BOARD OF WATER SUPPLY

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September 5, 2019

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and

Ms. Roxanne Kwan
Solid and Hazardous Waste Branch
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Department of Health
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Dear Mr. Shalev and Ms. Kwan:

Subject: Honolulu Board of Water Supply (BWS) Comments on ABS Consulting (ABS) Report "Quantitative Risk and Vulnerability Assessment Phase 1 (Internal Events without Fire and Flooding) dated November 12, 2018" and "Navy's Risk and Vulnerability Assessment Summary" and Cover Letter dated May 29, 2019 as per Red Hill Bulk Fuel Storage Facility (RHBFSF) Administrative Order on Consent (AOC) Statement of Work (SOW) Section 8

The Honolulu Board of Water Supply (BWS) is pleased to offer comments to the latest two documents submitted by the Navy under RHBFSF AOC Section 8. The first document is the ABS report "Quantitative Risk and Vulnerability Assessment Phase 1 (Internal Events without Fire and Flooding) dated November 12, 2018" (ABS, 2018). The second is the Navy's cover letter to the ABS report entitled "Navy's Risk and Vulnerability Assessment Summary" dated May 29, 2019 (Navy, 2019). In this letter you will find our general remarks followed by detailed comments addressing each document.

Please note that BWS has sent letters to the Regulatory Agencies in the past that commented on various Quantitative Risk and Vulnerability Assessment (QRVA) documents submitted previously by the Navy under RHBFSF AOC Section 8 (Lau,

2016; Lau, 2017a; Lau, 2017b; Lau, 2017c; Lau, 2017e; and Lau, 2018c). We are referencing these past letters as they provide context and historical perspective to our comments contained herein.

General Comments on Phase 1 QVRA Report

The ABS Phase 1 QVRA report substantiates the BWS' concerns with the chronic and potentially catastrophic risks associated with operating enormous fuel tanks a mere 100 feet above a one of a kind state-designated drinking water aquifer that cannot be replaced. According to ABS, the Navy's own consultant, we can expect:

- Greater than 27% probability of a sudden release of between 1,000 and 30,000 gallons of fuel from the RHBFSF each year;
- Greater than 34% chance of a sudden release of more than 120,000 gallons from the RHBFSF in the next 100 years;
- Greater than 5% chance of a sudden release of more than 1 million gallons from the RHBFSF in the next 100 years; and,
- 5,803 gallons per year of chronic, undetected fuel releases from the RHBFSF.

These risks to our irreplaceable drinking water resources are simply too high, and inconsistent with the mandate of Hawaii Revised Statutes Section 342L-32(b) that all USTs and UST systems must "be designed, constructed, installed, upgraded, maintained, repaired, and operated to prevent releases of the stored regulated substances for the operational life of the tank or tank system". Moreover, the risk estimates provided by ABS do not even consider other hazards such as seismic, fire, flood, landslides, etc. and thus can only underestimate the overall risks reported. Given the threat to our water supply these risks represent, the BWS maintains that the RHBFSF tanks should be upgraded with secondary containment or relocated away from our sole source groundwater aquifer.

The Phase 1 QRVA report details a comprehensive *quantitative* engineering evaluation of the internal event hazards at the RHBFSF. BWS strongly feels that a thorough, quantitative approach is necessary to properly address the considerable risks posed by the RHBFSF to our irreplaceable sole source groundwater aquifer. ABS' Phase 1 QVRA is designed to provide a baseline assessment of the level of risk the RHBFSF poses to nearby groundwater resources and to inform tank upgrade alternative (TUA) selection process decisions. The Phase 1 QVRA report is quite extensive, over 800 pages long, and details a rigorous, quantitative evaluation of the risks of uncontrolled releases from the RHBFSF. The scope and rigor of ABS' quantitative engineering evaluation of the risks of uncontrolled fuel releases from the RHBFSF is consistent with those typically used for nuclear power plants and large petrochemical facilities. To our

knowledge, this report represents the only *quantitative* analysis to date for the RHBFSF that estimates actual amounts of fuel that could be expected to be released in the future based on past releases and operations at the facility. The Phase 1 QVRA report confirms that the risk of a sudden, large or undetected, slow fuel release from the RHBFSF to the environment is unacceptably high.

Finally, the BWS notes that the Phase 1 QVRA report documents only the first phase of a planned, multi-phase quantitative risk assessment. Phases 2 through 4 can only increase the expected probabilities of fuel releases from the RHBFSF because they consider additional risks not accounted for in Phase 1. Phase 1 considers only certain internal events and does not include risks of release from fire, flood, earthquakes, high winds and hurricanes, landslides or mudslides, proximity transportation accidents (aircraft crashes, hazardous material or chemical spills), etc. Consequently, even the unacceptably high risk of future fuel releases reported by ABS likely understates the actual threat to our drinking water posed by the RHBFSF.

Specific Comments on Phase 1 QVRA Report

1. Navy's "Risk Thresholds of Concern"

The Phase 1 QVRA report compares their calculated release probabilities and volumes to "thresholds of concern" that were prescribed by the Navy as 120,000 gallons or greater per incident for acute releases and 41,400 gallons or greater per year for chronic releases (ABS, 2018). ABS appear to equate these thresholds of concern as a threshold "of fuel release potentially threatening water table safety". The BWS does not, and ABS should not, accept the Navy's risk thresholds. Oahu's sole source aquifer is the only one of its kind and cannot be replaced. Allowing any amount of fuel to be released from the RHBFSF tanks into this resource is unacceptable and contrary to Hawaii law.

Notwithstanding the basis of the Navy's thresholds of concern, the Phase 1 QVRA report clearly demonstrates that those thresholds are in jeopardy of being exceeded. ABS calculated that there would be a greater than 34% chance of a sudden release of more than 120,000 gallons in the next 100 years. While ABS opines that its mean chronic fuel release estimates fall "below the threshold of concern", ABS calculations recognize that as much as 52,596 gallons per year might be released from the RHBFSF under certain conditions. Both these event scenarios would exceed even the Navy's own stated thresholds of concern. Ultimately, the risks of acute and chronic fuel releases calculated by ABS demonstrate that the amount of fuel that could be expected to be released in the future from the RHBFSF is inconsistent with the standard required under Hawaii law and in excess of any reasonable risk threshold.

2. Constant Failure Rates

The BWS disagrees with the ABS' use of a constant future failure rate when steel liner corrosion damage is accumulating over time. While ABS do acknowledge that corrosion is a contributing factor to failure events, it appears that ABS ignores the cumulative effects of corrosion in its calculated release risks in part because it expects the Navy's inspection and repair processes to perform without fail. For instance, Section 5.4.9 of the Phase 1 QVRA report states:

> "We feel that a strong reason for why we do not see evidence of corrosion rate acceleration at the RHBFSF is that there is an effective continuous 'renewal' process in place for the tanks and supporting flow path components. This renewal process occurs via the regular tank inspection and repair processes in practice at the facility, specifically the commitment that all tanks will be inspected with 100% area coverage at least once every 20 years, and that as a result of these inspections there is a process in place for replacement of tank liner sections or plates where actual breeches in continuity are discovered or where impending breeches are predicted to cause through-wall leakage prior to the next inspection."

We believe ABS' use of the phrase "corrosion rate acceleration" is in error, because the rate at which the general or pitting corrosion is consuming steel liner is not expected to accelerate. The phrase "corrosion rate acceleration" used in the Phase 1 QVRA report likely refers to an increasing frequency of fuel releases due to corrosion damage accumulation as the tank liner continues to be thinned by general and pitting corrosion.

The Phase 1 QVRA report goes on to state:

> "[W]e might expect there to actually be a failure rate deceleration factor at play over the remainder of facility life. This could be supported by our reasonable expectations that, in the future over time, tank inspection processes designed to discover problematic corrosion and other failure mechanisms will improve (we have certainly seen that over the current history of the facility). Therefore, our ability to find actual and impending failures will improve. Also, we might even expect that tank repair and liner section replacement processes could be enhanced in the future. These aspects of tank inspection and repair processes bolster the argument for the renewal effect that would counteract any hypothetical corrosion rate acceleration."

In stark contrast to ABS, the BWS believes that the accumulated damage from liner corrosion, which progresses from the exterior of the tanks and cannot be mitigated, could have a major impact on future release rates. While the excerpts listed above from the Phase 1 QVRA report indicate that ABS implicitly acknowledges that corrosion

damage will contribute to future releases, it ignores the accumulation of corrosion damage, and thus underestimates associated risk, because ABS apparently believes that the Navy's nondestructive evaluation (NDE) inspection and repair process is likely to improve in the future such that it "would counteract any hypothetical corrosion rate acceleration." The BWS finds two major flaws with the ABS assumptions and conclusions:

(i) ABS fail to recognize the high probability that the Navy's current tank wall inspection and repair process will miss areas so corroded that they represent a significant probability of through-wall pitting prior to the next inspection in 20 years. The unreliability of the Navy's NDE techniques has been documented in the Navy's NDE report (Navy, 2018a), the initial destructive testing laboratory report (IMR Test Labs, 2018), the Navy's destructive testing results report (NAVFAC, 2019a), and the BWS' comments on these reports (Lau, 2019a; Lau, 2019b). As a result, ABS' risk calculations almost certainly underestimate the risk of future fuel releases from the RHBFSF, particularly as over time corrosion continues to eat away at the aging single-walled tanks from the outside.

(ii) The ABS assumption that NDE techniques will improve as corrosion damage accumulates, somehow balancing the increasing risk of through-wall corrosion, is speculative at best. No such NDE improvements have yet been postulated, much less demonstrated. Moreover, reliance on such speculation is not consistent with the ABS statement that its report is based on the "assumption that the facility will effectively be operated in the current configuration with the same operating profile ... hypothetically for hundreds of years with no intervening risk-mitigating improvements."

3. Capacity of the Concrete Tank Shell to Contain Leaks through the Liner

ABS also state in its "QRVA Bases and Assumptions – Overview" that the structural integrity of the concrete tanks and grouting is assumed robust for purposes of supporting the tank inner shell for this Phase 1 QRVA. However, ABS go on to note that there has effectively been no inspection, testing, or maintenance performed on the concrete tanks and grouting since construction and, therefore, no credit can be given in this assessment for fuel containment and that:

> "All fuel that passes through the tank inner shell is assumed to ultimately pass into the rock and soil surrounding the tank and, thus, have a capability of potentially propagating, over time, to the water table."

This is still the case as even the recently-completed destructive testing has not evaluated the quality of the concrete or condition of the rebar (NAVFAC, 2019a). In addition, the evidence of non-fuel tight concrete tanks is supported by the

release of fuel from Tank 5 in 2014 and prior fuel and fuel staining found underneath the RHBFSF tanks in 2002 (AMEC, 2002).

4. Navy Conceptual Site Model (CSM) Identifies Both Corrosion and Cracked Concrete as Fuel Release Points

The Navy acknowledges in its most recent CSM that migration pathways for fuel include corrosion pitting and cracks in the concrete surrounding the RHBFSF tanks (NAVFAC, 2019b). Specifically, the Navy CSM recognizes that there have been "historical observations of space between the back side of the steel shell plates and the inner side of the reinforced concrete" as one of three lines of evidence for fuel release points (NAVFAC, 2019b).

The Navy also states: "Areas of [Tank 5's] internal steel liner appears to have separated from the concrete encasement surrounding the tank. This condition can allow water, fuel, liquid or vapor, to be trapped in a localized area between the two surfaces … [and] hydrocarbons have been found in contact with the back-wall surfaces in the past" (NAVFAC, 2019b). In addition, the Navy CSM confirms that the AOC identifies typical historical structural and integrity issues with the RHBFSF tanks relevant to repairing them for a future use, including "corrosion and pitting," "holes in the steel liner," and "defective welds in the barrel and upper and lower domes" (NAVFAC, 2019b). Accordingly, the Navy's assessment of potential leak scenarios included "documented leaks in and around the Red Hill tank farm" (NAVFAC, 2019b).

The fuel release point and fuel migration pathways, as outlined in the Navy CSM, are outlined by the Navy in the following excerpt (NAVFAC, 2019b):

Release Point LOEs:

- Results of forensic analysis of the release as detailed in NAVFAC EXWC (2016)
- Historical observations of space between the back side of the steel shell plates and the inner side of the reinforced concrete (NAVFAC EXWC 2016)
- Areas of weakness or corrosion potential such as the bottom drain pipe and tell-tale pipe penetrations (NAVFAC EXWC 2016)

Migration Pathways:

- LNAPL migrates down along the space between the back side of the steel shell plates and the inner side of the reinforced concrete to lower tank bottom.
- Some LNAPL may potentially exit into cracks in the concrete shell into higher-permeability rock types surrounding the concrete or to space between the inner side of the reinforced concrete and outer gunite-covered rock formations.
- Contraction of the gunite after curing could create space between the gunite and rock formations around the tunnel exterior.
- Potential damage to concrete and gunite associated with tank metal plate reinforcement.
- Sumps, vent lines, grates, and drains.

Migration Pathway LOEs:

- Construction design supports potential development of LNAPL migration pathways due to cold joints, contraction, and cracking in the concrete and gunite.
- Historical observations of space between the back side of the steel shell plates and the inner side of the reinforced concrete (NAVFAC EXWC 2016).
- Appearance of a fuel hydrocarbon seep observed below Tank 5 on the evening of January 12, 2014 in the lower cross tunnel wall near the exterior of the material encasing the lower part of Tank 5.
- Monitored results of increasing soil vapor levels directly below and adjacent to Tank 5.

Source: NAVFAC. 2019b. "Conceptual Site Model, Investigation and Remediation of Releases and Groundwater Protection and Evaluation, Red Hill Bulk Fuel Storage Facility." June 30.

5. Individual Fuel Release Scenarios

The BWS comments herein are based on the summaries of results and descriptions of general risk assessment methodology included in the Phase 1 QVRA report, which provide sufficient data and analyses to evaluate the bases for the high level of risk for future fuel releases from the RHBFSF calculated by ABS. At this time, however, the BWS is unable to comment more specifically on ABS' quantification of *individual fuel release scenarios* because certain text in the main report and appendices (e.g., fault

and event tree construction) has been redacted. The BWS requests that the United State Environmental Protection Agency (EPA) and Hawaii Department of Health (DOH) (collectively, "Regulatory Agencies") provide the BWS with the complete unredacted QRVA Phase 1 report, including all appendices, so that we can provide further comment on ABS' risk assessment methodology pertaining to the individual fuel release scenarios outlined in the QRVA Phase 1 report.

General Comments to the Navy's Risk and Vulnerability Assessment Summary

The Navy's Risk and Vulnerability Assessment Summary letter expresses rejection of its own consultant's work and further quantitative risk assessment of the RHBFSF. The Navy's assessment is, at best, based on qualitative arguments. The Navy attached a long transmittal letter to the Phase 1 QVRA report, as well as its own eight-page summary document titled "Navy's Risk and Vulnerability Assessment Summary" that outline the Navy's concerns with and interpretation of the Phase 1 QVRA report (Navy, 2019). The Navy's Risk and Vulnerability Assessment Summary repeatedly calls into question the accuracy of ABS' baseline risk assessment and proposes to modify the AOC in order to abandon any further quantitative assessment of the risk of future fuel releases from the RHBFSF. In its place, the Navy is proposing a screening level, qualitative approach based on expert opinion rather than engineering analysis. The BWS could find no credible technical basis in the Navy's summary letter to justify the Navy's stated rejection of ABS' risk calculations, nor does the BWS agree with any proposal to substitute qualitative for quantitative risk assessment. The BWS does not support the Navy's proposal to walk back from rigorously calculated quantitative risk to subjective portrayals of qualitative risk. All phases of the planned quantitative risk assessment should be completed, and the significant risk the RHBFSF poses to our critical drinking water resources should be considered when making a TUA decision.

The significant risk to Oahu's sole source groundwater aquifer, as rigorously calculated and presented in the Phase 1 QVRA report, supports the BWS ongoing concerns with the RHBFSF. A proper response to such findings would be in to increase efforts to better understand and mitigate the threat to our water supply, not to walk away from the results and halt the engineering analysis. We request that the Regulatory Agencies reject the Navy's attempt to obscure the results of the Phase 1 QVRA report, and to direct the Navy to complete Phases 2 through 4 of the quantitative risk assessments. Otherwise, the final risk assessment will be neither quantitative nor representative of the risk the RHBFSF poses to our critical drinking water resources.

Specific Comments to the Navy's Risk and Vulnerability Assessment Summary

1. Quantitative vs. Qualitative Risk Assessment

In its cover letter to the Phase 1 QVRA report, the Navy recommends not performing Phases 2 through 4 of the quantitative risk assessments as originally proposed. The

Navy indicates that it may abandon the rigorous QRVA (Phases 2, 3 and 4) of the AOC Section 8 work and instead proposes "a more screening level, qualitative approach" using Navy and regulator subject matter experts (SMEs) for the completion of Phase 2, 3 and 4 risk evaluations (Navy, 2019). This stands in stark contrast to the approach documented in the Phase 1 QVRA report, which notes that "[d]uring the scoping discussions for Section 8 of the AOC Statement of Work (SOW) (Reference ES-2), all Parties agreed that a qualitative risk vulnerability assessment had limited value to support prudent decision-making. A QRVA was selected for providing a more rigorous and repeatable approach to evaluating risk." (ABS, 2018).

The BWS concurs with ABS that the Navy's newly-proposed use of qualitative approaches for risk assessment Phases 2 through 4 will have limited value and will not allow the explicit demonstration of the overall quantitative risk levels at the RHBFSF. Qualitative Phase 2, 3 and 4 evaluations cannot be added or combined "to the current calculated quantitative baseline QRVA Phase 1 Risks results" in order to support prudent decision making. The goal of the AOC Section 8 risk work is to be able to make a TUA selection that is conservative and protective of the environment. Changing to a qualitative approach at this point in the process will do little to help justify the eventual TUA decision.

2. Regulatory Involvement

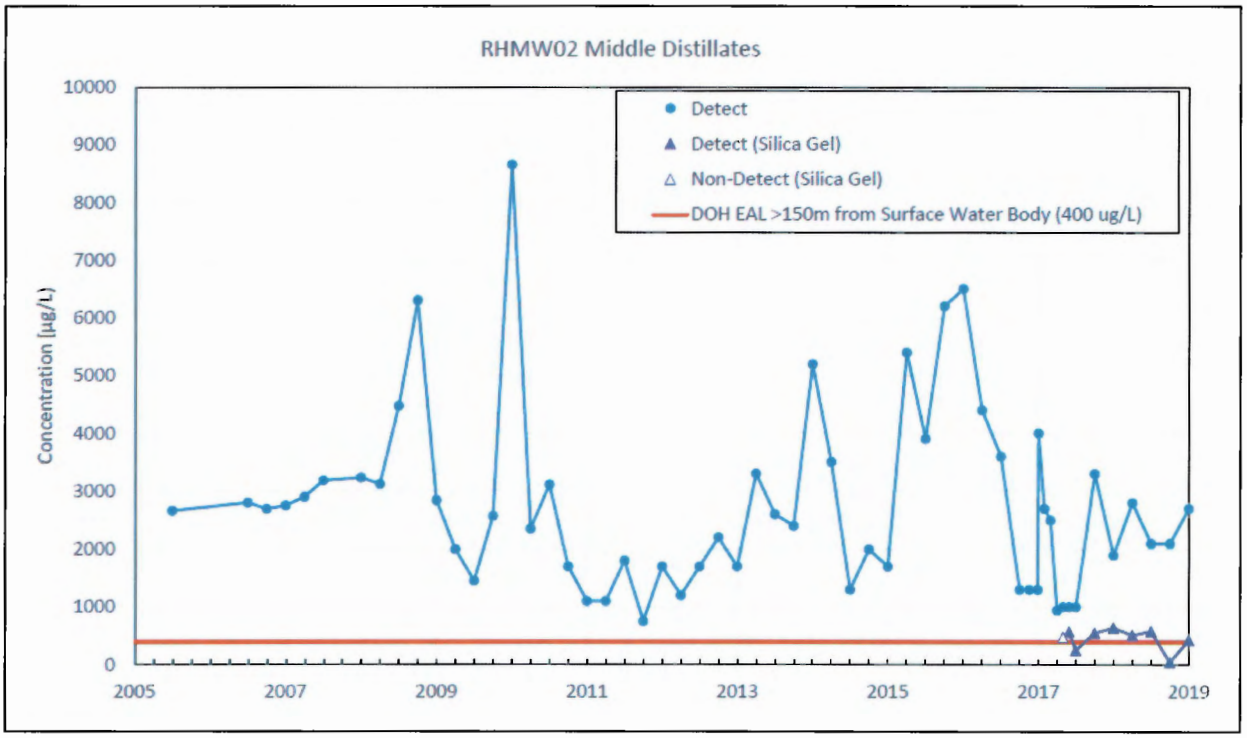
The Navy states that "[t]he Regulatory Agencies and their SMEs concur that additional effort to refine this initial baseline Phase 1 QRVA with additional sensitivity case studies would not significantly benefit the effort on the AOC as it relates to informing a [TUA] decision, and therefore may not be cost effective or timely, given estimates for time to completion" and that "[o]ne of the Regulatory Agencies' SMEs suggested a more qualitative, 'workshop' approach to the risk and vulnerability assessment" work under the AOC. The BWS is unaware of any such determination by the Regulatory Agencies or their SMEs. To the extent the Regulatory Agencies have made an independent determination concerning any changes to the agreed-upon quantitative risk assessment approach, the BWS requests that the Regulatory Agencies share the basis for such a decision.

3. Leak Record

The Navy states that the Phase 1 QVRA report "does not reflect the historical record, which shows that, since 1983, the Navy has not identified a release other than the 27,000 gallons from Tank 5 that was reported in 2014, which is 1 event in 35 years." The Navy continues to make this claim despite the fact that it is inconsistent with available records of the leak history at the RHBFSF. The BWS, by simply reviewing reports issued by the Navy, found that a release from Tank 6 was reported by the Navy in 2002 (Navy, 2002; Lau,2018a). Further, inspection reports provided by the Navy in its recent Tank Inspection Repair and Maintenance (TIRM) report indicate that Tank 15,

Tank 16, Tank 19, Tank 10, Tank 5, Tank 17, and Tank 20 underwent inspections after 1983 that identified through-wall corrosion and, by extension, leaks occurred (Lau, 2018c). The groundwater data from monitoring wells RHMW01 and RHMW02 are likewise indicative of multiple leaks as evidenced by TPH-d detections in groundwater samples (Lau, 2018b). Quite simply, the release from Tank 5 in 2014 is not the only release from the RHBFSF since 1983 (Lau, 2018a).

Groundwater data indicates that fuel continues to migrate to groundwater. As shown in the graph below, fuel constituents have been identified in groundwater samples collected from monitoring well RHMW02 since 2005. RHMW02 is the monitoring well located in the approximate center of the lower access tunnel and midpoint of the RHBFSF tank farm.



Source: NAVFAC, 2019c – First Quarter 2019 – Quarterly Groundwater Monitoring Report, Red Hill Bulk Fuel Storage Facility, Joint Base Pearl Harbor-Hickam, Oahu, Hawaii. May.

4. Leak Detection

The BWS has previously expressed its concern that the Navy's risk assessment was going to assume a maximum flow rate of 0.5 gallons per hour (gph) for chronic, undetectable leaks. This value, as we previously noted, derives from leak detection technology and associated information provided by Mass Technology Corporation (MTC). ABS has commented: "We see evidence in [unpublished] inspection reports

dated in 2015 that the [MTC] technology is currently in place at the RHBFSF." The BWS noted that periodic (e.g., biannual) deployment of the technology in offline tests of tank tightness is insufficient to justify use in the QRVA of a 0.5 gph maximum undetectable leak rate during normal operations. The BWS reiterates that the validity of that value depends critically on continuous, successful implementation of the MTC technology at the RHBFSF. The BWS acknowledges and appreciates that ABS has indicated it would revise the QRVA, and thus address the possibility of undetectable leaks with substantially higher flow rates than 0.5 gph, if its initial conclusion cannot be confirmed as correct by the Navy (Lau, 2018a).

The Phase 1 QVRA report (ABS, 2018) page 5-152 states that ABS estimated the "probabilities as to the likely actual level of accuracy" for these now annual RHBFSF tank leak tightness tests as follows:

0.7 gph, 30%

0.5 gph, 60%

0.2 gph, 10%

This indicates that the minimum leak that the Navy can detect during their annual leak detection has some uncertainty. Further, it confirms that low leak rates on the enormously large tanks at the RHBFSF are difficult to detect and that this level of detection is only done on an annual basis. Therefore, leaks of this magnitude, or even slightly greater may be occurring at rates above 0.7 gph between leak testing periods.

The Phase 1 QVRA report also indicates the probability of a through hole developing during the time since the last annual tank leak tightness test. It describes this probability as being "low" without any basis. The BWS notes that chronic, undetectable fuel releases to the environment from the RHBFSF, which ABS calculates could be as high as 52,596 gallons per year, are a consequence of the current tank design and the only TUA selections that would mitigate such releases would be secondary containment or removal of the tanks to a location that is not over the aquifer.

5. Navy's Proposed Actions to Mitigate Risk

The Navy presents ten approaches that it intends to take to mitigate certain vulnerabilities identified by the Phase 1 QVRA report as contributors to risk. The BWS notes that the vast majority of these actions are responses to leaks once they are discovered. The Navy proposes relatively little change to its current TIRM practices. Meaningful action must seek to prevent the leaks from occurring, and the best way to do that is to upgrade the RHBFSF tanks with secondary containment or relocate them away from our sole source groundwater aquifer.

6. Improvements to the Phase 1 Risk Assessment

The Navy states in its cover letter that "[t]he Navy has begun reconciling data used by the consultant and was looking towards additional effort to provide necessary updates to increase the absolute accuracy of the reported frequencies and/or potential release volumes." (Navy, 2019). However, the Navy goes on to declare that it "will not expend further resources to improve the accuracy of the baseline Phase I assessment" because "[t]here is little benefit in attempting to improve the reported frequencies or consequences." (Navy, 2019). The BWS cannot reconcile these statements. In any event, the BWS believes that the most prudent course of action in light of ABS' findings is to increase efforts to better understand and mitigate the threat to our water supply, not to walk away from the results and halt the engineering analysis. The Regulatory Agencies should direct the Navy to complete all phases of the quantitative risk assessments.

7. Missing Tank 5 and Tank 17 Tank Tightness Test Results

Among the Navy's concerns with the Phase 1 QVRA report is that apparently the tank tightness test results for Tank 5 and Tank 17 were not provided to ABS or incorporated into its calculations (Navy, 2019). The BWS does not understand why the Navy did not provide these test results to its own contractor. Although it is unclear to what extent this information might have impacted the overall risk assessment, the BWS agrees that the Navy should have provided it and it should have been used in the completion of the Phase 1 QRVA report.

8. Tank Nozzles

The Navy emphasizes that according to the ABS baseline risk model, nozzle leaks contribute to approximately twice the potential releases per year than small steel liner leaks (Navy, 2019). The Navy further discusses that in order to mitigate risk, it will remove the two smaller nozzles via the TIRM process, which will only leave the large nozzle for each tank. The Navy states that the Regulatory Agencies approved this approach with the understanding that the large nozzle remaining in each tank is fully inspectable, repairable, and can be coated. In addition, as shown by the recent destructive testing report the Navy has difficulty with its current NDE practices to accurately locate areas that need to be repaired on the inner tank wall which should be significantly easier than in the cramped space inside these nozzles. Furthermore, if the nozzles are indeed a significant risk driver, it is unclear to the BWS why the tank nozzles would not be considered for retrofitting with secondary containment. We understand that there has been some discussion of retrofitting one large nozzle in one of the tanks as a "pilot test." The BWS recommends strongly considering performing this tank nozzle retrofit for all RHBFSF tanks in use.

9. Risk Contributor List

The Navy lists 10 risk contributors in their summary document. The risk contributors are listed by the Navy in order of importance (Navy, 2019). The first listed item as a risk contributor is "availability of tank ullage to accommodate emergency movement of fuel from a leaking tank to a safe storage location." The Navy identifies this contributor as having the most influence on risk. Essentially, the Navy recognizes that it should have the ability to transfer fuel from a tank that is leaking into a tank that is determined to be safe and structurally uncompromised. But the Navy claims that federal regulations prohibit maintaining an asset that is not operationally used, i.e. an empty tank, and that an empty tank is very difficult to maintain. The BWS considers situational awareness insufficient to adequately mitigate risk and that an engineering solution (storage capacity for fuel from a leaking tank) should be in place and instituted immediately. The BWS believes that an empty tank, or another type of containment system, could be designated as "operational" and therefore not subject to the federal requirement that the Navy states is the barrier to implementing such a safety measure.

Summary of Comments

After reviewing the subject documents, the BWS continues to have serious concerns that the RHBFSF poses a considerable risk to the high-quality sole source groundwater aquifer that nourishes Oahu's drinking water. Numerous leaks from the RHBFSF tanks have been documented and sampling from under and around the RHBFSF has demonstrated the existence of petroleum contamination in the very aquifer that sustains Honolulu's water supply. To date, the Navy has not demonstrated to our satisfaction that the risks associated with storing enormous amounts of fuel directly above our drinking water can be sufficiently mitigated by simply continuing the status quo of cleaning, inspecting, and repairing its aging single-walled tanks.

The BWS concurs with the decision to utilize a quantitative approach for Phase 1 of the risk assessment at the RHBFSF. We believe that a quantitative approach should also be followed for Phases 2 through 4 of the remainder of the risk assessment. The BWS believes the risks calculated by ABS and presented in the Phase 1 QVRA report are unacceptably high and will only increase once seismic, fire, flood, landslide, and other hazards (associated with QVRA Phases 2 through 4) are considered.

The Navy's unusual and unconvincing efforts to separate itself from its own consultant's rigorous, quantitative evaluation of the risks of uncontrolled releases from the RHBFSF should be rejected by the Regulatory Agencies. To truly mitigate this considerable risk will require that the RHBFSF tanks be relocated to a facility not over our sole-source groundwater aquifer or be upgraded with engineered secondary containment.

Thank you for the opportunity to comment. If you have any questions, please contact Mr. Erwin Kawata, Program Administrator of the Water Quality Division, at 808-748-5080.

Very truly yours,

ERNEST Y.W. LAU, P.E.
Manager and Chief Engineer

CC: Mr. Steve Linder
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