CNRH ltr 7220 Ser N00J127 of 3 Dec 2021
253) COMNAVREGHINOTE11101 of 23 Dec 21 (Canc: Mar 2022)
254) Email from 647th Air Base Group CDR to (b)(6), Facebook Post

(December 2021)
255) Email from JBPHH CO to CNRH TLA Execution Plan for Designated Housing Areas Aboard JBPHH (3 December 2021)
256) JBPHH TLA Execution Plan
257) JCS Daily Report (20 December 2021)
258) COMNAVFAC HI email re: hume drain
259) CNRH Media Advisory 21-22 Virtual Town Hall Meeting on JBPHH Facebook Page (4 December 2021)
260) JBPHH Water Quality CAT Team Update 12-04
261) DOH Formal Request for Records (4 December 2021)
262) Email from (b)(6) to NAVFAC HI CO FW: Formal Request for Records (4 December 2021)
263) Maui Now.com article of 5 Dec 21; Gov. Ige and Hawai'i's Congressional Delegation Call for Immediate Suspension of Operations at Red Hill
264) Office of Congressman Ed Case Press Release (5 December 2021)
265) Email from (b)(6) to (b) (6) Bdation Assistance (6 December 2021)
266) CNRH Media Advisory 21-24, NEW LOCATION - Town Hall Meeting at Hokulani Community Center (4 December 2021)
267) DOH Dive Skim Plan Approval
268) Email from CNRH to Representative Bob McDermott Re: Civilians in Navy Housing (teachers and others qualified) (6 December 2021)
269) Email from CNRH to CNSGMP COS FW: Civilians in Navy Housing (teachers and others qualified) (6 December 2021)
270) JBPHH Facebook and town hall resident comments 29 November 2021 – 5 December 2021
271) BWS News Release Announces Halawa closure (3 December 2021)
272) Email from (b)(6) confirming Halawa well sampled 12.5 results 12.8
273) DOH Press Release, Petroleum Contamination in Aiea Halawa Shaft, 9 Dec 2021
274) Email from (b)(6) to (b)(6) Re: HDOH Split Sampling 12-7-21 (6 December 2021)
275) Initial Navy Sampling
276) QA Glossary | Environmental Monitoring & Assessment | US EPA
277) Email from (b)(6) to (b)(6) Re: Groundwater Sampling Plan for the November 20, 2021 and May 6, 2021 Releases (7 December 2021)
278) Fed Fire NFIRS response to flood spill ADIT 3 (6 December 2021)
279) Email from (b)(6) to (b)(6) Re: Interview Request RHSI (23 March 2021)
280) Joint Health Services JBPHH Water Guidance (5 December 2021)
281) Email from (b)(6) to (b)(6) NOI Acknowledgment - Case No 20211120-2330 (5 December 2021)
282) CNRH Media Advisory 21-25, SECNAV and CNO Press Engagement (5 December 2021)
283) JBPHH Water Quality Update 12-6
284) DOH Defueling Emergency Order (6 December 2021)
285) Email from NAVFAC HI CO to CNRH ROC Fingerprint pint of fuel (7 December 2021)

286) GSI Environmental Finger Analysis of Samples from Sump (11-24-2021), Adit 3 (11-24-2021) and Red Hill Shaft Water Gallery (12-2-2021) (29 December 2021)
287) Email from (b)(6) to (b)(6) Subj: RESPONSE TO DOH FORMAL REQUEST FOR RECORDS, RED HILL BULK FUEL STORAGE FACILITY, JBPHH, OAHU, DOD FACILITY ID NO. 9-102271 (7 December 2021)
288) JBPHH Claims Website Screen Shot
289) Code 15 claims packages (23 February 2022)
290) C700 Org Chart (complete) (4 April 2022)
291) Email from CDR (b)(6) to CAPT (b)(6) Re: FLC-PH Mil Billets (7 April 14, 2022)
292) Email from CAPT (b)(6) to (b)(6) Re: Approved FTE 2008-present for FLC-PH Fuels Department (6 April 2022)
293) Interview Summary – (b)(6) (5 April 2022)
294) Interview Summary – (b)(6) (5 April 2022)
295) Interview Summary – (b)(6) (1 April 2022)
296) Interview Summary – (b)(6) (29 March 2022)
297) Interview Summary – (b)(6) (23 March 2022)
298) Email from (b)(6) to CAPT (b)(6) FW: Ech 3 process of requesting additional billets (29 March 2022)
299) Email from (b)(6) to CAPT (b)(6) Re: Follow-up call (1 April 2022)
300) Email from (b)(6) to CAPT (b)(6) Re: Follow up call (31 March 2022)
301) Email from (b)(6) RE SMRD RFI (6 April 2022)
302) CNO memo of 14 October 1986
303) OPNAVINST 1000.16L CH-3 – Navy Total Force Manpower Policies and Procedures (2 July 2021)
304) NAVMAC ltr 5310 Ser 00051 of 1 January 2021
305) Email from DLA Energy East Pacific COM to CAPT (b)(6) Re: DLA-E guidance on manning (13 April 2022)
306) DELETED
307) (b)(6) ltr of 6 Jan 2022 Subj: Pearl Harbor Fuels A-76 Study Summary
308) Email from (b)(6) to (b)(6) Re: Manning Requests (4 April 2022)
309) Interview Summary - (b)(6) (23 March 2022)
310) High Performing Organization Business Process Reengineering outbrief PPT (NAVSUP February 2009)
311) JB Hickam – FLCPH merger (3 February 2011)
312) Email from (b)(6) to (b)(6) Re: Quick Question (1 December 2021)
313) Interview Summary - (b)(6) (18 Mar 2022)
314) Rightsizing FLC-PH Background paper (12 March 2022)
315) C700 Org Chart (4 January 2021)
316) Email from (b)(6) to (b)(6) - Labor Overage Issue (13 January 2021)
317) Email from (b)(6) to CAPT (b)(6) – NAVSUP approval process

for FTE increases (6 April 2022)
318) C700 Org Chart (22 November 2021)
319) Email from FLC PH CO to [redacted] FW: FLC Pearl Harbor SMRD Study (10 March 2022)
320) Email from NAVSUP HI XO to FLC PH CO Subj: UPDATE NAVSUP Enterprise Code 700 vacancy and manning information in support of NAVSUP Commander Congressional Testimony (35FTE) (31 December 2021)
321) Email from FLC Pearl Harbor Regarding SMRD Response (7 January 2022)
322) FLC Pearl Harbor Fuels Department Manning Request (31 December 2021)
323) Email from FLC Pearl Harbor Regarding FLC Pearl Harbor Manpower Responses (9 January 2022)
324) NAVSUP FLC Fuels manning levels vacancies and proposed increases revised (27 January 2022)
325) CAPT Albert Hornyak emails re 17_36FTE increase
326) CAPT Albert Hornyak Get Real Get Better brief
327) Email from NAVMAC CO to N13 re SMRD query
328) AFFF System Requirement (DD 1391)
329) Previous Fire Suppression System
330) Insynergy Inc. Basis of Design (October 2014)
331) Email [redacted], P-1551 Red Hill - Additional Technical Information on PVC piping and 1391 (23 June 2017)
332) Interview Summary – [redacted] (29 March 2022)
333) RFI 69.1 - Elevation Conflict at AFFF Waste Line Between Sump and Tank
334) AFFF Change Discussion #4 - DLA counter to NAVFAC PAC Concur
335) AFFF System Design Drawing #1
336) UFC 3-600-01 section 9-9
337) UFC 3-460-01 section 2-14
338) Questions & Answers (31 December 2014)
339) Section 21 13 13.00 20 WET PIPE SPRINKLER SYSTEM, FIRE PROTECTION
340) SECTION 21 13 24.00 10 AQUEOUS FILM FORMING FOAM (AFFF) FIRE PROTECTION SYSTEM (Amended)
341) AFFF Change Discussion #1 - Initial to NPO concur
342) Contract N62742-11-D-005 T.O. 0010, P-1151 Upgrade Fire Suppression and Ventilation Systems (A-E contract with Insynergy Inc.)
343) Contract Award N62742-15-C-1308, FY15 MCON P-1551 UPGRADE FIRE SUPPRESSION & VENTILATION SYSTEM, RED HILL, JBPHH, awarded to Hensel Phelps Construction Company (HPCC)(25 August 2015)
344) HPCC construction schedule (31 May 2017)
345) RFI 0006 Stainless Steel Jacket Containment Piping Clarification (28 October 2015)
346) Email: [redacted] fw: [PM_MAIL] [CONTRACT N62742-15- C-1308, FY15 P-1551 UPGRADES TO RED HILL FUEL STORAGE FACIL] Request For Information: 0006 Stainless Steel Jacket Containment Piping Clarification (15 December 2015)
347) Johnson Controls Field Service Report on Red Hill (21 December 2017)
348) Interview Summary – [redacted] (13 June 2017)
349) Material Submittal 0001-22 00 00-0001-0 Plumbing, General Purpose
350) RFI O 119 AFFF Retention Line Clarifications (10 August 2016)

351) Email (b)(6) fw N62742-15-C-1308 MILCON P-1551-RFI-0006 – Stainless Steel Jacket Containment
352) Email (b)(6) re P-1551 SAES (22 June 2017)
353) HPCC letter to Government (13 March 2017)
354) RFI 69.1 – Low Point Design and Initial Drain Proposal
355) AFFF PVC – NAVFAC PAC & CNRH Notification
356) AFFF Waste System Commissioning Test
357) AFFF Change Discussion #2 - DLA proposal (no steel)
358) AFFF System Acceptance and Maintenance Start
359) AFFF Change Discussion #3 - NAVFAC Discussion of DLA counter-proposal
360) AFFF Change Discussion #4 - DLA counter to NAVFAC PAC Concur
361) O&M handoff email
362) Change R Detailed Times
363) Request for AFFF waste system maintenance
364) No 2nd Commissioning and some pumps seized
365) FLC PH accepts O&M manuals
366) AFFF System Real Property Acceptance (DD 1354)
367) First AFFF Sump Pump Test – (December 2021)
368) B-1.6.11 NAVFAC Red Zone
369) No Red Zone Checklists Email
370) Only Red Zone Meeting Minutes
371) EPA PFAS Risk Management
372) MIL-PRF-24385F(2)
373) DODD 5101.08E DOD EXECUTIVE AGENT (DOD EA) FOR BULK PETROLEUM
374) Interview Summary – BGen Jimmy Canlas (21 March 2022)
375) Interview Summary – CAPT (b)(6) and (b)(6) (23 March 2022)
376) DLA and NAVSUP MORA on Funding of Fuel Terminal Operations 22 December 2015
377) CNIC and NAVSUP MOA on Management of Navy Bulk Fuel Facilities 30 April 2015
378) DLA, NAVFAC and NAVSUP MOA on Roles and Responsibilities for POL Facilities Sustainment, Restoration and Modernization 30 June 2016
379) NAVFAC and NAVSUP MOA on RPE 23 August 2017
380) Interview Summary – (b)(6) 23 March 2022
381) Interview Summary – LT (b)(6)
382) DELETED
383) Emails from VADM Lindsey, RADM Stamatopoulos, and RADM Korka of March 2022
384) Interview Summary – (b)(6)
385) Interview Summary – (b)(6)
386) CNRH ICS training records
387) FLC does not have ICS training pdf
388) JBPHH Appendix For Spill Response EOC – Environmental Pollution or Contamination of 23 August 2010
389) Email from (b)(6) 1 April 2022
390) Email from (b)(6) ICO Red Hill Fire Suppression System Maintenance
391) Failed pump tests
392) JBPHH Contamination Appendix

393) PREP TRNG SCHED 1–14
394) Red Hill Original Technical Drawing
395) Email from [redacted] GWPP update
396) Email from FLC Pearl Harbor Regarding CCTV Footage – No video footage from 6 May 2021 or 20 November 2021
397) Email from FLC Pearl Harbor Regarding NIWC Pacific Statement of Work for C700 CCTV Cameras (23 November 2021)
398) CNICINST 5090.4A
399) OPNAVINST 3440.17
400) OPNAVINST 11320.23G
401) OPNAVINST 11014.3
402) OPNAVINST 4020.27
403) U.S. Navy regulations
404) Interview Summary – RDML Christopher Cavanaugh (23 March 2022)
405) OPNAV M-5090.1
406) COMNAVREGHIINST 3120.2D 9 Mar 2018398) CNICINST 5090.4A
407) Property Record Card Updates
408) Email RE_ FOR APPROVAL_ RED HILL COMMAND INVESTIGATION
409) Interview Summary – [redacted] 21 Mar 22 (Second interview that day)
410) Email RE: Discussion on Possible Release 15 April 22

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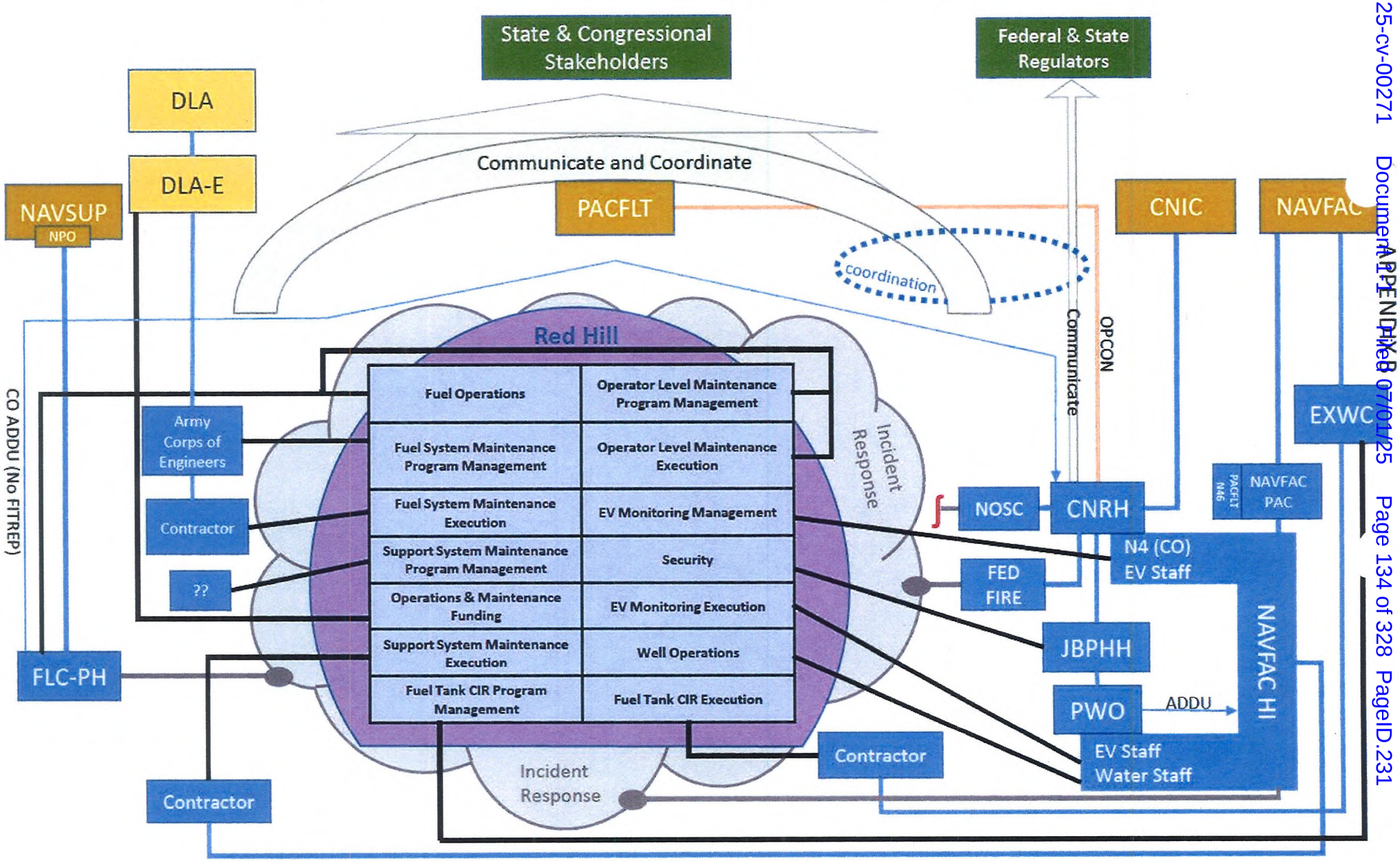
Red Hill C2 As Practiced



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APPENDIX C (Updated 6 Apr 22)
Quantities of Fuel Spilled, Recovered, and Potentially Released to the Environment

Total Fuel Spilled, Recovered, and Missing on 6 May

On 6 May 2021, Red Hill operators improperly executed a fuel transfer procedure, resulting in two piping joint ruptures and a subsequent JP-5 fuel spill. Although unknown at the time, a fire suppression system sump pump transferred most of the fuel into a retention line, where it remained until 20 November 2021.

• Fuel lost from tank 12 between rupture and tank isolation	19,866 gal
• Fuel spilled from lateral pipes connecting tanks 17/18 and 19/20, based on pipe volumes[1]	2,729 gal
• Fuel "repacked" into the pipeline to fill the void drawn prior to the rupture, equal to surge tank 2 level increase prior to the incident	(1,638) gal
Total quantity of fuel spilled on 6 May 2021[2]	***20,957 gal***

• Fuel recovered from sumps and recovery tank 311	1,230 gal
• Fuel absorbed in cleanup materials	350 gal
Total quantity of fuel recovered immediately after 6 May 2021	***1,580 gal***

The quantity of fuel released to the environment on 6 May 2021cannot be calculated, but is assessed to be small. In addition to some evaporation, potential pathways to the environment in the area of the spill are three soil vapor monitoring ports in the upper tank gallery and approximately six imperfections in the concrete. The following calculations assume all unrecovered fuel from 6 May 2021 was transferred to the fire suppression system.

• Fuel spilled on 6 May 2021[3]	20,957 gal
• Fuel recovered immediately after 6 May2021	(1,580) gal
Maximum quantity of fuel transferred to the fire suppression system[4]	***19,377 gal***

Total Fuel Spilled and Recovered Since 20 November

On 20 November 2021, the Red Hill rover inadvertently struck the fire suppression system retention line drain valve with the passenger cart of a train, cracking the PVC pipe near Adit 3. Although not known at the time, this retention line contained JP-5 fuel from the 6 May 2021 spill. The following quantities of fuel were recovered immediately after 20 November 2021.

• Fuel recovered by vacuum trucks	10,757 gal
• Fuel recovered from Adit 3 groundwater sump pump discharge line	1,134 gal
• Fuel recovered from flushing of fuel oil recovery facility sump line	420 gal
Total quantity of fuel recovered immediately after 20 November2021	***12,311 gal***

[1] Updated to reflect the actual installed field measurements of the JP5 pipeline. Previous volume was 351 gallons. Update reflects a net increase of 2,378 gallons. *Austin Brockenbrough and Associates, LLC,* independently verified this amount on 28 Mar 22.
[2] Updated to reflect the additional 2,378 gallons described in Footnote 1.
[3] Updated to reflect the additional 2,378 gallons described in Footnote 1.
[4] Updated to reflect the additional 2,378 gallons described in Footnote 1.

Following the 20 November 2021 spill, FLC Pearl Harbor drained fuel remaining in the fire suppression system retention line. At the time of this report, the line has not been flushed, which may recover some additional fuel.

• Fuel recovered from main sump following pumping from retention line	428 gal
• Fuel recovered from retention line low point drains	415 gal
• Fuel recovered from retention line manifolds[5]	146 gal
Total quantity of fuel recovered from fire suppression system retention line	***989 gal***

Beginning in December, FLC Pearl Harbor and other organizations continued to recover fuel as it was discovered.

• Fuel recovered from Adit 3 groundwater sump discharge holding tank	235 gal
• Fuel recovered from Red Hill well water surface[6]	152 gal
• Fuel recovered from CHT Sump[7]	148 gal
Total quantity of fuel recovered from additional locations	***535 gal***

Total Fuel Spilled, Recovered, and Unaccounted for Since 6 May

Below is a summary of the total quantities of fuel recovered since 6 May 2021 compared to the quantity spilled. A total of 5,542 gallons of fuel remain unaccounted for, and some or all of that fuel contaminated the Red Hill well and Navy water distribution system.

• Total quantity of fuel recovered immediately after 6 May 2021	1,580 gal
• Total quantity of fuel recovered immediately after 20 November 2021	12,311 gal
• Total quantity of fuel recovered from fire suppression system retention line[8]	989 gal
• Total quantity of fuel recovered from additional locations[9]	535 gal
Total quantity of fuel recovered since 6 May 2021[10]	***15,415 gal***

• Total fuel spilled on 6 May 2021	20,957 gal
• Total fuel recovered since 6 May 2021	(15,415) gal
Total quantity of fuel that remains unrecovered[11]	**5,542 gal**

[5] Amount added since the Original Appendix C of 14 Jan 22.
[6] Updated to reflect amount recovered from Red Hill well water surface (Original Appendix C of 14 Jan 22 reflected 140 gallons of fuel recovered from the Red Hill well shaft via skimmer pumps).
[7] On 6-7 December, heavy rains flooded the Red Hill tunnel near Adit 3. This resulted in a fuel and water mixture that was collected in the CHT sump. The CHT sump pump automatically pumped the fluid to a holding tank outside Adit 3, where it was subsequently recovered.
[8] Updated to reflect the additional 146 gallons in Footnote 5.
[9] Updated to reflect the additional 12 gallons in Footnote 6.
[10] Updated to reflect additional 158 gallons in Footnotes 5 and 6.
[11] Updated to reflect the difference between Footnote 3 and Footnote 10. This update reflects a net increase of 2,220 gallons from the 3,322 gallons in the Original Appendix C of 14 Jan 22.

APPENDIX D: Timeline of Engagements (20 Nov - 7 Dec)			
Day	**Time (if available)**	**Intended Audience**	**Information Provided and Who Provided It**
20-Nov	~1650L	November Spill	
	2345L	Regulators	The acting CNRH Environmental Director called DOH to report fuel/water spill [Encls (159), (173), (174)]
21-Nov		Government Leaders	CNRH COS made notification to CODEL staffs, Governor, LT Governor, and other state representatives regarding spill and actions taken Done at the request of PACFLT GA who was on leave on the mainland [Encls (108), (175), 178)]
	1618L	General Public	CNRH Media Release: Water and fuel mixture release from fire suppression drain line at Red Hill No signs or indication of any release to the environment and the drinking water remains safe to drink [Encls (34), (74), (182)]
	1645L	HHQ	FLC PH OPREP-3 Navy Blue: Reports spill All released fluid was contained in the lower tunnel No known fluid was released to the environment No impact to mission [Encl (183)]
22-Nov	Morning	Government Leaders	CNRH provided an in-person brief to Rep Kahele and Rep Case, along with their staffs, regarding the spill and also provided a tour of Red Hill [Encl (187)]
	1330L - 1530L	Regulators	FLC PH staff confirmed to DOH that there was no sheen on the Halawa stream and NAVFAC HI confirmed no fuel in the well pump room during DOH site visit to Red Hill [Encl (189)]
	1601L	General Public	CNRH Media Release: Red Hill Fuel tanks and main fuel pipelines are secure There are no signs or indication of any releases to the environment and the drinking water remains safe [Encl (190)]
23-Nov		Government Leaders	PACFLT COM called Sen Hirono to brief her on the spill at Red Hill and advised that he directed an investigation [Encl (196)]
24-Nov		Regulators	CNRH received from DOH a Notice of Interest (NOI) in a Release or Threatened Release of Hazardous Substances for the 20 November spill The NOI included requirements for additional sampling and development of work plans to remediate the area, among other items [Encls (199), (200)]
27-Nov	1830L	Military Housing Residents	JBPHH PWD help desk received the first phone call from a resident of Moanalua Terrace complaining of a chemical smell in their water There is no indication that action was taken beyond logging it This is the earliest report of the issue [Encls (194), (202), (203)]
28-Nov	0749L	Military Housing Residents	JBPHH PWD help desk started receiving phone calls from JBPHH housing residents complaining of a chemical/fuel smell in their water These continued throughout the day for a total of 37 calls [Encls (10), (194), (202), (206), (207)]
	1930L	Red Hill Well Secured	
	2133L	General Public	CNRH Media Release: Navy investigating reports of a chemical smell in drinking water from some residences There was no immediate indication that the water was not safe Navy continuing to test water, visit homes, and investigate the drinking wells [Encl (212)]
	2138L	Military Housing Residents	JBPHH FB Post: Navy is investigating reports of a chemical smell in drinking water at several homes in some of the military housing areas for JBPHH Sunday evening There is no immediate indication that the water is not safe Navy continues to investigate reports and is testing the water [Encl (223)]
29-Nov		Regulators	CNRH discussed reports of fuel/chemical smell in Army housing with DOH Deputy Director DOH notifies CNRH of intent to advise all Navy water system users to avoid using the water for drinking, cooking, or oral hygiene [Encl (175)]
		Regulators	CNRH e-mailed a sampling plan to DOH in response to the 24 Nov DOH Notice of Intent [Encls (199), (200)]
		Regulators	NAVFAC shared negative water test results with DOH for samples taken on 28 Nov NAVFAC also provided water from those same samples [Encls (44), (124), (213)]
		Military Housing Residents	Throughout the day, resident social media posts regarding smells of fuel in the water increased [Encl (175)]
		CNRH PA took the lead for Navy communications with media [Encls (34), (191), (217)]	
	1200L	Regulators	PACFLT DCOM called DOH Deputy Director to provide information on the situation and offered to provide Navy data and requested data regarding Army housing complaints from DOH DCOM attempted, unsuccessfully, to coordinate a joint press release through the afternoon [Encl (11)]
	1204L	Government Leaders	Acting CNRH Environmental Director responded to e-mail from State Rep Johansen that the Navy is aware of the base housing water quality issue and is taking samples for analysis [Encl (219)]
	1250L	Military Housing Residents	JBPHH CO released a statement via PPV housing portal that there are no immediate indications that the water is not safe, and that he and his staff are drinking the base water [Encl (35), (220)]
	1408L	General Public	PACFLT Media Release: Reports that on 22 Nov 21, PACFLT COM ordered an investigation into the spills at Red Hill [Encl (408)]
	1900L	DOH press release recommending all Navy water system users avoid using the water for drinking, cooking, or oral hygiene [Encl	

	2026L	General Public	CNRH Media Release: The Navy is working with HI DOH to resolve reports of chemical odors in the water at affected military housing at JBPHH Recommends avoiding ingestion if odors are present [Encl (222)]
	2031L	Military Housing Residents	JBPHH FB Post: DOH and Navy tested water – no measurable quantities of fuel found Navy pursuing additional, stringent testing [Encl (223)]
30-Nov	0901L/0902L	Military Housing Residents	JBPHH/CNRH FB Posts: Joint Base Pearl Harbor-Hickam Emergency Operations Center has stood up an information cell to receive calls from residents in military housing who have concerns about their water [Encl (223)]
	Morning	Government Leaders	CNRH conducted a phone call with Hawaii Lieutenant Governor Josh Green, updating him on actions being taken Dr Green expressed his support and offered assistance if needed [Encls (175), (224)]
		Government Leaders	CNRH provided updates to Representative Kahele and Honolulu Mayor Blangiardi [Encls (175), (224)]
	1414L	General Public	CNRH Media Release: JBPHH housing residents are asked to flush their water systems as the Navy continues to test water samples No detection of petroleum constituents in initial test sampling, residual contamination may exist [Encls (226), (227)]
	1448L	Military Housing Residents	CNRH update emailed to housing portal reps and ombudsmen on the flushing of the water distribution mains and request for residents to flush their individual household lines No detection of petroleum constituents in initial sampling [Encls (226), (227)]
	1448L/1449L	Military Housing Residents	CNRH/JBPHH FB Posts: Primary water distribution mains associated with the housing areas affected by possible potable water contamination have been flushed twice and the third flush is ongoing No petroleum detected, residual contamination remains concern [Encls (226), (227)]
		Regulators	Acting CNRH Environmental Director sent DOH the water system map, emergency action plan, and groundwater protection plan [Encl (229)]
	1615L	General Public	CNRH Media Release: Town halls are scheduled at Hickam Theater, Moanalua Terrace Community Center and Halsey Terrace Community Center for affected housing communities on JBPHH [Encls (175), (224), (230)]
	1621L/1624L	Military Housing Residents	CNRH/JBPHH FB Posts: Navy is holding four town hall meetings at 1900 30 Nov, with affected housing communities to provide up-to-date information and answer questions regarding the ongoing water issue identified at several military housing areas [Encl (223)]
	1800L	Military Housing Residents	Town hall for Ombudsmen/Key Spouses at Hickam Theater JBPHH Deputy (USAF Col) participates Communicate what the Navy knew about the water problems and what actions were being taken Listen to concerns and answer questions [Encls (175), (224), (230)]
	1900L	Military Housing Residents	Town hall for Hickam Housing Community at Hickam Theater JBPHH Deputy (USAF Col) participates Communicate what the Navy knew about the water problems and what actions were being taken Listen to concerns and answer questions [Encls (175), (224), (230)]
	1900L	Military Housing Residents	Town hall for Halsey Terrace, Radford, Catlin Housing Community residents at Halsey Terrace Community Center PACFLT DCOM and JBPHH CO participate Communicate what the Navy knew about the water problems and what actions were being taken Listen to concerns and answer questions [Encls (175), (224), (230)]
	1900L	Military Housing Residents	Town hall for Moanalua Terrace Housing Community residents at Moanalua Terrace Community Center CNRH and NAVFAC HI CO participate Communicate what the Navy knew about the water problems and what actions were being taken Listen to concerns and answer questions [Encls (175), (224), (230)]
	1915L	Military Housing Residents	JBPHH FB Post: Moanalua Terrace Community town hall FB livestream and recording of town hall [Encl (223)]
	2200L	General Public	CNRH Media Release: Water distribution plan set for December 1st at affected base housing [Encls (175), (224), (228)]
	2246L	Military Housing Residents	CNRH FB Post: Navy is providing sources of clean water for the communities in need The Navy will continue to set up several water distribution sites for residents of base housing [Encls (175), (223), (228)]
	2345L	Military Housing Residents	CNRH listing of available shower locations and times on JBPHH [Encl (237)]
	2345L	Military Housing Residents	JBPHH FB Post: Showers are available at JBPHH for those at affected military housing who have concerns with the water quality at their residences Locations and times included [Encl (223)]
		Regulators	DOH and EPA representatives join the PACFLT CAT [Encls (210), (214), (239)]
	0748L	Military Housing Residents	JBPHH FB Post: JBPHH Emergency Operations Center has established an information cell to receive calls from residents in military housing who have concerns about their water Numbers provided [Encl (223)]
	1334L	Military Housing Residents	CNRH PA launched the JBPHH Water Resources and Updates webpage, which was available through both CNRH and JBPHH web sites [Encl (235)]
	1556L	General Public	CNRH Media Release: Provided information regarding an upcoming Army town hall, the JBPHH EOC phone numbers, a new information web page, and availability of potable water trucks [Encl (236)]
	1603L	Military Housing Residents	CNRH FB Post: Showers are available at JBPHH for those in affected military housing who have concerns with the water quality at their residences have been expanded Updated available locations and times included in post [Encl (223)]

1-Dec	1603L	Military Housing Residents	CNRH updated listing of available shower locations and times on JBPHH [Encl (236)]
	1610L	Military Housing Residents	JBPHH FB Post: Army is hosting a town hall meeting for residents of the Aliamanu Military Reservation (AMR) housing at the AMR Chapel and has already notified residents [Encl (223)]
	1613L	Military Housing Residents	CNRH FB Post: Potable water trucks will be available for water at various locations for individuals in impacted communities Locations provided in post [Encl (223)]
	1800L	Military Housing Residents	CNRH/JBPHH FB Posts: Navy has built a new web page with information, resources and updates It will be updated continuously with new information It can be accessed from either the Navy Region Hawaii or Joint Base Pearl Harbor-Hickam pages [Encls (223), (235)]
	1808L	Military Housing Residents	JBPHH FB Post: Shower availability on Fort Shafter, Helemano Military Reservation, Schofield Barracks and Tripler Army Medical Center for anyone concerned with water quality [Encl (223)]
	1900L	Military Housing Residents	Town hall for AMR housing residents at AMR chapel A/ASN (E, I & E), PACFLT COM, PACFLT DCOM, CNRH and JBPHH CO and the Army Garrison Co-mmander participate Communicate what the Navy knew about the water problems and what actions were being taken Listen to concerns and answer questions [Encl (239)]
2-Dec		Army issues evacuation order for Army personnel in affected housing [Encls (175), (241)]	
		Government Leaders	During a HASC hearing, VADM Williamson (OPNAV N4) briefed Rep Kahele and answered questions regarding the Navy's response at Red Hill [Encl (245)]
		Government Leaders	PACFLT COM contacted Mayor Blangiardi and updated him on the situation [Encl (241)]
	1505L/1527L	Military Housing Residents	JBPHH/CNRH FB Posts: Military & Family Support Center has established Emergency Family Assistance Center to assist any affected personnel who need help to include medical assistance Phone number and location provided [Encl (223)]
	1656L	Military Housing Residents	JBPHH FB Post: Virtual town hall will begin shortly [Encl (223)]
	1735	Military Housing Residents	JBPHH FB Post: CNRH virtual town hall scheduled on JBPHH Facebook page at 1900 [Encl (223)]
	1814L	General Public	CNRH Media Advisory: Virtual town hall scheduled on JBPHH Facebook page at 1900 [Encl (246)]
	1900L	Military Housing Residents	Virtual town hall via Facebook Live PACFLT DCOM, NAVFAC PAC, CHRH, PACFLT Surgeon and NAVFAC HI CO participate Communicate what the Navy knew about the water problems and what actions were being taken Listen to concerns and answer questions (https://www PACFLT navy mil/JBPHH-Water-Updates/Town-Halls-Daily-Updates/)
	1902L	Military Housing Residents	JBPHH FB Post: Virtual Town Hall recording [Encl (223)]
	2204L	General Public	CNRH Media Release: Petroleum products detected in Red Hill well, below DOH action levels The well was isolated since 28 Nov 21 Waiawa well's water quality remains safe [Encl (247)]
3-Dec	2215L/2226L	Military Housing Residents	JBPHH/CNRH FB Posts: Petroleum products detected in Red Hill well, below DOH action levels The well was isolated since 11/28/2021 Waiawa well's water quality remains safe [Encl (223)]
	1002L/1008L	Military Housing Residents	JBPHH/CNRH FB Posts: Tricare beneficiaries can call the Tricare Nurse Advise line, send a message to their provider via the MHS Genesis Patient Portal or go to any ER in the event of an emergency Family members can be seen at any urgent care without a referral if the clinic accepts Tricare Advice line number provided [Encl (223)]
		Regulators	CNRH provided a letter to DOH confirming the release of approximately 14,000 gallons of a mix of water and fuel at Red Hill BFSF on 20 Nov 2021 [Encl (248)]
		Regulators	DOH ordered that diving and flushing at the Red Hill well stop [Encls (47), (257)]
		Government Leaders	PACFLT COM provided in-person brief to Rep Case and phone updates to HI Governor, Sen Hirono, Sen Schatz, Rep Kahele, and Sen Couchee [Encl (210)]
		Government Leaders	PACFLT COM provided an e-mail update to the Governor, to include water test sampling results [Encl (241)]
	1359L/1400L	Military Housing Residents	JBPHH/CNRH FB Posts: Navy will be hosting town hall tonight at 7-8 p m at the Hickam Theater to provide up-to-date info about ongoing water issue The town hall will be shared on JBPHH FB page [Encl (223)]
	1636L	General Public	CNRH Media Advisory: Town hall scheduled for 1900 at Hickam Theater [Encl (250)]
	1700L	Military Housing Residents	JBPHH/CNRH FB Posts: CNRH has determined TLA is necessary for service members and their dependents, and civilians living in housing affected by the current water-related health or safety concerns The date range is 3-12 Dec and communities are listed in post [Encl (223)]
	1701L	Military Housing Residents	JBPHH webpage updated to reflect CNRH order to use TLA funding for affected service member and dependent residents Affected DoD civilian employees and their dependents will be provided separate travel orders [Encls (175), (252), (254), (255), (256)]
	~1900	Military Housing Residents	PACFLT launched the JBPHH Water updates web page that replaced the Region webpage for sharing information

	1900L	Military Housing Residents	Town hall at Hickam Theater PACFLT DCOM, CNRH, JBPHH CO, PACFLT Surgeon and NAVFAC HI CO participate Intended to provide latest updates and answer questions [Encl (250)]
	1901L	Military Housing Residents	JBPH FB Post Hickam Theater town hall FB live stream and recording to provide latest updates and answer questions [Encl (223)]
4-Dec	2130L & 2131L	Military Housing Residents	JBPHH/CNRH FB Posts: Navy will be hosting a virtual town hall meeting on the JBPHH Facebook page tomorrow, Dec 4, from 11 a m to noon to provide up-to-date information about the ongoing water issue Please email questions to cnrhpao@gmail com [Encl (223)]
	0753L	Military Housing Residents	JBPHH FB Post: Navy will be hosting a virtual town hall meeting on the JBPHH FB page from 11 a m to noon today to provide up-to-date information about the ongoing water issue Please email questions to cnrhpao@gmail com [Encl (223)]
	0800L	General Public	CNRH Media Advisory: Virtual town hall scheduled on JBPHH Facebook page at 1100 [Encl (259)]
		Regulators	CNRH received a formal Request for Records from DOH requesting sampling plans, data, methodology, and analytical reports The request applied to future records generated as well [Encls (261), (262)]
	1025L	Military Housing Residents	JBPHH FB Post: Additional shower and laundry facilities are available at Halsey Terrace for those who have concerns with the water quality in their residence [Encl (223)]
	1049L	Military Housing Residents	JBPHH FB Post: Virtual town hall FB Live feed begins in order to provide latest updates and answer questions [Encl (223)]
	1100L	Military Housing Residents	Virtual town hall on JBPHH Facebook Live PACFLT DCOM, CNRH, PACFLT Surgeon and NAVFAC HI CO participate Provides the latest updates on the water crisis [Encl (223)]
	1850L	Military Housing Residents	JBPHH FB Post: CNRH has determined lodging procurement is necessary for active duty service members, their dependents, Federal civilian employees and their authorized dependents and all other privatized housing residents affected by the current water-related health and safety concerns Web page with info on lodging assistance and TLA info included in post (https://www PACFLT navy mil/JBPHH-Water-Updates/) [Encl (223)]
	1859L	General Public	CNRH Media Advisory: Town hall scheduled for 5 Dec at 1500 at Moanalua Terrace Community Center [Encl (223)]
	2001L	Military Housing Residents	CNRH FB Post: CNRH released updated lodging procurement guidance for all privatized housing residents affected by current water-related health and safety concerns [Encl (223)]
	2008L	Military Housing Residents	CNRH FB Post: Additional shower and laundry facilities are available at Halsey Terrace for those who have concerns with the water quality in their residence [Encl (223)]
5-Dec	2016L	Military Housing Residents	JBPHH FB Post: Town hall location updated to Hokulani Community Center for 5 Dec at 1500 Town Hall [Encl (223)]
	Governor Ige and Hawaii's Congressional Delegation call for suspension of Red Hill operations [Encls (263), (264)]		
		Government Leaders	SECNAV met with Representatives Courtney, Garamendi, and Kahele regarding the contamination of the water from Red Hill [Encl (210)]
		Government Leaders	CNRH PAO provided information to Representative Johanson via e-mail regarding how to best advise citizens seeking immediate relief/recourse at his request (TLA, temporary duty orders and government contracted lodging information) [Encl (265)]
		Government Leaders	Senator Glenn Wakai requested from the CNRH PAO a graphic of Red Hill BFSF showing how fuel is moved from the facility NAVFAC HI Red Hill PMO was tasked to provide [Encl (265)]
		Regulators	CNRH sent a letter to DOH acknowledging receipt of the 24 November Notice of Interest and expressing the intent to continue communication and coordination with DOH [Encl (281)]
	1116L	General Public	CNRH Media Advisory: Town hall scheduled for 05 December at 1500 updated location to Kokulani Community Center [Encl (266)]
	1119L/1129L	Military Housing Residents	JBPHH/CNRH FB Posts: Navy will host an in person Town Hall meeting today from 3-4 p m at the Hokulani Community Center to provide up-to-date information about the ongoing water issue to those who have been impacted Location updated in post [Encl (223)]
	1448L	Military Housing Residents	JBPHH FB Post: JBPHH CO apologized for the comments he made in his 19 November assurance to families that the drinking water was safe [Encl (223)]
	1450L	Military Housing Residents	JBPHH FB Post: Hokulani Community Center Town Hall FB Live feed begins in order to provide latest updates and answer questions [Encl (223)]
	1500L - 2000L	Military Housing Residents	Town hall at Hokulani Community Center SECNAV, CNO, PACFLT DCOM, CNRH, PACFLT Surgeon and NAVFAC HI CO participate Provide updates, answer questions and engage with residents Lasts ~5 hours [Encls (175), (266)]
		Military Housing Residents	Throughout the week of 29 November housing residents provided comments on the JBPHH Facebook page and made comments at the town halls reflecting concerns and frustrations with the water situation and response [Encl (270)]
		Regulators	CNRH received approval from DOH for divers to enter the Red Hill well DOH subsequently ordered that diving stop on 8 December until a recovery plan was renegotiated Permission was granted to continue on 9 December [Encls (46), (47), (267)]
		Regulators	The Interagency Drinking Water System Team (IDWST) stood up and included representatives from DOH and EPA [Encl (46)]

	1913L/1918L	Military Housing Residents	JBPHH/CHRH FB Posts: JBPHH MWR to provide free Grab-and-Go Lunch, Family Activities for service members and their dependents, DoD civilian employees and retirees living in military housing impacted by the water issue Locations and weekday and weekend hours included in post [Encl (223)]
	1947L	Government Leaders	CNRH engaged with Rep McDermott, who raised the concern that qualified civilians who live in some affected off base housing have no point of contact for temporary lodging and assistance CNRH advised that they were working to resolve the issue [Encl (268)]
	1957L/1958L	Military Housing Residents	JBPHH/CNRH FB Posts: JBPHH Military and Family Support Center have licensed clinical counselors and chaplains available at the Emergency Family Assistance Center to assist anyone in need Location, hours and phone number in post [Encl (223)]
6-Dec	2004L	General Public	CNRH Media Advisory: SECNAV and CNO Media engagement scheduled for 06 December at 1330 Both leaders are in Pearl Harbor to see Red Hill first hand and meet with affected residents as well as local officials [Encl (282)]
	2209L	Military Housing Residents	JBPHH FB Post: Government procured quarters still available for all those residing in JBPHH PPV communities regardless of affiliation who are seeking lodging due to water quality supply issues Website and email address for Hotel and Data request form options included in post [Encl (223)]
	1227L/1229L	Military Housing Residents	JBPHH/CNRH FB Posts: No scheduled Town Hall meetings today for JBPHH and CNRH. Dates and times of additional meetings will be posted as they become available The USAF leadership on JBPHH will have a Town Hall today at 4 p m at Hickam Theater to answer USAF specific questions and will be streamed live on the 15th Wing FB page [Encl (223)]
		Government Leaders	SECNAV toured Red Hill with Navy leaders and had lunch and discussions with Governor Ige [Encls (210), (283)]
	1330L	General Public	SECNAV, CNO and PACFLT DCOM conduct press engagement at PACFLT HQ [Encls (282), (283)]
		Government Leaders	SECNAV participated in a teleconference with the HI Congressional delegation [Encls (210), (283)]
		Government Leaders/Regulators	PACFLT COM and DCOM met with Governor Ige, DOH Director and DOH Deputy Director [Encls (210), (283)]
		Regulators	CNRH Deputy Environmental Director emailed revised sampling plan to DOH [Encl (277)]
		Regulators	DOH requested via email to collect samples at Navy facilities CNRH Environmental Director agreed and requested that the Navy be allowed to conduct split sampling by taking two or more representative portions from one sample This was done on 7 Dec [Encls (274-276)]
	1705L/1715L	Military Housing Residents	JBPHH/CNRH FB Posts: The Navy and USAF have authorized partial TLA for active members living in the currently designated housing areas, if they decide to stay in their housing Navy continues to work on authorization for all other categories of individuals who decide to stay in their homes [Encl (223)]
	1746L/1837L	Military Housing Residents	JBPHH/CNRH FB Posts: Additional laundry services with one-week turn around have been made available at four locations Addresses and hours included in post [Encl (223)]
	1758L/1759L	Military Housing Residents	CNRH/JBPHH FB Posts: SECNAV, CNO, PACFLT DCOM hold press conference at PACFLT HQ to discuss ongoing water issue earlier today Press conference recorded video posted [Encl (223)]
		DOH order to suspend operations at Red Hill, treat contaminated water, and remove fuel [Encls (210), (284)]	
	1917L	Military Housing Residents	JBPHH FB Post: Laundry services are available at four locations Hours and addresses included [Encl (223)]
7-Dec	1956L	Military Housing Residents	JBPHH FB Post Due to weather conditions all water distribution locations and Halsey Terrace shower and laundry facilities will cease operations Update on resumption of ops will be posted [Encl (223)]
	2158L	Military Housing Residents	JBPHH FB Post NAVFAC HI posted photos of Seabees delivering water to affected schools and also provided locations of water distribution sites in post [Encl (223)]
	1034L	Military Housing Residents	JBPHH FB Post Emergency Family Assistance Center (EFAC) is located at the Military & Family Assistance Center (MFSC) The EFAC serves as a consolidated staging area to coordinate care, and services from various orgs for personnel who need it Phone number and hours provided in post, no appointments necessary [Encl (223)]
	1203L	Military Housing Residents	JBPHH FB Post Phones at Navy Marine Corps Relief Society are currently down due to the weather Updates will be made as soon as available [Encl (223)]
		Regulators	CNRH responded to the 4 December formal Request for Records from DOH with sampling plans, sampling procedures, laboratory data, and initial sampling results [Encl (287)]
	2027L	Military Housing Residents	JBPHH FB Post Phone lines at the EOC have been affected by the current inclement weather conditions Anyone having issues reaching EOC numbers should try another number on the list Numbers provided in post [Encl (223)]
		SECNAV order to suspend Red Hill Operations [Encl (67)]	

APPENDIX E
Acronyms

ACRONYM	FULL DESCRIPTION
ACE	Army Corps of Engineers
ADDU	Additional Duties
ADM	Admiral
AFB	Air Force Base
AFFF	Aqueous Film Forming Foam
AFHE	Automated Fuel Handling Equipment
AOC	Administrative Order on Consent
AMR	Aliamanu Military Reservation
ASD(S)	Assistant Secretary of Defense (Sustainment)
BEC	Base Environmental Coordinator
BFSF	Bulk Fuel Storage Facility
BOD	Beneficial Occupancy Date
BOS	Base Operating Support
BWS	Board of Water Supply
BSO	Budget Submitting Office
C2	Command and Control
CAPT	Captain
CAT	Crisis Action Team
CCIR	Commander's Critical Information Requirements
CCR	Consumer Confidence Report
CCTV	Closed-Circuit Television
CDC	Child Development Center
CDO	Command Duty Officer
CDR	Commander
CEC	Civil Engineering Corps
CHINFO	Navy Office of Information
CHINFO CI	Navy Chief of Information
CHT	Collection, Holding, and Transfer
CIR	Clean, Inspect, and Repair
CMP	Centrally Managed Program
CNIC	Commander, Navy Installations Command
CNO	Chief of Naval Operations
CNPC	Commander, Navy Personnel Command
CNRH	Commander, Navy Region Hawaii
CO	Commanding Officer
COCO	Contractor-owned, Contractor-operated
CODEL	Congressional Delegation
COM	Commander
COMPACFLT	Commander, U.S. Pacific Fleet
COS	Chief of Staff

CPF	Commander, U.S. Pacific Fleet
CRO	Control Room Operator
CSG	Component Steering Group
DCOM	Deputy Commander
DFSP	Defense Fuel Support Point
DOD	Department of Defense
DOH	Hawaii Department of Health
DLA	Defense Logistics Agency
DLA-E	Defense Logistics Agency – Energy
DMHQ	Director, Maritime Headquarters
DTG	Date Time Group
DWCF	Defense Working Capital Fund
DWDSO	Drinking Water Distribution System Operator
EA	Executive Agent
ED	Executive Director
EOC	Emergency Operations Center
EPA	Environmental Protection Agency
ERP	Emergency Response Plan
ESAMS	Enterprise Safety Applications Management System
EXORD	Executive Order
EV	Environmental
EXWC	Expeditionary Warfare Center
F-24	Aviation Turbine Fuel
F-76	Diesel Marine Fuel
FFD	Federal Fire Department
FISC	Fleet Industrial Supply Center
FITREP	Fitness Report
FLC PH	Fleet Logistics Center Pearl Harbor
FMD	Fuels Manager Defense
FOF	Finding of Fact
FOR	Fuel Oil Reclaimed
FORFAC	Fuel Oil Reclaimed Facility
FSD	Facilities Sustainment Directorate
FTE	Full Time Equivalent
GA	Government Affairs
GOCO	Government-owned, Contractor-operated
GOGO	Government-owned, Government-operated
GS	General Schedule
GWPP	Ground Water Protection Plan
HFFC	Hawaii Fuel Facilities Corporation
ICP	Integrated Contingency Plan
IDWST	Interagency Drinking Water System Team
IEM	Installation Emergency Management
IEPD	Installation Environmental Program Director
IG I	Inspector General
INFADS	Internet Navy Facilities Assets Data Store

INDOPACOM	U.S. Indo-Pacific Command
INSURV	Board of Inspection and Survey
ISIC	Immediate Superior in Charge
JBPHH	Joint Base Pearl Harbor-Hickam
JP-5	Jet Propellant 5
LCDR	Lieutenant Commander
LNAPL	Light Non-Aqueous-Phase Liquid
MAV	Material Assist Visits
MBA	Master of Business Administration
MCL	Maximum Containment Level
MFR	Memorandum for the Record
MILCON	Military Construction
MOA	Memorandum of Agreement
MSR	Monthly Status Report
MUIC	Maintenance Unit Identification Code
NAS	Naval Air Station
NAVFAC	Naval Facilities Engineering Systems Command
NAVMAC	Navy Manpower Analysis Center
NAVSEA	Naval Sea Systems Command
NAVSUP	Naval Supply Systems Command
NEX	Navy Exchange
NLEC	Navy Leadership and Ethics Center
NMCPH	Navy Marine Corps Public Health
NOI	Notice of Intent
NOSC	Navy On-Scene Coordinator
NOSC-R	Navy On-Scene Coordinator Representative
NPO	Naval Petroleum Office
O&M, N	Operation and Maintenance, Navy
OHS	Oil and Hazardous Substance
OIC	Officer in Charge
OMB	Office of Management and Budget
OPREP	Operational Report
OSD	Office of the Secretary of Defense
OT	Over Time
PA	Public Affairs
PAO	Public Affairs Officer
PHEO	Public Health Emergency Officer
PIT	Pressure Indicating Transmitter
PM	Preventive Maintenance
PMO	Project Management Office
POL	Petroleum, Oil, and Lubricant
POM	Plan of Management
PPE	Personal Protective Equipment
PPM	Parts Per Million
PPV	Public Private Venture
PSP	Product and Service Plan

PVC	Polyvinyl Chloride
PWO	Public Works Officer
RADM	Rear Admiral Upper Half
RDML	Rear Admiral Lower Half
REC	Regional Environmental Coordinator
RFI	Request for Information
RMMR	Recurring Maintenance and Minor Repair
ROC	Regional Operations Center
RPA	Request Personnel Action
RPE	Regional POL Engineer
RRA	Risk and Resilience Assessment
RTOP	Regional Terminal Operations Program
SC	Supply Corps
SECNAV	Secretary of the Navy
SCBA	Self-Contained Breathing Apparatus
SORM	Standard Organizations and Regulations Manual
SMRD	Shore Manpower Requirements Determination
SNDL	Standard Naval Distribution Listing
SRM	Sustainment, Restoration, and Modernization
SUPO	Supply Officer
SWP	Strategic Workforce Plan
TOC	Total Organic Carbon
TF	Task Force
TLA	Temporary Lodging Allowance
TPH-O	Total Petroleum Hydrocarbons - Oil
UEM	Utilities and Energy Manager
UFC	Unified Facilities Code
USD(A&S)	Under Secretary of Defense (Acquisition and Sustainment)
UM	Utilities Management
UST	Underground Storage Tank
VADM	Vice Admiral
WG	Wage Grade
XO	Executive Officer

APPENDIX F
References

a) VCNO ltr 5800 Ser N09/22U100519 of 04 Mar 22
b) RDML Christopher J. Cavanaugh, USN, ltr 5830 of 14 Jan 22 w/encl
c) COMPACFLT ltr 5830 Ser N00/0076 of 20 Jan 22
d) CNICINST 5090.4A
e) OPNAVINST 11320.23G
f) OPNAVINST 11014.3
g) OPNAVINST 3440.17
h) OPNAVINST 4020.27
i) U.S. Navy Regulations (1990)
j) COMNAVREGHIINST 3120.2D 9 Mar 2018

DEPARTMENT OF THE NAVY
COMMANDER
UNITED STATES PACIFIC FLEET
250 MAKALAPA DRIVE
PEARL HARBOR HI 96860-3131

IN REPLY REFER TO:
5830
Ser N00/0076
20 Jan 22

FIRST ENDORSEMENT on RDML Christopher J. Cavanaugh, USN, ltr 5830 of 14 Jan 22
w/encl

From: Commander, U.S. Pacific Fleet
To: Vice Chief of Naval Operations

Subj: COMMAND INVESTIGATION INTO THE 6 MAY 2021 AND 20 NOVEMBER 2021 INCIDENTS AT RED HILL BULK FUEL STORAGE FACILITY

1. Forwarded, approving the findings of fact, opinions, and recommendations of the investigating officer as modified in paragraph 20 below.

2. The Navy is responsible for the 6 May 2021 and 20 November 2021 fuel spills at the Red Hill Bulk Fuel Storage Facility (Red Hill) and subsequent water contamination. As documented by the investigation, the root causes of the fuel spills and subsequent water contamination emanated from Naval Supply Systems Command (NAVSUP), a business-centric organization tasked at Red Hill with an engineering-focused mission. Fixing these significant problems demands immediate organizational reforms and improvements supported by a new "No-Fail Operational Framework" that is singularly designed to ensure safe and effective operations at Red Hill.

3. The Navy has a moral obligation and ethical duty to fix our mistakes, safeguard the environment, and rebuild trust. We must act.

4. As documented in the investigation, human error was the primary cause of both the 6 May 2021 and 20 November 2021 fuel spills – which led to as much as 3,322 gallons of fuel contaminating the Navy drinking water system in and around Joint Base Pearl Harbor-Hickam (JBPHH). But human error is not the full story. The investigation further revealed several preventable contributing factors including a culture of procedural non-compliance; material deficiencies; poor training and supervision; ineffective command and control; absence of ownership regarding operational safety; unacceptable immediate response actions, including a lack of timely, accurate, and thorough reporting; and a fundamentally flawed investigative process concerning the 6 May 2021 spill.

5. The lack of critical thinking, intellectual rigor, and self-assessment by key leaders at decisive moments exemplified a culture of complacency and demonstrated a lack of professionalism that is demanded by the high consequence nature of fuel operations. Two examples are particularly disturbing and salient.

a. The Fleet Logistics Center Pearl Harbor (FLC Pearl Harbor) Commanding Officer's decision to modify the duties of the Fuels Officer (a Navy Lieutenant Commander) in February 2021 effectively removed uniformed, military oversight of day-to-day operations at Red Hill, significantly increasing the risks associated with fuel handling operations. The FLC Pearl Harbor Commanding Officer failed to identify, mitigate, or directly address these risks. As a result, not a single uniformed military member participated in the planning, execution, or oversight of nearly 12 hours of fuel transfer evolutions on 6 May 2021. The alarming level of procedural non-compliance exhibited by civilian personnel on 6 May 2021 – including "poorly written and unclear operations orders" and personnel taking an "intentional procedural shortcut" – directly reflected the Commanding Officer's lack of critical thinking and leadership regarding the appropriate responsibility, authority, and accountability for uniform personnel in supervising and executing safe operations at Red Hill.

b. Key leaders at the scene of the 20 November 2021 fuel spill -- including both the FLC Pearl Harbor and NAVFAC Hawai'i Commanding Officers – failed to exercise the sense of urgency, critical thinking, forceful backup, and timely and effective communication demanded by the seriousness of the situation. Leadership failed to comprehend the multiple pathways for releasing fuel into the environment and did not adequately understand or appreciate the risks to the nearby Red Hill well. Although on-scene leaders took early steps to verify that no fuel flowed from the spill area to the well, they incorrectly assumed there was no risk to the drinking water system and failed to exercise the investigative rigor and intellectual scrutiny demanded by the situation. The critical moments immediately after the spill represented a tipping point in this situation – and the on-scene leaders failed to think critically, communicate clearly, and take the necessary and prudent actions to effectively respond to the situation while protecting the environment.

6. Having invoked my authority under the U.S. Navy Regulations as the Navy's Senior Officer Present in Hawai'i to convene this investigation, I am now responsible to provide the Department of the Navy a plan to restore safe operations at the Red Hill Underground Storage Tanks. In fulfilling my responsibility, I will ensure compliance with all governing laws and regulations. To that end, on 7 January 2022, I issued an order requiring cognizant commanders to take actions consistent with the Hawai'i Department of Health's 3 January 2022 Final Emergency Order. Always maintaining a laser-focus on safety, we will act with the necessary agility to adjust to any future change in the governing laws and regulations from appropriate authority.

7. I am also responsible to set the conditions for the Department of the Navy and Department of Defense to make fully informed longer-term decisions regarding Red Hill that protect our national security interests while safeguarding the environment. This endorsement memorializes my immediate actions to fix what is broken while providing a recommended framework to comprehensively address operational safety at Red Hill (including the Underground Storage Tanks, Upper Tank Farm, and associated fuel transfer infrastructure).

8. I recommend continuing the Secretary of the Navy's cessation of all operations at the Red Hill Underground Storage Tanks until Commander, U.S. Pacific Fleet certifies to the Chief of Naval Operations (CNO) that the Red Hill Underground Storage Tanks are Safe-to-Operate.

This initial Safe-to-Operate certification requires a successful inspection of operations and system integrity conducted by an independent third party in consultation with local, state, and federal partners, including the Hawai'i Department of Health and the Environmental Protection Agency. This initial Safe-to-Operate certification will be fully informed by the findings and recommendations of this investigation, the Safety Investigation Board, and any other relevant assessment or inquiry.

9. Applying this construct, resuming operations will be predicated on a conditions-based certification process rather than a set timeline. Thereafter, implementing a permanent, semi-annual Safe-to-Operate certification process combined with the No-Fail Operational Framework and Core Tenets of Safe and Effective Operations as outlined below will ensure safe and effective operations while protecting our local community and preserving the environment.

10. While providing this plan to restore safe operations at Red Hill, I further recommend the Navy and Defense Logistics Agency (DLA) conduct a deliberate and careful assessment as to whether the Navy and joint force are better served by implementing a government owned, contractor operated (GOCO) model at Red Hill. Under the present construct, the Navy operates Red Hill in support of DLA, the Department of Defense's Executive Agent for bulk petroleum. At Red Hill, the Navy provides fuel to the joint force to fulfill joint requirements and execute a joint mission – and does so using a primarily civilian work force operating within a business-centric command structure (NAVSUP). Therefore, while acting with a sense of urgency to restore safe operations at Red Hill, I recommend the Navy and DLA evaluate whether operations at Red Hill represent a core Navy function, or whether the Navy and joint force are better served by implementing a (GOCO) model at Red Hill that meets world class industry standards while protecting the national security interests of the United States.

11. In light of the significant risks presented by fuel storage and transfer operations coupled with the potential impact to national security and the environment, I further recommend the Navy comprehensively review material, operational, and incident response readiness at the 48 unique Defense Fuel Storage Points managed by the Navy worldwide. We cannot assume Red Hill represents an outlier, and similar problems may exist at other locations.

Background

12. Invoking my authority as Senior Officer Present in Hawai'i under Chapter 9 of the U.S. Navy Regulations, I convened this command investigation on 23 November 2021 to inquire into the 6 May 2021 and 20 November 2021 fuel spills at Red Hill. I took this action when presented new information regarding the scope and scale of the 6 May 2021 fuel spill combined with its possible impact on the subsequent 20 November 2021 incident.

13. As the Navy's Senior Officer Present in Hawai'i, I was best postured to direct and supervise an independent, fact-based, and comprehensive investigation into both incidents. I appointed a nuclear-trained flag officer to lead the investigative team that included a multi-disciplinary group of experts possessing a broad range of skills to provide the necessary scrutiny and quality assurance demanded by Red Hill's potential impact on the environment and importance to national security. I directed the investigating officer to consult with an independent (non-DoD)

commercial or governmental engineering company or entity to provide an independent assessment, technical support, and expertise to the investigation.

14. After residents in the JBPHH area began reporting water contamination, I modified the scope of the investigation on 3 December 2021 to include a determination of whether the 6 May 2021 or 20 November 2021 incidents contributed to or caused the water contamination in and around JBPHH. This investigation does not include the Navy's response to the contaminated drinking water system, which is being addressed through ongoing organizational self-assessment; feedback from service members, families, community neighbors, and our local, state, and federal partners; and appropriate legislative oversight.

Implementing a No-Fail Operational Framework

15. Our preeminent obligation is to ensure the health, safety, and well-being of our people, our families, our neighbors, and the communities we call home. To that end, the command investigation – along with conversations with service members, families, and many appropriately concerned and sincerely helpful local, state, and federal officials and community members – convinced me of one fundamental imperative: Conducting safe and effective operations at Red Hill demands a No-Fail Operational Framework. Because failure is not an option, we must invest for success.

16. Investing for success requires more than money. An enduring, No-Fail Operational Framework must be built on five pillars: (1) creating a culture of safety; (2) executing effective command and control; (3) providing requirements-based manpower; (4) building strong partnerships (local, state, and federal); and (5) prioritizing necessary funding.

a. Creating a Culture of Safety.

(1) Safety Maximizes Effectiveness. The Navy is an organization wherein safety represents a necessary and essential precondition to mission accomplishment. Simply stated, safety maximizes effectiveness and promotes excellence. We must foster a culture of safety that is self-assessing, self-correcting, and always learning – and we must apply this safety-focused mindset to every aspect of operations at Red Hill: skilled, trained, and motivated personnel; effective supervision and strong leadership acting within an effective command and control structure; and the highest standards of material readiness – including physical infrastructure, equipment design, and systems integrity.

(2) Safety Demands Critical Thinking. A culture of safety requires critical thinking, which means every actor in the Red Hill operational spectrum must actively question the status quo while proactively identifying risk through exhaustive and thoughtful inquiry. At the same time, we must eliminate "best case" thinking that assumes an outcome that serves one's purpose, thereby acting as if the desired outcome is true regardless of information or evidence to contrary. Opinion 11 exemplifies this type of thinking: "The FLC Pearl Harbor CO, XO, and Fuels Department leadership exhibited a consistent bias toward assuming and reporting the 'best case' scenario following the 6 May fuel spill." This "best case" thinking on 6 May 2021 directly contributed to the 20 November 2021 fuel spill and subsequent contamination of the drinking

water system. Fostering a culture of safety will eliminate "best case" thinking while promoting exhaustive and thoughtful inquiry and demanding intellectual rigor and scrutiny.

b. Executing Effective Command & Control. An effective command and control structure requires (1) unity of command and (2) unity of effort. As the Navy On-Scene Coordinator (NOSC) to coordinate environmental matters and respond to oil and hazardous substance spills, Commander, Navy Region Hawaii (CNRH) provides *unity of command* through rank (the only on-scene flag officer), positional authority (CNRH owns the facilities), and command relationships with subordinate Red Hill commands (both on-site Commanding Officers report additional duty to CNRH). In addition, CNRH provides *unity of effort* by exercising its NOSC coordinating authorities while integrating the activities of Red Hill's command structures. As revealed by the investigation, Red Hill does not represent a failed command and control structure. Instead, Red Hill represents the failed execution of command and control exemplified by poor on-scene leadership combined with inadequate Immediate Superior in Charge (ISIC) oversight.

(1) Commands at Red Hill. The command structure is composed of four commands:

(a) Commander, Navy Region Hawai'i (CNRH), an echelon 3 command which reports to Commander, Navy Installations Command (CNIC), an echelon 2 command.

(b) Fleet Logistics Center Pearl Harbor (FLC Pearl Harbor), an echelon 3 command which reports to Commander, Naval Supply Systems Command (NAVSUP), an echelon 2 command.

(c) Naval Facilities and Engineering Systems Command Hawai'i (NAVFAC Hawai'i), an echelon 4 command which reports to Naval Facilities and Engineering Systems Command Pacific (NAVFAC Pacific). NAVFAC Pacific is an echelon 3 command which reports to Naval Facilities and Engineering Systems Command (NAVFAC), an echelon 2 command.

(d) Defense Logistics Agency (DLA) is the Department of Defense Executive Agent for bulk petroleum and funds operations and maintenance at Red Hill. DLA Energy East Pacific represents DLA Energy in Hawai'i.

(2) Red Hill Command & Control. As stated by the investigating officer in Opinion 46: "The [command and control] of Red Hill is complex but fairly well defined…I expected to find significant seams or overlaps in [command and control] that created ambiguity – but I did not. In short: (1) FLC Pearl Harbor is responsible for day-to-day operations; (2) NAVFAC Hawai'i is responsible for maintenance and repair contracts; (3) CNRH is responsible for environmental functions and incident response; and (4) DLA funds operations and maintenance. This arrangement of multiple stakeholders is not unique among shore facilities." The day-to-day lines of responsibility, authority and accountability are clear, and CNRH provides unity of command and unity of effort for incident readiness, response, and reporting.

(3) Failed Execution of Command and Control. When everyone is in charge, no one is in charge. As described in Opinion 47: "In practice, the [command and control] among Red Hill stakeholders has devolved into 'management by committee' among O-6s," which is anathema to the strong and effective on-scene leadership demanded by the high consequence nature of fuel operations.

(4) Effective Execution of Command and Control. In light of the findings of the investigation, I am firmly convinced that effectively executing command and control at Red Hill requires (1) strong local leadership executing clear lines of responsibility; (2) robust ISIC oversight; and (3) seamless integration of the actions of all commands operating at Red Hill, which will be executed by CNRH as Commander, U.S. Pacific Fleet's Executive Agent for Red Hill Integration and Safety.

(a) Strong Local Leadership. Safe and effective operations at Red Hill demands leaders exercise the full scope of their authorities and eliminate "management by committee." Opinion 24 states in part: "No single person took charge at the scene [of the 20 November 2021 spill]." This unacceptable failure of on-scene leadership cannot happen again. The Commanding Officers of both FLC Pearl Harbor (responsible for safe and effective day-to-day operations) and NAVFAC Hawai'i (responsible for maintenance) report additional duty to CNRH. To enhance unity of command (through CNRH) and empower both Commanding Officers, CNRH will coordinate with both NAVSUP and NAVFAC to strengthen these lines of responsibility, authority, and accountability; clearly define responsibilities and expectations; and clarify any ambiguities. As the Region Command and NOSC with both rank and positional authority, CNRH will resolve any gray areas while demanding timely, accurate, and thorough reporting and communication at all times. At the same time, NAVSUP and NAVFAC must carefully detail and supervise leadership teams (commanding officer, executive officer, senior enlisted, and senior civilians) at FLC Pearl Harbor and NAVFAC Hawai'i to meet the high standards of leadership, experience, and technical expertise required at Red Hill.

(b) Robust ISIC Oversight. Proactive and engaged ISIC oversight reinforces responsibility, authority, and accountability; represents the hallmark of effective command and control; and must become part of the foundation of leadership at Red Hill. Opinions 3, 4, and 12 represent stern criticism of NAVSUP and its failed ISIC oversight of FLC Pearl Harbor – but there is a path to success. In coordination with NAVFAC, NAVSUP will establish an inspection team to monitor and assess all aspects of safe operations at Red Hill as informed by independent third party evaluations and reviews. This NAVSUP inspection team will serve as a standing inspection team responsible for continually assessing Red Hill's operational safety, physical infrastructure, and design/material readiness. The NAVSUP inspection team will operate akin to the Navy's Board of Inspection and Survey (INSURV), Nuclear Propulsion Examining Board (NPEB) for nuclear powered ships, and Aviation Maintenance Management Teams (AMMT). Although the specific scope and nature of the NAVSUP inspection team requires more detailed study (i.e., using a newly created Navy Petroleum Office Detachment Hawai'i; establishing and meeting manpower requirements; expanding inspections and certifications to other fuel storage and transfer locations), NAVSUP will take immediate steps to implement this inspection team. Additional improvements will include direct ISIC management and assistance with manpower requirements and material deficiencies; proactive and deliberate detailing to leadership positions;

improving supervision and accountability at all levels; and updating/establishing support agreements clearly delineating specific roles and responsibilities.

(c) CNRH as Executive Agent for Red Hill Integration and Safety. To further strengthen unity of command and unity of effort, I am designating CNRH as Commander, U.S. Pacific Fleet's Executive Agent to integrate the activities of Red Hill commands and report on the safety of Red Hill operations. Empowered with this authority, I expect CNRH will proactively identify and resolve any command and control issues while ensuring all commands operate with one mindset: safe and effective operations at Red Hill.

c. Providing Requirements-Based Manpower. The Navy has taken unnecessary risk in failing to provide the required manpower to safely operate Red Hill. The findings of the investigation – along with my personal observations informed by experience and insights from a broad-range of experts – crystallize the need for additional manpower to ensure safe and effective operations. Exercising my authority as Senior Officer Present, I direct CNIC, NAVSUP, and NAVFAC to assess their respective manpower requirements (military and civilian) relative to their responsibilities at Red Hill, identify current shortfalls, and implement immediate and long-term solutions in coordination with the Chief of Naval Personnel (CNP) and cognizant civilian personnel human resources authorities. Solutions must provide the best mix of highly skilled and well-trained military and civilian talent and expertise to fill the requirements.

d. Building Strong Partnerships. Developing enduring, broad-based partnerships with local, state, federal, and private entities and individuals is mission essential. We must act in consultation and coordination with our partners – including government officials; the Hawai'i Department of Health; the Environmental Protection Agency; and private industry – throughout the entire spectrum of Red Hill operations: remediation; inspection and certification; testing; and regulatory and environmental compliance.

e. Prioritizing Necessary Funding. Strategy requires applying limited resources to infinite needs. Because Red Hill represents a unique intersection of our two most important obligations – ensuring the safety of our people and protecting the national security interests of the United States – Red Hill must be a priority. Whether Navy leadership implements the recommended framework herein or an alternate framework, we must collectively resolve to fully fund the requirements necessary to implement effective and enduring solutions. Understanding the Navy and our nation have many legitimate competing interests, our actions must be carefully targeted and narrowly tailored to meet the mission without wasteful spending or unnecessary use of limited resources.

Safe-to-Operate Certification (Initial and Semi-Annual)

17. Building on the foundation of the above No-Fail Operational Framework, I assess the following Safe-to-Operate Certification process will ensure safe and effective operations at Red Hill. Under the below paradigm, resuming operations should be predicated on a conditions-based certification process outlined below rather than an arbitrary timeline. The specific scope and nature of future operations at Red Hill will ultimately be determined by the Department of Defense and Department of the Navy.

a. Initial Safe-to-Operate Certification. On 7 December 2021, the Secretary of the Navy ordered the cessation of all operations at the Red Hill Underground Storage Tanks. I recommend continuing the Secretary of the Navy's cessation of all operations at the Red Hill Underground Storage Tanks until Commander, U.S. Pacific Fleet certifies to the CNO that the Red Hill Underground Storage Tanks are safe to operate. This initial Safe-to-Operate certification will require a successful inspection of operations and system integrity conducted by an independent third party in consultation with local, state, and federal partners, including the Hawai'i Department of Health and the Environmental Protection Agency. This initial Safe-to-Operate certification will also be fully informed by the findings and recommendations of this investigation, the Safety Investigation Board, and any other relevant assessment or inquiry.

b. Semi-Annual Safe-to-Operate Certifications. Following the CNO's approval of the initial Safe-to-Operate certification, continued operations will require a semi-annual Safe-to-Operate certification from Commander, U.S. Pacific Fleet to the CNO that Red Hill (including the Underground Storage Tanks, Upper Tank Farm, and associated fuel transfer infrastructure) is safe to operate. These semi-annual Safe-to-Operate certifications will be due on 1 June and 1 December each year. Semi-annual certifications require a successful inspection of operations and system integrity conducted by an independent third party in consultation with local, state, and federal partners, including the Hawai'i Department of Health and the Environmental Protection Agency.

c. Strict Enforcement and Transparency. The Safe-to-Operate certification process and timelines will be strictly enforced. Failure to timely certify that Red Hill is safe to operate will result in ceasing operations until the certification is complete. All certifications will be shared with our local, state, and federal partners.

Core Tenets of Safe and Effective Operations

18. As the "Father of the Nuclear Navy," Admiral Hyman G. Rickover, USN (Ret) demanded brutally honest organizational self-assessment in order to exceed (not merely meet) standards of excellence. Recently, the CNO issued a call to all Navy leaders to apply "Get Real, Get Better" principles for self-assessing, self-correcting, and continuous learning. Guided by Admiral Rickover's safety-focused mindset and the CNO's best practices to empower our people to achieve maximum performance, the following core tenets provide the foundation for safe and effective operations at Red Hill.

a. Strong Leadership and Personnel Excellence Across All Commands. Red Hill requires a highly skilled, well-trained, and properly supervised staff representing the best mix of military and civilian talent and experience. Of primary importance is technical fuels management and engineering expertise – Red Hill demands the highest possible standards of fuels management and engineering rigor, expertise, and professional excellence. Cognizant commanders are responsible and accountable for ensuring their personnel are at all times properly trained and well supervised. As stated by the CNO in his Charge of Command: "Success demands that you hold true to the timeless elements of Command, while you continuously learn and adapt to keep pace with a rapidly changing world. You must remain accountable for both action and inaction

as well as the outcomes and the learning that make your team better. You are ultimately responsible for every aspect of your command."

b. State of the Art Technology, Physical Infrastructure, Equipment, and Design. State of the art technology, physical infrastructure, equipment, and design complements and augments human expertise and professional excellence. Comprehensive, redundant, fail-safe controls (e.g., a supervisory control and data acquisition type program, or SCADA) will constantly monitor systems and identify risk in real-time. Technology will provide a resilient and redundant complement to the staff personnel. Top-quality infrastructure and equipment combined with an effective, industry-approved operational design will maximize safety and minimize risk.

c. Formality and Procedural Compliance. As a military facility in a high consequence industry, Red Hill must operate with the same sense of formality, attention to detail, and zero defect procedural compliance employed by the Navy's nuclear power community. Rather than meeting minimum standards, Red Hill's operational safety must exceed standards.

d. Applying Best Practices and Lessons Learned From Private Industry. As directed by the Secretary of the Navy in his 7 December 2021 "Immediate Actions" Memo, the Navy has contracted with an independent, third-party (*Simpson Gumpertz & Heger, Inc.*) to conduct an assessment to determine design and operational deficiencies that may impact the environment and develop a work plan and implementation schedule to conduct any necessary repairs and make changes in operations to address any deficiencies. The integration of independent, third party expertise will become a firmly rooted, permanent component of Red Hill operations. Best practices and lessons learned from private industry will guide every aspect of operations and design/material readiness, ensuring Red Hill exceeds the highest industry standards of excellence.

e. Communication and Transparency. A clear, transparent, and constant flow of information within organizations, up-and-down the chain of command, and across stakeholders (including local, state, and federal partners) is a critical element of safe operations. As documented in the investigation (e.g., Finding of Fact 138 notes the root cause analysis of the 6 May 2021 spill was not shared with Fuels Department operators and engineers in a timely manner), a lack of transparency and effective communication – both internal and external – hindered operational safety at Red Hill. Increased scrutiny based on Red Hill's environmental, legal, and national security sensitivities created a strong desire to minimize mistakes, errors, or problems. This dysfunction stifled the flow of information within and between the CNIC, NAVSUP, and NAVFAC organizations. Moreover, Red Hill's high-visibility status resulted in unnecessarily tight control of information, which hampered organizational learning and created an environment where on-site leaders failed to inform higher level decision-makers who could have averted the current crisis. Opinion 27 exemplifies this lack of communication and transparency, i.e., if leaders at the scene of the 20 November 2021 spill had communicated the seriousness of the incident, it may have resulted in a more aggressive response from CNRH and other senior leaders. My guidance to those acting within the scope of my authority is clear: We will communicate clearly within the Navy organization through vibrant command-and-feedback while acting with maximum transparency in sharing information with our local, state, and federal partners.

f. Continuous Learning. All actors across the Red Hill operational spectrum must actively participate in an organization that continually challenges assumptions, fosters a questioning attitude, and demands forceful backup regardless of rank, status, or position. Quickly identifying mistakes coupled with taking immediate corrective action must be the rule that permeates every activity at all levels of command. Acting with a sense of urgency as informed by real-time information from personnel and technology, leadership must continually assess risk, apply lessons learned, ensure accountability, adapt processes, and make changes in a timely and resolute manner – this is the continuous learning process in a healthy, mature organization. In short, the learning process never ends. There is no room for complacency. We must learn a key lesson as stated by Admiral Rickover:

> Too often officials are willing to accept and adapt to situations they know to be wrong. The tendency is to downplay problems instead of actively trying to correct them. Recognizing this, many subordinates give up, contain their views within themselves, and wait for others to take action. When this happens, the manager is deprived of the experience and ideas of subordinates who generally are more knowledgeable than he in their particular areas.[1]

Immediate Actions

19. Acting pursuant to my authorities as Senior Officer Present under Chapter 9 of the U.S. Navy Regulations, I direct the following actions to ensure safe and effective operations at Red Hill. Cognizant Commanders will request an extension to the indicated timeline if necessary to complete execution.

a. U.S. Pacific Fleet N4:

(1) Assign an officer of appropriate rank and experience to coordinate and report the status of required actions in this investigation, including "Immediate Actions" in paragraph 19 and required actions to implement approved Recommendations in paragraph 20. Make monthly reports to Commander, U.S, Pacific Fleet and CNRH.
Due: 1 February 2022

(2) Coordinate with an appropriate contracting authority to contract for (or leverage an existing contract) a highly qualified fuel control and management expert to advise Commander, U.S. Pacific Fleet on all aspects of supervising safe and effective fuel storage and transfer operations.
Due: 1 March 2022

b. CNIC:

(1) Review and update Red Hill emergency response procedures as informed by this investigation. Working in coordination with NAVSUP and NAVFAC, updated emergency response procedures will include a comprehensive Red Hill emergency response plan that

[1] Admiral Hyman G. Rickover, USN (Ret), "Doing a Job" (Columbia University, 1982), https://govleaders.org/rickover.htm.

includes clearly delineated roles and responsibilities and incorporates Recommendation 37.
Due: 1 March 2022

(2) Report completed improvements to Red Hill command and control identified in this investigation and through critical self-assessment. Improvements must include specific measures to improve ISIC oversight.
Due: 1 March 2022

(3) Provide a plan of action and milestones to implement Core Tenets of Safe and Effective Operations as defined in paragraph 18 above with respect to matters under CNIC cognizance at Red Hill. Coordinate with NAVSUP and NAVFAC as necessary and appropriate.
Due: 1 April 2022

(4) After assessing current Red Hill manpower requirements (military and civilian) and identifying shortfalls, implement manpower solutions in coordination with CNP and cognizant civilian personnel human resources authorities. Solutions will address manpower at CNRH, with a focus on incident response and emergency management along with environmental compliance. Solutions must provide the best mix of military and civilian talent and expertise to fill the requirements.
Due: 1 May 2022

(5) In coordination with the U.S. Pacific Fleet N4, provide a plan of action and milestones to establish CNRH as Commander, U.S. Pacific Fleet's Executive Agent for Red Hill Integration and Safety. CNRH will integrate the activities of Red Hill command structures to ensure unity of command and unity of effort. This plan must address formal procedures (e.g., memorandums of agreement), reporting requirements, timelines for completion, and necessary resourcing at CNRH to execute these duties. This plan must also clearly delineate roles and responsibilities regarding technical authority for maintenance at Red Hill (coordinated with NAVFAC, NAVSUP, and DLA).
Due: 1 May 2022

(6) Provide a plan of action and milestones for implementing the Safe-to-Operate certification procedures (including initial and semi-annual inspection and certification requirements as outlined in paragraph 17). In conducting this assessment, coordinate with the independent third party entity conducting the Secretary of the Navy-directed assessment noted in paragraph 18(d) above while consulting with the Naval Safety Command, INSURV, NPEB, AMMT, NAVFAC, NAVSUP, DLA, and other entities, as appropriate. The plan of action and milestones must account for completing any necessary repairs and any changes in operations to address any deficiencies identified in the independent assessment.
Due: 1 June 2022

(7) In coordination with the other military services, area medical facilities, and local and state authorities, establish a centralized reporting system for water contamination from the Navy drinking water system.
Due: 1 June 2022

c. NAVSUP:

(1) To enhance unity of command (through CNRH) and empower the FLC Pearl Harbor Commanding Officer, coordinate with both CNRH and NAVFAC to strengthen lines of responsibility, authority, and accountability; clearly define additional duty responsibilities and expectations; and clarify any ambiguities.
Due: 1 March 2022

(2) Support CNIC in reviewing and updating Red Hill emergency response procedures as informed by this investigation. Updated procedures must specifically address improvements to ensure FLC Pearl Harbor personnel are trained and equipped to effectively respond to a fuel spill.
Due: 1 March 2022

(3) Report completed improvements to Red Hill command and control structures identified in the recommendations and through critical self-assessment. Improvements must include specific measures to improve ISIC oversight, including the establishment of an ISIC-supervised inspection team and resourcing necessary to provide day-to-day oversight in the same manner as other Navy ISICs. Improvements will include creating Navy Petroleum Office Detachment Hawai'i to provide local oversight and liaise with CNRH.
Due: 1 April 2022

(4) Provide a plan of action and milestones to implement Core Tenets of Safe and Effective Operations as defined in paragraph 18 above with respect to matters under NAVSUP cognizance at Red Hill. This plan must specifically address measures to provide resilient and redundant safety measures to offset human error. This plan must also integrate lessons learned from the 6 May 2021 spill (Recommendation 9) and implementing best practices from military and industry (Recommendation 11).
Due: 1 April 2022

(5) After assessing current Red Hill manpower requirements (military and civilian) and identifying shortfalls, implement manpower solutions in coordination with the CNP and cognizant civilian personnel human resources authorities. Solutions will specifically include improvements within the FLC Pearl Harbor Fuels Department as identified in Opinion 41 and Recommendations 10 and 27. Changes must also address detailing practices and training pipeline requirements for the Commanding Officer, Executive Officer, and Senior Enlisted Advisor of FLC Pearl Harbor; providing sufficient manpower to FLC Pearl Harbor to accomplish administrative tasks not related to fuel operations (e.g., conducting tours and responding to requests for information) without impacting mission accomplishment; and manning a Navy Petroleum Office Detachment in Hawai'i to facilitate local assistance and oversight of Red Hill and liaise with CNRH. Consider options and determine appropriate roles, responsibilities, experience, rank, and status (military or civilian) of the FLC Pearl Harbor Fuels Officer and Deputy Fuels Officer. Solutions must provide the best mix of military and civilian talent and expertise to fill the requirements.
Due: 1 May 2022

(6) Report the findings of the Secretary of Navy-directed independent, third-party assessment to determine design and operational deficiencies that may impact the environment. This will include the work plan and implementation schedule to conduct any necessary repairs and make necessary changes in operations to address any deficiencies identified in the assessment.
Due: 1 May 2022

(7) Upon receipt of the independent engineering analysis funded by DLA to determine the material cause of the vacuum conditions and pressure surge that occurred on 29 September 2021, take corrective action to remedy all operational design, material, or other deficiencies.
Due: 1 May 2022

(8) In coordination with Naval Safety Command, debrief the findings of the Red Hill Safety Investigation Board to Commander, U.S. Pacific Fleet, CNIC, and CNRH. All recommended corrective measures must be complete prior to the initial Safe-to-Operate Certification of the Red Hill Underground Storage Tanks.
Due: NLT 30 days after completion of the SIB.

d. NAVFAC:

(1) Report the findings of the engineering assessment being conducted by *GSI North America, Inc.*, regarding the contamination path or paths that led to fuel from the 20 November 2021 spill entering the Red Hill well and water distribution system.
Due: 1 March 2022

(2) Report the findings of the independent engineering analysis funded by DLA to determine the material cause of the vacuum conditions and pressure surge that occurred on 29 September 2021. Make recommendations to NAVSUP and DLA regarding any required corrective actions.
Due: 1 April 2022

(3) Provide an environmental assessment of the 20 November 2021 fuel spill.
Due: 1 April 2022

(4) Provide a plan of action and milestones to implement Core Tenets of Safe and Effective Operations as defined in paragraph 18 above.
Due: 1 April 2022

(5) After assessing current Red Hill manpower requirements (military and civilian) and identifying shortfalls, implement manpower solutions in coordination with CNP and cognizant civilian personnel human resources authorities. Solutions must provide the best mix of military and civilian talent and expertise to fill the requirements.
Due: 1 May 2022

(6) In consultation with local, state, and federal partners, develop an enhanced water sample testing capability on Oahu.
Due: 1 May 2022

(7) In consultation with local, state, and federal partners, develop a water treatment capability at Red Hill. This capability must comply with all governing laws and regulations.
Due: 1 May 2022

(8) Conduct an assessment and report findings of potential system impacts of a decommissioned defueling line at Hotel Pier.
Due: 1 June 2022

(9) Conduct an assessment and report findings of potential environmental impacts of the water main breaks at the Fuel Oil Recovery Facility on 26 October 2021.
Due: 1 July 2022

Findings of Fact, Opinions, and Recommendations

20. With the reservation that I make no determination regarding individual accountability herein, I approve the findings of fact, opinions, and recommendations of the investigating officer as modified in below:

a. I approve Findings of Fact 1 through 409. The following Findings of Fact are highlighted for their salient importance.

(1) Finding of Fact 41: "On 6 May 2021, Red Hill operators improperly executed a fuel transfer procedure, resulting in two piping joint ruptures and a subsequent JP-5 fuel spill. Although unknown at the time, a fire suppression system sump pump transferred most of the fuel [up to 16,999 gallons] into a retention line, where it remained until 20 November." Appendix C notes: "The quantity of fuel released to the environment on 6 May cannot be calculated, but is assessed to be small."

(2) Finding of Fact 174: "On 20 November 2021, the Red Hill rover inadvertently struck a fire suppression system retention line drain valve with the passenger cart of a train, cracking the PVC pipe near Adit 3. Although not known at the time, this retention line contained up to 16,999 gallons of JP5 fuel from the 6 May spill. A portion of this fuel was released to the environment and ultimately entered the Red Hill well and the Navy water distribution system." Appendix C notes: "A total of 3,322 gallons of remain unaccounted for, and some or all of that fuel contaminated the Red Hill well and Navy water distribution system."

b. I approve Opinions 1 through 48. The following Opinions are highlighted for their salient importance.

(1) Opinion 1 states in part: "The proximate cause of the fuel spill on 6 May 2021 was human error."

(2) Opinion 9 describes the 6 May 2021 NAVSUP command investigation as "cursory," "inadequate," and a "critical missed opportunity" for ISIC oversight.

(3) Opinion 10 states: "FLC Pearl Harbor's external reporting of the 6 May spill was not timely."

(4) Opinion 19 states in part: "The underlying cause of pressure surges at Red Hill is still not fully understood." The ongoing independent analysis and corrective actions are addressed in paragraph 19(d)(2) above.

(5) Opinion 20 states: "The proximate cause of the fuel spilled from the fire suppression system retention line on 20 November 2021 was a failure to properly account for the fuel spilled on 6 May 2021 (human error), as discussed above."

(6) Opinion 22 notes the fire suppression system struck on 20 November 2021, was cracked, poorly designed, and had not been properly maintained.

(7) Opinion 24 asserts: "No single person took charge at the scene" of the 20 November 2021 spill.

(8) Opinion 26 notes that formal incident response procedures were not implemented during the 20 November 2021 fuel spill. Although implementing formal response procedures would not have automatically secured the Red Hill drinking water well, it would have "alerted CNRH and other senior leaders that the incident was more serious than understood."

(9) Opinion 27 states in part: "Leaders at the scene [of the 20 November 2021 fuel spill] failed to communicate the seriousness of the incident." These leaders "displayed a consistent bias toward assuming and reporting the 'best case' scenario. Further, the FLC Pearl Harbor CO failed to report that the initial responder to the spill had gone to the hospital that evening due to chemical burns or that a second person had been injured. Failure to communicate the seriousness of the incident would not have changed the controlling actions at the scene, but it would have resulted in a more aggressive response from CNRH and other senior leaders."

(10) Opinion 28 reads in part: "The FLC Pearl Harbor CO was aware of the potential for a fuel release to the environment via the installed groundwater sump pump, but he did not communicate that possibility to senior leaders."

(11) Opinion 29 states in part: "The history, visibility, and charged nature of Red Hill issues are reality, but they do not absolve leaders from their duties to think critically and report accurately. This complacent atmosphere likely contributed to the consistent bias toward assuming and reporting 'best case' scenarios."

(12) Opinion 30 asserts in part: "The proximate cause of contaminated drinking water was a failure to properly respond to the fuel spill on 20 November 2021 (human error)." Opinion 30 further highlights that a lack of communication, critical assessment, and a questioning attitude prevented a timely and decisive response that could have protected the drinking water system.

(13) Opinion 32 states in part: "The JP-5 fuel released to the environment on 20-21 November contaminated the Navy drinking water system." There are "multiple pathways" the fuel may have entered the drinking water. The precise path and quantity of fuel that contaminated the drinking water system is currently being investigated and will be reported as required in paragraph 19(d)(1) above.

(14) Opinion 35 states: "The total quantity of fuel spilled on 6 May 2021 was 18,579 gallons. *Austin Brockenbrough and Associates, LLC,* a private engineering and consulting firm, conducted an independent third-party validation of this quantity. After the spill, 1,580 gallons were recovered. Therefore, up to 16,999 gallons of fuel were transferred to the fire suppression system retention line."

(15) Opinion 36 states in part: "The quantity of fuel released to the environment on 6 May cannot be calculated, but is assessed to be small."

(16) Opinion 37 states in part: "The majority of the fuel that was transferred to the fire suppression system retention line on 6 May, up to 16,999 gallons, spilled on 20 November. At the time of this report, 13,647 gallons of fuel were recovered."

(17) Opinion 38 states: "A total of 3,322 gallons of fuels remains unaccounted for. Some or all of this fuel is the source of contamination of the Navy drinking water system in and around JBPHH and its surrounding areas."

(18) Opinion 42 highlights the need to assess the risks posed by material issues including pipelines, valves, sensors, and ancillary systems. This critical requirement is specifically addressed in the above No-Fail Operational Framework and Core Tenets of Safe and Effective Operations (State of the Art Technology, Physical Infrastructure, Equipment, and Design).

(19) Opinions 44 and 45 address the need to incorporate best practices from industry while embracing self-assessment and lessons learned, which are specifically addressed in the above Core Tenets of Safe and Effective Operations.

(20) Opinions 46 through 48 discuss command and control, with Opinion 46 noting command and control "is complex but fairly well defined." Opinion 47 states in part that: "commanders have not embraced the full extent of their authority." Implementing the above framework will clarify roles and responsibilities to ensure unity of command while integrating various command actions to ensure unity of effort.

c. I approve Recommendations 1 through 54 subject to the disapprovals and modifications below. Where not duplicative with paragraph 19 ("Immediate Actions"), the approved recommendations require additional action.

(1) Recommendation 1 is modified to read: "As Commander, U.S. Pacific Fleet's Executive Agent for Red Hill Safety and Integration, CNRH will issue clear and concise guidance on expectations and command relationships among various Red Hill stakeholders. The purpose of this document is to define an oversight role for CNRH and clarify any current

ambiguities in responsibility, authority, and accountability under the command and control structure."

(2) Recommendation 2 is disapproved. Commander, U.S. Pacific Fleet has operational control of CNRH and may also exercise Senior Officer Present authorities when necessary to regulate or otherwise supervise the activities, operations, or commands at Red Hill.

(3) Recommendation 3 is modified to read: "Assign CNRH as Commander, U.S. Pacific Fleet's Executive Agent for Red Hill Safety and Integration."

(4) Recommendation 5 is modified to read: "Continue the Secretary of the Navy's cessation of all operations at the Red Hill Underground Storage Tanks until Commander, U.S. Pacific Fleet certifies to the CNO that the Red Hill Underground Storage Tanks are safe to operate. This initial Safe-to-Operate certification will require a successful inspection of operations and system integrity conducted by an independent third party in consultation with local, state, and federal partners, including the Hawai'i Department of Health and the Environmental Protection Agency. This initial Safe-to-Operate certification will also be fully informed by the findings and recommendations of this investigation, the Safety Investigation Board, and any other relevant assessment or inquiry. Following the CNO's approval of the initial Safe-to-Operate certification, continued operations will require a semi-annual Safe-to-Operate certification from Commander, U.S. Pacific Fleet to the CNO that Red Hill (including the Underground Storage Tanks, Upper Tank Farm, and associated fuel transfer infrastructure) is safe to operate. These semi-annual Safe-to-Operate certifications will be due on 1 June and 1 December each year. Semi-annual certifications require a successful inspection of operations and system integrity conducted by an independent third party in consultation with local, state, and federal partners, including the Hawai'i Department of Health and the Environmental Protection Agency.

(5) Recommendation 25 is modified to read: "NAVSUP will direct, manage, and supervise FLC Pearl Harbor with the recommended actions above."

(6) Recommendation 29 is modified to read: "Lead and organize a formal material and operational readiness inspection of Red Hill. This process will be led by the NAVSUP inspection team that will operate akin to the Navy's Board of Inspection and Survey (INSURV), Nuclear Propulsion Examining Board (NPEB) for nuclear powered ships, and Aviation Maintenance Management Teams (AMMT)."

(7) Recommendation 30 is disapproved (duplicative with Recommendation 29 as modified).

(8) Recommendation 42 is modified to read: "CNIC will direct, manage, and supervise CNRH with the recommended actions above."

(9) Recommendation 48 is modified to read: "NAVFAC will direct, manage, and supervise NAVFAC Pacific and NAVFAC Hawai'i with the recommended actions above."

(10) Recommendation 51 is approved. In light of the significant risk presented by fuel storage and transfer operations coupled with the potential impact to national security and the environment, I further recommend the Navy comprehensively review material, operational, and incident response readiness at the 48 unique Defense Fuel Storage Points managed by the Navy worldwide.

(11) Recommendation 52 is modified to read: "In light of the scope and complexity of this matter, designate Commander, U.S. Pacific Fleet as the Consolidated Disposition Authority to determine and execute any administrative or disciplinary actions, as appropriate, relating to any military members identified in this investigation. I further recommend forwarding this investigation to the cognizant supervisor of civilian employees identified in this investigation for action as appropriate."

(12) Recommendation 53 is modified to read: "NAVFAC will conduct an assessment and report the findings of potential system impacts of a decommissioned defueling line at Hotel Pier."

(13) Recommendation 54 is modified to read: "NAVFAC will conduct an assessment and report the findings of potential environmental impacts of the water main breaks at the Fuel Oil Recovery Facility on 26 October 2021."

(14) Additional Recommendation 55: Continue to enforce the Secretary of the Navy's 7 December 2021 order to cease all operations at the Red Hill Underground Storage Tanks until Commander, U.S. Pacific Fleet certifies to the CNO that the Red Hill Underground Storage Tanks are Safe-to-Operate.

(15) Additional Recommendation 56: Approve the Safe-to-Operate certification process delineated in paragraph 17 of this endorsement.

(16) Additional Recommendation 57: Advocate for and prioritize necessary funding and resource allocations to implement the immediate actions delineated herein. This includes appropriate Navy funding along with advocating for appropriate Department of Defense funding for DLA operations at Red Hill.

(17) Additional Recommendation 58: Conduct an assessment as to whether operations at Red Hill represent a core Navy function, or whether the Navy and joint force are better served by implementing a government owned, contractor operated (GOCO) model at Red Hill. This decision should be informed by the NAVSUP feasibility assessment of a GOCO model for Red Hill as approved in Recommendation 34.

Conclusion

21. The Navy is responsible for the 6 May 2021 and 20 November 2021 fuel spills and subsequent water contamination. We are taking ownership of the solutions. Implementing this Safe-to-Operate certification process combined with a comprehensive No-Fail Operational

Subj: COMMAND INVESTIGATION INTO THE 6 MAY 2021 AND 20 NOVEMBER 2021 INCIDENTS AT RED HILL BULK FUEL STORAGE FACILITY

Framework and Core Tenets of Safe and Effective Operations represents my immediate actions and recommendations to ensure this never happens again.

22. The Navy can safely operate Red Hill – but we must do it the right way, and we must do it right now. The immediate actions and recommendations herein are specifically designed to ensure safe and effective operations at Red Hill, thereby setting the conditions for the Department of the Navy and Department of Defense to determine the nature and scope of future operations at Red Hill. Whether Navy leadership implements the recommended framework herein or an alternate framework, we must resolve to get this right.

23. I commend the diligence of the investigation team led by RDML Christopher J. Cavanaugh, USN, and sincerely appreciate their efforts.

24. My point of contact for this matter is the [redacted]

S. J. PAPARO

Copy to:
CNO
CDRUSINDOPACOM
CNIC
NAVSUP
NAVFAC
OLA

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5830
14 Jan 22

From: RDML Christopher J. Cavanaugh
To: Commander, U.S. Pacific Fleet

Subj: COMMAND INVESTIGATION INTO THE 6 MAY 2021 AND 20 NOVEMBER 2021 INCIDENTS AT RED HILL BULK FUEL STORAGE FACILITY

Ref: (a) COMPACFLT ltr 5830 Ser N00/1232 of 23 Nov 21
(b) COMPACFLT ltr 5830 Ser N00/1260 of 3 Dec 21
(c) COMPACFLT ltr 5830 Ser N00/1275 of 9 Dec 21
(d) COMPACFLT ltr 5830 Ser N00/1279 of 10 Dec 21

Encl: (1) Final Report

1. Reference (a), as modified by references (b) through (d), directed a command investigation into the facts and circumstances regarding the 6 May 2021 and 20 November 2021 incidents at Red Hill Bulk Fuel Storage Facility.

2. My report is provided as enclosure (1).

C.J. CAVANAUGH

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CHAPTER 1
Executive Summary

1. Purpose. Pursuant to enclosures (1) through (4), this investigation examined the facts and circumstances regarding incidents at the Red Hill Bulk Fuel Storage Facility (Red Hill) on 6 May 2021 and 20 November 2021. The investigation also assessed the quantity of fuel released into the environment, which ultimately caused contamination of the Navy water system in and around Joint Base Pearl Harbor-Hickam (JBPHH).

This report provides a comprehensive, fact-based, and transparent examination of fuel operations at Red Hill informed by three fundamental priorities: (1) ensuring there are no additional spillages released into the environment; (2) ensuring Red Hill operations are environmentally safe and secure; and (3) identifying root causes and remedial actions to safeguard the local environment and ensure this does not happen again.

2. Summary of Events. On 6 May 2021, Red Hill operators improperly executed a fuel transfer procedure, resulting in two piping joint ruptures and a subsequent spill of Jet Propellant-5 (JP-5) fuel. Although unknown at the time, a fire suppression system sump pump transferred up to 16,999 gallons of the fuel into a retention line, where it remained until 20 November 2021.

On 20 November 2021, a Red Hill watch stander inadvertently struck a low point drain valve in the fire suppression system with the passenger cart of a train, cracking the pipe and spilling the fuel deposited there on 6 May. To date, up to 3,322 gallons of fuel remain unrecovered. Some portion of that fuel contaminated the Red Hill well and Navy drinking water distribution system.

This water contamination resulted from a series of cascading failures, and those failures were preventable. They were due to both individual errors and systemic problems. Although the Navy is proficient at conducting technically complex, high-consequence operations at sea, many of those processes were not applied at Red Hill.

3. Causation. The investigation analyzed these failures by identifying their proximate causes (*i.e.*, events or failures that would have prevented subsequent events, had they not occurred). We identified three proximate causes, all of which can be categorized as human error.

a. The cause of the fuel spill on 6 May 2021 was a failure to properly follow the required procedure for a fuel transfer evolution.

b. The cause of the fuel spill on 20 November 2021 was a failure to properly account for all fuel spilled on 6 May 2021.

c. The cause of contaminated drinking water was a failure to properly respond to the fuel spill on 20 November 2021.

4. Findings. This investigation provides 48 opinions and 54 recommendations. Resuming operations at Red Hill will require significant effort over an extended period, in coordination with regulatory partners.

a. Material Readiness. Red Hill tanks have been the focus of scrutiny and significant investment since the 2014 leak. As this investigation highlights, other components such as pipelines, valves, sensors, and ancillary systems are also sources of risk that must be assessed and mitigated.

b. Operational Readiness. Safe and effective operations at Red Hill require: (1) clear and accurate procedures, (2) trained and proficient operators, and (3) effective supervision. Weaknesses in all three of these areas contributed to the cascading failures described above. Red Hill is undermanned at every level and will require a significant overhaul to improve standards and resume operations.

c. Incident Response Readiness and Execution. A lack of training and drills resulted in a poor response to the spill on 20 November 2021. Absent a unity of effort and clear lines of reporting, leaders lacked a common sight picture. This investigation also identified a persistent bias by Red Hill leadership toward assuming and reporting the "best case" scenario following incidents.

d. Command and Control (C2). The C2 of Red Hill is complex but fairly well defined. However, it has devolved into "management by committee" with blurred lines of responsibility, authority, and accountability. This must be corrected.

e. Oversight. Oversight of Red Hill was not adequate to identify weaknesses in procedural compliance and incident response training. Immediate superiors in command (ISICs) must provide a higher level of assistance and oversight to those commands tasked with safe and effective mission execution at Red Hill.

5. Scope and Methodology. After preliminary briefings and site visits, we conducted over 60 interviews and reviewed over 500 pieces of documentary evidence. All personnel and organizations cooperated fully with the investigation. Areas where the investigation team was unable to definitely determine a cause or where additional analysis is required are highlighted in the report.

The investigation team consisted of subject matter experts from across the Navy. Team members included line officers; Supply Corps officers with extensive petroleum management experience; current and former inspectors from the Nuclear Propulsion Examination Board, the Nuclear Weapons Inspection Team, and the Board of Inspection and Survey (INSURV); a civilian Petroleum Facilities Engineer; Judge Advocates; and administrative support personnel.

The investigative team also received excellent support from four commercial entities that provided technical expertise and independent assessment: *Austin Brockenbrough and Associates, LLC*; *AECOM*; *GSI North America, Inc.*; and *Signature Flight Support*. The *AECOM* and *GSI North America, Inc.* assessments are ongoing.

CHAPTER 2
Findings of Fact

Section I: Red Hill Overview

1. The Navy has eight Fleet Logistics Centers (FLC) worldwide. FLC Pearl Harbor provides logistics solutions throughout the Indo-Pacific to generate and sustain readiness. [Encls (5), (6), (7)]

2. Among other responsibilities, FLCs provide operational oversight and direction for bulk fuel and aviation fuel operations, logistics functions, and bulk fuel facility management including the oversight and control of one or more Defense Fuel Support Points (DFSPs).[1] [Encl (8)]

3. FLC Pearl Harbor oversees and controls DFSP Pearl Harbor. This DFSP is a government-owned, government-operated (GOGO) fuel storage and distribution facility that supplies fuel and lubricating oils to support Navy fleet units, Navy overseas activities, Air Force units, Coast Guard units, and other authorized customers.[2] DFSP Pearl Harbor includes Red Hill underground bulk fuel storage facility, two aboveground tank facilities (Pearl Harbor and Hickam Field), a fuel oil recovery facility (FORFAC), an underground pump house, and the JBPHH fuel distribution network. [Encls (6), (7), (9)]

4. Red Hill consists of 20 underground fuel tanks, each with a capacity of 12.5 million gallons, and provides a significant fuel reserve for ships and aircraft in the United States Indo-Pacific Command (USINDOPACOM) area of responsibility. [Encl (10)]

5. The FLC Pearl Harbor Commanding Officer (CO) is responsible for FLC Pearl Harbor mission execution. The responsibility of the CO for his or her command is absolute, and authority is commensurate with his or her responsibilities. The FLC Pearl Harbor CO reports to Commander, Naval Supply Systems Command (COMNAVSUP). [Encls (6), (7), (11), (12)]

6. CAPT Trent Kalp, SC, USN was the FLC Pearl Harbor CO from June 2019 to 6 August 2021. He was relieved by CAPT Albert Hornyak, SC, USN. [Encls (13), (14)]

7. The FLC Pearl Harbor Executive Officer (XO) is the direct representative of the CO in maintaining the general efficiency and conduct of FLC Pearl Harbor work. He or she executes policies and orders of the CO, directs public affairs matters for the command, and serves as the Command Training Officer. The XO reports to the CO. [Encls (6), (7), (15)]

8. (b) (6), (b) (7)(C), SC, USN has been the FLC Pearl Harbor XO since June 2020. [Encl (17)]

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[1] This section includes a limited discussion of command relationships and responsibilities to provide context for facts associated with the events of 6 May 2021, 29 September 2021, and 20 November 2021. Section IV provides a more comprehensive and detailed discussion of command, control, and oversight relationships.

[2] DFSPs have three different owner/operator models. Across the Joint Force, some DFSPs are GOGO, some are government-owned, contractor-operated (GOCO), and some are contractor-owned, contractor operated (COCO). Among the 48 NAVSUP DFSPs, 18 (38%) are GOGO, 29 (60%) are GOCO, and one (2%) is split by fuel type between GOGO and GOCO. [Encl (16)]

9. The FLC Pearl Harbor Executive Director (ED) is the senior civilian manager, responsible for development and execution of command policies, strategic plans, goals, and objectives. He or she is the contact point for congressional inquiries, labor/management relations, and questions concerning the organization and its programs. He or she is also the principal point of contact for Navy stock material under the cognizance of NAVSUP, stored by various commands in the region, including Defense Logistics Agency (DLA). The ED reports to the CO. [Encls (6), (7), (18), (19)]

10. (b) (6), (b) (7)(C) has been the FLC Pearl Harbor ED since September 2018. [Encl (19)]

11. The FLC Pearl Harbor Fuels Director is a Supply Corps officer. He or she directs fuel operations, advises the CO on all matters pertaining to fuel operations, conducts studies of fuel handling and storage operations, recommends/initiates actions toward increasing efficiency and effectiveness, and provides regional fuel support services. The Fuels Director reports to the CO. [Encls (6), (7), (9), (20)]

12. (b) (6), (b) (7)(C), SC, USN was the Fuels Director from 30 May 2020 to 12 May 2021.[3] (b) (6), (b) (7)(C), SC, USN assumed duties as the Fuels Director on 13 July 2021. [Encls (21)-(27)]

13. The FLC Pearl Harbor Deputy Fuels Director is a General Schedule (GS-14) civilian who exercises full associate authority concurrently with the Fuels Director, represents the Fuels Department in the Director's absence, and advises the Fuels Director on all matters pertaining to fuel operations. The Deputy Fuels Director reports to the Fuels Director and is the direct supervisor of the training administrator. [Encls (6), (7), (9), (28)]

14. (b) (6), (b) (7)(C) has been the Deputy Fuels Director since February 2015. [Encl (29)]

15. The FLC Pearl Harbor Fuels Department (Code 700) consists of four divisions: Facilities (Code 701), Control (Code 702), Operations (Code 703), and Technical (Code 704). [Encls (6), (7)]

16. Facilities Division (Code 701) is responsible for facilities planning and maintenance operations for the command, including DLA funded maintenance, military construction (MILCON), and special facilities projects. Among other functions, Facilities Division provides technical advice and recommendations on the maintenance and repair to FLC Pearl Harbor facilities, structures, and grounds. Facilities Division also coordinates FLC Pearl Harbor's Safety, Fire Protection, and Energy Management programs. [Encls (6), (7)]

17. Among other functions, Control Division (Code 702) manages the procurement, receipt, and issue of stock to the extent specified by DLA Energy. Control Division also manages the Fuel Department's budget, finances, and job order system. [Encls (6), (7)]

[3] Effective 11 February 2021, (b) (6), (b) (7)(C) was no longer performing duties as the Fuels Director. [Encls (26), (29)]

18. Operations Division (Code 703) is responsible for operation of the JBPHH fuel distribution system to include the receipt, storage, issue, and control of ground, bulk, aircraft fuels and cryogenic products, including Red Hill operations. [Encls (6), (7)]

19. Among other functions, Technical Division (Code 704) maintains quality control checks on all petroleum products received and in storage at FLC Pearl Harbor. [Encls (6), (7)]

20. Naval Facilities Engineering Systems Command (NAVFAC) Hawaii is responsible for developing, awarding, and administering contracts funded by DLA in support of Red Hill maintenance and repair. NAVFAC Hawaii also conducts all environmental monitoring functions for Navy Region Hawaii. The NAVFAC Hawaii CO serves as the Commander, Navy Region Hawaii (CNRH) Region Engineer (N4). [Encls (10), (30), (31)]

21. CAPT James "Gordie" Meyer, CEC, USN has been the NAVFAC Hawaii CO since 8 August 2020. [Encls (33), (34)]

22. (b) (6), (b) (7)(C), CEC, USN has been the NAVFAC Hawaii Red Hill Program Management Office (PMO) Director since June 2018. He is embedded in the FLC Pearl Harbor Fuels Department to coordinate work and manage the clean, inspect, and repair (CIR) process for all petroleum, oil, and lubricant (POL) storage tanks. (b) (6), (b) (7)(C) also serves as Deputy Environmental Director for CNRH (N45A), providing technical expertise in support of the Administrative Order on Consent (AOC) and technical coordination with the U.S. Environmental Protection Agency (EPA) and Hawaii Department of Health (DOH). [Encls (33)-(36)]

23. CNRH is the Navy's representative for community matters and communication with regulatory agencies regarding Red Hill permits and the AOC. CNRH is designated as the Regional Environmental Coordinator (REC) as well as the Navy On-Scene Coordinator (NOSC) with responsibilities to respond to oil and hazardous substance (OHS) spills. CNRH, as a subordinate of Commander Navy Installations Command (CNIC), maintains ownership of Class I (land) and Class II (buildings and structures) property for Navy installations in Hawaii. [Encls (37)-(43)]

24. RDML Robert Chadwick, USN was CNRH from June 2019 to 18 June 2021. He was relieved by RDML Timothy Kott, USN. CNRH is dual-hatted as the Commander, Naval Surface Group Middle Pacific (CNSG MIDPAC). [Encls (42), (43)]

25. DLA is the Department of Defense (DoD) Executive Agent (EA) for bulk petroleum and funds operations and maintenance at DFSPs. Commander, DLA Energy is the integrated material manager for the Defense Working Capital Fund (DWCF) bulk petroleum supply chain. DLA Energy East Pacific represents DLA Energy in Hawaii. [Encls (44), (45)]

26. CDR William Jakubowicz, SC, USN has been the DLA Energy East Pacific CO since June 2021. [Encl (46)]

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27. The fuel stored at Red Hill is DWCF capitalized fuel, owned by DLA Energy. Red Hill tanks and pipelines contain either JP-5, aviation turbine fuel (F-24), or diesel marine fuel (F-76). [Encls (16), (31), (44), (45), (47), (48)]

28. In addition to the tanks, the Red Hill facility includes tunnels and sumps hollowed out of volcanic rock. The decks and sumps of the tunnels are lined with concrete. The concrete tunnel deck is porous and has minor cracks and imperfections. The walls of the tunnels are lined with gunite, which is also porous. [Encl (50)]

29. Three main fuel pipelines extend (b)(3), 10 USC 130e from the tanks at Red Hill to JBPHH. Pipelines exit the tanks, pass through a concrete plug, and run through the lower access tunnel, where they are inspected and monitored by roving watch standers and cameras. [Encls (51), (52)]

30. The upper access tunnel and lower access tunnel are centered between the two rows of tanks. The upper access tunnel provides access to upper access manholes, tank tops, and access to ventilation. The lower access tunnel provides access to fuel outlet nozzles, tank sample taps, tank bottom drains, soil vapor monitoring ports, and groundwater monitoring ports. Several adits provide access to the upper and lower access tunnels. [Encl (50)]

31. An emergency oil pressure door is located at the end of the tank gallery in the lower access tunnel. It is designed to automatically close when oil is detected, or it can be closed manually via a nearby push-button. The door provides an oil-tight seal and is designed to withhold the contents of one of the facility's storage tanks in the event of a spill. [Encl (50)]

32. A fire suppression system is installed to mitigate the risk of fire in the upper and lower access tunnels. The system became operational in early 2019, but maintenance did not commence until late 2021. [Encls (53)-(57)]

33. The fire suppression system consists of an alarm sub-system and a suppression sub-system. The alarm system includes any sensor that detects fire or heat. The suppression system includes water, concentrate, and FM-200. FM-200, a fire suppressant, is predominately used in the control room in the underground pump house. The retention pipe is constructed of steel in some sections and polyvinyl chloride (PVC) in others. PVC sections are not compliant with UFC 3-600-1. Some piping material was changed from steel to PVC following initial design approval. [Encls (58)-(61)]

34. After a fire suppression event, the system is designed to collect any dispersed agent, fuel, and water in retention sumps in the tank gallery. The contents of these sumps are then transferred by installed pumps to a fire suppression system retention tank located outside Adit 3. [Encls (54), (58)]

35. (b) (9) [redacted]. [Encls (51), (52)]

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36. Red Hill fuel tanks are approximately 100 feet above the basal groundwater table on the boundary of the Waimalu and Moanalua Aquifer Systems of the Pearl Harbor and Honolulu Aquifer Sectors, respectively. Both aquifers sectors are sources of potable water for several public water systems. [Encls (51), (52)]

37. The Red Hill soil vapor monitoring system and groundwater monitoring wells are used to detect petroleum release. Results are reported to the Hawaii DOH. [Encls (51), (52)]

38. The Red Hill soil vapor monitoring system has sampling ports located below 18 operational tanks. The sampling ports are on the deck of the lower access tunnel. Each port is covered with a metal cover. Sample results are immediately available.[4] [Encls (51), (52)]

39. (b) (9) [redacted]. Samples must be shipped to the mainland for analysis, and results generally take 2-3 weeks.[5] [Encls (51), (52), (63)]

40. (b)(3), 10 USC 130e; (b)(9) [redacted]. [Encls (51), (52)]

Section II: Sequence of Events

6 May Fuel Spill

Overview

41. On 6 May 2021, Red Hill operators improperly executed a fuel transfer procedure, resulting in two piping joint ruptures and a subsequent JP-5 fuel spill.[6] Although unknown at the time, a fire suppression system sump pump transferred most of the fuel into a retention line, where it remained until 20 November 2021. [Encls (64)-(66)]

Timeline

42. Two fuel transfer evolutions were scheduled on 6 May 2021. Both movements were associated with tank tightness testing, which involves filling a tank to its allowable limit and verifying it does not leak. The Navy conducts semiannual tightness testing of each tank at Red Hill, and these tests account for a significant portion of Red Hill fuel movements. [Encls (14), (23), (40), (67)-(69)]

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[4] Soil vapor monitoring samples are tested for volatile organic compounds. Most tanks have a horizontal shallow, medium, and deep sample line. [Encl (52)]

[5] Groundwater monitoring samples are tested for total petroleum hyrdocarbons, volatile organic compounds, polynuclear aromatic hydrocarbons, and lead. [Encl (52)]

[6] Some references and enclosures to this report use the terms "spill" and "release" interchangeably. Consistent with U.S. Code, this report uses the term "spill" for fuel that escapes primary containment and reserves the term "release" for fuel that enters the environment.

43. FLC Pearl Harbor Operations Division develops operations orders to control each fuel evolution. Operations orders provide responsibilities, communication requirements, emergency response procedures, and system lineups for the watch team. Operations Division supervisors approve most operations orders, and the Deputy Fuels Director approves the most complex operations orders. [Encl (68)]

44. Three of the four upper tanks were disconnected from the main JP-5 pipeline on 6 May 2021. Tanks 17 and 18 were out of service for CIR maintenance, and tank 19 is permanently out of, service because its capacity is not required. Tank 19 is used as a "tour" tank. [Encls (68), (70)-(72)]

45. Red Hill tanks are connected to main pipelines by lateral perpendicular piping. When a tank is out of service for CIR, a portion of this lateral piping is removed for isolation and ventilation. The Red Hill tank piping alignment on 6 May 2021 was a result of several concurrent maintenance actions. Tank 19 has been out of service since 1996, tank 17 has been out of service since 2014, and tank 18 was taken out of service in May 2020. [Encls (73), (74)]

46. When tank 18 was taken out of service, the new configuration was not identified as a potential risk to safe operation by FLC Pearl Harbor, NAVFAC Hawaii, or the contractor. Although not common, paired tanks (directly across the main pipeline from each other) have been out of service at the same time without incident. However, having tanks 17, 18, and 19 out of service may be a unique arrangement in the Red Hill tank maintenance history. [Encls (73), (75)]

47. Each Red Hill tank has at least two isolation valves. One is a double block and bleed valve for isolation (also known as the "skin valve" because it is closest to the tank), and the other is a ball valve for throttling flow. Surge tank 2, located in the underground pump house, is primarily isolated by a double block and bleed valve. Surge tank 2 also has a gate valve that isolates it from the pipeline gravity feed header and an additional gate valve that isolates it from the common pump header. The main pipeline has two butterfly valves that throttle flow. Butterfly valves are not intended for isolation, and other inline valves are installed for isolating various portions of the system. [Encls (76), (77)]

48. Personnel conducting fuel transfer evolutions at Red Hill on 6 May 2021 were the primary control room operator (CRO), pump operator, Red Hill rover, and Kuahua rover. [Encl (68)]

49. The CRO is the senior watch stander. He or she is responsible for pump and valve operations, monitoring tank levels and piping pressures, and coordinating with terminal fuel distribution system workers. The CRO uses the computer-based Automated Fuel Handling Equipment (AFHE) system from the control room, located in the underground pump house at Pearl Harbor, to control motor-operated valves throughout Red Hill. [Encls (9), (70)]

50. The pump operator serves as assistant CRO. He or she helps the CRO monitor the AFHE system, makes phone and radio calls, controls some motor-operated valves, and provides general backup to the CRO. [Encls (9), (70), (78)]

51. The Red Hill rover is responsible for roving and monitoring the Red Hill facility. The Kuahua rover is responsible for roving and monitoring the aboveground tanks and fuel distribution system at Pearl Harbor. Both rovers take manual gauge measurements of tank fuel levels and manually operate valves, as necessary. [Encl (79)]

52. At 0745 on 6 May 2021, the night shift CRO, (b) (6), (b) (7)(C), initiated fuel transfer evolution 3. The night shift pump operator was (b) (6), (b) (7)(C). [Encl (80)]

53. Fuel transfer evolution 3 consisted of gravity feeding fuel from tank 12 to surge tank 2, then pumping fuel from surge tank 2 to destination tank 20 for tank tightness testing. The watch team conducted evolution 3 in four increments. [Encl (68)]

54. The operations orders for 6 May 2021 were poorly written and unclear regarding valve operations. For example, operations orders directed the watch team to reposition a list of valves without specifying the desired final position of each valve. Operations orders also directed the watch team to realign the system without specifying the associated valves. Finally, operations orders directed the watch team to close all valves at the end of the evolution, even though this was not the normal position of all associated valves. [Encl (68)]

55. Prior to 0800, (b) (6), (b) (7)(C) relieved as CRO, and (b) (6), (b) continued duties as the pump operator. (b) (6), (b) (7)(C) relieved as Red Hill rover with (b) (6), (b) (7)(C) stationed as Red Hill rover under instruction. (b) (6), (b) (7)(C) relieved as Kuahua rover. They continued fuel transfer evolution 3 from the previous shift. [Encls (80)-(82)]

56. No watch standers reported any unusual conditions during the day shift. [Encl (83)]

57. At approximately 1600, (b) (6), (b) (7)(C) relieved as CRO, and (b) (6), (b) (7)(C) relieved as pump operator. (b) (6), (b) (7)(C) relieved as Red Hill rover, and (b) (6), (b) (7)(C) relieved as the Kuahua rover. They continued fuel transfer evolution 3, pumping fuel from surge tank 2 to tank 20. [Encls (79)-(82), (84), (85)]

58. At 1709, the pump operator secured pumping fuel and isolated surge tank 2 from the pump discharge header. Tank 20 remained aligned to the main pipeline. [Encl (65)]

59. At 1725, contrary to the operations order, the pump operator opened the surge tank 2 pipeline gravity feed valve. Once this valve opened, all valves between tank 20 and surge tank 2 were open except for the inline butterfly valves. This alignment put the full gravity head of tank 20 on the JP-5 pipeline between the upper tank gallery and closed butterfly valves lower in the system. Leakage past the butterfly valves resulted in fuel flowing into surge tank 2. [Encls (64), (65), (73), (76)]

60. At 1735, the pump operator isolated tank 20 by shutting both the associated ball valve and double block and bleed valve. Surge tank 2's fuel level continued to rise due to continued leakage past the butterfly valves. This resulted in a vacuum condition at the top of the pipeline. [Encls (64), (65)]

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61. At 1742, the pump operator isolated surge tank 2 by shutting the pipeline gravity feed valve. Surge tank 2 level stopped rising. Surge tank 2 fuel level had increased a total of 23 barrels (966 gallons), correlating to a 23-barrel vacuum in the pipeline. [Encls (64)-(66), (73)]

62. At 1800, the CRO and pump operator completed fuel transfer evolution 3. Contrary to the operations order, they did not close all valves or return the piping system to its normal configuration once the transfer was complete. This was an intentional procedural shortcut while transitioning between evolutions 3 and 4. [Encls (64), (65), (73)]

63. A review of valve operations recorded in the AFHE system shows that none of the increments of fuel transfer evolution 3 were performed in accordance with the approved operations order. Specifically, watch teams performed each increment differently and did not restore the system to a normal lineup between increments. Additionally, CROs utilized ball valves to isolate the tanks between increments, instead of using double block and bleed valves. [Encl (64)]

64. At 1801, watch standers initiated fuel transfer evolution 4. [Encls (64), (65), (73)]

65. Fuel transfer evolution 4 consisted of gravity feeding fuel from tank 12 to surge tank 2, then pumping fuel from surge tank 2 to destination tank 9 for tightness testing. [Encl (64)]

66. At 1803, contrary to the operations order, the pump operator opened the surge tank 2 pipeline gravity feed valve. Because the watch team did not properly restore the system at the completion of evolution 3, leakage past the butterfly valves again resulted in fuel flowing into surge tank 2. This exacerbated the vacuum condition at the top of the pipeline. [Encls (64), (73)]

67. At 1808, the pump operator isolated surge tank 2 by shutting the pipeline gravity feed valve. Surge tank 2 level stopped rising. Surge tank 2 fuel level had increased to a total of 39 barrels (1,638 gallons) since tank 20 was isolated, correlating to a final 39-barrel vacuum in the pipeline. [Encls (64)-(66)]

68. At 1810, the CRO aligned tank 12 to the pipeline. This caused the 39-barrel vacuum in the pipeline to collapse and exert forces on the system leading to failure of dresser couplings at tanks 18 and 20. [Encls (70), (73)]

69. At tank 18, the coupling and a 500-pound, 6-foot section of pipe separated completely from the piping and landed on the floor of the lower access tunnel. This failure was due to the large and sudden axial force from the vacuum collapse. [Encls (70), (73)]

70. At tank 20, the dresser coupling failed and leaked but did not separate. The failure at tank 20 was due to a bending force caused by the main pipeline moving away from tank 20 by approximately 16 inches. [Encls (70), (73)]

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71. The piping joint failures at tanks 18 and 20 resulted in a JP-5 fuel spill of approximately 18,579 gallons.[7] [Encls (66), (86)]

Incident Response

72. The Red Hill rover was in the gauger station at the time of the incident. He heard a loud noise and immediately informed the CRO. [Encls (65), (73), (79)]

73. As an emergency response, the operations order directed the watch team to stop the fuel transfer, contact the chain of command, and align the system to transfer fuel back to the source tank. [Encl (68)]

74. At 1812, the CRO began isolating tank 12. The CRO verified tank 20 isolation valves closed, and the level in tank 20 was not changing. He determined the spill was from the JP-5 pipeline and not a fuel tank. [Encls (64), (65)]

75. After donning personal protective equipment (PPE), the Red Hill rover walked through the gauger station door, near tank 12, and into the lower access tunnel. He walked through the blast door near tank 18, saw fuel spraying in the vicinity of tank 20, and noted the floor of zone 7 was covered with fuel. [Encl (79)]

76. The Red Hill rover observed the zone 7 sump and fire suppression system sump 1 were filled to their grates with fuel. He heard a pump running, which he assessed was the zone 7 sump pump. He had never heard the fire suppression system sump pumps operate, so he was not able to differentiate between different pumps in the area. [Encl (79)]

77. The Red Hill rover closed the blast door, noting that a small quantity of fuel continued to leak through the door seal into the lower portion of the tunnel. After 5-10 minutes, he noticed fuel was no longer leaking under the door and assessed it was safe to re-enter zone 7. Upon re-entering zone 7, the Red Hill rover saw fuel was no longer flowing from the tank 20 pipe. He reported this observation to the CRO and evacuated the lower access tunnel via Adit 3. [Encls (64), (73), (79)]

78. While not recognized at the time of the incident or during post-incident assessments, the fire suppression system sump 1 pumps ran on 6 May 2021 and transferred up to 16,999 gallons of JP-5 fuel into the fire suppression system retention line.[8] Each of the four sump pumps has a 1,000-gallon per minute capacity, so this transfer could have occurred in less than five minutes. The elevation profile and capacity of the fire suppression system retention line allowed this volume of fuel to remain in the line without reaching the fire suppression system retention tank. [Encls (13), (53), (54), (87)-(89)]

[7] Appendix C provides a detailed summary of fuel quantities spilled, recovered, and potentially released to the environment.

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79. Shortly after the incident, the NAVFAC Hawaii Construction Manager, (b) (6), (b) (7)(C), was informed of the spill by an *APTIM* contractor who was on-site for CIR maintenance. The NAVFAC Hawaii Construction Manager went to Red Hill and contacted an FLC Pearl Harbor Facilities Division general engineer, (b) (6), (b) (7)(C), and the NAVFAC Hawaii Red Hill PMO Director. [Encls (90), (91)]

80. At 1819, a Fuels Department Work Lead directed the pump operator to align valves to drain the JP-5 pipeline to surge tank 2, using the ruptured joint as a vent path. [Encls (65), (92)]

81. At 1905, the pump operator commenced draining the JP-5 pipeline to surge tank 2. He completed this evolution at 1950. [Encl (65)]

82. The Fuels Department Work Lead instructed the CRO to continue informing the chain of command. The CRO then sent the Deputy Fuels Director a text message. Once he saw the text message, the Deputy Fuels Director called the CRO and instructed him to contact the Federal Fire Department. The Deputy Fuels Director attempted to call the Fuels Director, but he was unable to leave a voice message. [Encls (28), (92), (93)]

83. The Deputy Fuels Director called the FLC Pearl Harbor CO and notified him of the spill. The Deputy Fuels Director's initial report included his assessment that the spill was contained, and no fuel was released to the environment. [Encls (13), (28)]

84. At 1937, the CRO notified the Federal Fire Department of the spill. The Federal Fire Department logged the call as a "gasoline or other flammable liquid spill" and dispatched a unit at 1940. [Encls (93)-(95)]

85. That evening, the Fuel Department Bulk Fuel Operations Supervisor called the NOSC Representative, (b) (6), (b) (7)(C), informing him of the spill at Red Hill and explaining it was contained in the lower access tunnel and sumps. No personnel at FLC Pearl Harbor requested assistance from the NOSC Representative for spill response or cleanup. [Encl (96)]

86. The responsibility of the NOSC Representative, as delegated by CNRH, is to oversee the response to actual or potential Navy OHS spills or releases within the CNRH area of responsibility. [Encls (96)-(98)]

87. Per the CNRH OHS Integrated Contingency Plan (ICP), the spilling activity fills functional roles for incident management in the Incident Command System when the spill is small. However, if cleanup is beyond the activity's capabilities, the activity is required to request assistance from CNRH. In those cases, the NOSC Representative fills the role of Incident Commander and oversees a fully staffed CNRH Spill Management Team to manage the response. [Encl (99)]

88. The FLC Pearl Harbor CO, in coordination with the NAVFAC Hawaii CO and CNRH Chief of Staff (COS), determined the spill was contained and within his command's capabilities to respond. Further, he determined no fuel was released to environment. As a result, FLC Pearl Harbor maintained incident management responsibilities. [Encls (51), (96), (100)]

89. At 1955, Federal Fire Department personnel arrived on-scene. [Encl (93), (94)]

90. At approximately 2000, the Fuels Director became aware of the incident when she received a call from the NOSC Representative. The NOSC Representative reported that the Deputy Fuels Director and NAVFAC Hawaii Red Hill PMO Director were both on-scene. [Encls (21), (96)]

91. The Fuels Director then called the Deputy Fuels Director, who informed her the spill occurred due to over-pressurization, and the Red Hill rover was evacuated. The Fuels Director did not go to Red Hill on 6 May 2021 based on a discussion with the Deputy Fuels Director. The Fuels Director was also in contact with the CRO, who was providing information about the amount of fuel recovered. [Encl (21)]

92. The FLC Pearl Harbor CO initially went to the FLC Pearl Harbor Fuels Department building at JBPHH to obtain more information about the incident. He later met the FLC Pearl Harbor XO at the FLC Pearl Harbor headquarters building to discuss reporting requirements. The FLC Pearl Harbor CO, FLC Pearl Harbor XO, and NAVFAC Hawaii CO did not go to Red Hill on 6 May 2021. [Encls (13), (33)]

93. Upon arrival at Red Hill on 6 May, an FLC Pearl Harbor Engineering Technician, (b) (6), (b) (7)(C), checked and gauged the fuel oil reclaimed (FOR) tank (tank 311). At 2030, the level in tank 311 had increased by 722 gallons and was stable. [Encls (21), (54)]

94. From the tank gallery, the Engineering Technician noted that fire suppression system sump 1 was filled to the grate with fuel. He checked the associated sump pump controllers for signs the pumps had activated. He noted they were in automatic mode with no audible indication and no lights illuminated. He also directed an *APTIM* contractor to check the fire suppression system retention tank, which was empty. [Encls (21), (54), (87), (101)]

95. Based on these observations, the Engineering Technician assessed the fire suppression system sump 1 pumps had not activated. If functioning properly, the pumps should have activated with a full sump. [Encls (54), (87), (102)]

96. At approximately 2200, the FLC Pearl Harbor CO, Fuels Director, and Deputy Fuels Director conducted a three-way conference call to coordinate follow-on actions. They agreed reports to Navy leadership and to regulators were required within 24 hours. [Encls (21), (103)]

97. The Deputy Fuels Director visually estimated the amount of fuel spilled in the lower access tunnel was between 1,000 and 1,500 gallons. He recommended delaying cleanup until 7 May 2021, which the FLC Pearl Harbor CO approved. [Encls (21), (103)]

98. A total of 1,580 gallons of fuel was recovered immediately following the 6 May 2021 spill.[9] [Encl (86)]

[9] Appendix C provides a detailed summary of fuel quantities spilled, recovered, and potentially released to the environment.

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External Reporting

99. The 6 May 2021 Red Hill spill met requirements for a NAVSUP Immediate Commander's Critical Information Requirements (CCIR) report. Contrary to these requirements, FLC Pearl Harbor failed to make the required voice report within one hour and the written report within two hours. FLC Pearl Harbor made a voice report to NAVSUP at 0844 on 7 May 2021 and sent the required CCIR report at 1710 on 7 May 2021. [Encls (13), (22), (29), (104), (105)]

100. The 6 May 2021 Red Hill spill also met the requirements for a CNRH CCIR, specifically an immediate voice or e-mail report to the Regional Operations Center (ROC). FLC Pearl Harbor did not make any reports to the ROC. [Encls (105), (106)]

101. Additionally, any incident that could garner negative media interest also requires an OPREP-3 Navy Blue voice report within five minutes and message within one hour, as well as CCIR reports to both NAVSUP and CNRH. FLC Pearl Harbor transmitted an OPREP-3 Navy Blue at 080450ZMAY21 (1950 local time on 7 May 2021). [Encls (106)-(108)]

102. Local media, monitoring police scanners, became aware of the Federal Fire Department response at Red Hill and contacted the CNRH Public Affairs Officer (PAO), (b) (6), (b) (7)(C) (b) (6), (b) (7)(C). [Encl (109)]

103. After receiving a phone call from the CNRH PAO at approximately 2000 on 6 May 2021, CNRH COS contacted the FLC Pearl Harbor CO to inquire about the response at Red Hill. The FLC Pearl Harbor CO was aware of an incident but was unable to provide many details. CNRH COS then notified the CNRH; the NAVFAC Hawaii CO; and the PACFLT Director of Government Affairs, (b) (6), (b) (7)(C). [Encl (109)]

104. The FLC Pearl Harbor CO and NAVFAC Hawaii CO subsequently informed CNRH and CNRH COS that the spill was from a ruptured piping joint and that the spill was contained. The FLC Pearl Harbor CO and NAVFAC Hawaii CO assessed there was no need to immediately contact regulators since there was no release to the environment. CNRH COS and the Pacific Fleet (PACFLT) Director of Government Affairs agreed that formal notification could be made the following morning. [Encls (33), (109)]

105. Early on the morning of 7 May 2021, prior to senior Navy leadership or congressional delegate notification, local media reported a fuel spill at Red Hill of approximately 1,000 gallons. [Encls (33), (43), (100), (109)-(111)]

106. At approximately 0700, the FLC Pearl Harbor CO ordered the Fuels Director to take the lead on notifications. The Fuels Director prepared a draft OPREP-3 message and a NAVSUP Immediate CCIR report with assistance from the NOSC Representative; the FLC Pearl Harbor Fuels Intern, (b) (6), (b) (7)(C); and the FLC Pearl Harbor XO. [Encls (17), (21), (96), (112)]

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107. Between 0830 and 0840, the FLC Pearl Harbor CO made required incident notifications. He left a voicemail report to COMNAVSUP. He then successfully made voice reports to the NAVSUP COS, NAVSUP N4, and CNRH COS. [Encl (113)]

108. At 0844, the FLC Pearl Harbor XO made a voice report to the NAVSUP Logistics Operations Center. [Encl (113)]

109. At 1006, the FLC Pearl Harbor CO emailed COMNAVSUP a link to the local media release and stated "All released fuel was contained within the tunnel and recovered. No fuel was released into the environment." This assessment was based on visual observations alone. NAVFAC Hawaii was unable to conduct soil vapor or groundwater monitoring until 10 May 2021, due to safety concerns. [Encls (105), (114)]

110. On 7 May 2021, the Hawaii DOH On-Scene Coordinator, (b) (6), (b) (7)(C), called the NOSC Representative to ask why he had not notified her of the spill. The NOSC Representative told (b) (6), (b) (7)(C) there was no release to the environment, so reporting was not required. [Encl (96)]

111. At 1323, based on information provided by FLC Pearl Harbor and CNRH, COMPACFLT (Acting), RADM Stephen Koehler, emailed COMINDOPACOM and CNO, stating: "...the design of the lower access tunnel and the piping within prevents release to the environment via a network of drains and sumps...there was NO release to the environment." He also stated: "EPA reports no concerns due to no release to the environment...CNRH will initiate root cause analysis/investigation and facilitate repair of failed piping." [Encl (111)]

112. On 7 May 2021, FLC Pearl Harbor Fuels Department reported to DLA that less than 1,000 gallons of fuel spilled. [Encl (115)]

Post-Incident Assessment

113. On 7 May 2021, FLC Pearl Harbor conducted an operational pause. This event was focused on damage assessment and cleanup. It was not focused on determining the cause of the incident or conducting training. [Encl (116)]

114. On 7 or 8 May 2021, a FLC Pearl Harbor Facilities Division Engineering Technician contacted the fire suppression system contractor, *Kinetix*, to request an inspection of the fire suppression system. Fire suppression system sump 1 remained filled with fuel. During the inspection, *Kinetix* concluded the pumps had not activated based on checking the *Gamewell* control panel, which is designed to record system activity. However, following the 20 November 2021 spill, *Kinetix* contractors assessed that the direct digital controller was not properly communicating with the *Gamewell* control panel. [Encls (54), (87)]

115. Fuels Manager Defense (FMD) is DLA Energy's accountable property system of record for processing transactions at DFSPs. FLC Pearl Harbor Control Division personnel manually input tank level data into FMD daily. They compare AFHE levels to manual soundings, and if there is

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a discrepancy greater than or equal to 3/16 of an inch, the manual reading is used. [Encls (88), (117)]

116. On 7 May 2021, the Deputy Fuels Director directed the Control Division accounting team to conduct a post-spill inventory reconciliation. They noted that the AFHE system recorded a drop in tank 12 fuel level of 19,983 gallons between 1801 and 1818 on 6 May 2021. Additionally, a loss of 20,139 gallons was recorded in FMD for all JP-5 evolutions on 6 May 2021. [Encls (88), (118), (119)]

117. On 7 May 2021, FLC Pearl Harbor Facilities Division engineers determined the volume of spilled fuel was equal to the volume of the main pipeline and cross piping above the damaged dresser coupling at tank 20. They calculated this volume as 1,016 gallons. At this point, they did not know the tank 18 dresser coupling was also damaged, because it was behind a maintenance partition. [Encl (120)]

118. Facilities Division engineers were aware of the level drop in tank 12, but this was a significantly larger volume of fuel than they visually observed during post-incident assessment. They concluded most of the fuel went into available space in the pipeline. However, a detailed review of AFHE data for valve lineups, tank levels, and head pressures shows that the system lineup could not have accommodated this amount of fuel. [Encls (14), (22), (28), (53), (88), (117), (119), (121), (122)]

119. On 12 May 2021, the FLC Pearl Harbor CO emailed COMNAVSUP, reporting the total quantity of fuel recovered was 557 gallons. He stated: "Levels in the sump tank have been holding steady to confidently state 557 as the quantity of the release."[10] This was the last total reported to him by the Deputy Fuels Director. [Encls (111), (123), (124)]

120. On 12 May 2021, the FLC Pearl Harbor Fuels Director transferred without a relief. [Encl (125)]

121. The following week, an FLC Pearl Harbor Facilities Division general engineer, (b) (6), (b) (7)(C) (b) (6), (b), discovered the dresser coupling for tank 18 had also been damaged during the 6 May 2021 incident. This discovery prompted a recalculation of the spilled fuel based on the volume of the main pipeline and cross piping above the damaged dresser coupling. They calculated this volume as 1,618 gallons. [Encls (126), (127)]

122. On 26 May 2021, the FLC Pearl Harbor Control Division Supervisory Management Analyst, (b) (6), (b) (7)(C), created a memorandum for the record (MFR) documenting a total inventory loss of 20,139 gallons in the FMD accountable property system of record. The MFR stated, "Per Operation Controller…this evolution was cancelled and did not occur. The 19,983 gallons was put into the pipeline and not accounted for inside any tank." [Encl (119)]

123. Based on the Facilities Division engineering assessment on 17 May 2021, a volume of 1,618 gallons was accounted for as spilled, and a volume of 18,521 gallons was accounted for as having remained in the pipeline.

[10] While FLC Pearl Harbor uses the word "release," he continues to assess no fuel has made it to the environment.

The inventory discrepancy was reported to the Deputy Fuels Director, who reported this to the FLC Pearl Harbor CO. However, the FLC Pearl Harbor CO did not recall this report. [Encls (13), (86), (118), (119), (121)]

124. FLC Pearl Harbor's final determination from 6 May 2021 was 1,618 gallons spilled, with 1,580 gallons recovered. The FLC Pearl Harbor CO was not involved in any discussions regarding the final amount of fuel spilled. [Encls (13), (86), (119)]

125. On 10 May 2021, the FLC Pearl Harbor ED directed the FLC Pearl Harbor Business Department Director, (b) (6), (b) (7)(C), to conduct a formal Management Inquiry into the events surrounding the spill and damages on 6 May 2021. (b) (6), (b) (7)(C) was instructed to conduct a thorough inquiry into all the circumstances connected with the fuel spill, "including a review of operational methods, operating documentation, preventive maintenance, and more importantly a detailed review of the AFHE information." The ED's memorandum directed the inquiry be limited to findings of fact and not include opinions or recommendations. The Business Department Director completed his inquiry on 28 May 2021. However, contrary to the ED's direction, the inquiry did not examine AFHE information or Fuels Department operations. [Encl (64)]

126. On 12 May 2021, CNRH asked COMNAVSUP to conduct an external investigation into the events of 6 May 2021. He noted there was significant damage and had concerns about FLC Pearl Harbor's ability to conduct an adequate internal investigation. [Encls (109), (128)]

127. On 13 May 2021, COMNAVSUP appointed Naval Petroleum Office (NPO) Deputy Officer in Charge (OIC), (b) (6), (b) (7)(C), to conduct a command investigation into the facts and circumstances surrounding the 6 May 2021 fuel spill at Red Hill. The order noted that FLC Pearl Harbor was conducting its own administrative review and NAVFAC (Engineering and Expeditionary Warfare Center) EXWC was conducting a root cause analysis of the incident. The appointing order further instructed (b) (6), (b) (7)(C) to conduct a review, validation, and consolidation of the FLC Pearl Harbor and NAVFAC EXWC efforts, in addition to the NAVSUP Headquarters-level investigation of the incident. The completed report, including opinions and recommendations, was due by 10 June 2021. This deadline was extended to 30 June 2021. [Encls (70), (129)]

128. COMNAVSUP appointed the NPO Deputy OIC as the investigating officer, because the NPO OIC was conflicted, having already been appointed in March 2021 to investigate an FLC Pearl Harbor personnel matter. [Encls (130)-(132)]

129. On 28 May 2021, the FLC Pearl Harbor Business Department Director issued a memorandum to the NPO Deputy OIC providing the findings of his Management Inquiry. The synopsis of the findings stated, based on the evidence collected from employee interviews and analysis of documents and records, that the Fuels Department received a rating of SATISFACTORY (with minor concerns) in the inquiry's three focus areas: (1) records management, (2) training and qualifications, and (3) inspections and preventive maintenance. The FLC Pearl Harbor Business Department Director noted the inquiry was not meant to be a root cause or technical analysis of the fuel release. The inquiry's focus was to ensure personnel

are properly trained and to document whether inspections and preventive maintenance were conducted. [Encl (64)]

130. During the investigation that followed the 6 May 2021 spill, the NAVFAC Hawaii CO directed one of his civilian engineers, (b) (6), (b) (7)(C), to validate the amount of fuel lost. He shared concerns with (b) (6), (b) (7)(C) that the calculations were based on an incorrect assumption that the pipeline was not pressurized, and therefore, the loss calculation was too low. However, he did not revisit this concern until October, after the NPO Deputy OIC amended his investigation. [Encls (33), (70), (133), (134)]

131. On 10 June 2021, (b) (6), (b) (7)(C) validated the calculations of the FLC Pearl Harbor Facilities Division engineers. He concluded that the calculations were reasonable for a static system; however, he said these would not have been correct if the plant was pressurized. The NAVFAC Hawaii Red Hill PMO Director informed (b) (6), (b) (7)(C) the pumps were off and the plant was not pressurized. This was confirmed by the FLC Pearl Harbor Facilities Division engineers. [Encl (70)]

132. On 25 June 2021, the NPO Deputy OIC submitted his investigation report. The investigation focused on determining the cause of the 6 May 2021 fuel spill, how much was released, and the impact of the release on the environment. It noted each objective of the appointing order was met with the exception of validating the work of the engineering root cause analysis contracted by NAVFAC EXWC, which was not complete at that time. As part of the NAVSUP investigation, he interviewed a number of FLC Pearl Harbor personnel, including CROs, Red Hill rovers, and supervisory staff. [Encl (135)]

133. The NAVSUP investigation did not reveal a directly attributable cause for the 6 May 2021 fuel spill. The report stated that additional engineering analysis was needed. [Encl (70)]

134. The NAVSUP investigation concurred with FLC Pearl Harbor's assessment of the quantity of fuel spilled on 6 May 2021. The NPO Deputy OIC, working with FLC Pearl Harbor Facilities Division engineers, determined 1,618 gallons spilled and 1,580 gallons were recovered. He concluded 37.9 gallons were released to the environment. The FLC Pearl Harbor CO was not aware of the 37.9 gallons released to the environment until after his change of command in August. On 1 October, NAVFAC Hawaii Environmental Business Line Leader, (b) (6), (b) (7)(C), forwarded a memorandum to the Hawaii DOH reporting 1,618 gallons spilled and 1,580 gallons recovered. [Encls (65), (66), (71), (135), (136)]

135. The NPO Deputy OIC did not critically assess the known 20,139-gallon discrepancy in the FMD ledger or the imbalance report that showed a similar discrepancy. He concluded both reports were unreliable, because the system can take days to account for missing fuel. As a result, he determined the information was irrelevant and did not include either report in his investigation. [Encls (65), (66), (71), (118), (135), (137)]

136. Between 26 and 30 July 2021, the Fuels Department implemented and trained on a "point and call" process for controlling major valve operations. Specifically, one operator points to the step in the operations order and announces their intention to take that action. A second operator

is present to provide backup.Fuels Department personnel continue to refine this process based on operator feedback. As of September 2021, operations orders also include a table with initial blocks for each valve operation and verification. [Encls (116), (138)]

137. In August 2021, the new FLC Pearl Harbor CO and Fuels Director questioned the 6 May 2021 fuel spill calculations. Based on a discussion with the FLC Pearl Harbor Lead Regional Fuel Engineer, (b) (6), (b) (7)(C), they accepted his explanation that the drop in tank 12 was consistent with fuel being repacked into the main pipeline. [Encls (14), (22)]

138. On 7 September 2021, NAVFAC EXWC Technical Director, (b) (6), (b) (7)(C), issued a memorandum to the NPO Deputy OIC providing the results of a root cause analysis of damage during the 6 May 2021 event conducted by *Austin Brockenbrough and Associates, LLC*, a priyate engineering and consulting firm. Per NAVSUP guidance, the FLC Pearl Harbor CO was unable to release the root cause analysis report to the Fuels Department. FLC Pearl Harbor Fuels Department operators and engineers did not know the root cause of the 6 May 2021 spill until training conducted during an operational pause following a pressure transient event on 29 September 2021. The training consisted of one slide that focused on the operator error and mitigations implemented by the command. [Encls (73), (139)]

139. On 15 September 2021, the NPO Deputy OIC issued an amendment to his investigation to incorporate the engineering root cause analysis. The analysis concluded the double block and bleed valve of tank 12 was opened, and a rapid inflow of fuel resulted in the collapse of a vacuum created by operator error. The resulting pressure wave displaced the piping, damaged the dresser couplings, and resulted in a level decrease of 473 barrels (19,866 gallons) in tank 12. The only recommended corrective action was to reinforce training on operations orders. The investigation did not evaluate the effectiveness of the operations orders, training, and qualifications. Additionally, the investigation did not address the 19,866-gallon discrepancy or recommend accountability actions. [Encls (135), (140)-(142)]

140. Neither the NPO Deputy OIC nor FLC Pearl Harbor supervisors reviewed AFHE data to determine which operators incorrectly operated the valves that resulted in the JP-5 pipeline vacuum condition. As a result, FLC Pearl Harbor leaders held the CRO accountable who re-pressurized the pipeline, but failed to note that many of the valves that created the vacuum condition were operated by the pump operator (albeit under the supervision of the CRO). [Encl (135)]

141. In October 2021, after the root cause analysis and NAVSUP command investigation was finalized, the NAVFAC Hawaii CO reiterated his concerns with the previous spill calculations, this time to the FLC Pearl Harbor CO. He was concerned the system was pressurized and the calculations were based on the system being under static conditions. The FLC Pearl Harbor CO informed the NAVFAC Hawaii CO that the extra fuel was repacked into the main pipeline and that this was validated by the NAVFAC Hawaii Red Hill PMO Director. [Encls (33), (133)]

Environmental Impact

142. Potential pathways to the environment in the area of the 6 May 2021 spill are three soil vapor monitoring ports in the upper tank gallery and at least six imperfections in the concrete. Specifically, the soil vapor monitoring port covers are not oil-tight, the soil vapor monitoring port cover for tank 20 was not properly secured during the spill and cleanup, and small imperfections exist in the fuel oil recovery trench and concrete floor. [Encls (35), (54), (143)]

143. Soil vapor monitoring identified elevated levels of total volatile organic vapors for tanks 17, 18, and 20, due to some fuel entering the ports during cleanup. NAVFAC Hawaii removed contaminated soil from all three soil vapor monitoring ports. The elevated levels tapered off over the following 50 days, returning to levels consistent with historic measurements. However, the tank 17 soil vapor monitoring shallow port has had intermittent increases in volatile organic vapors since the event. Of note, tanks 17 and 18 do not currently contain fuel, and there are no indications that tank 20 is compromised. [Encls (144), (145)]

144. NAVFAC Hawaii increased the sampling of their soil vapor monitoring ports from quarterly to daily for the week following 6 May 2021, and then weekly for the following four weeks. [Encls (146), (147)]

145. Total petroleum hydrocarbons diesel for Red Hill groundwater monitoring well 02 has historically been detected at elevated concentrations but below the 50 percent Site-Specific Risk Based Levels. These results are reported quarterly to Hawaii DOH. However, concentrations have increased since the events of 6 May 2021 for Red Hill groundwater monitoring well 02 above the 50 percent Site-Specific Risk Based Levels. [Encl (144)]

146. Between 4-8 June 2021, total petroleum hydrocarbons oil and grease for Red Hill ground water monitoring well 03 increased above the Environmental Action Level. All follow-on samples were below the Environmental Action Level. [Encls (144), (148)]

Independent Third-Party Assessment

147. As part of the post-incident assessment, NAVFAX EXWC contracted *Austin Brockenbrough and Associates, LLC*, a private engineering and consulting firm, to conduct a root cause analysis of this incident. That analysis is consistent with the investigation team's assessment outlined in the timeline above. [Encl (73)]

148. The investigation team requested an independent verification of the quantity of fuel spilled on 6 May 2021 from *Austin Brockenbrough and Associates, LLC*. That analysis is consistent with the investigation team's calculations. [Encl (149)]

29 September Pressure Surge

Overview

149. On 29 September 2021, personnel at Red Hill observed indications of a pressure surge in the F-24 pipeline during a fuel transfer evolution. The FLC Pearl Harbor CO conducted an operational pause, and during a review of data over the past year, Fuels Department engineers determined pressure surges are more common than previously thought. FLC Pearl Harbor put corrective actions in place to monitor for and mitigate pressure surges, but this phenomenon is not fully understood and requires further analysis. [Encls (68), (84), (150)]

Timeline

150. At approximately 0800 on 29 September 2021, [redacted] relieved as the day shift CRO, and [redacted] relieved as the assistant CRO. [redacted] and [redacted] relieved as the Red Hill rovers. [Encls (83), (151)-(153)]

151. The CRO initiated fuel transfer evolution 2 at 0836 on 29 September 2021. This evolution consisted of transferring F-24 fuel from Red Hill tank 4 to Hickam Airfield. Reconstructed AFHE information shows a pressure indicating transmitter (PIT) located inside the underground pump house read 34 psig just prior to commencing the evolution. Due to an approximate [redacted] elevation change from Red Hill to the underground pump house, the F-24 pipeline static condition pressure at this PIT should never fall below 46-48 psig. Any pressure below this range indicates there is some degree of vacuum in the pipeline (or the instrument is inaccurate). The exact pressure for creating a vacuum in this part of the system depends on the specific gravity of fuel in the pipeline and the valve lineup. [Encls (150), (154)]

152. At 0838, the CRO opened the tank 4 isolation ball valve, then the associated double block and bleed valve. [Encls (68), (155)]

153. Similar to 6 May 2021, the operations orders for 29 September 2021 were unclear regarding valve operations. For example, while the operations order listed the tank 4 double block and bleed valve prior to the ball valve, the valve operations were not required to be completed in that order. [Encls (68), (156)]

154. As the double block and bleed valve opened, the PIT recorded a rapid pressure increase from 33 psig to 125 psig. [Encls (150), (154)]

155. At the same time, two *ENGlobal* contractors and one Red Hill rover who were working in the lower access tunnel heard a loud noise and felt the pipe shake. The Red Hill rover, [redacted], reported this noise to the CRO. [Encls (83), (84), (150), (153), (154)]

156. The CRO instructed the other Red Hill rover, [redacted], who was near Adit 5, to report to the location of the noise. He arrived at the lower access tunnel shortly thereafter, and the contractors informed him the loud noise was in the vicinity of tanks 7 and 8. [Encl (83)]

157. The two Red Hill rovers immediately inspected the entire Red Hill F-24 line, tanks, and valves for visual damage or a fuel spill. Upon completion, they reported to the CRO there was no evidence of damage or abnormal conditions. [Encls (83), (152), (153)]

158. The CROs secured the fuel transfer evolution, informed their work supervisors of the event, and then notified the Fuels Director and Deputy Director. [Encls (28), (151)]

159. The Bulk Operations Supervisor directed the Hotel pier Person in Charge, (b) (6), (b) (7)(C), to go to Red Hill and investigate the reported noise. After conducting a walkthrough and inquiring with several contractors, he reported to his supervisor he did not see anything abnormal. [Encl (84)]

160. On 29 September 2021, the Fuels Director informed the FLC Pearl Harbor CO about the reported noise at Red Hill. On 30 September 2021, the Fuels Director updated the FLC Pearl Harbor CO and reported a pressure surge occurred. The FLC Pearl Harbor CO ordered an operational pause to investigate the incident, and the Deputy Fuels Director submitted a request to DLA for AFHE data to analyze the event. FLC Pearl Harbor Fuels Department received AFHE data on 1 October 2021. [Encls (28), (150), (157)]

Assessment

161. The defuel pipeline at Hotel pier, which received pressure relief from all three fuel pipelines, was taken out of service without a formal engineering analysis and/or procedural modifications. After taking the defuel pipeline out of service, operators left some mainline valves open to allow thermal relief to tank 301 and into the surge tanks. These actions were taken without engineering analysis and were based on informal guidance from Operations Division supervisors. [Encls (138), (158), (159)]

162. On 1 October 2021, FLC Pearl Harbor Facilities Division engineers conducted a post-event review and discovered that the night shift CROs from 22-24 September 2021 operated multiple underground pump house valves to equalize a perceived dangerous differential pressure in the F-24 pipeline. No operations orders directed these actions. They assessed that these valve operations may have contributed to creating a vacuum condition at the top of the F-24 pipeline. Additionally, they assessed the Red Hill tank double block and bleed valve should be fully open prior to opening the Red Hill tank ball valve. However, they required AFHE data from DLA to validate their analysis. [Encls (68), (150)]

163. The Fuels Director and Deputy Fuels Director conducted a walkthrough of Red Hill on 1 October 2021. They observed a low pressure condition in all three fuel pipeline PITs, ranging from 33-43 psig. The Fuels Director notified the FLC Pearl Harbor CO and expressed concern that these conditions were potentially similar to the conditions that resulted in the 6 May 2021 spill. [Encls (22), (160)]

164. On 12 October 2021, after analysis of the requested AFHE data, FLC Pearl Harbor Facilities Division engineers concluded that the sequence of opening the tank 4 ball valve before the double block and bleed valve led to the pressure surge. Additionally, they evaluated data

from 2020 for comparison and concluded the rapid vacuum collapse did not occur when the valve sequence was followed correctly. They also discovered that night shift personnel routinely cycled valves outside of the underground pump house without operations orders to equalize pressures throughout the system. AFHE data also indicated pressure surges had occurred frequently during normal plant operations at Red Hill in all pipelines. [Encls (53), (126), (154), (161), (162)]

165. On 15 October 2021, FLC Pearl Harbor Operations Division updated operations orders to direct specific valve sequences and added notes to ensure the double block and bleed valve is opened prior to the ball valve. [Encl (68)]

External Reporting

166. On 3 October 2021, the FLC Pearl Harbor CO emailed COMNAVSUP, informing him that a pressure surge caused by a vacuum collapse had occurred on the pipeline in Red Hill. He reported that he had completed an inspection of the tanks, pipeline, and valves for damage but noted no damage or spills. He also reported he had secured all Red Hill operations while his team investigated the cause of the pressure surge but was able to meet near-term mission requirements via the Pearl Harbor and Hickam Field aboveground tank facilities. The FLC Pearl Harbor CO also emailed CNRH reporting the operational pause, also conveying that he was able to meet all current mission requirements. [Encls (162)-(164)]

167. On 8 October 2021, the FLC Pearl Harbor CO reported to COMNAVSUP that he was resuming Red Hill operations and that operator error was not the cause of the pressure surge. He stated that the root cause of pressure surges at Red Hill was vacuum migrating from the pipelines outside the underground pump house into the Red Hill pipeline. His report further explained that the vacuum migration was caused by movement of valves outside the underground pump house to equalize pressure, that the actions creating the vacuum had been identified and stopped, that the operations orders were revised, and that he was comfortable the risk was mitigated. He resumed Red Hill operations on 8 October 2021. [Encls (68), (150), (165)]

Corrective Actions

168. FLC Pearl Harbor implemented corrective actions for the pressure surge on 4-5 October 2021. Specifically, they adjusted pressure alarm setpoints, updated existing operations orders, and conducted internal training with CROs. The training covered updated operational procedures and provided direction not to operate valves in the underground pump house to equalize pipeline pressures, which had become a common practice. [Encls (116), (154)]

169. FLC Pearl Harbor Fuels Department engineers and NAVFAC engineers established pressure alarm set points and developed a procedure to equalize pressure throughout the system without causing vacuum conditions in the pipeline. [Encls (161), (165)]

170. *ENGlobal* technicians calibrated existing PITs to alert watch standers to indications of vacuum conditions. [Encls (161), (165), (166)]

171. On 11-14 October 2021, FLC Pearl Harbor Fuels Department conducted training with Red Hill operators on valve opening and closing procedures and monitoring PIT settings. The command also conducted an operational pause for personnel training related to the 6 May 2021 fuel spill and 29 September 2021 pressure surge incidents. This training did not discuss the importance of correct sequencing of valve operations. [Encl (116)]

172. FLC Pearl Harbor did not request assistance from an independent third party to evaluate the 29 September 2021 pressure surge. The FLC Pearl Harbor CO reported to COMNAVSUP he was comfortable with mitigation measures put in place in the operations orders. However, NAVFAC EXWC determined additional analysis is recommended to ensure appropriate corrective actions have been implemented. [Encls (165), (167)]

Independent Third-Party Assessment

173. NAVFAC EXWC is contracting *Austin Brockenbrough and Associates, LLC,* a private engineering and consulting firm, to conduct an engineering analysis to determine the root cause of the vacuum conditions and pressure surge that occurred on 29 September 2021. [Encl (167)]

20 November Fuel Spill and Release to the Environment

Overview

174. On 20 November 2021, the Red Hill rover inadvertently struck a fire suppression system retention line drain valve with the passenger cart of a train, cracking the PVC pipe near Adit 3. Although not known at the time, this retention line contained up to 16,999 gallons of JP-5 fuel from the 6 May 2021 spill. A portion of this fuel was released to the environment and ultimately entered the Red Hill well and the Navy water distribution system. [Encls (33), (54), (83), (168), (169), (170), (172)]

Timeline

175. At approximately 1600 on 20 November 2021, (b) (6), (b) (7)(C) relieved as swing shift CRO, and (b) (6), (b) (7)(C) relieved as swing shift assistant CRO. (b) (6), (b) (7)(C) relieved as a swing shift Red Hill rover, and (b) (6), (b) (7)(C) commenced his second shift of the day as the second Red Hill rover. [Encls (78), (83), (153), (171)]

176. There is a 3.5-ton train with an attached passenger cart in the lower access tunnel. The train travels the length of the lower access tunnel from tanks 15 and 16 to Adit 1, in addition to the Adit 3 Y. The rovers utilize the train to conduct physical checks and collect samples in the lower access tunnel. [Encls (83), (172)]

177. At approximately 1650, the Red Hill rover was driving a train from the Red Hill lower tank gallery toward the Adit 2 Y while conducting pipeline checks. He passed a fire suppression system low point drain valve near the ventilation control door, which is normally closed

(see Figure 1). He slowed the train to a stop and disembarked to open the door. He noted nothing abnormal as he got back on the train and drove through the doorway. [Encls (83), (168), (169)]

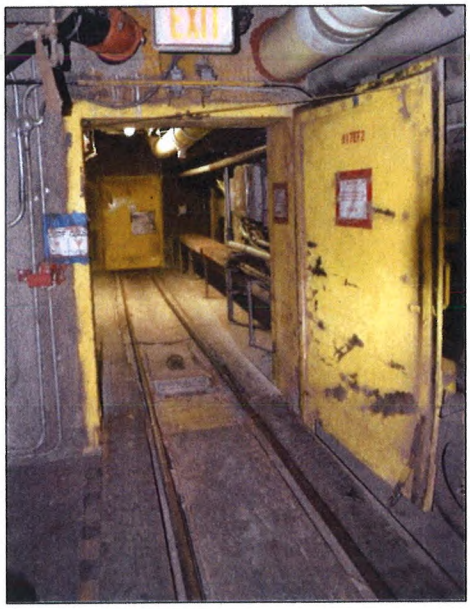

Figure 1: Image of open oil-tight door (foreground) and closed ventilation door on either side of the damaged fire suppression system low point drain valve. [Encl (169)]

178. After driving through the doorway, he again stopped the train and disembarked to close the ventilation control door. As he turned to close the door, he discovered liquid spraying from the low point drain of the fire suppression system retention line. He reported the leak immediately to the CRO. He recognized the source was a non-fuel system, first reporting it was from a sewage line, then fire suppression agent, then water. Finally, he reported the leak as water with a fuel smell. This line should have been empty. [Encls (83), (173)-(186)]

179. The low point drain valve cracked as a result of the train striking it. A preliminary investigation conducted by FLC Pearl Harbor concluded excessive speed may have been a factor; however, no definitive evidence confirmed this. Red paint was found to be missing on the valve hand wheel, and red paint was found on the top of the passenger cart. Various interviewees suggested lateral movement of the train while driving, or that downward deflection of the pipe or pipe supports over time due to the weight of fuel in the line, may have contributed. [Encls (14), (19), (22), (162), (172)]

180. The Red Hill rover described the flow of the leak to the CRO as being the equivalent of four safety showers on "full blast" at one time. During the emergency response, the Red Hill rover attempted to stop the spill and was doused with fuel. [Encl (78)]

Incident Response

181. The CRO contacted FLC Pearl Harbor Fuels Department Engineering Technician, (b) (6), (b) (6), (b) (7)(C), and reported water leaking out of the fire line. The Fuels Department Engineering Technician immediately called the emergency line for the contractor responsible for fire suppression system maintenance, *Hawaii Kinetix*. *Kinetix* dispatched a technician. [Encl (54)]

182. Shortly after the first report to the CRO, the Red Hill rover reported that the leak smelled like fuel. The assistant CRO directed the Red Hill rover to attempt to identify what kind of liquid was coming from the pipe. [Encls (78), (83), (171)]

183. At the scene, the Red Hill rover closed the ventilation door leading to the lower section of Adit 3. This did not prevent the flow of fluid from entering the section of the tunnel down-gradient from the leak, due to a gap between the bottom of the door and the deck. The rover also unplugged the train to prevent any potential for a spark. He then attempted to locate a fire suppression system isolation valve to stem the flow of what he assessed as a fuel/water mixture, but was unable to find one. Meanwhile, the leak's location near an exhaust fan resulted in fuel vapors being blown into the outside environment. The Red Hill rover considered securing the exhaust fan next to the leaking low point drain, but he did not. [Encls (22), (78), (83)]

184. The second Red Hill rover arrived on-scene, but both Red Hill rovers left shortly thereafter due to the buildup of fumes. Both Red Hill rovers exited via Adit 3. After exiting, the first Red Hill rover washed his eyes with water, because they were burning. He then re-entered Adit 3 and ascended to the upper tunnel via the elevator. He located and closed a fire suppression system supply line isolation valve at Adit 6 in the Red Hill upper tunnel, which had no effect on the leak. [Encl (83)]

185. The fuel continued to flow from the fire suppression system retention line low point drain down the tunnel, filling the train track all the way down to the Adit 3 Y. At the Adit 3 Y, the flow split toward the Harbor Tunnel in one direction and Adit 3 in the other (see Figure 2). The fuel trickled to a stop further down the Harbor Tunnel and filled the Adit 3 groundwater sump near the end of the Adit 3 tunnel. [Encl (83), (187)]

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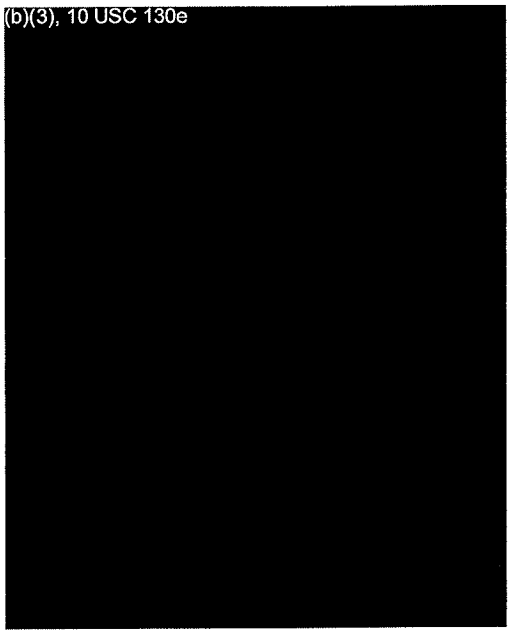

Figure 2: Image of tunnel split at the Adit 3 Y. [Encl (188)]

186. The Red Hill Response Plan provides procedures for responding to a catastrophic fuel leak at Red Hill. The plan was finalized in August 2020 and consists of four sections: (1) the Red Plan, (2) the Main Plan, (3) Scenario Tabs, and (4) Appendices. The Red Plan directs actions that FLC Pearl Harbor personnel must take in the event of a catastrophic fuel leak emergency at Red Hill. The Main Plan provides general information about Red Hill and the surrounding environment. The Scenario Tabs outline two different scenarios: a worst case discharge and a maximum most-probable discharge. The Appendices provide supporting information, to include notification lists, financial responsibility, spill information log, etc. [Encl (51)]

187. Although FLC Pearl Harbor did not formally activate this plan on 20 November 2021, the FLC Pearl Harbor CO referred to it, and many of the required actions happened. Of note, the plan does not address securing the Red Hill well. [Encl (189)]

188. CNRH, FLC Pearl Harbor, and NAVFAC Hawaii were generally aware of this plan, but had not practiced it and had a low understanding of plan details. [Encls (43), (57), (109), (189)-(191)]

189. If a fuel leak cannot be immediately stopped or controlled, the CNRH Red Hill Response Plan directs personnel to de-energize the sump pump at Adit 3 and to check the outlet for fuel (Section RP 2.2, step 1). The Red Hill rover was forced to evacuate the area due to spraying fuel and did not de-energize the sump pump motor controller. [Encls (51), (83)]

190. The CNRH Red Hill Response Plan does not specify any response requirements associated with the nearby collection, holding, and transfer (CHT) pumps or any other equipment in the Adit 3 tunnel. [Encl (51)]

Marking Removed

191. The Deputy Fuels Director, monitoring operations via a radio from home, overheard reports to the CRO. Once he heard reports of a fuel smell, he ordered the CRO to secure all fuel transfer operations and to call the Federal Fire Department. The Deputy Fuels Director contacted the Fuels Director, who notified the FLC Pearl Harbor CO of the incident. The Deputy Fuels Director arrived on-scene shortly thereafter. [Encl (28)]

192. When the Deputy Fuels Director departed his home to go to Red Hill, he knew he was responding to a fuel spill, not a water leak. [Encl (57)]

193. At 1718, the CRO contacted the Federal Fire Department. Federal Fire Department assets were dispatched at 1720 and arrived at 1735. Federal Fire Department personnel noted a fuel odor at the entrance of Adit 3. A small team entered the tunnel and assessed the leak was not contained, as fuel continued to spill. The Federal Fire Department then took air quality readings and established additional ventilation while FLC Pearl Harbor employees unsuccessfully attempted to isolate the leak. [Encls (78), (192)]

194. After exiting Adit 6, the first Red Hill rover met his supervisor. They went to Adit 3, where the Red Hill rover gauged the FOR tank (tank 311), finding no significant increase. Additionally, they checked the fire suppression system retention tank and found that it contained no fuel. Shortly afterward, the first Red Hill rover met with the Deputy Fuels Director and representatives from the Federal Fire Department. [Encl (83)]

195. Prior to Federal Fire Department assets arriving, the NAVFAC Hawaii Red Hill PMO Director arrived at Red Hill. Unaware of the ongoing incident, he was informed by the gate guard that there was an active spill incident. The guard redirected him to a different entrance gate. While driving through an adjacent neighborhood to the second gate, he detected a strong smell of fuel. He arrived at the Adit 3 entrance shortly thereafter. [Encl (193)]

196. At approximately 1745, the Deputy Fuels Director arrived on scene. During the drive to Red Hill, he smelled fuel from the H-3 interstate and, upon arrival, concluded the smell was coming from Red Hill. [Encls (22), (194)]

197. A Fuels Department Engineering Technician arrived at JBPHH at approximately 1800, where he obtained a work truck and PPE prior to driving to Red Hill. While on the drive to Red Hill, he fielded phone calls from *Kinetix* and the CRO. *Kinetix* personnel stated they do not respond to fuel leaks. [Encl (54)]

198. A Fuels Department Engineer, (b) (6), (b) (7)(C), arrived at approximately 1800 and entered the lower access tunnel from the direction of Adit 5. He smelled fuel upon entering the ventilation room where the leak was in progress. He became covered in fuel after slipping and falling to the deck. He sustained minor chemical burns and left the scene, but he did not need further medical attention. [Encls (53), (57)]

199. Between 1800 and 1815, the Deputy Fuels Director arrived at Adit 3. He considered himself the person in charge of the scene from that time forward. [Encl (57)]

200. At approximately 1815, the FLC Pearl Harbor CO coordinated with his XO prior to going to the underground pump house to review the response plan. The XO remained at the FLC Pearl Harbor headquarters building to assist with incident reporting. [Encl (189)]

201. The Fuels Department Engineering Technician relieved the first Red Hill rover so he could go home and shower due to a burning and itching sensation on his skin. After taking several showers, (b) (6), (b) (7)(C) went to the emergency room at (b) (6) for treatment. [Encls (54), (83), (195)]

202. The FLC Pearl Harbor CO learned in the early morning hours of 21 November 2021 that the Red Hill rover went to the hospital after being covered with fuel. [Encl (189)]

203. While the Federal Fire Department was establishing ventilation in Adit 3, the Fuels Department Engineering Technician accessed the lower access tunnel via Adit 5. He checked the low point drain of the fire suppression system retention pipeline at the main sump and found fuel in the line. He also isolated two valves in the fire suppression system retention line near the oil-tight door in the lower access tunnel. He then returned to the leak location where Federal Fire Department and FLC Pearl Harbor personnel were completing the safety evaluation. [Encl (54)]

204. Once the atmosphere was deemed safe, the Fuels Department Engineering Technician went past the fuel leak and secured power to the motor controllers for the CHT sump pumps and the groundwater sump pump near Adit 3. One of two CHT sump pumps is out of commission. After seeing fuel flowing into the CHT sump, he repositioned sand bags that were around the CHT sump to restrict flow into the sump. [Encls (54), (196)]

205. After securing all sump pumps and closing associated discharge valves, fuel began to fill both sumps. Prior to securing power to the motor controllers, the Fuels Department Engineering Technician observed both pumps running. [Encl (54)]

206. During the response, Fuels Department personnel notified the NAVFAC Utilities Management (UM) Water Supervisor of the spill, and he responded to the scene. Upon arrival, he opened the door to the Red Hill well shaft and noted there was no fuel inside the door. He closed the door and left Red Hill shortly thereafter. [Encls (28), (197), (198)]

207. At approximately 1930, the FLC Pearl Harbor CO received updates indicating that the spill was not exclusively water. He then called the NAVFAC Hawaii CO to convey that information. [Encls (14), (33), (189), (199), (200)]

208. Between 2000 and 2030, the NAVFAC Hawaii Red Hill PMO Director received reports that the source of the leak was a sump discharge line, not a fire main. [Encl (200)]

209. The FLC Pearl Harbor CO arrived at Adit 3 at approximately 2145. Shortly thereafter, he learned that the fluid was fuel and called the NAVFAC Hawaii CO to inform him. The NAVFAC Hawaii CO decided to go to Red Hill. [Encls (14), (191), (200)]

Marking Removed

210. At 2157, the Federal Fire Department certified that the scene was safe to enter and informed responders that they did not have the capacity to assist with cleanup efforts. They departed the scene at 2215. [Encls (57), (168), (192), (201)]

211. At approximately 2230, the NAVFAC Hawaii CO arrived at the scene. [Encls (33), (191)]

212. Someone at the scene filled a water bottle with the leaking liquid and passed it to the team. Leadership on-site, including the FLC Pearl Harbor CO, the NAVFAC Hawaii CO, the Fuels Director, and the NAVFAC Hawaii Red Hill PMO Director assessed it was fuel. [Encls (22), (28), (189), (191)]

213. The FLC Pearl Harbor CO, the NAVFAC Hawaii CO, and the NAVFAC Hawaii Red Hill PMO Director entered the tunnel to observe the source of the leak. After walking the length of the fire suppression system retention line and noting its connection to fire suppression system sump 1, it became clear the fuel in the pipeline originated from the 6 May 2021 spill. [Encls (14), (53), (189)]

214. FLC Pearl Harbor CO and NAVFAC Hawaii CO traced the fire suppression system retention line to assess what happened and how much liquid could be in the line. They estimated the volume as approximately 20,000 gallons. The FLC Pearl Harbor CO later made a voice report to CNRH. The volume of the fire suppression system retention line was later calculated to be 42,680 gallons. [Encls (14), (33)]

215. The NAVFAC Hawaii CO's biggest concerns were the groundwater sump pump and the CHT sump in Adit 3. He asked about this directly and was informed that FLC Pearl Harbor personnel had secured the pumps immediately. He was also told that the sump pump discharge location had been inspected to confirm the pumps had not activated. [Encls (33), (191)]

216. The FLC Pearl Harbor CO knew the spill on 20 November 2021 occurred in a part of the tunnel that does not normally contain fuel, and he assessed that the only risk of a release to the environment outside of Adit 3 was via the groundwater sump pump. He understood the groundwater sump contained one working pump, installed temporarily, that pumped groundwater to a leach field below the fire suppression system retention tank. The pump actually discharges to a holding tank. [Encls (14), (292)]

217. During the incident on 20 November 2021, the FLC Pearl Harbor CO received conflicting reports about the groundwater sump. Some reports indicated the pump was secured immediately, pumping only water from the bottom of the sump. Other reports estimated the pump may have been on service for up to three hours. Because of the uncertainty in this reporting, on the next day, he ordered Fuels Department personnel to examine a specific area around Adit 3 based on his incorrect understanding of where the discharge line ended. Personnel checked that area down to the Halawa stream for any evidence of a release and did not discover anything. [Encls (14), (189)]

218. The FLC Pearl Harbor CO remained uncertain as to whether the groundwater sump pump discharged fuel until 9 December 2021, when investigators opened the isolation valve and

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discovered fuel in the discharge line. This confirmed for the CO that the pump ran and discharged fuel. There is no evidence that he communicated this uncertainty to senior leaders between 20 November 2021 and 9 December 2021. [Encls (57), (189)]

219. That night, the FLC Pearl Harbor CO and the NAVFAC Hawaii CO were not aware of any other connections or penetrations in the Adit 3 ground water sump or in other areas of the Adit 3 tunnel. [Encls (14), (33), (189), (191)]

220. The FLC Pearl Harbor CO and Deputy Fuels Director were not concerned about the CHT sump, because they believed the sand bags had been in place around it prior to the incident. [Encl (189)]

221. The focus for both the FLC Pearl Harbor CO and the NAVFAC Hawaii CO was recovering spilled fuel that they assessed was being bounded within sumps in the tunnel. Because they considered the spill contained at this point, they agreed that any effort to actively stop the source of the spill was an unnecessary risk to personnel and might have exacerbated the spill. [Encls (14), (33), (189)]

222. FLC Pearl Harbor Fuels Department provided vacuum trucks, and NAVFAC Hawaii provided drivers because FLC Pearl Harbor operators had exceeded allowable work limits. [Encls (22), (84), (168), (197)]

223. Throughout the night and into the next morning, FLC Pearl Harbor and NAVFAC Hawaii personnel filled and off-loaded vacuum trucks multiple times. An initial attempt to draw fuel directly from another low point drain was unsuccessful. [Encls (189), (203)]

224. By the early afternoon of 21 November 2021, FLC Pearl Harbor Fuels Department personnel erected a catchment below the still-leaking valve with a hose to direct fuel away from the ventilation fan and toward the Adit 3 sump area to facilitate continued recovery via vacuum truck. The leak had continued for approximately 21 hours after the event started before the rate of flow from the pipe allowed personnel to erect the catchment. [Encls (19), (92), (189)]

225. On 21 November 2021 at 1104, FLC Pearl Harbor gave verbal authorization to NAVFAC Hawaii to contract for cleanup services. [Encl (168)]

226. At approximately 1600, the cleanup contractor was on-site to conduct drain down of the fire suppression system retention pipeline and sumps and cleaning and rinsing of Adit 3. [Encls (92), (168)]

227. On 22 November 2021 at 0313, FLC Pearl Harbor capped the fire suppression system retention pipeline low point drain when the flow had reduced to a manageable level. FLC Pearl Harbor personnel continued monitoring the site. [Encl (168)]

228. On 22 November 2021 at 1000, the cleanup contractor was demobilized from the site. [Encl (168)]

229. On 28 November 2021, CNRH secured the Red Hill well following reports of a fuel smell in the Navy drinking water. [Encls (43), (189)]

230. The cleanup focused on the area of the spill inside Adit 3, as the cleanup contract did not include CHT and groundwater systems outside the tunnel. Cleanup of these areas was not addressed prior to a rain event on 6 December 2021 that resulted in flooding in the tunnel. [Encls (54), (189)]

231. On 21 December 2021, the FLC Pearl Harbor CO issued standing orders that secured fuel transfers at Red Hill and directed Fuels Department to obtain his permission for any simultaneous fuel transfers. [Encl (204)]

External Reporting

232. The 20 November 2021 spill met the requirements for a COMNAVSUP routine CCIR and a CNRH immediate CCIR, which requires immediate voice or e-mail reports to the ROC. Additionally, emergencies at Red Hill trigger reporting requirements per COMNAVREGHINST 3440.18, to include notifications to CNRH within 15 minutes of the incident and to PACFLT within 30 minutes of the incident. [Encls (104), (106), (168), (205)-(208)]

233. The CNRH ROC called CNRH COS at approximately 1730 and informed him that the Federal Fire Department had responded to Red Hill. CNRH COS then called the FLC Pearl Harbor CO, who informed him there was an ongoing leak at Red Hill that appeared to be water from a fire main. CNRH COS subsequently called the NAVFAC Hawaii CO, who reported the same information. CNRH COS informed the PACFLT Director of Government Affairs, who asked him to notify Congressional Delegates (CODELs) and regulators. [Encls (109), (199)]

234. Although initial responders knew the spill was mostly fuel, the FLC Pearl Harbor CO and NAVFAC Hawaii CO understood it to be water, based on the first reports they received. At 1815, they participated in a group text with the CNRH COS and informed him that the spill in progress at Red Hill was water. [Encls (14), (33), (109), (189), (199)]

235. At 1840, the NAVFAC Hawaii Red Hill PMO Director called the NOSC representative to notify him of a fire main break at Red Hill. The NAVFAC Hawaii Red Hill PMO Director relayed that only water spilled and asked the NOSC representative if they were required to report the incident. The NOSC representative advised a report was not required for a water spill. The NAVFAC Hawaii Red Hill PMO Director told the NOSC representative it did smell like fuel, but this was because the water was entering sumps and causing agitation. The NOSC representative also assessed the tunnel always smelled like fuel. [Encls (32), (35), (96), (168)]

236. At 1942, by direction from the NAVFAC Hawaii CO, the NAVFAC Hawaii Red Hill PMO Director texted the CNRH NOSC representative: "Please notify Hawaii DOH about the fire main break at Red Hill." Talking points were summarized as no required notification, no environmental issues or fuel leaks, and fire suppression line leak causing loss of pressure and the Federal Fire Department automatic response. The NAVFAC Hawaii Red Hill PMO Director

indicated that the reason for reporting was a desire to over communicate, not because a formal report was required. [Encl (209)]

237. At 1958, the FLC Pearl Harbor CO received updates indicating that the spill was not exclusively water. He then called the NAVFAC Hawaii CO with these updates. The NAVFAC Hawaii CO recommended CNRH COS wait on reporting to Hawaii DOH in order to gain additional information. [Encls (14), (33), (109), (189), (200)]

238. The NAVFAC Hawaii CO relayed the decision to wait on Hawaii DOH reporting to the NAVFAC Hawaii Red Hill PMO Director. He, in turn, relayed the message to the CNRH NOSC representative, who had not yet made a report. [Encls (32), (33), (35), (96), (200)]

239. The NOSC representative received no further communications until 2321, when he received a text from the NAVFAC Hawaii Red Hill PMO Director asking for Hawaii DOH contact information. The CNRH NOSC representative provided the number for the Hawaii DOH On-Scene Coordinator. The CNRH NOSC representative was never informed that the spill at Red Hill contained anything other than water with a smell of fuel. [Encls (96), (209)]

240. At the CO's direction, FLC Pearl Harbor XO made voice reports to the JBPHH CDO, PACFLT CDO, and the CNRH ROC between 2000 and 2015. [Encls (106), (168), (205)]

241. At 2130, while the FLC Pearl Harbor CO was in the Red Hill control room, CNRH COS requested an update from him and the NAVFAC Hawaii CO in a group text message communication. The FLC Pearl Harbor CO replied that personnel were still working to secure the spill and that he was enroute to Adit 3. [Encl (200)]

242. At approximately 2145, the FLC Pearl Harbor CO arrived at Red Hill. [Encls (14), (191), (200)]

243. Between 2230 and 2330, both the FLC Pearl Harbor CO and the NAVFAC Hawaii CO were at Red Hill, and response efforts were underway. During this time both, COs knew that the leak was fuel and not water. [Encls (22), (189), (191)]

244. At approximately 2330, the FLC Pearl Harbor CO and NAVFAC Hawaii CO made a voice report update to CNRH and CRNH COS. The report discussed recovery efforts and the contents of the fluid. The FLC Pearl Harbor CO and NAVFAC Hawaii CO believe that they communicated that the fluid was mostly fuel. [Encls (189), (191), (199)]

245. CNRH and CNRH COS understood the 2330 report to mean that the fluid was water with a smell of fuel and that it was contained in the tunnel. The FLC Pearl Harbor CO later stated, in retrospect, that he may have used the word "contained," but intended to communicate that the spill was "stable and manageable." [Encls (43), (109), (189), (191)]

246. Also at approximately 2330, the NAVFAC Hawaii Red Hill PMO Director notified Hawaii DOH, with concurrence from the FLC Pearl Harbor CO and NAVFAC Hawaii CO, reporting a water leak with the potential of fuel. [Encl (33)]

247. Between 2330 and 0650, response efforts continued at Red Hill, and no other external reports were made. [Encls (43), (193), (210), (211)]

248. At 0650 on 21 November 2021, the NAVFAC Hawaii CO emailed talking points to CNRH for a follow-up conference phone call with the FLC Pearl Harbor CO, NAVFAC Hawaii CO, and CNRH COS. Talking points included, "...the fluid in the line appears to have fuel in it." During the call, CNRH received the voice report that the leak was mainly fuel. [Encls (43), (210), (211)]

249. At 0917, the FLC Pearl Harbor XO emailed COMNAVSUP stating, "At this time, an unknown amount of fluid leaked out of the line and has been contained within the tunnel," and, "Continue ongoing rigorous environmental sampling to confirm that all fluid was contained and is not affecting the environment or groundwater. At this time, there are no indications of fluid releasing to the environment or into the groundwater." The e-mail did not mention fuel. [Encls (207), (212)]

250. At 1000, CNRH emailed the PACFLT Deputy Commander(DCOM), RADM Blake Converse, stating, "The leak occurred roughly (b)(3), 10 USC 130e downhill of the actual fuel tanks in the lower access tunnel and on the way to the tunnel leading to the underground pump station near the Harbor...All the fluid has been contained within the tunnel...It was originally reported as predominately water yesterday, becoming more fuel laden this morning, indicating that water and fuel may have separated over time in the pipe," and "There are no indications of this fluid releasing into the environment, including the groundwater." [Encls (168), (203), (213)]

251. At 1013, the FLC Pearl Harbor XO forwarded CNRH's 1000 update to the PACFLT DCOM to COMNAVSUP. The update reported the leak consisted of a fluid mixture that appeared to have fuel in it, with the amount of fuel unknown and being quantified. [Encl (214)]

252. On the morning of 21 November 2021, CNRH toured Red Hill with the FLC Pearl Harbor CO. During the tour, the CO informed CNRH that the spill was contained in the tunnel and the tracks. Additionally, the CO stated that he was concerned about the groundwater sump pump, as it led to the Halawa stream, but he did not believe this was an issue since the pumps were secured. During this visit, CNRH became aware that a significant amount of fuel on 6 May 2021 had been accounted for as having gone back into the pipeline. The FLC Fuels Department Deputy Director now believed that fuel went into the fire suppression system return line and was the source of the fuel on 20 November 2021. [Encl (43)]

253. At 1545 on 21 November 2021, FLC Pearl Harbor transmitted an OPREP-3 Navy Blue. The OPREP-3 did not state that the fluid spilled contained fuel or that there were any personnel injuries. [Encls (104), (106), (108), (215)]

254. On 21 November 2021, CNRH informed the media that a spill of "14,000 gallons of a mix of water and fuel" occurred from the fire suppression system drain line at Red Hill. [Encl (216)]

255. On 23 November 2021, FLC Pearl Harbor Fuels Department reported to DLA that approximately 22,230 gallons of fuel-water mixture, including wash-down water, was recovered.

Additionally, they reported two employees were injured, homeowners in the area reported an odor of fuel, and there was no known fuel release to the environment. [Encl (170)]

256. There is no evidence that the FLC Pearl Harbor CO communicated to senior leaders that he was uncertain as to whether the groundwater sump pump ran on the night of 20 November 2021, potentially releasing fuel to the environment. [Encls (43), (109), (189), (206)]

Environmental Impact

257. There were five main pathways to the environment from the spill location at Adit 3 in the lower access tunnel: (1) penetrations in the lower access tunnel floor, (2) imperfections in the concrete floor, (3) the hume line drainage system, (4) two CHT sumps, and (5) the Adit 3 groundwater sump.[11] [Encls (33), (54)]

258. The source of the spill was directly adjacent to a recirculation fan that atomized the fuel and spread it within the lower access tunnel. A small amount of fuel evaporated in the facility. [Encls (22), (33)]

259. On 20 November 2021, fuel traveled down-gradient between the train tracks and split in two directions at the Adit 3 Y. The majority of the fuel flowed to Adit 3, and a small amount flowed down the harbor tunnel. [Encl (58)]

260. Fuel detected in the Red Hill well following the spill on 20 November 2021 was evaluated as JP-5. [Encls (217), (218)]

Penetrations in the Adit 3 Tunnel Floor

261. Penetrations in the Adit 3 tunnel floor include ports to the CHT sump, ports to the hume line drainage system, and other areas where construction altered the original design in the tunnel. There are at least seven penetrations between the source of the spill and the end of the Adit 3 tunnel. [Encls (25), (219)]

262. These penetrations are up-gradient from the Red Hill well. [Encl (58)]

263. A small quantity of fuel entered the environment via this pathway. [Encl (58)]

Imperfections in the Concrete Floor

264. As the fuel travelled down-gradient in the depression between the train tracks to the Adit 3 Y, a small amount entered the environment via cracks and imperfections in the tunnel floor concrete. [Encls (54), (220)]

265. These imperfections are up-gradient from the Red Hill well. [Encl (58)]

[11] Appendix D provides a flowchart of pathways to the environment from the spill location on 20 November 2021.

Hume Line Drainage System

266. The hume line drainage system is a 6-inch pipe that runs beneath the lower access tunnel and leads to the groundwater sump. The line runs the length of Adit 3 from the Adit 3 Y to the groundwater sump. The upper portion of the pipe is permeable and allows groundwater to enter the pipe and flow into the sump to reduce hydraulic impact on the concrete floor. Additionally, a floor drain in the vicinity of the drinking water well pumps and is designed to collect water and feeds into the hume line drainage system. The hume line drainage system intersects the path of the Red Hill water development tunnel, which is approximately 80 feet below. [Encls (36), (58), (221)]

267. Red Hill was built on native basalt, which is highly permeable. Water percolates through even the most dense lava flows because of the significant number of cooling cracks and myriad individual flows compromising the rock mass. Water typically percolates downward, with little diversion along successive strata, until it reaches the basal water level. [Encl (222)]

268. To date, Mobile Diving Salvage Unit personnel recovered 140 gallons of fuel from the surface of the Red Hill well. This occurred after the well was secured on 28 November 2021. [Encl (58)]

269. Some fuel entered into the hume line drainage system on 20 November 2021 via penetrations and imperfections in the concrete floor. [Encls (35), (58)]

270. Most of the fuel that entered the hume line drainage system on 20 November 2021 came from the groundwater sump. Specifically, once the sump filled with fuel from the tunnel to a level above the hume line drainage connection, fuel was pushed back into the drainage system and then into the environment. [Encls (35), (58)]

271. Portions of the hume line drainage system are up-gradient from the Red Hill well. [Encl (58)]

272. A significant amount of fuel entered the environment after being pushed back into the hume line drainage system via the groundwater sump. [Encl (58)]

CHT Sumps

273. Some of the fuel that flowed to Adit 3 collected in two CHT sumps. Based on the time between the onset of the spill and a Fuels Department Engineering Technician securing power to the motor controller, the CHT sump pump was on service, and likely running, for approximately two hours. Some fuel in the CHT sumps was pumped to a CHT holding tank located outside of Adit 3 before power was secured to the pumps. [Encls (54), (58), (223)]

274. The 2 CHT pumps are rated at 50 gallons per minute and are float-activated. Only one of two CHT pumps was operational. Both CHT pumps lift to a holding tank outside of Adit 3. NAVFAC Hawaii empties the CHT holding tank approximately two weeks by a vacuum truck. If the holding tank overflows, it overflows directly into the soil above Adit 3. [Encls (54), (58)]

275. Fuel pumped from the CHT sump to the CHT holding tank on 20 November 2021 remained in the holding tank until 6 December 2021, when heavy rain led to runoff and flooding of the Adit 3 tunnel. The flood water filled the CHT sump and was subsequently pumped to the CHT holding tank, causing it to overflow. The overflow (consisting of fuel, sewage, and water) either entered the ground as it flowed downhill toward Adit 3 or was carried by the continuing surface water runoff back into Adit 3, where it reentered the CHT sump and the Adit 3 ground water sump. [Encls (54), (202)]

276. The CHT sump and associated systems are down-gradient from the Red Hill well. [Encl (58)]

277. FLC Pearl Harbor recovered 148 gallons of fuel from the CHT holding tank after 6 December 2021. [Encl (54)]

Groundwater Sump

278. The majority of fuel that flowed toward Adit 3 collected in the groundwater sump. There are four pathways for fuel to leave the groundwater sump: (1) being pumped via the installed sump pump to the groundwater holding tank, (2) being pushed back into the hume line drainage system, (3) cracks and imperfections in the concrete floor and walls, and (4) removal via vacuum truck. [Encls (58), (221), (223)]

279. Based on the time between the onset of the spill and a Fuels Department Engineering Technician securing power to the motor controller, the groundwater pump was on service and likely running for approximately two hours. Fuel and groundwater entered the groundwater sump and was pumped to a groundwater holding tank. [Encl (58)]

280. The groundwater sump pump is rated at 50 gallons per minute and is float-activated. [Encl (58)]

281. The groundwater sump pump lifts to a concrete holding tank with a capacity of approximately 2,300 gallons. The concrete holding tank is connected to a concrete leaching pit that leaches into a field near Halawa Stream. Neither tank is intended for fuel containment. [Encls (54), (224), (202)]

282. Several thousand gallons of fuel entered the groundwater sump. A majority of the fuel in the sump was recovered via vacuum truck through the night of 20 November 2021 and the following two days. Some fuel in the sump was pumped to the groundwater holding tank outside Adit 3 that connects to the leach pit near Halawa stream. An undetermined amount of fuel entered the environment via the leach pit. Some fuel also entered the environment via cracks and imperfections in the floor and walls of the sump. [Encls (54), (58), (189)]

283. A perched aquifer is a pocket of water that sits directly below ground level, but is separated from the basal aquifer (i.e., drinking water) by a layer of clay. Groundwater monitoring well 06 sits in the vicinity of the groundwater sump leach pit and samples water from the perched aquifer there. [Encls (225), (226)]

284. In late December, *AECOM* investigators detected a fuel odor in groundwater monitoring well 06. At the time of this report, *AECOM* is setting conditions to sample the perched aquifer. [Encl (225)]

285. The groundwater sump and associated systems are down-gradient from the Red Hill well. [Encl (58)]

286. The total fuel recovered from the groundwater holding tank and its associated piping leading from the groundwater sump is 1,369 gallons. [Encl (54)]

Total Fuel Recovered

287. Immediately after the spill from the fire suppression system retention line on 20-21 November 2021, FLC Pearl Harbor personnel collected 12,311 gallons via vacuum truck from Adit 3, the Adit 3 groundwater sump pump discharge line, and the FORFAC sump line. [Encl (227)]

288. During the week of 6 December 2021, FLC Pearl Harbor drained 843 gallons of fuel that was remaining in the fire suppression system retention line. [Encl (227)]

289. From 6-7 December 2021, a rainstorm flooded the Red Hill lower access tunnel near Adit 3. This generated a fuel and water mixture that collected in the CHT sump. The CHT sump pump automatically pumped the fluid to a septic holding tank outside Adit 3. FLC Pearl Harbor recovered 148 gallons of fuel from the CHT holding tank. [Encl (227)]

290. Additionally, FLC Pearl Harbor and other recovery teams recovered 375 gallons of fuel from the Adit 3 ground water sump discharge line and from the Red Hill well shaft. [Encl (227)]

291. The total fuel recovered, including fuel recovered on 6 May 2021, is 15,257 gallons. [Encl (227)]

292. Up to 3,322 gallons of JP-5 remain unrecovered. Due to integrity concerns in the fire suppression system retention line, the system has not been flushed. There is likely a small amount of fuel remaining in the fire suppression system retention line. [Encls (66), (189), (228)]

Independent Third-Party Consultation

293. The inspection team met with *AECOM*, an engineering consulting firm that performs environmental monitoring at Red Hill under NAVFAC contract, to obtain hydrologic expertise and to compare methodologies and findings to date. *AECOM* is contracted to perform an environmental assessment of the 20-21 November 2021 fuel release. The *AECOM* assessment is ongoing. [Encl (225)]

294. The inspection team met with *GSI North America, Inc.*, a contractor with fuels construction and environmental services experience, to discuss methodology and findings to date. *GSI North America, Inc.* is under contract to provide an independent assessment of how fuel went from the

Navy fuel system into the Red Hill well, as well as engineering and technical consultation in support of analysis and recovery of the Red Hill well and water distribution system. The *GSI North America, Inc.* assessment is ongoing. [Encls (229), (230)]

Section III: Red Hill Operations

Personnel

295. FLC Pearl Harbor CO is a major command ashore billet coded for a Supply Corps CAPT (O-6). Officers must complete an administrative screening process to be eligible for major command, and the Chief of Supply Corps approves all command and milestone assignments. [Encls (231)-(234)]

296. The FLC Pearl Harbor XO billet is coded for a Supply Corps CDR (O-5). There is no administrative screening for this assignment. [Encl (15)]

297. Prospective FLC COs and XOs attend leadership training at Navy Leadership and Ethics Center (NLEC), and prospective COs normally attend a senior leader legal course. Neither receive any training specific to their prospective FLC or fuels management. There is no requirement that either COs or XOs have any previous fuels experience. [Encls (17), (235)-(238)]

298. The FLC Pearl Harbor Fuels Director billet is coded for a Supply Corps LCDR (O-4). There are two paths to qualify as an FLC Fuels Director: (1) a two-year Supply Corps Internship under a NAVSUP Fuels Director and a follow-on fuels tour at a smaller DFSP,[12] or (2) earning an MBA with a certificate in Petroleum Management from the University of Kansas. FLC Fuels Directors, are then screened through an application process. [Encls (239), (240)]

299. The FLC Pearl Harbor Deputy Fuels Director is coded for a civilian GS-14. The Deputy Fuels Director is required to have comprehensive knowledge and skill in bulk fuels management, to include the safe receipt, issues, handling, and storage of petroleum products to manage a complex fuel facility. [Encls (27), (28), (241)]

300. Including the Fuels Director and Deputy Fuels Director, the Fuels Department has 118 available billets. DLA funds 88 of these billets. Key management billets are currently filled, with a total of 15 other billets unfilled. Vacancies in the Operations Division account for 10 of the unfilled billets. [Encls (242), (243)]

301. FLC Pearl Harbor Fuels Department operators typically work 16 hours or more overtime per week. [Encls (78), (79), (84), (151), (244)-(247)]

[12] A Supply Officer who completes an internship will conduct a Fuels Director tour at NAS Rota, Spain; NAS Sigonella, Italy; NSA Souda Bay, Greece; NSF Diego Garcia; or COMLOGWESTPAC (Singapore) prior to becoming a Fuels Director at FLC Pearl Harbor.

302. For fiscal year 2022, FLC Pearl Harbor formally requested DLA fund an additional 35 positions. [Encls (248), (249)]

303. A Shore Manpower Requirements Determination has not been conducted for FLC Pearl Harbor. [Encl (241)]

304. Prior to 6 May 2021, a fuel transfer operation watch section typically consisted of at least one WG-11 primary CRO, one WG-09/WG-08 pump operator, one Kuahua rover, and one Red Hill rover. After the 6 May 2021 incident, Fuels Department added an assistant CRO and an additional Red Hill rover. [Encls (68), (250), (251)]

Qualifications, Continuing Training, and Self-Assessment

Qualifications

305. New employees at FLC Pearl Harbor attend new employee orientation given at the Human Resource Support Center, which includes a brief about the history and overall mission of FLC Pearl Harbor. Personnel also receive safety training, a familiarization tour of the facility, and are assigned a mentor until they have successfully completed the qualification standard for the work center and grade they were hired. [Encl (9)]

306. Fuels Department operators qualify for watch stations by on-the-job training and job-specific qualification checklists that they complete with a senior operator. The qualification checklist consists of computer-based training and on-the-job training, and includes both knowledge factors and skills demonstrations. Fuels Department operators are approved for qualification by the Bulk Fuels Operations. [Encls (84), (252)]

307. The Fuels Department operators are qualified by an oral board convened by other qualified operators, the Bulk Fuels Operations Supervisor, and a work lead. There are no written examinations or final performance tests to qualify as a Fuels Department operator. [Encls (84), (252), (253)]

308. FLC Pearl Harbor does not mention auditable records of completed qualification checklists. [Encl (254)]

Continuing Training

309. Continuing training for CROs and rovers is computer-based training via Enterprise Safety Applications Management System (ESAMS), on-the-job training, and classroom training with instruction given by senior operators. Required job-specific training includes AFHE training (DLA contracted initial and annual training) and Underground Storage Operator training. There are no examination events to assess training effectiveness. [Encls (9), (70), (84), (139)]

310. Training, other than required ESAMS training, has not been conducted since February 2020. AFHE training has not been conducted at the command since 2019 due to COVID-related travel restrictions. FLC Pearl Harbor did not implement mitigating factors for the delayed training. [Encls (70), (139)]

311. The Clean Water Act, amended by the Oil Pollution Act of 1990, requires all facilities to train and exercise in order to respond to oil spills. All Fuels Department operators are required to participate in an annual spill response exercise, unless they are on approved leave or for a medical condition. Annual spill response drills are conducted on the piers, but they are not conducted at Red Hill. In the event of a spill, the CRO's responsibility is to secure the evolution and inform the chain of command. Operations orders and the Fuel Department Operation, Maintenance, Environmental, and Safety Plan include the operators' pre-planned responses. Pre-planned responses are the same for all spills: secure the evolution, inform the chain of command, and drain the effected portion of the system (if required). [Encls (32), (68), (78), (83), (152), (255)]

312. Fuels Department operators have not participated in formal training on the fire suppression system. Rovers only know how to turn "on and off" the manual valves for the fire suppression system concentrate. [Encls (83), (153), (245)]

Self-Assessment

313. FLC Pearl Harbor does not have an internal monitoring process to evaluate the effectiveness of qualifications and continuing training. [Encl (14)]

314. FLC Pearl Harbor Fuels Department does not conduct post-event reviews or have a program to share event lessons learned to all operators. [Encls (57), (84), (85)]

315. On 7 May 2021, the Deputy Fuels Director directed the Control Division accounting team to conduct a post-spill inventory reconciliation. On 26 May 2021, the FLC Pearl Harbor Control Division Supervisory Management Analyst, (b) (6), (b) (7)(C), created an MFR documenting a total inventory loss of 20,139 gallons in the FMD accountable property system of record. However, while knowing this information, the command did not perform any further analysis to determine if fuel had been lifted to the fire suppression system retention line, including checking for fuel at the low point drains. [Encls (88), (118), (119)]

316. On 10 May 2021, the FLC Pearl Harbor ED directed the FLC Pearl Harbor Business Department Director, (b) (6), (b) (7)(C), to conduct a formal Management Inquiry into the events surrounding the spill and damages on 6 May 2021. Contrary to specific guidance from the ED, the FLC Pearl Harbor Business Department Director did not conduct a detailed review of the AFHE information or Fuels Department operations. Additionally, the analysis did not include an assessment of the adequacy of the training and qualifications, and only focused on meeting regulatory requirements. [Encl (64)]

317. FLC Pearl Harbor did not conduct a causal analysis of the spill on 6 May 2021. Instead, the command relied on the external NAVSUP investigation. Neither the NPO Deputy OIC nor

FLC Pearl Harbor supervisors reviewed AFHE data to determine which operators incorrectly operated the valves that resulted in the JP-5 pipeline vacuum. As a result, the FLC Pearl Harbor leadership held the CRO accountable who pressurized the pipeline, but failed to note that many of the valves that created the vacuum condition were operated by the pump operator (albeit under the supervision of the CRO). [Encls (84), (135), (256)]

318. On 1 October 2021, the FLC Pearl Harbor CO suspended operations to determine the cause of an unexpected pressure surge. The FLC Pearl Harbor CO resumed operations on 8 October 2021 based on preliminary reporting and a working hypothesis of the cause. However, Facilities Division engineering analysis was ongoing and had not conclusively determined the cause. [Encls (139), (150), (154), (163), (165)]

Independent Third-Party Comparison

319. The investigation team consulted with *Signature Flight Support*, the company that provides private and general aviation fuel support for Honolulu International Airport, to better understand industry standards for qualifications, continuing training, and self-assessment. *Signature Flight Support 's* processes are more robust than those at Red Hill. [Encl (257)]

320. *Signature Flight Support* provides incoming personnel a six-month qualification program. Initial training and qualification consists of computer-based training; on-the-job training and a written test in each functional area; and a one-on-one performance review with the training supervisor at 30 days, another supervisor at 60 days, and the Operations Manager at 90 days. Additionally, there is a final written examination covering all areas and a four-day performance evaluation. A full-time Training Manager oversees the qualification and training program. Training is based on regulatory requirements. [Encl (257)]

321. *Signature Flight Support* maintains a facility response plan coordinated with the Hawaii Fuel Facilities Corporation (HFFC) Board, Aviation Services, and Environmental Response Management. They conduct an annual incident response event, as well as less stringent quarterly drills. The USCG conducts a "no notice" drill approximately every two years. [Encl (257)]

322. *Signature Flight Support* initiates a root cause analysis for any abnormal operating condition, safety concern, workplace injury, or any spill of one gallon or more that is not maintenance-related. Results of root cause analysis are reported to HFFC Board, Hawaii DOH, EPA, and/or other applicable regulators. HFFC may bring a third-party contractor to conduct additional analysis. [Encl (257)]

Additional Material Issues

323. Closed-circuit television (CCTV) footage is unavailable in Red Hill. Of the 57 CCTV cameras installed throughout FLC Pearl Harbor Fuels Department spaces, 44 are inoperable. Thirteen cameras work, but those cameras do not cover any areas inside Red Hill. [Encls (258), (259)]

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324. In December 2018, Fuels Department personnel recognized the need for 22 PITs to provide key pressure indications and submitted a Fuels Automation Modification Request to Naval Information Warfare Center (NIWC). This request is still pending implementation, but has been prioritized since the 6 May 2021spill. [Encls (260)-(262)]

325. Soon after the fire suppression system was installed, FLC Pearl Harbor discovered a leak from the concentrate supply line into secondary containment. Portions of the system remain tagged-out to avoid release of the concentrate to the environment. In the event of a fire, however, the system can be activated manually. [Encl (14)]

Section IV: Command, Control, and Oversight

Command Relationships and Responsibilities

Office of the Secretary of Defense (OSD)

326. Undersecretary of Defense for Acquisition and Sustainment (USD(A&S)) has direct oversight of the Assistant Secretary of Defense for Sustainment (ASD(S)), who in turn has direct oversight of the DoD Executive Agent (EA) for Bulk Petroleum. [Encl (46)]

Director, Defense Logistics Agency (DLA)

327. DLA is a Defense Agency led by a general or flag officer with a headquarters at Fort Belvoir, Virginia. DLA is under the authority, direction, and control of the USD(A&S). [Encls (263), (264)]

328. DLA functions as an integral element of the military logistics system responsible for providing effective, efficient, and risk-mitigated worldwide logistics support to the DoD, as well as to federal agencies, and, when authorized by law or by agreement, state and local government organizations, foreign governments, and international organizations. Director, DLA serves as the DoD EA for Bulk Petroleum with authority to delegate to the Commander, DLA Energy. [Encls (45), (263)]

329. DLA executes integrated material management responsibility for the DWCF bulk petroleum supply chain by providing procurement, transportation, storage, distribution, ownership, accountability, budgeting, quality assurance and surveillance, and infrastructure sustainment, restoration, and modernization functions to the point of sale.
DLA is responsible for chairing the DoD Component Steering Group (CSG) for Bulk Petroleum, which provides a forum for DoD Component members to address bulk petroleum supply chain issues and recommended courses of action to the EA. [Encl (45)]

330. Per MOA with NAVSUP, DLA conducts and participates in financial inspections and audits of NAVSUP DFSPs, including monthly reviews of terminal operations expenditure reports provided by NPO and participation in NAVSUP IG command inspections. DLA ensures NAVSUP FLCs follow Quality Assurance/Quality Surveillance policies, programs, and procedures that establish minimum standards to be used for DWCF Fuel, and coordinates with

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the NAVSUP NPO on quality related to DWCF fuel operations, to include quality deficiencies. [Encl (44)]

Commander, United States Indo-Pacific Command (USINDOPACOM)

331. USINDOPACOM is one of six Geographic Combatant Commanders, with a headquarters in Camp H M Smith, Hawaii. USINDOPACOM has operational control of COMPACFLT. [Encls (264)-(266)]

332. As a Combatant Commander, USINDOPACOM exercises authority, direction, and control over the commands and forces assigned to the USINDOPACOM area of responsibility. [Encl (266)]

333. USINDOPACOM integrates service fuel requirements to meet the most strenuous operational plan across the area of responsibility. [Encls (45), (266)]

334. USINDOPACOM notifies the Hawaii State Legislators in the event an emergency response is required at Red Hill. [Encl (205)]

Office of the Chief of Naval Operations (CNO)

335. CNO is an echelon 1 command with a headquarters in the Pentagon. CNO has administrative control of COMPACFLT, CNIC, NAVFAC, and NAVSUP. [Encls (39), (264), (265), (267), (268)]

336. CNO establishes policy for authority, responsibilities, and roles for management and future planning of capitalized bulk fuel tanks at Navy installations. CNO has assigned responsibility for the management of capitalized bulk fuel tanks to NAVSUP. CNO has assigned responsibility for developing, awarding, and administering contracts in support of cleaning, inspecting, and repairing capitalized bulk fuel tanks to NAVFAC. CNO has assigned responsibility for the physical property of the capitalized bulk fuel tanks and associated compliance to CNIC. CNIC is supported in this responsibility by NAVFAC and NAVSUP. [Encl (47)]

337. A capitalized bulk fuel tank is a field-constructed tank, typically greater than 10,000 gallons, that contains DWCF fuel. [Encl (47)]

Commander, United States Pacific Fleet (COMPACFLT)

338. COMPACFLT is an echelon 2 command with a headquarters in Pearl Harbor, Hawaii. COMPACFLT has operational control over CNRH. [Encls (264), (265)]

339. COMPACFLT is under the administrative control of CNO and the operational control of USINDOPACOM. [Encl (265)]

340. COMPACFLT is formally supported by CNIC, NAVFAC, and NAVSUP. [Encls (39), (267), (268)]

341. The mission of COMPACFLT is to protect and defend the maritime interests of the United States in the Indo-Asia-Pacific Region by providing combat-ready naval forces and operating forward in global areas of consequence. [Encl (265)]

342. Per U.S. Navy Regulations, COMPACFLT is the Navy's Senior Officer Present in Hawaii. As such, COMPACFLT shall assume command and direct the movements and efforts of all Navy personnel when deemed necessary; this includes taking precautions to preserve the health of the persons under his authority. [Encls (269), (270)]

343. COMPACFLT notifies USINDOPACOM, the Governor of Hawaii, and the Hawaii Congressional delegation in the event an emergency response is required at Red Hill. [Encl (205)]

Commander, Naval Supply Systems Command (NAVSUP)

344. NAVSUP is an echelon 2 command, led by a Supply Corps Rear Admiral (O-8), with a headquarters in Mechanicsburg, Pennsylvania. NAVSUP is the immediate superior in command and assigned administrative control of 11 subordinate commands, including FLC Pearl Harbor. [Encls (264), (267), (271)]

345. NAVSUP is under the administrative control of CNO. [Encl (267)]

346. NAVSUP is formally assigned as a supporting commander to Navy component commanders and fleet commanders, including COMPACFLT. NAVSUP also coordinates requirements and liaisons with DLA and coordinates with CNIC for support of Navy regions. [Encl (267)]

347. NAVSUP provides logistics support services, operations, and management of bulk petroleum, oil, and lubricants (POL) for afloat and ashore naval, joint, and multinational forces. NAVSUP also serves as the service control point for all Department of Navy activities for bulk POL and monitors the operational compliance of capitalized bulk fuel tanks. As Service Control Point, NAVSUP also coordinates requirements, technical issues, and supply actions with military units and DLA. [Encls (47), (267)]

348. The Naval Petroleum Office (NPO) is an element of NAVSUP headquarters that provides technical expertise in the area of naval POL. Primary functions include inventory management, facilities, operations, quality, business support, fuel logistics and strategy matters, IG command inspections, and assist visits. NPO is collocated with the DLA Energy and other Service Control Points at Fort Belvoir, Virginia. [Encls (271)-(273)]

349. Per OPNAVINST 4020.27, NAVSUP is responsible for monitoring the operational compliance of capitalized bulk fuel tanks for which NAVSUP has service control point oversight responsibility. These responsibilities include serving as the operator; determining the requirements for operational compliance, including the dates for tank inspections, the tank out-of-service sequencing, the repairs required for tanks' return-to-service; coordination with

NAVFAC and other design and construction agents early for project review and approval; and serving as the Navy's liaison to DLA Energy to ensure proper funding. [Encl (47)]

350. Per MOA with CNIC, NAVSUP is responsible for defining and executing an enterprise approach for regional bulk fuel oversight, operations, and maintenance and for acting as the EA for bulk fuel facility management and fueling operations. As EA, NAVSUP is responsible for ensuring bulk fuel facility maintenance is being performed. NAVSUP will resource and conduct comprehensive periodic inspections and assessments of bulk fuel facilities and practices to assess compliance with applicable regulatory requirements and industry standards through scheduled NAVSUP IG command inspections, Management Assist Visits, and as otherwise deemed necessary. Results shall be provided to the CNIC Installation CO. This MOA is dated 30 April 2015 and has expired. [Encl (47)]

351. Per MOA with DLA, NAVSUP is responsible for retaining supervisory and management control and the ability to direct and approve the actions of NAVSUP personnel whose billets are reimbursed by DLA Energy. NAVSUP is also charged with conducting financial inspections and audits, to include Material Assist Visits (MAV) and NAVSUP IG command inspections. [Encl (44)]

Fleet Logistics Center (FLC) Pearl Harbor

352. FLC Pearl Harbor is an echelon 3 major command, led by a Navy Supply Corps CAPT (O-6), responsible for providing logistics support and under the authority and direction of NAVSUP. FLC Pearl Harbor has no subordinate commands. [Encls (5), (232)]

353. FLC Pearl Harbor is under the administrative control of NAVSUP and is assigned official additional duty to CNHR. Prior to 2020, CNRH submitted concurrent Fitness Reports on the FLC Pearl Harbor CO. The former CNRH discontinued this practice. [Encls (5), (13), (109), (271)]

354. FLC Pearl Harbor is formally assigned as a supporting commander to USINDOPACOM, COMPACFLT, CNRH, and U.S. Army 25th Infantry Division. [Encls (5), (274)]

355. FLC Pearl Harbor provides logistics support services, operations, and Defense Working Capital Fund (DWCF) bulk petroleum, oil, and lubricants in support of afloat and shore naval, joint, and multinational forces. This includes maintaining and operating Navy's deep-water DWCF bulk fuel terminals as well as performing all tasks related to fuel system facilities management, engineering services, and technical support. [Encl (5)]

356. Per MOA between CNIC and NAVSUP, FLC COs shall provide operational oversight and direction for bulk fuel and aviation fuel operations, logistics functions, and bulk fuel facility management. FLC COs shall also coordinate with the CNIC Installation CO regarding site-specific fuel facilities requirements as well as report environmental issues, performance standards, and metrics. [Encl (37)]

357. Per MOA between NAVSUP and NAVFAC, FLCs are responsible for providing oversight of bulk and aviation fueling operations and work functions. The MOA further establishes roles and responsibilities associated with NAVFAC Regional POL Engineers (RPEs) co-located FLCs in support of sustainment, restoration, and modernization (SRM) programs. This MOA is dated 5 August 2014 and has expired. [Encls (275), (276)]

Commander, Navy Installations Command (CNIC)

358. CNIC is an echelon 2 command, led by an Unrestricted Line Vice Admiral (O-9), with a headquarters in Washington, DC. CNIC is the immediate superior in command and assigned administrative control of 11 subordinate commands, including CNRH. [Encls (264), (268)]

359. CNIC is under the administrative control of CNO and coordinates with Director, Environmental Readiness Division (OPNAV N45) to develop and execute the Navy's Shore Environmental Program, which includes compliance with laws and regulations. [Encl (268)]

360. CNIC maintains ownership of Class I (land) and Class II (buildings and structures) property and is responsible for resourcing installation management support and maintenance of U.S. Navy bases worldwide. CNIC is overall responsible for Navy installations and is the Navy's primary liaison regarding shore installation and budget submitting office matters with local, state, and federal officials for the region. Additionally, CNIC retains ultimate accountability for regional environmental permits. [Encl (37)]

361. Per OPNAVINST 4020.27, CNIC is responsible for the physical property of the capitalized bulk fuel tanks and associated compliance with assistance from NAVFAC and NAVSUP. [Encl (47)]

362. Per the MOA with NAVSUP, CNIC is responsible for maintaining ownership of Class I (land) and Class II (buildings and structures) property and acts as the Navy's primary liaison regarding shore installation and Base Operating Support matters with local, state, and federal officials. Additionally, CNIC develops and maintains a schedule of installation assessments and provide semi-annual copies and updates to NAVSUP. [Encl (37)]

Commander, Navy Region Hawaii (CNRH)

363. CNRH is an echelon 3 command, led by an Unrestricted Line Officer Rear Admiral (O-7), with a headquarters in Pearl Harbor, Hawaii. CNRH is assigned administrative and operational control of Commander, JBPHH and administrative control of CO, Pacific Missile Range Facility. [Encls (30), (38), (264)]

364. CNRH is under the administrative control of CNIC and the operational control of PACFLT. [Encl (38)]

365. FLC Pearl Harbor and NAVFAC Hawaii are assigned official additional duty to CNRH. These duties are not specified for FLC Pearl Harbor; the NAVFAC Hawaii CO is also dual-hatted as the Region Engineer (CNRH N4). [Encls (32), (38), (268)]

366. CNRH oversees all matters of facility sustainment, restoration and modernization; investment and military construction; environmental; real estate; facility planning; utilities; base support vehicles and equipment; and facility services issues. CNRH serves as the point of contact with U.S. Congress and their staffs and coordinates arrangements for visits as well as monitors visits of other distinguished persons and coordinates protocol when deemed appropriate. Additionally, CNRH serves as the Regional Environmental Coordinator (REC) and Navy On-Scene Coordinator (NOSC) to coordinate environmental matters and responses to oil and hazardous substance (OHS) spills and coordinates issues with Commander, Navy Region Southwest as the designated Department REC for Environmental Protection Agency Region IX, as well as acting as the liaison for U.S. Navy interests before local offices, national offices, and judicial forums in the Hawaii area of responsibility. [Encl (30)]

367. Per MOA between CNIC and NAVSUP, CNRH is responsible for liaising with FLC Pearl Harbor on Navy bulk fuel matters and providing oversight and coordination, to include directing actions of all tenant and visiting commands, with regards to emergency management. [Encl (37)]

368. CNRH notifies COMPACFLT, Hawaii DOH, and EPA in the event an emergency response is required at Red Hill. [Encl (205)]

Commander, Joint Base Pearl Harbor-Hickam (JBPHH)

369. JBPHH is an echelon 4 major command, led by an Unrestricted Line Captain (O-6). JBPHH has no subordinate commands. [Encls (232), (264), (277)]

370. JBPHH is under the administrative and operational control of CNRH. [Encl (31)]

371. JBPHH coordinates all Base operational matters including fire, emergency services and management, and oversees all Base matters of Facility Sustainment, Restoration and Modernization, and Environmental. JBPHH implements the Base Response Training Plan and serves as the Base Environmental Coordinator (BEC) and NOSC to coordinate environmental matters and responses to OHS spills. The JBPHH Mission, Function, and Tasks is unsigned. [Encls (277)-(280)]

372. Per MOA between CNIC and NAVSUP, JBPHH retains Title 10 responsibilities for safety and environmental stewardship for all personnel and property on installation; this includes bulk fuel facilities. [Encl (38)]

Commander, Naval Facilities Engineering Systems Command (NAVFAC)

373. NAVFAC is an echelon 2 command, led by a Civil Engineer Corps Rear Admiral (O-8), with a headquarters in Washington, DC. NAVFAC is the immediate superior in command and assigned administrative control of four subordinate commands, including NAVFAC Pacific and NAVFAC Engineering Systems and EXWC. NAVFAC is assigned official additional duty to CNIC. The NAVFAC Commander is also dual-hatted as the Deputy Commander for Facilities

and Environmental and provides technical and material support regarding shore facilities. [Encl (39)]

374. NAVFAC is under the administrative control of CNO. [Encl (39)]

375. NAVFAC executes on behalf of the Assistant Secretary of the Navy (Energy, Installations and Environment) acquisition authority, use, management, and disposal actions of real property. NAVFAC serves as the technical authority for maintenance and facility services, environmental remediation, and public works, as well as the technical authority and primary execution agent in support of Navy installation commanding officers for environmental planning, compliance, restoration, and natural and resource management for Navy shore facilities. [Encl (39)]

376. Per OPNAVINST 4020.27, NAVFAC is responsible for developing, awarding, and administering contracts in support of cleaning, inspecting, and repairing capitalized bulk fuel tanks. [Encl (47)]

377. Per MOA with DLA Energy, NAVFAC is responsible for providing engineering, design, SRM, and minor construction technical review services and contracting as well as executing non-Navy funded POL facility maintenance and repair at DLA capitalized DFSPs executing the bulk fuels mission. This MOA is dated 6 October 2016 and has expired. [Encl (31)]

Commander, Naval Facilities Engineering Systems Command Pacific (NAVFAC PAC)

378. NAVFAC PAC is an echelon 3 command, led by a Civil Engineer Corps Rear Admiral (O-8), with a headquarters in Pearl Harbor, Hawaii. NAVFAC PAC is the immediate superior in command and assigned administrative control of seven subordinate commands, including NAVFAC HI. [Encls (10), (39)]

379. NAVFAC PAC is under the administrative control of NAVFAC. [Encls (39), (281)]

380. NAVFAC PAC is assigned official additional duty to PACFLT. The NAVFAC PAC Commander is also dual-hatted as the Pacific Fleet Civil Engineer (N46). [Encls (10), (39)]

381. NAVFAC PAC provides prioritization, general engineering and resource management advice, and support for all facility and operational engineering matters to PACFLT. [Encls (10), (39)]

Commander, Naval Facilities Command Hawaii (NAVFAC Hawaii)

382. NAVFAC HI is an echelon 4 major command, led by a Civil Engineer Corps Captain (O-6). NAVFAC HI has no subordinate commands. [Encls (10), (232)]

383. NAVFAC HI is responsible for the integration of planning, programming, and delivery of NAVFAC capabilities and functions to supported commands. [Encl (10)]

384. NAVFAC HI is under the administrative control of NAVFAC PAC. [Encls (10), (282)]

385. NAVFAC HI is assigned official additional duty to CNRH. The NAVFAC HI CO is also dual-hatted as the CNRH Region Engineer. [Encl (10)]

386. The JBPHH Public Works Officer is under the administrative control of NAVFAC HI and the operational control of JBPHH. The JBPHH CO establishes priorities of effort; the NAVFAC Hawaii CO provides guidance to the Public Works Officer with processes, provides resources and reach-back support, and coordinates efforts among the Public Works Departments. [Encl (10)]

Commander, Naval Facilities Engineering and Expeditionary Warfare Center (NAVFAC EXWC)

387. NAVFAC EXWC is an echelon 3 major command, led by a Civil Engineer Corps CAPT (O-6). NAVFAC EXWC is located in Port Hueneme, California. NAVFAC EXWC is the immediate superior in command and assigned administrative control of 2 subordinate commands. [Encl (283)]

388. NAVFAC EXWC provides research, development, testing, and evaluation for all acquisition areas under NAVFAC cognizance. [Encl (39)]

External Oversight

COMNAVSUP as ISIC

389. NAVSUP resources and conducts comprehensive periodic inspections and assessments of bulk fuel facilities to assess compliance with applicable regulatory requirements and industry standards through scheduled NAVSUP IG command inspections and management assist visits. Results of the inspections are required to be provided to the CNIC Installation CO. [Encl (37)]

390. The NPO Assistant Officer in Charge leads NAVSUP IG command inspections of, and management assist visits to, Navy fuel sites, ensuring they are maintained and operated per regulations and procedures. [Encl (284)]

391. The NAVSUP IG, the main source of external oversight, conducts a review on a recurring three-year basis across all FLCs. NAVSUP IG has delegated the Fuels Department portion of the inspection to NPO. NAVSUP IG command inspections cover facilities, operations, inventory, and fuels quality. NAVSUP IG inspectors observe operations if they are in progress and will secure any unsafe operations, but there is no requirement to inspect operations. NAVSUP IG command inspections are focused on assessing program compliance, not proficiency. [Encls (14), (71), (285), (286)]

392. On the most recent NAVSUP IG command inspection, conducted in January 2019, the Fuels Department was evaluated as "not fully compliant," with five of six programs assessed as not fully compliant. These programs were organizational management, administration and inventory, facilities management, environmental protection, and operations. Notably, the Fuels Department did not conduct the required investigation when they exceeded their daily allowable inventory tolerances on 14 different occasions. [Encls (287)-(289)]

393. At the time of this report, 45 of the 49 Fuels Department findings from the 2019 NAVSUP IG command inspection have been closed. The remaining findings require long-term resolution, and none of the open findings apply to Red Hill. [Encl (290)]

394. Since the 2019 NAVSUP IG command inspection, NPO personnel visited FLC Pearl Harbor seven times. Three of these visits were related to the 6 May 2021 spill at Red Hill. Specifically, one was the NPO Deputy OIC conducting the NAVSUP command investigation. The other two occurred after the 20 November 2021 spill. COVID-19 travel restrictions beginning in March 2020 curtailed site visit opportunities. Since 2019, NPO has provided remote communication and support to FLC Pearl Harbor in multiple areas, including assessment of bulk fuel storage requirements in the USINDOPACOM area of responsibility; AFHE maintenance and upgrades; AOC engagement involving DoD, regulators, and the public; NATOPS refueling compliance at Hickam Airfield; fuel stock rotation challenges; DLA terminal operations funding; and coordination of project development, funding, and execution for multiple SRM projects. [Encl (290)]

Hawaii Department of Health/U.S. Environmental Protection Agency

395. The Hawaii DOH and the United States Environmental Protection Agency (EPA), Region 9, provide regulatory oversight of Red Hill via the Administrative Order on Consent (AOC), which was entered into by Hawaii DOH, EPA, U.S. Navy (via CNRH), and DLA following a spill in January 2014. [Encl (41)]

396. The State of Hawaii obtained EPA state program approval for Hawaii's Underground Storage Tank (UST) program to operate in lieu of EPA's UST program under Subtitle I of the Resource Conservation and Recovery Act of 1976, as amended, 42 United States Code Section 6901 et seq. [Encl (41)]

397. Navy or DLA is required to immediately notify the Hawaii DOH Project Coordinator and the EPA Project Coordinator if the Navy or DLA encounter any condition or situation that constitutes an emergency or may present an immediate threat to human health or the environment. [Encl (41)]

398. Navy and DLA are required to consult with the Hawaii DOH Project Coordinator and the EPA Project Coordinator to take immediate and appropriate action and must submit written notification to Hawaii DOH and EPA within 24 hours of such discovery and, if further action is required, submit a plan to further mitigate the threat within seven days of sending the written notification of the emergency. [Encl (40)]

399. Navy and DLA are required to submit all results of sampling, testing, and modeling. This includes raw data, which shall be made available if requested, to Hawaii DOH and EPA within thirty calendar days of receipt. [Encls (40), (147)]

400. Navy and DLA are required to provide written notice to Hawaii DOH and EPA at least seven calendar days prior to conducting field sampling. At Hawaii DOH and EPA's request,

Navy and DLA are required to allow split or duplicate samples to be taken by Hawaii DOH and EPA. [Encl (40)]

401. Hawaii DOH and EPA are allowed to enter Red Hill. [Encl (40)]

402. Navy and DLA are required to increase tank tightness testing from biennially to annually, continue to use an inventory control monitoring system, and conduct vapor monitoring for all in-service tanks. [Encl (40)]

403. Per the AOC, the Navy is required to conduct soil vapor monitoring monthly and groundwater sampling quarterly. Following the events of 6 May 2021, Hawaii DOH issued Notice of Interests that increased soil vapor monitoring to twice per week and groundwater sampling to once per week. [Encls (40), (114), (147)]

U.S. Coast Guard

404. The Coast Guard has jurisdiction over fuel facilities capable of transferring oil or hazardous materials, in bulk, to or from a vessel. [Encl (291)]

405. Marine transportation-related fuel facilities that could reasonably be expected to cause substantial harm to the environment by discharging oil into or on the navigable waters, adjoining shorelines, or exclusive economic zone, are required to submit a response plan to the Coast Guard. This requirement applies to FLC Pearl Harbor Fuels Department. [Encl (291)]

406. The Coast Guard requires conducting of annual spill management team tabletop exercises. In a 3-year period, at least one of these exercises must include a worst-case discharge scenario. Additionally, equipment deployment exercises must be conducted semiannually for facility owned and operated equipment, and annually for oil spill removal organization equipment. [Encl (291)]

Defense Logistics Agency

407. DLA conducts and participates in financial inspections and audits of NAVSUP Defense Fuel Supply Points (DFSP), including monthly reviews of Terminal Operations expenditure reports provided by the NAVSUP NPO and participation in the NAVSUP IG command inspection and MAVs and OMB A-123 inspections. [Encl (44)]

408. DLA, in conjunction with the NAVSUP NPO, conducts in-depth financial reviews of Terminal Operations expenditures on a recurring cycle not to exceed five years. [Encl (44)]

409. DLA ensures NAVSUP FLCs follow Quality Assurance/Quality Surveillance policies, programs, and procedures that establish minimum standards to be used for DWCF Fuel, and coordinates with the NAVSUP NPO on quality related to DWCF Fuel operations, to include quality deficiencies. [Encl (44)]

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CHAPTER 3
Opinions

6 May Fuel Spill

1. The proximate cause of the fuel spill on 6 May 2021 was human error. The CRO and pump operator took intentional shortcuts when transitioning between procedures. Their improper valve operations resulted in drawing a vacuum in the JP-5 line, then rapidly pressurizing it. This pressure surge caused mechanical failure of two piping joints. This opinion is consistent with a root cause analysis conducted by *Austin Brockenbrough and Associates, LLC*, a private engineering and consulting firm. [FF (41), (42), (47)-(50), (52)-(73), (164), (304), (306)-(310), (313), (314)]

2. The FLC Pearl Harbor Fuels Department does not have adequate defense in depth against human error. Safe and effective operations require: (1) clear and accurate procedures, (2) trained and proficient operators, and (3) effective supervision. Weaknesses in all three of these areas led to poor standards of procedural compliance across the FLC Pearl Harbor Fuels Department. For example, on 6 May 2021, operators performed four fuel movements governed by the same operations order; no two of those four transfers were conducted in the same sequence. Although FLC Pearl Harbor has taken steps to improve operations orders and processes for controlling valve operations, supervision of control room operations and validation of training effectiveness remain blind spots. Finally, the AFHE system does not provide operator aids or interlocks to prevent human error. [FF (48)-(50), (52)-(56), (63), (90), (120), (126), (129), (135)-(138), (140), (161), (164), (165), (168)-(170), (173), (299)-(310), (313)-(318)]

3. NAVSUP oversight was not adequate to identify weaknesses in procedural compliance and training at FLC Pearl Harbor prior to 6 May 2021. As the ISIC for FLCs and associated DFSPs, NAVSUP is not organized or resourced to provide day-to-day oversight in the same manner as other Navy ISICs (*e.g.*, submarine squadrons, destroyer squadrons, carrier air wings, etc.). NAVSUP IG command investigations, which are led by NPO and conducted every three years at each bulk fuel facility, focus on compliance with requirements and not operational proficiency. NPO promulgates lessons learned and best practices, but NAVSUP does not have policy guidance in place regarding qualifications, continuing training, self-assessment, or operational practices such as required elements of procedures or methods of valve control at DFSPs. [FF (56), (132)-(135), (138)-(141), (389)-(394)]

4. NAVSUP should have provided additional assistance and oversight following the 6 May 2021 spill. During this period, COMNAVSUP had directed two simultaneous investigations and was aware that the Fuels Director had been removed from her duties. Additionally, CNRH had expressed his concerns to COMNAVSUP about the seriousness of the incident and the sensitivity of Red Hill issues. These circumstances should have provided sufficient notice that more scrutiny was required over FLC Pearl Harbor operations. NAVSUP convened a formal investigation but resourced it poorly, did not provide additional on-the-ground support to facilitate a safe return to operations, and did not provide intrusive oversight of the command's self-assessment and restoration efforts. [FF (82), (90), (126)-(134), (138)-(140)]

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5. No consolidated technical authority is responsible for providing a comprehensive overview of issues associated with Navy DFSPs. Identifying technical issues is a shared responsibility among NAVSUP, NAVFAC, and potentially contractors performing maintenance. The configuration of the JP-5 pipeline on 6 May 2021, with three of four upper tanks disconnected, highlights this gap. The combination of these maintenance items may have made the pipeline more vulnerable to damage during continued operations, but no organization is clearly responsible for identifying or assessing that risk. The investigation team concluded that further engineering analysis would be needed to determine what effect this configuration may have had on 6 May 2021, but this uncertainty illustrates the need for a mechanism to proactively identity and assess similar technical risks. [FF (44)-(46), (375)]

6. FLC Pearl Harbor Fuels Department personnel recognized the possibility that spilled fuel in the fire suppression sump could have been transferred into the return line, and they took reasonable steps to investigate that possibility. During the night of 6 May 2021, they visually inspected the pumps and controllers for signs the pumps were running and visually inspected the fire suppression system retention tank, which was empty. Based on these indications, they concluded the sump pumps did not run. Within two days of the incident, the fire suppression system contractor checked a control panel designed to record system activity and also concluded the sump pumps did not run. System design, with the retention tank higher in elevation than a significant portion of the piping, as well as a low level of knowledge of the system by Fuels Department personnel, contributed to this incorrect conclusion. A system malfunction also appears to have contributed, but the investigation team was unable to determine the details of that malfunction. At the time of this report, FLC Pearl Harbor is setting conditions to test the fire suppression system sump pumps. [FF (41), (75)-(79), (93)-(95), (114)]

7. The decrease in tank inventory of nearly 20,000 gallons of fuel coincident with the 6 May 2021 spill should have prompted a more critical and through investigation by FLC Pearl Harbor supervisors. Multiple supervisors were informed of this inventory loss, including the FLC Pearl Harbor CO, but failed to ask hard questions or demand a detailed technical analysis of how the majority of this fuel could have been returned to the pipeline. Additionally, FLC Pearl Harbor did not request assistance with this determination or report any uncertainty in the amount spilled up the chain of command. The fact that the calculated quantity of fuel spilled closely matched the quantity recovered likely reinforced the incorrect calculations. For example, had they recovered more fuel than the calculated quantity of fuel spilled, Fuels Department supervisors would have conducted a more thorough investigation. [FF (41), (71), (74), (78)-(81), (91)-(94), (97), (98), (105), (114)-(124), (130)]

8. FLC Pearl Harbor has no formal or effective processes for self-assessment. At no time did anyone direct or lead a meaningful critique or hotwash of the 6 May 2021 spill. Further, there is no evidence that these types of self-assessment events, which are common in other parts of the Navy, are conducted as a means of continuous improvement. [FF (73), (125), (130)-(132), (141), (147), (148)]

9. The NAVSUP command investigation conducted by the NPO Deputy OIC was inadequate and a critical missed opportunity for ISIC oversight. The investigation report was cursory, aggregating results from the work and analysis of other organizations with little independent

assessment. It failed to identify the root causes of the 6 May 2021 incident, and it did not recommend meaningful corrective actions or accountability measures. Perhaps most significantly, it confirmed the reported quantity of fuel spilled without a critical or thorough verification. The NPO Deputy OIC was aware of the decrease in tank inventory of nearly 20,000 gallons of fuel on 6 May 2021, but he did not consider it relevant. He did not highlight this information in his report, and he did not provide it to at least one engineer who independently calculated the quantity spilled. [FF (74), (80), (81), (126)-(141)]

10. FLC Pearl Harbor's external reporting of the 6 May 2021 spill was not timely. The CO, XO, and Fuels Department leaders believed they had 24 hours to make formal reports, which is contrary to Navy OPREP and NAVSUP/CNRH CCIR reporting requirements, especially with known media interest the night of the incident. The reporting on 6-7 May 2021 was so unsatisfying that CNRH created a new instruction, Red Hill Bulk Fuel Storage Facility Emergency Response Notification Coordination Plan, to improve reporting in the event of a future incident. [FF (84)-(92), (96)-(112), (120)]

11. The FLC Pearl Harbor CO, XO, and Fuels Department leadership exhibited a consistent bias toward assuming and reporting the "best case" scenario following the 6 May 2021 fuel spill. On 7 May 2021, FLC Pearl Harbor personnel had no affirmative evidence that fuel had been contained in the tunnel and were still unaware of the total amount of fuel spilled and recovered. Nevertheless, they reported that day that no fuel was released to the environment. Importantly, I found no evidence that poor reporting of this incident was motivated by a conscious effort to deceive or obfuscate the truth. [FF (85)-(92), (96)-(112), (120)]

12. COMNAVSUP failed to provide oversight as ISIC to ensure FLC Pearl Harbor was able to and did satisfactorily perform its mission to manage Red Hill, despite several indications that further assistance and oversight was required. Two simultaneous investigations, ordered by COMNAVSUP, were in progress during the period following the 6 May 2021 spill, and the Fuels Director had transferred without a relief. Later, COMNAVSUP received and approved the final investigation into the 6 May 2021 spill, which was noticeably incomplete and left key questions unanswered. In total, COMNAVSUP should have known that the FLC Pearl Harbor Fuels Department needed additional assistance and oversight but failed to provide it. [FF (9), (10), (126)-(140)]

13. The FLC Pearl Harbor CO during and after the 6 May 2021 fuel spill failed to act in order to understand the causes or effects of the spill, or to validate that Fuels Department was safe to continue operations. He reported the spill, conducted an administrative review via Management Inquiry, and provided access to the NAVSUP investigator. However, the FLC Pearl Harbor CO did not direct any meaningful operational pause or safety stand down, did not direct meaningful remedial action to prevent future spills, and did not adequately investigate the quantities of fuel spilled and released to the environment. [FF (113), (116), (121)-(125), (129), (391)-(394)]

14. The FLC Pearl Harbor Deputy Fuels Director failed to direct the safe and effective operation of Fuels Department. Specifically, he failed to ensure that operations orders were adequate or sufficiently understood, failed to ensure effective supervision to monitor compliance with operations orders, and failed to enforce standards surrounding procedural compliance or a culture

of learning within the department. The Deputy Fuels Director is under-resourced to be able to fully perform his duties. On 6 May 2021, he had been performing his normal duties and effectively acting as the Fuels Director for approximately three months. The Deputy Fuels Director spent at least 50 percent of his time performing tasks not directly related to managing fuel operations, such as conducting tours and generating responses to requests for information from other organizations. Since 6 May 2021, he has demonstrated a commitment to improving Fuels Department operations. [FF (113), (116)-(124), (136)-(143), (299)- (325), (392), (393)]

15. The NAVSUP NPO investigating officer knew about the inventory loss from the 6 May 2021 fuel spill but failed to report it. He incorrectly determined this information was not relevant to his analyses of the root cause of the spill and the quantity of fuel spilled. The investigating officer relied heavily on third parties to validate his findings, but because of his erroneous conclusion that the 6 May 2021 inventory loss was irrelevant, he did not provide that information when seeking additional verification of the quantity spilled. The investigating officer was not resourced to conduct an investigation of this scope and complexity, but he did not request additional resources. [FF (132)-(141), (389)-(394)]

16. The CRO on 6 May 2021 was responsible for the safe execution of scheduled fuel movements in accordance with approved operations orders, which he failed to do. Automated logs show that valves were consistently operated not in accordance with prescribed operations orders during his shift. Cognizant officials initiated employment actions to hold the CRO accountable. He has since retired from FLC Pearl Harbor, effective 31 December 2021. [FF (41), (48), (49), (54), (57)-(71), (304)]

17. The pump operator on 6 May 2021 was not directly responsible for the safe execution of scheduled fuel movements. Nevertheless, he operated valves not in accordance with prescribed operations orders, under the supervision of the CRO. This was a common practice between CROs and pump operators, and was widely understood within Fuels Department to be the manner by which a pump operator would learn and ultimately become a CRO. The pump operator incorrectly sequenced the valves that created the vacuum condition, which ultimately led to the pipe rupture and fuel spill on 6 May 2021. [FF (48)-(50), (54), (57)-(71), (304)]

29 September Pressure Surge

18. The FLC Pearl Harbor CO acted prudently by ordering an operational pause after being informed of an unexplained pressure surge. This action and subsequent evaluation demonstrate an improved ability to self-assess when contrasted with the actions taken by FLC Pearl Harbor following the 6 May 2021 spill. [FF (5)-(7), (113), (124), (149)-(167), (172), (295), (297), (318), (352), (356)]

19. The underlying cause of pressure surges at Red Hill is still not fully understood. The analysis conducted by Fuels Department engineers revealed that pressure surges have occurred frequently during normal plant operations in all pipelines. Fuels Department supervisors have implemented measures to identify and mitigate this phenomenon, but a thorough engineering analysis is needed to determine and correct the cause(s). NAVFAC EXWC has contracted *Austin Brockenbrough and Associates, LLC*, a private engineering and consulting firm to conduct

a root cause analysis of the 29 September 2021 pressure surge event. This analysis will likely inform a broader follow-on effort to identify and correct problems. [FF (149)-(173), (318), (387), (388)]

20 November Fuel Spill and Release to the Environment

20. The proximate cause of the fuel spilled from the fire suppression system retention line on 20 November 2021 was a failure to properly account for the fuel spilled on 6 May 2021 (human error), as discussed above. [FF (32)-(34), (41), (71), (75)-(78), (97), (98), (105), (114)-(118), (121)-(141), (174), (252), (315)]

21. The Red Hill rover inadvertently struck the drain valve hand wheel with the passenger cart of a train, causing the PVC pipe to crack and leak. This train is used to transit the tunnel system and likely contacted the valve hand wheel multiple times, weakening and finally cracking the pipe. FLC Pearl Harbor conducted a preliminary inquiry regarding this event, and the report postulates excessive speed may have caused the train to jump. The investigation team assesses it is more likely that the weight of fuel in the 14-inch diameter PVC pipe caused it to sag over time. Worn paint on the hand wheel suggests the train rubbed against it on several occasions. I do not assess this event was due to misconduct. [FF (2), (3), (5), (29), (33), (34), (41), (51), (174)-(180), (222), (225), (233)-(236)]

22. The fire suppression system is poorly designed and has not been properly maintained. Portions of the return line are constructed of steel and others are constructed of PVC, which is vulnerable to damage in an industrial environment. Although the system was fully installed in 2019, the associated maintenance program was only recently approved and is not fully implemented. Had periodic maintenance been performed, the sump pumps may not have malfunctioned on 6 May 2021 or the fuel may have been discovered in the retention line prior to 20 November 2021. [FF (15), (16), (20)-(22), (32)-(34), (114), (174), (222), (225), (254)]

23. FLC Pearl Harbor personnel were not trained or equipped to stop the source of the fuel spill. A low level of knowledge of the fire suppression system by initial responders resulted in confusion, inaccurate reporting, and ineffective actions. Additionally, appropriate PPE and pipe-patching or plugging kits were not available at the scene. Without the ability to stop the spill, responders defaulted to managing it. They did not know how much fuel would spill or for how long, and even as spill was still ongoing, personnel were focused on recovery and cleanup rather than control. A lack of training and drills contributed to these problems. [FF (2), (3), (7), (11)-(14), (32)-(34), (174), (214), (222), (225), (232)-(239), (245)-(256), (309), (312)]

24. No single person took charge at the scene. FLC Pearl Harbor, as the spilling command, was responsible for taking charge as the on-scene incident commander or determining that the response was beyond the command's capability and requesting additional response from CNRH. The Deputy Fuels Director took charge initially. Later, with both the FLC Pearl Harbor CO and the NAVFAC Hawaii CO present, and with representatives of each of their commands managing different aspects of the response effort, there was not a unity of effort or clear lines of reporting.

This resulted in miscommunication and the absence of a common sight picture. Again, a lack of training and drills contributed. [FF (2), (3), (5), (11)-(14), (23), (24), (86), (87), (199), (208), (209), (213), (233)-(248), (295), (311)]

25. The initial external response was prompt, but it quickly dissipated based on early characterization of the fluid as all or mostly water. FLC Pearl Harbor personnel called the Federal Fire Department, as required, and the Federal Fire Department responded to Red Hill with HAZMAT and atmosphere monitoring capabilities. Federal Fire Department personnel departed after clearing the tunnel for entry and assessing the situation as stable. The NOSC representative never went to the scene because the initial report to him was that the spill consisted of all or mostly water. No one at the scene corrected that report to the NOSC representative or requested additional assistance from CNRH, JBPPH, or the Federal Fire Department. [FF (2), (3), (11)-(14), (23), (24), (86), (87), (181)-(184), (191)-(198), (207)-(210),(233)-(239), (366)]

26. Once responders determined that the spill was a fuel leak, they did not implement formal incident response procedures. The FLC Pearl Harbor CO referenced the Red Hill Response Plan, and his team performed many of the actions therein, but responders did not universally understand that this procedure was in use. One key action not taken was recalling the NOSC representative. Having the NOSC representative on scene likely would have alerted CNRH and other leaders that the incident was more serious than understood. Knowledge of the plan is generally low among responders, and most assessed the plan is not applicable because it is intended for a "catastrophic fuel release." Of note, no steps in the Red Hill Response Plan would have secured the drinking water well. [FF (2), (3), (5), (7), (8), (11)-(14), (23), (24), (86), (87), (186),(187)-(190), (200), (207), (212), (232)-(239), (311), (366)]

27. Leaders at the scene failed to communicate the seriousness of the incident. Every person physically present at Red Hill on the evening of 20 November 2021 knew within a short time after arriving that the spill was all or mostly fuel. The fact that the spill was from a non-fuel system was undoubtedly confusing and led to initial reports of a water spill. However, those initial reports were never fully corrected. By midnight on 20 November 2021, the FLC Pearl Harbor CO and NAVFAC Hawaii CO/Region Engineer knew the spill was primarily fuel and likely from the 6 May 2021 spill. They assessed they had accurately communicated that the spilling fluid contained fuel, but their reports allowed CNRH and Hawaii DOH to believe there had been a transition from water to fuel. Again, they displayed a consistent bias toward assuming and reporting the "best case" scenario. Further, the FLC Pearl Harbor CO failed to report that the initial responder to the spill had gone to the hospital that evening due to chemical burns or that a second person had been injured. Failure to communicate the seriousness of the incident would not have changed controlling actions at the scene, but it would have resulted in a more aggressive response from CNRH and other senior leaders. [FF (5), (11)-(14), (20)-(24), (175), (181)-(184), (192), (196)-(214), (228), (232)-(256), (344), (345), (366)]

28. The FLC Pearl Harbor CO was aware of the potential of a fuel release to the environment via the installed groundwater sump pump, but he did not communicate that possibility to senior leaders. On the night of 20 November 2021, the CO was unable to ascertain when the groundwater sump pump was secured. Based on this uncertainty, he sent Fuels Department

personnel to look for any indication of fuel in the area where he incorrectly believed the pump discharges. They found no fuel, which confirmed to the CO that no fuel had been released. He remained uncertain until fuel was discovered in the discharge line on 9 December, confirming the pump transferred fuel. While this pathway likely did not contribute to the drinking water contamination, he nevertheless failed to clearly communicate his uncertainty about whether the 20 November 2021 spill had been contained. [FF (2), (3), (5), (11)-(15), (185), (189), (190), (204), (205), (213)-(221), (228), (230), (232)-(235), (245), (249)-(253), (256), (257), (278)-(285), (326)-(342), (348), (358)-(364), (369)-(372)]

29. The history, visibility, and charged nature of Red Hill issues are reality, but they do not absolve leaders from their duties to think critically and report accurately. This atmosphere likely contributed to the consistent bias toward assuming and reporting "best case" scenarios. I am also concerned that lessons misapplied from the 6 May 2021 spill contributed to over-prioritizing external reporting and under-prioritizing actual incident response on 20 November 2021. In general, if an ongoing event is significant enough to inform senior military and government officials, it would be appropriate to activate emergency response organizations such as the EOC and ROC to ensure adequate assistance and a continuous flow of the most accurate information. Resuming Red Hill operations will require stakeholders at all levels to face facts with brutal honesty and communicate with full transparency. [FF (1), (4), (23), (24), (86), (87), (144), (232)-(239), (243)-(256), (343), (366), (368), (395)-(406)]

30. The proximate cause of contaminated drinking water was a failure to properly respond to the fuel spill on 20 November 2021 (human error). Had leaders at the scene questioned more critically the potential for a release to the environment, they would have acted more decisively to stop the source of the spill and demanded more resources to manage it. Further, had leaders at the scene communicated concerns about a potential release, CNRH and other stakeholders would have provided additional resources during and after the incident to understand and mitigate environmental impacts. [FF (5), (23), (24), (28), (30), (35), (86), (87), (185), (204), (205), (213), (217)-(222), (227), (232)-(239), (243)-(246), (248)-(257), (261)-(285]

31. FLC Pearl Harbor and NAVFAC Hawaii personnel did not adequately understand or appreciate risks to the nearby Red Hill well. Responders were aware of the well's location and took early steps to verify that no fuel flowed aboveground from the spill area to the well. Based on those initial actions, they incorrectly assessed there was no risk to the drinking water well. They had not anticipated a fuel spill in this area of the Red Hill tunnel system and were unaware of multiple pathways to the environment and aquifer from the area. Nevertheless, this knowledge gap is surprising and concerning given persistent scrutiny on the environmental risks associated with a major fuel spill at Red Hill. [FF (2), (3), (5), (6), (11)-(14), (20)-(22), (35), (185)-(189), (206), (216), (219)-(222), (234), (244), (245), (249)-(252), (256), (257), (261)-(285)]

32. The JP-5 fuel released to the environment on 20-21 November 2021 contaminated the Navy drinking water system. There are multiple pathways to the Red Hill well from the area of the spill. The most prominent pathways by which fuel entered the drinking water well were the hume line drainage system under the Adit 3 tunnel and cracks and imperfections in the floor and walls of the groundwater sump. Penetrations in the tunnel floor and imperfections in the

concrete also provided pathways to the Red Hill well but were less prominent. A significant amount of fuel was also released to the environment after being pumped from two CHT sumps and the groundwater sump. However, this fuel likely did not contribute to contamination of the drinking water system because it was first discharged to holding tanks down-gradient from the Red Hill well. *AECOM*, an infrastructure consulting firm, is conducting a hydrologic engineering analysis to determine the precise quantities of fuel and environmental pathways that contaminated the drinking water. [FF (28)-(30), (35), (36), (174), (185)-(189), (203)-(205), (213), (216), (221), (222), (229), (230), (245), (249), (250), (252), (256), (257), (260), (267), (269), (276)]

33. The FLC Pearl Harbor CO failed to take charge as the on-scene incident commander or make the determination that the required response was beyond his capability to address and request additional response from CNRH. He demonstrated poor judgment by deciding that the spill was stable and manageable despite uncertainty about key elements of the unfolding incident. In light of that uncertainty, he further failed to convey the seriousness of the incident or the potential that fuel was released to the environment via the groundwater sump pump. The FLC Pearl Harbor CO has, however, demonstrated a sincere desire and ability to self-assess and apply lessons learned. He acted prudently by pausing operations after an unexplained pressure surge on 29 September 2021, and he applied lessons learned from the failures outlined above in his response to heavy rains and flooding on 6 December 2021. [FF (2), (5), (23), (24), (199), (209), (217), (221), (222), (231)-(237), (240)-(256), (295), (355)]

34. The NAVFAC Hawaii CO was not the on-scene commander and was not overall responsible for incident response on 20 November 2021. He asked critical and thoughtful questions that evening and received satisfactory answers while working in step with the FLC Pearl Harbor CO. As the Region Engineer and the senior CNRH leader on-scene, however, he had a duty to ensure that CNRH received timely and accurate reports that conveyed the seriousness of the 20 November 2021 spill. He failed to do so, and he also failed to recall or recommend recall of the NOSC representative. [FF (5), (20)-(24), (86), (87), (199), (211), (212), (215), (221), (232)-(247), (373), (374), (377)-(385)]

Quantities of Fuel Spilled and Released[1]

35. The total quantity of fuel spilled on 6 May 2021 was 18,579 gallons. *Austin Brockenbrough and Associates, LLC*, a private engineering and consulting firm, conducted an independent third-party validation of this quantity. After the spill, 1,580 gallons of fuel were recovered. Therefore, up to 16,999 gallons of fuel were transferred to the fire suppression system retention line. [FF (41), (76), (78), (93)-(95), (98), (114), (116), (118), (122)-(124), (131), (135), (139), (147), (148), (174), (214), (287), (294)]

36. The quantity of fuel released to the environment on 6 May 2021 cannot be calculated, but is assessed to be small. This opinion is based on the location of the spill in an area of the tunnel with few penetrations as well as the results of post-incident soil vapor and groundwater monitoring results. Some amount of fuel entered the environment through soil vapor monitoring

[1] Appendix C provides a detailed summary of fuel quantities spilled, recovered, and potentially released to the environment.

ports when covers for those ports were disturbed during cleanup. [FF (37)-(39), (76)-(78), (94), (97), (98), (105), (109), (112), (114), (119), (123), (124), (134), (142)-(146), (293)]

37. The majority of the fuel that was transferred to the fire suppression system retention line on 6 May 2021, up to 16,999 gallons, spilled on 20 November 2021. At the time of this report, 13,677 gallons of that fuel were recovered. Efforts remain underway to locate and recover any additional fuel. [FF (37)-(39), (76)-(78), (94), (97), (98), (105), (109), (112), (114), (119), (123), (124), (134), (142)-(146), (293)]

38. A total of 3,322 gallons of fuel remains unrecovered. Some or all of this fuel is the source of contamination of the Navy drinking water system in and around JBPHH and its surrounding areas. The most prominent pathways by which fuel entered the drinking water well were the hume line drainage system under the Adit 3 tunnel and cracks and imperfections in the floor and walls of the groundwater sump. [FF (40), (142)-(146), (174), (185), (205), (212), (215), (217), (218), (224), (257)-(294)]

Personnel

39. Detailing practices and training pipeline requirements for the FLC Pearl Harbor CO and XO are not adequate. The CO and XO should be selectively detailed, and one of the two should have previous fuels experience at all times. Additionally, they should be trained in fuels management and operations prior to reporting. The current FLC Pearl Harbor CO was assigned based on his fuels experience, but this is not a formal or consistent policy. [FF (2), (3), (5)-(8), (295)-(297)]

40. The University of Kansas MBA program alone does not prepare Supply Corps officers for assignment as an FLC Fuels Director. Multiple interviews described the Fuels Director position as a "learning role," and many agreed that it takes at least one year to be fully proficient in the role. Given the high-consequence nature of fuel management operations, particularly at Red Hill, this approach creates considerable risk. Tailored training or previous fuels experience should be required. [FF (2), (3), (11), (12), (41), (149), (174), (298), (300)]

41. The FLC Fuels Department is undermanned at every level and will require a significant overhaul to improve standards and resume operations. By multiple accounts, the Fuels Director and Deputy Fuels Director each spend at least 50 percent of their time responding to requests for information to support the AOC, providing tours of Red Hill, and conducting other associated duties. Further, FLC Pearl Harbor Fuels Department operators typically work 16 hours or more overtime per week. Establishing a culture of high standards within Fuels Department will require an infusion of leadership at multiple levels, and particularly among mid-level managers. [FF (2), (3), (13)-(19), (299)-(304)]

Material

42. The Red Hill tanks have been the focus of scrutiny since the 2014 leak. As this investigation highlights, other components such as pipelines, valves, sensors and ancillary systems are also sources of risk that must be assessed and mitigated, commensurate with their attendant risks. [FF (28)-(31), (33), (36), (47), (49), (59), (60), (66), (69), (94), (95), (114),

(117), (121), (139), (144), (149), (151), (163), (164), (178), (257), (261), (264), (266), (274), (275), (281)-(323), (324), (325), (330), (395)]

43. Unneeded systems should be removed rather than decommissioned in place. This practice introduces complexity and confusion for operators and maintainers. For example, several interviewees cited an ongoing issue with a decommissioned defueling line at Hotel Pier. That line, and other systems like it, should be studied and removed if their existence impedes safe or effective fuel operations. [FF (208), (257), (261), (281), (282)]

Qualifications, Continuing Training, and Self-Assessment

44. Qualifications and continuing training programs meet minimum requirements, but they are not as comprehensive or robust as corresponding Navy shipboard programs or fuels industry practices. For example, *Signature Flight Support*, the company that provides private and general aviation fuel support for Honolulu International Airport, conducts quarterly fuel spill drills and comprehensive oral boards for all technical positions. They have dedicated training personnel on staff who supervise and perform quality assurance of the company's training program. Because the U.S. Coast Guard provides robust oversight of FLC Pearl Harbor Fuels Department waterborne refueling operations, the department's training and drill programs are focused on meeting those requirements. CNRH, JBPHH, and FLC Pearl Harbor do not conduct periodic fuel spill response drills at Red Hill, as would be appropriate. [FF (222), (309), (311)]

45. FLC Pearl Harbor does not have a culture that embraces self-assessment and continuous learning. This limits the command's ability to self-regulate. The Fuels Department does not conduct critiques, hotwashes, or debriefs following complex operations. Supervisors and engineers in the department who study events to understand root causes do not routinely disseminate that information to operators in the department. This is due, in part, to the perception that ongoing litigation surrounding Red Hill and the AOC creates an obligation to hold information, rather than share it. [FF (313), (314)]

Command and Control

46. The C2 of Red Hill is complex but fairly well defined. The investigation team reviewed instructions governing DFSPs; mission, functions, and tasks documents; and MOAs among various stakeholders. I expected to find significant seams or overlaps in C2 that created ambiguity—but I did not. In short: (1) FLC Pearl Harbor is responsible for day-to-day operations; (2) NAVFAC Hawaii is responsible for maintenance and repair contracts; (3) CNRH is responsible for environmental functions and incident response; and (4) DLA funds operations and maintenance. This arrangement of multiple stakeholders is not unique among shore facilities (*e.g.*, military hospitals). [FF (344)-(390), (407)-(409)]

47. In practice, the C2 among Red Hill stakeholders has devolved into "management by committee" among O-6s. The lines of responsibility, authority, and accountability have become blurred, and commanders have not embraced the full extent of their authorities. When gray areas exist regarding Red Hill, for example, the FLC Pearl Harbor CO is normally the most logical

commander to take ownership of those gaps. This has not always happened. Furthermore, when disagreements or ambiguities exist, it would not be difficult to formalize local agreements. The history and sensitivity of Red Hill issues and the requirements of the AOC add complexity, but they do not supersede other clearly defined command relationships and authorities. [FF (207), (209), (212), (214), (238), (241), (243), (244), (248)]

48. All stakeholders agreed that DLA funding, via working capital fund, is almost never a limiting factor. Stakeholders did point to NAVFAC Hawaii's capacity for contracting as a limiting factor for both Red Hill maintenance and CNRH environmental functions. [FF (25)-(27), (32), (302), (323), (324), (349), (373), (407)-(409)]

CHAPTER 4
Recommendations

The following recommendations are organized by cognizant commander under the current C2 structure. These recommendations include short-term actions that strengthen the existing structure and formalize or clarify existing command relationships, including COMPACFLT's role as the Navy's Senior Officer Present in Hawaii. I also recommend a long-term action to review the C2 for DFSPs to determine if technical expertise, responsibility, authority, and accountability can be better aligned.

Commander, U.S. Pacific Fleet

Actions Prior to Resuming Operations

1. (b) (5) [redacted]

2. (b) (5) [redacted]

3. (b) (5) [redacted]

4. Contract an independent third-party consultant with expertise in bulk fuel operations to assist in the oversight of Red Hill. This will continue after Red Hill resumes operations.

5. (b) (5) [redacted]

Long-Term Actions

6. Participate in annual material, operational, and incident response readiness inspections conducted by NAVSUP as ISIC.

Fleet Logistics Center Pearl Harbor

Actions Prior to Resuming Operations

7. Apply additional supervision to all fuel operations, particularly in the control room. Operations internal to Red Hill are suspended, but other FLC Pearl Harbor fuel operations are ongoing and warrant supervision (*e.g.*, operation of aboveground tanks, ship and aircraft fueling, etc.). The FLC Pearl Harbor CO should propose the appropriate level of supervision for various operations to COMNAVSUP for approval. FLC Pearl Harbor and NAVSUP should provide a significant portion of this additional supervision, but supervisors from other Navy commands with applicable subject matter or supervisory expertise are appropriate. COMPACFLT should approve any Red Hill operations required prior to certification for maintenance or testing based on a detailed recommendation from COMNAVSUP, concurrence from CNRH, and in consultation with regulatory partners.

8. If not already done, verify the tunnel train path clear of any potential blockages or risks to operator or equipment safety.

9. Fully implement the lessons learned and corrective actions identified since 6 May 2021. This includes formalizing these lessons and actions in NAVSUP or FLC Pearl Harbor instructions, training personnel, and monitoring operations to verify they are understood and effective. Specific corrective actions include developing more detailed operations orders, assigning a secondary CRO during operations, and requiring a two-person "point and call" method of controlling valve operations. Additional corrective actions will likely be identified and should be implemented prior to certification.

10. Hire additional Fuels Department watch standers to support corrective actions identified since 6 May 2021. Coordinate with DLA for funding and NAVSUP for assistance if required. These may be military personnel or civilian hires, and they will be in excess of current billets in the near term.

11. Implement best practices from other parts of the military and industry for conducting technically complex, high-consequence operations. For example, the FLC Pearl Harbor Fuels Department should learn and incorporate lessons from the recent Fleet Major Fires Review as they relate to watch standing principles, qualification and training programs, and critical self-assessment/improvement processes. Similarly, the Navy contracted *Simpson, Gumpertz, and Heger* to independently assess operations at Red Hill; this assessment will inform future operations and certification.

12. Clearly define incident response capabilities that can be performed by FLC Pearl Harbor personnel. Those response capabilities should be drilled, and material to affect those responses should be staged throughout the Red Hill facility. For those incidents that are beyond FLC Pearl Harbor response capability, clearly define the responsible organization and formalize those responsibilities in written agreements.

13. Requalify all watch standers. Requalification should require operators and rovers to demonstrate individual knowledge and skills in a manner similar to shipboard qualifications and industry best practices (*e.g.*, knowledge interviews, skills demonstrations, written examinations, final boards, etc.). The FLC Pearl Harbor CO should propose the details of the requalification plan to COMNAVSUP for approval.

14. Determine and correct the cause of unexplained pipeline vacuum conditions. NAVFAC EXWC is contracting *Austin Brockenbrough and Associates, LLC* to conduct an engineering analysis to determine the root cause of the vacuum conditions and pressure surge that occurred on 29 September 2021. This analysis will likely inform a broader effort to conduct a system-wide functional piping survey to identify redundant or unnecessary valves and fittings, update the thermal relief scheme, and to install components to prevent vacuum conditions and surge events.

15. Identify and mitigate risks associated with all non-fuel systems, tunnel penetrations, and other pathways to the environment in Red Hill. This includes removing or sealing unnecessary connections, verifying penetration covers are oil-tight (*e.g.*, environmental monitoring port covers), and clearly marking all penetrations and pathways to the environment with warning labels. Ensure all pathways to the environment are incorporated into incident response plans and checked periodically by rovers. This recommendation will require close coordination with CNRH and NAVFAC Hawaii.

16. Install additional PITs in pipeline systems to monitor for vacuum conditions and pressure differentials. FLC Pearl Harbor Fuels Department engineers identified recommended PIT locations, and NIWC is contracting *ENGlobal* to install them. The engineering analysis of pipeline vacuum conditions may identify additional PIT locations.

17. Identify and mitigate material issues and other risks associated with the fire suppression system. This includes determining and executing any necessary changes to system design, configuration, operation, or maintenance requirements.

Long-Term Actions

18. Develop rigorous and sustainable qualification, training, and monitoring programs based on Navy shipboard processes and industry best practices. Training should stress all aspects of FLC Pearl Harbor Fuels Department operations and not focus exclusively on any one competency. Training should be realistic and incorporate full-scale drills at Red Hill.

19. Conduct at least one Red Hill incident response training event quarterly. Training events should include classroom training, tabletop exercises, and incident response drills. This periodicity is consistent with requirements for some shipboard fire drills per the Naval Sea Systems Command (NAVSEA) 8010 Manual and industry best practices. Regulatory partners and other local agencies should participate during larger events.

20. Per the CNO's Charge of Command, develop a culture that is effective at self-assessing, self-correcting, and learning.

21. Upgrade the AFHE system to incorporate automatic interlocks and/or operator aid functions.

22. Evaluate the secondary containment capability throughout Red Hill. Expand or enhance containment capability where appropriate.

23. Prioritize and request any necessary infrastructure repairs, to include ancillary systems and equipment.

24. Establish a region-specific Support Agreement with CNRH as required by the MOA between CNIC and NAVSUP. [Encl (38)]

Commander, Navy Supply Systems Command

Actions Prior to Resuming Operations

25. [redacted]

26. Create a NPO detachment in Hawaii to facilitate local assistance and oversight for Red Hill, and to liaise with COMPACFLT and CNRH. This detachment should be staffed by an O-5/O-6 with previous Fuels Director experience. The NPO OIC should make periodic reports to COMPACFLT, NAVSUP, and CNRH and participate in their weekly battle rhythm events.

27. Double the number of leaders and supervisors in the FLC Pearl Harbor Fuels Department. Specifically, work with CNPC to identify a post-command O-5/O-6 line officer (or Supply Corps officer with significant leadership and Fuels Director experience) to serve as the FLC Pearl Harbor Fuels Department Director. Re-designate the current Fuels Director as the Fuels Officer, and assign an additional, qualified officer to that position as his or her assistant. Assign an additional GS-14 (or military equivalent) as an assistant to the Deputy Fuels Officer. A senior enlisted advisor and a cadre of three to four Chief Petty Officers should also be assigned to the Fuels Department. These leaders and supervisors will be in excess of current billets in the near term.

28. Review officer assignment policies for FLC Pearl Harbor. Officers assigned to CO, XO, and Fuels Director should require additional vetting as part of the detailing process (similar to Submarine Force detailing to "watch list" ships). Additionally, the CO or XO should have prior fuels experience, and the Fuels Director should have prior fuels experience (*i.e.*, Fuels Intern or previous Fuels Director assignment). Issue formal detailing policy guidance to this effect.

29. [redacted]

30. [redacted]

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[redacted]

31. Include incident response in the formal operational readiness certification. At a minimum, conduct an evaluated spill response drill with participation by all commands with Red Hill incident responsibilities. Satisfactory performance by all commands (or satisfactory performance upgrades) should be required.

Long-Term Actions

32. Conduct formal manpower assessments and coordinate with OPNAV to resource all manpower requirements associated with Red Hill operations, maintenance, and oversight. Coordinate with CNPC/NAVMAC to conduct these assessments for NAVSUP (including NPO Fort Belvoir and NPO Hawaii) and FLC Pearl Harbor Fuels Department.

33. Conduct annual material, operational, and incident response readiness inspections similar to the certification events described above. Conduct periodic assist visits and readiness evaluations as required.

34. Evaluate the feasibility of a GOCO model for Red Hill.

35. [redacted]

Commander, Navy Region Hawaii

Actions Prior to Resuming Operations

36. Assist FLC Pearl Harbor with the recommended actions above.

37. Lead a comprehensive overhaul of Red Hill incident response plans. Recommended improvements include making the plan scalable, employing the full range of CNRH and JBPHH resources available to respond to all spills, defining key terms used during response (e.g., "spill" vs. "release," "contained," etc.), and protecting the drinking water system by securing the Red Hill well until samples confirm no release to the environment. Coordinate these updates with regulatory partners. COMPACFLT should approve updated Red Hill incident response plans.

38. Consider streamlining reporting requirements in the event of a Red Hill incident. One senior officer should contact senior government officials for unity of message. Additionally, consider use of an automated text message system (*e.g.*, AtHoc) to keep stakeholders informed.

39. Investigate the cause of elevated sample results at groundwater monitoring well 02 and the tank 17 soil vapor monitoring port.

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Long-Term Actions

40. Conduct a formal manpower assessment and coordinate with CNIC to resource all manpower requirements associated with Red Hill environmental monitoring and oversight, incident response, and requirements related to complying with the AOC. Coordinate with CNPC/NAVMAC to conduct these assessments for CNRH and JBPHH.

41. Establish a region-specific Support Agreement with FLC Pearl Harbor as required by the MOA between CNIC and NAVSUP. [Encl (38)]

Commander, Navy Installations Command

Actions Prior to Resuming Operations

42. (b) (5) [redacted]

Long-Term Actions

43. (b) (5) [redacted]

Commander, Navy Facilities and Engineering Systems Command, Hawaii

Actions Prior to Resuming Operations

44. Assist FLC Pearl Harbor and CNRH with the recommended actions above.

Commander, Navy Facilities and Engineering Systems Command, Pacific

Actions Prior to Resuming Operations

45. Develop an enhanced water sample testing capability on Oahu. NAVFAC EXWC has entered into an agreement with the University of Hawaii to purchase the required equipment and to fund the first 6 months of operation.

46. Develop a water treatment capability at Red Hill. COMPACFLT has tasked NAVFAC with planning and designing a drinking water treatment system at the Red Hill well vicinity to comply with safe drinking water act standards.

Long-Term Actions

47. Evaluate whether NAVFAC Hawaii is appropriately resourced to award contract funds in support of Red Hill maintenance, operations, and environmental monitoring. Coordinate with NAVFAC to resource any additional requirements.

Commander, Navy Facilities and Engineering Systems Command

Actions Prior to Resuming Operations

48. (b) (5) [redacted]

49. (b) (5) [redacted]

Long-Term Actions

49. (b) (5) [redacted]

Chief of Naval Operations

Long-Term Actions

50. Evaluate, via the Learning to Action Board process, the C2 for Navy DFSPs to determine if technical expertise, responsibility, authority, and accountability can be better aligned.

51. Conduct a comprehensive review of all Navy DFSP material, operational, and incident response readiness. The Navy manages 48 unique DFSPs, and many of the risks identified in this report are not unique to Red Hill. Given the number of stakeholders, this is likely beyond the capacity of NAVSUP alone to conduct.

Additional Recommendations

52. (b) (5) [redacted]
(b) (5)

Additional Investigations

The following issues were identified but deemed outside the scope of this investigation. They warrant further consideration.

53. (b) (5) [redacted]

54. (b) (5) [redacted]
(b) (5)

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APPENDIX A
Enclosures

(1) COMPACFLT ltr 5830 Ser N00/1232 of 23 Nov 21
(2) COMPACFLT ltr 5830 Ser N00/1260 of 3 Dec 21
(3) COMPACFLT ltr 5830 Ser N00/1275 of 9 Dec 21
(4) COMPACFLT ltr 5830 Ser N00/1279 of 10 Dec 21
(5) NAVSUPINST 5450.139 - Missions, Functions, and Tasks of NAVSUP FLC Pearl Harbor (8 September 2020)
(6) NAVSUPFLCPHINST 5450.3T - Missions, Functions, and Organizations (13 May 2021)
(7) NAVSUPFLCPHINST 5450.3S - Missions, Functions, and Organizations (31 July 2018)
(8) MOA between NAVSUP and NAVFAC - 5 August 2014 (Regional POL Engineers)
(9) DFSP Pearl Harbor Bulk Terminal Operation, Maintenance, Environmental, and Safety Plan (August 2018)
(10) NAVFAC Concept of Operations (April 2021)
(11) USN Regulations, Chapter 7 - Commanders in Chief and Other Commanders
(12) USN Regulations, Chapter 8 - The Commanding Officer
(13) Interview Summary - CAPT Trent Kalp, SC, USN
(14) Interview Summary - CAPT Albert Hornyak, SC, USN
(15) Email from Supply Corps Assistant Commander Detailer ICO FLC XO Positions (10 January 2022)
(16) NAVSUP DFSP Snapshot
(17) Interview Summary - (b) (6), (b) (7)(C), SC, USN
(18) Position Description ICO Supervisory Program (October 2019)
(19) Interview Summary - (b) (6), (b) (7)(C)
(20) DLA Energy Accountability and Custodial Responsibilities P-7 (5 February 2014)
(21) Interview Summary - (b) (6), (b) (7)(C), SC, USN
(22) Interview Summary - (b) (6), (b) (7)(C), SC, USN
(23) NAVSUPFLCPH 7320 - Appointment as Responsible Officer for Personal Property ICO (b) (6), (b) (7)(C) (16 June 2020)
(24) NAVSUPFLCPH 4020 Appointment of Responsible Officer (b) (6), (b) (7)(C) (16 December 2020)
(25) NAVSUPFLCPH 7320 - Appointment as Responsible Officer ICO (b) (6), (b) (7)(C) (9 September 2021)
(26) NAVSUP FLCPH Relief of Department Director ICO (b) (6), (b) (7)(C) (9 September 2021)
(27) FLC Pearl Harbor Fuels Department FY22 Actual Organization Chart (6 December 2021)
(28) Interview Summary - (b) (6), (b) (7)(C)
(29) NAVSUP FLC Pearl Harbor CO - Letter of Instruction ICO (b) (6), (b) (7)(C), SC, USN (11 February 2021)
(30) COMNAVREGHIINST 3120.2D – CNRH SORM (9 March 2018)
(31) MOA between DLA Energy and NAVFAC - 6 October 2018 (Fund Program Execution for SRM Capitalized D33 Navy Fuel Facilities)
(32) OPNAVIST 5090.1E – Environmental Readiness Program Manual (25 June 2021)
(33) Interview Summary - CAPT Gordie Meyer, CEC, USN
(34) OPNAVINST 5450.348A - Missions, Functions, and Tasks of NAVFAC (23 June 2021)

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(35) Interview Summary - (b) (6), (b) (7)(C), CEC, USN
(36) NAVFAC Hawaii Red Hill PMO Director Missions, Functions, and Tasks - (b) (6), (b) (7)(C) (b) (6), (b) (7)(C) Email from 3 January 2022
(37) MOA between NAVSUP and CNIC - 30 April 2015 (Management of Bulk Fuel)
(38) CNICINST 5450.8B - Missions, Functions, and Tasks of CNRH (16 April 2013)
(39) (b) (5)
(40) Red Hill Administrative Order on Consent
(41) Interview Summary – (b) (6), (b) (7)(C)
(42) Interview Summary – RDML Robert Chadwick, USN
(43) Interview Summary – RDML Timothy Kott, USN
(44) MOA between DLA Energy and NAVSUP GLS - 22 December 2015 (Funding Fuel Terminal Operations)
(45) DoD 5101.08E CH-2 - DoD EA for Bulk Petroleum (2 May 2019)
(46) Interview Summary - (b) (6), (b) (7)(C), SC, USN
(47) OPNAVINST 4020.27 - Capitalized Bulk Fuel Tank Management at Navy Installations (8 September 2017)
(48) Institute for Defense Analysis - Bulk Fuel Infrastructure Final (December 2018)
(49) DELETED
(50) CNRH Integrated Contingency Plan - Appendix I Drainage and Containment
(51) CNRH Red Hill Fuel Storage Facility Response Plan (August 2020)
(52) NAVFAC PAC Interim Update on the Final Groundwater Protection Plan (August 2014)
(53) Interview Summary - (b) (6), (b) (7)(C)
(54) Interview Summary - (b) (6), (b) (7)(C)
(55) Johnson Controls Field Service Report on Red Hill (21 December 2017)
(56) Email from (b) (6), (b) (7)(C) ICO Red Hill Fire Suppression System Maintenance Efforts (9 January 2022)
(57) Interview Summary – (b) (6), (b) (7) (Second Interview)
(58) Sump Drain Line and AFFF Drain Line Brief (CNRH and NAVFAC)
(59) UFC Fire Protection Engineering for Facilities 2016
(60) Interview Summary - (b) (6), (b) (7)(C)
(61) P-1551 Red Hill Retention Drain Line Modification (21 December 2017)
(62) Image of Soil Vapor Monitoring Well with Port Cover Removed
(63) Email from NAVFAC HI CO to CNRH Regarding Water Distribution Efforts (29 November 2021)
(64) NAVSUP Command Investigation Report Regarding 6 May 2021 JP-5 Spill
(65) DFSP Pearl Harbor Combined AFHE Event and Alarm Logs for 6 May 2021
(66) DFSP Pearl Harbor AFHE Tank Data for 6 May 2021
(67) Hawaii Administrative Rules (HAR) 11-280.1 (11 November 2021)
(68) FLC Pearl Harbor Fuels Department Operations Orders (1 May - 20 November 2021)
(69) Red Hill and Hickam UST Operation Permit Draft (Effective: July 2019; Expires: July 2024)
(70) Enclosures to NAVSUP Command Investigation Report Regarding 6 May 21 JP-5 Spill
(71) Interview Summary - (b) (6), (b) (7)(C)
(72) NAVFAC Hawaii Red Hill PMO Director Brief on Red Hill NAVFAC Status (16 November 2021)

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(73) Red Hill Root Cause Analysis Memo and Report Regarding 6 May 2021 JP-5 Spill (7 September 2021)
(74) JBPHH-Red Hill HI - 2021 Semi-Annual Bulk Fuel Constructed Storage Tanks Leak Detection Testing Report (June 2021)
(75) Red Hill Tank OOS Historical
(76) Unified Facilities Criteria (UFC) 3460.1 – Design: Petroleum Fuel Facilities
(77) DLA AFHE Master Operational Schematic as of 6 March 2020
(78) Interview Summary - (b) (6), (b) (7)(C)
(79) Interview Summary - (b) (6), (b) (7)(C)
(80) FLC Pearl Harbor Fuels Department Operators Monthly Work Schedule (Red Hill)
(81) CRO Logs 5 May 2021, 28-29 September 2021, 19-22 November 2021
(82) Red Hill Rover Check-list 5-7 May 2021, 28-29 September 2021, 20-22 November 2021
(83) Interview Summary - (b) (6), (b) (7)(C)
(84) Interview Summary - (b) (6), (b) (7)
(85) Interview Summary - (b) (6), (b) (7)(C)
(86) FLC Pearl Harbor Fuels Department Estimates of Fuel Recovered after 6 May 2021 JP-5 Spill
(87) Interview Summary - (b) (6), (b) (7)(C)
(88) Interview Summary - (b) (6), (b) (7)(C)
(89) Powerpoint of Red Hill AFFF Retention Sketch Revision 1 (Created: 22 November 2021)
(90) Interview Summary - (b) (6), (b) (7)(C)
(91) Interview Summary (b) (6), (b) (7)(C)
(92) Interview Summary - (b) (6), (b) (7)
(93) FLC Pearl Harbor Timeline of Incident and Action 6 May 2021
(94) FEDFIRE Red Hill NFIRS for 6 May 2021 Spill
(95) Interview Summary - FEDFIRE
(96) Interview Summary - (b) (6), (b) (7)
(97) CNRH 5750 - Designation as FOSC Representative, NOSC Representative, and QI ICO (b) (6), (b) (7)(C) (12 February 2021)
(98) CNRH Integrated Contingency Plan - Core Plan (May 2014)
(99) CNRH Combined Integrated Contingency Plan (August 2018)
(100) Interview Summary - (b) (6), (b) (7)(C)
(101) Fire Suppression Reclamation System Record Drawings
(102) P-1551 Design Drawings, Change R, (Signed 22 June 2018) (flattened and half size)
(103) Three-Way Phone call with FLC PH CO, Deputy Fuels Director, and Fuels Director (6 May 2021)
(104) NAVSUPINST 3020.2E - NAVSUP HQ CCIRs (8 June 2021)
(105) Email from FLC PH CO to COMNAVSUP - Red Hill Fuel Release (7 May 2021)
(106) COMNAVREGHICOMNAVSURGRUMIDPACINST 5214.1 - CNRH and CNSG MIDPAC CCIRs (21 January 2020)
(107) NAVSUP FLC Pearl Harbor CCIRs and Voice Reports 7 MAY 21
(108) OPNAVINST F3100.6K – Special Incident Reporting (10 August 2021)
(109) Interview Summary - (b) (6), (b) (7)(C), USN
(110) Interview Summary - (b) (6), (b) (7)(C)
(111) CPF, COMNAVSUP, FLC Pearl Harbor CO Emails ICO 6 May 2021 JP-5 Spill
(112) Interview Summary - (b) (6), (b) (7)(C), SC, USN

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(113) Email from FLC Pearl Harbor XO with Reports (CCIRs and OPREPs) from 6 May 2021 Spill
(114) Interview Summary - (b) (6), (b) (7)(C)
(115) P-40 DFSP Pearl Harbor Red Hill Tank 20-001
(116) FLC Pearl Harbor Training Timeline After 6 May 2021 Spill
(117) DLA Energy P-1, CH-3 (4 April 2019)
(118) Documentation Regarding Other Explanations For Missing 20,000 Gals (26 May 2021)
(119) Inventory JP-5 MFR for 6 May 2021
(120) FLC Pearl Harbor Fuels Department Estimated JP-5 Volume Release at Tanks 19 and 20 - 7 May 2021
(121) Excel Spreadsheet with Estimated JP5 Line Volume Release (17 May 2021)
(122) FuelsManager Defense (FMD) Ledger May 2021
(123) Email from CAPT Kalp to Investigation Team Responding to RFI (557 gallons) (11 January 2022)
(124) Email from CAPT Kalp to Investigation Team Responding to RFI (11 January 2022)
(125) FLC Pearl Harbor CO Memorandum for the Record ICO (b) (6), (b) (7)(C) (11 May 2021)
(126) Interview Summary - (b) (6), (b) (7)(C)
(127) Powerpoint Presentation on Red Hill JP-5 Line Column Separation (Created: 28 June 2021)
(128) Email from CNRH to NAVSUP ICO Red Hill Pipe Failure on 6 May 2021 (9 May 2021)
(129) Interview Summary - RADM John Korka, CEC, USN
(130) NAVSUP Command Investigation of 13 August 2021
(131) Interview Summary - (b) (6), (b) (7)(C)
(132) Interview Summary- RADM Pete Stamatopoulos, SC, USN
(133) Email from FLC Pearl Harbor CO to NAVFAC Hawaii CO Regarding 6 May 2021 Spill Release and Recovery Calculations (5 October 2021)
(134) Email from NPO Deputy OIC Regarding Draft Red Hill Investigation Deliverables (8 June 2021)
(135) Amendment to NAVSUP Command Investigation Regarding 6 May 2021 JP-5 Spill
(136) Email from NAVFAC HI EV Business Line Leader Regarding 6 May 2021 Spill Reporting Made to the State of Hawaii DOH (11 January 2022)
(137) (b) (6), (b) (7)(C) Interview RFIs
(138) Interview Summary – (b) (6), (b) (7)(C) (Second Interview)
(139) FLC Pearl Harbor Fuels Department Qualifications and Training Programs
(140) Email from NAVSUP to CPF Regarding 6 May 2021 Spill (17 September 2021)
(141) (CUI-AWP) Email from FLC Pearl Harbor CO to COMNAVSUP ICO Update to COM Regarding Red Hill Permit and 6 May 2021 Spill (28 September 2021)
(142) (CUI-AWP) Email from FLC Pearl Harbor CO to COMNAVSUP ICO Update to COM Regarding Red Hill Permit and 6 May 2021 Spill – CPF to INDOPACOM (1 October 2021)
(143) Email to Pond Regarding FOR Trench Concrete Repair (13 July 2021)
(144) Red Hill Notice of Interest - Sampling Results (10 May 2021 - 2 December 2021)
(145) NAVSUP FLC Pearl Harbor FY21 MIC Checklists
(146) FLC Pearl Harbor and NAVFAC EV Red Hill Remedial Actions after 6 May 2021 Spill
(147) 6 May 2021 and 20 November 2021 GW Sampling Plan as of 9 December 2022

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(148) Email from FLC Pearl Harbor CO to COMNAVSUP Regarding Elevated GW Samples (30 June 2021)
(149) Austin Brockenbrough 6 May 2021 Loss Calculations (6 December 2021)
(150) Email from C700 Engineer Regarding F-24 Pipeline (1 October 2021)
(151) Interview Summary - (b) (6), (b) (7)(C)
(152) Interview Summary - (b) (6), (b) (7)(C)
(153) Interview Summary - (b) (6), (b) (7)(C)
(154) (CUI) Email from C700 Engineer to C700 Deputy Fuels Director - Red Hill Pipeline Pressure Surges (12 October 2021)
(155) FLC Pearl Harbor Red Hill AFHE Data - All Events (21 - 29 September 2021)
(156) Email from FLC Pearl Harbor CO ICO Response to RFI Regarding 29 September 2021 Pressure Surge (10 January 2022)
(157) FLC Pearl Harbor Timeline of Events - 29 September 2021
(158) (CUI-AWP) Email from FLC Pearl Harbor CO to COMNAVSUP – Red Hill Discussion Items (10 November 2021)
(159) (CUI) Email from CPF to CNO and Follow-on Discuss with FLC Pearl Harbor CO, PACFLT N4, and COMNAVSUP (13 November 2021)
(160) Email from FLC Pearl Harbor CO to COMNAVSUP Red Hill F-24 Pipeline Transient Surge
(161) FLC Pearl Harbor Fuels Department Investigation ICO 29 September 2021
(162) Email from FLC Pearl Harbor CO to COMNAVSUP Regarding 29 September 2021 Pressure Surge (3 October 2021)
(163) Red Hill F-24 Pipeline Transient Surge
(164) Email from Fuels Director Responding to RFI on 29 September 2021 Pressure Surge (10 January 2022)
(165) FLC Pearl Harbor CO to COMNAVSUP Email ICO 29 September 2021 Pressure Surge
(166) Excel Spreadsheet with Underground Pump House PIT Pressures (5 October 2021)
(167) NAVFAC EXWC Modification Contract Request in January 2022
(168) FLC Pearl Harbor Timeline of Events - 20 November 2021
(169) Compilation of Images Taken on Red Hill Tour on 30 November 2021
(170) P-40 DFSP Pearl Harbor Red Hill Adit 3 Release Report
(171) Interview Summary – (b) (6), (b) (7)(C)
(172) FLC Pearl Harbor Endorsed Preliminary Inquiry ICO Release from Fire Suppression Drain Line at Red Hill (9 December 2021)
(173) 20 November 2021 Video - 11 Seconds
(174) 20 November 2021 Video - 11.2 Seconds
(175) 20 November 2021 Video - 12 seconds
(176) 20 November 2021 Video - 43 Seconds
(177) Red Hill Fuel Inventory 20 December 2021
(178) Image of Fire Suppression System Retention Line Low Point Drain with Plug (Taken: 20 November 2021)
(179) Image of Fire Suppression System Retention Line Low Point Drain Valve with Paint Missing from Hand Wheel (Taken: 20 November 2021)
(180) Image of Fire Suppression System Retention Line in Adit 3 (Taken: 20 November 2021)
(181) Image of Fire Suppression System Retention Line Low Point Drain with Plug, Alternate View (Taken: 20 November 2021)

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(182) Image of Leak in Adit 3 on 20 November 2021(Taken: 20 November 2021)
(183) DELETED
(184) DELETED
(185) DELETED
(186) Image of Fire Suppression Retention Line Low Point Drain Valve with leak on 20 November 2021 (Taken: 20 November 2021)
(187) Red Hill AFFF Retention Line Low-point Drain Rupture 20 November 2021
(188) Compilation of Images Taken on Red Hill Tour on 7 December 2021
(189) Interview Summary - CAPT Albert Hornyak, SC, USN (Second Interview)
(190) Interview Summary - (b) (6), (b) (7)(C)
(191) Interview Summary – CAPT Gordie Meyer, CEC, USN (Second Interview)
(192) FEDFIRE Red Hill NFIRS for 20 November 2021 Spill
(193) Interview Summary - (b) (6), (b) (7)(C), CEC, USN (Second Interview)
(194) Recorded Interview ICO (b) (6), (b) (7)(C), SC, USN (Part 2) (9 December 2021)
(195) ESAMS 20 November 2021 - Red Hill Rovers
(196) Email from (b) (6), (b) (7)(C) on 13 January 2022
(197) Interview Summary - (b) (6), (b) (7)
(198) Interview Summary - (b) (6), (b) (7)(C)
(199) Text Messages from 20 November 2021 between FLC Pearl Harbor CO, NAVFAC Hawaii CO, and CNRH COS
(200) Text Messages from 20 November 2021 with JB4, NAVFAC HI OPS, NAVFAC HI CDO, and NAVFAC HI Red Hill PMO Director
(201) OPNAVINST 11320.23G – Navy Fire and Emergency Services Program (4 February 2013)
(202) Compilation of Images Taken on Red Hill Tour on 17 December 2021
(203) (CUI) Email from CNRH to PACFLT DCOM Regarding 20 November 2021 Spill (21 November 2021)
(204) NAVSUPFLCPHINST 11162 – FLC Pearl Harbor Code 700 Standing Orders (21 December 2021)
(205) CNRHINST 3440.18 – CNRH Red Hill Bulk Fuel Storage Facility Emergency Response Notification Coordination Plan
(206) FLC Pearl Harbor OPREP-3 Navy Blue (DTG: 220145Z NOV 21)
(207) Email from FLC Pearl Harbor XO to COMNAVSUP – Update on 20 November 2021 Spill (21 November 2021)
(208) NAVSUPINST 3020.2D - CCIRs (1 February 2019)
(209) Text Message Between the NOSC and NAVFAC Hawaii Red Hill PMO Director (20 November 2021)
(210) Email from NAVFAC HI CO to CNRH ICO 20 November 2021 Spill (21 November 2021)
(211) CCIR Email from NAVFAC HI CO to NAVFAC PAC Regarding 20 November 2021 Spill (21 November 2021)
(212) Email from FLC Pearl Harbor CO to COMNAVSUP with Details from 20 November 2021 Spill (21 November 2021)
(213) Email from FLC Pearl Harbor CO to COMNAVSUP Regarding 20 November 2021 Spill (22 November 2021)

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(214) Email from FLC Pearl Harbor XO to COMNAVSUP Regarding 20 November 2021 Spill (22 November 2021)
(215) FLC Pearl Harbor OPREP-3 Navy Blue (DTG: 220145Z NOV 21)
(216) CNRH Media Release on 21 November 2021
(217) Email from AECOM with Preliminary Lab Results from Water Samples Collected on 24 November 2021 (6 December 2021)
(218) Interview Summary - (b) (6), (b) (7)(C)
(219) Powerpoint Presentation of Adit 3 Tunnel Penetrations (Created: 10 January 2022)
(220) Powerpoint Presentation of Adit 3 Tunnel Concrete Imperfections (Created: 10 January 2022)
(221) FLC Pearl Harbor Adit 3 (Encls 2-14)
(222) Tech Study of Possible Contamination of Basal Water Sources From RH Underground Fuel Storage (1949)
(223) Information Paper from (b) (6), (b) (7)(C) ICO Evaluation of Potential of Contamination of Red Hill Shaft (5 January 2022)
(224) Red Hill Layout Plan Schematics
(225) Interview Summary - AECOM
(226) Powerpoint Presentation of Groundwater Monitoring Wells (Created: 8 December 2021)
(227) NAVSUP FLC Pearl Harbor Fuel Inventory Recovery Numbers (27 December 2021)
(228) Excel Spreadsheet with Loss and Recovery Inventory as of 8 January 2022
(229) NAVFAC PAC Contract with GSI (14 December 2021)
(230) Interview Summary - GSI North America Inc.
(231) NAVSUPINST 1412.1B - Supply Corps Officer (310X) Commander Milestone and Captain Major Command Ashore Requirements and Assignments (22 April 2019)
(232) OPNAV NOTICE 5450 - Sequential and Major Command Plan (30 October 2020)
(233) Navy Supply Corps, It's Your Board
(234) OPNAVINST 1412.14 – Command Qualification Program (4 June 2012)
(235) MILPERSMAN 1301-906 – Navy Officer Leadership Continuum Program, CH-74 (7 March 2021)
(236) Naval Justice School - Senior Officers' Course - U.S. Navy JAG Corps
(237) Navy Leadership Development Framework 3.0 (May 2019)
(238) NAVADMIN 254/21 – Updates to the Navy Leadership Development Program (9 November 2021)
(239) Navy Supply Corps, Its Your Experience
(240) Interview Summary - (b) (6), (b) (7)(C)
(241) Email from FLC Pearl Harbor Regarding SMRD Response (7 January 2022)
(242) FLC Pearl Harbor Fuels Department FY22 Organizational Chart (22 November 2021)
(243) FLC Pearl Harbor Fuels Department with Division Break-Down (31 December 2021)
(244) FLC Pearl Harbor Fuels Department Labor Requirement (Created: 18 March 2021)
(245) Interview Summary – (b) (6), (b) (7)(C)
(246) FLC Pearl Harbor Fuels Department (C703) Chart Schedule for 2021
(247) FLC Pearl Harbor Fuels Department Overtime Hours from October 2020 to December 2021
(248) FLC Pearl Harbor Fuels Department Manning Request (31 December 2021)
(249) Email from FLC Pearl Harbor Regarding FLC Pearl Harbor Manpower Responses (9 January 2022)

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(250) Email from FLC Pearl Harbor CO to COMNAVSUP (24 November 2021)
(251) Operations Orders from 22 November - 28 December 2021
(252) Blank Computer-Based Training (CBT) Qualifications Checklist
(253) Interview Summary - (b) (6), (b) (7)(C)
(254) DFSP Pearl Harbor C703 CBT Qualifications (11 January 2022)
(255) Interview Summary - (b) (6), (b) (7)(C)
(256) Email from COMNAVSUP to FLC Pearl Harbor CO Regarding NAVSUP Command Investigation ICO 6 May 2021 Spill (17 September 2021)
(257) Interview Summary - Signature Flight Services
(258) Email from FLC Pearl Harbor Regarding CCTV Footage – No video footage from 6 May 2021 or 20 November 2021 Available (10 January 2021)
(259) Email from FLC Pearl Harbor Regarding NIWC Pacific Statement of Work for C700 CCTV Cameras (23 November 2021)
(260) Historical Emails from FLC Pearl Harbor Deputy Fuels Director Regarding PIT Request for Red Hill (December 2018)
(261) FLC Pearl Harbor PIT Request (December 2018)
(262) Email from FLC Pearl Harbor XO Responding to RFI on PIT Contract Delay (11 January 2022)
(263) DoDD 5105.22 – Defense Logistics Agency (DLA) (29 June 2017)
(264) OPNAVINST 5450.4T - Standard Navy Distribution List Shore Chain of Command under SECNAV and CNO (1 December 2021)
(265) OPNAVINST 5450.337B - Missions, Functions, and Tasks of U.S. Pacific Fleet (21 January 2016)
(266) Organization and Management of the DoD Resource Guide v3.2 (March 2019)
(267) OPNAVINST 5450.349A Mission, Functions and Tasks of Commander, Naval Supply Systems Command
(268) [redacted]
(269) COMPACFLT EXORD DTG 110411Z DEC 21
(270) United States Navy Regulations
(271) NAVSUPINST 5400.4Q – NAVSUP Headquarters Organization Manual (2 October 2017)
(272) FLC Pearl Harbor Visual Inspection Checklist for Piping Systems Discrepancy List - Zone Inspection 7 Hotel Pier (9 September 2021)
(273) Naval Petroleum Office Overview Brief (Modified: 8 May 2020)
(274) OPNAVINST 5450.349A - Missions, Functions and Tasks of NAVSUP (16 December 2019)
(275) Interview Summary - RDML Dion English, SC, USN
(276) MOA between NAVSUP and NAVFAC – 19 April 2017 (Regional POL Engineers)
(277) Interview Summary - (b) (6), (b) (7)(C)
(278) COMNAVREGHIINST 5450.1 – Missions, Functions, and Tasks (Not Signed)
(279) JBPHHINST 3440.17D – JBPHH Installation Emergency Management Plan (27 February 2018)
(280) JBPHH Emergency Management Plan – Appendix 05: Hazardous Materials Spill / Release (26 October 2015)
(281) JBPHHINST 3440.17E – JBPHH Emergency Management Program (20 June 2021)
(282) Interview Summary - RADM Dean VanderLey

Marking Removed

(283) NAVFACPACINST 5401.3 – Missions, Functions, and Tasks of NAVFAC Hawaii (DRAFT)
(284) Email from PACFLT N4 to PACFLT CAG ICO Draft NAVSUP Red Hill Investigation After 6 May 2021 Spill (7 July 2021)
(285) Naval Petroleum Operations Functions Brochure
(286) Interview Summary - (b) (6), (b) (7)(C), SC, USN
(287) DLA Energy P-14 – Causative Research and Financial Liability Investigation of Property Loss, CH-1 (25 April 2018)
(288) NAVSUP Report of Inspection of FLC Pearl Harbor (13 May 2019)
(289) FLC Pearl Harbor P-14 Causative Research, Trends of Gains/Losses 2019 through 2021 (Modified: 1 December 2021)
(290) NPO Summary of 2019 NAVSUP IG Fuels Department RFI Response (11 January 2022)
(291) 33 Code of Federal Regulations (C.F.R.) Part 154
(292) Yelomine Material Change Submittal (24 March 2016)

APPENDIX B
References

(a) JAGINST 5800.7G (JAGMAN)
(b) The Manual for Courts-Martial (MCM), 2019
(c) NAVSUPINST 5450.139 - Missions, Functions, and Tasks of NAVSUP FLC Pearl Harbor (8 September 2020)
(d) NAVSUPFLCPHINST 5450.3T - Missions, Functions, and Organizations (13 May 2021)
(e) NAVSUPFLCPHINST 5450.3S - Missions, Functions, and Organizations (31 July 2018)
(f) U.S. Navy Regulations (1990)
(g) COMNAVREGHIINST 3120.2D – CNRH Standard Organization and Regulations Manual (9 March 2018)
(h) OPNAVIST 5090.1E – Environmental Readiness Program Manual (25 June 2021)
(i) OPNAVINST 5450.348A - Missions, Functions, and Tasks of NAVFAC (23 June 2021)
(j) CNICINST 5450.8B - Missions, Functions, and Tasks of CNRH (16 April 2013)
(l) DoD 5101.08E CH-2 - DoD EA for Bulk Petroleum (2 May 2019)
(m) OPNAVINST 4020.27 - Capitalized Bulk Fuel Tank Management at Navy Installations (8 September 2017)
(n) UFC Fire Protection Engineering for Facilities 2016
(o) Hawaii Administrative Rules (HAR) 11-280.1 (11 November 2021)
(p) Unified Facilities Criteria (UFC) 3460.1 – Design: Petroleum Fuel Facilities
(q) NAVSUPINST 3020.2E - NAVSUP HQ CCIRs (8 June 2021)
(r) COMNAVREGHICOMNAVSURGRUMIDPACINST 5214.1 - CNRH and CNSG MIDPAC CCIRs (21 January 2020)
(s) OPNAVINST F3100.6K – Special Incident Reporting (10 August 2021)
(t) NAVSUPFLCPHINST 11162 – FLC Pearl Harbor Code 700 Standing Orders (21 December 2021)
(u) NAVSUPINST 3020.2E - NAVSUP HQ CCIRs (8 June 2021)
(v) NAVSUPINST 1412.1B - Supply Corps Officer (310X) Commander Milestone and Captain Major Command Ashore Requirements and Assignments (22 April 2019)
(w) OPNAV NOTICE 5450 - Sequential and Major Command Plan (30 October 2020)
(x) OPNAVINST 1412.14 – Command Qualification Program (4 June 2012)
(y) MILPERSMAN 1301-906 – Navy Officer Leadership Continuum Program, CH-74 (7 March 2021)
(z) DoDD 5105.22 – Defense Logistics Agency (DLA) (29 June 2017)
(aa) OPNAVINST 5450.337B - Missions, Functions, and Tasks of U.S. Pacific Fleet (21 January 2016)
(ab) OPNAVINST 5450.349A Mission, Functions and Tasks of Commander, Naval Supply Systems Command (16 December 2019)
(ac) OPNAVINST 5450.339 - Missions, Functions, and Tasks of CNIC (21 April 2004)
(ad) COMNAVREGHIINST 5450.1 – Missions, Functions, and Tasks (Not Signed)
(ae) DLA Energy P-14 – Causative Research and Financial Liability Investigation of Property Loss, CH-1 (25 April 2018)
(af) 33 C.F.R. Part 154
(ag) OPNAVINST 11320.23G – Navy Fire and Emergency Services Program (4 February 2013)
(ah) NAVSUPINST 3020.2D - CCIRs (1 February 2019)

(ai) NAVADMIN 254/21 – Updates to the Navy Leadership Development Program (9 November 2021)
(aj) OPNAVINST 5450.4T - Standard Navy Distribution List Shore Chain of Commandunder SECNAV and CNO (1 December 2021)
(aj) Organization and Management of the DoD Resource Guide v3.2 (March 2019)
(ak) NAVSUPINST 5400.4Q – NAVSUP Headquarters Organization Manual (2 October 2017)

APPENDIX C
Quantities of Fuel Spilled, Recovered, and Potentially Released to the Environment

Total Fuel Spilled, Recovered, and Missing on 6 May

On 6 May 2021, Red Hill operators improperly executed a fuel transfer procedure, resulting in two piping joint ruptures and a subsequent JP-5 fuel spill. Although unknown at the time, a fire suppression system sump pump transferred most of the fuel into a retention line, where it remained until 20 November 2021.

• Fuel lost from tank 12 between rupture and tank isolation	19,866 gal
• Fuel spilled from lateral pipes connecting tanks 17/18 and 19/20, based on pipe volumes	351 gal
• Fuel "repacked" into the pipeline to fill the void drawn prior to the rupture, equal to surge tank 2 level increase prior to the incident	(1,638) gal
Total quantity of fuel spilled on 6 May 2021[1]	***18,579 gal***

• Fuel recovered from sumps and recovery tank 311	1,230 gal
• Fuel absorbed in cleanup materials	350 gal
Total quantity of fuel recovered immediately after 6 May 2021	***1,580 gal***

The quantity of fuel released to the environment on 6 May 2021cannot be calculated, but is assessed to be small. In addition to some evaporation, potential pathways to the environment in the area of the spill are three soil vapor monitoring ports in the upper tank gallery and approximately six imperfections in the concrete. The following calculations assume all unrecovered fuel from 6 May 2021 was transferred to the fire suppression system.

• Fuel spilled on 6 May 2021	18,579 gal
• Fuel recovered immediately after 6 May2021	(1,580) gal
Maximum quantity of fuel transferred to the fire suppression system	***16,999 gal***

Total Fuel Spilled and Recovered Since 20 November

On 20 November 2021, the Red Hill rover inadvertently struck the fire suppression system retention line drain valve with the passenger cart of a train, cracking the PVC pipe near Adit 3. Although not known at the time, this retention line contained JP-5 fuel from the 6 May 2021 spill. The following quantities of fuel were recovered immediately after 20 November 2021.

• Fuel recovered by vacuum trucks	10,757 gal
• Fuel recovered from Adit 3 groundwater sump pump discharge line	1,134 gal
• Fuel recovered from flushing of fuel oil recovery facility sump line	420 gal
Total quantity of fuel recovered immediately after 20 November2021	***12,311 gal***

[1] The investigation team requested an independent verification of the quantity of fuel spilled on 6 May from *Austin Brockenbrough and Associates, LLC*. That analysis is consistent with the inspection team's calculations.

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Following the 20 November 2021 spill, FLC Pearl Harbor drained fuel remaining in the fire suppression system retention line. At the time of this report, the line has not been flushed, which may recover some additional fuel.

• Fuel recovered from main sump following pumping from retention line	428 gal
• Fuel recovered from retention line low point drains	415 gal
Total quantity of fuel recovered from fire suppression system retention line	***843 gal***

Beginning in December, FLC Pearl Harbor and other organizations continued to recover fuel as it was discovered.

• Fuel recovered from Adit 3 groundwater sump discharge holding tank	235 gal
• Fuel recovered from Red Hill well shaft via skimmer pumps	140 gal
• Fuel recovered from CHT Sump[2]	148 gal
Total quantity of fuel recovered from additional locations	***523 gal***

Total Fuel Spilled, Recovered, and Unaccounted for Since 6 May

Below is a summary of the total quantities of fuel recovered since 6 May 2021 compared to the quantity spilled. A total of 3,322 gallons of fuel remain unaccounted for, and some or all of that fuel contaminated the Red Hill well and Navy water distribution system.

• Total quantity of fuel recovered immediately after 6 May 2021	1,580 gal
• Total quantity of fuel recovered immediately after 20 November 2021	12,311 gal
• Total quantity of fuel recovered from fire suppression system retention line	843 gal
• Total quantity of fuel recovered from additional locations	523 gal
Total quantity of fuel recovered since 6 May 2021	***15,257 gal***

• Total fuel spilled on 6 May 2021	18,579 gal
• Total fuel recovered since 6 May 2021	(15,257) gal
Total quantity of fuel that remains unrecovered	**3,322 gal**

[2] On 6-7 December, heavy rains flooded the Red Hill tunnel near Adit 3. This resulted in a fuel and water mixture that was collected in the CHT sump. The CHT sump pump automatically pumped the fluid to a holding tank outside Adit 3, where it was subsequently recovered.

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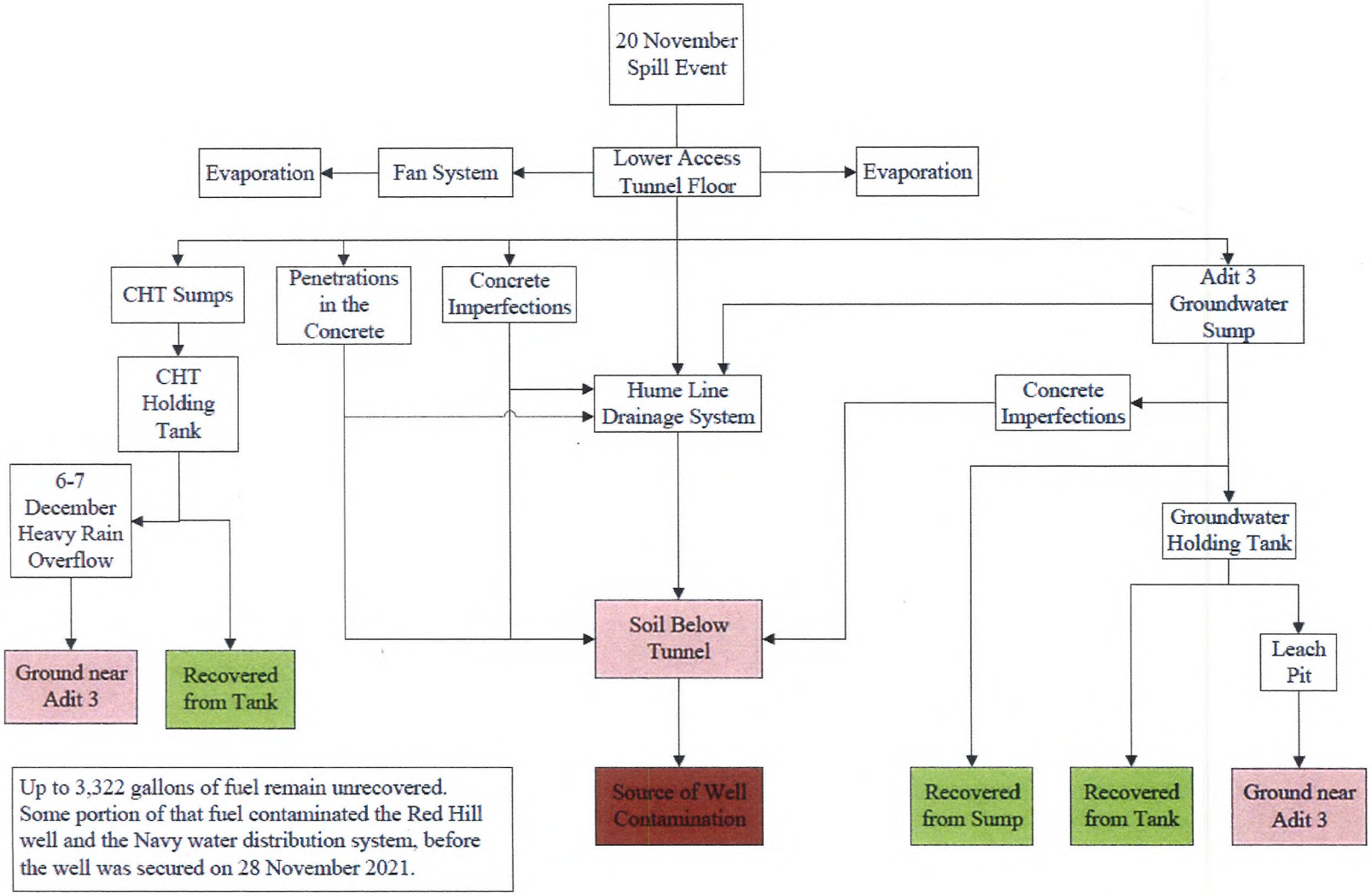
APPENDIX D
Potential Release Paths to the Environment



Up to 3,322 gallons of fuel remain unrecovered. Some portion of that fuel contaminated the Red Hill well and the Navy water distribution system, before the well was secured on 28 November 2021.

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APPENDIX E
Acronyms

ACRONYM	FULL DESCRIPTION
ADDU	Additional Duties
ADM	Admiral
AFHE	Automated Fuel Handling Equipment
AOC	Administrative Order on Consent
ASD(S)	Assistant Secretary of Defense (Sustainment)
BEC	Base Environmental Coordinator
BWS	Board of Water Supply
C2	Command and Control
CAPT	Captain
CCIR	Commander's Critical Information Requirements
CCTV	Closed-Circuit Television
CDO	Command Duty Officer
CDR	Commander
CHT	Collection, Holding, and Transfer
CIR	Clean, Inspect, and Repair
CNIC	Commander, Navy Installations Command
CNO	Chief of Naval Operations
CNPC	Commander, Navy Personnel Command
CNRH	Commander, Navy Region Hawaii
CO	Commanding Officer
COCO	Contractor-owned, Contractor-operated
CODEL	Congressional Delegation
COMPACFLT	Commander, U.S. Pacific Fleet
COS	Chief of Staff
CRO	Control Room Operator
CSG	Component Steering Group
DFSP	Defense Fuel Support Point
DOD	Department of Defense
DOH	Department of Health
DLA	Defense Logistics Agency
DWCF	Defense Working Capital Fund
EA	Executive Agent
ED	Executive Director
EPA	Environmental Protection Agency
ESAMS	Enterprise Safety Applications Management System
EXWC	Expeditionary Warfare Center
F-24	Aviation Turbine Fuel
F-76	Diesel Marine Fuel
FITREP	Fitness Report
FLC	Fleet Logistics Center
FMD	Fuels Manager Defense

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FOR	Fuel Oil Reclaimed
FORFAC	Fuel Oil Reclaimed Facility
GOCO	Government-owned, Contractor-operated
GOGO	Government-owned, Government-operated
GS	General Schedule
HFFC	Hawaii Fuel Facilities Corporation
ICP	Integrated Contingency Plan
IG	Inspector General
INDOPACOM	U.S. Indo-Pacific Command
INSURV	Board of Inspection and Survey
ISIC	Immediate Superior in Charge
JBPHH	Joint Base Pearl Harbor-Hickam
JP-5	Jet Propellant 5
LCDR	Lieutenant Commander
MAV	Material Assist Visits
MBA	Master of Business Administration
MFR	Memorandum for the Record
MILCON	Military Construction
MOA	Memorandum of Agreement
NAS	Naval Air Station
NAVFAC	Naval Facilities Engineering Systems Command
NAVMAC	Navy Manpower Analysis Center
NAVSEA	Naval Sea Systems Command
NAVSUP	Naval Supply Systems Command
NLEC	Navy Leadership and Ethics Center
NPO	Naval Petroleum Office
OHS	Oil and Hazardous Substance
OIC	Officer in Charge
OPREP	Operational Report
OSD	Office of the Secretary of Defense
PAO	Public Affairs Officer
PIT	Pressure Indicating Transmitter
PMO	Project Management Office
POL	Petroleum, Oil, and Lubricant
PPE	Personal Protective Equipment
PVC	Polyvinyl Chloride
RADM	Rear Admiral Upper Half
RDML	Rear Admiral Lower Half
REC	Regional Environmental Coordinator
ROC	Regional Operations Center
RPE	Regional POL Engineer
SC	Supply Corps
SRM	Sustainment, Restoration, and Modernization
USD(A&S)	Under Secretary of Defense (Acquisition and Sustainment)
UM	Utilities Management
UST	Underground Storage Tank

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VADM	Vice Admiral
WG	Wage Grade
XO	Executive Officer

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APPENDIX F
Command Investigation Team Members

RANK/NAME/TITLE	COMMAND	BACKGROUND
RDML Christopher Cavanaugh Investigating Officer	COMPACFLT	Submarine Officer Nuclear Qualified
(b) (6) Chief of Staff /Investigator	COMPACFLT	Former FLC Pearl Harbor XO
(b) (6) Senior Enlisted Advisor/Investigator	NAVCOMTELSTA San Diego	Command Organization Submarine Qualified
(b) (6), (b) (7)(C) Investigator	SUBPAC	Former NPO OIC
(b) (6) Investigator	COMPACFLT	Nuclear Weapons Inspector Former JBPHH XO Submarine Qualified
(b) (6) Investigator	NECC Little Creek	Former FLC Pearl Harbor Fuels Director
(b) (6) Investigator	COMPACFLT	Engineering Duty Officer Former INSURV Inspector
(b) (6) Investigator	COMPACFLT	Nuclear Propulsion Examination Board
(b) (6) Legal Advisor	RLSO SW Det Lemoore	Legal Former CNRH SJA
(b) (6) Head Legal Advisor	RLSO NW Det Hawaii	Legal
(b) (6) Legal Advisor	RLSO SE	Legal
(b) (6) Admin Support	COMPACFLT	Administration
(b) (6) Legal Support	RLSO NW Det Hawaii	Legal
(b) (6) Legal Support	RLSO SW	Legal
(b) (6) Investigator	NAVFAC EXWC	Petroleum Facilities Engineer
(b) (6) Investigator	COMPACFLT	Public Affairs Officer

EXHIBIT B

SECNAV Takes Accountability Actions Following Red Hill Investigation

28 Sep 2023

Those individuals are Rear Adm. (ret) Peter Stamatopoulos, Rear Adm. (ret) John Korka, and Rear Adm. (ret) Timothy Kott. Stamatopoulous was Commander, Naval Supply Systems Command during the spills; Korka was Commander, Navy Facilities Engineering Command (NAVFAC), Pacific before the spills; and Kott was Commander, Navy Region Hawaii during the November 2021 spill.

Secretary Del Toro issued the SLOCs based on the recommendations of Commander, U.S. Fleet Forces Command, Adm. Daryl Caudle, the Consolidated Disposition Authority (CDA) for accountability actions relating to the May and November 2021 fuel spills at the Red Hill Bulk Fuel Storage Facility. As the CDA, Adm. Caudle considered all Navy service members whose performance may have been reasonably called into question with one or both of the fuel spills.

"What happened was not acceptable and the Department of the Navy will continue to take every action to identify and remedy this issue. Taking accountability is a step in restoring the trust in our relationship with the community," said Secretary Del Toro. "We are determined and committed along with all of our partners in this effort to making the necessary changes. We can and will take care of our people, while also preserving and protecting our national security interests in the Pacific and at home. I have determined that there were no leaders in relevant positions at the Red Hill Bulk Fuel Storage Facility worthy of an end of tour award over the period in question."

The CDA issued Letters of Instruction (LOIs) to Rear Adm. Dean VanderLey and Rear Adm. (ret) Robert Chadwick. VanderLey was Commander, NAVFAC Pacific during the November 2021 spill and Chadwick was Commander, Navy Region Hawaii during the May 2021 spill.

The CDA issued Non-Punitive Letters of Censure to seven Navy captains, three of whom are pending a Board of Inquiry to decide if they may continue their naval service. The CDA also issued LOIs to one Navy commander and one Navy lieutenant commander.

These accountability actions reflect a determination that despite prior organizational challenges and continued oversight failures associated with Red Hill maintenance, modernization, operations, and response, a naval officer is never absolved of the personal requirement to discharge faithfully the duties of the office to the best of their abilities.

The Navy remains committed to environmental stewardship and continues to work closely with federal and state agencies, including the Hawaii Department of Health and the Environmental Protection Agency under an Administrative Order on Consent, to protect human health, the environment and Oahu's drinking water.

The SLOCs can be found here : 'www.secnav.navy.mil/foia/readingroom/sitepages/home.

RootFolder=%2Ffoia%2Freadingroom%2FHotTopics%2FRED%20HILL%20INVESTIGATION&FolderCTID=0x012000C9F89F68D

EXHIBIT C

THE SECRETARY OF THE NAVY
WASHINGTON, D.C. 20350-1000

SEP 2 8 2023

From: Secretary of the Navy
To: RADM Peter G. Stamatopoulos, SC, USN (ret.)

SUBJ: SECRETARIAL LETTER OF CENSURE

Ref: (a) RDML Christopher J. Cavanaugh, USN, ltr 5830 of 14 Jan 22
(b) RADM James P. Waters III, USN, ltr 5830 of 15 Apr 22
(c) U.S. Navy Regulations
(d) OPNAVINST 5450.349A
(e) JAGMAN 0114a

1. On 6 May 2021 and 20 November 2021, two fuel spills occurred at the Red Hill Bulk Fuel Storage Facility (Red Hill) and subsequently contaminated the Joint Base Pearl Harbor-Hickam water distribution system. References (a) and (b) examined the events leading to these spills and contamination. You served as Commander, Naval Supply Systems Command (NAVSUP) from 19 June 2020 through 23 June 2023. As the commander, you have the responsibility for the satisfactory accomplishment of the mission and duties assigned to your command including proper oversight and inspection of your subordinate command, Fleet Logistics Center Pearl Harbor (FLC Pearl Harbor), which manages and operates Red Hill.

2. You negligently failed to adequately perform your duties as an immediate superior in command to FLC Pearl Harbor, as required by references (c) and (d). NAVSUP did not issue policy guidance concerning qualifications, training, self-assessment, or operational practices at Defense Fuel Support Points such as Red Hill. This failure contributed to the lack of performance assessment and feedback required to ensure proper readiness to respond to a complex fuel spill inside of Red Hill. The inadequate response to the 20 November 2021 fuel spill was the primary cause of the drinking water contamination.

3. You also negligently approved an insufficient investigation of the 6 May 2021 fuel spill at Red Hill. Furthermore, once the investigation was complete you had the responsibility to review the report and return it to the investigating officer if you were not satisfied. You determined the command investigation met your expectations; however, the investigation was cursory, contained little independent analysis, did not recommend meaningful corrective actions, and failed to investigate the response efforts during the 6 May 2021 fuel spill. This inadequate investigation was the largest missed opportunity to properly identify the error in fuel accountability after the 6 May 2021 fuel spill. The failure to fully account for the fuel spilled in the 6 May 2021 incident was the primary source of the 20 November 2021 fuel spill.

4. Commanders are responsible for the proper execution of duties and performance of their subordinates. You failed to identify and mitigate against lack of oversight of contracting and installation of a critical system at Red Hill which contributed to the fuel spill and subsequent contamination of the water distribution system.

5. Accordingly, you are hereby censured for your leadership failures. A copy of this letter will be placed in your official service record per reference (e). You may forward within 15 days of receipt of this letter a rebuttal consistent with reference (e), for inclusion in your official record, if you so desire.

Carlos Del Toro

THE SECRETARY OF THE NAVY
WASHINGTON, D.C. 20350-1000

From: Secretary of the Navy
To: RADM John W. Korka, CEC, USN (ret.)

SEP 2 8 2023

SUBJ: SECRETARIAL LETTER OF CENSURE

Ref: (a) RDML Christopher J. Cavanaugh, USN, ltr 5830 of 14 Jan 22
(b) RADM James P. Waters III, USN, ltr 5830 of 15 Apr 22
(c) Unified Facilities Criteria (UFC) 3-600-01
(d) MIL-STD-3007F
(e) JAGMAN 0114a

1. On 6 May 2021 and 20 November 2021, two fuel spills occurred at the Red Hill Bulk Fuel Storage Facility (Red Hill) and subsequently contaminated the Joint Base Pearl Harbor-Hickam water distribution system. References (a) and (b) examined the events leading to these spills and contamination.

2. Between May 2017 and September 2018, as Commander, NAVFAC Pacific (NAVFAC PAC), you were responsible for providing oversight and support to Naval Facilities Engineering Systems Command Hawaii (NAVFAC Hawaii). You failed to ensure NAVFAC Hawaii complied with the requirements and procedures set forth in references (c) and (d) during the contracting and installation of the Aqueous Film Forming Foam (AFFF) system (P-1551). You also failed to exercise proper oversight of the NAVFAC PAC team responsible for the engineering, design, and construction management of the AFFF system. These failures resulted in the use and acceptance of PVC piping in the AFFF waste system, an unauthorized material in violation of reference (c). Ultimately, the use of PVC piping in the AFFF waste system was a proximate cause of the fuel spill at Red Hill Bulk Fuel Storage Facility.

3. Commanders are responsible for the proper execution of duties and performance of their subordinates. You failed to identify and mitigate against lack of oversight of contracting and installation of a critical system at Red Hill which contributed to the fuel spill and subsequent contamination of the water distribution system.

4. Accordingly, you are hereby censured for your leadership failures. A copy of this letter will be placed in your official service record per reference (e). You may forward within 15 days of receipt of this letter a rebuttal consistent with reference (e), for inclusion in your official record, if you so desire.

Carlos Del Toro

THE SECRETARY OF THE NAVY
WASHINGTON, D.C. 20350-1000

From: Secretary of the Navy
To: RDML Timothy J. Kott, USN (ret.)

SEP 2 8 2023

SUBJ: SECRETARIAL LETTER OF CENSURE

Ref: (a) RDML Christopher J. Cavanaugh, USN, ltr 5830 of 14 Jan 22
(b) RADM James P. Waters III, USN, ltr 5830 of 15 Apr 22
(c) CNICINST 5450.8B
(d) OPNAV M-5090.1E
(e) OPNAVINST 3440.17A
(f) JAGMAN 0114a

1. On 6 May 2021 and 20 November 2021, two fuel spills occurred at the Red Hill Bulk Fuel Storage Facility (Red Hill) that subsequently contaminated the Joint Base Pearl Harbor-Hickam water distribution system. References (a) and (b) examined the events leading to these spills and contamination. From 18 June 2021 to 17 June 2022, you served as Commander, Navy Region Hawaii. As the commander, you had the responsibility for the satisfactory accomplishment of the mission and duties assigned to your command to include serving as the Navy On-Scene Coordinator and Region Environmental Coordinator.

2. As the Region Commander, you negligently failed to coordinate a training plan and execute fuel spill drills or exercises at Red Hill, as required by references (c) and (d). Navy Region Hawaii conducted no comprehensive fuel spill response drills at Red Hill prior to 20 November 2021. This failure contributed to the inadequate response to the 20 November 2021 fuel spill at Red Hill, which was the primary cause of the drinking water contamination.

3. Commanders are responsible for the proper execution of duties and performance of their subordinates. You failed to identify and mitigate against lack of oversight of contracting and installation of a critical system at Red Hill, which contributed to the fuel spill and subsequent contamination. You also negligently failed to adequately deploy your environmental management team and conduct an independent environmental risk assessment during the 20 November 2021 fuel spill at Red Hill, as required by references (c) and (d). Despite the fact that fuel was actively spilling for approximately 34 hours, you did not direct the Navy On-Scene Coordinator Representative (NOSC-R) to assess the spill at the scene. Had you ensured a proper environmental risk analysis, the risk to the drinking water system could have been identified before the first reports of contamination.

4. Further, you negligently failed to notify the public that the Red Hill well had been secured, as required by reference (e). After you ordered the well to be secured, you had a duty to timely communicate that pertinent information to the public; however, you did not tell the public that you secured the well until four days after the fact. This delay in reporting negatively impacted public trust and gave some members of the public the impression that the Navy was not transparent in their reporting.

5. Accordingly, you are hereby censured for your leadership failures. A copy of this letter will be placed in your official service record per reference (f). You may forward within 15 days of receipt of this letter a rebuttal consistent with reference (f), for inclusion in your official record, if you so desire.

Carlos Del Toro

Carlos Del Toro

EXHIBIT D

Honolulu Board of Water Supply

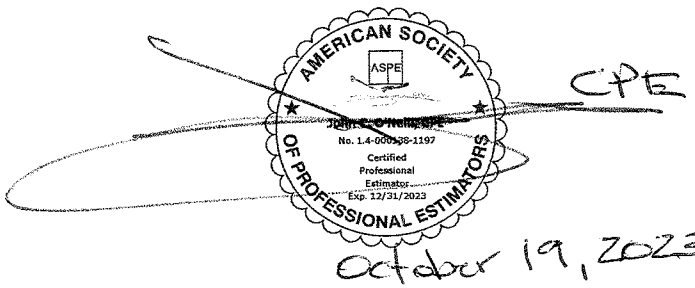
New Fresh Water Wells Construction Project

Honolulu, Hawaii

STATEMENT OF PROBABLE CONSTRUCTION COST

Conceptual Design Development Phase

October 19, 2023



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Honolulu Board of Water Supply
New Fresh Water Wells Construction Project
Honolulu, Hawaii

Master General Summary

Conceptual Design Development Phase

October 19, 2023
January 0, 1900

Run Date: 10/19/23

Project: Conceptual Design Development Phase Probable Cost Evaluation for the Honolulu Board of Water Supply New Fresh Water Wells Project
Estimated and Certified by J. O'Neill, FCPE

Master Construction Cost Breakdown Summary

GENERAL CONTRACTOR TOTAL CONSTRUCTION COST w/ Escalation	**$918,818,444.26**

1.1.1 and 1.1.3 - Division 01 thru 46 - OWNERS COST	
Engineering & Architects Fees @ 10%	$91,881,844.43
Environmental Impact Studies @ 1.5%	$13,782,276.66
Permits @ 1%	$9,188,184.44
OWNER'S TOTAL CONSTRUCTION COST w/ Architects Fee's	$114,852,305.53
Land Acquisition - State land at 10 acres @ $1300/acre + 10 acres @ $1,200,000.00/acre	$12,013,000.00
GENERAL CONTRACTOR TOTAL CONSTRUCTION COST w/ Architect's Fees & Land Acquisition Costs	$126,865,305.53
Owner's Contingency @ 15% OF Construction Cost	$137,822,766.64
OWNER'S TOTAL CONSTRUCTION COST w/ Architect's Fees, Land Acquisition Costs, & Owner's Contingency	**$264,688,072.17**

1.1.1 and 1.1.3 - Division 01 thru 46 - TOTAL PROJECT COST	
GENERAL CONTRACTOR AND OWNER'S TOTAL CONSTRUCTION COST FOR TOTAL PROJECT COST	**$1,183,506,516.43**

Honolulu Board of Water Supply
New Fresh Water Wells Construction Project
Honolulu, Hawaii

General Summary

Conceptual Design Development Phase

October 19, 2023
January 0, 1900

Run Date: 10/19/23

Project: Conceptual Design Development Phase Probable Cost Evaluation for the Honolulu Board of Water Supply New Fresh Water Wells Project
Estimated and Certified by J. O'Neill, FCPE

Construction Cost Breakdown Summary

DIVISION OF WORK	Labor	Material	Equipment	Total Cost
1.1.1 - Divisions 02 thru 46 - Direct Cost				
Division 02 - Existing Conditions				
02.4113 - Site Preparation	$14,647.36	$25,079.60	$3,735.60	$43,462.56
02.4119 - Site Selective Demolition	$23,389.48	$0.00	$75,081.42	$98,470.90
02.4126 - Selective Electrical Demolition	$88,675.80	$0.00	$0.00	$88,675.80
02.4155 - Well Decommissioning	$404,520.40	$248,200.00	$495,505.20	$1,148,225.60
02.4175 - Hazardous Materials Removals	NIC	NIC	NIC	NIC
SUBTOTAL DIRECT COST	$531,233.04	$273,279.60	$574,322.22	$1,378,834.86
Division 03 - Concrete				
03.1000 - Concrete Forms & Accessories	$29,023.70	$22,073.66	$13,215.12	$64,312.48
03.2000 - Concrete Reinforcement	$3,945.73	$6,345.16	$0.00	$10,290.89
03.3000 - Cast-in-Place Concrete	$51,873.98	$89,647.12	$19,876.48	$161,397.58
03.3035 - Under Slab Vapor Retarder	$1,254.00	$988.00	$0.00	$2,242.00
03.3543 - Sealed Concrete Floor	$4,832.48	$1,712.48	$0.00	$6,544.96
03.3816 - Unbonded Post-Tensioned Concrete	$33,864.12	$3,579.76	$15,972.96	$53,416.84
SUBTOTAL DIRECT COST	$124,794.01	$124,346.18	$49,064.56	$298,204.75
Division 04 - Masonry				
04.2000 Masonry Grout	$1,567.68	$1,839.60	$0.00	$3,407.28
04.4000 Masonry Unit & Accessories	$37,535.78	$53,706.52	$5,630.60	$96,872.90
SUBTOTAL DIRECT COST	$39,103.46	$55,546.12	$5,630.60	$100,280.18
Division 05 - Metals				
05.1200 - Basic Metal Material	$0.00	$813.12	$0.00	$813.12
05.2000 - Steel Joists	$10,703.28	$17,136.84	$0.00	$27,840.12
05.3100 - Steel Decking	$15,154.24	$23,841.80	$0.00	$38,996.04
05.4000 - Cold Form Metal Framing	$11,041.28	$16,172.80	$0.00	$27,214.08
05.5000 - Metal Fabrications	$33,627.04	$63,330.96	$0.00	$96,958.00
SUBTOTAL DIRECT COST	$70,525.84	$121,295.52	$0.00	$191,821.36
Division 06 - Woods, Plastics & Composites				
06.1000 - Rough Carpentry	$3,319.82	$4,702.06	$0.00	$8,021.88
06.4023 - Plastic-Laminate Clad Woodwork	$1,203.12	$7,383.00	$0.00	$8,586.12
06.6400 - Solid Surface Countertops	$1,332.96	$2,132.88	$0.00	$3,465.84

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Project: Conceptual Design Development Phase Probable Cost Evaluation for the Honolulu Board of Water Supply New Fresh Water Wells Project
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Construction Cost Breakdown Summary

DIVISION OF WORK	Labor	Material	Equipment	Total Cost
06.6430 - Gypsum Sheathing	$1,355.96	$1,642.08	$0.00	$2,998.04
SUBTOTAL DIRECT COST	$7,211.86	$15,860.02	$0.00	$23,071.88
Division 07 - Thermal & Moisture Protection				
07.2100 - Thermal Insulation	$6,507.44	$12,266.90	$0.00	$18,774.34
07.2210 - Roof & Deck Insulation	$7,128.00	$14,701.50	$0.00	$21,829.50
07.2740 - Exterior Insulated Finish System	$42,086.08	$44,542.08	$2,342.64	$88,970.80
07.2600 - Vapor Retarders	$1,424.00	$3,916.00	$0.00	$5,340.00
07.5400 - Fluid-Applied Membrane	$2,197.80	$4,422.24	$0.00	$6,620.04
07.4113 - Metal Roof Panels	$44,091.00	$59,310.56	$0.00	$103,401.56
07.6200 - Flashing & Sheetmetal	$4,267.57	$10,241.61	$0.00	$14,509.18
07.7000- Gutters & Downspouts	$1,728.00	$3,459.60	$0.00	$5,187.60
07.8413 - Penetration Firestopping	$399.04	$414.21	$0.00	$813.25
07.9200 - Joint Sealants	$636.00	$525.40	$0.00	$1,161.40
07.9500 - Expansion Control	$1,394.40	$3,259.20	$0.00	$4,653.60
SUBTOTAL DIRECT COST	$111,859.33	$157,059.30	$2,342.64	$271,261.27
Division 08 - Openings				
08.1113 - Hollow Metal Doors & Frames	$3,339.78	$8,860.00	$0.00	$12,199.78
08.1416 - Flush Wood Doors	$1,123.20	$2,866.50	$0.00	$3,989.70
08.3113 - Access Doors & Frames	$3,424.00	$7,942.40	$0.00	$11,366.40
08.3313 - Rolling Service Doors	$8,736.00	$33,396.00	$0.00	$42,132.00
08.4113 - Aluminum Framed Entrance Doors & Storefront	$18,649.20	$37,874.40	$0.00	$56,523.60
08.6300 - Metal-Framed Skylight	$1,755.60	$16,896.00	$0.00	$18,651.60
08.7100 - Door Hardware	$6,864.98	$18,675.96	$0.00	$25,540.94
08.8000 - Glazing	$1,429.98	$1,813.24	$0.00	$3,243.22
08.8300 - Mirrors	$425.76	$692.64	$0.00	$1,118.40
08.9119 - Fixed Louvers	$3,322.48	$5,984.00	$0.00	$9,306.48
SUBTOTAL DIRECT COST	$49,070.98	$135,001.14	$0.00	$184,072.12
Division 09 - Finishes				
09.2216 - Non - Structural Metal Framing	$17,773.08	$42,479.00	$0.00	$60,252.08
09.2900 - Gypsum Board	$10,495.02	$19,320.44	$580.46	$30,395.92
09.5113 - Acoustical Systems	$11,933.32	$14,588.70	$0.00	$26,522.02
09.6513 - Resilient Wall Base & Accessories	$941.16	$1,666.80	$0.00	$2,607.96
09.6519 - Resilient Tile Flooring	$6,659.36	$13,257.60	$0.00	$19,916.96
09.6623 - Resinous Flooring	$1,989.80	$4,565.60	$0.00	$6,555.40

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DIVISION OF WORK	Labor	Material	Equipment	Total Cost
09.6813 - Acoustical Blanket Insulation	$303.04	$4,550.56	$0.00	$4,853.60
09.6900 - Access Flooring	$4,739.46	$13,385.90	$0.00	$18,125.36
09.8433 - Sound Absorbing Wall Units	$881.44	$3,109.12	$0.00	$3,990.56
09.9113 - Paints & Coatings	$10,361.34	$9,131.66	$0.00	$19,493.00
SUBTOTAL DIRECT COST	$66,077.02	$126,055.38	$580.46	$192,712.86
Division 10 - Specialties				
10.1400 - Signage	$2,491.70	$7,623.05	$456.00	$10,570.75
10.2600 - Wall & Door Protection	$358.40	$1,702.40	$0.00	$2,060.80
10.2800 - Toilet and Bath Accessories	$312.75	$1,197.92	$0.00	$1,510.67
10.4313 - Defibrillator Cabinets	$225.00	$2,132.00	$1.12	$2,358.12
10.4413 - Fire Extinguisher Cabinets	$325.00	$1,032.00	$0.00	$1,357.00
10.4416 - Fire Extinguishers	$55.65	$66.32	$0.00	$121.97
10.5113 - Metal Lockers	$1,627.80	$3,893.16	$0.00	$5,520.96
10.9900 - Misc. Specialties	$325.00	$225.00	$1.12	$551.12
SUBTOTAL DIRECT COST	$5,721.30	$17,871.85	$458.24	$24,051.39
Division 11 - Equipment				
11.4000 - Food Service Equipment	$880.00	$7,650.00	$0.00	$8,530.00
11.5209 - Projector Screens and Projector Mounts	$865.00	$2,432.32	$0.00	$3,297.32
SUBTOTAL DIRECT COST	$1,745.00	$10,082.32	$0.00	$11,827.32
Division 12 - Furnishings				
12.9313 - Office Furnishings	$8,466.00	$2,550.00	$0.00	$11,016.00
SUBTOTAL DIRECT COST	$8,466.00	$2,550.00	$0.00	$11,016.00
Division 13 - Special Construction				
13.2500 - Lightning Protection	$4,256.00	$12,274.00	$0.00	$16,530.00
SUBTOTAL DIRECT COST	$4,256.00	$12,274.00	$0.00	$16,530.00
Division 14 - Inclined Cable Car				
14.4500 - Inclined Cable Car	$1,171,997.64	$1,232,064.36	$531,134.40	$2,935,196.40
SUBTOTAL DIRECT COST	$1,171,997.64	$1,232,064.36	$531,134.40	$2,935,196.40
Division 21 - Fire Suppression				
21.0500 - Fire Sprinkler Systems	$20,569.32	$24,230.32	$0.00	$44,799.64

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Project: Conceptual Design Development Phase Probable Cost Evaluation for the Honolulu Board of Water Supply New Fresh Water Wells Project
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Construction Cost Breakdown Summary

DIVISION OF WORK	Labor	Material	Equipment	Total Cost
21.9000 - Chemical Agent Fire Suppression Systems	$474.60	$717.36	$0.00	$1,191.96
SUBTOTAL DIRECT COST	$21,043.92	$24,947.68	$0.00	$45,991.60
Division 22 - Plumbing				
22.0500 - Plumbing	$23,591.07	$31,915.91	$0.00	$55,506.98
SUBTOTAL DIRECT COST	$23,591.07	$31,915.91	$0.00	$55,506.98
Division 23 - Heating, Ventilation, & Air Conditioning				
23.0500 - Heating Ventilating, and Air Conditioning	$20,477.62	$50,714.17	$7,382.00	$78,573.79
SUBTOTAL DIRECT COST	$20,477.62	$50,714.17	$7,382.00	$78,573.79
Division 25 - Integrated Automation				
23.0923 - Building Automation & Control	$165.55	$209.00	$0.00	$374.55
SUBTOTAL DIRECT COST	$165.55	$209.00	$0.00	$374.55
Division 26 - Electrical				
26.0500 - Electrical	$60,044.56	$132,788.74	$0.00	$192,833.30
SUBTOTAL DIRECT COST	$60,044.56	$132,788.74	$0.00	$192,833.30
Division 27 - Communications				
27.0500 - Communications	$109,222.22	$189,458.68	$888.32	$299,569.22
SUBTOTAL DIRECT COST	$109,222.22	$189,458.68	$888.32	$299,569.22
Division 28 - Electronic Life Safety				
28.1300 - Access Controls	$4,961.80	$21,722.30	$0.00	$26,684.10
28.2300 - Video Surveillance System	$55,695.80	$208,653.30	$0.00	$264,349.10
28.0500 - Fire-Alarm Systems	$39,396.48	$127,954.20	$0.00	$167,350.68
SUBTOTAL DIRECT COST	$100,054.08	$358,329.80	$0.00	$458,383.88
Division 31 - Earthwork				
31.1000 - Site Clearing, Earthmoving, Cut & Fill	$1,910,989.98	$3,121,272.60	$8,732,697.48	$13,764,960.06
31.2550 - Excavation Shoring	$14,103.52	$30,608.88	$10,250.24	$54,962.64
31.2333 - Utility Trenching & Backfill	$65,561.10	$7,396.96	$220,193.60	$293,151.66
31.2500 - Temporary Erosion & Sediment Control	$30,994.00	$49,147.36	$40,080.08	$120,221.44
31.6329 - Drilled Concrete Piers	$393,537.46	$546,512.60	$967,114.32	$1,907,164.38
SUBTOTAL DIRECT COST	$2,415,186.06	$3,754,938.40	$9,970,335.72	$16,140,460.18

AES Certified Professional Estimating & Facility Maintenance Systems

Run Date: 10/19/23

Project: Conceptual Design Development Phase Probable Cost Evaluation for the Honolulu Board of Water Supply New Fresh Water Wells Project
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Construction Cost Breakdown Summary

DIVISION OF WORK	Labor	Material	Equipment	Total Cost
Division 32 - Exterior Improvements				
32.1216 - Asphalt Paving	$477,042.72	$1,118,109.96	$720,441.80	$2,315,594.48
32.1314 - Concrete for Site Improvements	$311,199.76	$573,865.16	$51,648.70	$936,713.62
32.1373 - Concrete Paving Joint Sealants	$7,319.20	$5,283.20	$2,611.20	$15,213.60
32.1723 - Pavement Markings	$10,699.10	$9,769.76	$1,622.40	$22,091.26
32.5000 - Fencing & Gates	$2,085,952.00	$5,526,712.80	$0.00	$7,612,664.80
32.6000 - Site Furnishings	$40,343.34	$176,774.56	$0.00	$217,117.90
SUBTOTAL DIRECT COST	$2,932,556.12	$7,410,515.44	$776,324.10	$11,119,395.66
Division 33 - Utilities				
33.1100 - Domestic Water & Fire Protection	$27,344.40	$55,603.68	$4,726.64	$87,674.72
33.3100 - Sanitary Sewer	$4,456.00	$18,325.00	$2,244.00	$25,025.00
33.4100 - Storm Drainage & Containment	$50,920.04	$145,593.87	$90,424.68	$286,938.59
33.6100 - Site Electrical Distribution	$1,082,551.94	$6,671,299.86	$114,416.00	$7,868,267.80
33.6200 - Site Lighting	$79,581.67	$421,685.00	$20,778.16	$522,044.83
33.6300 - Site Circuits, F.A., P.A., Security	$12,408.10	$15,511.20	$4,834.80	$32,754.10
33.7100 - Site Communication & Data	$426,702.60	$771,285.60	$0.00	$1,197,988.20
SUBTOTAL DIRECT COST	$1,683,964.75	$8,099,304.21	$237,424.28	$10,020,693.24
Division 42 - Exploratory Wells, Boring, Excavation, Pumping Systems, and Fresh Air Supply, SCADA for Water Development Tunnels:				
42.1000 - Boring & Excavation of Water Development Tunnel	$28,597,557.73	$4,367,083.60	$140,492,785.95	$173,457,427.28
42.1556 - Exploratory & Production Wells	$4,837,958.78	$11,376,314.31	$5,047,034.60	$21,261,307.70
42.2000 - Fresh Water Mechanical Pump Equipment & Accessories	$689,347.70	$7,329,635.80	$88,497.00	$8,107,480.50
42.3000 - Fresh Water Transmission, Production Piping & Storage System	$61,258,729.33	$188,017,486.40	$53,022,697.30	$302,298,913.03
42.5000 - Electrical and SCADA System	$2,557,242.51	$37,229,259.96	$20,301.00	$39,806,803.48
42.6000 - Monitoring Wells - 3EA.	$250,352.36	$3,394,972.00	$1,107,336.00	$4,752,660.36
SUBTOTAL DIRECT COST	$98,191,188.41	$251,714,752.07	$199,778,651.86	$549,684,592.35
1.1.1 and 1.1.3 - Division 01 - GENERAL CONTRACTOR'S - Indirect Costs based on Direct Cost				
TOTAL DIRECT COST	$107,749,555.84	$274,051,159.89	$211,934,539.40	$593,735,255.13
Design Contingency @ 10%				$59,373,525.51
Excise Tax on Labor @ 4%				$10,962,046.40
SUBTOTAL				$664,070,827.04
Preconstruction Staffing & Support				$1,947,699.00
Construction Staffing & Support				$18,609,300.00
General Contractor Overhead @ 3.5%				$23,242,478.95

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Run Date: 10/19/23

Project: Conceptual Design Development Phase Probable Cost Evaluation for the Honolulu Board of Water Supply New Fresh Water Wells Project
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Construction Cost Breakdown Summary

DIVISION OF WORK	Labor	Material	Equipment	Total Cost
General Conditions/General Requirements				$8,123,996.20
SUBTOTAL				$715,994,301.19
General Construction Fee @ 4.5%				$32,219,743.55
SUBTOTAL				$748,214,044.74
GC General Liability & Workman's Compensation Insurance @ 1.88%				$14,066,424.04
GC Builder's Risk Insurance @1.75%				$13,093,745.78
SUBTOTAL				$775,374,214.56
Escalation @ 18.5% - 10 years with 2033 start date				$143,444,229.69
GENERAL CONTRACTOR TOTAL CONSTRUCTION COST w/ Escalation				$918,818,444.26

1.1.1 and 1.1.3 - Division 01 thru 46 - OWNERS COST

Engineering & Architects Fees @ 10%	$91,881,844.43
Environmental Impact Studies @ 1.5%	$13,782,276.66
Permits @ 1%	$9,188,184.44
OWNER'S TOTAL CONSTRUCTION COST w/ Architects Fee's	$114,852,305.53
Land Acquisition - State land at 10 acres @ $1300/acre + 10 acres @ $1,200,000.00/acre	$12,013,000.00
GENERAL CONTRACTOR TOTAL CONSTRUCTION COST w/ Architect's Fees & Land Acquisition Costs	$126,865,305.53
Owner's Contingency @ 15% OF Construction Cost	$137,822,766.64
OWNER'S TOTAL CONSTRUCTION COST w/ Architect's Fees, Land Acquisition Costs, & Owner's Contingency	$264,688,072.17

GENERAL CONTRACTOR AND OWNER'S TOTAL CONSTRUCTION COST FOR TOTAL PROJECT COST **$1,183,506,516.43**

Honolulu Board of Water Supply
New Fresh Water Wells Construction Project
Honolulu, Hawaii

Labor Productivity Analysis

Conceptual Design Development Phase

October 19, 2023
January 0, 1900

Labor Productivity Factor Analysis for Honolulu Hawaii

Description		Minus		%		Plus			Job Section Avg (-)	Job Section Avg (+)	Delta
									Labor		
Skill, Worker	Experienced	10	5	0	5	10	15	Untrained	10%	0%	
Union	Co-operative	10	5	0	5	10	15	Disputes	5%	0%	
Availability	Choice	10	5	0	5	10	15	Shortage	0%	0%	
									15%	0.0%	-15%
									Site		
Location	Local	10	5	0	5	10	15	Remote	5%	10%	
Temperature/Humidity	Ideal	10	5	0	5	10	15	Extreme		10%	
Wind, dust,mud,snow	Negligable	10	5	0	5	10	15	Severe		10%	
									5%	30%	25%
	Minutes per day			15	30	45	60		Project Type		
Portal to Portal				0	5	10	15			5%	
	Number of Levels		1	2-3	4-9	10-15	16-20				
Multi Level		10	5	0	5	10	15			15%	
	Height		2 ft	4 ft	6 ft	8 ft	10 ft				
Scaffold		10	5	0	5	10	15			0%	
	Depth	None	5 ft	10 ft	12 ft	15 ft	20 ft				
Trench		10	5	0	5	10	15		10%	0%	
	Type		Yard	Bldg	Eq. Rm	Tunnel	Shaft				
Working Space			5	0	5	10	15			0%	
Complexity	Familiar	10	5	0	5	10	15	Unusual		0%	
	Feet			10 ft	30 ft	50 ft	80 ft				
Hoisting		10	5	0	5	10	15			5%	
									10%	25%	15%
									Working Conditions		
Traffic & Unloading	Smooth	10	5	0	5	10	15	Obstructions		10%	
Material Storage	Sufficient	10	5	0	5	10	15	Inadequate	5%		
Material Supply	As required	10	5	0	5	10	15	Shortages	0%	10%	
Interferance (other crews)	None	10	5	0	5	10	15	Several crafts		10%	
Occupants	None	10	5	0	5	10	15	Working plant	5%		
QA/QC	No requirements	10	5	0	5	10	15	Strict Requirements		10%	
Security	Low	10	5	0	5	10	15	High		10%	
Noise	None	10	5	0	5	10	15	Excess	15%		
Lighting	Daylight	10	5	0	5	10	15	Poor, Artificial	10%		
Ventilation	Outside	10	5	0	5	10	15	Poor, Artificial	10%		
Fire Hazards	Ideal	10	5	0	5	10	15	Extreme	5%	0%	
Safety Regulations	Normal	10	5	0	5	10	15	Dangerous		5%	
Hazardous Abatement	None	10	5	0	5	10	15	High	0%	5%	
									50%	60%	10%
	Hours Per Week				48	50	60		Schedule		
Overtime					5	10	15			0%	
	Number of Shifts				1	2	3				
Shiftwork					0	10	20			0%	
				0	10%	25%	50%				
Excess Workforce				5	0	10	25			0%	
Duration of Project	Short			0	5	10	15	Extended		5%	
									$0	5%	5%
								Total %	80%	120%	40%
											1.40

Productivity Factor Adjustment

Honolulu Board of Water Supply

New Fresh Water Wells Construction Project

Honolulu, Hawaii

GC Staffing & GC General Requirements

Conceptual Design Development Phase

October 19, 2023
January 0, 1900

General Contractor General Requirements/General Conditions

AES
Certified Professional Estimating & Facility Maintenance Systems

Schedule Requirements		
Months	Days	Hours
46	1035	8280

Description	Quantity	Unit	Manhours	Rate	% time on job	Total Cost
Temp Facilities:						
Temp. trailers - 3 Single wide - contractor usage	46	months	60	$5,565	100%	$255,990
Custodial trailer - 2 single wide w/storage	46	months	24	$892	100%	$41,032
Temp. fencing at limits of GC temp laydown area	46	months	120	$650	100%	$29,900
Temp. fencing at limits of GC construction - 1500'	46	months	60	$1,865	100%	$85,790
Protection scaffolding at pedestrian walkways	46	months	320	$650	100%	$29,900
Noise Abatement at bore sites	46	months	320	$56,325	80%	$2,072,760
Temp. electrical service - 400 A service for trailers	1	ea	100	$5,632	100%	$5,632
Temp. electrical service 400A feeders in temp con	150	lf	60	$12	100%	$1,800
Curb/cuts & repairs	60	lf	42	$55	100%	$3,300
Road access/site maintainence	46	months	120	$350	100%	$16,100
SWPPP maintenence	46	months	140	$650	100%	$29,900
Concrete wash down area cleaning	46	months	120	$150	100%	$6,900
General fence repair & trash pick-up	46	months	240	$500	100%	$23,000
Site Temp. toilet rental - 6ea.	46	months	120	$2,432	100%	$111,872
Carpentry for temp barricades & floor openings	150	personhrs	150	$55	100%	$8,250
Winter protection - concrete blankets	150	days	120	$165	100%	$24,750
Salamander propane temporary heaters	150	days	150	$550	100%	$82,500
Weather protection - visqueen walls	25000	sf	180	$1	100%	$30,250
Temp. Job signage	1	ea	120	$3,250	100%	$3,250
Dumpsters -refuse removal	46	months	120	$8,850	100%	$407,100
Tools & Equipment:						
Small tool rental	46	months	120	$12,325	100%	$566,950
Man Lift rentals, installation, takedown	12	months	320	$24,325	100%	$291,900
Backhoe rental, operator, w/dumptruck	46	months	960	$8,832	5%	$20,314
Track mounted crawler crane, operator Oiler - 165	46	months	60	$36,325	5%	$83,548
Tower crane, operator Oiler - 400 ton - 1ea.	46	months	120	$52,325	75%	$1,805,213
Water truck & operator	60	days	1600	$322	100%	$19,320
Wellpoints and Dewatering	NIC	NIC	NIC	NIC	NIC	NIC
Permit & Fees:						
Permit/ Inspection	By Owner	By Owner	By Owner	By Owner	By Owner	By Owner
Impact fees	By Owner	By Owner	By Owner	By Owner	By Owner	By Owner

General Contractor General Requirements/General Conditions

AES Certified Professional Estimating & Facility Maintenance Systems

Schedule Requirements		
Months	Days	Hours
46	1035	8280

Description	Quantity	Unit	Manhours	Rate	% time on job	Total Cost
Hook-up/User Fees, Water/Fireprotection	1	ls	24	$45,325	100%	$45,325
Hook-up/User Fees, Sewer	1	ls	24	$112,325	100%	$112,325
Hook-up/User Fees, Natural Gas	1	ls	0	$32,325	100%	$32,325
Hook-up/User Fees, Electrical	1	ls	16	$325,325	100%	$325,325
Utility Company Hook-up/User Fees, IT/Communic	1	ls	18	$33,500	100%	$33,500
Temporary Utilities:						
Temporary 1" water tap & distribution system	1	ea	35	$1,232	100%	$1,232
Temp electrical 1000KVA power	1	ea	12	$1,588	100%	$1,588
Temp electrical 500KVA power	2	ea	65	$1,244	100%	$2,488
Temp electrical spider boxes at buildings	46	months	80	$3,250	80%	$119,600
Temp electrical circuits & lighting at buildings	46	months	30	$650	60%	$17,940
Gas/Propane for temp heating	46	months	40	$22,325	32%	$328,624
On Site Telephone Expenses	46	months	0	$1,232	80%	$45,338
Cellular phones/ Site Communications	46	months	0	$6,500	100%	$299,000
General Conditions:						
Mob/Demob	1	ls	320	$12,500	100%	$12,500
Testing and inspection	160	hrs	160	$1,250	100%	$200,000
Travel, food, lodging	46	months	0	$3,250	100%	$149,500
Bottled water for trailers	46	months	0	$165	100%	$7,590
Layout & survey	320	hrs	120	$565	100%	$180,800
O & M Manuals, Bound	1	ls	0	$12,320	100%	$12,320
As-Built Drawings, Autocad	1	ls	0	$15,650	100%	$15,650
Job office supplies & copies	46	months	0	$650	100%	$29,900
Punchlist/warranty work	380	hrs	0	$56	100%	$21,147
Drug Testing for GC personnel	24	people	24	$365	100%	$8,760
Progress/Final Cleaning	30	days	0	$450	100%	$13,500
Custodial contract	46	months	0	$250	100%	$11,500
Building Commissioning, LEED Silver	120	personhrs	750	$325.00	100%	$39,000
Estimated Total MHRS			**7,584**			
Estimated Total Cost						**$8,123,996**

A E S
Certified Professional Estimating & Facility Maintenance Systems

Run Date: 10/19/23

	Staffing	Water Well Project	%	Construction Phase Staffing Analysis												
			Worked							Worked	Adjusted					
No.	Name	Position		01/33-12/33	01/34-12/34	01/35-12/35	01/36-12/36	Hr. Rate	Mon. Rate	%	Rate	Burden	Sub. Total	Months	Total
1	TBD	Project Director	100					$75.00	$13,500	1.0	$13,500	1.55	$20,925	46	$962,550
2	TBD	Sr. Project Manager	100					$68.00	$12,240	1.0	$12,240	1.55	$18,972	46	$872,712
3	TBD	Jr. Estimator	100					$67.00	$12,060	1.0	$12,060	1.55	$18,693	46	$859,878
4	TBD	Scheduler	100					$92.00	$16,560	1.0	$16,560	1.55	$25,668	46	$1,180,728
5	TBD	Senior Project Engine	100					$91.00	$16,380	1.0	$16,380	1.55	$25,389	46	$1,167,894
6	TBD	Jr. Project Engineer	100					$64.00	$11,520	1.0	$11,520	1.55	$17,856	46	$821,376
7	TBD	EHS Director	100					$88.00	$15,840	1.0	$15,840	1.55	$24,552	46	$1,129,392
8	TBD	Safety Manager	100					$92.00	$16,560	1.0	$16,560	1.55	$25,668	46	$1,180,728
9	TBD	Lead Superintendent	100					$65.00	$11,700	1.0	$11,700	1.55	$18,135	46	$834,210
10	TBD	Jr. Superintendent	100					$52.00	$9,360	1.0	$9,360	1.55	$14,508	46	$667,368
11	TBD	Mech Superintendent	100					$77.00	$13,860	1.0	$13,860	1.55	$21,483	46	$988,218
12	TBD	Elec Superintendent	100					$78.00	$14,040	1.0	$14,040	1.55	$21,762	46	$1,001,052
13	TBD	IT Superintendent	100					$56.00	$10,080	1.0	$10,080	1.55	$15,624	46	$718,704
14	TBD	Field Engineer	100					$48.00	$8,640	1.0	$8,640	1.55	$13,392	46	$616,032
15	TBD	Assist. Supt./Craftsma	100					$49.00	$8,820	1.0	$8,820	1.55	$13,671	46	$628,866
16	TBD	Accounting PM	100					$56.00	$10,080	1.0	$10,080	1.55	$15,624	46	$718,704
17	TBD	Assit. Accounting	100					$52.00	$9,360	1.0	$9,360	1.55	$14,508	46	$667,368
18	TBD	Admin. Support	100					$45.00	$8,100	1.0	$8,100	1.55	$12,555	46	$577,530
19	TBD	EHS Admin. - Mgr	100					$28.00	$5,040	1.0	$5,040	1.55	$7,812	46	$359,352
20	TBD	Doc Ctrl & Asst. Admir	100					$36.00	$6,480	1.0	$6,480	1.55	$10,044	46	$462,024
21	TBD	Crane Operator	100					$65.00	$11,700	1.0	$11,700	1.55	$18,135	46	$834,210
22	TBD	Carpenter Foreman	100					$42.00	$7,560	1.0	$7,560	1.55	$11,718	46	$539,028
23	TBD	Carpenter	100					$36.00	$6,480	1.0	$6,480	1.55	$10,044	46	$462,024
24	TBD	Laborer	100					$28.00	$5,040	1.0	$5,040	1.55	$7,812	46	$359,352
														Estimated Staffing Total =	$18,609,300

Legend

TBD — To be Determined

Partial Month

Full Month

AES
Certified Professional Estimating & Facility Maintenance Systems

Run Date: 10/19/23

Preconstruction - Project Staffing Analysis

	Staffing	Water Wells	%													Worked	Adjusted				
No.	Name	Position	Worked	01/32	02/32	03/32	04/32	05/32	06/32	07/32	08/32	09/32	11/32	12/32	Hr. Rate	Mon. Rate	%	Rate	Burden	Sub. Total	Months	Total
1	TBD	Project Director	0.3												$111.00	$19,980	0.3	$4,995	1.55	$7,742	12	$92,907
2	TBD	Sr. Project Manager	50												$108.00	$19,440	0.5	$9,720	1.55	$15,066	12	$180,792
3	TBD	Jr. Project Engineer	50												$125.00	$22,500	0.5	$11,250	1.55	$17,438	12	$209,250
4	TBD	Scheduler	50												$125.00	$22,500	0.5	$11,250	1.55	$17,438	12	$209,250
5	TBD	Dpocument Control	50												$125.00	$22,500	0.5	$11,250	1.55	$17,438	12	$209,250
6	TBD	Office Admin.	50												$125.00	$22,500	0.5	$11,250	1.55	$17,438	12	$209,250
7	TBD	Jr Estimator	50												$125.00	$22,500	0.5	$11,250	1.55	$17,438	12	$209,250
8	TBD	Sr. Accounting	50												$125.00	$22,500	0.5	$11,250	1.55	$17,438	12	$209,250
9	TBD	Jr. Accounting	50												$125.00	$22,500	0.5	$11,250	1.55	$17,438	12	$209,250
10	TBD	Clerical	50												$125.00	$22,500	0.5	$11,250	1.55	$17,438	12	$209,250

Estimated Staffing Total = $1,947,699

Legend

TBD — To be Determined
Partial Month
Full Month

Honolulu Board of Water Supply

New Fresh Water Wells Construction Project

Honolulu, Hawaii

1.1.1 - Portal & Pump House Structures CSI Detailed Cost Breakdown

Conceptual Design Development Phase

October 19, 2023
January 0, 1900

1.1.1 - Portal & Well Houses Building Cost Detail

Run Date: 10/19/23

Project: Conceptual Design Development Phase Probable Cost Evaluation for the Honolulu Board of Water Supply New Fresh Water Wells Project
Estimated and Certified by J. O'Neill, FCPE

Division	DESCRIPTION	QUANTITY	UNITS	Labor Cost Unit	Labor Cost Total	Material Cost Unit	Material Cost Total	Equipment Cost Unit	Equipment Cost Total	Labor,Mat Equip Unit	Labor,Mat Equip Total	Division Total
03.100	**CONCRETE FORMS & ACCESSORIES**											
	Spread Foundation & Portal Retaining Walls & Foundations											
	Excavation & prep for concrete work, backhoe	36	crewhrs	$88.87	$3,199.32	$0.00	$0.00	$225.54	$8,119.44	$314.41	$11,318.76	
	Forms in place, spread footings 4 use, set to grade	2132	sfca	$4.65	$9,913.80	$3.88	$8,272.16	$0.00	$0.00	$8.53	$18,185.96	
	Forms in place, stem walls 4 use, spread footings	1244	sfca	$4.25	$5,287.00	$3.96	$4,926.24	$0.00	$0.00	$8.21	$10,213.24	
	Thickened slab for spot ftgs and cont. ftgs	880	sfca	$4.12	$3,625.60	$4.88	$4,294.40	$0.00	$0.00	$9.00	$7,920.00	
	Forms in place, Slab on grade, door blockouts	180	sfca	$5.22	$939.60	$5.32	$957.78	$0.00	$0.00	$10.54	$1,897.38	
	Slab door blockouts typical	260	sfca	$5.22	$1,357.20	$5.21	$1,354.60	$0.00	$0.00	$10.43	$2,711.80	
	Slab edge forms at entry step-up	270	sfca	$5.65	$1,525.50	$5.44	$1,468.80	$0.00	$0.00	$11.09	$2,994.30	
	Strip foundation and clean forms	24	crewhrs	$132.32	$3,175.68	$33.32	$799.68	$212.32	$5,095.68	$377.96	$9,071.04	
	TOTAL CONCRETE FORMS & ACCESSORIES				$29,023.70		$22,073.66		$13,215.12			$64,312.48
03.200	**CONCRETE REINFORCEMENT**											
	Reinforcing, in place grade beams, caps, slabs	3.65	tons	$865.00	$3,157.25	$1,032.00	$3,766.80	$0.00	$0.00	$1,897.00	$6,924.05	
	Welded wire fabric, 6x6, 42lb per ton	64	csf	$12.32	$788.48	$32.44	$2,076.16	$0.00	$0.00	$44.76	$2,864.64	
	3" plain chairs, galv.	4	c	$0.00	$0.00	$53.50	$214.00	$0.00	$0.00	$53.50	$214.00	
	Dowel caps, 1/2-3/4" diameter	220	ea	$0.00	$0.00	$1.31	$288.20	$0.00	$0.00	$1.31	$288.20	
	TOTAL CONCRETE REINFORCEMENT				$3,945.73		$6,345.16		$0.00			$10,290.89
03.300	**CAST-IN-PLACE CONCRETE**											
	Spread Foundation & Portal Retaining Walls & Foundations											
	Cast in place spread ftgs, 4000 PSI high early	42	cyrds	$188.87	$7,932.54	$325.00	$13,650.00	$12.32	$517.44	$526.19	$22,099.98	
	Cast in place stem walls, 4000 PSI high early	26	cyrds	$155.54	$4,044.04	$325.00	$8,450.00	$16.76	$435.76	$497.30	$12,929.80	
	Cast in Place retaining walls, 4000 PSI high early	102	cyrds	$155.54	$15,865.08	$325.00	$33,150.00	$16.76	$1,709.52	$497.30	$50,724.60	
	Thickened slab CIP spot , 4000 PSI high early	8	cyrds	$132.32	$1,058.56	$325.00	$2,600.00	$14.54	$116.32	$471.86	$3,774.88	
	Prep for slab on grade floors	24	crewhrs	$156.65	$3,759.60	$24.54	$588.96	$17.87	$428.88	$199.06	$4,777.44	
	4" Slab on compact grade, 4000 PSI high early	78	cryrds	$222.32	$17,340.96	$325.00	$25,350.00	$12.32	$960.96	$559.64	$43,651.92	
	Add for 6" thickened slabs	8	cryrds	$65.32	$522.56	$325.00	$2,600.00	$88.45	$707.60	$478.77	$3,830.16	
	Concrete Cure	3800	sf	$0.05	$190.00	$0.05	$190.00	$0.00	$0.00	$0.10	$380.00	
	Truck mounted boom pump, 250' boom	24	crewhrs	$0.00	$0.00	$0.00	$0.00	$375.00	$9,000.00	$375.00	$9,000.00	
	Sawcut slab for expansion joints	16	crewhrs	$0.00	$0.00	$0.00	$0.00	$375.00	$6,000.00	$375.00	$6,000.00	
	1.5" insulation at 4' - perimeter slabs	1632	sf	$0.44	$718.08	$1.88	$3,068.16	$0.00	$0.00	$2.32	$3,786.24	
	Clean-up and dispose of excess concrete	8	hrs	$55.32	$442.56	$0.00	$0.00	$0.00	$0.00	$55.32	$442.56	
	TOTAL CAST-IN-PLACE CONCRETE				$51,873.98		$89,647.12		$19,876.48			$161,397.58
03.3035	**UNDER SLAB VAPOR BARRIER**											
	Vapor Barrier:											
	Vapor block 15 mil polyolefin film bonding agent	3800	sf	$0.33	$1,254.00	$0.26	$988.00	$0.00	$0.00	$0.59	$2,242.00	
	TOTAL UNDER SLAB VAPOR RETARDER				$1,254.00		$988.00		$0.00			$2,242.00
03.3543	**SEALED CONCRETE FLOOR**											
	Prep, & Seal Concrete:											
	Clean, scoring & dry grinding, sandblasting concrete	24	crewhrs	$88.87	$2,132.88	$12.32	$295.68	$0.00	$0.00	$101.19	$2,428.56	

1.1.1 - Portal & Well Houses Building Cost Detail

Run Date: 10/19/23

Project: Conceptual Design Development Phase Probable Cost Evaluation for the Honolulu Board of Water Supply New Fresh Water Wells Project
Estimated and Certified by J. O'Neill, FCPE

Division	DESCRIPTION	QUANTITY	UNITS	Labor Cost Unit	Labor Cost Total	Material Cost Unit	Material Cost Total	Equipment Cost Unit	Equipment Cost Total	Labor,Mat Equip Unit	Labor,Mat Equip Total	Division Total
	Floor repairs, fill voids and deformations	24	crewhrs	$88.87	$2,132.88	$12.32	$295.68	$0.00	$0.00	$101.19	$2,428.56	
	ARDEX liquid floor treatments, clear	1232	sf	$0.24	$295.68	$0.36	$443.52	$0.00	$0.00	$0.60	$739.20	
	Install/remove Temp protection	1232	sf	$0.22	$271.04	$0.55	$677.60	$0.00	$0.00	$0.77	$948.64	
	TOTAL SEALED CONCRETE FLOOR				$4,832.48		$1,712.48		$0.00			$6,544.96
03.3816	**UNBONDED POST-TENSIONED CONCRETE**											
	Post Tensioning:											
	Post Tensioning labor and equipment	120	crewhrs	$222.54	$26,704.80	$12.32	$1,478.40	$122.32	$14,678.40	$357.18	$42,861.60	
	Certifation of calibrations & Testing biweekly	36	mhrs	$88.87	$3,199.32	$24.43	$879.48	$22.32	$803.52	$135.62	$4,882.32	
	Detailed Shop drwgs tendon sizes, locations profiles	22	mhrs	$180.00	$3,960.00	$55.54	$1,221.88	$22.32	$491.04	$257.86	$5,672.92	
	TOTAL UNBONDED POST-TENSIONED CONCRETE				$33,864.12		$3,579.76		$15,972.96			$53,416.84
04.2300	**MASONRY GROUT**											
	Non-Shrink Grout:											
	Grout column plates at posts & Exterior door frames	24	crewhrs	$65.32	$1,567.68	$76.65	$1,839.60	$0.00	$0.00	$141.97	$3,407.28	
	TOTAL MASONRY GROUT				$1,567.68		$1,839.60		$0.00			$3,407.28
04.4000	**MASONRY UNITS & ACCESSORIES**											
	Reinforced Masonry Walls:											
	8" CMU block, Color #5 vert. @ 24" o/c	5632	blk	$5.54	$31,201.28	$8.44	$47,534.08	$0.65	$3,660.80	$14.63	$82,396.16	
	Set steel embed plates, supplied by GC	24	crewhrs	$45.32	$1,087.68	$5.65	$135.60	$0.65	$15.60	$51.62	$1,238.88	
	Place conc., masonry lintels w/ OH pump	42	yrds	$88.65	$3,723.30	$112.32	$4,717.44	$32.54	$1,366.68	$233.51	$9,807.42	
	Grout walls/bond beams w/ grout pump	36	yrds	$42.32	$1,523.52	$36.65	$1,319.40	$16.32	$587.52	$95.29	$3,430.44	
	TOTAL MASONRY UNITS & ACCESSORIES				$37,535.78		$53,706.52		$5,630.60			$96,872.90
05.1200	**BASIC METAL MATERIAL**											
	J-Bolts											
	J-bolts, bolts, nuts, washers, anchors	0.66	tons	$0.00	$0.00	$1,232.00	$813.12	$0.00	$0.00	$1,232.00	$813.12	
	TOTAL BASIC METAL MATERIAL				$0.00		$813.12		$0.00			$813.12
05.2000	**STEEL JOISTS**											
	Pre-Fabricated Steel Joists:											
	Pre-Fabricated Steel Joists, sloped 6/12 pitch	1932.00	lf	$5.54	$10,703.28	$8.87	$17,136.84	$0.00	$0.00	$14.41	$27,840.12	
	TOTAL STEEL JOISTS				$10,703.28		$17,136.84		$0.00			$27,840.12
05.3100	**STEEL DECKING**											
	Steel Roof Deck:											
	1.5" 20 gage steel deck, galv. Steel, zink screewed to	6532.00	sf	$2.32	$15,154.24	$3.65	$23,841.80	$0.00	$0.00	$5.97	$38,996.04	
	TOTAL STEEL DECKING				$15,154.24		$23,841.80		$0.00			$38,996.04

1.1.1 - Portal & Well Houses Building Cost Detail

Run Date: 10/19/23

Project: Conceptual Design Development Phase Probable Cost Evaluation for the Honolulu Board of Water Supply New Fresh Water Wells Project
Estimated and Certified by J. O'Neill, FCPE

Division	DESCRIPTION	QUANTITY	UNITS	Labor Cost Unit	Labor Cost Total	Material Cost Unit	Material Cost Total	Equipment Cost Unit	Equipment Cost Total	Labor,Mat Equip Unit	Labor,Mat Equip Total	Division Total
05.4000	**COLD-ROLLED STEEL FRAMING**											
	Steel Stud at Exterior Walls:											
	18 gage steel framing @ 24" o/c	2432.00	sf	$4.54	$11,041.28	$6.65	$16,172.80	$0.00	$0.00	$11.19	$27,214.08	
	TOTAL COLD-ROLLED STEEL FRAMING				$11,041.28		$16,172.80		$0.00			$27,214.08
05.5000	**METAL FABRICATIONS**											
	Structural Steel:											
	Beams, Columns, embeds, posts, misc. steel	18.32	tons	$1,432.00	$26,234.24	$2,665.00	$48,822.80	$0.00	$0.00	$4,097.00	$75,057.04	
	Masonry Wall Lintels & Angles:											
	6"x4"x3/8" double angle at rated walls	880	lf	$2.31	$2,034.56	$7.32	$6,441.60	$0.00	$0.00	$9.63	$8,476.16	
	6"x3-1/2"x3/8" lintel angle	320	lf	$2.31	$739.84	$7.32	$2,342.40	$0.00	$0.00	$9.63	$3,082.24	
	Steel Bollards:											
	6" diameter bollards, installed by others	24.00	ea	$88.00	$2,112.00	$76.00	$1,824.00	$0.00	$0.00	$164.00	$3,936.00	
	Embeds:											
	Masonry embeds, set by others	1.12	tons	$0.00	$0.00	$3,244.43	$3,633.76	$0.00	$0.00	$3,244.43	$3,633.76	
	Shop Drawings:											
	Shop drawings and mock-ups	16	crewhrs	$156.65	$2,506.40	$16.65	$266.40	$0.00	$0.00	$173.30	$2,772.80	
	TOTAL METAL FABRICATIONS				$33,627.04		$63,330.96		$0.00			$96,958.00
06.1000	**ROUGH CARPENTRY**											
	Rough Buck, Blocking & Nailers:											
	2x Green treated wood blocking, parapets	120	bf	$2.32	$278.40	$2.32	$278.40	$0.00	$0.00	$4.64	$556.80	
	2x FR treated wood blocking & furring	450	bf	$2.44	$1,098.00	$2.56	$1,152.00	$0.00	$0.00	$5.00	$2,250.00	
	1x door & window rough buck	320	bf	$1.54	$492.80	$1.88	$601.60	$0.00	$0.00	$3.42	$1,094.40	
	3/4"CDX plywood in wall backing	96	sf	$0.65	$62.40	$2.32	$222.72	$0.00	$0.00	$2.97	$285.12	
	3/4" A/C plywood phone board	96	sf	$2.32	$222.72	$5.54	$531.84	$0.00	$0.00	$7.86	$754.56	
	Hardware, nails & screws	75	lbs	$15.54	$1,165.50	$25.54	$1,915.50	$0.00	$0.00	$41.08	$3,081.00	
	TOTAL ROUGH CARPENTRY				$3,319.82		$4,702.06		$0.00			$8,021.88
06.4116	**PLASTIC-LAMINATE-CLAD WOODWORK**											
	Plastic Laminate Architectural Cabinets:											
	Break Room Room P-Lam base	12	lf	$22.32	$267.84	$122.32	$1,467.84	$0.00	$0.00	$144.64	$1,735.68	
	Break Room P-Lam uppers	12	lf	$12.32	$147.84	$96.76	$1,161.12	$0.00	$0.00	$109.08	$1,308.96	
	Copy/Work Room Room P-Lam base	15	lf	$22.32	$334.80	$122.32	$1,834.80	$0.00	$0.00	$144.64	$2,169.60	
	Copy/Work Room Room P-Lam uppers	15	lf	$12.32	$184.80	$96.76	$1,451.40	$0.00	$0.00	$109.08	$1,636.20	
	Reception P-Lam base	12	lf	$22.32	$267.84	$122.32	$1,467.84	$0.00	$0.00	$144.64	$1,735.68	
	TOTAL PLASTIC-LAMINATE CLAD WOODWORK				$1,203.12		$7,383.00		$0.00			$8,586.12

1.1.1 - Portal & Well Houses Building Cost Detail

Run Date: 10/19/23

Project: Conceptual Design Development Phase Probable Cost Evaluation for the Honolulu Board of Water Supply New Fresh Water Wells Project
Estimated and Certified by J. O'Neill, FCPE

Division	DESCRIPTION	QUANTITY	UNITS	Labor Cost Unit	Labor Cost Total	Material Cost Unit	Material Cost Total	Equipment Cost Unit	Equipment Cost Total	Labor,Mat Equip Unit	Labor,Mat Equip Total	Division Total
06.6400	**SOLID SURFACE COUNTERTOPS**											
	Solid Surface:											
	24" wide solid surface countertops with 4" backsplash	24	lf	$55.54	$1,332.96	$88.87	$2,132.88	$0.00	$0.00	$144.41	$3,465.84	
	TOTAL SOLID SURFACE COUNTERTOPS				$1,332.96		$2,132.88		$0.00			$3,465.84
06.1643	**GYPSUM SHEATHING**											
	Exterior Wall, Parapet Sheathing:											
	1/2" ext. sheathing, screwed to mtl stud	1244	sf	$0.77	$957.88	$0.96	$1,194.24	$0.00	$0.00	$1.73	$2,152.12	
	Sheeting joint & penetration treatment	1244	sf	$0.32	$398.08	$0.36	$447.84	$0.00	$0.00	$0.68	$845.92	
	Scaffolding access to install	w/GC	w/GC	w/GC	w/GC	w/GC	w/GC	w/GC	w/GC	w/GC	w/GC	
	TOTAL GYPSUM SHEATHING				$1,355.96		$1,642.08		$0.00			$2,998.04
07.2100	**THERMAL INSULATION**											
	Extruded Polystyrene Foam-Plastic Board:											
	1.5" extruded poly board at foundations	2432	sf	$0.88	$2,140.16	$2.21	$5,374.72	$0.00	$0.00	$3.09	$7,514.88	
	Polyisocyanurate Foam-Plastic Board:											
	Glass Fiber Mat faced brd cavity walls/soffits/gables	1322	sf	$1.32	$1,745.04	$1.88	$2,485.36	$0.00	$0.00	$3.20	$4,230.40	
	Glass-Fiber Blanket											
	Glass fiber blanket at unfaced CMU cavities	3642	sf	$0.72	$2,622.24	$1.21	$4,406.82	$0.00	$0.00	$1.93	$7,029.06	
	TOTAL THERMAL INSULATION				$6,507.44		$12,266.90		$0.00			$18,774.34
07.2210	**ROOF DECK INSULATION**											
	Roofing Insulation Boards:											
	2ea. 1.5 " polyisocyanurate brd. Insul.	4455	sf	$1.24	$5,524.20	$2.65	$11,805.75	$0.00	$0.00	$3.89	$17,329.95	
	1/2" Gypsum roof board R-0.45	4455	sf	$0.36	$1,603.80	$0.65	$2,895.75	$0.00	$0.00	$1.01	$4,499.55	
	TOTAL ROOF DECK INSULATION				$7,128.00		$14,701.50		$0.00			$21,829.50
07.2419	**EXTERIOR INSULATED FINISH SYSTEM**											
	Rigid Cellular Poly Board, Reinforcing Mesh, Base Coat, Primer, Finish Coat, Trims:											
	Dryvit 1.5" EIFS drain wall ass. synthetic finish	632	sy	$55.54	$35,101.28	$66.65	$42,122.80	$1.12	$707.84	$123.31	$77,931.92	
	Add for Expansion joints & metal trims	340	lf	$3.32	$1,128.80	$5.54	$1,883.60	$0.88	$299.20	$9.74	$3,311.60	
	Erect & dismantle scaffolding & access	24	crewhrs	$244.00	$5,856.00	$22.32	$535.68	$55.65	$1,335.60	$321.97	$7,727.28	
	TOTAL EXTERIOR INSULATED FINISH SYSTEM				$42,086.08		$44,542.08		$2,342.64			$88,970.80
07.2600	**VAPOR RETARDERS**											
	Vapor Retarders:											
	10 mil Fire-retardant, reinforced poly vapor retarders	4450	sf	$0.32	$1,424.00	$0.88	$3,916.00	$0.00	$0.00	$1.20	$5,340.00	
	TOTAL VAPOR RETARDERS				$1,424.00		$3,916.00		$0.00			$5,340.00

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07.2726	**FLUID APPLIED MEMBRANE BARRIERS**											
	Fluid applied barriers, corners/intersections	1332	sf	$1.65	$2,197.80	$3.32	$4,422.24	$0.00	$0.00	$4.97	$6,620.04	
	TOTAL FLUID APPLIED MEMBRANE BARRIERS				$2,197.80		$4,422.24		$0.00			$6,620.04
07.4113	**METAL ROOF PANELS**											
	Prefinished Standing Seam Metal Roof:											
	22 ga. Galvalume Prefinshed metal panel standing sea	6532	sf	$4.43	$28,936.76	$6.76	$44,156.32	$0.00	$0.00	$11.19	$73,093.08	
	Clips, fastners, trims, ridge caps	6532	sf	$2.32	$15,154.24	$2.32	$15,154.24	$0.00	$0.00	$4.64	$30,308.48	
	TOTAL METAL ROOF PANELS				$44,091.00		$59,310.56		$0.00			$103,401.56
07.6000	**FLASHING & SHEETMETAL**											
	22 ga. Thru-wall Scuppers	9	ea	$55.65	$500.85	$66.77	$600.89	$0.00	$0.00	$122.42	$1,101.74	
	22 ga. Galv. Pain ted coping at parapets	640	lf	$5.54	$3,545.60	$12.32	$7,884.80	$0.00	$0.00	$17.86	$11,430.40	
	24 ga. Reglet/counterflashing at walls	220	lf	$0.88	$193.60	$5.12	$1,126.40	$0.00	$0.00	$6.00	$1,320.00	
	24 ga. Reglet/counterflashing at roof penetrations	86	lf	$0.32	$27.52	$7.32	$629.52	$0.00	$0.00	$7.64	$657.04	
	TOTAL FLASHING & SHEETMETAL				$4,267.57		$10,241.61		$0.00			$14,509.18
07.7000	**GUTTER & DOWNSPOUTS**											
	4"X5" continous aluminum gutter, attachements	240	lf	$5.54	$1,329.60	$9.98	$2,395.20	$0.00	$0.00	$15.52	$3,724.80	
	5"x5" aluminum gutter downsputs	120	lf	$3.32	$398.40	$8.87	$1,064.40	$0.00	$0.00	$12.19	$1,462.80	
	TOTAL GUTTER & DOWNPOUTS				$1,728.00		$3,459.60		$0.00			$5,187.60
07.8413	**PENITRATION FIRESTOPPING**											
	Fire stopping for through floor penitrations	7	ea	$32.32	$226.24	$44.43	$311.01	$0.00	$0.00	$76.75	$537.25	
	Fire Stopping ta 1 hour drywall partitions in HVAC n	120	lf	$1.44	$172.80	$0.86	$103.20	$0.00	$0.00	$2.30	$276.00	
	TOTAL PENITRATION FIRE STOPPING				$399.04		$414.21		$0.00			$813.25
07.9200	**JOINT SEALANTS**											
	Interior caulking & firestop	220	lf	$1.32	$290.40	$1.45	$319.00	$0.00	$0.00	$2.77	$609.40	
	Window & door sealant caulking	240	lf	$1.44	$345.60	$0.86	$206.40	$0.00	$0.00	$2.30	$552.00	
	TOTAL JOINT SEALANTS				$636.00		$525.40		$0.00			$1,161.40
07.9500	**EXPANSION CONTROL**											
	Prefabricated EIFS expansion joints	420	lf	$3.32	$1,394.40	$7.76	$3,259.20	$0.00	$0.00	$11.08	$4,653.60	
	TOTAL EXPNASION CONTROL				$1,394.40		$3,259.20		$0.00			$4,653.60
08.110	**HOLLOWMETAL METAL DOORS & FRAMES**											
	Hollow metal Doors:											

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	3'-0" x 7'-0" Hollow metal dress, sol cut outs	7	leaf's	$112.32	$786.24	$532.00	$3,724.00	$0.00	$0.00	$644.32	$4,510.24	
	6'-0" x 7'-0" Hollow metal dress, pr cut-outs	2	leaf's	$99.65	$199.30	$675.00	$1,350.00	$0.00	$0.00	$774.65	$1,549.30	
	Hollow metal Door Frames:											
	3'-0"x7'-0" Hollow metal door frame	15	sgl	$78.32	$1,174.80	$222.00	$3,330.00	$0.00	$0.00	$300.32	$4,504.80	
	6'-0"x7'-0" Hollow metal door frame	1	pr	$118.32	$118.32	$456.00	$456.00	$0.00	$0.00	$574.32	$574.32	
	Storage and Handling:											
	Unload and store HM for distribution	8	crewhrs	$66.32	$530.56	$0.00	$0.00	$0.00	$0.00	$66.32	$530.56	
	Distribution of hollow metal to req'd flrs	8	crewhrs	$66.32	$530.56	$0.00	$0.00	$0.00	$0.00	$66.32	$530.56	
	TOTAL HOLLOWMETAL DOORS & FRAMES				$3,339.78		$8,860.00		$0.00			$12,199.78
08.1416	**FLUSH WOOD DOORS**											
	3'-0"x7' Wd dress, SC, flush, veneer	8	leaf's	$112.32	$898.56	$286.65	$2,293.20	$0.00	$0.00	$398.97	$3,191.76	
	3'-0"x7' Wd dress, SC, flush, veneer, DBL	2	leaf's	$112.32	$224.64	$286.65	$573.30	$0.00	$0.00	$398.97	$797.94	
	TOTAL FLUSH WOOD DOORS				$1,123.20		$2,866.50		$0.00			$3,989.70
08.305	**ACCESS DOORS & FRAMES**											
	Fire Rated Access Doors:											
	18"x18" flush access door, fire-rated	16	ea	$112.00	$1,792.00	$255.65	$4,090.40	$0.00	$0.00	$367.65	$5,882.40	
	24"x24" flush access door, fire-rated	12	ea	$136.00	$1,632.00	$321.00	$3,852.00	$0.00	$0.00	$457.00	$5,484.00	
	TOTAL ACCESS DOORS & FRAMES				$3,424.00		$7,942.40		$0.00			$11,366.40
08.3323	**OVERHEAD COILING DOORS**											
	Overhead Coiling Doors at Counter:											
	OH 6'x8' Insulated overhead door, electric, controls	6	ea	$1,456.00	$8,736.00	$5,566.00	$33,396.00	$0.00	$0.00	$7,022.00	$42,132.00	
	TOTAL OVERHEAD COILING DOORS				$8,736.00		$33,396.00		$0.00			$42,132.00
08.4113	**ALUMINUM FRAMED ENTRANCE DOORS & STOREFRONT**											
	Aluminum Storefront Entrance Doors:											
	Kawneer 6'-0"x7'-0" alum. doors	1	pr	$3,322.00	$3,322.00	$12,326.00	$12,326.00	$0.00	$0.00	$15,648.00	$15,648.00	
	Aluminum Storefront Door Frames with Kynar Finish:											
	Kawneer TriFab 451 alum, Kynar	460	sf	$33.32	$15,327.20	$55.54	$25,548.40	$0.00	$0.00	$88.86	$40,875.60	
	TOTAL ALUMINUM FRAMED ENTRANCE DOORS & STOREFRONT				$18,649.20		$37,874.40		$0.00			$56,523.60
08.6300	**METAL-FRAMED SKYLIGHTS**											
	Kalwall Insulated Skylights:											
	Kalwall skylights, aluminum insulated frame	264	sf	$6.65	$1,755.60	$64.00	$16,896.00	$0.00	$0.00	$70.65	$18,651.60	
	TOTAL METAL-FRAMED SKYLIGHTS				$1,755.60		$16,896.00		$0.00			$18,651.60

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08.7100	**DOOR HARDWARE**											
	Commercial Hardware:											
	Exit Device	3	ea	$112.00	$336.00	$471.00	$1,413.00	$0.00	$0.00	$583.00	$1,749.00	
	Deadbolts	3	ea	$35.00	$105.00	$165.00	$495.00	$0.00	$0.00	$200.00	$600.00	
	Locksets, Manuel	15	sets	$88.00	$1,320.00	$256.00	$3,840.00	$0.00	$0.00	$344.00	$5,160.00	
	Push/pulls	2	sets	$16.00	$32.00	$133.00	$266.00	$0.00	$0.00	$149.00	$298.00	
	Door bottoms	3	ea	$2.00	$6.00	$12.45	$37.35	$0.00	$0.00	$14.45	$43.35	
	Thresholds 3'-0"	7	ea	$77.00	$539.00	$324.00	$2,268.00	$0.00	$0.00	$401.00	$2,807.00	
	Thresholds 6'-0"	1	ea	$24.00	$24.00	$32.00	$32.00	$0.00	$0.00	$56.00	$56.00	
	Hinges, 4" standard	38	prs	$1.65	$62.70	$21.32	$810.16	$0.00	$0.00	$22.97	$872.86	
	Hinges, 4" electric	4	ea	$3.32	$13.28	$55.65	$222.60	$0.00	$0.00	$58.97	$235.88	
	Closers	12	ea	$22.00	$264.00	$650.00	$7,800.00	$0.00	$0.00	$672.00	$8,064.00	
	Weatherstripping	3	ea	$15.00	$45.00	$12.65	$37.95	$0.00	$0.00	$27.65	$82.95	
	Kickplates	19	ea	$12.00	$228.00	$13.22	$251.18	$0.00	$0.00	$25.22	$479.18	
	Silencers	14	ea	$13.00	$182.00	$24.00	$336.00	$0.00	$0.00	$37.00	$518.00	
	Floor stops	6	ea	$17.00	$102.00	$21.00	$126.00	$0.00	$0.00	$38.00	$228.00	
	Wall stops	12	ea	$18.00	$216.00	$24.56	$294.72	$0.00	$0.00	$42.56	$510.72	
	Smokeseals	8	ea	$16.00	$128.00	$36.00	$288.00	$0.00	$0.00	$52.00	$416.00	
	Astragal	1	ea	$17.00	$17.00	$56.00	$56.00	$0.00	$0.00	$73.00	$73.00	
	Manuel Flush bolts	1	ea	$24.00	$24.00	$64.00	$64.00	$0.00	$0.00	$88.00	$88.00	
	Dustproof strike	1	ea	$21.00	$21.00	$38.00	$38.00	$0.00	$0.00	$59.00	$59.00	
	Keying System:											
	Master Keying system and grandfather system	1	ls	$3,200.00	$3,200.00	$0.00	$0.00	$0.00	$0.00	$3,200.00	$3,200.00	
	TOTAL DOOR HARDWARE				$6,864.98		$18,675.96		$0.00			$25,540.94
08.8000	**GLAZING**											
	Glass:											
	1/4" tempered glass at HM frames	54	sf	$8.65	$467.10	$8.25	$445.50	$0.00	$0.00	$16.90	$912.60	
	1/2" Insul. tempered glass at HM frames	56	sf	$9.32	$521.92	$8.77	$491.12	$0.00	$0.00	$18.09	$1,013.04	
	Glass Windows											
	Temp. glass windows w/alum frames	53	lf	$8.32	$440.96	$16.54	$876.62	$0.00	$0.00	$24.86	$1,317.58	
	TOTAL GLAZING				$1,429.98		$1,813.24		$0.00			$3,243.22
08.8300	**MIRRORS**											
	Mirrors:											
	Mirrors - 12mm sik mirror glass, 500UL/UL	48	sf	$8.87	$425.76	$14.43	$692.64	$0.00	$0.00	$23.30	$1,118.40	
	TOTAL MIRRORS				$425.76		$692.64		$0.00			$1,118.40
08.9119	**FIXED LOUVERS**											
	Prefinished Metal Louvers:											
	Painted metal louvers at ext walls, relief vents	136	sf	$24.43	$3,322.48	$44.00	$5,984.00	$0.00	$0.00	$68.43	$9,306.48	

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	TOTAL FIXED LOUVERS				$3,322.48		$5,984.00		$0.00			$9,306.48
09.2216	**NON-STRUCTURAL METAL FRAMING**											
	Light Ga. Metal Wall Framing:											
	22 gage 3-1/2" wall studs at 24" o/c	880	sf	$2.22	$1,953.60	$5.32	$4,681.60	$0.00	$0.00	$7.54	$6,635.20	
	25 gage 3-1/2" wall studs at 12" o/c	3344	sf	$2.12	$7,089.28	$4.65	$15,549.60	$0.00	$0.00	$6.77	$22,638.88	
	25 gage 3-1/2" wall studs at 24" o/c	650	sf	$1.96	$1,274.00	$4.32	$2,808.00	$0.00	$0.00	$6.28	$4,082.00	
	25 gage 3-1/2" masonry furring studs at 24" o/c	2700	sf	$1.99	$5,373.00	$6.65	$17,955.00	$0.00	$0.00	$8.64	$23,328.00	
	25 gage 6" metal studs at 16" o/c	440	sf	$2.32	$1,020.80	$0.88	$387.20	$0.00	$0.00	$3.20	$1,408.00	
	Ceiling/Soffit/Light Coves Framing:											
	Light ga. ceiling framing, hardlids	320	sf	$3.32	$1,062.40	$3.43	$1,097.60	$0.00	$0.00	$6.75	$2,160.00	
	TOTAL NON-STRUCTURAL METAL FRAMING				$17,773.08		$42,479.00		$0.00			$60,252.08
09.2900	**GYPSUM BOARD**											
	Gypsum Board Walls:											
	5/8" type X, taped & textured, sgl layer	16028	sf	$0.54	$8,655.12	$0.88	$14,104.64	$0.00	$0.00	$1.42	$22,759.76	
	5/8" water res., taped & textured, 1 layer	1965	sf	$0.46	$903.90	$0.92	$1,807.80	$0.00	$0.00	$1.38	$2,711.70	
	Gypsum Board Suspended Ceilings:											
	Clg/soffit drywall, typical perim. soffit	320	sf	$1.11	$355.20	$1.88	$601.60	$0.00	$0.00	$2.99	$956.80	
	Metal Trim:											
	Corner bead and metal trim	250	lf	$0.12	$30.00	$2.32	$580.00	$0.03	$7.50	$2.47	$617.50	
	Caulking & Sealants:											
	Caulk & seal stairway gypsum, airtight	560	lf	$0.12	$67.20	$2.65	$1,484.00	$0.03	$16.80	$2.80	$1,568.00	
	Caulk & seal, dissimilar materials	320	lf	$0.12	$38.40	$2.32	$742.40	$0.03	$9.60	$2.47	$790.40	
	Clean-up:											
	Scrap-out, sweeping, and clean-up	8	crewhrs	$55.65	$445.20	$0.00	$0.00	$68.32	$546.56	$123.97	$991.76	
	TOTAL GYPSUM BOARD				$10,495.02		$19,320.44		$580.46			$30,395.92
09.5001	**SUSPENDED ACOUSTICAL CEILINGS**											
	Suspended Ceilings:											
	2'x2' Armstrong suspended ceiling systems	2550	sf	$4.54	$11,577.00	$5.65	$14,407.50	$0.00	$0.00	$10.19	$25,984.50	
	Seismic wires at light fixtures	8	crewhrs	$44.54	$356.32	$22.65	$181.20	$0.00	$0.00	$67.19	$537.52	
	TOTAL SUSPENDED ACOUSTICAL CEILINGS				$11,933.32		$14,588.70		$0.00			$26,522.02
09.6513	**RESILIENT BASE & ACCESSORIES**											
	Rubber Base:											
	4" rubber cove base, adhesive	1032	lf	$0.88	$908.16	$1.55	$1,599.60	$0.00	$0.00	$2.43	$2,507.76	
	Transition Strip:											

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	Pre-molded transition strip	60	lf	$0.55	$33.00	$1.12	$67.20	$0.00	$0.00	$1.67	$100.20	
	TOTAL RESILIENT BASE & ACCESSORIES				$941.16		$1,666.80		$0.00			$2,607.96
09.6519	**RESILIENT TILE FLOORING**											
	Data Center:											
	12"x12" static dissipative tile	1980	sf	$3.32	$6,573.60	$6.65	$13,167.00	$0.00	$0.00	$9.97	$19,740.60	
	Misc.											
	Floor prep & protection	4	crewhrs	$21.44	$85.76	$22.65	$90.60	$0.00	$0.00	$44.09	$176.36	
	TOTAL RESILIENT TILE FLOORING				$6,659.36		$13,257.60		$0.00			$19,916.96
09.6623	**RESINOUS FLOORING**											
	Epoxy Flooring:											
	Pump house epoxy floor coatings, 2 coats, 60 mil	560	sf	$3.32	$1,859.20	$7.76	$4,345.60	$0.00	$0.00	$11.08	$6,204.80	
	Preparation:											
	Floor preparation & protection	4	crewhrs	$32.65	$130.60	$55.00	$220.00	$0.00	$0.00	$87.65	$350.60	
	TOTAL RESINOUS FLOORING				$1,989.80		$4,565.60		$0.00			$6,555.40
09.6813	**ACOUSTICAL BLANKET INSULATION**											
	Acoustical Batt Insulation:											
	3-1/2" Sound attenuation blanket	1632	sf	$0.08	$130.56	$1.12	$1,827.84	$0.00	$0.00	$1.20	$1,958.40	
	10" Sound attenuation blanket	1232	sf	$0.14	$172.48	$2.21	$2,722.72	$0.00	$0.00	$2.35	$2,895.20	
	TOTAL ACOUSTICAL BLANKET INSULATION				$303.04		$4,550.56		$0.00			$4,853.60
09.6900	**ACCESS FLOORING**											
	Data Center:											
	12" stantions with computer access flooring system	86	sf	$55.11	$4,739.46	$155.65	$13,385.90	$0.00	$0.00	$210.76	$18,125.36	
	TOTAL ACCESS FLOORING				$4,739.46		$13,385.90		$0.00			$18,125.36
09.8433	**SOUND-ABSORBING WALL UNITS**											
	Acoustical Composite Wall Panels:											
	2" Acoustical Composite Wall Panels, HW	112	sf	$7.87	$881.44	$27.76	$3,109.12	$0.00	$0.00	$35.63	$3,990.56	
	TOTAL SOUND ABSORBING UNITS				$881.44		$3,109.12		$0.00			$3,990.56
09.900	**PAINTS & COATINGS**											
	Painting:											
	Paint on HM doors	8	leaf's	$55.00	$440.00	$21.00	$168.00	$0.00	$0.00	$76.00	$608.00	
	Paint at HM door frames	16	ea	$88.00	$1,408.00	$22.00	$352.00	$0.00	$0.00	$110.00	$1,760.00	
	Paint & prep at wood doors	12	ea	$72.32	$867.84	$22.00	$264.00	$0.00	$0.00	$94.32	$1,131.84	

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	Paint at ceiling access doors	6	ea	$32.00	$192.00	$5.00	$30.00	$0.00	$0.00	$37.00	$222.00	
	Paint drywall walls & ceilings	17993	sf	$0.22	$3,958.46	$0.22	$3,958.46	$0.00	$0.00	$0.44	$7,916.92	
	Paint interior metal trims	16	crewhrs	$32.65	$522.40	$55.00	$880.00	$0.00	$0.00	$87.65	$1,402.40	
	High Performance Coatings:											
	Exterior steel coatings	1232	sf	$1.12	$1,379.84	$0.65	$800.80	$0.00	$0.00	$1.77	$2,180.64	
	Concrete sealer	320	sf	$0.08	$25.60	$0.12	$38.40	$0.00	$0.00	$0.20	$64.00	
	Paint exterior metal trims	24	crewhrs	$32.65	$783.60	$55.00	$1,320.00	$0.00	$0.00	$87.65	$2,103.60	
	Preparation:											
	Wall preparation & protection	24	crewhrs	$32.65	$783.60	$55.00	$1,320.00	$0.00	$0.00	$87.65	$2,103.60	
	TOTAL PAINTS & COATINGS				$10,361.34		$9,131.66		$0.00			$19,493.00
	SIGNAGE											
	Exterior Signage:											
	Sign at Bldg Face	1	ea	$1,250.00	$1,250.00	$3,250.00	$3,250.00	$456.00	$456.00	$4,956.00	$4,956.00	
	Interior Signage:											
	Brass dedication plaque	1	ea	$135.65	$135.65	$1,232.00	$1,232.00	$0.00	$0.00	$1,367.65	$1,367.65	
	Plastic room signage , braille type	15	ea	$55.65	$834.75	$188.65	$2,829.75	$0.00	$0.00	$244.30	$3,664.50	
	Plastic restroom signage , braille type	2	ea	$135.65	$271.30	$155.65	$311.30	$0.00	$0.00	$291.30	$582.60	
	TOTAL SIGNAGE				$2,491.70		$7,623.05		$456.00			$10,570.75
10.2600	**WALL & DOOR PROTECTION**											
	Plastic corner guards, LEED, recycle	320	lf	$1.12	$358.40	$5.32	$1,702.40	$0.00	$0.00	$6.44	$2,060.80	
	TOTAL WALL & DOOR PROTECTION				$358.40		$1,702.40		$0.00			$2,060.80
10.2800	**TOILET & BATH ACCESSORIES**											
	Bathroom Accessories:											
	36" grab bar, horizontal	2	ea	$12.32	$24.64	$52.32	$104.64	$0.00	$0.00	$64.64	$129.28	
	42" grab bar, horizontal	2	ea	$15.65	$31.30	$62.44	$124.88	$0.00	$0.00	$78.09	$156.18	
	Toilet tissue dispenser - Dbl roll	2	ea	$8.65	$17.30	$17.35	$34.70	$0.00	$0.00	$26.00	$52.00	
	Flush mount Paper towel dispenser	2	ea	$44.57	$89.13	$138.00	$276.00	$0.00	$0.00	$182.57	$365.13	
	Surface mount Liquid Soap dispenser	2	ea	$9.65	$19.30	$39.35	$78.70	$0.00	$0.00	$49.00	$98.00	
	Recessed waste receptacles	2	ea	$54.32	$108.64	$263.00	$526.00	$0.00	$0.00	$317.32	$634.64	
	Mop/broom holders 5 holders 48" long	1	ea	$22.44	$22.44	$53.00	$53.00	$0.00	$0.00	$75.44	$75.44	
	TOTAL TOILET & BATH ACCESSORIES				$312.75		$1,197.92		$0.00			$1,510.67
10.4313	**DEFIBULATOR CABINETS**											
	Recessed Wall Cabinets:											
	Defulator cabinets, semi-resessed	1	ea	$225.00	$225.00	$2,132.00	$2,132.00	$1.12	$1.12	$2,358.12	$2,358.12	
	TOTAL DEFIBULATOR CABINETS				$225.00		$2,132.00		$1.12			$2,358.12

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10.4413	**FIRE PROTECTION CABINETS**											
	Recessed Cabinets:											
	Semi Recessed Fire Protection cabinets	1	ea	$325.00	$325.00	$1,032.00	$1,032.00	$0.00	$0.00	$1,357.00	$1,357.00	
	TOTAL FIRE PROTECTION CABINETS				$325.00		$1,032.00		$0.00			$1,357.00
10.4416	**FIRE EXTINGUISHERS**											
	Fire Extinguishers:											
	Fire extinguisher, surface mounted	1	ea	$55.65	$55.65	$66.32	$66.32	$0.00	$0.00	$121.97	$121.97	
	TOTAL FIRE EXTINGUISHERS				$55.65		$66.32		$0.00			$121.97
10.5113	**METAL LOCKERS**											
	Painted Metal Lockers:											
	Painted metal lockers, 2 tier, 72" H	12	ea	$135.65	$1,627.80	$324.43	$3,893.16	$0.00	$0.00	$460.08	$5,520.96	
	TOTAL METAL LOCKERS				$1,627.80		$3,893.16		$0.00			$5,520.96
10.9900	**MISCELLANEOUS SPECIALTIES**											
	TV Brackets:											
	Wall mount, tilt, swivel TV brackets	1	ea	$325.00	$325.00	$225.00	$225.00	$1.12	$1.12	$551.12	$551.12	
	TOTAL MISCELLANEOUS SPECIALTIES				$325.00		$225.00		$1.12			$551.12
11.4000	**FOOD SERVICE EQUIPMENT**											
	Breakroom Kitchen Equipment:											
	Food Service Equipment & installation	1	ls	$880.00	$880.00	$7,650.00	$7,650.00	$0.00	$0.00	$8,530.00	$8,530.00	
	TOTAL FOOD SERVICE EQUIPMENT				$880.00		$7,650.00		$0.00			$8,530.00
11.5209	**PROJECTION SCREENS & PROJECTION MOUNTS**											
	Motorized Projection Screens:											
	Conference room 8' projection screens	1	ea	$865.00	$865.00	$2,432.32	$2,432.32	$0.00	$0.00	$3,297.32	$3,297.32	
	TOTAL PROJECTION SCREENS & PROJECTION MOUNTS				$865.00		$2,432.32		$0.00			$3,297.32
12.9313	**OFFICE FURNISHINGS**											
	Office furnishings, desk partiions, file storage	2550	sf	$3.32	$8,466.00	$1.00	$2,550.00	$0.00	$0.00	$4.32	$11,016.00	
	TOTAL OFFICE FURNISHINGS				$8,466.00		$2,550.00		$0.00			$11,016.00
13.2500	**LIGHTNING PROTECTION**											
	Lightning protection rods, grounding, ground rods	3800	sf	$1.12	$4,256.00	$3.23	$12,274.00	$0.00	$0.00	$4.35	$16,530.00	
	TOTAL LIGHTNING PROTECTION				$4,256.00		$12,274.00		$0.00			$16,530.00

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21.1000	**FIRE SPRINKLER SYSTEMS**											
	Wet & Dry Sprinkler systems											
	Wet & dry Fire protection system, standpipes	2550	sf	$7.44	$18,972.00	$7.32	$18,666.00	$0.00	$0.00	$14.76	$37,638.00	
	Backflow preventor flow & tamper	1	ls	$832.32	$832.32	$4,532.32	$4,532.32	$0.00	$0.00	$5,364.64	$5,364.64	
	3-1/2" fire Dept connection	1	ea	$765.00	$765.00	$1,032.00	$1,032.00	$0.00	$0.00	$1,797.00	$1,797.00	
	TOTAL FIRE SPRINKLERS SYSTEMS				$20,569.32		$24,230.32		$0.00			$44,799.64
21.9000	**CHEMICAL AGENT SYSTEMS**											
	Data Room HALON Agent Systems:											
	Clean agent system for data center	84	sf	$5.65	$474.60	$8.54	$717.36	$0.00	$0.00	$14.19	$1,191.96	
	TOTAL CHEMICAL AGENT SYSTEMS				$474.60		$717.36		$0.00			$1,191.96
22.100	**PLUMBING**											
	Domestic Water Fixtures & Trim											
	Plumbing Fixtures & trim package	2550	sf	$5.65	$14,407.50	$8.54	$21,777.00	$0.00	$0.00	$14.19	$36,184.50	
	Domestic Water Heater:											
	Instant Hot water maker, electric	1	ea	$722.32	$722.32	$1,566.65	$1,566.65	$0.00	$0.00	$2,288.97	$2,288.97	
	Water Hammer Arrestor:											
	Water hammer arrestor, 3/4"	2550	sf	$0.16	$408.00	$0.22	$561.00	$0.00	$0.00	$0.38	$969.00	
	Drains:											
	Floor Drain, Zurn 6" medium duty	2550	sf	$0.33	$841.50	$0.44	$1,122.00	$0.00	$0.00	$0.77	$1,963.50	
	Misc:											
	WCO wall cleanout, 7"x7" square panel	1	ea	$112.00	$112.00	$55.65	$55.65	$0.00	$0.00	$167.65	$167.65	
	1/4" icemaker connection & box	1	ea	$88.87	$88.87	$99.98	$99.98	$0.00	$0.00	$188.85	$188.85	
	Washer connection & box	1	ea	$123.00	$123.00	$144.00	$144.00	$0.00	$0.00	$267.00	$267.00	
	FP Hose Bib connection & box	2	ea	$77.76	$155.52	$92.32	$184.64	$0.00	$0.00	$170.08	$340.16	
	Sanitary Waste & Vent Piping & Accessories:											
	1-1/2" SAS piping, PVC, hangers 10' o/c	80	lf	$5.32	$425.60	$5.65	$452.00	$0.00	$0.00	$10.97	$877.60	
	1-1/2" SAS pipe 45 PVC	2	ea	$33.54	$67.08	$38.65	$77.30	$0.00	$0.00	$72.19	$144.38	
	1-1/2" SAS pipe 90 ell, PVC	2	ea	$42.32	$84.64	$45.55	$91.10	$0.00	$0.00	$87.87	$175.74	
	1-1/2" SAS pipe connector, PVC	3	ea	$55.65	$166.95	$55.32	$165.96	$0.00	$0.00	$110.97	$332.91	
	1-1/2" SAS pipe wye PVC	2	ea	$132.00	$264.00	$93.45	$186.90	$0.00	$0.00	$225.45	$450.90	
	2" SAS piping, PVC w/hangers @ 10' o/c	2	lf	$6.32	$12.64	$6.11	$12.22	$0.00	$0.00	$12.43	$24.86	
	2" SAS pipe 45 ell, PVC	1	ea	$33.54	$33.54	$38.65	$38.65	$0.00	$0.00	$72.19	$72.19	
	2" SAS pipe 90 ell, PVC	1	ea	$42.32	$42.32	$45.55	$45.55	$0.00	$0.00	$87.87	$87.87	
	2" SAS pipe connector, PVC	1	ea	$55.65	$55.65	$55.32	$55.32	$0.00	$0.00	$110.97	$110.97	
	2" SAS pipe wye PVC	2	ea	$132.00	$264.00	$93.45	$186.90	$0.00	$0.00	$225.45	$450.90	
	3" SAS piping, PVC w/hangers @ 10' o/c	80	lf	$7.21	$576.80	$7.32	$585.60	$0.00	$0.00	$14.53	$1,162.40	

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				Unit	Total	Unit	Total	Unit	Total			
	3" SAS pipe 45 ell, PVC	2	ea	$33.54	$67.08	$38.65	$77.30	$0.00	$0.00	$72.19	$144.38	
	3" SAS pipe 90 ell, PVC	6	ea	$42.32	$253.92	$45.55	$273.30	$0.00	$0.00	$87.87	$527.22	
	3" SAS pipe connector, PVC	2	ea	$55.65	$111.30	$55.32	$110.64	$0.00	$0.00	$110.97	$221.94	
	3" SAS pipe tee, PVC	2	ea	$132.00	$264.00	$93.45	$186.90	$0.00	$0.00	$225.45	$450.90	
	4" SAS piping, PVC w/hnagers @ 10 o/c	130	lf	$8.29	$1,077.70	$8.88	$1,154.40	$0.00	$0.00	$17.17	$2,232.10	
	4" SAS pipe 45 ell, PVC	8	ea	$33.54	$268.32	$38.65	$309.20	$0.00	$0.00	$72.19	$577.52	
	4" SAS pipe 90 ell, PVC	6	ea	$42.32	$253.92	$45.55	$273.30	$0.00	$0.00	$87.87	$527.22	
	4" SAS pipe connector, PVC	4	ea	$55.65	$222.60	$55.32	$221.28	$0.00	$0.00	$110.97	$443.88	
	4" SAS pipe tee, PVC	3	ea	$132.00	$396.00	$93.45	$280.35	$0.00	$0.00	$225.45	$676.35	
	Hot & Cold Piping & Accessories:											
	3/8" copper piping, ells, 90's w/hangers	60	lf	$1.56	$93.60	$2.44	$146.40	$0.00	$0.00	$4.00	$240.00	
	3/8" copper piping tees	2	ea	$18.65	$37.30	$19.32	$38.64	$0.00	$0.00	$37.97	$75.94	
	3/8" ball valves	2	ea	$18.65	$37.30	$19.32	$38.64	$0.00	$0.00	$37.97	$75.94	
	1/2" copper piping, ells, 90's w/hangers	2	lf	$1.88	$3.76	$2.88	$5.76	$0.00	$0.00	$4.76	$9.52	
	1/2" ball valves	2	ea	$18.65	$37.30	$19.32	$38.64	$0.00	$0.00	$37.97	$75.94	
	3/4" copper piping, ells, 90's w/hangers	2	lf	$2.12	$4.24	$3.32	$6.64	$0.00	$0.00	$5.44	$10.88	
	3/4" copper piping tees	2	ea	$18.65	$37.30	$19.32	$38.64	$0.00	$0.00	$37.97	$75.94	
	3/4" ball valves	2	ea	$19.55	$39.10	$23.45	$46.90	$0.00	$0.00	$43.00	$86.00	
	Insulated 3/4" pipe with R-3 2" insulation, Cvr	60	lf	$3.22	$193.20	$5.65	$339.00	$0.00	$0.00	$8.87	$532.20	
	Testing & Inspection:											
	Leak testing & inspection	8	crewhrs	$55.65	$445.20	$62.32	$498.56	$0.00	$0.00	$117.97	$943.76	
	Testing, labeling, adjustment	8	mhrs	$112.00	$896.00	$12.32	$423.00	$0.00	$0.00	$124.32	$1,319.00	
	TOTAL PLUMBING				$23,591.07		$31,915.91		$0.00			$55,506.98
23.100	**HEATING, VENTILATION, & AIR CONDITIONING**											
	Rooftop Units:											
	RTU 1 Electric Rooftop units electric DX heat/cool	1	ea	$4,455.00	$4,455.00	$25,325.00	$25,325.00	$2,432.00	$2,432.00	$32,212.00	$32,212.00	
	Exhaust Fans:											
	Restroom Exhaust fans 80 CFM	2	ea	$211.21	$422.42	$321.21	$642.42	$550.00	$1,100.00	$1,082.42	$2,164.84	
	Pump House Exhaust fans 320 CFM. In-wall, vertical	5	ea	$355.54	$1,777.70	$844.43	$4,222.15	$550.00	$2,750.00	$1,749.97	$8,749.85	
	4" duct to outside wall w/outlet	2	ea	$211.21	$422.42	$321.21	$642.42	$550.00	$1,100.00	$1,082.42	$2,164.84	
	Air Distribution:											
	24 ga. Galv. Sheetmetal duct, overhead	2455	lb	$2.88	$7,070.40	$3.65	$8,960.75	$0.00	$0.00	$6.53	$16,031.15	
	R-8 Insulation at mech ductwork	246	sf	$0.65	$159.90	$0.66	$162.36	$0.00	$0.00	$1.31	$322.26	
	8" diameter galv. Round ductwork	40	lf	$7.76	$310.40	$12.32	$492.80	$0.00	$0.00	$20.08	$803.20	
	6" diameter galv. Round ductwork	40	lf	$7.21	$288.40	$10.44	$417.60	$0.00	$0.00	$17.65	$706.00	
	26 ga. Dryer connection box, inwall, receessed	1	ea	$122.32	$122.32	$155.54	$155.54	$0.00	$0.00	$277.86	$277.86	
	Supply Diffusers:											
	Supply Air, 24"x24", 6", louvered	24	ea	$52.00	$1,248.00	$155.00	$3,720.00	$0.00	$0.00	$207.00	$4,968.00	
	Supply Diffusers:											
	Supply Air, 12"x12", 6", louvered	16	ea	$52.00	$832.00	$155.00	$2,480.00	$0.00	$0.00	$207.00	$3,312.00	

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				Unit	Total	Unit	Total	Unit	Total	Equip Unit	Equip Total	Total
	Supply Air, 12"x6", 14", louvered	8	ea	$57.00	$456.00	$158.00	$1,264.00	$0.00	$0.00	$215.00	$1,720.00	
	Exhaust Grilles:											
	Exhaust Air, 12"x12", sgl deflect	4	ea	$45.00	$180.00	$113.00	$452.00	$0.00	$0.00	$158.00	$632.00	
	Exhaust Air, 6"x6", sgl deflect	2	ea	$42.00	$84.00	$102.00	$204.00	$0.00	$0.00	$144.00	$288.00	
	A/C Condenser Piping & Accessories:											
	3/4" copper pipe	80	lf	$1.68	$134.40	$1.72	$137.60	$0.00	$0.00	$3.40	$272.00	
	3/4" copper pipe 90 elbow	1	ea	$6.32	$6.32	$2.65	$2.65	$0.00	$0.00	$8.97	$8.97	
	3/4" copper pipe 45 elbow	1	ea	$6.88	$6.88	$2.55	$2.55	$0.00	$0.00	$9.43	$9.43	
	3/4" copper pipe tee	1	ea	$12.32	$12.32	$5.32	$5.32	$0.00	$0.00	$17.64	$17.64	
	3/4" copper pipe coupling	1	ea	$5.65	$5.65	$3.65	$3.65	$0.00	$0.00	$9.30	$9.30	
	3/4" copper pipe reducer	1	ea	$5.66	$5.66	$2.45	$2.45	$0.00	$0.00	$8.11	$8.11	
	3/4" copper pipe ball valve	1	ea	$55.32	$55.32	$56.32	$56.32	$0.00	$0.00	$111.64	$111.64	
	3/4" copper pipe adapter	1	ea	$8.65	$8.65	$5.43	$5.43	$0.00	$0.00	$14.08	$14.08	
	Pipe hangers & supports	1	ea	$33.56	$33.56	$72.32	$72.32	$0.00	$0.00	$105.88	$105.88	
	Leak testing & inspection	2	crewhrs	$55.65	$111.30	$62.32	$124.64	$0.00	$0.00	$117.97	$235.94	
	Labels & consumables	2	mhrs	$25.65	$51.30	$36.45	$72.90	$0.00	$0.00	$62.10	$124.20	
	Condensate Water Pipe Insulation & Accessories:											
	3/4" fiberglass insulation w/PVC jacket	120	lf	$7.65	$918.00	$6.32	$758.40	$0.00	$0.00	$13.97	$1,676.40	
	Labels & consumables	2	mhrs	$25.65	$51.30	$36.45	$72.90	$0.00	$0.00	$62.10	$124.20	
	Test & balance & start-up:											
	Test & balance & start-up	8	mhrs	$156.00	$1,248.00	$32.00	$256.00	$0.00	$0.00	$188.00	$1,504.00	
	TOTAL HEATING, VENTILATION, & AIR CONDITIONING				$20,477.62		$50,714.17		$7,382.00			$78,573.79
25.100	**BUILDING AUTOMATION & CONTROLS**											
	Wiring:											
	#18 beldon #9688 control wiring	50	lf	$1.54	$77.00	$0.880	$44.00	$0.00	$0.00	$2.42	$121.00	
	Thermostats											
	7 day programable thermostat	1	ea	$88.55	$88.55	$165.000	$165.00	$0.00	$0.00	$253.55	$253.55	
	TOTAL BUILDING AUTOMATION & CONTROLS				$165.55		$209.00		$0.00			$374.55
26.100	**POWER, DISTRIBUTION, LIGHTING, & DEVICES**											
	Distribution Panels & Grounding Equipment:											
	Panel 600A Panel, NEMA 1R with GFI's	2	sec	$1,622.32	$3,244.64	$4,455.54	$8,911.08	$0.00	$0.00	$6,077.86	$12,155.72	
	Panel 200A Panel, NEMA 1R with GFI's	5	ea	$1,433.32	$7,166.60	$3,644.00	$18,220.00	$0.00	$0.00	$5,077.32	$25,386.60	
	12"x12" x4" NEMA 3R meter box/socket	1	ea	$122.32	$122.32	$355.54	$355.54	$0.00	$0.00	$477.86	$477.86	
	5/8" x10' ground rod, claps, wire (existing)	1	ea	$322.00	$322.00	$832.32	$832.32	$0.00	$0.00	$1,154.32	$1,154.32	
	8"x4" x1/4" ground plates, claps, wire	1	ea	$222.00	$222.00	$244.54	$244.54	$0.00	$0.00	$466.54	$466.54	
	Terminations at panel lugs	1	ea	$65.65	$65.65	$32.44	$32.44	$0.00	$0.00	$98.09	$98.09	
	Conduit, Wire, & Boxes:											

1.1.1 - Portal & Well Houses Building Cost Detail

Run Date: 10/19/23

Project: Conceptual Design Development Phase Probable Cost Evaluation for the Honolulu Board of Water Supply New Fresh Water Wells Project
Estimated and Certified by J. O'Neill, FCPE

Division	DESCRIPTION	QUANTITY	UNITS	Labor Cost		Material Cost		Equipment Cost		Labor,Mat	Labor,Mat	Division
				Unit	Total	Unit	Total	Unit	Total	Equip Unit	Equip Total	Total
	1/2" EMT conduit and hangers	120	lf	$6.76	$811.20	$2.77	$332.40	$0.00	$0.00	$9.53	$1,143.60	
	3/4" EMT conduit and hangers	2436	lf	$7.32	$17,831.52	$4.43	$10,791.48	$0.00	$0.00	$11.75	$28,623.00	
	1.25" EMT conduit and hangers	140	lf	$8.32	$1,164.80	$4.12	$576.80	$0.00	$0.00	$12.44	$1,741.60	
	#8 THWN-THHN copper stranded	5566	lf	$0.12	$667.92	$0.16	$890.56	$0.00	$0.00	$0.28	$1,558.48	
	#10 THWN-THHN copper stranded	3259	lf	$0.12	$391.08	$0.14	$456.26	$0.00	$0.00	$0.26	$847.34	
	#12 THWN-THHN copper stranded	4232	lf	$0.12	$507.84	$0.14	$592.48	$0.00	$0.00	$0.26	$1,100.32	
	#1/0 THWN-THHN copper solid	6822	lf	$0.12	$818.64	$0.22	$1,500.84	$0.00	$0.00	$0.34	$2,319.48	
	4ea. 500 kCMIL solid copper feeder w/shielding	120	lf	$5.65	$678.00	$55.65	$6,678.00	$0.00	$0.00	$61.30	$7,356.00	
	4ea. #1/0 THHN copper solid	120	lf	$7.88	$945.60	$10.44	$1,252.80	$0.00	$0.00	$18.32	$2,198.40	
	#1/0 Insulated CU copper solid	120	lf	$0.12	$14.40	$21.21	$2,545.20	$0.00	$0.00	$21.33	$2,559.60	
	#6 THWN-THHN copper solid	3320	lf	$0.12	$398.40	$0.07	$232.40	$0.00	$0.00	$0.19	$630.80	
	4"x4" outlet box, wall mount, straps	44	ea	$6.32	$278.08	$12.55	$552.20	$0.00	$0.00	$18.87	$830.28	
	4"x4" outlet box, floor mount, 2" conduit	2	ea	$325.65	$651.30	$762.32	$1,524.64	$0.00	$0.00	$1,087.97	$2,175.94	
	6"x6" Surface mounted wire gutter	3	lf	$6.32	$18.96	$12.55	$37.65	$0.00	$0.00	$18.87	$56.61	
	12"x12" x4" NEMA 3R floor boxes	8	ea	$6.32	$50.56	$12.55	$100.40	$0.00	$0.00	$18.87	$150.96	
	4"x6"x4" gutter surface mounted raceway, hangers, c	3	lf	$6.32	$18.96	$12.55	$37.65	$0.00	$0.00	$18.87	$56.61	
	Light Fixtures:											
	Light Fixtures, exterior & interior	2550	sf	$3.32	$8,466.00	$24.00	$61,200.00	$0.00	$0.00	$27.32	$69,666.00	
	Emergency Exit Lights	2550	sf	$0.12	$306.00	$0.33	$841.50	$0.00	$0.00	$0.45	$1,147.50	
	Devices & Controls:											
	Light switch & cover	14	ea	$12.32	$172.48	$32.32	$452.48	$0.00	$0.00	$44.64	$624.96	
	3-way switch & cover	12	ea	$16.32	$195.84	$112.32	$1,347.84	$0.00	$0.00	$128.64	$1,543.68	
	120V duplex outlet & cover	8	ea	$18.55	$148.40	$44.65	$357.20	$0.00	$0.00	$63.20	$505.60	
	120V Quad outlet & cover	8	ea	$22.32	$178.56	$55.32	$442.56	$0.00	$0.00	$77.64	$621.12	
	120V GFCI duplex outlet & cover - int.	32	ea	$21.21	$678.72	$96.35	$3,083.20	$0.00	$0.00	$117.56	$3,761.92	
	120V GFCI duplex outlet & cover - WP	26	ea	$41.33	$1,074.58	$112.00	$2,912.00	$0.00	$0.00	$153.33	$3,986.58	
	Equipment Connections:											
	Rooftop unit connections, waterproof flex connector	3	ea	$222.32	$666.96	$322.32	$966.96	$0.00	$0.00	$544.64	$1,633.92	
	Exhaust fan units	7	ea	$266.65	$1,866.55	$366.76	$2,567.32	$0.00	$0.00	$633.41	$4,433.87	
	Test & start-up:											
	Test, start-up, & commissioning	60	mhrs	$165.00	$9,900.00	$32.00	$1,920.00	$0.00	$0.00	$197.00	$11,820.00	
	TOTAL POWER, DISTRIBUTION, LIGHTING, DEVICES				$60,044.56		$132,788.74		$0.00			$192,833.30
27.1000	**COMMUNICATIONS**											
	Data & Communications:											
	Cable vault for cable rack, rm HUB build-out	1	ea	$24,325.00	$24,325.00	$55,326.00	$55,326.00	$888.32	$888.32	$80,539.32	$80,539.32	
	Data/communication CAT 6 cabling	32500	lf	$0.22	$7,150.00	$0.72	$23,400.00	$0.00	$0.00	$0.94	$30,550.00	
	Hybrid 12 strand MM 50u 7 6 strand SM	20	lf	$6.32	$126.40	$21.21	$424.20	$0.00	$0.00	$27.53	$550.60	
	4ea. 200 pair CMR copper cable	120	lf	$3.56	$427.20	$32.32	$3,878.40	$0.00	$0.00	$35.88	$4,305.60	
	4"x12" aluminum cable tray. 3 ways, 90's	24	lf	$7.32	$175.68	$18.65	$447.60	$0.00	$0.00	$25.97	$623.28	
	4"x24" aluminum cable tray, 3 ways, 90's	60	lf	$12.32	$739.32	$24.56	$1,473.60	$0.00	$0.00	$36.88	$2,212.92	
	Ceiling mounted hook and loop straps	1230	lf	$1.00	$1,230.00	$1.00	$1,230.00	$0.00	$0.00	$2.00	$2,460.00	
	1" EMT conduit, hangers w/pullstring	w/16000	w/16000	w/16000	w/16000	w/16000	w/16000	w/16000	w/16000	w/16000	w/16000	

1.1.1 - Portal & Well Houses Building Cost Detail

Run Date: 10/19/23

Project: Conceptual Design Development Phase Probable Cost Evaluation for the Honolulu Board of Water Supply New Fresh Water Wells Project
Estimated and Certified by J. O'Neill, FCPE

Division	DESCRIPTION	QUANTITY	UNITS	Labor Cost Unit	Labor Cost Total	Material Cost Unit	Material Cost Total	Equipment Cost Unit	Equipment Cost Total	Labor,Mat Equip Unit	Labor,Mat Equip Total	Division Total
	4" EMT conduit, hangers w/pullstring	w/16000	w/16000	w/16000	w/16000	w/16000	w/16000	w/16000	w/16000	w/16000	w/16000	
	1" conduit, data outlet w/pull string drops	w/16000	w/16000	w/16000	w/16000	w/16000	w/16000	w/16000	w/16000	w/16000	w/16000	
	Wireless Internet nodes	7	ea	$522.32	$3,656.24	$1,032.00	$7,224.00	$0.00	$0.00	$1,244.32	$10,880.24	
	SCADA connections	164	ea	$422.32	$69,260.48	$566.65	$92,930.60	$0.00	$0.00	$1,244.32	$162,191.08	
	Floor mount, double port, power/data , alum	1	ea	$265.66	$265.66	$999.32	$999.32	$0.00	$0.00	$1,244.32	$1,264.98	
	Wall mount, double port, power/data , alum	24	ea	$77.76	$1,866.24	$88.54	$2,124.96	$0.00	$0.00	$1,244.32	$3,991.20	
	TOTAL COMMUNICATIONS				$109,222.22		$189,458.68		$888.32			$299,569.22
28.1300	**ACCESS CONTROLS**											
	Intrusion Detection System & Card readers:											
	Burglar Alarm, battery back-up, multicore	1	ea	$2,211.00	$2,211.00	$12,325.00	$12,325.00	$0.00	$0.00	$14,536.00	$14,536.00	
	Card readers, flush type standard, std.	1	ea	$1,233.00	$1,233.00	$4,232.00	$4,232.00	$0.00	$0.00	$5,465.00	$5,465.00	
	Door Switches, hinge switch	4	ea	$165.00	$660.00	$112.00	$448.00	$0.00	$0.00	$277.00	$1,108.00	
	Passive infrared detectors	6	ea	$44.00	$264.00	$162.00	$972.00	$0.00	$0.00	$206.00	$1,236.00	
	Alarm siren	6	ea	$55.00	$330.00	$456.00	$2,736.00	$0.00	$0.00	$511.00	$3,066.00	
	Police connection & dialer	1	ea	$68.00	$68.00	$324.00	$324.00	$0.00	$0.00	$392.00	$392.00	
	#18 beldon #9932 control wiring	890	lf	$0.22	$195.80	$0.77	$685.30	$0.00	$0.00	$0.99	$881.10	
	120V Conduit & pullstring	w/16000	w/16000	w/16000	w/16000	w/16000	w/16000	w/16000	w/16000	w/16000	w/16000	
	TOTAL ACCESS CONTROLS				$4,961.80		$21,722.30		$0.00			$26,684.10
28.2300	**VIDEO SURVEILLANCE SYSTEM**											
	Intrusion Detection System:											
	CCTV Head End Equip. battery back-up	1	ea	$3,244.00	$3,244.00	$32,444.00	$32,444.00	$0.00	$0.00	$35,688.00	$35,688.00	
	CCTV Monitors, switching & controls	2	ea	$3,124.00	$6,248.00	$2,456.00	$4,912.00	$0.00	$0.00	$5,580.00	$11,160.00	
	Color CCTV cameras, Zoom tilt, pan, mnt	56	ea	$325.00	$18,200.00	$2,132.00	$119,392.00	$0.00	$0.00	$2,457.00	$137,592.00	
	Color CCTV cameras, stationary, mnt	136	ea	$165.00	$22,440.00	$112.00	$15,232.00	$0.00	$0.00	$277.00	$37,672.00	
	CCTV splitter cabinet & terminals	42	ea	$44.00	$1,848.00	$162.00	$6,804.00	$0.00	$0.00	$206.00	$8,652.00	
	Software installation & 1 year maintenance	64	ea	$55.00	$3,520.00	$456.00	$29,184.00	$0.00	$0.00	$511.00	$32,704.00	
	#18 beldon #9932 control wiring	890	lf	$0.22	$195.80	$0.77	$685.30	$0.00	$0.00	$0.99	$881.10	
	120V Conduit & pullstring	w/16000	w/16000	w/16000	w/16000	w/16000	w/16000	w/16000	w/16000	w/16000	w/16000	
	TOTAL VIDEO SURVEILLANCE				$55,695.80		$208,653.30		$0.00			$264,349.10
28.3100	**FIRE-ALARM SYSTEM**											
	Fire Alarm System:											
	Alarm center complex, subpanels	1	ea	$4,232.00	$4,232.00	$33,435.00	$33,435.00	$0.00	$0.00	$37,667.00	$37,667.00	
	Voice communication center	1	ea	$3,124.00	$3,124.00	$2,456.00	$2,456.00	$0.00	$0.00	$5,580.00	$5,580.00	
	Battery, rack, & autocharger	1	ea	$325.00	$325.00	$2,132.00	$2,132.00	$0.00	$0.00	$2,457.00	$2,457.00	
	Heat Detectors, addressable type	56	ea	$165.00	$9,240.00	$112.00	$6,272.00	$0.00	$0.00	$277.00	$15,512.00	
	Smoke detector, ceiling type	42	ea	$44.00	$1,848.00	$162.00	$6,804.00	$0.00	$0.00	$206.00	$8,652.00	
	Duct Detectors, addressable type	64	ea	$55.00	$3,520.00	$456.00	$29,184.00	$0.00	$0.00	$511.00	$32,704.00	
	Horn and strobe ADA approved	42	ea	$68.00	$2,856.00	$324.00	$13,608.00	$0.00	$0.00	$392.00	$16,464.00	
	Fire alarm horns	16	ea	$32.00	$512.00	$112.00	$1,792.00	$0.00	$0.00	$144.00	$2,304.00	
	Speakers	56	ea	$45.00	$2,520.00	$232.00	$12,992.00	$0.00	$0.00	$277.00	$15,512.00	
	Mag/lock, card reader, FA	2	ea	$3,244.54	$6,489.08	$1,232.32	$2,464.64	$0.00	$0.00	$4,476.86	$8,953.72	

1.1.1 - Portal & Well Houses Building Cost Detail

Run Date: 10/19/23

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Division	DESCRIPTION	QUANTITY	UNITS	Labor Cost		Material Cost		Equipment Cost		Labor,Mat Equip Unit	Labor,Mat Equip Total	Division Total
				Unit	Total	Unit	Total	Unit	Total			
	Fire alarm pull w/breakable security box	24	ea	$24.00	$576.00	$189.00	$4,536.00	$0.00	$0.00	$213.00	$5,112.00	
	#18 beldon #9866 control wiring, rated	9232	lf	$0.45	$4,154.40	$1.33	$12,278.56	$0.00	$0.00	$1.78	$16,432.96	
	120V Conduit & pullstring	w/16000	w/16000	w/16000	w/16000	w/16000	w/16000	w/16000	w/16000	w/16000	w/16000	
	TOTAL FIRE-ALARM SYSTEM				$39,396.48		$127,954.20		$0.00			$167,350.68

TOTAL BUILDING DIRECT COST **$2,456,082.45**

Direct Cost per 2,550 GSF of Base Bid Portal Building and 5ea. 250 GSF Pump houses for Well Heads for a total of 3,800 GSF in Construction **$646.34**

Honolulu Board of Water Supply

New Fresh Water Wells Construction Project

Honolulu, Hawaii

1.1.2 - Site Infrastructure CSI Detailed Cost Breakdown

Conceptual Design Development Phase

October 19, 2023
January 0, 1900

1.1.2 - Site Infrastructure Building Cost Detail

Run Date: 10/19/23

Project: Conceptual Design Development Phase Probable Cost Evaluation for the Honolulu Board of Water Supply New Fresh Water Wells Project
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Division	DESCRIPTION	QUANTITY	UNITS	Labor Cost Unit	Labor Cost Total	Material Cost Unit	Material Cost Total	Equipment Cost Unit	Equipment Cost Total	Labor,Mat Equip Unit	Labor,Mat Equip Total	Division Total
02.200	**SITE PREPARATION**											
	SWPPP Storm Drainage:											
	River rock enclosed in wire at entrance, compact	24	crewhrs	$112.32	$2,695.68	$265.00	$6,360.00	$155.65	$3,735.60	$532.97	$12,791.28	
	Silt fencing around south & west boundries	3200	lf	$3.32	$10,624.00	$5.65	$18,080.00	$0.00	$0.00	$8.97	$28,704.00	
	Haybale check dams, supports, backfill	24	crewhrs	$55.32	$1,327.68	$26.65	$639.60	$0.00	$0.00	$81.97	$1,967.28	
	TOTAL SITE PREPARATION				$14,647.36		$25,079.60		$3,735.60			$43,462.56
02.4113	**SITE SELECTIVE DEMOLITION**											
	Utility Coordination:											
	Coordinate all underground utilities	16	crewhrs	$0.00	$0.00	$0.00	$0.00	$132.00	$2,112.00	$132.00	$2,112.00	
	Field survey & mark utilities for digging	16	crewhrs	$88.55	$1,416.80	$0.00	$0.00	$325.00	$5,200.00	$413.55	$6,616.80	
	Site Selective Demolition at Street Tie-In's:											
	Break & remove asphalt pavement at street tie-ins	36	crewhrs	$156.65	$5,639.40	$0.00	$0.00	$677.32	$24,383.52	$833.97	$30,022.92	
	Break & remove concrete pavement	24	crewhrs	$172.32	$4,135.68	$0.00	$0.00	$566.65	$13,599.60	$738.97	$17,735.28	
	Break & remove (e) curb & gutter	16	crewhrs	$146.65	$2,346.40	$0.00	$0.00	$688.44	$11,015.10	$835.09	$13,361.50	
	Sawcutting:											
	Sawcut (e) asphalt pavement 3"-4" at street tie-ins	320	lf	$12.32	$3,942.40	$0.00	$0.00	$12.32	$3,942.40	$24.64	$7,884.80	
	Sawcut (e) concrete pavement 4"-6"	320	lf	$10.44	$3,340.80	$0.00	$0.00	$15.54	$4,972.80	$25.98	$8,313.60	
	Debris Removal & Dumping Fees:											
	Debris removal/dumping fees/permits, 20 yrd truck	8	loads	$321.00	$2,568.00	$0.00	$0.00	$1,232.00	$9,856.00	$1,553.00	$12,424.00	
	TOTAL SITE SELECTIVE DEMOLITION				$23,389.48		$0.00		$75,081.42			$98,470.90
02.4126	**SELECTIVE ELECTRICAL DEMOLITION**											
	Selective Electrical Demolition from (e) Water Wells:											
	Demo electrical lighting, conduit, wire, and hangers	120	crewhrs	$222.32	$26,678.40	$0.00	$0.00	$0.00	$0.00	$222.32	$26,678.40	
	Demo trans/electrical panels, swithches, transformers,	180	crewhrs	$344.43	$61,997.40	$0.00	$0.00	$0.00	$0.00	$344.43	$61,997.40	
	TOTAL SELECTIVE ELECTRICAL DEMOLITION				$88,675.80		$0.00		$0.00			$88,675.80
02.4126	**WATER WELL DECOMMISSIONING**											
	Removals, Seral & Cap:											
	Demo stairs, landings, HVAC duct, tracks	120	crewhrs	$222.32	$26,678.40	$0.00	$0.00	$321.21	$38,545.20	$543.53	$65,223.60	
	Grout plug at (e) entry to (e) water well	680	cyrds	$555.65	$377,842.00	$365.00	$248,200.00	$672.00	$456,960.00	$1,592.65	$1,083,002.00	
	Grout solid underground storage water water well	NIC	NIC	NIC	NIC	NIC	NIC	NIC	NIC	NIC	NIC	
	TOTAL WATER WELL DECOMISSIOING				$404,520.40		$248,200.00		$495,505.20			$1,148,225.60
02.4175	**HAZARDOUS MATERIALS REMOVAL**											
	Selective Demolition:											
	Demo allowance for HazMat decontaminated soil	NIC	NIC	NIC	NIC	NIC	NIC	NIC	NIC	NIC	NIC	
	TOTAL HAZARDOUS MATERIALS REMOVAL				$0.00		$0.00		$0.00			$0.00

1.1.2 - Site Infrastructure Building Cost Detail

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14.4500	**INCLINED CABLE CAR**											
	Inclined Cable Car:											
	Maint. water access tunnel cable car system, controls	660	lf	$1,532.32	$1,011,331.20	$1,532.32	$1,011,331.20	$732.32	$483,331.20	$3,796.96	$2,505,993.60	
	Misc. Struc tural Steel attachements and supports	12	tons	$888.87	$10,666.44	$2,144.43	$25,733.16	$322.00	$3,864.00	$3,355.30	$40,263.60	
	5 year maintenance contract	60	mo	$2,500.00	$150,000.00	$3,250.00	$195,000.00	$732.32	$43,939.20	$6,482.32	$388,939.20	
	TOTAL INCLINED CABLE CAR				$1,171,997.64		$1,232,064.36		$531,134.40			$2,935,196.40
31.1000	**SITE CLEARING, EARTHMOVING, CUT & FILL**											
	Site Preperation & Grading:											
	Move-in Equipment	120	crewhrs	$155.54	$18,664.80	$0.00	$0.00	$1,232.00	$147,840.00	$1,387.54	$166,504.80	
	Clear & grub	120	crewhrs	$175.00	$21,000.00	$0.00	$0.00	$3,322.00	$398,640.00	$3,497.00	$419,640.00	
	Site cuts to+/- 1/10th of a foot	22320	cyrds	$3.65	$81,468.00	$0.00	$0.00	$8.32	$185,702.40	$11.97	$267,170.40	
	Rock demolition & removal	32325	cyrds	$5.54	$179,080.50	$0.00	$0.00	$75.65	$2,445,386.25	$81.19	$2,624,466.75	
	Export excavated fill offsite	54645	cyrds	$7.32	$400,001.40	$0.00	$0.00	$24.56	$1,342,081.20	$31.88	$1,742,082.60	
	Import engineered fill with 15% overage	44320	cyrds	$5.54	$245,532.80	$45.00	$1,994,400.00	$12.32	$546,022.40	$62.86	$2,785,955.20	
	Backfill and compact in 8" lifts	44320	cyrds	$6.65	$294,728.00	$0.00	$0.00	$10.44	$462,700.80	$17.09	$757,428.80	
	Water truck & tank fill	150	days	$232.00	$34,800.00	$0.00	$0.00	$456.00	$68,400.00	$688.00	$103,200.00	
	Install Temporary access ramp w/ dirt	1120	cyrds	$0.65	$728.00	$24.43	$27,361.60	$5.65	$6,328.00	$30.73	$34,417.60	
	Remove Temporary access ramp, dirt	150	cyrds	$0.65	$97.50	$0.00	$0.00	$4.54	$681.00	$5.19	$778.50	
	Rough Grading	130	crewhrs	$0.85	$110.50	$0.00	$0.00	$555.65	$72,234.50	$556.50	$72,345.00	
	Bypass Road and Improvements for Access Road Improvements:											
	Move-in Equipment	120	crewhrs	$155.54	$18,664.80	$0.00	$0.00	$1,232.00	$147,840.00	$1,387.54	$166,504.80	
	Clear & grub	240	crewhrs	$175.00	$42,000.00	$0.00	$0.00	$3,322.00	$797,280.00	$3,497.00	$839,280.00	
	Site cuts to+/- 1/10th of a foot	12325	cyrds	$3.65	$44,986.25	$0.00	$0.00	$8.32	$102,544.00	$11.97	$147,530.25	
	Rock demolition & removal	8888	cyrds	$5.54	$49,239.52	$0.00	$0.00	$75.65	$672,377.20	$81.19	$721,616.72	
	Export excavated fill offsite	21213	cyrds	$7.32	$155,279.16	$0.00	$0.00	$24.56	$520,991.28	$31.88	$676,270.44	
	Import engineered fill with 15% overage	24325	cyrds	$5.54	$134,760.50	$45.00	$1,094,625.00	$16.65	$405,011.25	$67.19	$1,634,396.75	
	Backfill and compact in 8" lifts	24325	cyrds	$6.65	$161,761.25	$0.00	$0.00	$10.44	$253,953.00	$17.09	$415,714.25	
	Water truck & tank fill	120	days	$232.00	$27,840.00	$0.00	$0.00	$456.00	$54,720.00	$688.00	$82,560.00	
	Install Temporary access ramp w/ dirt	200	cyrds	$0.65	$130.00	$24.43	$4,886.00	$5.65	$1,130.00	$30.73	$6,146.00	
	Remove Temporary access ramp, dirt	180	cyrds	$0.65	$117.00	$0.00	$0.00	$4.54	$817.20	$5.19	$934.20	
	Rough Grading	180	crewhrs	$0.85	$153.00	$0.00	$0.00	$555.65	$100,017.00	$556.50	$100,170.00	
	TOTAL SITE CLEARING, EARTH MOVING, CUT & FILL				$1,910,989.98		$3,121,272.60		$8,732,697.48			$13,765,113.06
31.2550	**EXCAVATION SHORING**											
	Superstructure Foundation Shoring:											
	Timber Shoring system, below grade	1232	sf	$8.87	$10,927.84	$24.54	$30,233.28	$8.32	$10,250.24	$41.73	$51,411.36	
	Shop Drawings:											
	Design and PE stamp shoring drawings	24	crewhrs	$132.32	$3,175.68	$15.65	$375.60	$0.00	$0.00	$147.97	$3,551.28	
	TOTAL EXCAVATION SHORING				$14,103.52		$30,608.88		$10,250.24			$54,962.64

1.1.2 - Site Infrastructure Building Cost Detail

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31.2333	**UTILITY TRENCHING & BACKFILL**											
	Domestic Water & Fire Protection:											
	Excavation with backhoe crew	80	crewhrs	$88.55	$7,084.00	$0.00	$0.00	$202.00	$16,160.00	$290.55	$23,244.00	
	Rock demolition & removal	560	cyrds	$5.54	$3,102.40	$0.00	$0.00	$12.32	$6,899.20	$17.86	$10,001.60	
	Backfill, compact, 8" lifts import pipe bedding	50	crewhrs	$112.32	$5,616.00	$44.56	$2,228.00	$256.00	$12,800.00	$412.88	$20,644.00	
	Sanitary Sewer:											
	Excavation with backhoe crew	16	crewhrs	$88.55	$1,416.80	$0.00	$0.00	$202.00	$3,232.00	$290.55	$4,648.80	
	Rock demolition & removal	120	cyrds	$5.54	$664.80	$0.00	$0.00	$12.32	$1,478.40	$17.86	$2,143.20	
	Excavate trench for piping trench/shoring	40	crewhrs	$112.32	$4,492.80	$44.56	$1,782.40	$355.54	$14,221.60	$512.42	$20,496.80	
	Drainage & Containment:											
	Excavation with backhoe crew	16	crewhrs	$88.55	$1,416.80	$0.00	$0.00	$202.00	$3,232.00	$290.55	$4,648.80	
	Rock demolition & removal	140	cyrds	$5.54	$775.60	$0.00	$0.00	$12.32	$1,724.80	$17.86	$2,500.40	
	Backfill, compact, 8" lifts import pipe bedding	8	crewhrs	$112.32	$898.56	$44.56	$356.48	$256.00	$2,048.00	$412.88	$3,303.04	
	Site Circuits:											
	Excavation with backhoe crew	8	crewhrs	$88.55	$708.40	$0.00	$0.00	$202.00	$1,616.00	$290.55	$2,324.40	
	Rock demolition & removal	100	cyrds	$5.54	$554.00	$0.00	$0.00	$12.32	$1,232.00	$17.86	$1,786.00	
	Backfill, compact, 8" lifts import pipe bedding	8	crewhrs	$112.32	$898.56	$44.56	$356.48	$256.00	$2,048.00	$412.88	$3,303.04	
	Underground Site Electrical, Communications, Site Electrical Distribution:											
	Excavation with backhoe crew	250	crewhrs	$88.55	$22,137.50	$0.00	$0.00	$202.00	$50,500.00	$290.55	$72,637.50	
	Rock demolition & removal	880	cyrds	$5.54	$4,875.20	$0.00	$0.00	$12.32	$10,841.60	$17.86	$15,716.80	
	Backfill, compact, 8" lifts import pipe bedding	60	crewhrs	$112.32	$6,739.20	$44.56	$2,673.60	$256.00	$15,360.00	$412.88	$24,772.80	
	Spoils Removal:											
	Spoils removal/dumping fees, 12 yrd truck	64	loads	$65.32	$4,180.48	$0.00	$0.00	$1,200.00	$76,800.00	$1,265.32	$80,980.48	
	TOTAL UTILITY TRENCHING & BACKFILL				$65,561.10		$7,396.96		$220,193.60			$293,151.66
31.2500	**TEMPORARY SEDIMENT & EROSION CONTROL**											
	Erosion Control:											
	Offsite tracking prevention 1"-3" coarse	50	cyrds	$8.88	$444.00	$55.54	$2,777.00	$45.54	$2,277.00	$109.96	$5,498.00	
	Sediment control Silt fence, supports, backfill	15320	lf	$1.21	$18,537.20	$2.20	$33,704.00	$2.32	$35,542.40	$5.73	$87,783.60	
	Sediment control logs install & relo as required	50	crewhrs	$77.76	$3,888.00	$33.32	$1,666.00	$2.32	$116.00	$113.40	$5,670.00	
	Inlet protection dams on all downhill inlets	60	ea	$55.32	$3,319.20	$88.87	$5,332.20	$2.32	$139.20	$146.51	$8,790.60	
	Outlet protection dams on all downhill inlets	40	crewhrs	$55.32	$2,212.80	$24.56	$982.56	$2.32	$92.80	$82.20	$3,288.16	
	Designated concrete washout area/sign	2	ea	$650.00	$1,300.00	$1,232.00	$2,464.00	$45.54	$91.08	$1,927.54	$3,855.08	
	Laydown yard stabilization, 6" gravel	40	cyrds	$32.32	$1,292.80	$55.54	$2,221.60	$45.54	$1,821.60	$133.40	$5,336.00	
	TOTAL TEMPORARY SEDIMENT & EROSION CONTROL				$30,994.00		$49,147.36		$40,080.08			$120,221.44
31.6329	**DRILLED CONCRETE PIERS**											
	Hillside Retaining Walls:											
	Grade stakes and Layout piers	8	crewhrs	$88.87	$710.96	$3.88	$31.04	$0.00	$0.00	$92.75	$742.00	

1.1.2 - Site Infrastructure Building Cost Detail

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				Unit	Total	Unit	Total	Unit	Total			
	24" drilled conc. piers, place concrete & rebar	140	lf	$45.54	$6,375.60	$55.65	$7,791.00	$124.00	$17,360.00	$225.19	$31,526.60	
	30" drilled conc. piers, place concrete & rebar	320	lf	$48.87	$15,638.40	$66.65	$21,328.00	$136.00	$43,520.00	$251.52	$80,486.40	
	Precast retaining blocks, foundation tie-ins	6650	cft	$55.65	$370,072.50	$77.76	$517,104.00	$136.00	$904,400.00	$269.41	$1,791,576.50	
	Bobcat for spoils removal and loading	8	crewhrs	$55.54	$444.32	$32.32	$258.56	$156.00	$1,248.00	$243.86	$1,950.88	
	Dump truck, 12 yrd capacity, dumping fees	24	cyrds	$12.32	$295.68	$0.00	$0.00	$24.43	$586.32	$36.75	$882.00	
	TOTAL DRILLED CONCRETE PIERS				$393,537.46		$546,512.60		$967,114.32			$1,907,164.38
32.1216	**ASPHALT PAVING**											
	Site Parking & Access:											
	Grade, backfill, compact subbase to 12"	2432	sy	$1.11	$2,699.52	$1.21	$2,942.72	$1.56	$3,793.92	$3.88	$9,436.16	
	3"AC/4"AC/12" Aggregate subgrade	2432	sy	$18.87	$45,891.84	$33.32	$81,034.24	$44.43	$108,053.76	$96.62	$234,979.84	
	Street closure, flagmen	8	crewhrs	$55.32	$442.56	$0.00	$0.00	$0.00	$0.00	$55.32	$442.56	
	Final sweep & clean	8	crewhrs	$88.32	$706.56	$0.00	$0.00	$112.32	$898.56	$200.64	$1,605.12	
	Bypass Road & Improvements to Access Road:											
	Grade, backfill, compact subbase to 12"	19360	sy	$1.11	$21,489.60	$1.21	$23,425.60	$1.56	$30,201.60	$3.88	$75,116.80	
	3"AC/4"AC/12" Aggregate subgrade	19360	sy	$16.65	$322,344.00	$44.54	$862,294.40	$24.43	$472,964.80	$85.62	$1,657,603.20	
	Street closure, flagmen	120	crewhrs	$55.32	$6,638.40	$0.00	$0.00	$0.00	$0.00	$55.32	$6,638.40	
	Final sweep & clean	120	crewhrs	$88.32	$10,598.40	$0.00	$0.00	$112.32	$13,478.40	$200.64	$24,076.80	
	Water Storage Tank Inspection & Access Roads:											
	Grade, backfill, compact subbase to 12"	3244	sy	$1.11	$3,600.84	$1.21	$3,925.24	$1.56	$5,060.64	$3.88	$12,586.72	
	3"AC/4"AC/12" Aggregate subgrade	3244	sy	$16.65	$54,012.60	$44.54	$144,487.76	$24.43	$79,250.92	$85.62	$277,751.28	
	Street closure, flagmen	60	crewhrs	$55.32	$3,319.20	$0.00	$0.00	$0.00	$0.00	$55.32	$3,319.20	
	Final sweep & clean	60	crewhrs	$88.32	$5,299.20	$0.00	$0.00	$112.32	$6,739.20	$200.64	$12,038.40	
	TOTAL ASPHALT PAVING				$477,042.72		$1,118,109.96		$720,441.80			$2,315,594.48
32.1616	**CONCRETE FOR SITE IMPROVEMENTS**											
	General Site Concrete, Ramps, Walks, Curb & Gutter, Stand-Up Curb:											
	Excavation for sidewalk concrete work	80	crewhrs	$44.65	$3,572.00	$0.00	$0.00	$324.43	$25,954.40	$369.08	$29,526.40	
	Prep for SOG w/6" compacted base	8832	sf	$0.20	$1,766.40	$0.12	$1,059.84	$0.00	$0.00	$0.32	$2,826.24	
	4" SOG, rebar reinforcing, broom, grey, pump	8832	sf	$3.88	$34,268.16	$4.54	$40,097.28	$1.54	$13,601.28	$9.96	$87,966.72	
	24"x1'-6" concrete curb & gutter, machine formed	31680	lf	$6.88	$217,958.40	$6.32	$200,217.60	$0.00	$0.00	$13.20	$418,176.00	
	6"x2'-0" concrete stand-up curb	320	lf	$4.92	$1,574.40	$5.02	$1,606.40	$0.00	$0.00	$9.94	$3,180.80	
	ADA steel DWS embed plate	456	sf	$12.32	$5,617.92	$18.87	$8,604.72	$0.00	$0.00	$31.19	$14,222.64	
	16" concrete turned edge at sidewalk	255	lf	$3.67	$934.58	$6.32	$1,611.60	$0.00	$0.00	$9.99	$2,546.18	
	14" concrete sidewalk trench drain	16	lf	$22.32	$357.12	$44.54	$712.64	$0.00	$0.00	$66.86	$1,069.76	
	15" concre steps & risers, formed on grade	64	rsr	$18.87	$1,207.68	$28.87	$1,847.68	$0.00	$0.00	$47.74	$3,055.36	
	1.5" painted tub handrail, sleeves, grouted	46	lf	$15.54	$714.84	$36.65	$1,685.90	$0.00	$0.00	$52.19	$2,400.74	
	Backfill & compaction sidewalks	46	crewhrs	$44.65	$2,053.90	$3.25	$149.50	$233.32	$10,732.72	$281.22	$12,936.12	
	Lightpole Foundations:											
	Backhoe for excavation work	4	crewhrs	$22.65	$90.60	$88.65	$354.60	$75.00	$300.00	$186.30	$745.20	
	18" x6'-0" diameter CIP light pole foundation with bo	49	ea	$822.32	$40,293.68	$6,432.32	$315,183.68	$5.54	$271.46	$7,260.18	$355,748.82	

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	Transformer Pad:											
	Backhoe for excavation work	4	crewhrs	$22.65	$90.60	$88.65	$354.60	$75.00	$300.00	$186.30	$745.20	
	6"concrete SOG, #4 rebar, transformer pads	24	sf	$6.65	$159.60	$10.32	$247.68	$5.54	$132.96	$22.51	$540.24	
	6" dia. Conc. filled bollards, placement	4	ea	$112.32	$449.28	$26.32	$105.28	$33.32	$133.28	$171.96	$687.84	
	Backfill & compact	4	crewhrs	$22.65	$90.60	$6.54	$26.16	$55.65	$222.60	$84.84	$339.36	
	TOTAL CONCRETE FOR SITE IMPROVEMENTS				$311,199.76		$573,865.16		$51,648.70			$936,713.62
32.1317	**CONCRETE PAVING JOINT SEALANTS**											
	Concrete Silicon Sealants with Right Away Improvements:											
	.50" wide concrete joint sealants, silicon	560	lf	$3.32	$1,859.20	$2.32	$1,299.20	$1.32	$739.20	$6.96	$3,897.60	
	.75" wide conc. joint sealants, silicon, backrod	1200	lf	$4.55	$5,460.00	$3.32	$3,984.00	$1.56	$1,872.00	$9.43	$11,316.00	
	TOTAL CONCRETE PAVING JOINT SEALANTS				$7,319.20		$5,283.20		$2,611.20			$15,213.60
32.1723	**PAVING MARKINGS**											
	Markings:											
	Painted directional symbols, reflective	36	ea	$156.65	$5,639.40	$122.32	$4,403.52	$0.00	$0.00	$278.97	$10,042.92	
	ADA markings	2	ea	$156.65	$313.30	$122.32	$244.64	$0.00	$0.00	$278.97	$557.94	
	4" painted striping	12320	lf	$0.32	$3,942.40	$0.33	$4,065.60	$0.12	$1,478.40	$0.77	$9,486.40	
	Painted curbs	1200	lf	$0.67	$804.00	$0.88	$1,056.00	$0.12	$144.00	$1.67	$2,004.00	
	TOTAL PAVING MARKINGS				$10,699.10		$9,769.76		$1,622.40			$22,091.26
32.5000	**EXTERIOR FENCING & GATES**											
	Expanded Metal Mesh Fence:											
	Exp mtl Security fence, posts, ftgs, 3 wire security	8800	lf	$233.32	$2,053,216.00	$622.32	$5,476,424.80	$0.00	$0.00	$855.64	$7,529,640.80	
	Security steel fence, gates, HW, elec, locks	12	sgl	$1,232.00	$14,784.00	$1,732.00	$20,784.00	$0.00	$0.00	$2,964.00	$35,568.00	
	Security Steel fence, gates, HW, elec, locks	8	pr	$2,244.00	$17,952.00	$3,688.00	$29,504.00	$0.00	$0.00	$5,932.00	$47,456.00	
	TOTAL EXTERIOR FENCING & GATES				$2,085,952.00		$5,526,712.80		$0.00			$7,612,664.80
32.6000	**SITE FURNISHINGS**											
	Site Signage:											
	Traffic control signs , galv post w/ftg	24	ea	$750.00	$18,000.00	$3,500.00	$84,000.00	$0.00	$0.00	$4,250.00	$102,000.00	
	ADA parking signs, galv. Post w/ftgs	2	ea	$122.32	$244.64	$162.32	$324.64	$0.00	$0.00	$284.64	$569.28	
	Stop signs, galv. Post w/ftgs	16	ea	$112.32	$1,797.12	$156.00	$2,496.00	$0.00	$0.00	$268.32	$4,293.12	
	Trash Cans:											
	Trash can, footing	5	ea	$144.54	$722.70	$1,032.32	$5,161.60	$0.00	$0.00	$1,176.86	$5,884.30	
	Benches:											
	Recycled plastic benches	8	ea	$532.32	$4,258.56	$2,432.00	$19,456.00	$0.00	$0.00	$2,964.32	$23,714.56	
	Flagpoles:											
	30'-0" flagpoles, footing, hardware	3	ea	$1,232.00	$3,696.00	$4,422.00	$13,266.00	$0.00	$0.00	$5,654.00	$16,962.00	

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	Vehicle Charging Station:											
	Electric vehicle charging stations	2	ea	$5,551.00	$11,102.00	$25,324.00	$50,648.00	$0.00	$0.00	$30,875.00	$61,750.00	
	Bike Rack:											
	Bike racks, galv. Steel, lockable	1	ea	$522.32	$522.32	$1,422.32	$1,422.32	$0.00	$0.00	$1,944.64	$1,944.64	
	TOTAL SITE FURNISHINGS				$40,343.34		$176,774.56		$0.00			$217,117.90
33.1100	**DOMESTIC WATER & FIRE PROTECTION**											
	Building Fire Protection and Water:											
	Excavate trench for piping trench	16	crewhrs	$72.32	$1,157.12	$0.00	$0.00	$144.54	$2,312.64	$216.86	$3,469.76	
	2" black pipe/fittings w/bedding	100	lf	$7.88	$788.00	$8.87	$887.00	$0.12	$12.00	$16.87	$1,687.00	
	2" gate valve in freezeproof enclosure	1	ea	$42.32	$42.32	$672.00	$672.00	$0.00	$0.00	$714.32	$714.32	
	BFP-1 Meter box, precast, ftgs, lid, posts, meter	1	ea	$1,032.32	$1,032.32	$4,222.32	$5,532.32	$165.00	$165.00	$5,419.64	$6,729.64	
	Install 2"x8"x8" black pipe tee, street tie-in	1	ea	$44.55	$44.55	$133.00	$133.00	$0.00	$0.00	$177.55	$177.55	
	6" Black pipe/fittings with bedding	1250	lf	$12.32	$15,400.00	$15.54	$19,425.00	$0.24	$300.00	$28.10	$35,125.00	
	6" gate valve in freezeproof enclosure	1	ea	$56.32	$56.32	$1,032.00	$1,032.00	$0.00	$0.00	$1,088.32	$1,088.32	
	Install 8"x2"x8" black pipe, tie-in	1	ea	$444.55	$444.55	$555.32	$555.32	$188.00	$188.00	$1,187.87	$1,187.87	
	Install 8"x6"x8" black pipe tee, tie-in	2	ea	$388.65	$777.30	$482.32	$964.64	$161.22	$322.44	$1,032.19	$2,064.38	
	6" Fire hydrant, valve, risor, thrustblock	8	ea	$825.65	$6,605.20	$3,256.32	$26,050.56	$0.00	$0.00	$4,081.97	$32,655.76	
	Pressure Testing & disinfection	4	crewhrs	$44.54	$178.16	$45.32	$181.28	$0.00	$0.00	$89.86	$359.44	
	Backfill & compact piping trench	8	crewhrs	$102.32	$818.56	$21.32	$170.56	$178.32	$1,426.56	$301.96	$2,415.68	
	TOTAL DOMESTIC WATER & FIRE PROTECTION				$27,344.40		$55,603.68		$4,726.64			$87,674.72
33.3100	**SANITARY SEWER**											
	6" Sanitary Sewer systems to leach field, perc test	1	ea	$4,456.00	$4,456.00	$18,325.00	$18,325.00	$2,244.00	$2,244.00	$25,025.00	$25,025.00	
	TOTAL SANITARY SEWER				$4,456.00		$18,325.00		$2,244.00			$25,025.00
33.4100	**STORM DRAINAGE & CONTAINMENT**											
	Storm Water Collection System:											
	8" dia Ultralow pipe w/bedding	1600	lf	$1.45	$2,320.00	$6.65	$10,640.00	$5.54	$8,864.00	$13.64	$21,824.00	
	12" dia Ultralow pipe w/bedding	3200	lf	$2.22	$7,104.00	$8.32	$26,624.00	$6.32	$20,224.00	$16.86	$53,952.00	
	15" dia Ultralow pipe w/bedding	3600	lf	$2.65	$9,540.00	$9.32	$33,552.00	$7.33	$26,388.00	$19.30	$69,480.00	
	18" dia Ultralow pipe w/bedding	3200	lf	$3.88	$12,416.00	$12.32	$39,424.00	$8.65	$27,680.00	$24.85	$79,520.00	
	24" dia Drainage inlet, precast w HD steel grate	24	ea	$355.00	$8,520.00	$890.00	$21,360.00	$9.32	$223.68	$1,254.32	$30,103.68	
	Detention water quality vault, access hatches	1	ea	$9,232.32	$9,232.32	$12,444.43	$12,444.43	$980.00	$980.00	$22,656.75	$22,656.75	
	Tie-in roof drains to SD system	16	crewhrs	$66.65	$1,066.40	$32.32	$517.12	$325.00	$5,200.00	$423.97	$6,783.52	
	Precast 24" outlet to spillway, street level	1	ea	$721.32	$721.32	$1,032.32	$1,032.32	$865.00	$865.00	$2,618.64	$2,618.64	
	TOTAL STORM DRAINAGE & CONTAINMENT				$50,920.04		$145,593.87		$90,424.68			$286,938.59
33.6100	**SITE ELECTRICAL DISTRIBUTION**											
	Primary Feeders/Transformer - Underground:											
	Tie-in' primary power to POC	80	crewhrs	$255.56	$20,445.12	$122.32	$9,785.60	$325.00	$26,000.00	$702.88	$56,230.72	

1.1.2 - Site Infrastructure Building Cost Detail

Run Date: 10/19/23

Project: Conceptual Design Development Phase Probable Cost Evaluation for the Honolulu Board of Water Supply New Fresh Water Wells Project
Estimated and Certified by J. O'Neill, FCPE

Division	DESCRIPTION	QUANTITY	UNITS	Labor Cost		Material Cost		Equipment Cost		Labor,Mat Equip Unit	Labor,Mat Equip Total	Division Total
				Unit	Total	Unit	Total	Unit	Total			
	New primary conduit, feeders to transformer	150	lf	$33.43	$5,014.50	$88.87	$13,330.50	$0.00	$0.00	$122.30	$18,345.00	
	1ea. 3" galv metal WP conduit encased in conc.	12500	lf	$12.32	$154,000.00	$14.54	$181,750.00	$0.00	$0.00	$26.86	$335,750.00	
	1ea. 5" PVC galv. Metal WP encased in conc.	12500	lf	$15.65	$195,625.00	$22.32	$279,000.00	$0.00	$0.00	$37.97	$474,625.00	
	3ea. 500 KCMIL cable, w/#1 ground	13600	lf	$32.65	$444,040.00	$165.00	$2,244,000.00	$0.00	$0.00	$197.65	$2,688,040.00	
	In-Ground transformer, utility fees by GC	36	ea	$555.32	$19,991.52	$21,325.00	$767,700.00	$0.00	$0.00	$21,880.32	$787,691.52	
	In-Ground transformer Vaults	36	ea	$2,233.32	$80,399.52	$10,320.00	$371,520.00	$2,456.00	$88,416.00	$15,009.32	$540,335.52	
	Secondary Feeders - Underground:											
	Cap elec. stub-outs with 2"x4" signs	2	ea	$52.32	$104.64	$55.65	$111.30	$0.00	$0.00	$107.97	$215.94	
	1" PVC conduit, wall mounted	60	lf	$1.32	$79.20	$1.55	$93.00	$0.00	$0.00	$2.87	$172.20	
	1ea. 3" glav conduit encased in conc.	2450	lf	$8.87	$21,731.50	$18.87	$46,231.50	$0.00	$0.00	$27.74	$67,963.00	
	1ea. 5" galv conduit encased in conc.	3260	lf	$12.32	$40,163.20	$21.21	$69,144.60	$0.00	$0.00	$33.53	$109,307.80	
	3 - 350 KCMIL cable w/#750kcmil ground	3680	lf	$5.65	$20,792.00	$33.65	$123,832.00	$0.00	$0.00	$39.30	$144,624.00	
	4ea. #14 1#6 ground THWN wiring	1240	lf	$0.72	$892.80	$1.96	$2,430.40	$0.00	$0.00	$2.68	$3,323.20	
	3ea. #12 1#12 ground THWN wiring	320	lf	$0.75	$240.00	$2.12	$678.40	$0.00	$0.00	$2.87	$918.40	
	3ea. #10 1#8 ground THWN wiring	560	lf	$0.78	$436.80	$2.32	$1,299.20	$0.00	$0.00	$3.10	$1,736.00	
	3ea. 500 KCMIL cable, w/#1 ground	350	lf	$32.65	$11,427.50	$55.65	$19,477.50	$0.00	$0.00	$88.30	$30,905.00	
	350 KCMIL cable lugs & terminations	120	ea	$32.65	$3,918.00	$25.65	$3,078.00	$0.00	$0.00	$58.30	$6,996.00	
	#4/0 copper grounding rod 10'-0" 3/4" dia	2	ea	$454.00	$908.00	$888.00	$1,776.00	$0.00	$0.00	$1,342.00	$2,684.00	
	Building meter base socket, programble	1	ea	$188.87	$522.32	$321.21	$1,455.54	$0.00	$0.00	$510.08	$1,977.86	
	1000A Main disconnect switch/lockable	1	ea	$555.32	$555.32	$2,632.32	$2,632.32	$0.00	$0.00	$3,187.64	$3,187.64	
	1000kw Emergency genset skid & ATS, diesel fuel	1	ea	$55,325.00	$55,325.00	$2,524,444.00	$2,524,444.00	$0.00	$0.00	$2,579,769.00	$2,579,769.00	
	System Testing & Labeling	50	mhrs	$66.00	$3,300.00	$45.00	$2,250.00	$0.00	$0.00	$111.00	$5,550.00	
	Electrical shut-down & meter installation	40	mhrs	$66.00	$2,640.00	$132.00	$5,280.00	$0.00	$0.00	$198.00	$7,920.00	
	TOTAL SITE ELECTRICAL DISTRIBUTION				$1,082,551.94		$6,671,299.86		$114,416.00			$7,868,267.80
33.6200	**SITE LIGHTING**											
	Site and Bypass Drive Light Poles & Luminaire:											
	Excavate trench for piping	8	crewhrs	$28.65	$229.20	$0.00	$0.00	$233.32	$1,866.56	$261.97	$2,095.76	
	3/4" PVC conduit, direct buried, feeders	560	lf	$1.32	$739.20	$1.55	$868.00	$0.65	$364.00	$3.52	$1,971.20	
	1 ea. 1-1/4" PVC conduit with pull string	1250	lf	$4.43	$5,537.50	$4.32	$5,400.00	$0.00	$0.00	$8.75	$10,937.50	
	2ea. #12 1#12 ground THWN wiring	2250	lf	$0.72	$1,620.00	$1.56	$3,510.00	$0.32	$720.00	$2.60	$5,850.00	
	Ground Mount Metal LED up lights	2	sgl	$232.00	$464.00	$1,265.00	$2,530.00	$122.00	$244.00	$1,619.00	$3,238.00	
	Metal LED Side Mount light fixture	32	sgl	$244.00	$7,808.00	$988.00	$31,616.00	$122.00	$3,904.00	$1,354.00	$43,328.00	
	Metal LED Light bollards	15	sgl	$243.00	$3,645.00	$655.32	$9,829.80	$122.00	$1,830.00	$1,020.32	$15,304.80	
	Single Head Metal LED Light post, 30'-0"	75	sgl	$732.00	$54,900.00	$4,532.00	$339,900.00	$122.00	$9,150.00	$5,386.00	$403,950.00	
	Double Head Metal LED Light post, 30'-0"	4	dbl	$865.00	$3,460.00	$6,588.00	$26,352.00	$122.00	$488.00	$7,575.00	$30,300.00	
	Set 3/4" sleeves at light pole bases	11	ea	$12.32	$135.52	$6.76	$74.36	$112.32	$1,235.52	$131.40	$1,445.40	
	Timeclock with photocell controller	1	ea	$255.65	$255.65	$888.44	$888.44	$112.32	$112.32	$1,256.41	$1,256.41	
	Backfill & compact w/bedding & import fill	8	crewhrs	$32.45	$259.60	$44.55	$356.40	$32.32	$258.56	$109.32	$874.56	
	System Testing & Labeling	8	mhrs	$66.00	$528.00	$45.00	$360.00	$75.65	$605.20	$186.65	$1,493.20	
	TOTAL SITE LIGHTING				$79,581.67		$421,685.00		$20,778.16			$522,044.83
33.6300	**SITE CIRCUITS**											
	Monument Sign:											

1.1.2 - Site Infrastructure Building Cost Detail

Run Date: 10/19/23

Project: Conceptual Design Development Phase Probable Cost Evaluation for the Honolulu Board of Water Supply New Fresh Water Wells Project
Estimated and Certified by J. O'Neill, FCPE

Division	DESCRIPTION	QUANTITY	UNITS	Labor Cost Unit	Labor Cost Total	Material Cost Unit	Material Cost Total	Equipment Cost Unit	Equipment Cost Total	Labor,Mat Equip Unit	Labor,Mat Equip Total	Division Total
	Excavate trench for piping	8	crewhrs	$28.65	$229.20	$0.00	$0.00	$233.32	$1,866.56	$261.97	$2,095.76	
	1 ea. 3/4" PVC conduit with pull string	880	lf	$3.32	$2,921.60	$3.55	$3,124.00	$0.00	$0.00	$6.87	$6,045.60	
	1 ea. 1-1/4" PVC conduit with pull string	1250	lf	$4.43	$5,537.50	$4.32	$5,400.00	$0.00	$0.00	$8.75	$10,937.50	
	3 ea. #10 with 1ea. #8 ground wire	2250	lf	$1.12	$2,520.00	$2.44	$5,490.00	$0.00	$0.00	$3.56	$8,010.00	
	24"x24" in-ground pillbox, WP	1	ea	$165.00	$165.00	$322.00	$322.00	$0.00	$0.00	$487.00	$487.00	
	Backfill & compact w/bedding & import fill	8	crewhrs	$32.45	$259.60	$44.55	$356.40	$288.87	$2,310.96	$365.87	$2,926.96	
	Irrigation Circuit:											
	Excavate trench for piping	8	crewhrs	$28.65	$229.20	$0.00	$0.00	$66.00	$528.00	$94.65	$757.20	
	1 ea. 1-1/4" PVC conduit with pull string	60	lf	$3.32	$199.20	$3.55	$213.00	$0.00	$0.00	$6.87	$412.20	
	3 ea. #10 with 1ea. #8 ground wire	80	lf	$0.65	$52.00	$1.32	$105.60	$0.00	$0.00	$1.97	$157.60	
	24"x24" in-ground pillbox, WP	1	ea	$165.00	$165.00	$322.00	$322.00	$0.00	$0.00	$487.00	$487.00	
	Backfill & compact w/bedding & import fill	4	crewhrs	$32.45	$129.80	$44.55	$178.20	$32.32	$129.28	$109.32	$437.28	
	TOTAL SITE CIRCUITS				$12,408.10		$15,511.20		$4,834.80			$32,754.10
33.6400	**SITE COMMUNICATIONS & DATA**											
	Site Comm/Data Duct Bank:											
	2 ea 4" PVC conduit with string, buried	8000	lf	$0.78	$6,240.00	$1.32	$10,560.00	$0.00	$0.00	$2.10	$16,800.00	
	Multi-code fiber to buildings	8000	lf	$4.43	$35,440.00	$44.43	$355,440.00	$0.00	$0.00	$48.86	$390,880.00	
	Cat 6e shielded cable to monument sign	880	lf	$0.77	$677.60	$1.32	$1,161.60	$0.00	$0.00	$2.09	$1,839.20	
	6 pr. #22 pair wire, copper phone wire	16500	lf	$0.77	$12,705.00	$1.56	$25,740.00	$0.00	$0.00	$2.33	$38,445.00	
	24"x24" in-ground pillbox, WP	24	ea	$165.00	$3,960.00	$322.00	$7,728.00	$0.00	$0.00	$487.00	$11,688.00	
	Terminations, switches, connections	24	ls	$15,320.00	$367,680.00	$15,444.00	$370,656.00	$0.00	$0.00	$30,764.00	$738,336.00	
	TOTAL SITE COMMUNICATIONS & DATA				$426,702.60		$771,285.60		$0.00			$1,197,988.20
	TOTAL SITE INFRASTRUCTURE DIRECT COST										**$41,594,733.34**	

Honolulu Board of Water Supply
New Fresh Water Wells Construction Project
Honolulu, Hawaii

1.1.3 Exploratory/Production Water Wells & Storage, Transmission CSI Cost Breakdown

Conceptual Design Development Phase

October 19, 2023
January 0, 1900

1.1.3 - Exploratory & Production Water Wells, Storage, Transmission Cost Detail

Run Date: 10/19/23

Project: Conceptual Design Development Phase Probable Cost Evaluation for the Honolulu Board of Water Supply New Fresh Water Wells Project

Estimated and Certified by J. O'Neill, FCPE

Division	DESCRIPTION	QUANTITY	UNITS	Labor Cost Unit	Labor Cost Total	Material Cost Unit	Material Cost Total	Equipment Cost Unit	Equipment Cost Total	Labor,Mat Equip Unit	Labor,Mat Equip Total	Division Total
42.1000	**BORING, EXCAVATION, SHOTCRETE FOR WATER DEVELOPMENT TUNNEL**											
	Decline Shaft - 10 Foot Finish											
	Mobilization & Set-Up	80	crewhrs	$88.87	$7,109.60	$0.00	$0.00	$125.00	$10,000.00	$213.87	$17,109.60	
	Excavation	3688	bcy	$2,456.00	$9,057,728.00	$650.00	$2,397,200.00	$16,444.00	$60,645,472.00	$19,550.00	$72,100,400.00	
	Shotcrete Lining	395	nzcyrds	$8.87	$3,503.65	$7.76	$3,065.20	$5.65	$2,231.75	$22.28	$8,800.60	
	Demobilization	0	crewhrs	$55.54	$0.00	$32.32	$0.00	$156.00	$0.00	$243.86	$0.00	
	Site Restoration	0	crewhrs	$12.32	$0.00	$0.00	$0.00	$24.43	$0.00	$36.75	$0.00	
	Pump Room - 30 Foot Finish											
	Mobilization & Set-Up	40	crewhrs	$88.87	$3,554.80	$0.00	$0.00	$125.00	$5,000.00	$213.87	$8,554.80	
	Excavation	3960	bcy	$886.00	$3,508,560.00	$112.32	$444,787.20	$1,455.65	$5,764,374.00	$2,453.97	$9,717,721.20	
	Shotcrete Lining	110	cyrds	$8.87	$975.70	$7.76	$853.60	$5.65	$621.50	$22.28	$2,450.80	
	5" Concrete equipment pads #4 ea way	55	cyrds	$444.54	$24,449.70	$456.00	$25,080.00	$333.43	$18,338.65	$1,233.97	$67,868.35	
	Demobilization	0	crewhrs	$55.54	$0.00	$32.32	$0.00	$156.00	$0.00	$243.86	$0.00	
	Site Restoration	0	crewhrs	$12.32	$0.00	$0.00	$0.00	$24.43	$0.00	$36.75	$0.00	
	Water Collection Trough:											
	Mobilization & Set-Up	16	crewhrs	$88.87	$1,421.92	$0.00	$0.00	$125.00	$2,000.00	$213.87	$3,421.92	
	Excavation	1780	bcy	$886.00	$1,577,080.00	$112.32	$199,929.60	$1,455.65	$2,591,057.00	$2,453.97	$4,368,066.60	
	24" CIP Concrete run down #4 ea way	122	cyrds	$444.54	$54,233.88	$456.00	$55,632.00	$333.43	$40,678.46	$1,233.97	$150,544.34	
	Demobilization	0	crewhrs	$55.54	$0.00	$32.32	$0.00	$156.00	$0.00	$243.86	$0.00	
	Site Restoration	0	crewhrs	$12.32	$0.00	$0.00	$0.00	$24.43	$0.00	$36.75	$0.00	
	Development Tunnel - 10' Finish:											
	Mobilization & Set-Up	100	crewhrs	$88.87	$8,887.00	$0.00	$0.00	$125.00	$12,500.00	$213.87	$21,387.00	
	Excavation	5588	bcy	$1,344.00	$7,510,272.00	$222.00	$1,240,536.00	$9,644.00	$53,890,672.00	$11,210.00	$62,641,480.00	
	Demobilization	0	crewhrs	$55.54	$0.00	$32.32	$0.00	$156.00	$0.00	$243.86	$0.00	
	Site Restoration	0	crewhrs	$12.32	$0.00	$0.00	$0.00	$24.43	$0.00	$36.75	$0.00	
	Spoils Removal											
	Load & remove debris/spoils off-site, 20 yrd trucks	21045	loads	$325.00	$6,839,781.48	$0.00	$0.00	$832.00	$17,509,840.59	$1,157.00	$24,349,622.07	
	TOTAL BORING, EXCAVATION, & SHOTCRETE FOR WATER DEVELOP				$28,597,557.73		$4,367,083.60		$140,492,785.95			$173,457,427.28
42.1556	**EXPLORATORY & PRODUCTION WELLS**											
	Exploratory Well #1:											
	Site Prep	1	ls	$25,325.00	$25,325.00	$42,324.00	$42,324.00	$36,555.00	$36,555.00	$104,204.00	$104,204.00	
	Drill 48" dia bore holes, 36" mild steel 1/2" casing	50	lf	$1,244.54	$62,227.00	$1,665.00	$83,250.00	$1,232.00	$61,600.00	$4,141.54	$207,077.00	
	Drill 30" diameter bore hole 50 to 35 bags	250	lf	$576.00	$144,000.00	$832.00	$208,000.00	$688.00	$172,000.00	$2,096.00	$524,000.00	
	Drill 24" diameter bore hole 300 to 516 bags	216	lf	$233.32	$50,397.12	$455.54	$98,396.64	$321.21	$69,381.36	$1,010.07	$218,175.12	
	Provide Caliper survey of borehole	1	ls	$3,650.00	$3,650.00	$560.00	$560.00	$5,966.00	$5,966.00	$10,176.00	$10,176.00	
	Install 16" mild steel 3/8" casing, 304L SS	420	lf	$355.54	$149,326.80	$1,665.00	$699,300.00	$533.32	$223,994.40	$2,553.86	$1,072,621.20	
	Install 16" cont wire-slot wrapped 304L SS screen	100	lf	$155.65	$15,565.00	$566.65	$56,665.00	$155.65	$15,565.00	$877.95	$87,795.00	
	Install 16" cont blank casing with bot plate 304L SS	4	lf	$322.32	$1,289.28	$1,844.00	$7,376.00	$321.00	$1,284.00	$2,487.32	$9,949.28	
	Install 2ea. 3" Schedule 40, mild steel gravel pipe	360	lf	$24.43	$8,794.80	$26.65	$9,594.00	$8.87	$3,193.20	$59.95	$21,582.00	
	Install glass bead filter pack material	200	lf	$55.65	$11,130.00	$325.54	$65,108.00	$24.32	$4,864.00	$405.51	$81,102.00	
	Install compressed bentonite pellet seal	30	lf	$44.54	$1,336.20	$288.87	$8,666.10	$18.87	$566.10	$352.28	$10,568.40	
	Install annular cement bentonite seal	280	lf	$55.54	$15,551.20	$144.54	$40,471.20	$55.65	$15,582.00	$255.73	$71,604.40	
	Construct 7'x7'x6" concrete pad, #5 rebar ea way	1	ea	$55.65	$3,650.00	$4,455.00	$4,455.00	$556.00	$556.00	$5,066.65	$8,661.00	
	Develop & clean well with open end airlifting	30	crewhrs	$1,565.00	$46,950.00	$55.65	$1,669.50	$325.00	$9,750.00	$1,945.65	$58,369.50	
	Provide development by pumping, turbine pump	30	crewhrs	$2,124.00	$63,720.00	$77.88	$2,336.40	$888.98	$26,669.40	$3,090.86	$92,725.80	
	Provide step draw-down terst test	10	crewhrs	$322.32	$3,223.20	$44.43	$444.30	$255.54	$2,555.40	$622.29	$6,222.90	
	Provide constant rate pump test	96	crewhrs	$322.32	$30,942.72	$44.43	$4,265.28	$255.54	$24,531.84	$622.29	$59,739.84	
	New source water quality sampling	1	ls	$7,650.00	$7,650.00	$1,232.00	$1,232.00	$1,565.00	$1,565.00	$10,447.00	$10,447.00	
	Complete wellhead, dummy survey, cleanliness, and	1	ls	$25,325.00	$25,325.00	$3,344.00	$3,344.00	$3,233.00	$3,233.00	$31,902.00	$31,902.00	

1.1.3 - Exploratory & Production Water Wells, Storage, Transmission Cost Detail

Run Date: 10/19/23

Project: Conceptual Design Development Phase Probable Cost Evaluation for the Honolulu Board of Water Supply New Fresh Water Wells Project

Estimated and Certified by J. O'Neill, FCPE

Division	DESCRIPTION	QUANTITY	UNITS	Labor Cost		Material Cost		Equipment Cost		Labor,Mat Equip Unit	Labor,Mat Equip Total	Division Total
				Unit	Total	Unit	Total	Unit	Total			
	Provide duel cam video survey on USB Format	1	ls	$44.54	$44.54	$0.00	$0.00	$1,644.54	$1,644.54	$1,689.08	$1,689.08	
	Pump assembly, ASTM A409 304L SS	1	ls	$22,325.00	$22,325.00	$295,000.00	$295,000.00	$36,555.00	$36,555.00	$353,880.00	$353,880.00	
	Exploratory Well #2:											
	Site Prep	1	ls	$25,325.00	$25,325.00	$42,324.00	$42,324.00	$36,555.00	$36,555.00	$104,204.00	$104,204.00	
	Drill 48" dia bore holes, 36" mild steel 1/2" casing	50	lf	$1,244.54	$62,227.00	$1,665.00	$83,250.00	$1,232.00	$61,600.00	$4,141.54	$207,077.00	
	Drill 30" diameter bore hole 50 to 35 bags	250	lf	$576.00	$144,000.00	$832.00	$208,000.00	$688.00	$172,000.00	$2,096.00	$524,000.00	
	Drill 24" diameter bore hole 300 to 516 bags	216	lf	$233.32	$50,397.12	$455.54	$98,396.64	$321.21	$69,381.36	$1,010.07	$218,175.12	
	Provide Caliper survey of borehole	1	ls	$3,650.00	$3,650.00	$560.00	$560.00	$5,966.00	$5,966.00	$10,176.00	$10,176.00	
	Install 16" mild steel 3/8" casing, 304L SS	420	lf	$355.54	$149,326.80	$1,665.00	$699,300.00	$533.32	$223,994.40	$2,553.86	$1,072,621.20	
	Install 16" cont wire-slot wrapped 304L SS screen	100	lf	$155.65	$15,565.00	$566.65	$56,665.00	$155.65	$15,565.00	$877.95	$87,795.00	
	Install 16" cont blank casing with bot plate 304L SS	4	lf	$322.32	$1,289.28	$1,844.00	$7,376.00	$321.00	$1,284.00	$2,487.32	$9,949.28	
	Install 2ea. 3" Schedule 40, mild steel gravel pipe	360	lf	$24.43	$8,794.80	$26.65	$9,594.00	$8.87	$3,193.20	$59.95	$21,582.00	
	Install glass bead filter pack material	200	lf	$55.65	$11,130.00	$325.54	$65,108.00	$24.32	$4,864.00	$405.51	$81,102.00	
	Install compressed bentonite pellet seal	30	lf	$44.54	$1,336.20	$288.87	$8,666.10	$18.87	$566.10	$352.28	$10,568.40	
	Install annular cement bentonite seal	280	lf	$55.54	$15,551.20	$144.54	$40,471.20	$55.65	$15,582.00	$255.73	$71,604.40	
	Construct 7'x7'x6" concrete pad, #5 rebar ea way	1	ea	$55.65	$3,650.00	$4,455.00	$4,455.00	$556.00	$556.00	$5,066.65	$8,661.00	
	Develop & clean well with open end airlifting	30	crewhrs	$1,565.00	$46,950.00	$55.65	$1,669.50	$325.00	$9,750.00	$1,945.65	$58,369.50	
	Provide development by pumping, turbine pump	30	crewhrs	$2,124.00	$63,720.00	$77.88	$2,336.40	$888.98	$26,669.40	$3,090.86	$92,725.80	
	Provide step draw-down terst test	10	crewhrs	$322.32	$3,223.20	$44.43	$444.30	$255.54	$2,555.40	$622.29	$6,222.90	
	Provide constant rate pump test	96	crewhrs	$322.32	$30,942.72	$44.43	$4,265.28	$255.54	$24,531.84	$622.29	$59,739.84	
	New source water quality sampling	1	ls	$7,650.00	$7,650.00	$1,232.00	$1,232.00	$1,565.00	$1,565.00	$10,447.00	$10,447.00	
	Complete wellhead, dummy survey, cleanliness, and	1	ls	$25,325.00	$25,325.00	$3,344.00	$3,344.00	$3,233.00	$3,233.00	$31,902.00	$31,902.00	
	Provide duel cam video survey on USB Format	1	ls	$44.54	$44.54	$0.00	$0.00	$1,644.54	$1,644.54	$1,689.08	$1,689.08	
	Pump assembly, ASTM A409 304L SS	1	ls	$22,325.00	$22,325.00	$295,000.00	$295,000.00	$36,555.00	$36,555.00	$353,880.00	$353,880.00	
	HALAWA Well #1											
	Site Prep	1	ls	$25,325.00	$25,325.00	$42,324.00	$42,324.00	$36,555.00	$36,555.00	$104,204.00	$104,204.00	
	Drill 48" dia bore holes, 36" mild steel 1/2" casing	50	lf	$1,244.54	$62,227.00	$1,665.00	$83,250.00	$1,232.00	$61,600.00	$4,141.54	$207,077.00	
	Drill 30" diameter bore hole 50 to 35 bags	264	lf	$576.00	$152,064.00	$832.00	$219,648.00	$688.00	$181,632.00	$2,096.00	$553,344.00	
	Drill 24" diameter bore hole 300 to 516 bags	212	lf	$233.32	$49,463.84	$455.54	$96,574.48	$321.21	$68,096.52	$1,010.07	$214,134.84	
	Provide Caliper survey of borehole	1	ls	$3,650.00	$3,650.00	$560.00	$560.00	$5,966.00	$5,966.00	$10,176.00	$10,176.00	
	Install 16" mild steel 3/8" casing, 304L SS	433	lf	$355.54	$153,948.82	$1,665.00	$720,945.00	$533.32	$230,927.56	$2,553.86	$1,105,821.38	
	Install 16" cont wire-slot wrapped 304L SS screen	89	lf	$155.65	$13,852.85	$566.65	$50,431.85	$155.65	$13,852.85	$877.95	$78,137.55	
	Install 16" cont blank casing with bot plate 304L SS	4	lf	$322.32	$1,289.28	$1,844.00	$7,376.00	$321.00	$1,284.00	$2,487.32	$9,949.28	
	Install 2ea. 3" Schedule 40, mild steel gravel pipe	354	lf	$24.43	$8,648.22	$26.65	$9,434.10	$8.87	$3,139.98	$59.95	$21,222.30	
	Install glass bead filter pack material	200	lf	$55.65	$11,130.00	$325.54	$65,108.00	$24.32	$4,864.00	$405.51	$81,102.00	
	Install compressed bentonite pellet seal	42	lf	$44.54	$1,870.68	$288.87	$12,132.54	$18.87	$792.54	$352.28	$14,795.76	
	Install annular cement bentonite seal	165	lf	$55.54	$9,164.10	$144.54	$23,849.10	$55.65	$9,182.25	$255.73	$42,195.45	
	Construct 7'x7'x6" concrete pad, #5 rebar ea way	1	ea	$55.65	$3,650.00	$4,455.00	$4,455.00	$556.00	$556.00	$5,066.65	$8,661.00	
	Develop & clean well with open end airlifting	28	crewhrs	$1,565.00	$43,820.00	$55.65	$1,558.20	$325.00	$9,100.00	$1,945.65	$54,478.20	
	Provide development by pumping, turbine pump	28	crewhrs	$2,124.00	$59,472.00	$77.88	$2,180.64	$888.98	$24,891.44	$3,090.86	$86,544.08	
	Provide step draw-down terst test	10	crewhrs	$322.32	$3,223.20	$44.43	$444.30	$255.54	$2,555.40	$622.29	$6,222.90	
	Provide constant rate pump test	96	crewhrs	$322.32	$30,942.72	$44.43	$4,265.28	$255.54	$24,531.84	$622.29	$59,739.84	
	New source water quality sampling	1	ls	$7,650.00	$7,650.00	$1,232.00	$1,232.00	$1,565.00	$1,565.00	$10,447.00	$10,447.00	
	Complete wellhead, dummy survey, cleanliness, and	1	ls	$25,325.00	$25,325.00	$3,344.00	$3,344.00	$3,233.00	$3,233.00	$31,902.00	$31,902.00	
	Provide duel cam video survey on USB Format	1	ls	$44.54	$44.54	$0.00	$0.00	$1,644.54	$1,644.54	$1,689.08	$1,689.08	
	Pump assembly, ASTM A409 304L SS	1	ls	$22,325.00	$22,325.00	$295,000.00	$281,325.00	$36,555.00	$36,555.00	$353,880.00	$340,205.00	
	HALAWA Well #2											
	Site Prep	1	ls	$25,325.00	$25,325.00	$42,324.00	$42,324.00	$36,555.00	$36,555.00	$104,204.00	$104,204.00	
	Drill 48" dia bore holes, 36" mild steel 1/2" casing	50	lf	$1,244.54	$62,227.00	$1,665.00	$83,250.00	$1,232.00	$61,600.00	$4,141.54	$207,077.00	
	Drill 30" diameter bore hole 50 to 35 bags	264	lf	$576.00	$152,064.00	$832.00	$219,648.00	$688.00	$181,632.00	$2,096.00	$553,344.00	
	Drill 24" diameter bore hole 300 to 516 bags	212	lf	$233.32	$49,463.84	$455.54	$96,574.48	$321.21	$68,096.52	$1,010.07	$214,134.84	
	Provide Caliper survey of borehole	1	ls	$3,650.00	$3,650.00	$560.00	$560.00	$5,966.00	$5,966.00	$10,176.00	$10,176.00	

1.1.3 - Exploratory & Production Water Wells, Storage, Transmission Cost Detail

Run Date: 10/19/23

Project: Conceptual Design Development Phase Probable Cost Evaluation for the Honolulu Board of Water Supply New Fresh Water Wells Project
Estimated and Certified by J. O'Neill, FCPE

Division	DESCRIPTION	QUANTITY	UNITS	Labor Cost		Material Cost		Equipment Cost		Labor,Mat Equip Unit	Labor,Mat Equip Total	Division Total
				Unit	Total	Unit	Total	Unit	Total			
	Install 16" mild steel 3/8" casing, 304L SS	433	lf	$355.54	$153,948.82	$1,665.00	$720,945.00	$533.32	$230,927.56	$2,553.86	$1,105,821.38	
	Install 16" cont wire-slot wrapped 304L SS screen	89	lf	$155.65	$13,852.85	$566.65	$50,431.85	$155.65	$13,852.85	$877.95	$78,137.55	
	Install 16" cont blank casing with bot plate 304L SS	4	lf	$322.32	$1,289.28	$1,844.00	$7,376.00	$321.00	$1,284.00	$2,487.32	$9,949.28	
	Install 2ea. 3" Schedule 40, mild steel gravel pipe	354	lf	$24.43	$8,648.22	$26.65	$9,434.10	$8.87	$3,139.98	$59.95	$21,222.30	
	Install glass bead filter pack material	200	lf	$55.65	$11,130.00	$325.54	$65,108.00	$24.32	$4,864.00	$405.51	$81,102.00	
	Install compressed bentonite pellet seal	42	lf	$44.54	$1,870.68	$288.87	$12,132.54	$18.87	$792.54	$352.28	$14,795.76	
	Install annular cement bentonite seal	165	lf	$55.54	$9,164.10	$144.54	$23,849.10	$55.65	$9,182.25	$255.73	$42,195.45	
	Construct 7'x7'x6" concrete pad, #5 rebar ea way	1	ea	$55.65	$3,650.00	$4,455.00	$4,455.00	$556.00	$556.00	$5,066.65	$8,661.00	
	Develop & clean well with open end airlifting	28	crewhrs	$1,565.00	$43,820.00	$55.65	$1,558.20	$325.00	$9,100.00	$1,945.65	$54,478.20	
	Provide development by pumping, turbine pump	28	crewhrs	$2,124.00	$59,472.00	$77.88	$2,180.64	$888.98	$24,891.44	$3,090.86	$86,544.08	
	Provide step draw-down terst test	10	crewhrs	$322.32	$3,223.20	$44.43	$444.30	$255.54	$2,555.40	$622.29	$6,222.90	
	Provide constant rate pump test	96	crewhrs	$322.32	$30,942.72	$44.43	$4,265.28	$255.54	$24,531.84	$622.29	$59,739.84	
	New source water quality sampling	1	ls	$7,650.00	$7,650.00	$1,232.00	$1,232.00	$1,565.00	$1,565.00	$10,447.00	$10,447.00	
	Complete wellhead, dummy survey, cleanliness, and	1	ls	$25,325.00	$25,325.00	$3,344.00	$3,344.00	$3,233.00	$3,233.00	$31,902.00	$31,902.00	
	Provide duel cam video survey on USB Format	1	ls	$44.54	$44.54	$0.00	$0.00	$1,644.54	$1,644.54	$1,689.08	$1,689.08	
	Pump assembly, ASTM A409 304L SS	1	ls	$22,325.00	$22,325.00	$281,325.00	$281,325.00	$36,555.00	$36,555.00	$340,205.00	$340,205.00	
	HALAWA Well #3											
	Site Prep	1	ls	$25,325.00	$25,325.00	$42,324.00	$42,324.00	$36,555.00	$36,555.00	$104,204.00	$104,204.00	
	Drill 48" dia bore holes, 36" mild steel 1/2" casing	50	lf	$1,244.54	$62,227.00	$1,665.00	$83,250.00	$1,232.00	$61,600.00	$4,141.54	$207,077.00	
	Drill 30" diameter bore hole 50 to 35 bags	264	lf	$576.00	$152,064.00	$832.00	$219,648.00	$688.00	$181,632.00	$2,096.00	$553,344.00	
	Drill 24" diameter bore hole 300 to 516 bags	212	lf	$233.32	$49,463.84	$455.54	$96,574.48	$321.21	$68,096.52	$1,010.07	$214,134.84	
	Provide Caliper survey of borehole	1	ls	$3,650.00	$3,650.00	$560.00	$560.00	$5,966.00	$5,966.00	$10,176.00	$10,176.00	
	Install 16" mild steel 3/8" casing, 304L SS	433	lf	$355.54	$153,948.82	$1,665.00	$720,945.00	$533.32	$230,927.56	$2,553.86	$1,105,821.38	
	Install 16" cont wire-slot wrapped 304L SS screen	89	lf	$155.65	$13,852.85	$566.65	$50,431.85	$155.65	$13,852.85	$877.95	$78,137.55	
	Install 16" cont blank casing with bot plate 304L SS	4	lf	$322.32	$1,289.28	$1,844.00	$7,376.00	$321.00	$1,284.00	$2,487.32	$9,949.28	
	Install 2ea. 3" Schedule 40, mild steel gravel pipe	354	lf	$24.43	$8,648.22	$26.65	$9,434.10	$8.87	$3,139.98	$59.95	$21,222.30	
	Install glass bead filter pack material	200	lf	$55.65	$11,130.00	$325.54	$65,108.00	$24.32	$4,864.00	$405.51	$81,102.00	
	Install compressed bentonite pellet seal	42	lf	$44.54	$1,870.68	$288.87	$12,132.54	$18.87	$792.54	$352.28	$14,795.76	
	Install annular cement bentonite seal	165	lf	$55.54	$9,164.10	$144.54	$23,849.10	$55.65	$9,182.25	$255.73	$42,195.45	
	Construct 7'x7'x6" concrete pad, #5 rebar ea way	1	ea	$55.65	$3,650.00	$4,455.00	$4,455.00	$556.00	$556.00	$5,066.65	$8,661.00	
	Develop & clean well with open end airlifting	28	crewhrs	$1,565.00	$43,820.00	$55.65	$1,558.20	$325.00	$9,100.00	$1,945.65	$54,478.20	
	Provide development by pumping, turbine pump	28	crewhrs	$2,124.00	$59,472.00	$77.88	$2,180.64	$888.98	$24,891.44	$3,090.86	$86,544.08	
	Provide step draw-down terst test	10	crewhrs	$322.32	$3,223.20	$44.43	$444.30	$255.54	$2,555.40	$622.29	$6,222.90	
	Provide constant rate pump test	96	crewhrs	$322.32	$30,942.72	$44.43	$4,265.28	$255.54	$24,531.84	$622.29	$59,739.84	
	New source water quality sampling	1	ls	$7,650.00	$7,650.00	$1,232.00	$1,232.00	$1,565.00	$1,565.00	$10,447.00	$10,447.00	
	Complete wellhead, dummy survey, cleanliness, and	1	ls	$25,325.00	$25,325.00	$3,344.00	$3,344.00	$3,233.00	$3,233.00	$31,902.00	$31,902.00	
	Provide duel cam video survey on USB Format	1	ls	$44.54	$44.54	$0.00	$0.00	$1,644.54	$1,644.54	$1,689.08	$1,689.08	
	Pump assembly, ASTM A409 304L SS	1	ls	$22,325.00	$22,325.00	$295,000.00	$281,325.00	$36,555.00	$36,555.00	$353,880.00	$340,205.00	
	AIEA Well #1											
	Site Prep	1	ls	$25,325.00	$25,325.00	$42,324.00	$42,324.00	$36,555.00	$36,555.00	$104,204.00	$104,204.00	
	Drill 48" dia bore holes, 36" mild steel 1/2" casing	50	lf	$1,244.54	$62,227.00	$1,665.00	$83,250.00	$1,232.00	$61,600.00	$4,141.54	$207,077.00	
	Drill 30" diameter bore hole 50 to 35 bags	250	lf	$576.00	$144,000.00	$832.00	$208,000.00	$688.00	$172,000.00	$2,096.00	$524,000.00	
	Drill 24" diameter bore hole 300 to 516 bags	220	lf	$233.32	$51,330.40	$455.54	$100,218.80	$321.21	$70,666.20	$1,010.07	$222,215.40	
	Provide Caliper survey of borehole	1	ls	$3,650.00	$3,650.00	$560.00	$560.00	$5,966.00	$5,966.00	$10,176.00	$10,176.00	
	Install 16" mild steel 3/8" casing, 304L SS	400	lf	$355.54	$142,216.00	$1,665.00	$666,000.00	$533.32	$213,328.00	$2,553.86	$1,021,544.00	
	Install 16" cont wire-slot wrapped 304L SS screen	100	lf	$155.65	$15,565.00	$566.65	$56,665.00	$155.65	$15,565.00	$877.95	$87,795.00	
	Install 16" cont blank casing with bot plate 304L SS	4	lf	$322.32	$1,289.28	$1,844.00	$7,376.00	$321.00	$1,284.00	$2,487.32	$9,949.28	
	Install 2ea. 3" Schedule 40, mild steel gravel pipe	360	lf	$24.43	$8,794.80	$26.65	$9,594.00	$8.87	$3,193.20	$59.95	$21,582.00	
	Install glass bead filter pack material	200	lf	$55.65	$11,130.00	$325.54	$65,108.00	$24.32	$4,864.00	$405.51	$81,102.00	
	Install compressed bentonite pellet seal	30	lf	$44.54	$1,336.20	$288.87	$8,666.10	$18.87	$566.10	$352.28	$10,568.40	
	Install annular cement bentonite seal	280	lf	$55.54	$15,551.20	$144.54	$40,471.20	$55.65	$15,582.00	$255.73	$71,604.40	
	Construct 7'x7'x6" concrete pad, #5 rebar ea way	1	ea	$55.65	$3,650.00	$4,455.00	$4,455.00	$556.00	$556.00	$5,066.65	$8,661.00	
	Develop & clean well with open end airlifting	30	crewhrs	$1,565.00	$46,950.00	$55.65	$1,669.50	$325.00	$9,750.00	$1,945.65	$58,369.50	

1.1.3 - Exploratory & Production Water Wells, Storage, Transmission Cost Detail

Run Date: 10/19/23

Project: Conceptual Design Development Phase Probable Cost Evaluation for the Honolulu Board of Water Supply New Fresh Water Wells Project
Estimated and Certified by J. O'Neill, FCPE

Division	DESCRIPTION	QUANTITY	UNITS	Labor Cost		Material Cost		Equipment Cost		Labor,Mat Equip Unit	Labor,Mat Equip Total	Division Total
				Unit	Total	Unit	Total	Unit	Total			
	Provide development by pumping, turbine pump	30	crewhrs	$2,124.00	$63,720.00	$77.88	$2,336.40	$888.98	$26,669.40	$3,090.86	$92,725.80	
	Provide step draw-down terst test	10	crewhrs	$322.32	$3,223.20	$44.43	$444.30	$255.54	$2,555.40	$622.29	$6,222.90	
	Provide constant rate pump test	96	crewhrs	$322.32	$30,942.72	$44.43	$4,265.28	$255.54	$24,531.84	$622.29	$59,739.84	
	New source water quality sampling	1	ls	$7,650.00	$7,650.00	$1,232.00	$1,232.00	$1,565.00	$1,565.00	$10,447.00	$10,447.00	
	Complete wellhead, dummy survey, cleanliness, and	1	ls	$25,325.00	$25,325.00	$3,344.00	$3,344.00	$3,233.00	$3,233.00	$31,902.00	$31,902.00	
	Provide duel cam video survey on USB Format	1	ls	$44.54	$44.54	$0.00	$0.00	$1,644.54	$1,644.54	$1,689.08	$1,689.08	
	Pump assembly, ASTM A409 304L SS	1	ls	$22,325.00	$22,325.00	$288,325.00	$288,325.00	$36,555.00	$36,555.00	$347,205.00	$347,205.00	
	AIEA Well #2											
	Site Prep	1	ls	$25,325.00	$25,325.00	$42,324.00	$42,324.00	$36,555.00	$36,555.00	$104,204.00	$104,204.00	
	Drill 48" dia bore holes, 36" mild steel 1/2" casing	50	lf	$1,244.54	$62,227.00	$1,665.00	$83,250.00	$1,232.00	$61,600.00	$4,141.54	$207,077.00	
	Drill 30" diameter bore hole 50 to 35 bags	250	lf	$576.00	$144,000.00	$832.00	$208,000.00	$688.00	$172,000.00	$2,096.00	$524,000.00	
	Drill 24" diameter bore hole 300 to 516 bags	216	lf	$233.32	$50,397.12	$455.54	$98,396.64	$321.21	$69,381.36	$1,010.07	$218,175.12	
	Provide Caliper survey of borehole	1	ls	$3,650.00	$3,650.00	$560.00	$560.00	$5,966.00	$5,966.00	$10,176.00	$10,176.00	
	Install 16" mild steel 3/8" casing, 304L SS	420	lf	$355.54	$149,326.80	$1,665.00	$699,300.00	$533.32	$223,994.40	$2,553.86	$1,072,621.20	
	Install 16" cont wire-slot wrapped 304L SS screen	100	lf	$155.65	$15,565.00	$566.65	$56,665.00	$155.65	$15,565.00	$877.95	$87,795.00	
	Install 16" cont blank casing with bot plate 304L SS	4	lf	$322.32	$1,289.28	$1,844.00	$7,376.00	$321.00	$1,284.00	$2,487.32	$9,949.28	
	Install 2ea. 3" Schedule 40, mild steel gravel pipe	360	lf	$24.43	$8,794.80	$26.65	$9,594.00	$8.87	$3,193.20	$59.95	$21,582.00	
	Install glass bead filter pack material	200	lf	$55.65	$11,130.00	$325.54	$65,108.00	$24.32	$4,864.00	$405.51	$81,102.00	
	Install compressed bentonite pellet seal	30	lf	$44.54	$1,336.20	$288.87	$8,666.10	$18.87	$566.10	$352.28	$10,568.40	
	Install annular cement bentonite seal	280	lf	$55.54	$15,551.20	$144.54	$40,471.20	$55.65	$15,582.00	$255.73	$71,604.40	
	Construct 7'x7'x6" concrete pad, #5 rebar ea way	1	ea	$55.65	$3,650.00	$4,455.00	$4,455.00	$556.00	$556.00	$5,066.65	$8,661.00	
	Develop & clean well with open end airlifting	30	crewhrs	$1,565.00	$46,950.00	$55.65	$1,669.50	$325.00	$9,750.00	$1,945.65	$58,369.50	
	Provide development by pumping, turbine pump	30	crewhrs	$2,124.00	$63,720.00	$77.88	$2,336.40	$888.98	$26,669.40	$3,090.86	$92,725.80	
	Provide step draw-down terst test	10	crewhrs	$322.32	$3,223.20	$44.43	$444.30	$255.54	$2,555.40	$622.29	$6,222.90	
	Provide constant rate pump test	96	crewhrs	$322.32	$30,942.72	$44.43	$4,265.28	$255.54	$24,531.84	$622.29	$59,739.84	
	New source water quality sampling	1	ls	$7,650.00	$7,650.00	$1,232.00	$1,232.00	$1,565.00	$1,565.00	$10,447.00	$10,447.00	
	Complete wellhead, dummy survey, cleanliness, and	1	ls	$25,325.00	$25,325.00	$3,344.00	$3,344.00	$3,233.00	$3,233.00	$31,902.00	$31,902.00	
	Provide duel cam video survey on USB Format	1	ls	$44.54	$44.54	$0.00	$0.00	$1,644.54	$1,644.54	$1,689.08	$1,689.08	
	Pump assembly, ASTM A409 304L SS	1	ls	$22,325.00	$22,325.00	$295,000.00	$288,325.00	$36,555.00	$36,555.00	$353,880.00	$347,205.00	
	Spoils Removal											
	Load & remove debris/spoils off-site, 20 yrd trucks	22	loads	$325.00	$7,186.11	$0.00	$0.00	$832.00	$18,396.44	$1,157.00	$25,582.56	
	TOTAL EXPLORATORY & PRODUCTION WELLS				$4,837,958.78		$11,376,314.31		$5,047,034.60			$21,261,307.70
32.6000	**MECHANICAL PUMPS, EQUIPMENT, & ACCESSORIES**											
	Water Development & Production Well Pumps:											
	7000 GPM line shaft turbine pumps, water dev tunnel	1	ea	$87,325.00	$87,325.00	$1,912,455.00	$1,912,455.00	$0.00	$0.00	$1,999,780.00	$1,999,780.00	
	4300 GPM line shaft turbine pumps, water dev tunnel	2	ea	$68,325.00	$136,650.00	$1,442,223.00	$2,884,446.00	$0.00	$0.00	$1,510,548.00	$3,021,096.00	
	1000 GPM line shaft turbine pumps, production well	5	ea	$59,444.00	$297,220.00	$342,456.00	$1,712,280.00	$0.00	$0.00	$401,900.00	$2,009,500.00	
	Pump Associated Fittings:											
	Install fittings for clamps and bolted flanges	8	ea	$3,250.00	$26,000.00	$1,232.00	$9,856.00	$1,560.00	$12,480.00	$6,042.00	$48,336.00	
	HVAC Air Supply at Shafts:											
	Vertical fans, 56,000cfm, w/smoke evacuation	5	ea	$12,444.00	$62,220.00	$112,325.00	$561,625.00	$3,655.00	$18,275.00	$128,424.00	$642,120.00	
	36" air supply at main shaft only	700	lf	$33.32	$23,324.00	$55.54	$38,878.00	$21.21	$14,847.00	$110.07	$77,049.00	
	Brackets and hangers	80	ea	$225.00	$18,000.00	$167.76	$13,420.80	$125.00	$10,000.00	$517.76	$41,420.80	
	Motor Control:											
	MCC-1 Large Fans Motor controls center	1	ea	$2,232.00	$2,232.00	$52,325.00	$52,325.00	$3,655.00	$3,655.00	$58,212.00	$58,212.00	
	VDF 150 HP Variable frequency drives	3	ea	$6,655.00	$19,965.00	$14,555.00	$43,665.00	$3,655.00	$10,965.00	$24,865.00	$74,595.00	
	VDF 75 HP Variable frequency drives	5	ea	$325.54	$1,627.70	$12,325.00	$61,625.00	$3,655.00	$18,275.00	$16,305.54	$81,527.70	

AES Certified Professional Estimating & Facility Maintenance Systems

1.1.3 - Exploratory & Production Water Wells, Storage, Transmission Cost Detail

Run Date: 10/19/23

Project: Conceptual Design Development Phase Probable Cost Evaluation for the Honolulu Board of Water Supply New Fresh Water Wells Project
Estimated and Certified by J. O'Neill, FCPE

Division	DESCRIPTION	QUANTITY	UNITS	Labor Cost		Material Cost		Equipment Cost		Labor,Mat Equip Unit	Labor,Mat Equip Total	Division Total
				Unit	Total	Unit	Total	Unit	Total			
	Maintenance Agreement:											
	1 year maintenance agreement	12	mo	$1,232.00	$14,784.00	$3,255.00	$39,060.00	$0.00	$0.00	$4,487.00	$53,844.00	
	TOTAL MECHANICAL PUMPS, EQUIPMENT, & ACCESSORIES				$689,347.70		$7,329,635.80		$88,497.00			$8,107,480.50
33.1100	**FRESH WATER SUPPLY TRANSMISSION, PRODUCTION PIPING & STORAGE**											
	Fresh Water Supply 12" Production Main:											
	12" steel bonded coating pipe, bolted flanges w/beddi	10560	lf	$156.00	$1,647,360.00	$1,155.00	$12,196,800.00	$321.00	$3,389,760.00	$1,632.00	$17,233,920.00	
	12" gate valve in freezeproof enclosure	15	ea	$1,265.00	$18,975.00	$622.32	$9,334.80	$0.00	$0.00	$1,887.32	$28,309.80	
	12" Meter box, precast, ftgs, lid, posts, meter	5	ea	$3,244.00	$16,220.00	$7,244.00	$5,532.32	$165.00	$825.00	$10,653.00	$22,577.32	
	Install 12"x12"x12" steel tee, street tie-in	12	ea	$321.00	$3,852.00	$865.00	$10,380.00	$0.00	$0.00	$1,186.00	$14,232.00	
	Install 12" steel, bonded coating bolted 45 degree ell	25	ea	$544.00	$13,600.00	$788.00	$19,700.00	$188.00	$4,700.00	$1,520.00	$38,000.00	
	Install 12" steel bonded coatingbolted 90 degree ell	75	ea	$565.00	$42,375.00	$756.00	$56,700.00	$188.00	$14,100.00	$1,509.00	$113,175.00	
	Install 12" steel bonded coating bolted 112.5 degree e	50	ea	$588.00	$29,400.00	$732.00	$36,600.00	$188.00	$9,400.00	$1,508.00	$75,400.00	
	Welded 12" dia steel flanged bolted at connections	660	ea	$66.65	$43,989.00	$72.32	$47,731.20	$355.54	$234,656.40	$494.51	$326,376.60	
	Pressure Testing & disinfection	75	crewhrs	$166.65	$12,498.75	$45.32	$3,399.00	$112.00	$8,400.00	$323.97	$24,297.75	
	Fresh Water Supply 42" Transmission Main including Bypass Roads and Improved Areas:											
	42" steel bonded coating pipe, bolted flanges w/beddi	16800	lf	$880.00	$14,784,000.00	$4,455.00	$74,844,000.00	$650.00	$10,920,000.00	$5,985.00	$100,548,000.00	
	42" gate valve in freezeproof enclosure	12	ea	$3,644.00	$43,728.00	$15,325.00	$183,900.00	$0.00	$0.00	$18,969.00	$227,628.00	
	42" Meter box, precast, ftgs, lid, posts, meter	10	ea	$10,320.00	$103,200.00	$10,444.00	$5,532.32	$165.00	$1,650.00	$20,929.00	$110,382.32	
	Install 42"x42"x42" steel,bonded tee, street tie-in	7	ea	$1,522.32	$10,656.24	$3,244.00	$22,708.00	$0.00	$0.00	$4,766.32	$33,364.24	
	Install 42" steel bonded coating bolted 45 degree ell	24	ea	$1,432.00	$34,368.00	$1,865.00	$44,760.00	$188.00	$4,512.00	$3,485.00	$83,640.00	
	Install 42" steel bonded coating bolted 90 degree ell	36	ea	$1,544.00	$55,584.00	$1,944.00	$69,984.00	$188.00	$6,768.00	$3,676.00	$132,336.00	
	Install 42" steel bonded coating bolted 112.5 degree e	24	ea	$1,688.00	$40,512.00	$1,855.00	$44,520.00	$188.00	$4,512.00	$3,731.00	$89,544.00	
	Welded 42" dia steel flanged bolted at connections	1050	ea	$188.00	$197,400.00	$233.00	$244,650.00	$355.54	$373,317.00	$776.54	$815,367.00	
	Pressure Testing & disinfection	150	crewhrs	$166.65	$24,997.50	$45.32	$6,798.00	$0.00	$0.00	$211.97	$31,795.50	
	Concrete Water Storage Reservoirs:											
	Fresh Water Storage Tank prestressed conc., gravel p:	1000000	gal	$14.54	$14,540,000.00	$33.32	$33,320,000.00	$12.32	$12,320,000.00	$60.18	$60,180,000.00	
	Fresh Water Storage Tank prestressed conc., gravel p:	1000000	gal	$14.54	$14,540,000.00	$33.32	$33,320,000.00	$12.32	$12,320,000.00	$60.18	$60,180,000.00	
	Fresh Water Storage Tank prestressed conc., gravel p:	1000000	gal	$14.54	$14,540,000.00	$33.32	$33,320,000.00	$12.32	$12,320,000.00	$60.18	$60,180,000.00	
	18" concrete tank pads, reinforcing ea way 2 levels	325	cyrds	$222.32	$72,254.00	$392.32	$127,504.00	$255.54	$83,050.50	$870.18	$282,808.50	
	Excavation and Backfill for Transmission Main and Storage Tanks:											
	Excavation with backhoe crew	1856	crewhrs	$88.55	$164,348.80	$0.00	$0.00	$202.00	$374,912.00	$290.55	$539,260.80	
	Rock demolition & removal	15320	cyrds	$5.54	$84,872.80	$0.00	$0.00	$12.32	$188,742.40	$17.86	$273,615.20	
	Backfill, compact, 8" lifts import pipe bedding	1732	crewhrs	$112.32	$194,538.24	$44.43	$76,952.76	$256.00	$443,392.00	$412.75	$714,883.00	
	TOTAL FRESH WATER SUPPLY TRANSMISSION, PRODUCTION PIPIN				$61,258,729.33		$188,017,486.40		$53,022,697.30			$302,298,913.03
33.6100	**ELECTRICAL and SCADA Systems**											
	Primary Feeders/Transformer:											
	Primary transformer on pad grounded, elec co	5	ea	$2,233.00	$11,165.00	$12,650.00	$63,250.00	$325.00	$1,625.00	$15,208.00	$76,040.00	
	New primary conduit, feeders to transformer	2500	lf	$15.54	$38,850.00	$16.65	$41,625.00	$0.00	$0.00	$32.19	$80,475.00	
	Distribution Panels, Emergency, & Grounding Equipment:											
	4000A switch, 480Y/277V 3P	1	ea	$2,132.00	$2,132.00	$15,325.00	$15,325.00	$0.00	$0.00	$17,457.00	$17,457.00	
	2000A switch feeder, 480Y/277V 3P	1	ea	$1,455.00	$1,455.00	$5,532.00	$5,532.00	$0.00	$0.00	$6,987.00	$6,987.00	
	2000A switch feeder, 480Y/277V 3P	1	ea	$1,455.00	$1,455.00	$5,532.00	$5,532.00	$0.00	$0.00	$6,987.00	$6,987.00	
	2000A switch feeder, 480Y/277V 3P	1	ea	$1,455.00	$1,455.00	$5,532.00	$5,532.00	$0.00	$0.00	$6,987.00	$6,987.00	
	2000A switch feeder, 480Y/277V 3P	1	ea	$1,455.00	$1,455.00	$5,532.00	$5,532.00	$0.00	$0.00	$6,987.00	$6,987.00	

1.1.3 - Exploratory & Production Water Wells, Storage, Transmission Cost Detail

Run Date: 10/19/23

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Estimated and Certified by J. O'Neill, FCPE

Division	DESCRIPTION	QUANTITY	UNITS	Labor Cost		Material Cost		Equipment Cost		Labor,Mat Equip Unit	Labor,Mat Equip Total	Division Total
				Unit	Total	Unit	Total	Unit	Total			
	2000A switch feeder, 480Y/277V 3P	1	ea	$1,455.00	$1,455.00	$5,532.00	$5,532.00	$0.00	$0.00	$6,987.00	$6,987.00	
	2000A switch feeder l, 480Y/277V 3P	1	ea	$1,455.00	$1,455.00	$5,532.00	$5,532.00	$0.00	$0.00	$6,987.00	$6,987.00	
	2000A switch feeder l, 480Y/277V 3P	1	ea	$1,455.00	$1,455.00	$5,532.00	$5,532.00	$0.00	$0.00	$6,987.00	$6,987.00	
	1600A panel, 480Y/277V 3P	1	ea	$1,244.00	$1,244.00	$4,832.00	$4,832.00	$0.00	$0.00	$6,076.00	$6,076.00	
	2500A panel, 480Y/277V 3P	1	ea	$1,523.00	$1,523.00	$6,432.00	$6,432.00	$0.00	$0.00	$7,955.00	$7,955.00	
	1200A panel, 480Y/277V 3P	1	ea	$1,132.00	$1,132.00	$4,422.00	$4,422.00	$0.00	$0.00	$5,554.00	$5,554.00	
	1000A panel, 480Y/277V 3P	1	ea	$1,055.00	$1,055.00	$4,232.00	$4,232.00	$0.00	$0.00	$5,287.00	$5,287.00	
	3000A panel, 480Y/277V 3P	1	ea	$1,732.00	$1,732.00	$6,644.00	$6,644.00	$0.00	$0.00	$8,376.00	$8,376.00	
	600A panel, 480Y/277V 3P	1	ea	$844.00	$844.00	$2,543.00	$2,543.00	$0.00	$0.00	$3,387.00	$3,387.00	
	400A panel, 480Y/277V 3P	4	ea	$788.00	$3,152.00	$2,455.00	$9,820.00	$0.00	$0.00	$3,243.00	$12,972.00	
	400A panel, 480Y/277V 3P	2	ea	$788.00	$1,576.00	$2,455.00	$4,910.00	$0.00	$0.00	$3,243.00	$6,486.00	
	Utility meter sockets, mounting HW	1	ea	$355.65	$355.65	$832.32	$832.32	$0.00	$0.00	$1,187.97	$1,187.97	
	225A Main disconnect switch/lockable	6	ea	$244.32	$1,465.92	$432.32	$2,593.92	$0.00	$0.00	$676.64	$4,059.84	
	175A Main disconnect switch/lockable	4	ea	$188.54	$754.16	$355.65	$1,422.60	$0.00	$0.00	$544.19	$2,176.76	
	100A Main disconnect switch/lockable	2	ea	$152.32	$304.64	$244.43	$488.86	$0.00	$0.00	$396.75	$793.50	
	800A panel, 480/277V 3P, 20 crt	2	ea	$888.00	$1,776.00	$2,865.00	$5,730.00	$0.00	$0.00	$3,753.00	$7,506.00	
	400A panel, 480/277V 3P, 20 crt	3	ea	$732.00	$2,196.00	$2,565.00	$7,695.00	$0.00	$0.00	$3,297.00	$9,891.00	
	225A panel, 480/277V 3P, 42 crt	4	ea	$699.00	$2,796.00	$2,233.00	$8,932.00	$0.00	$0.00	$2,932.00	$11,728.00	
	100A panel, 480/277V 3P, 42 crt	5	ea	$688.00	$3,440.00	$1,532.32	$7,661.60	$0.00	$0.00	$2,220.32	$11,101.60	
	50A panel, 480/277V 3P, 42 crt	5	ea	$644.00	$3,220.00	$1,832.00	$9,160.00	$0.00	$0.00	$2,476.00	$12,380.00	
	30A panel, 480/277V 3P, 42 crt	5	ea	$621.00	$3,105.00	$1,765.00	$8,825.00	$0.00	$0.00	$2,386.00	$11,930.00	
	1000A automatic transfer switch	1	ea	$732.32	$732.32	$2,532.32	$2,532.32	$0.00	$0.00	$3,264.64	$3,264.64	
	2L3 100A panel, 208/120V 3P, 42ct	2	ea	$733.00	$1,466.00	$2,132.00	$4,264.00	$0.00	$0.00	$2,865.00	$5,730.00	
	TK1 150KVA 480-120/280V 3P, transformer	2	ea	$832.32	$1,664.64	$7,532.00	$15,064.00	$0.00	$0.00	$8,364.32	$16,728.64	
	T 112.5KVA 480-120/280V 3P, transformer	14	ea	$788.00	$11,032.00	$4,432.32	$62,052.48	$0.00	$0.00	$5,220.32	$73,084.48	
	T 30KVA 480-120/280V 3P, transformer	6	ea	$732.00	$4,392.00	$4,432.32	$26,593.92	$0.00	$0.00	$5,164.32	$30,985.92	
	T 15KVA 480-120/280V 3P, transformer	6	ea	$721.00	$4,326.00	$4,232.00	$25,392.00	$0.00	$0.00	$4,953.00	$29,718.00	
	T 9KVA 480-120/280V 3P, transformer	14	ea	$632.00	$8,848.00	$2,865.65	$40,119.10	$0.00	$0.00	$3,497.65	$48,967.10	
	Splice boxes and terminations	24	ea	$832.32	$19,975.68	$453.22	$10,877.28	$0.00	$0.00	$1,285.54	$30,852.96	
	5/8" x10' ground rod, claps, wire	8	ea	$322.00	$2,576.00	$1,655.21	$13,241.68	$0.00	$0.00	$1,977.21	$15,817.68	
	20"x4" x1/4" ground plates, claps, wire	160	ea	$302.00	$48,320.00	$1,455.65	$232,904.00	$0.00	$0.00	$1,757.65	$281,224.00	
	12"x3" x1/4" ground plates, claps, wire	150	ea	$222.00	$33,300.00	$892.00	$133,800.00	$0.00	$0.00	$1,114.00	$167,100.00	
	24"x3" x1/4" ground plates, claps, wire	80	ea	$244.00	$19,520.00	$1,322.00	$105,760.00	$0.00	$0.00	$1,566.00	$125,280.00	
	#4 Grounding bare copper wire	320	lf	$2.32	$742.40	$8.32	$2,662.40	$0.00	$0.00	$10.64	$3,404.80	
	Grounding wire & clamp at raised floor	56320	sf	$1.55	$87,296.00	$1.22	$68,710.40	$0.00	$0.00	$2.77	$156,006.40	
	Programmable clock, integrator type	1	ea	$344.43	$344.43	$1,544.46	$1,544.46	$0.00	$0.00	$1,888.89	$1,888.89	
	Terminations at panel lugs	320	ea	$44.54	$14,252.80	$32.44	$10,380.80	$0.00	$0.00	$76.98	$24,633.60	
	Conduit, Wire, & Boxes including Wells, Bypass, and Site Connections:											
	1/2" PVC conduit and hangers	1240	lf	$4.21	$5,220.40	$0.88	$1,091.20	$0.00	$0.00	$5.09	$6,311.60	
	3/4" PVC conduit and hangers	16888	lf	$3.68	$62,147.84	$1.56	$26,345.28	$0.00	$0.00	$5.24	$88,493.12	
	1-1/4" PVC conduit and hangers	680	lf	$5.55	$3,774.00	$2.12	$1,441.60	$0.00	$0.00	$7.67	$5,215.60	
	1-1/2" PVC conduit and hangers	680	lf	$5.65	$3,842.00	$2.32	$1,577.60	$0.00	$0.00	$7.97	$5,419.60	
	2" PVC conduit and hangers	680	lf	$6.12	$4,161.60	$2.36	$1,604.80	$0.00	$0.00	$8.48	$5,766.40	
	3-1/2" PVC conduit and hangers	2450	lf	$6.33	$15,508.50	$2.55	$6,247.50	$0.00	$0.00	$8.88	$21,756.00	
	4" PVC conduit and hangers	3260	lf	$6.44	$20,994.40	$3.25	$10,595.00	$0.00	$0.00	$9.69	$31,589.40	
	4ea. 4" PVC Bank conduit, direct buried, access road	18650	lf	$21.32	$397,618.00	$21.21	$395,566.50	$0.00	$0.00	$42.53	$793,184.50	
	#6 THWN-THHN copper solid	32550	lf	$0.12	$3,906.00	$0.07	$2,278.50	$0.00	$0.00	$0.19	$6,184.50	
	#8 THWN-THHN copper stranded	26320	lf	$0.12	$3,158.40	$0.08	$2,105.60	$0.00	$0.00	$0.20	$5,264.00	
	#10 THWN-THHN copper stranded	36888	lf	$0.12	$4,426.56	$0.07	$2,582.16	$0.00	$0.00	$0.19	$7,008.72	
	#12 THWN-THHN copper stranded	24560	lf	$0.12	$2,947.20	$0.07	$1,719.20	$0.00	$0.00	$0.19	$4,666.40	
	#1/0 THWN-THHN copper solid	4456	lf	$0.12	$534.72	$0.12	$534.72	$0.00	$0.00	$0.24	$1,069.44	
	#2/0 THWN-THHN copper solid	3242	lf	$0.12	$389.04	$0.12	$389.04	$0.00	$0.00	$0.24	$778.08	
	#3/0 THWN-THHN copper solid	1432	lf	$0.12	$171.84	$0.14	$200.48	$0.00	$0.00	$0.26	$372.32	
	1 ea. 2" EMT conduit and hangers	320	lf	$4.21	$1,347.20	$0.88	$281.60	$0.00	$0.00	$5.09	$1,628.80	

1.1.3 - Exploratory & Production Water Wells, Storage, Transmission Cost Detail

Run Date: 10/19/23

Project: Conceptual Design Development Phase Probable Cost Evaluation for the Honolulu Board of Water Supply New Fresh Water Wells Project
Estimated and Certified by J. O'Neill, FCPE

Division	DESCRIPTION	QUANTITY	UNITS	Labor Cost		Material Cost		Equipment Cost		Labor,Mat	Labor,Mat	Division
				Unit	Total	Unit	Total	Unit	Total	Equip Unit	Equip Total	Total
	3ea. 3" EMT conduit and hangers	880	lf	$4.54	$3,995.20	$1.12	$985.60	$0.00	$0.00	$5.66	$4,980.80	
	3ea. 250 kCMIL solid copper feeder w/shielding	240	lf	$6.34	$1,522.08	$28.65	$6,876.00	$0.00	$0.00	$34.99	$8,398.08	
	4ea. 350 kCMIL solid copper feeder w/shielding	650	lf	$5.65	$3,672.50	$33.22	$21,593.00	$0.00	$0.00	$38.87	$25,265.50	
	4ea. 400 kCMIL solid copper feeder w/shielding	450	lf	$5.65	$2,542.50	$44.56	$20,052.00	$0.00	$0.00	$50.21	$22,594.50	
	4ea. 500 kCMIL solid copper feeder w/shielding	8800	lf	$5.65	$49,720.00	$77.32	$680,416.00	$0.00	$0.00	$82.97	$730,136.00	
	1ea. #1/0 Insulated CU copper solid	1232	lf	$0.12	$147.84	$21.21	$26,130.72	$0.00	$0.00	$21.33	$26,278.56	
	4ea. #1/0 THHN copper solid	360	lf	$7.88	$2,836.80	$10.44	$3,758.40	$0.00	$0.00	$18.32	$6,595.20	
	4"x4" outlet box, wall mount, straps	326	ea	$6.32	$2,060.32	$12.55	$4,091.30	$0.00	$0.00	$18.87	$6,151.62	
	6"x6" Surface mounted wire gutter	24	lf	$6.32	$151.68	$12.55	$301.20	$0.00	$0.00	$18.87	$452.88	
	12"x12" x4" NEMA 3R boxes	56	ea	$6.32	$353.92	$12.55	$702.80	$0.00	$0.00	$18.87	$1,056.72	
	4"x6"x4" gutter surface mounted raceway, hangers, c	56	lf	$6.32	$353.92	$12.55	$702.80	$0.00	$0.00	$18.87	$1,056.72	
	Light Fixtures:											
	Light Fixture Package for Main Shaft, WP	660	lf	$1.21	$798.60	$55.54	$36,656.40	$0.00	$0.00	$56.75	$37,455.00	
	XX - Quantum LED, with NiCd battery, WP	10	ea	$566.65	$5,666.50	$2,132.32	$21,323.20	$0.00	$0.00	$2,698.97	$26,989.70	
	XX - Edgelit, LED, with NiCd battery, WP	10	ea	$532.32	$5,323.20	$2,455.65	$24,556.50	$0.00	$0.00	$2,987.97	$29,879.70	
	Devices & Controls:											
	Light switch & cover - WP	15	ea	$12.32	$184.80	$32.32	$484.80	$0.00	$0.00	$44.64	$669.60	
	Ceiling mounted sensor, power pack	15	ea	$44.54	$668.10	$112.32	$1,684.80	$0.00	$0.00	$156.86	$2,352.90	
	Single switch, low voltage, digital switch	5	ea	$25.43	$127.16	$82.32	$411.60	$0.00	$0.00	$107.75	$538.76	
	Passive Infrared, dual relay wall switch	25	ea	$41.22	$1,030.50	$76.33	$1,908.25	$0.00	$0.00	$117.55	$2,938.75	
	Occupency sensor light switch & cover	5	ea	$15.65	$78.25	$88.65	$443.25	$0.00	$0.00	$104.30	$521.50	
	3-way switch & cover, WP	15	ea	$16.32	$244.80	$112.32	$1,684.80	$0.00	$0.00	$128.64	$1,929.60	
	120V GFCI duplex outlet & cover - WP	125	ea	$41.33	$5,166.25	$112.00	$14,000.00	$0.00	$0.00	$153.33	$19,166.25	
	Motor Control & Equipment Connections:											
	Smoke control fans, waterproof flex, disconnect	15	ea	$3,532.32	$172.32	$888.44	$13,326.60	$0.00	$0.00	$4,420.76	$13,498.92	
	Electric water valves Water connections	15	ea	$122.32	$1,834.80	$232.00	$3,480.00	$0.00	$0.00	$354.32	$5,314.80	
	Variable frequency drives	15	ea	$165.00	$2,475.00	$256.00	$3,840.00	$0.00	$0.00	$421.00	$6,315.00	
	SCADA valve and water control connections	64	ea	$233.32	$14,932.48	$321.21	$20,557.44	$0.00	$0.00	$554.53	$35,489.92	
	MCC Water Pump Unit controls, medium volt connec	5	ea	$35,325.00	$176,625.00	$1,032,444.00	$5,162,220.00	$0.00	$0.00	$1,067,769.00	$5,338,845.00	
	MCC Water Pump Unit controls, low volt connection	5	ea	$14,325.00	$71,625.00	$965,325.00	$4,826,625.00	$0.00	$0.00	$979,650.00	$4,898,250.00	
	Shaft vertical lift connections and controls	1	ea	$1,232,444.00	$1,232,444.00	$21,233,322.00	$21,233,322.00	$6,532.00	$6,532.00	$22,472,298.00	$22,472,298.00	
	Fan inline vertical supply air fans, redundancy	4	ea	$2,344.00	$9,376.00	$2,532.00	$10,128.00	$0.00	$0.00	$4,876.00	$19,504.00	
	SCADA Systems:											
	SCADA Monitoring & Controller	1	ea	$165.32	$165.32	$322.32	$322.32	$0.00	$0.00	$487.64	$487.64	
	24"x24" NEMA 3R in-wall box, ext, term block	20	ea	$165.00	$3,300.00	$322.00	$6,440.00	$0.00	$0.00	$487.00	$9,740.00	
	Valve Bypass monitoring	20	ea	$165.32	$3,306.40	$356.65	$7,133.00	$0.00	$0.00	$521.97	$10,439.40	
	Water pressure monitoring	20	ea	$0.77	$15.40	$372.32	$7,446.40	$0.00	$0.00	$373.09	$7,461.80	
	Water Temperature monitoring	15	ea	$0.77	$11.55	$388.65	$5,829.75	$0.00	$0.00	$389.42	$5,841.30	
	Water flow monitoring	25	ea	$0.77	$19.25	$342.32	$8,558.00	$0.00	$0.00	$343.09	$8,577.25	
	Water pressure relief automatic valves	20	ea	$0.77	$15.40	$356.56	$7,131.28	$0.00	$0.00	$357.33	$7,146.68	
	Water quality monitoring	25	ea	$0.77	$19.25	$522.32	$13,058.00	$0.00	$0.00	$523.09	$13,077.25	
	Water flow actuator valves, watertight connections	100	ea	$0.77	$77.00	$533.43	$53,343.00	$0.00	$0.00	$534.20	$53,420.00	
	Beldon control wire #9632, water tight connections	5600	lf	$1.23	$6,888.00	$621.10	$3,478,160.00	$0.00	$0.00	$622.33	$3,485,048.00	
	Terminations, switches, connections	64	ea	$112.32	$7,188.48	$55.65	$3,561.60	$0.00	$0.00	$167.97	$10,750.08	
	BWS:											
	Provide & install security switch	1	ea	$1,122.32	$1,122.32	$2,344.43	$2,344.43	$0.00	$0.00	$3,466.75	$3,466.75	
	Labels & Consumables:											
	Labels & Consumables	120	crewhrs	$165.65	$19,878.00	$55.54	$6,664.80	$0.00	$0.00	$221.19	$26,542.80	
	Pipe route markers at buried trench line	64	ea	$88.87	$5,687.68	$244.43	$15,643.52	$0.00	$0.00	$333.30	$21,331.20	

1.1.3 - Exploratory & Production Water Wells, Storage, Transmission Cost Detail

Run Date: 10/19/23

Project: Conceptual Design Development Phase Probable Cost Evaluation for the Honolulu Board of Water Supply New Fresh Water Wells Project
Estimated and Certified by J. O'Neill, FCPE

Division	DESCRIPTION	QUANTITY	UNITS	Labor Cost Unit	Labor Cost Total	Material Cost Unit	Material Cost Total	Equipment Cost Unit	Equipment Cost Total	Labor,Mat Equip Unit	Labor,Mat Equip Total	Division Total
	Testing, Adjustments, Owner's Training:											
	Testing & Adjustment	120	crewhrs	$165.65	$19,878.00	$33.43	$4,011.60	$66.00	$7,920.00	$265.08	$31,809.60	
	Owner's Training	64	crewhrs	$165.65	$10,601.60	$12.34	$789.89	$66.00	$4,224.00	$243.99	$15,615.49	
	TOTAL ELECTRICAL & SCADA SYSTEMS				$2,557,242.51		$37,229,259.96		$20,301.00			$39,806,803.48
42.6000	**MONITORING WELLS**											
	Monitoring Well No 1											
	Monitoring Well No1, estimated length	317	lf	$233.32	$73,962.44	$3,164.00	$1,002,988.00	$1,032.00	$327,144.00	$4,429.32	$1,404,094.44	
	Monitoring Well No 2											
	Monitoring Well No1, estimated length	363	lf	$233.32	$84,695.16	$3,164.00	$1,148,532.00	$1,032.00	$374,616.00	$4,429.32	$1,607,843.16	
	Monitoring Well No 3											
	Monitoring Well No1, estimated length	393	lf	$233.32	$91,694.76	$3,164.00	$1,243,452.00	$1,032.00	$405,576.00	$4,429.32	$1,740,722.76	
	TOTAL MONITORING WELLS				$250,352.36		$3,394,972.00		$1,107,336.00			$4,752,660.36

TOTAL EXPLORATORY AND PRODUCTION WATER WELLS, STORAGE, AND TRANSMISSION DIRECT COST **$549,684,592.35**

Honolulu Board of Water Supply
New Fresh Water Wells Construction Project
Honolulu, Hawaii

Estimators Notes & Assumptions

Conceptual Design Development Phase

October 19, 2023
January 0, 1900

A E S
Certified Professional Estimating & Facility Maintenance Systems

Run Date: 10/19/23

Project: Conceptual Design Development Phase Probable Cost Evaluation for the Honolulu Board of Water Supply New Fresh Water Well Project
Estimated and Certified by J. O'Neill, FCPE

Estimator's Notes & Assumptions

1. The classification conforms to ASTM designation E1557-97 "Standard Classification of Building Elements and Related Sitework.
2. The "Design Contingency Allowance" is designated as the 10% value; and the Owner's Contingency is 15% for unforseen circumstances.
3. Escalation costs are included and Hawaii Excise Tax are included in the site infrastructure and building unit costs for Honolulu, Hawaii.
4. General Contractors staffing costs, general requirements, and general conditions are included in the site infrastructure and building costs.
5. Work shall be performed during regular working hours from 8:00AM to 5:00PM Monday thru Friday, premium time for weekend work and Holiday work is excluded.
6. General Contractor general requirements includes temporary facilities, temporary equipment rental, building permits, and builders risk insurance.
7. Cost of work includes General Contractor and Subcontractor bonding costs.
8. Cost of work assumes "No premium time" to complete the work per a compressed construction schedule.
9. Cost of work assumes General Contractor and it's subcontractor's shall pay State of Hawaii prevailing wage rates adjusted for living wage rates for work performed in Honolulu, Hawaii.
10. Cost of work excludes moving and purchase of furniture, computer hardware, computer system cabling, software, and printers.
11. Cost of work includes a means of conveyance for the data and communication via ceiling plenum wire system to phone board located in the electrical room with 3/4" conduit from rack to wall mount data/communications jacks and CAT 6E wire to data/communications terminations at POC's and furniture cubicles supplied and installed by GC.
12. Cost of work includes full-time supervision staff by General Contractor for this size and type of project for a 46 month duration, construction management to be performed by Owner.
13. Base cost of work includes additional tap fees for Utility Company point of connections at domestic and fire-protection water, storm drainage, sanitary sewer, and telephone, and includes electric company transformer and primary upgrades or new gas meter.
14. Cost of work includes one year of preconstruction and mobilization and demobilization by General Contractor.

EXHIBIT E

CONSTRUCTION CONSULTING, LLC

October 20, 2023

Mr. Ernie Lau, P.E., Manager
Honolulu Board of Water Supply
630 South Beretania Street
Honolulu, HI 96843

RE: Cost Estimate for Honolulu Board of Water Supply Replacement Production Wells, Water Conveyance Tunnel, and Pipelines

Mr. Lau:

SJ Construction Consulting, LLC ("SJCC") was retained by Intera Incorporated ("Intera") to provide cost estimating services for the above project. Below is a brief summary of scope and estimated cost in response to that request:

1. WATER DEVELOPMENT TUNNEL FACILITY

This facility would be a replacement for the Halawa Shaft facility and would be located approximately 1-mile up slope from the existing facility (approximate elevation = 365 feet amsl). Average yield 10 million gallons per day (MGD). Maximum yield 14 MGD.

Basic components of the replacement facility are:

- **Surface Portal Structure (Entrance) -** Dimensions: Length: 80 ft, Width: 30 ft, Height: 20 ft.
- **30° Inclined Shaft from Portal Structure to Pump Room -** Dimensions: Length: 660 ft, Width: 10 ft, Height: 10 ft.
- **Pump Room -** Dimensions: Length: 75 ft, Width: 30 ft, Height: 30 ft. Includes one 1,500 HP pump motor/pump bowl assembly capable of 7,000 gpm production and two 800 HP pump motors/pump bowl assemblies each capable of 4,300 gpm production.
- **Sump Basin in Pump Room Floor -** Dimensions: Length: 50 ft, Width: 15 ft, Depth: 40 ft.
- **Water Development Tunnel -** Starts 25 ft below Pump Room floor in Sump Basin and extend 1,000 ft at a rising grade of 0.5 ft/100 ft with a tunnel width of 10 ft and tunnel height of 10 ft.

Included as part of this replacement facility are three (3) sentinel groundwater monitoring wells that would serve to monitor basal aquifer groundwater quality.

Estimated Cost: $252,234,016

2. REPLACEMENT OF EXISTING HALAWA WELLS (Units 1, 2, & 3), AND AIEA WELLS (Units 1 & 2) (5 Final Production Wells/2 Additional Exploratory or Reserve Wells)

The design and construction specifications for seven exploratory wells/ five replacement water supply wells based on BWS current well designs (for the above production wells) which includes the installation of a filter pack/well screen within each well's groundwater production zone (each production well targeted to produce 1.5 MGD). The maximum terminal depth (TD) for each of the proposed wells within the Basal Aquifer were calculated using requirements set forth in CWRM (2004) Hawaii Well Construction & Pump Installation Standards (Section 2.2, Page 2-2). The production wells were assumed to be completed with stainless steel (ASTM A409 (304L Grade)) casing and well screen. Include in the cost-estimate a lump-sum cost-estimate for a new pump assembly and its installation in each well. Finally, include a lump-sum cost-estimate for the decommissioning and proper abandonment of each of the five existing wells based on the CWRM (2004) Hawaii Well Construction & Pump Installation Standards (Part 3 Well Abandonment/Sealing). New locations may be "outside" of the current water system and therefore three new reservoirs may be required (see Section 3 below).

Estimated Cost: $15,139,840

3. INSTALLATION OF NEW WATER TRANSMISSION PIPELINES/RESERVOIRS

Install 3 miles of 42-inch main line and 2 miles of 12-inch main pipelines (ductile iron, bonded coatings, cathodic protection). Construct 3 reservoirs (reinforced concrete), sizes: three, one million gallons each. Include approximately 9,000 LF of security fence.

Estimated Cost: $393,436,000

Please see next page for these costs, plus contingencies, in a tabular summary form.

CONSTRUCTION CONSULTING, LLC

Cost Estimate Summary		
Item 1 – Water Development Tunnel	$	252,234,016
Item 2 – Replacement Wells	$	15,139,840
Item 3 – Pipelines and Reservoirs	$	393,436,000
General Contractor Staffing and Fee, General Conditions (35%)	$	231,283,450
Subtotal	$	892,093,306
Land Acquisition	$	12,000,000
Subtotal	$	904,093,306
Insurance and Bonding at 3%	$	27,122,799
Subtotal	$	931,216,105
10 Year Escalation at 18.5%	$	172,274,979
Subtotal	$	1,103,491,084
Engineering and Architects – Design – 10%	$	110,349,108
Subtotal	$	1,213,840,193
Environmental Impact Studies – 1.5%	$	18,207,603
Subtotal	$	1,232,047,795
Permits – 1%	$	12,320,478
Subtotal	$	1,244,368,273
Owner Contingency – 15%	$	186,655,241
TOTAL	**$**	**1,431,023,514**

The costs above are based on design concepts only. SJCC was not provided with drawings, specifications, or bid tabs which would have allowed for a greater level of accuracy. SJCC also incorporated various assumptions and instructions received from Intera regarding contingencies about the design and prosecution of the proposed work. Costs were developed by the SJCC team based upon industry experience, discussion with a local contractor, and discussions with Intera.

Please do not hesitate to contact the undersigned upon receipt of further details to improve the accuracy of these calculations.

Very truly yours,

Scott Jennings
President

EXHIBIT F

DECLARATION OF RAELYNN NAKABAYASHI

1. I provide this declaration in support of the Honolulu Board of Water Supply's ("BWS") Federal Tort Claims Act ("FTCA") claims against the United States Department of the Navy ("Navy") for damages arising from the drinking water contamination crisis caused by fuel releases from the Navy's Red Hill Bulk Fuel Storage Facility ("Red Hill").

2. I have a Bachelor of Art degree in Business Administration, with a concentration in Accounting, from the University of Hawaii at West Oahu.

3. I started my career with the City and County of Honolulu in 2010. My previous positions while employed by the City and County of Honolulu include Accountant, Budget Analyst, Administrative Services Officer, and Management Analyst.

4. I have been employed by the BWS since August 2019. My current position at the BWS is Executive Assistant of the Executive Support Office, and I have been in this position since I started at the BWS. My work over the past four years has focused primarily on overseeing the administrative support functions of four distinct offices within the BWS; specifically, the Management and Budget Office, the Procurement Office, the Risk Management Office, and the Emergency Response and Security Office. In this role I report directly to the BWS Manager and Chief Engineer.

5. In connection with performing my duties at the BWS, I am generally familiar with the BWS' water distribution system and operations. I am familiar with the BWS' budgeting, contracting, and procurement processes. I am also familiar with the BWS' budget management system, procurement files, insurance policy records, and accounting system.

6. I am responsible for and/or serve as the BWS custodian of records for budget documents maintained in the BWS budget system, solicitations and formal BWS contracts, BWS insurance policies, and BWS emergency response plans.

7. To support the BWS' FTCA claims against the Navy, I have been asked to: (1) identify categories of costs incurred by the BWS to date to respond to the drinking water contamination crisis caused by the Navy's fuel releases at Red Hill; (2) review documentation of such costs and, where necessary or appropriate, prepare reasonable estimates of such costs; and (3) calculate the current balance of such costs in order to assist in the determination of the total amount of costs owed to the BWS.

8. In connection with this effort, I reviewed budgetary records maintained in the BWS' electronic budget management system, hard copy and/or scanned contract records and insurance policies, and financial expenditure records maintained in the BWS' electronic accounting system. After review of these records, I can affirm that the records I reviewed were made in the regular course of business operations, and it is the BWS' customary practice to create and maintain such records as a routine part of business activities. I can also affirm that the records I reviewed were made at or near the time of the act, condition, or events described therein, and created either by a person with direct knowledge of those matters or from information transmitted by someone with such knowledge. In addition, I conferred with personnel in the BWS Finance, Field Operations, and Water System Operations Divisions with knowledge of information contained in such records.

9. Based on my review of these records and with the input of BWS personnel, I concluded that the total amount of costs incurred or committed by the BWS to date to respond to

the Navy's fuel releases at Red Hill is $24,987,978.02. These costs can be generally attributed to the following categories:

a.	Laboratory testing	$1,004,508.82
b.	Monitoring/exploratory wells	$21,711,842.18
c.	Materials, supplies and services	$234,386.92
d.	Consultant services	$1,268,773.32
e.	BWS staff costs	$768,466.78

10. Review of BWS records also indicates that the BWS' Halawa Shaft drinking water well was completed on December 1, 1944, at a cost of $2,295,000. Drilling of the BWS' Aiea Wells (Units 1 and 2) drinking water wells was completed by February 1, 1955, and these wells cost the BWS at least $28,471.45. Drilling of the BWS' Halawa Wells (Units 1, 2, and 3) drinking water wells was completed by October 5, 1961, and these wells cost the BWS at least $80,310.01. The BWS' Halawa Shaft, Aiea Wells (Units 1 and 2) and Halawa Wells (Units 1, 2, and 3) drinking water wells have not been used to extract and deliver potable water into the BWS' water distribution system since December 2021.

11. Two itemized signed statements or estimates by competent, reliable, and disinterested persons have been prepared to support the BWS' claims for damage to property; specifically, to replace the BWS' Halawa Shaft, Aiea Wells (Units 1 and 2) and Halawa Wells (Units 1, 2, and 3) drinking water wells rendered inoperable by the Navy's fuel releases from the Red Hill facility. The total estimated value of the BWS' Halawa and Aiea drinking water wells as demonstrated by the costs to replace these wells is between $1,183,506,516 and $1,431,023,514.

12. The BWS' investigation of and response to the Navy's fuel releases from the Red Hill facility remains ongoing. Accordingly, I reserve the right to amend or supplement my declaration if additional relevant documents or information becomes available that affects my conclusions.

I, RAELYNN NAKABAYASHI, do declare under the penalty of law that the foregoing is true and correct to the best of my knowledge.

DATED: Honolulu, Hawaii, October 23, 2023.

RAELYNN NAKABAYASHI

EXHIBIT 2

DEPARTMENT OF THE NAVY
OFFICE OF THE JUDGE ADVOCATE GENERAL
TORT CLAIMS UNIT NORFOLK
9620 MARYLAND AVENUE SUITE 205
NORFOLK VA 23511-2949

IN REPLY REFER TO:

5890
Ser J241629
January 10, 2025

CERTIFIED MAIL RETURN RECEIPT REQUESTED & ELECTRONIC MAIL

ELLA F GANNON ESQ
MORGAN LEWIS & BOCKIUS LLP
ONE MARKET SPEAR STREET TOWER
SAN FRANCISCO CA 94105

Dear Ms. Gannon:

SUBJECT: FTCA TORT CLAIM OF HONOLULU BOARD OF WATER SUPPLY; OUR FILE NO. J241629

This responds to your client's, Honolulu Board of Water Supply ("BWS"), administrative claim in the amount of $1,208,494,494.45 for property damage and economic losses allegedly resulting from the November 21, 2021 incident at the United States Navy's Red Hill Bulk Fuel Storage Facility. BWS's claim was analyzed under the Federal Tort Claims Act ("FTCA"), 28 U.S.C. §§ 1346(b), 2401(b), and 2671-2680. Our investigation has determined that your client has failed to establish, as required under the FTCA, that the United States Navy ("Navy") is responsible for the aforementioned property damage and economic losses. *See* 28 U.S.C. §§ 2671-2689; 28 C.F.R. 14.4; 32 C.F.R. 750.27.

TCU has sent correspondence on multiple occasions notifying your client that additional information and documentation was necessary to be able to adjudicate its claim. Specifically, on December 20, 2023, March 27, 2024, and October 8, 2024, TCU sent correspondence requesting "all documentation to support the development, expenses and causal relationship of installing additional Red Hill groundwater monitoring wells" and "all documentation to support the costs and expenses incurred from implementation of enhanced water quality testing and protocols at the drinking water wells stations." TCU also explicitly requested "all documentation to support the shutdown and loss of use of the Honolulu Board of Water Supply (BWS) Halawa Shaft, Aiea Wells, and Halawa drinking water wells." Furthermore, in our October 8 substantiation correspondence, we acknowledged that while BWS previously provided over two-thousand pages of documents in purported efforts to substantiate its claim, many of those documents were for costs that predated the November 2021 incident and were both irrelevant and time-barred, while a vast majority of other documented expenses were insufficient, without additional information, to properly evaluate and adjudicate several facets of BWS's substantial claim for damages. To that end, TCU highlighted, in detail, examples of categories of damages for which BWS failed to submit sufficient substantiation documentation and provided the type of information that the Navy still required to evaluate these claimed costs.

5890
Ser J241629
January 10, 2025

Following our October 8 correspondence, TCU set a deadline of December 2, 2024, by which BWS was required to supplement its claim. TCU received BWS's response letter and additional exhibit (HBWS00002116) on December 2, 2024, at 5:02pm EST. However, even with this correspondence, BWS failed to meaningfully respond to the third substantiation request. BWS largely referred TCU back to documents it had produced in its previous substantiation responses (documents that TCU had already thoroughly reviewed and requested additional context for) and the one supplementary exhibit submitted only created more ambiguity. Moreover, BWS's responses to the deficient categories outlined in TCU's final substantiation request were either conclusory, circular, or were not otherwise supported by the documents BWS cited. In adjudicating BWS's claim under the FTCA, TCU cannot (1) make assumptions, (2) reverse-engineer which costs/line items BWS intended to include in its total claim, or (3) simply accept BWS' word for the expenses it claimed to have incurred.

Significantly, BWS is also deficient in providing appropriate substantiation to support the indefinite closure of its Halawa Shaft/Well and Aiea Well. As such, BWS has failed to demonstrate a causal connection between the Navy's conduct and BWS's claim for the development and construction of alternative water supply wells to replace the alleged lost production from the closure of the above facilities—damages which comprise a vast majority of BWS's total claim.

As noted in the aforementioned substantiation requests, a failure to provide requested information could result in an administrative denial of BWS's claim. Accordingly, because BWS has failed to provide information sufficient to adjudicate and evaluate its $1.2 billion claim, its claim is hereby denied for failure to substantiate as required under 28 C.F.R. § 14.4 and 32 C.F.R. § 750.27.

If your client does not agree with this decision, be advised it has six months from the date of mailing of this letter to file suit in the appropriate Federal district court. Alternatively, BWS may, within the same six-month period, request reconsideration of the denial in accordance with the procedures set forth at 32 C.F.R. §750.31. If you have any questions, please contact me at (757) 350-3085.

Sincerely,

Tort Claims Attorney

Cc: David Brown, Esq., via electronic mail only

CIVIL COVER SHEET

The JS 44 civil cover sheet and the information contained herein neither replace nor supplement the filing and service of pleadings or other papers as required by law, except as provided by local rules of court. This form, approved by the Judicial Conference of the United States in September 1974, is required for the use of the Clerk of Court for the purpose of initiating the civil docket sheet. *(SEE INSTRUCTIONS ON NEXT PAGE OF THIS FORM.)*

I. (a) PLAINTIFFS

BOARD OF WATER SUPPLY, CITY AND COUNTY OF HONOLULU

(b) County of Residence of First Listed Plaintiff Honolulu
(EXCEPT IN U.S. PLAINTIFF CASES)

(c) Attorneys *(Firm Name, Address, and Telephone Number)*

see Attachment

DEFENDANTS

UNITED STATES OF AMERICA

County of Residence of First Listed Defendant Honolulu
(IN U.S. PLAINTIFF CASES ONLY)

NOTE: IN LAND CONDEMNATION CASES, USE THE LOCATION OF THE TRACT OF LAND INVOLVED.

Attorneys *(If Known)*

Kenneth M. Sorenson, U.S. Attorney
United States Attorney's Office
300 Ala Moana Blvd. #6-100, Honolulu, HI 96850

II. BASIS OF JURISDICTION *(Place an "X" in One Box Only)*

- ❒ 1 U.S. Government Plaintiff
- ❒ 3 Federal Question *(U.S. Government Not a Party)*
- ☒ 2 U.S. Government Defendant
- ❒ 4 Diversity *(Indicate Citizenship of Parties in Item III)*

III. CITIZENSHIP OF PRINCIPAL PARTIES *(Place an "X" in One Box for Plaintiff and One Box for Defendant)*

(For Diversity Cases Only)

	PTF	DEF		PTF	DEF
Citizen of This State	❒ 1	❒ 1	Incorporated *or* Principal Place of Business In This State	❒ 4	❒ 4
Citizen of Another State	❒ 2	❒ 2	Incorporated *and* Principal Place of Business In Another State	❒ 5	❒ 5
Citizen or Subject of a Foreign Country	❒ 3	❒ 3	Foreign Nation	❒ 6	❒ 6

IV. NATURE OF SUIT *(Place an "X" in One Box Only)*

CONTRACT
- ❒ 110 Insurance
- ❒ 120 Marine
- ❒ 130 Miller Act
- ❒ 140 Negotiable Instrument
- ❒ 150 Recovery of Overpayment & Enforcement of Judgment
- ❒ 151 Medicare Act
- ❒ 152 Recovery of Defaulted Student Loans (Excludes Veterans)
- ❒ 153 Recovery of Overpayment of Veteran's Benefits
- ❒ 160 Stockholders' Suits
- ❒ 190 Other Contract
- ❒ 195 Contract Product Liability
- ❒ 196 Franchise

REAL PROPERTY
- ❒ 210 Land Condemnation
- ❒ 220 Foreclosure
- ❒ 230 Rent Lease & Ejectment
- ❒ 240 Torts to Land
- ❒ 245 Tort Product Liability
- ❒ 290 All Other Real Property

TORTS

PERSONAL INJURY
- ❒ 310 Airplane
- ❒ 315 Airplane Product Liability
- ❒ 320 Assault, Libel & Slander
- ❒ 330 Federal Employers' Liability
- ❒ 340 Marine
- ❒ 345 Marine Product Liability
- ❒ 350 Motor Vehicle
- ❒ 355 Motor Vehicle Product Liability
- ❒ 360 Other Personal Injury
- ❒ 362 Personal Injury - Medical Malpractice

PERSONAL INJURY
- ❒ 365 Personal Injury - Product Liability
- ❒ 367 Health Care/ Pharmaceutical Personal Injury Product Liability
- ❒ 368 Asbestos Personal Injury Product Liability

PERSONAL PROPERTY
- ❒ 370 Other Fraud
- ❒ 371 Truth in Lending
- ☒ 380 Other Personal Property Damage
- ❒ 385 Property Damage Product Liability

CIVIL RIGHTS
- ❒ 440 Other Civil Rights
- ❒ 441 Voting
- ❒ 442 Employment
- ❒ 443 Housing/ Accommodations
- ❒ 445 Amer. w/Disabilities - Employment
- ❒ 446 Amer. w/Disabilities - Other
- ❒ 448 Education

PRISONER PETITIONS

Habeas Corpus:
- ❒ 463 Alien Detainee
- ❒ 510 Motions to Vacate Sentence
- ❒ 530 General
- ❒ 535 Death Penalty

Other:
- ❒ 540 Mandamus & Other
- ❒ 550 Civil Rights
- ❒ 555 Prison Condition
- ❒ 560 Civil Detainee - Conditions of Confinement

FORFEITURE/PENALTY
- ❒ 625 Drug Related Seizure of Property 21 USC 881
- ❒ 690 Other

LABOR
- ❒ 710 Fair Labor Standards Act
- ❒ 720 Labor/Management Relations
- ❒ 740 Railway Labor Act
- ❒ 751 Family and Medical Leave Act
- ❒ 790 Other Labor Litigation
- ❒ 791 Employee Retirement Income Security Act

IMMIGRATION
- ❒ 462 Naturalization Application
- ❒ 465 Other Immigration Actions

BANKRUPTCY
- ❒ 422 Appeal 28 USC 158
- ❒ 423 Withdrawal 28 USC 157

PROPERTY RIGHTS
- ❒ 820 Copyrights
- ❒ 830 Patent
- ❒ 840 Trademark

SOCIAL SECURITY
- ❒ 861 HIA (1395ff)
- ❒ 862 Black Lung (923)
- ❒ 863 DIWC/DIWW (405(g))
- ❒ 864 SSID Title XVI
- ❒ 865 RSI (405(g))

FEDERAL TAX SUITS
- ❒ 870 Taxes (U.S. Plaintiff or Defendant)
- ❒ 871 IRS—Third Party 26 USC 7609

OTHER STATUTES
- ❒ 375 False Claims Act
- ❒ 400 State Reapportionment
- ❒ 410 Antitrust
- ❒ 430 Banks and Banking
- ❒ 450 Commerce
- ❒ 460 Deportation
- ❒ 470 Racketeer Influenced and Corrupt Organizations
- ❒ 480 Consumer Credit
- ❒ 490 Cable/Sat TV
- ❒ 850 Securities/Commodities/ Exchange
- ❒ 890 Other Statutory Actions
- ❒ 891 Agricultural Acts
- ❒ 893 Environmental Matters
- ❒ 895 Freedom of Information Act
- ❒ 896 Arbitration
- ❒ 899 Administrative Procedure Act/Review or Appeal of Agency Decision
- ❒ 950 Constitutionality of State Statutes

V. ORIGIN *(Place an "X" in One Box Only)*

☒ 1 Original Proceeding ❒ 2 Removed from State Court ❒ 3 Remanded from Appellate Court ❒ 4 Reinstated or Reopened ❒ 5 Transferred from Another District *(specify)* ❒ 6 Multidistrict Litigation

VI. CAUSE OF ACTION

Cite the U.S. Civil Statute under which you are filing ***(Do not cite jurisdictional statutes unless diversity)***:
Federal Tort Claims Act, Title 28 §§ 1346(b), 2671, et seq.

Brief description of cause:
negligence, nuisance, trespass, violation of Hawai'i Environmental Response Law

VII. REQUESTED IN COMPLAINT:

❒ CHECK IF THIS IS A **CLASS ACTION** UNDER RULE 23, F.R.Cv.P.

DEMAND $

CHECK YES only if demanded in complaint:

JURY DEMAND: ☒ Yes ❒ No

VIII. RELATED CASE(S) IF ANY

(See instructions): JUDGE _____ DOCKET NUMBER _____

DATE
07/01/2025

SIGNATURE OF ATTORNEY OF RECORD
/s/ Joseph A. Stewart

FOR OFFICE USE ONLY

RECEIPT # _____ AMOUNT _____ APPLYING IFP _____ JUDGE _____ MAG. JUDGE _____

INSTRUCTIONS FOR ATTORNEYS COMPLETING CIVIL COVER SHEET FORM JS 44

Authority For Civil Cover Sheet

The JS 44 civil cover sheet and the information contained herein neither replaces nor supplements the filings and service of pleading or other papers as required by law, except as provided by local rules of court. This form, approved by the Judicial Conference of the United States in September 1974, is required for the use of the Clerk of Court for the purpose of initiating the civil docket sheet. Consequently, a civil cover sheet is submitted to the Clerk of Court for each civil complaint filed. The attorney filing a case should complete the form as follows:

I.(a) **Plaintiffs-Defendants.** Enter names (last, first, middle initial) of plaintiff and defendant. If the plaintiff or defendant is a government agency, use only the full name or standard abbreviations. If the plaintiff or defendant is an official within a government agency, identify first the agency and then the official, giving both name and title.

(b) **County of Residence.** For each civil case filed, except U.S. plaintiff cases, enter the name of the county where the first listed plaintiff resides at the time of filing. In U.S. plaintiff cases, enter the name of the county in which the first listed defendant resides at the time of filing. (NOTE: In land condemnation cases, the county of residence of the "defendant" is the location of the tract of land involved.)

(c) **Attorneys.** Enter the firm name, address, telephone number, and attorney of record. If there are several attorneys, list them on an attachment, noting in this section "(see attachment)".

II. **Jurisdiction.** The basis of jurisdiction is set forth under Rule 8(a), F.R.Cv.P., which requires that jurisdictions be shown in pleadings. Place an "X" in one of the boxes. If there is more than one basis of jurisdiction, precedence is given in the order shown below.
United States plaintiff. (1) Jurisdiction based on 28 U.S.C. 1345 and 1348. Suits by agencies and officers of the United States are included here.
United States defendant. (2) When the plaintiff is suing the United States, its officers or agencies, place an "X" in this box.
Federal question. (3) This refers to suits under 28 U.S.C. 1331, where jurisdiction arises under the Constitution of the United States, an amendment to the Constitution, an act of Congress or a treaty of the United States. In cases where the U.S. is a party, the U.S. plaintiff or defendant code takes precedence, and box 1 or 2 should be marked.
Diversity of citizenship. (4) This refers to suits under 28 U.S.C. 1332, where parties are citizens of different states. When Box 4 is checked, the citizenship of the different parties must be checked. (See Section III below**; NOTE: federal question actions take precedence over diversity cases.**)

III. **Residence (citizenship) of Principal Parties.** This section of the JS 44 is to be completed if diversity of citizenship was indicated above. Mark this section for each principal party.

IV. **Nature of Suit.** Place an "X" in the appropriate box. If the nature of suit cannot be determined, be sure the cause of action, in Section VI below, is sufficient to enable the deputy clerk or the statistical clerk(s) in the Administrative Office to determine the nature of suit. If the cause fits more than one nature of suit, select the most definitive.

V. **Origin.** Place an "X" in one of the six boxes.
Original Proceedings. (1) Cases which originate in the United States district courts.
Removed from State Court. (2) Proceedings initiated in state courts may be removed to the district courts under Title 28 U.S.C., Section 1441. When the petition for removal is granted, check this box.
Remanded from Appellate Court. (3) Check this box for cases remanded to the district court for further action. Use the date of remand as the filing date.
Reinstated or Reopened. (4) Check this box for cases reinstated or reopened in the district court. Use the reopening date as the filing date.
Transferred from Another District. (5) For cases transferred under Title 28 U.S.C. Section 1404(a). Do not use this for within district transfers or multidistrict litigation transfers.
Multidistrict Litigation. (6) Check this box when a multidistrict case is transferred into the district under authority of Title 28 U.S.C. Section 1407. When this box is checked, do not check (5) above.

VI. **Cause of Action.** Report the civil statute directly related to the cause of action and give a brief description of the cause. **Do not cite jurisdictional statutes unless diversity.** Example: U.S. Civil Statute: 47 USC 553 Brief Description: Unauthorized reception of cable service

VII. **Requested in Complaint.** Class Action. Place an "X" in this box if you are filing a class action under Rule 23, F.R.Cv.P.
Demand. In this space enter the actual dollar amount being demanded or indicate other demand, such as a preliminary injunction.
Jury Demand. Check the appropriate box to indicate whether or not a jury is being demanded.

VIII. **Related Cases.** This section of the JS 44 is used to reference related pending cases, if any. If there are related pending cases, insert the docket numbers and the corresponding judge names for such cases.

Date and Attorney Signature. Date and sign the civil cover sheet.

Attachment

Attorneys for Plaintiff Board of Water Supply, City & County of Honolulu

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