



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.

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

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.

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

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)

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

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

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

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.

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

(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;

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

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.

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

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

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

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.

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

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>.

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

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

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

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

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

(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

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

(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."

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

(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.

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

(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

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

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.”

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

(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

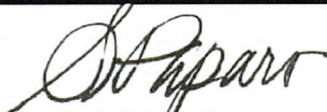
Subj: COMMAND INVESTIGATION INTO THE 6 MAY 2021 AND 20 NOVEMBER 2021
INCIDENTS AT RED HILL BULK FUEL STORAGE FACILITY

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 (b) (5), (b) (6)
(b) (5), (b) (6)



S. J. PAPARO

Copy to:
CNO
CDRUSINDOPACOM
CNIC
NAVSUP
NAVFAC
OLA

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

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)]

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)]

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)

[Encls (51), (52)]

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]
[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]
[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)]

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 hydrocarbons, 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) (7)(C) 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)]

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)]

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.

⁸ Appendix C provides a detailed summary of fuel quantities spilled, recovered, and potentially released to the environment.

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, [REDACTED] (b) (6), (b) (7)(C) [REDACTED], 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.

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), [REDACTED]. [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)]

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, [REDACTED], called the NOSC Representative to ask why he had not notified her of the spill. The NOSC Representative told [REDACTED] 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

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, [REDACTED], 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, [REDACTED], 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, [REDACTED], to conduct a formal Management Inquiry into the events surrounding the spill and damages on 6 May 2021. [REDACTED] 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 [REDACTED] 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 private 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 groundwater 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, NAVFAC 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 ENGglobal 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, [REDACTED], 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, [REDACTED], 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)]

(b)(3) 10 USC 130e



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)]

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)]

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

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 [REDACTED] 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 *GSF 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, [REDACTED], 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, [REDACTED], 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)]

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 2021 spill. [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

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 CNRH. 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)]

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)]

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 identify 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 thorough 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 Released¹

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. [REDACTED]
2. [REDACTED]
3. [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. [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 *ENGglobal* 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]

[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.

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. [REDACTED]

Long-Term Actions

43. [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. [REDACTED]

49. [REDACTED]
[REDACTED]

Long-Term Actions

49. [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. [REDACTED]
[REDACTED]

Additional Investigations

The following issues were identified but deemed outside the scope of this investigation. They warrant further consideration.

53. [REDACTED]

54. [REDACTED]
[REDACTED]

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 (16 June 2020)
- (24) NAVSUPFLCPH 4020 Appointment of Responsible Officer (16 December 2020)
- (25) NAVSUPFLCPH 7320 - Appointment as Responsible Officer ICO (9 September 2021)
- (26) NAVSUP FLCPH Relief of Department Director ICO (9 September 2021)
- (27) FLC Pearl Harbor Fuels Department FY22 Actual Organization Chart (6 December 2021)
- (28) Interview Summary -
- (29) NAVSUP FLC Pearl Harbor CO - Letter of Instruction ICO, 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)

- (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)
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) [REDACTED]
- (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)(C) (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)

- (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)(C)
- (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)(C)
- (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)(C)
- (97) CNRH 5750 - Designation as FOSC Representative, NOSC Representative, and QI ICO (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) CPE, COMNAVSUP, FLC Pearl Harbor CO Emails ICO 6 May 2021 JP-5 Spill
- (112) Interview Summary - (b) (6), (b) (7)(C), SC, USN

- (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

- (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 - [REDACTED]
- (152) Interview Summary - [REDACTED]
- (153) Interview Summary - [REDACTED]
- (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 - [REDACTED]
- (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)

- (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)(C)
- (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) (CUT) 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)

- (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)

- (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) COMNAVREGHINST 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

- (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)
- (c) 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 Command under 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
<i>Total quantity of fuel spilled on 6 May 2021¹</i>	<i>18,579 gal</i>

• Fuel recovered from sumps and recovery tank 311	1,230 gal
• Fuel absorbed in cleanup materials	350 gal
<i>Total quantity of fuel recovered immediately after 6 May 2021</i>	<i>1,580 gal</i>

The quantity of fuel released to the environment on 6 May 2021 cannot 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 May 2021	(1,580) gal
<i>Maximum quantity of fuel transferred to the fire suppression system</i>	<i>16,999 gal</i>

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
<i>Total quantity of fuel recovered immediately after 20 November 2021</i>	<i>12,311 gal</i>

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.

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
<i>Total quantity of fuel recovered from fire suppression system retention line</i>	<i>843 gal</i>

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
<i>Total quantity of fuel recovered from additional locations</i>	<i>523 gal</i>

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.

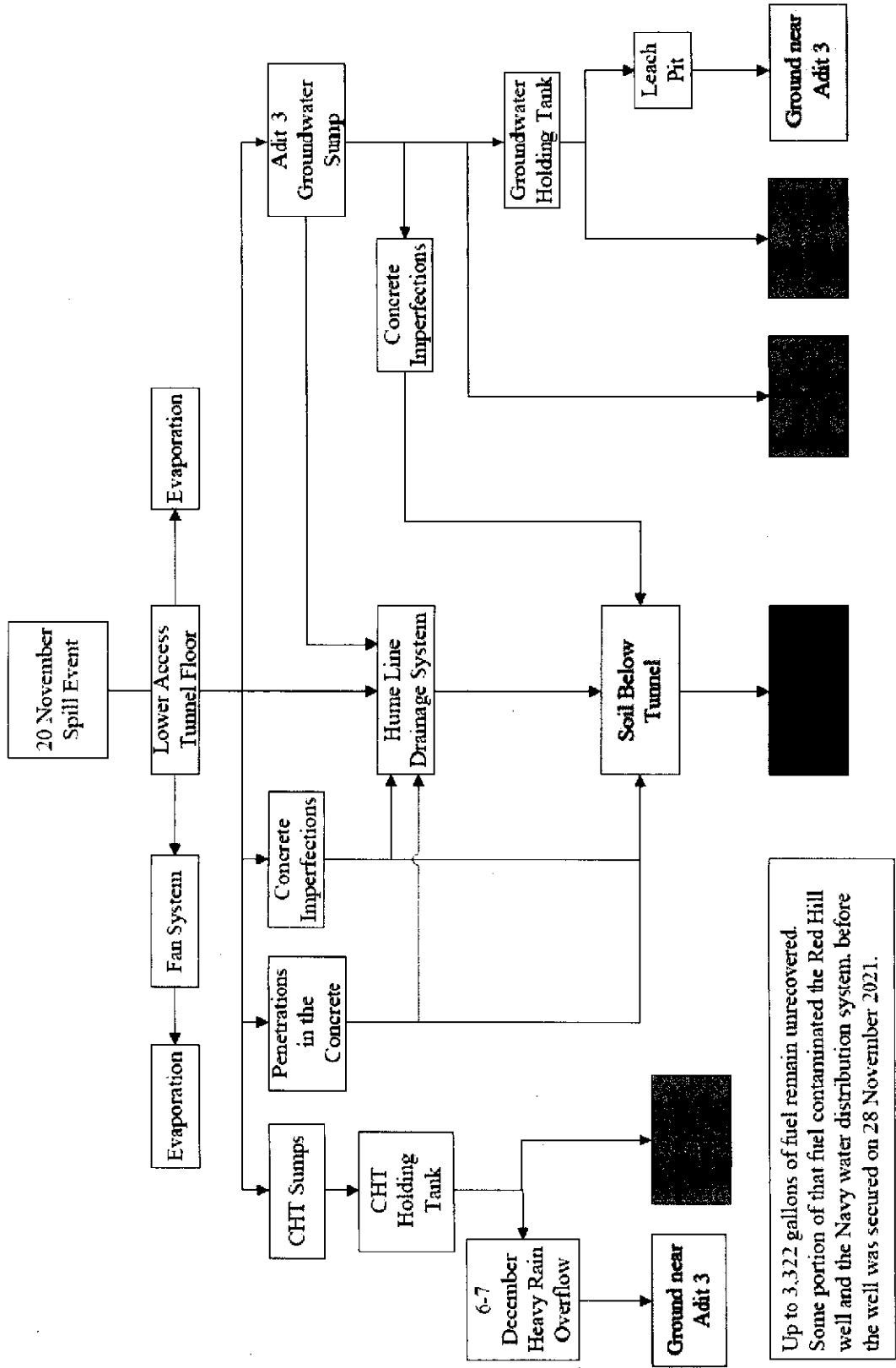
• Total quantity of fuel recovered immediately after 6 May 2021	1,580 gal
• Total quantity of fuel recovered immediately after 20 November 2021	12,311 gal
• Total quantity of fuel recovered from fire suppression system retention line	843 gal
• Total quantity of fuel recovered from additional locations	523 gal
<i>Total quantity of fuel recovered since 6 May 2021</i>	<i>15,257 gal</i>

• 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.

Marking
Removed

APPENDIX D
Potential Release Paths to the Environment



Marking
Removed

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

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

Marking
Removed

VADM
WG
XO

Vice Admiral
Wage Grade
Executive Officer

Marking
Removed

APPENDIX F **Command Investigation Team Members**

<u>RANK/NAME/TITLE</u>	<u>COMMAND</u>	<u>BACKGROUND</u>
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