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DEPARTMENT OF HEALTH
STATE OF HAWAI'I

In re US Navy's Application for a UST) DOCKET NO. 19-UST-EA-01
Permit for the Red Hill Bulk Storage)
Facility) Environmental Health Administration's
) Proposed Findings of Fact and
) Conclusions of Law; Certificate of Service
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**ENVIRONMENTAL HEALTH ADMINISTRATION'S PROPOSED
FINDINGS OF FACT AND CONCLUSIONS OF LAW**

Pursuant to chapter 91, Hawaii Revised Statutes ("HRS"), and section 11-1-22(a) of the Hawaii Administrative Rules ("HAR") a contested case hearing was conducted February 1-5, and on February 8, 2021, and additional evidence was received on May 27, 2021 on the US Navy's Application for a UST permit for the Red Hill Bulk Fuel Storage Facility.

The Environmental Health Administration ("EHA") hereby submits its Proposed Findings of Fact and Conclusions of Law on Permitting, Corrosion Protection, and Protection of Human Health and the Environment.

To the extent any of the following Findings of Fact shall be determined to be Conclusions of Law, they shall be deemed as such:

I. FINDINGS OF FACT

A. Permitting

1. The Navy filed its application with the Department of Health (DOH) for a permit to operate the Red Hill Bulk Fuel Storage Facility (Red Hill Facility) on March 14, 2019 (Exhibit N-33), and filed a revised application on May 23, 2019 (Exhibit N-35).

2. On May 29, 2019 DOH provided a status update on the application informing the Navy that DOH had received the Navy's revised application, it was deemed complete, and that DOH has requested public comment on the application and draft permit. Additionally, DOH informed the Navy that its application was timely, that it could continue to operate the UST system until a decision on the permit application was rendered, and that a contested case hearing had been requested. (Exhibit N-41.)

3. HAR 11-280.1-323 provides in pertinent part as follows:

(b) The director shall approve an application for a permit only if the applicant has submitted sufficient information to the satisfaction of the director that the technical, financial, and other requirements of this chapter are or can be met and the installation and operation of the UST or tank system will be done in a manner that is protective of human health and the environment.

(c) A permit shall be issued only in accordance with chapter 342L, Hawaii Revised Statutes, and this chapter, and it shall be the duty of the permittee to ensure compliance with the law in the installation and operation of the UST or tanks system.

4. HRS 342L-4(c) provides in pertinent part as follows:

(c) The director shall issue a permit for any term, not exceeding five years, if the director determines this to be protective of human health and the environment; provided that the permit may be subject to conditions as the director may prescribe. ... The director shall not deny an application for the issuance or renewal of a permit without affording the applicant an opportunity for a hearing in accordance with chapter 91...

B. Corrosion Protection

5. HAR 11-280.1-21(a) provides as follows: (a) All UST systems must comply with one of the following requirements:

- (1) UST system performance standards in section 11-280.1-20(b) to (d):
- (2) For airport hydrant fuel distribution systems and UST systems with field-constructed tanks installed before the effective date of these rules:
 - (A) The system performance standards in section 11-280.1-20(b) and (c); and
 - (B) Not later than one year after the effective date of these rules, the system performance standards under section 11-280.1-20(d); or
- (3) Closure requirements under subchapter 7.

6. HAR 11-280.1-20(b) provides as follows:

(b) Tanks. Each tank must be properly designed, constructed, and installed, and any portion underground that routinely contains product must be protected from corrosion, in accordance with a code of practice developed by a nationally recognized association or independent testing laboratory as specified below:

- (1) The tank is constructed of fiberglass reinforced plastic; or
- (2) The tank is constructed of steel and cathodically protected in the following manner:
 - (A) The tank is coated with a suitable dielectric material;
 - (B) Field-installed cathodic protection systems are designed by a corrosion expert;
 - (C) Impressed current systems are designed to allow determination of current operating status as required in section 11-280.1-31 (3); and
 - (D) Cathodic protection systems are operated and maintained in accordance with section 11-280.1-31 or according to guidelines established by the department; or
- (3) The tank is constructed of steel and clad or jacketed with a non-corrodible material; or
- (4) The tank is constructed of metal without additional corrosion protection measures provided that:
 - (A) The tank is installed at a site that is determined by a corrosion expert not to be corrosive enough to cause

- it to have a release due to corrosion during its operating life; and
- (B) Owners and operators maintain records that demonstrate compliance with the requirements of subparagraph (A) for the remaining life of the tank; or
- (5) The tank construction and corrosion protection are determined by the department to be designed to prevent the release or threatened release of any stored regulated substance in a manner that is no less protective of human health and the environment than paragraphs (1) to (4).

7. The phrase “and is in contact with the ground” applies to piping and does not apply to HAR 11-280.1(b) relating to Tanks. Piping that routinely contains regulated substances and is in contact with the ground must be properly designed, constructed, and installed, and any portion underground that routinely contains product must be protected from corrosion, in accordance with a code of practice developed by a nationally recognized association or independent testing laboratory.” (Navy Witness Danae Smith’s testimony p. 6-7, and Transcript V1, p. 127-128.)

8. Navy Witness Danae Smith provided a reference to EPA guidance for UST regulations “The EPA guidance for UST regulations at 80 FR 41566 (Exhibit N-59), page 41595, states that “[m]etal tanks and piping which are encased or surrounded by concrete have no metal in contact with the ground and are not subject to the corrosion protection requirements.” (Navy Witness Danae Smith Testimony, p. 7.)

9. This interpretation is specifically regarding corrosion protection requirements found at 40 CFR §280.252(b)(1) where the language applied to airport hydrant systems and UST systems with field constructed tanks differs from the corrosion protection requirements in 40 CFR §280.20, and the language in 40 CFR §280.252(b)(1) was not adopted in the state rules (chapter 11-280.1, Hawaii Administrative Rules).

10. Navy Witness Danae Smith did not provide any evidence to demonstrate that the tanks meet the requirements of HAR 11-280.1-20(b) which does not have an exception for tanks that have no metal in contact with the ground. (Navy Witness Danae Smith Testimony.)

11. Navy Witness Blake Whittle testified that “In regards to corrosion protection, the Navy selected a corrosion protection option involving the use of expert determination because the tanks are inspected under a modified American Petroleum Institute (API) 653 standard that is certified by a licensed professional engineer. DOH requested that the Navy instead choose the option exempting the tanks from corrosion protection because they are jacketed in or enclosed within a non-corrodible material, concrete.” (Navy Witness Blake Whittle Testimony, p. 17, emphasis added.)

12. Navy Witness Blake Whittle further testified that “DOH indicated that the tanks meet the corrosion protection requirement in §11-280.1[-]20(b)(3) because the tanks are steel and clad or jacketed with a non-corrodible material, concrete. Because the tanks are inspected under a modified American Petroleum Institute (API) 653 standard that is certified by a licensed professional engineer, the Navy checked the box “corrosion expert determination” in the original permit application from March 13, 2019. The “corrosion expert determination” was not required to be checked in the permit application because the tanks are jacketed with a non-corrodible material, concrete, and therefore the Hawaii State Department of Health directed the Department of the Navy to uncheck it.” (Navy Witness Blake Whittle Testimony pp. 19-20.)

13. The DOH did not state that the Red Hill tanks are “exempt” from corrosion protection because they are jacketed in or enclosed with a non-corrodible

material, concrete as stated in Whittle's testimony. (DOH's April 12, 2019 letter Exhibit N-034.)

14. DOH informed the Navy that: "The phrase "corrosion expert determination" on the application form refers specifically to an option for meeting the corrosion protection requirements of §11-280.1-20(b) and (c). To meet the requirements, the tank or piping must be "installed at a site that is determined by a corrosion expert not to be corrosive enough to cause it to have a release due to corrosion during its operating life" [§11-280.1-20(b)(4)(A) and (c)(3)(A)]." Accordingly, the corrosion expert determination box should be unchecked. (DOH's April 12, 2019 letter Exhibit N-034.)

15. DOH informed the Navy that "The tanks meet the corrosion protection requirement in §11-280.1-20(b)(3) because the tanks are steel and clad or jacketed with a non-corrodible material (concrete)." (DOH's April 12, 2019 letter Exhibit N-034.)

16. Although the tanks are steel, and concrete is a non corrodible material, the tanks are in fact not adequately clad or jacketed because there is space between the steel liner and the concrete, and corrosion is occurring. (Navy's Destructive Testing [DT] Results Report Exhibit N-40 and DOH's March 16, 2020 response letter, Exhibit N-044, Attachment 2, p. 15.)

17. There is corrosion behind the steel liners, space between the steel liner and concrete, and moisture behind the steel liner, as identified in a number of coupons. "The results of the field analyses [1] showed that voids between the steel plates and the concrete/grout structure ranged in gap size from 1/16" to 1/2" for nine of the ten steel coupon sites. The presence of moisture [1] was also noted on the back side of the

steel coupons or the concrete structure for six of the ten coupon locations. The results from the DT Results Report [1] show that the steel was rusting and had lost passivation on 7 of the 10 coupons removed.” (DOH’s March 16, 2020 response letter Exhibit N-044, Attachment 2, p.15.)

18. The DOH’s consultant concluded “In short, the evidence of carbonation of the concrete, presence of chlorides in the corrosion products, and structure-to-electrolyte corrosion potential readings all corroborate that regions of the tank were actively corroding.” (DOH’s March 16, 2020 response letter Exhibit N-044, Attachment 2, p. 20.)

19. Navy Witness Robert Jamond testified that: “The Navy identified some separation between the liner and the concrete behind Coupons 1, 3, 5, 8, A1 and A2. Coupons 2, 3, 7, and A1 had some moisture present. This means that the external sides of these coupons were damp when extracted from the tank.” (Navy Witness Robert Jamond Testimony, p. 20.)

20. Navy Witness Robert Jamond testified that: “The presence of moisture indicated there is potential for corrosion to occur or continue. The presence of corrosion product indicated that some corrosion had occurred...” (Navy Witness Robert Jamond Testimony, p. 18.)

21. HAR 11-280.1-20(b) provides as follows: “Each tank must be properly designed, constructed, and installed, and any portion underground that routinely contains product must be protected from corrosion...”

22. Corrosion behind the steel liners has been identified. (Navy’s Corrosion Report Exhibit N-040.)

23. Navy Witness Frank Kern testified that: Corrosion repairs are not made to areas behind the steel liner, but to the front (product side) of the steel liner. He states “Corrosion in the tank liners is repaired by adding metal to the liner plates. The entirety of the steel liner is easily renewable in this manner. Since the most recent inspections performed consistently report that corrosion is most prevalent near the upper region of the cylinder, repairing those areas has become the focus. Navy has decided to recoat the entirety of the extension ring, which is the 12-foot upper portion of the cylinder, with a durable and highly flexible material. This will prevent product side corrosion in this region. In addition, Navy will cease filling the storage tanks into the upper dome area. Since this region is an area with a high prevalence of backside corrosion, removing it from service greatly reduces the likelihood of a release for a given tank.” (Navy Witness Frank Kern Testimony p. 28.)

24. Navy Witness Donald Panthen testified that: “With regard to how the facility is operated, the Navy and DLA have also reduced fill in the tanks from 212’ to 190’ or less.” (Navy Witness Donald Panthen testimony p. 21.)

25. Based on the DOH’s consultant’s review of the Navy’s Destructive Testing Report (Exhibit N-040) and the Navy’s own statements and actions with the reduction of operational capacity, there is not sufficient evidence that the tanks comply with corrosion protection requirements.

C. Protection of Human Health and the Environment

26. HRS 342L-4(c) provides as follows:

(c) The director shall issue a permit for any term, not exceeding five years, if the director determines this to be protective of human health and the environment; provided that the permit may be subject to conditions as the director may prescribe. ... The director shall not deny an application for the issuance or

renewal of a permit without affording the applicant an opportunity for a hearing in accordance with chapter 91...

27. Navy Witness Curt Stanley testified that the Navy's groundwater modeling shows that they can "capture" any contamination released from the Tank Farm. (Navy Witness Curt Stanley Testimony, p. 10.)

28. The DOH has issued a number of comment letters on the Navy's conceptual site model (CSM), on which the groundwater model is based and generally describes the site's geology and hydrogeology. In DOH's Evaluation of Groundwater Flow Paths in the Moanalua, Red Hill, and Halawa Regions, Revision 2 by Whitter, R.B., Thomas, D.M., and Beckett, G.D., dated July 11, 2019, the DOH demonstrates that the Navy's CSM is likely flawed and does not adequately reflect the flow and behavior of groundwater in the Site vicinity. DOH concludes,

"The Navy's transient model simulations do a good job of replicating the monitoring well responses to changes in pumping rates at the Red Hill Shaft. This agreement between the modeled and measured data provides confidence that the chosen hydraulic conductivity and effective porosity for the basalt aquifer are reasonably accurate. What the groundwater flow model does very poorly is replicating the relative groundwater elevations within the RHGWMNW [Red Hill Groundwater Monitoring Network], indicating deficiencies in the choice of boundary conditions or values, or the hydraulic conductivity assigned to the non-basalt geologic units. This lack of agreement between the modeled and measured groundwater elevations, particularly at the magnitude of contrasts noted above, suggests that the groundwater model will not reliably reflect groundwater flow, contaminant transport, plume capture or other key risk-based considerations." (BWS Exhibit B-374.)

29. In DOH's PowerPoint presentation titled: Department of Health Red Hill Geology/Hydrogeology -Joint Agency Groundwater Investigations that was presented at Groundwater Modeling Working Group Meeting No. 15 on July 31, 2019 (BWS Exhibit B-372), the DOH identified technical deficiencies in the Navy's CSM and

its geologic framework and the understanding necessary to evaluate groundwater risk and mitigation approaches.

30. Assuming that the Navy’s “capture” model is viable, there is no infrastructure in-place to allow such contaminant capture actions. For example, the Navy’s Tank Upgrade Alternatives and Release Detection Decision Document, dated September 2019, states:

“In the unlikely scenario of a Significant Release from the Facility, there is a high probability of the Red Hill Shaft being directly impacted within a short period of time. The environmental modeling predicts that for any Significant Release to be captured and prevented from entering the public drinking water source, the Red Hill Shaft would need to maintain continuous pumping, and thus would require a water treatment plant to ensure the quality of the drinking water being supplied to Joint Base Pearl Harbor-Hickam (JBPHH).” (Navy’s Tank Upgrade Alternatives and Release Detection Decision Document dated September 2019 Exhibit N-042, p. 28.)

31. The Navy defines Significant (Gradual) Releases as those that occur at rates above 0.5 gallons per hour. (Navy’s Tank Upgrade Alternatives and Release Detection Decision Document dated September 2019 Exhibit N-042, p. 97.)

32. The Navy States that:

“Navy/DLA will determine the feasibility for potential construction of a water treatment plant or equivalent engineering controls for the aquifer below the Facility. No later than 2022, Navy/DLA will evaluate the design, logistics, operations, and sustainment requirements for such a facility in order to estimate the cost and construction schedule. Navy/DLA will incorporate into its evaluation how to best attain future DoD military construction funding, as applicable. All proposed improvements are subject to the availability of appropriations.” (Navy’s Tank Upgrade Alternatives and Release Detection Decision Document dated September 2019 Exhibit N-042, p. 6.)

33. The Regulatory Agencies state that:

“The Navy in the proposed TUA Decision Document has not demonstrated to the Regulatory Agencies that the proposed alternative is the most protective of the groundwater and drinking water resources and other options are either less

protective or impractical; and that the proposed alternative adequately mitigates release risk.” (October 26, 2020 comment letter in response to the Navy’s Tank Upgrade Alternatives and Release Detection Decision Document Exhibit N-075, Attachment A, p. 1.)

34. The Navy’s proposed alternative is the current design and operation as presented in the permit application.

“Navy/DLA have reviewed the TUA Report and have concluded that the most practicable tank upgrade alternative is to retain the reinforced concrete, single-walled steel tank liner configuration, while permanently adopting the significantly upgraded tank CIR [clean, inspect and repair] program, which was adopted after the 2014 release. The tank clean, inspect and repair program is the most effective, cost-efficient, and safe means of ensuring and maintaining the integrity of the steel tank liner.” (Navy’s Tank Upgrade Alternatives and Release Detection Decision Document dated September 2019 Exhibit N-042, p. 10.)

35. Navy Witness Curt Stanley in his testimony states that there is no evidence of fuel impacts near the Navy’s one supply well or at any of the 16 “perimeter wells” (i.e., wells other than the 3 located near the tanks); and that the 2014 release did not impact groundwater beneath the tanks. Stanley testified,

“I think what I said was if you look at the data from the monitoring wells, and you look at the data from the soil vapor probes that, I think, were started in 2008, there's not an indication of fuel impacts in those wells, other than 1, 2 and 3. And 1, 2, and 3 we haven't seen any additional fuel impacts, even including the 2014 release. They were all preexisting prior to this time.” (Transcript, vol.3, p. 727). As referenced, Well 1 (RHMW01) is just southwest of the Tank Farm footprint, while Wells 2 (RHMW02) and 3 (RHMW03) are located within the Tank Farm footprint.

36. The Regulatory Agencies issued a letter dated April 22, 2019 stating that:

“The Navy's groundwater data is of generally good quality, but at the present time is relatively sparse. Given the highly complex subsurface conditions and a low density of monitoring wells at the Red Hill underground tank farm, the Regulatory Agencies will conservatively interpret data to ensure protection of human health and the environment. Although we agree with much of the Navy's interpretations, we continue to believe that the relatively sparse data available at present can also support the following interpretations:

1. Fuel-related detections reported in distal groundwater monitoring wells are potentially associated with releases from the tank farm;
2. Persistent, elevated concentrations of petroleum related contaminants in groundwater and soil vapor at the tank farm are consistent with the presence of a residual fuel source in the formation; and
3. Some fraction of the fuel released in 2014 may have reached groundwater, with the remainder retained as residual in the vadose zone and subject to natural attenuation processes.” (Comments on Environmental Work and Development of the Contaminant Fate and Transport Model for the Red Hill Administrative Order on Consent [“AOC”] Statement of Work [“SOW”] Exhibit B-356.)

37. The Regulatory Agencies also stated that:

“2014 Release Impact to Groundwater: Although the data do not show widespread increases in contaminant levels in groundwater after the 2014 release, the Regulatory Agencies believe there is evidence to suggest that a portion of the 2014 JP8 release may have reached groundwater. First, vapor data indicate possible transport to the northwest outside of the source zone monitoring array. Second, the detection behavior of TPH-diesel and naphthalene at RHMW02 suggests that either dissolved-phase entrainment of petroleum or fuel-related migration to the water table may have occurred near this well. Available data show that the 2014 release did not cause reliable increases in petroleum detections at Red Hill Shaft.”

“Light Non-Aqueous Phase Liquid (“LNAPL”) Presence: Persistent detections of TPH and individual fuel constituents in groundwater are typically interpreted to result from the presence of an LNAPL source. Due to the frequency of elevated detections in RHMW01, RHMW02, and RHMW03, along with the occurrence of occasional detections in distal wells, the Regulatory Agencies conclude it is reasonable to assume that residual LNAPL is present in the subsurface from past releases. Furthermore, despite consensus on the anticipated dilution rates caused at Red Hill Shaft, trace levels of petroleum compounds have been detected in approximately 12% of the samples collected there.⁴ The Regulatory Agencies interpret this information as implying that Red Hill Shaft is a likely receptor, and that some LNAPL mass from the facility may be the cause of those detections. For the Red Hill groundwater system, dissolved-phase fuel impacts are not expected to travel further than approximately 200-ft from the LNAPL source mass, suggesting a relative distance of LNAPL distribution away from the tank farm. This 200-foot estimate is based on Red Hill characteristics reported by the Navy⁵ and is consistent with plume dimension studies.⁶ However, dissolved phase impacts have been detected further than 200 feet from the tank farm, thus atypical transport conditions, such as fast-track transport features (open voids, lava tubes), may also contribute to the detections observed at Red Hill Shaft.” (Comments on Environmental Work and Development of the Contaminant Fate and Transport

Model for the Red Hill Administrative Order on Consent ["AOC"] Statement of Work ["SOW"] Exhibit B-356.)

II. CONCLUSIONS OF LAW

To the extent any of the following Conclusions of Law shall be determined to be Findings of Fact, they shall be deemed as such.

1. Pursuant to HRS chapter 91, HAR 11-1-22, and the Order dated July 14 2020, Regarding Burden of Proof, Producing Evidence and Persuasion, the Navy as the applicant for an underground storage tank permit has the burden of proof, including the burden of producing evidence as well as the burden of persuasion on issues relating to whether the Navy's application for an underground storage tank permit to operate its bulk storage facility at Red Hill satisfies the requirements imposed by applicable laws, rules and regulations and should be granted and, if so, on what conditions.

2. The Navy has not met its burden of demonstrating that the tanks comply with corrosion protection requirements.

3. Given the documented history of releases at the site, the uncertainty associated with the Navy's groundwater model, and the lack of treatment or recovery systems in place to date, the Navy has not met its burden of demonstrating that this facility is protective of human health and the environment from potentially "significant" future releases.

4. Because the Navy has not provided sufficient information, any permit issued would have to include conditions prescribed by the Director under HRS 342L-4 that addressed corrosion protection requirements pending the completion of secondary containment or relocation of the tanks, the uncertainty associated with the Navy's groundwater model, and the lack of treatment or recovery systems.

DATED: Honolulu, Hawaii, July 13, 2021.

/s/ James C. Paige
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DEPARTMENT OF HEALTH
STATE OF HAWAII

In re US Navy's Application for a UST) DOCKET NO. 19-UST-EA-01
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CERTIFICATE OF SERVICE

I HEREBY CERTIFY that on the date indicated below, a true and correct copy of the foregoing document was duly served upon the following persons by email or by placing the same in the United States mail, first class postage prepaid, as follows:

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DATED: Honolulu, Hawaii, July 13, 2021.

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