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October 26, 2020

Captain Gordie Meyer
Commander Navy Region Hawaii
850 Ticonderoga St., Suite 110
Joint Base Pearl Harbor Hickam, Hawaii 96860-5101

Re: Notice of Deficiency for the Tank Upgrade Alternatives Decision Document and New Release Detection Alternatives Decision Document, for Red Hill Administrative Order on Consent Statement of Work Sections 3.5 and 4.8

Dear Captain Meyer,

The United States Environmental Protection Agency ("EPA") and the Hawaii Department of Health ("DOH"), collectively the "Regulatory Agencies," have reviewed *Red Hill Bulk Fuel Storage Facility Administrative Order on Consent Tank Upgrade Alternatives("TUA") and Release Detection ("RD") Decision Document* ("*Decision Document*") dated September 2019 submitted by the U.S. Department of the Navy ("Navy") and Defense Logistics Agency ("DLA") to satisfy the requirements in sections 3.5 and 4.8 of the Red Hill Administrative Order on Consent ("AOC") Statement of Work ("SOW").

Subsequent to submittal of this Decision Document, the Navy hosted a public information workshop on October 15, 2019, and the Navy presented their Decision Document at the Fuel Tank Advisory Committee Meeting on October 17, 2019. The Regulatory Agencies published the Decision Document on our websites, solicited public comments on the TUA and RD Decision Document from September 9, 2019 through December 9, 2019, and held a public hearing on November 19, 2019 at Moanalua Middle School.

Pursuant to section 7(b) of the AOC, the Regulatory Agencies disapprove this submittal and are providing this Notice of Deficiency on the Decision Document. We are granting the Navy and DLA an opportunity to cure the deficiencies and resubmit the decision document. The Regulatory Agencies have determined that the TUA Decision Document lacks detail, clarity, rationale and justification to demonstrate that the actions described in the Decision Document are the best available practicable technology ("BAPT") for the tanks and operations at the Red Hill

facility. While the selection of technologies for release detection seems appropriate, the RD section of the combined Decision Document is deficient because it does not clearly identify how each of the release detection methods will collectively work together to trigger response; what those response actions will be to minimize risk and impact to the drinking water resource; and how the multiple systems will improve overall monitoring, accuracy, redundancy.

The expectations for the Decision Document were discussed among the parties during our Decision Meetings held pursuant to sections 3.4 and 4.7 of the AOC, as well as provided in letters dated March 7, 2018, May 21, 2018 and May 16, 2019 for TUA and letters dated August 30, 2018 and November 29, 2018 for RD. For example, we discussed the need for analysis of relative environmental performance of upgrade options, expected life of upgrade and improvement options, demonstration that the selected option is protective of the drinking water resource, and optimization of release detection and release response measures to bound maximum volume of fuel released to the environment in the event of an emerging leak. We also asked the Navy to consider contingency measures such as water treatment that can be implemented to assure clean available drinking water as a precaution, regardless of TUA selection. These issues were not adequately addressed in the Decision Document. Therefore, we are providing this Notice of Deficiency and opportunity to cure the TUA and RD Decision Document. The list of deficiencies associated with the TUA and RD portions of the Decision Document is included as Attachment A.

The primary objective of the work required by the Red Hill AOC is to identify the BAPT to improve the Red Hill facility, which is supported by various studies (as provided for in Sections 2, 4, 5, 6, 7, and 8). Greater integration and understanding of the overall objective in completing the individual studies will help the Navy and DLA reach this overall objective. As addressed in AOC page 2, *" The primary objectives of this AOC are to take steps to ensure that the groundwater resource in the vicinity of the Facility is protected and to ensure that the Facility is operated and maintained in an environmentally protective manner."* The Regulatory Agencies believe that the most important improvements are those procedural changes and infrastructure upgrades that mitigate risk to the drinking water resources from future releases.

During the public comment period, the Regulatory Agencies received approximately 411 written comments along with 45 oral comments presented at the public hearing. Most comments were not in support of the Navy and DLA's proposed tank upgrade alternative with a few comments on release detection. Nearly half of the comments suggested relocating the fuel storage. Other comments indicated that the proposal does not call for major changes, or stated that the tanks are leaking, are at the end of service life, will leak under the current operational and repair protocol, and/or that the proposal does not address the risk to drinking water. A document summarizing the comments we received along with our overall response to these comments is included as Attachment B.

The Regulatory Agencies believe that certain near-term aspects of the Decision Document submitted in September 2019 are prudent, and we recommend the Navy move forward to implement those actions that reduce risk at the facility. Examples of the near-term proposed actions include installation of high precision leak detection hardware in each tank and

decommissioning of the smaller tank nozzles as part of the ongoing tank inspection and repair process. Although these actions alone are not considered BAPT by the Regulatory Agencies, the Regulatory Agencies encourage the Navy to implement presumptive risk reduction actions once identified on an ongoing basis in order to strive for continuous risk reduction.

Pursuant to AOC section 7(b), the Navy and DLA are being given the opportunity to cure and resubmit the Decision Document. The Regulatory Agencies recognize that many of our issues with the collective Decision Document may require substantial effort and time to address beyond the standard thirty (30) day opportunity to cure established in the AOC. Therefore, if preferred, the Navy/DLA may choose to submit the revised RD Decision Document separately from the TUA Decision Document provided that actions specified in the RD Decision Document are not dependent on the TUA selection, and any TUA dependent RD options are discussed specifically in the TUA Decision Document. If the Navy and DLA cannot correct the deficiencies and resubmit the Decision Document within thirty days, the Regulatory Agencies require the Navy and DLA to participate in a meeting with the Regulatory Agencies within thirty days to review this decision letter to present a plan and schedule for addressing the deficiencies for Regulatory Agency Approval.

If you have any questions, please contact us.

Sincerely,

Steven Linder, P.E.
Red Hill Project Coordinator
EPA Region 9

Roxanne Kwan
Interim Red Hill Project Coordinator
State of Hawaii, Department of Health

Enclosures: 1. Attachment A – Identified Deficiencies, Tank Upgrade Alternatives and Release Detection Decision Document

2. Attachment B – Red Hill Tank Upgrade Alternative and Release Detection Proposal, Response to Comments

ATTACHMENT A

IDENTIFIED DEFICIENCIES
TANK UPGRADE ALTERNATIVES AND RELEASE DETECTION
DECISION DOCUMENT

Part 1: Comments Related to the Tank Upgrade Decision Document

No Clear Nexus Between Proposed Decision and Protection to Drinking Water Aquifer

The objective of the Administrative Order on Consent (AOC) is to study the Red Hill facility and its environmental setting to determine the best available practicable technology (BAPT) and practices that should be used at the facility to mitigate risk from potential future releases and provide the best protection to drinking water resources. In the Environmental Protection Agency (EPA) and Hawaii Department of Health (DOH) (Regulatory Agencies) letters dated March 7, 2018 and reiterated in May 16, 2019, we specified that the proposed BAPT must demonstrate that groundwater and drinking water resources are protected. 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. Evaluations utilizing information gained from other sections of the AOC, such as release detection, groundwater, and risk assessment should be incorporated into the justification.

Instead, page 28 of the Decision Document 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)."* Page 97 of the Decision Document defines Significant (Gradual) Releases as those that occur at rates above 0.5 gallons per hour. The Regulatory Agencies consider the water treatment to be a contingency release response measure and therefore, for the purposes of comparing TUA options, discussion on the related impacts to groundwater and drinking water resources should be provided without this reliance.

Insufficient Comparison of Environmental Performance and Justification of BAPT

The Navy has not adequately discussed the environmental performance of the proposed decision in comparison with the other TUA options. In other words, the Navy has not adequately discussed potential mitigation measures of the proposed alternative in comparison with other alternatives related to protection of groundwater. For a TUA option to be considered BAPT, the Navy needs to demonstrate in the Decision Document that the proposed decision outperforms the other practicable options considered. For example, if secondary containment options outperform single walled options, then to eliminate the secondary containment options, including new tank option, the Navy needs to demonstrate that each of

these secondary containment options are impracticable. If an option is determined impracticable, then the corresponding trade-offs with respect to environmental protection should be discussed.

As discussed in the Regulatory Agencies' letter dated March 7, 2018, we requested that the comparison of environmental performance not only consider the tank vessel and other aspects of the fuel management system, but also the environmental performance during all modes of operation (i.e., recommissioning, static storage, transient storage), and from different release initiating events. This assessment of environmental protection should be more detailed and include a discussion of how each alternative would perform relative to risks of minor, significant, and catastrophic releases and under all modes of operation.

Some of this information is provided in a qualitative manner in Appendix C of the Decision Document, explaining that minor releases are better contained in secondary containment options than the single wall options, but did not expand in detail significant releases or catastrophic releases or attempt to quantitatively demonstrate potential impact or consequence to groundwater. Use of hypothetical release scenarios for the various modes of operations and type of release (affecting release rates), could be used to assist in estimating potential release volumes (bounding estimates) for each TUA options for comparison purposes.

In addition, the Regulatory Agencies note that not all similar options will have the same environmental protection and should be discussed. For example:

- Per *Red Hill Repair Tanks Options Study FISC Pearl Harbor, Hawaii, Final Report, September 2008,* page 13, *"Visual detection of a leak is the fastest way to detect leaks. Detection by electronic leak detection systems may have a significant time delay before a leak is detected."* Only one TUA option provides this capability to visually inspect the outer tank wall and provide secondary containment.
- Additionally, two of the assumptions the Navy has applied to the TUA Decision Document (page 14 of the Decision Document), infer that all proposed TUA options, including new construction, would have the same environmental performance during both a kinetic attack or a major seismic event without justification. More supporting information and engineering justification need to be given before these assumptions can be made.

Information gained from all other sections of the AOC should be utilized to best complete the comparison. Where there is uncertainty regarding potential impact, especially with incomplete work in other sections, greater conservatism is warranted in the selection of the TUA proposal and identification of BAPT. Following are more specific comments regarding the TUA evaluation.

Incomplete Analysis of Alternatives and Missing Information

<u>Limitations of the NDE Process and Concerns Related to Corrosion Should Be Addressed</u>
The Navy's Tank Inspection Repair and Maintenance (TIRM) program depends on Non-Destructive Evaluation (NDE) to locate areas of the steel liner that requires repair. Among the assumptions the Navy has applied to the TUA Decision (page 14 of the Decision Document), is that the *"4. NDE is a reliable method for detecting corrosion in the tank liner."* However, the Navy noted on page 86 of the Decision Document that, *"Given the destructive testing results, the Navy is investigating alternatives to improve scanning. The report contains additional recommendation which will be considered by Navy's experts in the continual improvement of TIRM Procedures, including:*

1. *Analysis of the corrosion rate calculation procedures and recommendations for improvement;*
2. *Evaluation of results against current corrosion mitigation practices;*
3. *Recommendations for modification or improvements to TIRM Procedures; and*
4. *Recommendations for additional destructive testing."*

The Regulatory Agencies in our *Response to Corrosion and Metal Fatigue Practices, Destructive Testing Results Report, Red Hill Bulk Fuel Storage Facility (Red Hill), Joint Base Pearl Harbor-Hickam, Oahu Hawaii,* dated March 16, 2020 letter in response to the Navy's *Corrosion and Metal Fatigue Practices, Destructive Testing Results Report, Red Hill Bulk Fuel Storage Facility* report dated July 7, 2019 ("Destructive Test Report"), did not agree with the Navy's conclusion that the NDE results are validated, both by Destructive Testing and thorough, case-by-case analysis, and are requiring additional studies. The additional studies that the Regulatory Agencies are seeking are related to improvements on the NDE process, analyses on the condition of the concrete structure and imbedded steel, evaluation of potential causes for corrosion and possible mitigative actions to reduce corrosion rates, and reassessment of repair thresholds to account for inaccuracies in the NDE process, corrosion rates, and possible delays in repair cycles.

While this work is being performed, the concerns raised in our March 16, 2020 letter should be addressed in evaluating TUA options and comparing environmental performance. For example, the Decision Document should explain:

- How the risk due to limitations of the NDE process to detect back side corrosion and weld flaws that could develop into a leak through the steel lining will be addressed; and
- How risk from potential increased back side corrosion of the steel liner, which may be due to lower pH and concrete passivation loss (indicative of a corrosive environment) will be mitigated.

<u>Military and Industry Standards Do Not Necessarily Equate to BAPT</u>

Standards, such as API 653 And MIL-STD-3007F can be useful guidelines in efforts to design, operate, and maintain fuel storage facilities. However, in order to meet the AOC objective of implementing the BAPT at Red Hill, the Decision Document needs to clearly describe the nexus between these standards and the BAPT, considering the Red Hill facility is a unique facility where many of these standards are not directly applicable.

<u>Evaluation of Operational Life and Associated Cost Estimates</u>

The selection of the alternative that represents BAPT shall be based on several factors listed in the AOC Statement of Work (SOW) section 3, including but not limited to *"… (3) the anticipated operational life of the technology; and (4) the cost of implementing and maintaining the technology."* The anticipated operational life of each of the options were not discussed in the Decision Document, except for the brief mention on page 32 of an asset study, which to our understanding has not yet been performed. The cost estimates provided on page 31 of the Decision Document only include the initial costs incurred for the implementation of each of the options and does not consider the operational life of each alternative or operation and maintenance (O&M) costs. Incorporating the amortization of capital costs over the operational life of each option, as well as all O&M costs, including those for tank inspection and repair, into the cost analysis will likely provide a better comparison of costs.

It is possible that the New Tank option could be the most cost-effective approach to achieving long-term fuel storage and environmental protection goals. Although the Navy does include a discussion of new

tanks in Appendix C, this evaluation is limited and does not identify all potential environmental protection advantages of new infrastructure. A cost comparison that is not limited to capital costs is particularly important when comparing the New Tanks alternative to the alternatives that utilize the existing tanks as either primary or secondary containment since new tanks would have greatly reduced O&M costs and reduced potential for resource damage costs.

Implementation Schedule for BAPT

Section 3.5 of the AOC SOW states, *"The TUA Decision Document shall define and specify the:…(4) plan and schedule for implementation of the BAPT setting forth the order and schedule that Tanks shall receive BAPT, including a schedule for the start of each tank's budget planning cycle…"* While we have a schedule from the TIRM decision document, the TUA decision document does not clearly state the tank order and schedule for implementation, in relation to contract. The Regulatory Agencies note that the TUA Decision Document may be revised under Section 3.7 of the AOC SOW, and tanks that have already begun their budget planning cycle for a previously approved BAPT, but have not completed installation of that BAPT, shall continue with installation of the previously approved BAPT unless all parties agree to a revised schedule for installing the new BAPT on those tanks. Given the relationship between the implementation of the selected BAPT to the current contract schedule, and to the planned update to the TUA Decision Document, a schedule with all of these components shall be provided in the TUA Decision Document.

Performance Criteria for BAPT

Similarly, Section 3.5 of the AOC SOW states, *"The TUA Decision Document shall define and specify the: … (5) overall performance criteria for successful application of BAPT. The TUA Decision Document shall either incorporate the TIRM Procedures Decision Document approved by the Regulatory Agencies in Section 2 above, or, consistent with the BAPT identified, incorporate a modified TIRM Procedures Decision Document."* Because only a general assessment of environmental performance is provided, the performance criteria for the proposed BAPT or a comparison with other alternatives have not been provided. In addition, with the information provided, it is unclear the specific changes to the currently approved TIRM Report that the Navy is seeking. This should be more clearly defined.

Experimental Pilot Project to Fully Coat Interior Surface of a Tank Requires Detail

On page 13 of the Decision Document, under "Additional Improvement—Mid-Term/Long-Term," the Navy proposes to evaluate fully coating the interior surface of one tank as a pilot, if laboratory testing, to be completed by the end of September 2019, indicates the coating could act as a hydraulic barrier/liner and provide corrosion resistance. The Regulatory Agencies recognize that this is not a commitment to a proposal, nor a formal request for a pilot program. Should the Navy decide to pursue a pilot, information required under Section 3.6 of the AOC SOW shall be submitted for review by the Regulatory Agencies. Such information includes but is not limited to the overall operational design of the pilot program; the technology and procedural aspects of the pilot; and the performance criteria and method of evaluating the success of the pilot program. Any proposal for a pilot shall also describe how the action will mitigate risk to the environment.

The Regulatory Agencies note that the proposed epoxy coating will not address backside corrosion concerns on the steel liner but may potentially seal porous welds and other small defects, as is currently applied to new weld joints during the clean, inspect, and repair process.

The Navy's "Double-Wall Equivalency Secondary Containment Or Remove Fuel From Red Hill In Approximately the 2045-Time Frame" Requires Further Discussion

This proposal is provided under "Studies Concerning the Future of the Facility," on page 31 of the Decision Document. It is not tied to any TUA option currently before us, and therefore is not clear how this plan is intended to be implemented. If the Navy wants to incorporate this concept in a future submission as a new TUA option, please consider the following:

1. Double-wall equivalency secondary containment needs to be defined. There are regulatory definition and requirements for secondary containment. The objective of secondary containment for underground tanks is risk mitigation. Secondary containment has the potential to contain both acute and chronic releases. As we have previously specified as our expectation for comparative environmental performance, the Navy must present a detailed comparison of how the proposed secondary containment equivalency will perform against the other options, including the secondary containment options. If equivalent risk mitigation measures cannot achieve that of secondary containment, then the Navy needs to clearly define and justify their alternative plan and schedule to achieve risk mitigation adequate to protect the water supply. All other required information necessary to compare this option with the other proposed TUA options must also be provided.
2. Section 3.5 AOC SOW specifies that all tanks in operation shall have deployed Regulatory Agencies' approved BAPT by September 2037 or be taken out of use, temporarily closed, and emptied of all regulated substances or permanently closed pursuant to applicable regulations or as approved by the Regulatory Agencies. Currently, the 2045-time frame does not appear to comply with section 3.5 AOC SOW agreed upon deadline for BAPT tank compliance.
3. State of Hawaii UST regulations (section 11-280.2-21(c)) for airport hydrant fuel distribution systems and UST systems with field-constructed tanks require by July 15, 2038, that *"…tanks and piping installed before the effective date of these rules must be provided with secondary containment that meets the requirements of section 11-280.1-24 or must utilize a design which the director determines is protective of human health and the environment…"*. Similarly, there is no information to support that this proposal will comply with state regulations.

Part 2: Comments Related to the Release Detection Decision Document

Justification on the Selected Combination of Release Detection Systems is Required

Release detection is a critical aspect of risk management at all underground storage tank facilities. The AOC requires the Navy and DLA to summarize their current release detection practices and investigate opportunities to improve their release detection practice to better the Red Hill Bulk Fuel Storage Facility's ability to operate in an environmentally protective manner. The Navy has proposed the following as their improved release detection system:

- Install permanent enhanced release detection equipment in order to have the ability to run as many tank tightness tests as desired. Currently the facility is conducting tank tightness testing at a semi-annual frequency.
- Install slots in stilling wells to improve precision of existing automatic tank gauging (ATG) system with automatic fuel handling equipment (AFHE).
- Conduct a real-time soil vapor monitoring pilot project.
- Continue to install additional groundwater monitoring wells.

- Continue environmental sampling—soil vapor, oil/water interface measurements, and groundwater samples.

Release detection methods should provide the earliest possible detection of a release in order to quickly implement mitigation (release response) measures and minimize impact to the environment. Thus, detection and mitigation of the release is preferred to be addressed before impact to groundwater. The Decision Document does not clearly describe release detection options explored and the basis for the selection of these collective systems.

Greater Detail on the Integration of Release Detection Systems is Needed

The Decision Document should clearly describe how the new enhanced release detection will be implemented and integrated with the other release detection systems (inventory and soil vapor monitoring). This should include specifics on monitoring hardware, data collection, and operations. The proposal should also describe the performance goals of the system and how this new system, along with other existing and proposed systems that provide indications of a suspected release, will be used as multiple lines of evidence in an overall release detection and response system, and comply with UST regulations.

Similarly, the inventory monitoring system is a critical component of the Release Detection at the facility, the Decision Document should include greater detail that describes the improvements to the inventory system, its performance goals and how this improved system will be integrated with the overall release detection and response system.

In addition, the Navy should explain how vapor monitoring will be used as another line of evidence for release detection, which the Regulatory Agencies believe is more sensitive than inventory monitoring and can be used more frequently than precision static tightness testing.

The frequency of precision release detection tests (tank tightness tests) and the basis for this frequency need to be clearly defined and justified in the Decision Document. Higher frequency will result in a greater degree of risk mitigation; however, in order to conduct a precision test, the tank being tested needs to be isolated to insure an accurate test. This testing interrupts normal operations, so the Navy needs to evaluate the trade-off between frequency and operations to justify proposed frequency. Additionally, the Decision Document also needs to clearly describe the types of conditions or indications that would require additional precision testing (for example, in response to alarms and when soil vapor measurements show an increasing trend). UST regulations require all suspected releases to be confirmed within seven days. Investigations and confirmation require a system test (tanks and piping tightness test) or another procedure approved by the Department of Health.

The Decision Document should present clear release detection and response decision trees that establish inspectable and auditable records of release detection system alarms or other indications of a suspected release. This should include the details of causative research that is triggered with alarm, actionable thresholds or unusual operating conditions. The decision tree should describe what actions are automatic versus what actions rely on the judgement of specialized operators. The Decision Document should describe how data indicating suspected and confirmed releases will be shared with the regulatory implementing agency (DOH). The proposed decision should analyze the timeline for providing this information to the implementing agency and clearly describe the causative research (tests) completed as timely as possible, including an option for real-time alarm reporting.

Effectiveness of the Improvements to the Overall Release Detection System Should be Quantified

The Decision Document should describe the effectiveness of the integrated system. For example, describe how the integrated release detection system affects precision and accuracy and how they will be used to reduce thresholds for alarms and action triggers such as in unscheduled fuel movement alarm thresholds. This discussion should include any limitations on the system such as limitations during transient conditions after a fuel movement and limitations caused by the unique hemispherical tank bottom.

Explanation of New Soil Vapor Concentration Thresholds and Basis to Discontinue Trend Evaluation is Needed

The Navy proposes to continue monthly soil vapor monitoring (SVM), but with reduced soil vapor thresholds from 280,000 parts per billion of volatile organic compounds by volume (ppbv) to 50,000 ppbv for tanks with jet fuel and from 14,000 ppbv to 8,000 ppbv for tanks with marine diesel. Based on the 2014 release, the Regulatory Agencies agree that the existing 280,000 ppbv action level is too high and needs revision; however, the selection of the new values and how they will be used to trigger action requires further discussion.

Page 23 of the Decision Document states, *"The existing protocols for evaluation of soil gas monitoring events uses a concentration trend methodology to trigger causative research."* The document does not define what "causative research" entails. The document further states, *"In addition, the 2014 release from Tank 5 was detected as part of inventory control reconciliation. The leak would not have been detected for several months using only the trend-based soil gas monitoring. Use of the 50,000 and 8,000 ppb thresholds for jet fuel and diesel fuel, respectively, would have allowed the release to be detected sooner and independent of inventory control measures. Based on 10 years of monitoring, the concentration trend evaluations do not appear to be useful for identification of possible fuel releases, and therefore will be discontinued."*

The Regulatory Agencies agree that soil vapor monitoring with improvements can potentially provide early detection of a release. For example, on December 9, 2013, Tank 5 refill operations started. On December 23, 2013, routine SVM showed a four to five-times increase in soil vapor levels in SV-5M and SV-5D (the middle and deep probes) in comparison to the average of the previous six months' data. On December 10, 2013, the first Unscheduled Fuel Movement (UFM) alarm went off. From January 13 -17, 2014 the tank was drained. On January 15, 2014 and January 31, 2014 SVM levels were as much as 350 times higher than the December 23, 2013 results. Therefore, SVM can provide another line of evidence of a release, and if done more frequently, could be more sensitive than inventory monitoring.

However, it is unclear why concentration trend evaluation will be discontinued. The Navy, in the Decision Document should explain the basis for this change. Rather than a fixed action level (thresholds), it appears that comparison of soil vapor measurements for a specific probe to the statistical background concentration for the specific probe that accounts for variations in existing conditions, similar to a concentration trend evaluation, would better account for the varying environmental conditions surrounding each probe (porosity, historic fuel release) that could impact the data, and its interpretation. Then, similar to the description in the Decision Document, any detection above a statistically significant increase would trigger the collection of a soil vapor sample to determine whether the detected vapor is fresh or weathered. An on-site gas chromatography/mass spectrometry unit could expedite results and associated release response actions, as needed.

In addition, based on our review of data collected since 2005, DOH observations of the current SVM program, and upon discussions with the Navy's contracting Officer Technical Representative, we believe

that current data collection can be improved. While a detailed discussion of the deficiencies in the current monitoring program is outside of the scope of this letter, the rehabilitation of inoperable probes and implementation of a better quality assurance protocol will reduce random and systematic sampling and analytical errors.

Greater Detail on The Real-Time Soil Vapor Continuous Monitoring Pilot Study is Needed.
Real-time soil vapor monitoring can be an important source of information for an overall leak detection system and the Navy proposed implementing a continuous soil vapor monitoring pilot test. The pilot will consist of a monitoring system for one to three tanks using an auto-sampler PID. Results would be documented over six months to one year. However, the goals and details of a pilot program are not provided with sufficient detail.

- The Navy should develop goals and procedures for this pilot study in consultation with the regulatory agencies and other critical stakeholders.
- The performance criteria and method of evaluating the success of the pilot program; and a plan for terminating the pilot program should be clearly defined.
- The pilot proposal should clearly define the details of causative research tests or actions. For example, what constitutes an "outlier" versus what is statistically significant? More frequent readings will certainly give more volatility than a monthly sampling, which may be addressed through statistical calculations. How will the pilot study handle inconsistencies with monthly monitoring? What would a causative decision tree look like with a continuous monitoring approach compared to the monthly monitoring?
- The Regulatory Agencies' comments on the current SVM program should be considered in developing the scope of the pilot project.
- A proposed implementation schedule should be provided.

A Detailed Release Response Action Plan Needs Be Included in the Decision Document

Ability to identify and respond rapidly to indications of a release is critical to effective risk mitigation. In the event of a confirmed release, the Navy will need available ullage to quickly drain the tanks and prevent more fuel to release into the environment. The Decision Document mentions having available ullage, but is silent on how this response process will be implemented.

The Decision Document should describe in quantitative terms the response procedures and timelines, and how these procedures are optimized in order to achieve effective risk mitigation. For example, this description should include:

- When a drain down is warranted or when a tank tightness test should be initiated. This should include how the multiple lines of evidence related to release detection will be utilized in an objective manner to trigger an immediate response action such as drain down, or how the integrated release detection system consisting of vapor monitoring, inventory monitoring, visual inspections, manual gauging, will trigger one another or the initiation of a tank tightness testing.
- New procedures that allow operators to transfer fuel out of a tank within 36 hours. Although mentioned on page 11 of the Decision Document, there is no information to substantiate this duration. Contradictory to this claim, on page 183 of the *Navy's New Release Detection Alternatives Report*, dated July 25, 2018, two hypothetical release response scenarios referenced longer time frames for emptying a tank (96.3 hours and 118.6 hours). A clear description of the improvements made/proposed that allow for this significant improvement should be provided.

After the 2014 release from Tank 5, the draining process took approximately 5 days, January 13-17, 2014. If spare ullage is not available, draining could take longer.

- Bounding estimates of possible release volumes based on the release response plan for various release scenarios (minor, significant, and catastrophic).
- A detailed description of training and drills to be implemented to assure that the release detection and response procedures are effective and will perform as planned.

Evidence is Needed to Support the Claim that Minimal Contamination will Result from a Minor Release.

The Navy claims that even in the unlikely event of a minor release, the multiple layers of release detection listed in the Decision Document will be able to detect releases and, because of their response action plans, there will be minimal contamination allowed into the environment. The Decision Document does not provide sufficient information to make this case and should be revised to provide quantitative analysis and evidence of this risk mitigation achieved through these improvements. Bounding estimates of possible release volumes based on the release response plan for various release scenarios, as mentioned in the previous comment, can help with this illustration. In addition, if damages occur, what plans are in place to address potential resource damages?

Minor releases are defined on page 97 of the Decision Document as releases occurring at rates less than 0.5 gph (or 4,380 gallons per year). Questions remain about how quickly the Navy would be able to respond to various types of releases and mitigate the release.

Significance of Slow Chronic Fuel Seepage Below the Tank Tightness Testing Threshold is not Addressed.

The Navy's release detection testing demonstrated that commercial technologies exist that can detect releases at rates as low as 0.5 gallons per hour or 4380 gallons per year. The release that occurred in 2014 was much larger than this, with a loss of about 27,000 gallons in a month or an average rate of around 37 gallons per hour. Along with the tank tightness testing on a periodic basis, other information that allows for detection of leaks includes the near continuous inventory monitoring system along with periodic soil vapor measurements.

However, even with all these release detection systems, slow chronic leaks can go undetected. This concern is most significant with single walled systems. The Decision Document does not adequately analyze the significance of this concern and describe the potential environmental consequences of this limitation and potential mitigation measures.

Response Actions and Related Environmental Impact from a Significant Release is Needed.

The Decision Document, page 97 states, "*The early detection and mitigation of a Significant (Gradual) Release is critical for minimizing the overall volume and subsequent impact of any release. Currently, groundwater modeling suggests any Significant (Gradual) Release could eventually be treated at a Red Hill Shaft water treatment plant without posing risk to the public drinking water source*." The document does not attempt to quantify potential volume of release based on release response measures but relies on a water treatment system at Red Hill to ensure available drinking water. Because of this reliance, the RD Decision Document should include specifics about the timeframe for evaluation, design, and construction

of the water treatment system. If the Navy cannot proceed directly to design of a system, the Decision Document must adequately describe the uncertainty related to the ability to design and construct a treatment system that justifies the need for a feasibility study, and discuss the related impacts for not having a water treatment system in response to a release.

The Regulatory Agencies note that the degree of capture at Red Hill Shaft for a range of possible release scenarios has not yet been fully evaluated and remains unclear whether it is an adequate measure to prevent impact to other receptors.

Increase Transparency of Data Related to Release Detection to Build Greater Public Confidence in the Operational Integrity of the Red Hill System.

Navy should consider publishing data on groundwater monitoring and release detection on their website on an ongoing basis to increase transparency to build public confidence.

Part 3: Fail-Safe Water Protection Strategy

The Overall Strategy Needs to Provide a Fail-Safe Plan for Water Protection

The overall objective of both DOH's and EPA's underground storage tank programs is to protect human health and the environment from releases at underground storage tank facilities. This is accomplished by requiring prevention, detection and response systems. Our objective is to prevent all releases, but this is not always possible.

Given the importance of the aquifer below the Red Hill tanks as a major source of drinking water for Honolulu, the Navy needs to establish a contingency strategy to assure no impairment of drinking water quality and no disruption in drinking water availability. This fail-safe protection strategy should be presented in the TUA and Release Detection Decision Documents.

ATTACHMENT B

RED HILL TANK UPGRADE ALTERNATIVE AND RELEASE DETECTION PROPOSAL, RESPONSE TO COMMENTS

Contents

Tank Upgrade Alternatives (Tank Upgrade) Option Comments

General Proposal Comments

Proposed decision document lacks discussion of alternative courses of action – The Regulatory Agencies seek a revised Decision Document that adequately evaluates alternatives and compares the relative environmental benefits/risk reduction of the various options along with other factors to frame the basis for a decision.

The Navy's tank upgrade proposal fails to meet the requirements of Federal and State law – The EPA does not agree that the proposal would lead to an option that violates federal law. However, if the Navy is unable to demonstrate the proposal is protective of human health and the environment, then they may be in violation with state regulations if they continue operation without secondary containment after July 2038.

The Navy's Decision Document suggests the proposed tank upgrade should provide sufficient protection – What is meant by sufficient protection is not clear in the comments. The Regulatory Agencies suggest that sufficient protection is engineering, operational, and institutional safeguards that prevent adverse consequences to the drinking water supply and minimize future releases from the Red Hill facility.

National Security is not a justification for maintaining the presence of the Red Hill tanks – Determining the need for National Security assets is outside of the scope of EPA's or DOH's responsibility.

Reject Proposal / Not 1A (over 50% of the comments)

The Regulatory Agencies should reject the Navy's proposed option 1A for upgrade of the tanks – The Regulatory Agencies are requiring the Navy to revise and resubmit the submitted document, as the Decision Document does not provide adequate justification that the proposed improvements to the tank and leak detection systems are the best available practicable technology ("BAPT"). Therefore, the Regulatory Agencies are instructing the Navy and DLA to conduct additional analysis and submit a revised Decision Document to present a BAPT approach that is protective of the environment.

However, several aspects of the proposal do contain actions that will likely reduce threat to the environment. The Regulatory Agencies are encouraging the Navy and DLA to implement these actions as soon as possible.

The tanks have leaked and will continue to leak under option 1A actions. Many of the actions in the proposal are already occurring independent of the AOC. And more significant actions are not planned and are limited to studies and pilot projects. – The Regulatory Agencies agree that more specificity and clear commitments are necessary for risk reduction actions such as the Navy's mention of continuous leak detection, water treatment, and tank liner improvements. The Regulatory Agencies do believe that many of the ongoing improvements are a direct result of the work required under the AOC. The Regulatory Agencies have and will continue to encourage the Navy to make continuous improvements to the facility and not wait for approval under the AOC.

Secondary Containment

The Regulatory Agencies should require Red Hill to upgrade with secondary containment – The Navy must first demonstrate the relative environmental benefits of each option as well as present a

discussion on each option's viability. Based on this evaluation, the Navy then selects the BAPT for the Regulatory Agencies' approval. Based on the Decision Document submitted, the Regulatory Agencies believe that the Navy did not provide adequate analysis or justification for their selection. The Navy has only provided generalized statements that there are substantial constructability risks associated with retrofitting secondary containment into the existing tanks.

Therefore, the Regulatory Agencies are seeking greater analysis on design and implementation issues related to a secondary containment retrofit in order to understand how environmental performance of this approach compares with other approaches to safeguarding drinking water supply and quality.

The term "double wall equivalency" needs to be clearly defined – The Regulatory Agencies agree that for the purposes of a proposed tank upgrade decision, the document needs to include a clear definition of what is meant by "double wall equivalency." Underground storage tanks with double walls are typically designed to meet regulatory secondary containment requirements. Secondary containment means a release prevention and release detection system for a tank or piping. Typically, this type of system has an inner and outer barrier with an interstitial space that is monitored for leaks.

The Navy needs to implement the Fuel Tank Advisory Committee recommendation to select either the double wall or tank in a tank options – The Fuel Tank Advisory Committee is an important meeting to provide legislators, the public and other stakeholders an update of the work performed and the status of ongoing studies. Although some members of the committee may have concluded that the double wall or tank in a tank option is the best upgrade for the facility, it is not an official determination made by the committee.

Short of relocation, secondary containment is the most protective way to contain a release from a tank and provides the best chance of surviving a catastrophic event – Under certain conditions, such as degradation of the internal liner, secondary containment would likely improve performance. But many other operating conditions need to be assessed in order to understand how secondary containment may perform compared to single containment. The Decision Document does not adequately compare the relative environmental performance among the single and secondary containment options and therefore, is one of the reasons for which we are requiring the Navy revise and resubmit their Decision Document.

Adding a second wall to the inside of the tanks will not stop the corrosion of the outer wall – If double walled tanks becomes the proposed decision, the Navy needs to clearly address how the exterior corrosion will be controlled and managed long-term, and if double wall will be constructed, how the exterior corrosion will impact construction and long term operation and maintenance.

Timeline too long

The process to select upgrade requirements and improve Red Hill is taking too long – The Regulatory Agencies agree that the process to develop Red Hill studies and select plans for improvements is taking longer than anticipated. Progress has been slowed by Federal contracting constraints, personnel turnover, and quality issues with studies. However, many risk reductions actions have already been put in place at Red Hill in response to the AOC process and public stakeholder concerns. For example, repair quality assurance and tank monitoring during the fill process after repairs has been significantly improved to prevent the failures that contributed to the size of the 2014 release.

Implement improvements sooner than 28 years – The AOC indicates that all tanks in operation will deploy Regulatory Agencies' approved BAPT by September 15, 2037. Thus, the Regulatory Agencies are also concerned about the extended time frames the Navy is suggesting to implement a tank upgrade option and we will be working diligently with the Navy to implement BAPT at Red Hill as quickly as practicable.

It should be noted that the Regulatory Agencies are working with the Navy to institute numerous risk reduction improvements at Red Hill on an ongoing basis. Changes to the tank vessel itself is just one of many issues being evaluated for risk reduction improvements. In 2014, the leak was primarily caused by human error. Many changes have already been implemented to reduce chances that human error will cause a significant release during tank filling and operations.

Risk Assessment and TIRM

The current tank inspection, repair, and maintenance (TIRM) protocols are not sufficient to address risk – The Regulatory Agencies continue to instruct the Navy to study their TIRM and propose changes in order to improve its efficacy in managing risk and strive for continuous improvement. For instance, the Regulatory Agencies in our *Response to Corrosion and Metal Fatigue Practices, Destructive Testing Results Report, Red Hill Bulk Fuel Storage Facility (Red Hill), Joint Base Pearl Harbor-Hickam, Oahu Hawaii,* dated March 16, 2020 letter in response to the Navy's *Corrosion and Metal Fatigue Practices, Destructive Testing Results Report, Red Hill Bulk Fuel Storage Facility* report dated July 7, 2019 ("Destructive Test Report"), are seeking improvements on the non-destructive examination (NDE) process, an integral part of the TIRM protocol. While important, TIRM is only one of several risk management aspects of the Red Hill risk management practices that are a focus for improvements.

The Navy neglects to consider tank degradation – The Regulatory Agencies agree that tank degradation (operational life of the tanks) needs to be considered in the decision-making process. The Navy should do a more thorough analysis of how potential degradation in the future will impact tank performance.

The Navy's Proposed Tank Upgrade Decision is inconsistent with their risk assessment – The Navy's Phase I risk assessment provided limited insight into risk at the facility. Further risk assessment is ongoing. However, some of the insights gained from the Phase I assessment have been used to develop mitigation measures described in the Decision Document such as decommissioning of the smaller tank nozzles. The Regulatory Agencies agree that the Proposed Decision Document should address and incorporate findings from all studies that have been performed under the AOC, which is one of reasons that the agencies have found that the document requires revision and resubmission.

The Navy's risk assessment provides release probabilities that justify rejection of proposal – The Navy's Risk Assessment is based on infrastructure and operations that were in affect as of July 27, 2017. The Regulatory Agencies agree that for comparison purposes, having the identified component failures described in the Navy's Risk Assessment, with a description of the improvements made and proposed, and how the corresponding actions have or will reduce potential risk and release probabilities for future releases, would be useful.

Tank tightness testing was not effective because the 2014 release occurred

Tank tightness testing in general is an effective method of release detection, but only during static fuel storage conditions.

During the 2014 release, Tank 5 was in the process of being filled with fuel after the repairs were completed. Tank Tightness testing cannot be done during dynamic filling. The flaw in repairs leading to the leak was discovered during the filling process as the tank was being brought back into service. At that time, the filling process did not have adequate safeguards in place.

The Navy has since updated their filling and return to service procedures, with the addition of incremental filling, fuel level stabilization, and multiple tank tightness testing at multiple stages.

Shut Down the Facility

The Regulatory Agencies should require relocation of the Red Hill tanks / the Regulatory Agencies should require shutdown of the tanks – The objective of the AOC is to conduct studies to guide improvements to the Red Hill Facility to reduce risk of impact to the environment. The Navy has expanded the tank upgrade options to include new tanks at a different location.

Under Hawaii Revised Statutes 342L-9 Emergency powers & procedures, the governor or director of health can take immediate action in response to an imminent peril to human health or the environment if the situation at Red Hill were to ever meet this criterion. In addition to these emergency powers, environmental regulatory agencies are provided the authority under federal and state law to regulate activities that present environmental risk by requiring monitoring, permits, inspections, testing, and response plans designed to adequately protect the environment. Cost of environmental compliance along with liability can also play a role in facility owner's decision to shut down or relocate. The Regulatory Agencies have commented on the Navy's cost analysis of the tank upgrade options and have requested that it be revised and resubmitted.

Tanks should not be put in strategic ready reserve and should be retired - Temporary closure rules would apply to Red Hill Tanks, and they would remain subject to regulatory requirements while temporarily closed pursuant to Hawaii Administrative Rules 11-280.1-70.

Environmental Concern

Regulatory Agencies required Navy to compare relative environmental performance of each Tank Upgrade alternative which was not done – The Agencies agree that an in-depth comparison of relative environmental performance of all tank upgrade alternatives is necessary in order to determine the appropriate alternative.

The proposed tank upgrade decision should have compared environmental performance during all modes of operation and from different initiating events – The Regulatory Agencies agree that a more thorough comparison of alternatives during all modes of operation and from different initiating events is needed to inform decisions.

Proposal cannot rely on treatment plant that does not exist and no timeline or commitment to build. Treatment should be last resort. – The Regulatory Agencies agree that a treatment plant is a last resort, but we do not object to the construction of additional safety (contingency) measures to protect consumers of the drinking water. The Regulatory Agencies agree that in order to rely on a treatment plant as a contingency measure, the treatment system needs to be in place.

Upgrades that only detect releases is not enough to protect sole source aquifer – Release detection is a critical component of an environmental protection strategy because it can significantly limit the size and

duration of a release by early detection that will allow for mitigative actions. The Regulatory Agencies agree that release detection is only one component of an overall environmental protection strategy in managing a fuel storage facility, and that other components such as risk mitigation (design and operation) and maintenance, are also important factors in identifying the BAPT for this facility.

Comments expressed concerns that proposal comes before final CSM, GW model, fate and transport model, and further Risk Assessment – The AOC requires the Navy to seek continuous improvement of the facility and reassessment of the Tank Upgrade Alternatives at least once every five years as inspections and repairs are made to the next set of tanks. Although more information can improve decision making, taking actions sooner to reduce risk is also desirable. Therefore, the Navy and the Regulatory Agencies need to balance how and when decisions are made to strive for continuous improvement.

The Navy does not acknowledge the groundwater monitoring network near the Red Hill tanks is limited so the assessments of tank upgrade alternatives needs to account for monitoring limitations – The Regulatory Agencies agree that uncertainty, including uncertainty related to the efficacy of the groundwater monitoring network, need to be taken into account during decision making related to the proposed tank upgrade decision.

Relocation

The Decision Document does not make the argument that the tank within a tank and relocation options are impractical – The Regulatory Agencies agree that insufficient information is presented to conclude a tank within a tank option would be impractical (see Attachment A). Relocation of the fuel is not an upgrade option to the current system but could be a long-term fuel storage approach pursued by the Navy if continuing to upgrade and maintain the current facility can no longer be done effectively.

Relocation is only option that protects Oahu Drinking water – Although relocating fuel storage would ultimately eliminate the risk of fuel released from these tanks in their current location, the tanks are expected to continue to operate for the immediate future. Therefore, actions over the short term to reduce risk are very important in an overall risk management approach for the Red Hill Facility.

Moving the tanks to an area where a release could potentially impact the shore is not acceptable Hawaii Revised Statutes, 342L-4.5, states, *"(a) The department shall not issue a permit for a new underground fuel storage tank within one hundred yards of the shoreline; provided that a permit may be issued by the department for purposes of repairing or replacing an existing underground fuel storage tank…(c) Beginning January 1, 2045, no person shall operate an underground fuel storage tank within one hundred yards of the shoreline, and no permit for an underground fuel storage tank within one hundred yards of the shoreline shall be renewed."*

The alternative locations study referenced in option to remove fuel by 2045 should be cited in the proposed decision – The Navy's proposal of secondary containment equivalency or relocation by 2045 lacks detail. The Regulatory Agencies are seeking clarification.

Other TUA Alternative

Encourage the use of polymer coatings – Polymer tank coatings can be an effective tool to reduce interior corrosion if the coating is applied effectively but would not directly address backside corrosion of the steel tank lining. The Navy is currently using coatings in the lower dome and repair areas, such

as welds, which may reduce risk from corrosion and seepage due to weld porosity or small cracks. The Navy is considering a pilot test to apply coating on majority of the interior of the tanks. In our response, the Regulatory Agencies are requesting clarity and additional information on their pilot proposal.

Cost

The Proposed Decision is the least expensive option and least protective of options studied – The Regulatory Agencies acknowledge that the Navy proposal appears to be the least expensive option, but the Navy has not provided a comprehensive comparative cost analysis that considers the operational life of the tank options, nor a comprehensive comparative analysis under all operational modes to compare degree of environmental protection. The Regulatory Agencies are seeking revisions to the Decision Document to include this information.

Do not provide leniency if upgrade costs are too high – The Regulatory Agencies will not approve a plan that does not adequately mitigate risk to the drinking water supply. If the cost to achieve adequate protection is deemed by the Navy to be too high, then the Navy can choose to close the facility.

Release Concerns

The Regulatory Agencies should take action to address the concern that a catastrophic release can occur due to condition of the tanks – The Regulatory Agencies are requiring further evaluation on how this tank system will perform in the event of a seismic event and other plausible initiating events that could cause structural failure of the tanks or impacts to other features, such as nozzles, valves and piping. These issues will continue to be investigated as a part of the Section 8 work on facility vulnerabilities.

The likelihood of chronic and potentially catastrophic releases is unacceptably high and cannot be mitigated by actions described in the proposal – The Regulatory Agencies agree that the Decision Document does not clearly describe how the proposal adequately addresses risk from the range of potential releases. Further analysis is needed to identify appropriate mitigation measures for the range of potential future releases.

There is a greater concern over catastrophic releases than smaller releases. There should be a public warning of a catastrophic release, a disaster recovery plan, and a plan to assure drinking water safety – We agree that emphasis needs to be focused on prevention of damage due to potential catastrophic releases. And even though the probability may be low, consequences of a catastrophic release can be much greater. We agree that the Navy needs to have a mitigation plan for catastrophic releases in order to assure that drinking water quality and availability is not impacted by a catastrophic release at Red Hill.

Not enough known about fate of releases to justify status quo practices – The Regulatory Agencies agree that status quo practices are not justified, and improvements are needed. Numerous changes to practices have already occurred since the 2014 release. The Regulatory Agencies have instructed the Navy to examine a range of release scenarios. Given the very complex geology at Red Hill, a limited ability exists to determine the precise 'fate' of releases; however, there are several magnitudes of releases that should be examined for their potential fate and transport. We agree that further analysis is needed to evaluate the consequences of a range of release scenarios and identify appropriate mitigation measures.

Pathways and rate of movement of releases cannot be predicted – The Regulatory Agencies agree that it is not possible to predict exactly how future release will move through the environment. But the

ongoing efforts to collect data and study the environment is meant to identify the potential range of possibilities, including the more likely and less likely scenarios.

The Proposed Decision does not meet the zero future release standard – The goal is zero releases from all fuel storage facilities, not the standard. The Regulatory Agencies and the Navy are striving to meet a zero-release goal.

At least 200,000 gallons of fuel have been released at Red Hill – The total fuel loss from the facility from when the tanks started operating in the 1940s to present cannot be accurately determined. Environmental data, anecdotal operational reports describing fuel loss prior to promulgation of environmental regulations, along with contemporary release reports all have a high degree of uncertainty. The amount of residual fuel that is trapped in the subsurface below the tanks is also very difficult to determine due to uncertainty associated with naturally attenuation, including dispersion and degradation.

Use of tanks beyond service life presents a danger to drinking water supply – The Decision Document did not discuss service life of the facility, which is one of the comments provided by the Regulatory Agencies. The document mentions that the Navy intends to complete an asset study, which will identify the remaining "life" of the existing tanks. This information, as well as the anticipated operational life of each of the other TUA options, is needed to fully assess the options.

The primary concern of Honolulu residents is proximity of fuel to a primary drinking water aquifer – The mission of the Regulatory Agencies is to protect human health and the environment; therefore, our mission is also to protect drinking water from potential pollution sources. We recognize the proximity of the Red Hill Tanks over the drinking water aquifer and therefore, the Regulatory Agencies' goal is to assure adequate prevention and mitigation of risk from the underground storage tank system.

Spills from Red Hill are difficult if not impossible to cleanup – The Regulatory Agencies agree that due to the geologic setting at Red Hill, cleanup is extremely difficult. Therefore, greater focus on prevention and mitigative measures are preferred.

Limited ullage to move fuel from leaking tank is significant risk factor – The Regulatory Agencies agree that the Navy should have adequate processes, infrastructure, procedures, and training to rapidly respond to leaks and reduce potential damage. This includes available ullage to drain a leaking tank.

Human error including reluctance to report problems to superiors is a concern – The Regulatory Agencies recognize human error contributed to the 2014 release both at the tank repair and operational levels. The expectation is that the Decision Document will address human factors as a contribution to risk, in its overall strategy.

Release Detection Concerns / NDE

The current Non-destructive examination ("NDE") process is unreliable – The Regulatory Agencies agree that, based on the destructive testing study, further work is needed to study the reliability of the Navy's NDE process and seek opportunities for improvement. The NDE shortcomings appear to limit the ability to identify smaller scale corrosion defects that could lead to emerging small-scale releases. The Regulatory Agencies acknowledge that NDE will never be 100% accurate, so other layers of protection such as aggressive leak detection and leak response and/or secondary containment are likely necessary as part of an option that relies on NDE to assure tank liner integrity.

Corrosion mechanisms creates reliance on non-destructive evaluation ("NDE") to inspect liner – The Regulatory Agencies agree. Due to the way Red Hill is constructed, the only way to investigate the condition of the exterior of the steel liner is using NDE.

Tanks do not meet corrosion protection requirement due to gap between steel liner and concrete in areas – The Navy's "*Red Hill Bulk Fuel Storage Facility Destructive Testing Results Report, AOC/SOW Section 5.3.3,"* dated January 7, 2019 identified some void space between the steel liner and the concrete structure in about eight of the ten coupon sample locations. The presence of moisture was also noted on the exterior portion of the steel liner on about five of the ten coupons. The Regulatory Agencies will work with the Navy to further investigate potential causes for corrosion and evaluate potential options for addressing this concern.

The heavily redacted report on leak detection does not allow for the public evaluate if leak detection meets requirements – The Regulatory Agencies continues to work with the Navy to make as much information as possible available to the public in order to have transparency. Redactions are used to protect national security, trade secrets, and to assure integrity of future procurement. Stakeholders with subject matter experts on these leak detection technologies may be able to gain greater access to information by entering into non-disclosure agreements.

Nozzle decommissioning for smaller nozzle is already approved, but larger nozzles present larger risk that is not being addressed – The Navy suggests that risk reduction on the larger nozzle can be adequately addressed via improved internal inspections using NDE technology and human visual inspection, but the Regulatory Agencies are seeking clarification and justification from the Navy of the proposed mitigation measures in a revised document.

Release detection is only reactionary and does little to address concerns regarding fuel above drinking water aquifer – Although release detection identifies releases of fuel from the tank system, aggressive release detection and response can limit the magnitude of a release.

Environmental

Water Security should not be compromised by Red Hill – The Regulatory Agencies agree that the availability of drinking water on Oahu should not be compromised by the Red Hill facility. The Regulatory Agencies believe that the Decision Document should clearly and defensibly demonstrate how the actions and safeguards proposed will guarantee water quality and availability for consumers on Oahu.

The Regulatory Agencies should require the Navy to clean up past contamination at the facility – When an underground storage tank leaks, the typical regulatory approach is investigation and cleanup of the release. In response to the 2014 release at Red Hill, the Regulatory Agencies took an alternative approach to not only require investigation and assessment of the 2014 release but also improvements to the facility to minimize future releases. The facility's unique construction, terrain, and extremely complex geologic setting does not allow for typical cleanup activities. Fortunately, the 2014 release, although unacceptable, has not had significant impact to drinking water quality. The Navy recently submitted the "*Investigation and Remediation of Releases Report, Red Hill Bulk Fuel Storage Facility*" dated March 25, 2020, which discusses their plans for remediation of the 2014 release as well as future releases. The Regulatory Agencies are currently reviewing this document.

The Groundwater Modeling being done by the Navy is flawed – Groundwater modeling work is ongoing. The Navy recently submitted a report describing their multi-model approach to flow modeling titled, "*Groundwater Flow Model Report*" dated March 25, 2020. The objective of the multi-model approach was to create several models to better account for uncertainty in this very complex setting. The Regulatory Agencies are currently reviewing this document.

The environmental modeling efforts are deficient – Accurately modeling groundwater movement at the scale of interest for the Red Hill project is very challenging due to the complexity of the subsurface and data density. Continuing data collection and modeling are improving the utility of this effort, but the Regulatory Agencies will not inappropriately rely on the modeling effort to guide decision making.

Navy is creating models to produce preferred outcomes – Models are interpretation of data. The Regulatory Agencies have and will continue to review the modeling developed by the Navy and will make our own interpretations that will help guide the Regulatory Agencies' decision making.

The Navy unrealistically assumes large storage capacity of vadose zone, no preferential groundwater flow pathways, high biodegradation rates, and recent releases have not reached groundwater – The Navy's current assumptions relating to vadose storage capacity, existence of preferential groundwater flow pathways, biodegradation rates, and whether or not fuel has reached the groundwater are currently under review by the Regulatory Agencies as part of the review of other deliverables required by the AOC.

Navy CSM is deficient in characterization of features and conditions such as hydraulic gradients and aquifer properties of preferential flow and saprolite – The Hawaii Department of Health reiterated in the letter, "*Response to Conceptual Site Model, Investigation and Remediation of Releases and Groundwater Protection and Evaluation, Red Hill Bulk Fuel Storage Facility, Joint Base Pearl Harbor-Hickam, Oahu Hawaii,"* dated March 30, 2020 that, "we continue to disagree with fundamental conclusions made in the 2019 CSM." The Regulatory Agencies recognize that the CSM continues to evolve as new information is obtained. Work completed as part of another AOC deliverable, the "Groundwater Flow Model Report" dated March 2020, that further refines the CSM is currently being reviewed and evaluated by the Regulatory Agencies.

Improve monitoring of groundwater, vapor, and improve release detection – The Regulatory Agencies agree. Many of the improvements already made in these areas since the 2014 release are documented in the Decision Document, along with extra proposals that are under consideration by the Navy. Additionally, the Regulatory Agencies are recommending even more improvements, listed in Attachment A.

The Regulatory Agencies should seek input from USGS, USACE and BWS on adequate monitoring network – The Regulatory Agencies have been and will continue to seek input on the groundwater work from experts from USGS, BWS, Department of Land and Natural Resources, University of Hawaii, as well as our own experts and consultants.

Treating drinking water does nothing to alleviate concerns about long-term health and environmental impacts of permanently contaminating Oahu's drinking water with fuel – The Regulatory Agencies agree that the solution at Red Hill should not require the need for a drinking water treatment system. But treatment should be considered as a safeguard or contingency measure for low probability yet high consequence events (e.g. catastrophic failure of tank, pipeline, or nozzle).

The Navy's interpretation of existing data and analysis are not conservative, often unsupported, and should be rejected – Although the data collected by the Navy, for the most part, has been very useful to help guide further work and decisions, the analysis and interpretation of this data by the Navy does not always match that of the Regulatory Agencies. The Regulatory Agencies have provided multiple comment letters to the Navy on their environmental work. The Regulatory Agencies will continue reviewing new information as it comes in and will make our own interpretations that will help guide the Regulator Agencies' decision making.

Hawaii Regulations

State law requires USTs to be upgraded and operated to prevent releases for operational life of tank or tank system – Prior to July 2018, Hawaii UST regulations required owners and operators of field constructed tanks to comply with release reporting, investigation and confirmation of releases, release response actions, and closure requirements. In July 2018, the Department of Health revised their UST regulations to also require underground storage tank systems with field constructed tanks and airport hydrant fuel distribution system have: release detection, spill and overfill protection, financial responsibility, operator training, a permit, -and for these tanks and piping installed prior to July 15, 2018, must be provided with secondary containment or a design which the director determines is protective of human health and the environment by July 15, 2038.

Allowing any amount of fuel released from the Red Hill tanks violates Hawaii law and fails to comply with the AOC – Neither Hawaii law nor the AOC permit fuel releases. The goal of the Regulatory Agencies' regulations and the AOC is to prevent future releases.

AOC

Do not extend the upgrade deadline in the AOC – The Regulatory Agencies do not have any intention to extend the deadline at this time. The Regulatory Agencies seek improvements to the tanks as soon as practicable. But the Regulatory Agencies also need to balance the assurance that improvements are done in a way that is meticulous and avoids mistakes that could happen if the work is rushed.

Do not provide extension of time to relocate fuel. At Point Loma, California and Manchester, Washington State the Navy was able to address issues with tanks much faster – The Red Hill facility cannot be directly compared with the tank facilities in California and Washington State. Red Hill is a unique facility, with very different issues than what was seen at these other locations. Red Hill is much larger, the tanks are constructed much differently, and the alternatives to Red Hill are much more limited due to land use and availability. The Regulatory Agencies are urging the Navy to move forward and take actions to reduce risk.

Data and tests collected since the AOC was signed affirm the concerns expressed in April 2015 – The Regulatory Agencies agree that much of the information collected affirms our general understanding of issues and risk at Red Hill, but the work has been very useful to further identify risk drivers and risk mitigation options.

The AOC legitimatizes non-action – The AOC has been an important tool to get the Navy to conduct studies and analysis to inform decisions on where to reduce risk at the facility. Although an overall tank upgrade decision has not yet been made, many actions have already been taken to reduce the risk of future releases at the facility.

Additional

Above Ground Storage Tank ("AST") American Petroleum Institute ("API") standards are not appropriate for Red Hill Tanks – The Regulatory Agencies agree that the API Standards cited by the Navy were developed as inspection, maintenance and repair guidelines for standard above ground storage tanks. The Navy modified these standards in order to create a unique inspection, repair, and maintenance procedures for the Red Hill tanks. The Regulatory Agencies continue to evaluate the Navy's procedures to identify areas for improvement.

Children have had health impacts from Red Hill Tanks – Based on the environmental monitoring at Red Hill and surrounding wells, we have no evidence of any potential for exposure from the environmental conditions at Red Hill.

Navy should trade Waiawa wells for Moanalua and Halawa wells – This is outside of the scope of the AOC and authority of the Regulatory Agencies.

Navy should utilize their top experts to come up with solution at Red Hill – The Regulatory Agencies believe the Navy is using their top expert engineers who are responsible for fuel storage to improve conditions at the Red Hill Facility. Additionally, the Regulatory Agencies are utilizing internal and contracted experts to oversee the Navy's effort.

The Hawaiian creation story is important on framing the value of the land and water – The Regulatory Agencies acknowledge this consideration, and it is our goal to ensure protection of our environment.

Install reinforced concrete spillways under tanks – Numerous experts explored a very large range of options to improve the tanks. Unfortunately, construction of a bathtub-type secondary containment under the current tanks in the basalt was deemed impracticable due to extreme complexity and cost involved in mining out a space below the tanks.