BOARD OF WATER SUPPLY

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December 24, 2018

Dr. Bruce Anderson
Chair
Fuel Tank Advisory Committee
Department of Health
P.O. Box 3378
Honolulu, Hawaii 96801-3378

Attention: Ms. Thu Perry

Dear Dr. Anderson and Ms. Perry:

Subject: Honolulu Board of Water Supply (BWS) Comments on draft "Report to the Thirtieth Legislature, State of Hawaii, 2019, Pursuant to Section 342L-62 Hawaii Revised Statutes, The Third Annual Fuel Tank Advisory Committee Meeting to Study the Issues Related to Leaks of Field-Constructed Underground Storage Tanks at Red Hill Bulk Fuel Storage Facility and Four Other DOD Facilities", Prepared By: State of Hawaii, Department of Health (DOH), Underground Storage Tank Section, dated December 2018

The BWS appreciates the opportunity to be a member of the Fuel Tank Advisory Committee (FTAC) and participate in the FTAC meeting held on November 1, 2018 and also those in 2016 and 2017. BWS also participates as a subject matter expert (SME) pursuant to the Red Hill Bulk Fuel Storage Facility (RHBFSF) Administrative Order on Consent (AOC) Statement of Work (SOW) by reviewing various work documents and attending AOC technical meetings.

The BWS reviewed the subject draft report and offers the following comments.

General Comments

Under Chapter 342L, Section 62, the FTAC is required to submit a report after its annual meeting on its findings, including groundwater test results, and recommendations, including any proposed legislation, to the legislature. The draft report summarizes the 2018 meeting discussions but does not include recent groundwater test results, nor any recommendations and/or proposed regulations as is required under the FTAC charter.

Opening Remarks – Rear Admiral Brian Fort

Page 3, Paragraph 2: The report states that the Rear Admiral specifically stated that the work to continually "modernize" the RHBFSF was being done to ensure safe operations and emphasized that the RHBFSF is considered "critical infrastructure" by the Department of Defense. This is all the report states about his opening remarks. In fact, Rear Admiral Fort made several claims, critical infrastructure was just one, that were presented as factual statements, and the BWS rejects as either incorrect or misleading certain of these statements as discussed in greater detail below. The DOH should consider adding considerable text to this paragraph to more accurately describe the Rear Admiral's remarks. The BWS believes the report should reflect an accurate account of the discussions and presentations made at the meeting to ensure content correctness.

For example, Rear Admiral Fort stated: "The Navy doubles the American Petroleum Institute approved industry standard for steel liners on the tanks at Red Hill. Those tanks as designed are quarter-inch steel; that's 0.25-inches. The API standard for such liners is only 0.05 inches." The API standard referenced by the Rear Admiral is for aboveground tanks and does not apply to the underground tanks at the RHBFSF. Instead, the Navy presentation appears to have misinterpreted an API standard that does not apply to the RHBFSF. Namely, the standard prescribes a minimum thickness (0.05 inches) for the floor of an aboveground tank with secondary containment. The loading and behavior of dome and barrel liners differ fundamentally from the floor of an aboveground tank, and there is no secondary containment for the RHBFSF tanks (as demonstrated in the 2014 release). There is, therefore no additional factor of safety on the Navy's provision for remaining wall thickness as stated by the Navy.

In another example, the Rear Admiral stated: "Each of these tanks must pass an annual tank tightness test as part of our modernization. No tank has ever failed a tank tightness test". The Navy reliance on tank tightness testing results does not prove that the tanks are not leaking. It is a fact that the RHBFSF tanks can test "tight" yet still leak up to 0.5 gallon/hour of fuel through the steel liner. For a RHBFSF tank, that may result in the loss of up to 4,000 gallons of fuel in a given year.

The Rear Admiral also stated that "the [Tank 5] fuel release, now almost 5 years ago, was the one and only release to the public since the Clean Water Act of 1988. The one and only release." This 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 (a copy of this Navy completed DOH release report was passed out at the meeting by the BWS). Further, inspection reports provided by the Navy in its recent Tank Inspection Repair and Maintenance report indicate that Tank 15, Tank 16, Tank 19, Tank 10, Tank 5, Tank 17, and Tank 20 underwent inspections after 1988 that identified through-wall corrosion, and, by

extension, leaks occurred. The groundwater data from monitoring wells RHMW01 and RHMW02 are likewise indicative of multiple leaks as evidenced by TPH-d detections in ground water samples. Quite simply, the release from Tank 5 in 2014 is not the only release from the RHBFSF since 1988.

The BWS requests that the DOH amend its report accordingly so the FTAC Report is complete and the State Legislature and the public is adequately informed.

"No conclusions could be made from only a visual observation."

Page 4, Paragraph 6, Third Sentence: "Some of the coupons were selected because they appear to meet the repair criteria while others were chosen for the fact that it would not require repair. The Navy's presentation addressed each coupon that was cut out but emphasized that no conclusion could be made from only a visual observation. ...Page 4, Paragraph 7, First Sentence: HBWS made a formal request for the raw data, anticipated from the laboratory from analysis of the coupons, to be given to them in order to obtain an "independent assessment over the effectiveness of the NDE process."...

The BWS agrees that the Navy selected coupons from two general classes: those that likely needed repair and those expected not to require repair. BWS takes issue with the Navy's statement that "no conclusions could be made from only visual observations." It is BWS opinion that, based on our visual inspection of the coupon's cut edges, it is unlikely the Navy's stated "quantitative validation" criteria (NAVFAC, 2018) will be realized. The Navy's quantitative validation criteria requires that the Navy demonstrate that pit depth is within 20 mils of actual laboratory results and that wall thinning is within 5% of actual laboratory results (NAVFAC, 2018). We believe, even given the very few coupons removed and the limited measurements BWS was allowed to perform, that these observations indicate that the Navy is unlikely to achieve its "quantitative validation" criteria regarding nondestructive evaluation (NDE) techniques. We request that a statement be made in the FTAC report that reflects the uncertainty associated with the current Navy NDE methods and that the Navy should not rely on the unproven accuracy of the NDE in going forward with a single-wall TUA option. Further, the Navy has not allowed BWS to measure the maximum pit depth nor to review the third-party coupon sample laboratory destructive testing report. BWS requests the opportunity to do one or both in order to revisit our preliminary opinions.

TUA Selection ... (identified as Options 1A and Option 1B as a pilot during the question and answer period)

Statement: The Navy identified their planned TUA selection as their current clean, inspect and repair regimen, ... identified as options 1A and 2B on Slide #31 of Appendix D and on pages 82 and 83 of Appendix C). The Navy listed two factors in this selection. The first is that historically, the tanks have not failed. The 2014 release was from "bad contractor, bad quality control, bad quality assurance, [and] operator error."

First, the DOH report likely refers to TUA 1B and not TUA 2B (TUA 2B is for a stainless-steel composite wall that, to our understanding, the Navy has not recommended). Contractors were only working on Tank 5 because of defects and deterioration. Therefore, any leaks attributed to their errors, and the Navy's inability to properly supervise and inspect the work, is at the most fundamental level due to tank deterioration. Second, human error is but one of the underlying causes of potential tank leaks. Human errors that increase the likelihood of leaks are not limited to the type of flawed weld repairs that failed in Tank 5, but also include errors in scanning for corroded areas, errors in scanning for weld defects, errors in testing repair patches, and errors in applying and inspecting coatings. The advantage of moving the tanks to a new location that is not over the aquifer is that any leaks due to human errors will not contaminate the drinking water. The advantage of secondary containment is that any leaks through the primary liner due to human errors should be captured by the secondary liner rather than released into the environment.

Specific Comments

The BWS requests that the second and third sentences of the first paragraph on Page 5 be revised as follows: "The Navy identified their planned TUA selection as their current clean, inspect and repair regimen, with many improvements including the installation of a more accurate leak protection system, and a pilot of epoxy coating the bottom dome and barrel of one tank (identified as options 1A and 1B) on slide #31 of Appendix D). Currently, under the Navy's planned TUA selection, only the bottom dome of the tanks will be coated. The Navy stated that there are engineering challenges to coating the whole tank that needs to be addressed in the pilot study."

The BWS requests that the second sentence of the first paragraph be revised as follows: "Mr. Lau reiterated the request to get the corrosion data from the coupons so that HBWS experts could examine independently." Please add sentences following this statement: "Along with Mr. Lau, Senator Thielen also stressed that the Navy send the laboratory report for the coupon samples to the HBWS for independent evaluation. Further, Captain Delao committed to transparency and to sending the HBWS the name of the laboratory that analyzed the coupon samples."

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

Very truly yours,

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

CC: Ms. Thu Perry
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Underground Storage Tank Section
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Mr. Steve Linder
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Region 9
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Reference

NAVFAC, 2018. Red Hill Bulk Fuel Storage Facility Scope of Work for Destructive Testing Supplement - Destructive Testing Plan, Supplement to Administrative Order on Consent (AOC) and Statement of Work (SOW) Section 5.3.2, June 1.

REPORT TO THE THIRTIETH LEGISLATURE
STATE OF HAWAII
2019

PURSUANT TO SECTION 342L-62 HAWAII REVISED STATUTES THE THIRD ANNUAL FUEL TANK ADVISORY COMMITTEE MEETING TO STUDY THE ISSUES RELATED TO LEAKS OF FIELD-CONSTRUCTED UNDERGROUND STORAGE TANKS AT RED HILL BULK FUEL STORAGE FACILITY, AND FOUR OTHER DOD FACILITIES

PREPARED BY:
STATE OF HAWAII
DEPARTMENT OF HEALTH
UNDERGROUND STORAGE TANK SECTION
DECEMBER 2018

Introduction

This report summarizes the third annual Fuel Tank Advisory Committee (FTAC) meeting as required under Chapter 342L, Section 62, Hawaii Revised Statutes (HRS), which was held on November 1, 2018 at the state Capitol. The agenda and list of committee members are attached as Appendices A and B. A transcript of the meeting, as prepared by a court reporter, is presented in Appendix C.

The work of the FTAC is generally a continuation of work from two previous task forces that were formed per Senate Concurrent Resolution (SCR) 57 (2015) and SCR 73 (2014). The purpose of these groups were to; gauge the impact of a 27,000-gallon fuel leak at the Red Hill Bulk Fuel Storage Facility, assess what efforts were being made to prevent future releases from that facility, and evaluate 26 additional field-constructed tanks (FCTs) at four Department of Defense (DOD) facilities.

For additional details of advisory committee efforts, please see the Hawaii Department of Health (HDOH) Solid & Hazardous Waste Branch's (SHWB) website on Underground Storage Tanks (USTs) and namely the Red Hill Task Force Meetings link (http://health.hawaii.gov/shwb/red-hill-task-force-meetings-2014/).

Duties of the Fuel Tank Advisory Committee

In accordance with HRS Section 342L-62:

1. The advisory committee shall study issues related to leaks of field-constructed underground storage tanks at:
    a. Red Hill
    b. Kuahua Peninsula
    c. Pacific Missile Range
    d. Hickam POL Annex
    e. Schofield Barracks
2. The advisory committee shall consider:
    a. The short- and long-term effects of leaks of the fuel tanks, including effects relating to the health of residents, safe drinking water, and the environment;
    b. Response strategies to mitigate the effects of leaks from fuel tanks;
    c. Methods to improve communication between the United States Navy, Air Force, and Army; the State; any local board of water supply; and the public in the event of a leak of any fuel tank;
    d. Groundwater test results in relation to the surrounding areas of fuel tank facilities, with a particular emphasis on the groundwater near the Red Hill Bulk Fuel Storage Facility;
    e. The implications of shutting down any fuel tank facility; and
    f. Updates on progress toward meeting goals of agreement between the State, the affected county, and the federal government.
3. The advisory committee shall submit a report on its findings, including groundwater test results, and recommendations, including any proposed legislation, to the legislature.

After the first FTAC meeting in 2016, the committee excused the U. S. Air Force and U.S. Army from future participation since they no longer own and operate FCTs. Schofield Barracks was no longer a DOD facility of interest because they had been mistakenly identified as a FCT facility. In addition,

Senator Brian Schatz's representative emphasized that they are not an ex official member due to the Senator's assignments, but would attend as an observer.

Summary of the 2018 FTAC Meeting

Before this year's update from the U.S. Navy (Navy) began, there was a request from Mr. Ernest Lau, Chief Engineer at the Honolulu Board of Water Supply (HBWS) that changes should be made to the draft report to the Legislature summarizing the 2017 FTAC meeting. A draft of this report is available on the SHWB website previously referenced. HDOH was agreeable to incorporate all of the requested changes in the final report except one. That one request will require additional time to address and was reiterated again in this year's meeting. Mr. Lau asked for, "some references of historical releases at these closed facilities like Kipapa or Hickam POL Annex in Waikakalaua, [and] that the history of releases should be described further in the report… [like] how much was released, [and] when… the suspected release occurred… [and that] remediation efforts be more descriptive in terms of what types of remediation, was there [like] soil vapor extraction, [and when were] monitoring wells drilled." Due to the deadline for the submission of this report, this information will be collected and presented to the committee in the next meeting.

The Navy's presentation began with opening remarks from Rear Admiral Brian Fort, Commander of Navy Region Hawaii, Naval Surface Group Middle Pacific, about the Red Hill Facility. Specifically, he stated that the work to continually "modernize" the facility was being done to ensure safe operations and emphasized that the Red Hill Facility is considered "critical infrastructure" by the DOD.

The Navy presentation (Appendix D) on the subject FCTs was given by Captain Marc Delao, Commanding Officer of NAVPAC Hawaii. He first discussed the one site that is temporarily out of use, Kuahua Peninsula, and the two closed sites that are part of the Hickam POL Annexes, Kipapa and Waikakalua. The former, site also known as the former Diesel Purification Plant, is still scheduled to be put permanently out of use in the next one to two years, pending funding and contracting considerations. The two Hickam POL sites were both installed in the 1940s and were operational for 50 years. After that time both sites were decommissioned and remain permanently out of service for the last 20 years. The 17 monitoring wells at Waikakalua are still sampled annually as a result of a historic release that occurred prior to Navy acquisition. The Navy confirmed that Total Petroleum Hydrocarbons (TPH) results from the last sampling event were all under the TPH clean-up goals (Appendix D, Slide #7).

In an exchange with the Navy, Mr. Lau acknowledged that although the Navy inherited these two closed sites through Pearl Harbor/Hickam Joint Base consolidation, he again requested a more comprehensive summary of the historic releases at those two sites, asking, "is it possible to get an overview of the whole field facility… and also connecting pipelines,…[to] get an overall picture of what was released, how much was released, and the remediation efforts and monitoring efforts?" The Navy responded that they would look into this request.

Besides Red Hill, the only other active FCT site is the Pacific Missile Range Facility (PMRF) in Kauai. While constructed in the early 1940s, the same time as Red Hill, these nine tanks are smaller with an estimate volume of 50,000-gallons each. They are protected from corrosion by an impressed current cathodic protection system and are not located over a drinking water resource. It is also monitored monthly and annually for releases.

Red Hill Bulk Fuel Storage Facility & Surge Tanks

On the subject of Red Hill, the Navy first addressed a question from last year's meeting, asking for the number of repairs that were completed after the modified American Petroleum Institute (API) 653 inspections for the four 400,000-gallon surge tanks. The Navy confirmed that a total of 19 repairs had been done to these tanks.

The Navy then listed the studies and improvements that have been made since the 2014 release and the additional improvements scheduled for implementation in the next couple of years. Some of these improvements included: an increase from annual to semi-annual tank tightness testing, continuation of quarterly groundwater monitoring, installation of additional groundwater monitoring wells, and the regular assembly of a Groundwater Modeling Working Group, which includes other Subject Matter Experts (SMEs) like the U.S. Geological Survey and the Department of Land and Natural Resources, Commission on Water Resource Management.

The Navy confirmed the continuation of the clean, inspect and repair process for the tanks. After the entire tank is scanned, this protocol dictates repair patches be welded on any area that is less than the 0.16-inch criteria. The cost for this process range from $16 to $18 million per tank. They also predicted that the second round of repairs to Tank 5, which was responsible for the 2014 fuel release, will be slated for completion by 2020.

The Navy briefly talked about current "high level DOD studies" to examine fuel needs for the Pacific Rim. The Navy is waiting on the completion of these studies to ascertain long-term options available for the Red Hill facility.

The Navy is on course to submit the combination Tank Upgrade Alternative (TUA)/Release Detection Decision Document by the end of the 2018. Other pending documents for 2019 include the Destructive Testing Results Report and the Groundwater Flow Model Report.

There was an in-depth discussion of the process and purpose of the destructive testing project, which included the removal of 10 coupons from Tank 14 earlier this year. The selection of the coupon sites was not to locate the worse cases of corrosion but examine various scenarios to challenge whether the scanning technology, known as the Non-Destructive Evaluation (NDE), used to validate the repair criteria, proves consistent and accurate. Some of the coupons were selected because they appear to meet the repair criteria while others were chosen for the fact that it would not require repair. The Navy's presentation addressed each coupon that was cut out but emphasized that no conclusion could be made from only visual observation. The laboratory results need to validate whether the steel thickness observed corroborates the thickness predicted by the scanning data. This information will be presented in a final report due in spring 2019.

HBWS made a formal request for the raw data, anticipated from the laboratory from analysis of the coupons, to be given to them in order to obtain an "independent assessment over the effectiveness of the NDE process." They also submitted three letters to the committee that includes their comments on the destructive testing process and challenges the Navy's draft groundwater flow model that implies that the aquifer could handle 700,000 gallons of fuel without affecting the drinking water. These letters have been included as Appendix E.

The Navy summarized the six TUA options plus the new construction at an alternative site option. The Navy confirmed that they will formally present their selected TUA in the TUA Decision Document later this year. The Navy identified their planned TUA selection as their current clean, inspect and repair regimen, with many improvements including the installation of a more accurate leak protection system, and a pilot of epoxy coating the entire tank (identified as options 1A and 2B on slide #31 of Appendix D). Currently only the bottom dome has been coated. There are engineering challenges to coating the whole tank that needs to be addressed in the pilot study. The Navy listed two factors in this selection. The first is that historically, the tanks have not failed. The 2014 release was from "bad contractor, bad quality control, bad quality assurance, [and] operator error." The second factor is their confidence in the improvements to operations at the facility like the increased tank tightness testing, and improvements in the clean, inspect and repair protocols. Regulators are waiting for the full details of this decision in the TUA Decision Document, along with the thorough justification of any TUA selection, before they can comment.

The Navy acknowledged that in the first draft of their own vulnerability assessment, the highest risk of large releases is from the nozzles in the lower access tunnel, not the tanks. The Navy will consider coating the nozzles with epoxy.

Other work mandated in the enforceable agreement called the Administrative Order on Consent (AOC), include studies to address the environmental consequences if a release were to occur. The Navy's goal is to improve response time and decrease the volume allowed to be released, in order "to do the right thing and to respond… [in order to be] good stewards of the aquifer, of the environment, of the taxpayer's money, [and] of this infrastructure."

Because of the continuation of additional AOC work beyond the first selection of TUA, the Navy made assurances that any determination made now, may be improved upon, even before the mandatory five-year review, if and when, new and relevant information becomes forthcoming. Any decision made now, will not slow the collaboration with regulators and SMEs and other work mandated by the AOC.

During the question and answer period, the committee asked the following questions. The exact exchanges and responses are in the meeting transcript, provided in Appendix C.

1. Is the Navy prepared to treat the water, the groundwater, in the unlikely event of a release tomorrow or next week?
2. Besides the 2014 release, is the Navy's presentation correct in stating that there has not been a release from the Red Hill facility since 1988?
3. Was there a leak around 2002 from Tank 6?
4. Is there an option to close the tanks that are the closest to the aquifer?
5. Are there improvements that can get you from 90% safe to closer to 100% safe?
6. Is the military security of the Red Hill facility compromised since it's location and so much information about it is now public?
7. During the NDE scanning process, what measures are being taken to ensure human error is not a problem again?
8. In the Navy's July 27, 2018 groundwater report, it is stated that a fuel release as large as 700,000-gallons would not cause an exceedance of risk-based decision criteria, is that factually verifiable or an opinion?
9. Is the Navy committed to no more leaks at Red Hill?

10. How many square inches in each tank, that is potentially in contact with fuel, needs to be scanned?
11. Can you acknowledge that the NDE process is crucially important in determining the effectiveness of the single wall TUA selection, of the 1A and 1B combination, in being able to ensure no more leaks in the tank?
12. If five of 10 coupons indicated that repairs are necessary, can you extrapolate to say that 50% of the tank would also need repair?

Mr. Lau also added that if the effectiveness of the Navy's tentative TUA selection (1A and 1B combination) depends on the effectiveness of the NDE process, then the TUA Decision Document should not be submitted until the NDE process has been validated, and that information incorporated to justify that selection. This would potentially extend submission after Spring 2019. Mr. Lau also reiterated the request to get the corrosion data from the coupons so that HBWS's experts could examine it independently. Mr. Lau referenced these requests in their letters, Appendix E, to the committee that also challenges the Navy's declaration that were no releases at Red Hill between 1988 and 2002.

HDOH announced that they had received almost 70 written comments an anticipation of this committee meeting. These will be posted verbatim on their website. Several members of the public who attended this committee meeting, insisted that the Chair allow them time to give oral comments. Over the course of the next hour, 15 people came to the front of the room to speak. The exact comments are in the meeting transcript as provided in Appendix C.

Next Committee Meeting

The committee recommended that they continue to meet annually. HDOH is tentatively scheduling the next Fuel Advisory Committee meeting for the end of 2019.

Appendices

- Appendix A - Agenda
- Appendix B – List of FTAC Members
- Appendix C – Meeting Transcript
- Appendix D – Navy Presentation on FCTs and Red Hill
- Appendix E – HBWS Letters

Additional information from previous meetings are available at http://health.hawaii.gov/shwb/red-hill-task-force-meetings-2014/.

Appendix A

DAVID Y. IGE
GOVERNOR OF HAWAII

BRUCE S. ANDERSON, Ph.D.
DIRECTOR OF HEALTH

STATE OF HAWAII
DEPARTMENT OF HEALTH
P. O. BOX 3378
HONOLULU, HI 96801-3378

In reply, please refer to:
File:

FUEL TANK ADVISORY COMMITTEE

AGENDA FOR THE THIRD ANNUAL MEETING

Thursday, November 1, 2018
9:00 a.m. to 11 a.m.
Hawaii State Capitol, 415 S. Beretania St., Room 016
Honolulu, HI 96814

1. **Call to Order**
2. **Welcome & Introductions – Keith Kawaoka, Deputy Director of Health, Department of Health (DOH), Committee Chair**
    a. Congressional Delegation
    b. State Legislature
    c. Department of Defense
    d. Subject Matter Experts (Board of Water Supply, Department of Land and Natural Resources and Commission on Water Resource Management)
    e. Public Members
    f. U.S. Environmental Protection Agency
3. **Review of Duties of the Committee – HRS 342L-62 (below)**
   Committee to focus on field-constructed tanks (FCTs) at Red Hill Bulk Fuel Storage Facility, Kuahua Pennisula, Pacific Missile Range Facility Barking Sands, Hickam Pol Annex, and Schofield Barracks Military Reservation
4. **Summary of November 2017 Meeting**
5. **Navy Updates for Subject Field-Constructed Tanks pursuant to HRS 342L-62(1), (2), (3) and (5)**
    a. Groundwater Results Pursuant to HRS 342L-62(4)
    b. Answers to Outstanding Questions
6. **Navy and DOH Update on the Actions Through the Administrative Order on Consent (AOC) at the Red Hill Bulk Storage Facility Pursuant to HRS 342L-62(6)**
    a. Improvements to the Facility
    b. Studies Completed and Pending
    c. Regulatory Oversight and Approvals
    d. Future Work Timetable
7. **Advisory Committee Discussion on Adequacy of Response Measures and Communication**
    a. Recommendations
    b. Discuss Future Schedule
8. **Public Comment Period**
   The committee will receive comments from the public concerning issues related to leaks of field-constructed underground storage tanks. Anyone seeking to provide information relevant to the committee's study of these issues is welcome to address the committee in person, as time allows. The committee will also accept any written information concerning the subject matter of the committee's inquiry.
9. **Adjournment**

HRS 342L-62 The advisory committee shall study issues related to leaks of field-constructed underground fuel storage tanks at the Red Hill Bulk Fuel Storage Facility, Kuahua Peninsula, Pacific Missile Range Facility Barking Sands, Hickam Pol Annex, and Schofield Barracks Military Reservation. The advisory committee shall consider:

a. Short- and long- term effects of leaks of the fuel tanks, including effects relating to the health of residents, safe drinking water, and the environment
b. Response strategies to mitigate the effects of leaks from fuel tanks;
c. Methods to improve communication between the United States Navy, Air Force, and Army; the State; any local board of water supply; and the public in the event of leak of any fuel tank;
d. Groundwater test results in relation to the surrounding areas of fuel tank facilities, with a particular emphasis on the groundwater near the Red Hill Bulk Fuel Storage Facility;
e. The implications of shutting down any fuel tank facility; and
f. Updates on progress toward meeting goals of agreement between the State, the affected country, and the federal government.

If you need an auxiliary aid or accommodation due to a disability, contact Thu Perry by **October 25, 2018** at 586-4226 or e-mail thu.perry@doh.hawaii.gov so arrangements can be made. If you reply after the date given, we cannot assure that your request will be fulfilled.

Underground Storage Tank Program Website http://health.hawaii.gov/shwb/underground-storage-tanks/
Red Hill Website http://health.hawaii.gov/shwb/ust-red-hill-project-main/

Appendix B

November 1, 2018 Fuel Tank Advisory Committee Members	
Keith Kawaoka, Deputy Director, Department of Health	
Chuck Freedman, Senator Brian Schatz's Office	Not Official Member
Representative Colleen Hanabusa (attended in person)	
Senator Mazie Hirono	Did Not Attend
Kainoa Penarosa, Representative Tulsi Gabbard's Office	
Captain Marc Delao, NAVFAC Hawaii	
Senator Mike Gabbard, Agriculture & Environment Committee	
Representative Chris Lee, Energy & Environmental Protection Committee	
Steven Linder, EPA Region IX	
Ernest Lau, P.E., Honolulu Board of Water Supply	
Patrick Casey, Commission on Water Resource Management	
Roy Hardy, Department of Land & Natural Resources	
Steven Onoue, President, Moanalua Valley Community Association	
David Yomes, Chair Aliamanu/Salt Lake Neighborhood Board	
~~Director of Public Works, Army Hawaii~~ (N/A)	Exempt
~~Air Force Hawaii~~ (N/A)	Exempt

Appendix C

THIRD ANNUAL FUEL TANK ADVISORY COMMITTEE

Thursday, November 1, 2018

9:03 a.m. to 11:59 a.m.

State Capitol

Honolulu, Hawaii

P R O C E E D I N G S

COMMITTEE CHAIR: Let's call to order. Good morning, everybody. Happy November 1st. Waited till the end of the year almost. Thank you for coming to this Third Annual Fuel Tank Advisory Committee. My name is Keith Kawaoka. I'm the Deputy Director for Environmental Health, Department of Health, and I'll serve as your chairperson this morning.

Just a reminder to everybody that this session is being documented by a court reporter, sitting right here in the front, so before you speak, especially committee members, could you please introduce yourself if you have a comment or a question as we proceed on.

As a reminder, this is a committee meeting that we can technically only have committee members for two hours. So we started just after 9:00, just about 9:05. We have a full agenda, you have the agenda in front of you, so to make sure that we get through our primary objectives through the agenda, after the items of the agenda have been completed and the questions of the committee have been addressed, we'll be happy to accept comments from the public, both verbal and written, time permitting.

At this time I'd like to have each of the

members introduce themselves. Let's start on this side first.

CAPT. DELAO: Yes. My name is Marc Delao. I'm the commanding officer at NAVFAC Hawaii.

SEN. GABBARD: Mike Gabbard. I represent District 20 in West Oahu. And I also chair the Agriculture Environment Committee for the Senate.

MR. LAU: Ernie Lau, manager Honolulu Board of Water Supply.

MR. YOMES: David Yomes, Neighborhood Board 18.

MR. ONOUE: Steven Onoue, Moanalua Valley Community Association president.

MR. FREEDMAN: Chuck Freedman from Senator Schatz's office.

REP. HANABUSA: Colleen Hanabusa, Congressional District 1.

MR. PENAROSA: Kainoa Penarosa representing Tulsi Gabbard.

COMMITTEE CHAIR: And we have EPA on the line. EPA, introduce yourself.

MR. LINDER: Yes, this is Steve Linder from EPA, and I have Omer Shalev and Lyndsey Tu here with me.

COMMITTEE CHAIR: There may be possibly

some other members coming in later, but -- oh, I'm sorry, Senator.

SEN. THIELEN: I'm not (inaudible).

MR. CASEY: Patrick Casey, geologist with the Commission on Water Resource Management, DLNR.

MR. HARDY: Roy Hardy, I'm the groundwater hydrologic program manager for the commission as well, but sitting in for DLNR right now.

COMMITTEE CHAIR: Thank you everybody, committee members.

First I'd like to review the duties of the committee, based on HRS 342L-62. The provision requires the advisory committee to study issues related to leaks related to field-constructed tanks of underground storage tanks at the Red Hill Fuel Storage Facility, Kuahua Peninsula, Pacific Missile Range Barking Sands, the Hickam POL Annex, as well as the Schofield Barracks Military Reservation.

The committee shall consider both short-term and long-term effects of leaks from fuel tanks, including effects relating to the health of residents, safe drinking water and the environment; response strategies to mitigate the leaks -- effects of leaks from fuel tanks; methods to improve communication between the United States Navy, Air

Force and Army, the state and any local board of Board of Water Supply, as well as the public in the event of a leak of any fuel tank; groundwater test results in relation to surrounding areas of the fuel tank facilities, with a particular emphasis on the groundwater near Red Hill Bulk Fuel Storage Facility, as well as the implication of shutting down any fuel tank facility; the updates on the progress towards meeting the goals of the agreement between the state and the federal government.

At this time I'd like to have Thu Perry kind of give a rundown of what happened at the November 2017 meet.

MS. PERRY: Thank you.

My name is Thu Perry. I'm the public participation coordinator for the underground storage tank program for Department of Health, and I just want to take a few minutes to give you some context about how this committee was formed and then also what they've done so far.

So for two years, starting in 2014, the Hawaii legislature passed a handful of concurrent resolutions putting together a number of temporary task force. This was to gather information about Red Hill, how they operated, and what they were going to

do in order to prevent releases in the future. During one of these meetings it was highlighted that Hawaii had other field-constructed tanks, not just Red Hill. So in 2016, as stated by Keith, this fuel tank advisory committee was formed in statute as law, not just part of a resolution.

In that first year, in 2016, the committee was told that the Army no longer had field-constructed tanks. Also, the Navy inherited all of the remaining field-constructed tanks from the Air Force that the Air Force used to own and operate. This was done during Pearl Harbor Joint Base consolidation. The committee chose to excuse these two agencies from future meetings.

Last year the Navy put together a formal presentation for the committee about the remaining field-constructed tanks. In summary, there are 31 active field-constructed tanks, excuse me, at two sites, Red Hill and PMRF, Pacific Missile Range Facility in Kauai, as well as other field-constructed tanks that are no long operational or either temporarily out of use or permanently out of use. These tanks are the subject of this meeting today.

That Navy presentation in 2017, as well as all other presentations, reports, minutes from

previous meetings are all available on our website, which is most easily accessed by Googling UST Department of Health Red Hill Task Force. I've also provided my business card outside if you prefer to email me for more information.

And before I hand it over to the Navy for this year's update, I just wanted to personally apologize for the crowdedness of this room. Historically, all of the meetings thus far have been 50 to 60 people, so this capacity would have been totally adequate. For the next meeting we'll consider a larger room. Thank you.

COMMITTEE CHAIR: Okay, thank you, Thu.

At this time are there any questions or comments from the committee members on the agenda items so far?

MR. LAU: Ernie Lau from the Board of Water Supply. I understand that there is a -- thank you for distributing a draft report from 2017, which was submitted.

AUDIENCE MEMBER: Can you speak into the mic, please.

MR. LAU: Is this better? Is it on? Ernie from the Honolulu Board of Water Supply.

The 2017 report is in draft form and

we've got a copy. I have some comments about the 2017 report which Thu just talked about. I'd like to recommend that the -- that there be some additions or corrections to the report, the draft report.

MS. PERRY: Sure.

MR. LAU: On page 3 of the report, and I apologize to the public you don't have a copy of this report, but on page 3 of the report, under permanently out of use, 13 tanks, Kipapa Gulch Fuel Storage Annex, I notice that there's -- it doesn't indicate, as it does indicate for the Red Hill facility and the PMRF facility on Kauai, whether or not the Kipapa Gulch Fuel Storage Annex is located over a drinking water aquifer. I think it should be consistent for all the descriptions of the tanks if it's over a drinking water aquifer or not over a drinking water aquifer, even if it's no longer in use.

And also I'd like to suggest that there's some references of historical releases at these closed facilities like Kipapa or the Hickam POL Annex in Waikakalaua, that the history of releases should be described further in the report, you know, how much was released, when it was -- the suspected releases occurred. And it mentions a record of decision and remediation efforts, and I'd like to suggest that the

remediation efforts be more descriptive in terms of what types of remediation, was there soil vapor extraction, monitor wells drilled?

So that's some of my recommendations over -- on this report to make it a better report.

And lastly, there's some acronyms used in the report. For clarity to the legislature and to the public, I'd like to suggest that the acronyms be spelled out, at least maybe in the beginning of the report.

And I note, Thu, you just mentioned that there's stuff -- the draft report has links to the DOH website for documents, including the minutes of the meeting. I'd like to suggest that not everybody has access to the Internet, that the report be stand alone by itself, a complete document with all references that are currently on the website, like PowerPoint presentations by the Navy, the verbatim discussion records, all be part of the report itself so it's a complete document by itself.

Because I'm also concerned about in the future that -- and it isn't the Navy, but more I've seen it happen in other federal agencies where things on the website over time get taken down, and these reports are supposed to be part of a permanent record,

so my suggestion is this report by itself should be a complete stand-alone document with no references to links on websites that are contained components of the report. That's why the report is so thin, I suspect.

Those are my recommendations to the chair of the committee.

COMMITTEE CHAIR: Okay. Thank you for those comments. If you can provide that to Thu for incorporation.

MR. LAU: Thu, I'll convert this to a letter from us summarizing our comments on the draft report.

MS. PERRY: Thank you.

MR. LAU: Do you have a timeline for submittal of the report to the legislature?

MS. PERRY: Right now it's drafted for internal review, so amendments are fine at this point.

MR. LAU: Thank you.

COMMITTEE CHAIR: Any other comments or questions from members?

Okay, hearing none, we'll move to item 5, Navy updates on the subject field-constructed tanks.

Captain Delao:

CAPT. DELAO: Keith, thank you very much. Before I get into this -- into our brief this year,

I'd like to turn it over to my boss, Admiral Fort for a few comments, and then I'll provide the update.

So Admiral Fort.

REAR ADM. FORT: Sure, thanks.

Good morning. Thank you for this opportunity to provide a few opening remarks before I turn it over to Captain Delao.

Is it on? Better? Great.

Sir, first of all, my name is Brian Fort. I'm a rear admiral in the United States Navy. In my current assignment I serve as Commander, Navy Region Hawaii, and Commander, Naval Surface Group Middle Pacific. Those are facts. I think I'm pretty good at my job. That's an opinion. And there's a distinction between the two. In my remarks and what you're going to hear from Captain Delao and any other members of my team today, will be nothing but facts. The truth, veritas. Not conjecture, not hyperbole, and certainly not fear, sir. Just facts.

A few important facts I would like to share. Our drinking water continues to be safe. And we are absolutely committed to keeping it safe. The Navy continues to modernize Red Hill. In fact, we've been doing so since prior to the 2014 release and the Administrative Order on Consent, and as a fact, since

2006 we've invested more than a quarter of a billion dollars to modernize and update the facility.

As part of that investment and in June of this past year, we began work to validate the effectiveness of our nondestructive examination, or what we call NDE processes, which many of you have read about in the paper or seen in the news. We use that to identify areas within the tank needing repair, and that will be part of Captain Delao's presentation today.

A few more facts. The Navy doubles the American Petroleum Institute approved industry standard for steel liners on the tanks at Red Hill. Those tanks as designed are quarter-inch steel; that's .25 inches. The API standard for such liners is only .05 inches. As part of our clean, inspect and repair process, if we find anything less than .16 inches, we repair it.

The tanks are not just steel lining, though, as those of you who have toured know. The tanks have up to four feet of concrete, a layer of gunite, and then a pressure injected layer of gunite which ensures that there is a positive inward pressure on the tanks at all times.

Each of these tanks must pass an annual

tank tightness test as part of our modernization. No tank has ever failed the tank tightness test. Similar to how we double the API standard for the steel liner, the API standard now requires that you test those tanks every year, vice every two years. We're now going to double that as well and we'll be inspecting our tanks for tank tightness every six months as opposed to annually.

And, yes, it is a fact that the tanks are more than 70 years old. That's why we modernize, and that's why we have such a rigorous, ongoing clean, inspect, repair process.

A few more facts about the facility. Red Hill is considered critical infrastructure by the Department of Defense. It is physically protected, it is cyber hardened, and it can operate without power. In the event of a national emergency and under the right circumstances, we can provide fuel to the state of Hawaii if the state were cut off from outside shipments.

Red Hill provides fuel for every branch of the military, including the Coast Guard and including the Hawaii National Guard. Red Hill fuel was used during recovery and relief efforts, not only on Kauai after the flooding, but on the Big Island

after the volcanic eruptions. The hospital ship USNS Mercy carried Red Hill fuel throughout the western Pacific and to Oceania as part of her partnership mission. Red Hill fuel is used by the military to protect the shipping lanes to and from the state of Hawaii. Red Hill fuel provides support to security, stability and prosperity throughout the entire Pacific.

Just a few more facts and I'll wrap up. We have taken more than 350 community outreach stakeholders through tours of Red Hill. We've provided briefings to hundreds more at neighborhood board meetings and public workshops. My predecessor and I have released ten stakeholder letters to date and had numerous engagements with both the media and many public officials. We will continue to be open and transparent and provide nothing but facts about Red Hill.

The fuel release, now almost five years ago, was the one and only release to the public since the Clean Water Act of 1988. The one and only release. That was due to a contractor's error and poor oversight, we acknowledged that after it happened, not due to an old, rusty, leaky tank. That's an example of fact versus opinion, and

sometimes outright untruth.

Over the past four and a half years we have improved workmanship, oversight, procedures and training. We've instituted additional safeguards, checks and balances and alarms, and we continue to work with both the EPA and the Hawaii Department of Health and are committed to the best, affordable, practicable technology when it comes to updating the facility.

One closing fact. In the extremely unlikely event petroleum every reached the drinking water, we would immediately respond to ensure the drinking water remained clean. That is federal law, and a responsibility we take very seriously. Red Hill a vital to our national defense. Operating Red Hill safely and continuing to modernize is both vital to protecting our drinking water as well. We are certainly and most unequivocally committed to doing both.

Thank you, Senator, for giving me a few minutes. I'll turn it over to Marc, and I'll be here to answer any questions, if you have any, that are directed to me.

COMMITTEE CHAIR: Thank you, Admiral.

CAPT. DELAO: All right, Admiral Fort,

thank you very much for that. And Senator and Members of the Fuel Tank Advisory Committee, also members of the general population, Marc Delao again, commanding officer NAVPAC Hawaii, also Admiral Fort's regional engineer, and I am honored to be here. Honored, all right, as an American, as a naval officer that served almost 30 years, this is -- this is what our country is all about. And the preparation for this is really part of our great democracy, and so I thank you for taking interest in this.

So without further ado, I'd like to walk you through an update on our fuel tanks and sort of show you what we've been doing, and also give you a sense for the continued work, the commitment that the admiral just spoke of that we continue to put forth.

MS. PERRY: Sorry, Captain. Anyone want a hard copy?

CAPT. DELAO: Excellent. What was the question?

MS. PERRY: Is it available online?

CAPT. DELAO: It is not, but this is all information, obviously, that's for the public.

AUDIENCE MEMBER: How are you going to get it published? How would it be published and we can see it?

MS. PERRY: All of these reports are available on the website. They're public.

CAPT. DELAO: Okay, everybody's okay? Copies have been distributed.

Let's -- so the first slide is just a transitional slide, and so here are the sites that we'll be talking about, okay, and so I was not here for last year's iteration, but obviously the Navy, in continuity, we're going to replicate sort of what we did last year in sort of giving you a sense for all sites, and then of course Red Hill being the one probably of the most interest and we'll probably spend the most time on that one. Okay? So that's really just the order of march and without further ado, if I can advance to the next slide, please.

So the first slide that we'll talk about, and I will say that really in comparison to what was presented last year, nothing really has changed, and so this is a site that is out of use. It was operationally in use from 1941 to 1991, so about 50 years of use, and so it is under contract, awaiting approval for a contract mod for some work that's being done in cleanup, but the system itself and the facility itself is out of use. And then you can see -- and this is -- goes a little bit to what

Mr. Lau's comments were about showing graphically, and this is really for those in the audience, right, obviously green being the aquifer and non-green being non-aquifer. So you can see out of commission, being cleaned up, and then obviously not in the footprint of the aquifer. So that's really -- that's the first site.

So let's go ahead and advance to the next one. Next site would be -- we've got two sites that are part of the Hickam POL Annexes. And so you can see there those two sites fall within the aquifer, but these are not in operational use, okay. So let me walk you through that a little bit.

Next slide, Darrell. Okay. So this site is again not in use. It was operational for about 50 years from 1943 to 1993, and so this one is currently taken off site, offline. And now there were some questions from last year, and if you'll advance.

Okay. And so, again, not having been here last year, but I did want to make sure in sort of the fidelity and sort of the spirit of this committee, make sure that we picked up those questions. So the question from last year was what are TPH cleanup goals for the Hickam POL Annex?

And so we are showing there what the

goals are. And what I would say for the committee and for the audience, that these are the parameters, the goals, and then the actual data right here would show that we are below those criteria, okay. And so I think that answers the mail, but I definitely want to make sure that in the spirit of transparency and reporting that we took the homework assignment to heart and that we did the research and that we are showing the math and science and facts and figures, and again currently both thresholds below the standard, okay.

Next slide, please. Okay, so the second Hickam POL site. Similar, this one is out of use, so permanently out of use. It was online for 50 years, and so this one sits in a nonoperational status, and the picture there is just simply showing the infrastructure as it is currently. But again, it's not an active fuel POL facility.

All right, next. Which brings us really to, I think, the two sites that we'll spend a little bit of time on. So these two sites are operational. So as Thu mentioned, this site is in Kauai. This is PMRF and, again, you can see in use. Aquifer here. Really along the coastline, and so not on the footprint of the aquifer. So that's key to note.

That's a certain risk area that, you know, mitigated risk in that regard.

Darrell, if you'll advance, I'll sort of provide a graphic, and this is just representative sample of what the facility looks like, what the infrastructure looks like. So obviously it's constructed in ground, you get that sense, and then on the right you get a sense for sort of the pristine status.

And I'll say with this facility, much smaller than Red Hill, but nonetheless, you know, high level of investment and interest in making sure that the system is well maintained, and, again, from an operational standpoint, integral to the operations out at Barking Sands and so diligence being given to maintaining the infrastructure.

So let me just walk you through some facts on this facility. Nine tanks. Each tank -- and each tank obviously below ground is slightly greater than 50,000 gallons, okay, and so really the threshold for a lot of these criteria is 50,000, and so we're slightly above it, so we must comply and we must report on this, and we do that and that's why this is part of the brief this morning.

Again, currently in use. These are

epoxy-lined steel tanks constructed back in 1942. All tanks were inspected between 2011 and 2012, and they are all in compliance with API 653 standards. This system employs an impressed current cathodic protection system, and we employ an annual third-party cathodic protection assessment survey to ensure that that system is functioning the way it was designed.

All tanks are equipped with visual and audible alarms for spill prevention. All tanks are equipped with a third-party certified fuels manager defense leak detection system. Leak detection tests are done on these tanks monthly, and leak detection system certification is done annually. And that's the PMRF system.

So I'm going to pause. And very quickly I've covered the systems that are offline. I've covered the Kauai Barking Sands system, and so I will open up for any questions before transitioning to Red Hill.

Mr. Lau.

MR. LAU: Just a question. With the recently passed USD regulations updated rules by the state Department of Health, is this facility, does it have a permit to operate? Or will you be applying to a permit under the new DOH rules to operate the

facility within one year?

CAPT. DELAO: Mr. --

MR. LAU: Can you folks hear the question?

AUDIENCE MEMBER: No.

MR. LAU: So the question I had was the Department of Health passed some recent underground storage tank rules and update to their administrative rules in July of this year, and my question was, because this is a field-constructed tank that was previously not required to get a permit, but under the new rules I think they're required to get a permit. And is the intent by the Navy to get a permit for this facility and also the other operating facility, which is Red Hill?

CAPT. DELAO: Correct, the intent is to comply with that and to submit the permits.

MR. LAU: And you have to do that within one year; is that correct?

CAPT. DELAO: (Nodding head.)

MR. LAU: I see nodding heads from Navy sites.

CAPT. DELAO: Any other questions on PMRF?

MR. YOMES: Yes.

CAPT. DELAO: Yes, sir.

MR. YOMES: These tanks that's not in operation at different sites, are these tanks the same size as what you're dealing with in Halawa?

CAPT. DELAO: No, they are much smaller.

MR. YOMES: And these tanks have been used for 50 years, have you folks ever took one of those tanks out and find out what happens on the bottom of these tanks as far as erosion and stuff to see what happens underneath?

CAPT. DELAO: So, turning back to the experts that have been here for a while, so indications are no, we have not done anything of that nature.

MR. LAU: On the -- a question on the tanks that are no longer in service but were in service for maybe 50 years or so, at Hickam POL Annex at Kipapa and Waikakalaua, did you have leaks from the tanks and what was the estimated volume of the leaks, since these are also located over the drinking water aquifer.

CAPT. DELAO: Go ahead. This is Aaron Fuentes, he is my environmental director. He's been with NAVPAC for a while. Go ahead, Aaron.

MR. POENTIS: As far as these tanks that

are concerned, you know, these are being cleaned up under the, I guess what we call Super Fund, Super Fund regulations, and it's completely under the oversight of the Department of Health.

And so as Captain Delao has indicated, these facilities are closed down. We're in the process of cleanup. It's -- some of these were inherited by the Navy as part of Joint Base from the Air Force. And so we're in the long-term cleanup program. We have monitoring wells. We're seeing the cleanup is progressing as anticipated.

I cannot speak to the specific volume offhand of what the releases are, but to, you know, address the concern that you had made, and I think we expressed this in previous meetings, all of this work, you know, by rule is under a lot of public scrutiny. So we have routine public meetings, we call them Restoration Advisory Board meetings. All of the documents and reports, studies, the proposed plans, they're all well documented, all submitted to the agencies. They are in public repositories either in the state libraries and the various communities. And I believe we put you on the mailing list so you're made aware of these reports as well as provided committees of copies of these reports as.

MR. LAU: Thank you, Aaron. I think periodically a CD shows up in our mailbox. I haven't seen one for a while, though.

MR. POENTIS: Because we're in the long-term cleanup right now.

MR. LAU: There's also these field facilities, and I know it's not the Navy's, you kind of inherited this when Joint Base Pearl Harbor-Hickam was created, there's also connecting pipelines that connected both facilities all the way to Pearl Harbor or to Hickam; is that correct.

MR. POENTIS: That's correct, that's correct, several sites.

MR. LAU: And several sites have leaked.

MR. POENTIS: That's correct. And we have cleanup for all those sites as part of the overall effort under the Super Fund program.

MR. LAU: Is it possible, I notice you have the separate actions under the Super Fund cleanup process, but is it possible to get like an overview of the whole field facility of both of Hickam, both facilities at Hickam that are no longer in operation and also connecting pipelines, kind of get an overall picture of what was released, how much was released, and the remediation efforts and monitoring efforts,

kind of an overview, instead of having to go to separate actions and try to dig out the separate actions.

MR. POENTIS: So certainly all of the actions are, like I mentioned, subject to public scrutiny. We have public meetings. I mean, I understand your question and we can take that for consideration.

MR. LAU: I would appreciate it, because Pearl Harbor aquifer is one of the most important aquifers, and we have a lot of wells around the areas where these facilities are located.

MR. POENTIS: Sure.

MR. LAU: Although I want to make it clear, we have not detected fuel at this time in those wells.

MR. POENTIS: And as part of the cleanup program that is overseen by the Department of Health, they recognize through the monitoring program that we are not affecting groundwater.

MR. LAU: It is great for us to understand where the releases occurred, when they occurred, what was released, what is the -- what was detected in the vadose zone, the unsaturated zone or in the groundwater itself, what remediation efforts

have been taken, how much has it cost, and when is it going to end?

MR. POENTIS: Sure, I mean, like I said, all of that information is publically available in public repositories, but if the desire is to aggregate them together --

MR. LAU: Just as a request, as a task force committee -- Fuel Tank Advisory Committee member, can you make is easier for us to actually get access to that information by consolidating it or summarizing it so we can see the big picture of what happened here in the past?

And then I want to make clear, this is not under Navy's responsibility, but when it was operated by other services of the military.

MR. POENTIS: Yeah, it wasn't caused by Navy activities, but we have functional responsibility to continue the cleanup.

MR. LAU: Right, you inherited, but for at least for us it would be much easier to understand the scope and magnitude of what happened there.

MR. POENTIS: Understand.

MR. LAU: Thank you.

CAPT. DELAO: Okay, Aaron, thank you.

Okay, so let's -- we've got a few more

copies.

So let's transition to Red Hill, and so slide 11, Navy and Department of Health update on the administrative order on --

COMMITTEE CHAIR: Let me pause here real quick. Are there any other questions from committee members, comments on the current field-constructed tanks?

Okay, thank you. Go ahead, Marc.

CAPT. DELAO: Okay, all right. So, Darrell, next. Okay, so similar to what I did with the question from last year, same here, right. So going back to last year, the question that I wanted to address up front and then sort of go into the new stuff, stuff that we've done over this last year, but a question from last year: When Red Hill surge tanks last underwent American Petroleum Institute inspection, how many areas were found requiring repair?

And so we have bulletized the response there. API 653 inspections last completed on all four surge tanks back in 2004.

19 areas were identified for repair during this inspection.

All repairs successfully completed and

passed subsequent testing.

Each surge tank successfully passed tank tightness testing since those repairs have been done.

And next cycle of clean, inspect, repair has already began. And in fact the next cycle started in 2018, this year, and the plan is to kick up all four. And one thing I want to point out there is that there's a periodicity of 20 years, and so we're in fact picking this up early, and we're going to go through and take care of that.

So again that was a question that was brought up last year. I wanted to make sure that we addressed that, wanted to make -- provide that vision for not just follow up, but also leaning forward.

All right, next slide. So this slide is pretty busy, it's pretty wordy, but it's a good rundown of all the actions that we've taken, all right. And ladies and gentlemen, you know, hear me well. We're taking this very seriously. And the admiral spoke of money that's been invested in this, I'm going to speak to experts and experts, and a lot of work that's been done in relation to the AOC, but in some regards above and beyond the AOC, okay. And so this is where I sort of talk a little bit about, hey, as the engineer, as Admiral Fort's engineer, I've

got certain responsibilities there. As a steward of the environment, I've got responsibilities there. As a naval officer being a steward at your taxpayer money, I've got certain responsibilities there. I'm also a purveyor of water to our military.

And so I'll show you a graphic in relation to Red Hill where we've got a shaft, water shaft, and we've got a few others throughout the island where we draw from that very same aquifer.

So ladies and gentlemen, I've got a little bit of a vested interested in doing this right, and so in the short time that I've been here, I've taken it very, very seriously. Very seriously. And I'm going to be in this job for a couple of years, and I plan on taking that AOC, following it to the letter of the law, and where it is practical and where it makes sense, to exceed the minimum requirements.

And this goes back to my early training at the Naval Academy and 20-plus years of serving this fine nation, the minimum standard is the minimum standard. You know, we strive for much higher than that. And so I look forward to sharing with you this morning some of those efforts in that regard.

But this is a quick rundown, and I'll walk you through some of this, not all of it, but

certainly the ones up at the top that are bolded, you know, I think those are the ones that are probably of the most interest, and so we'll definitely spend time talking about that. But this is a good list of efforts. And for the nontechnical, you know, I'll do my best to sort of explain what some of them are, but it's a lot of math and science, it's a lot of accumulating of facts, truth, veritas as the admiral spoke of, and analytics that go behind it.

So without further ado, let's step through some of these, and I look forward to sharing with you the work that we've been doing. All right, Darrell.

Okay, so this slide shows, again, for the audience, for the experts that have been tracking this for a while obviously you're familiar, but the Red Hill facility, right? So 20 tanks. And of course you know that two are offline, so really what we're talking about is 18 tanks that we are maintaining and doing inspections on and repairing and improving, okay. And so this slide is meant to show those tanks, and then it's also meant to show the sampling that we do.

So we talk a lot about maintaining the tanks and that's where it starts. The structural

integrity of those tanks and understanding the condition of those tanks, and we'll talk a little bit about further corroborating the techniques that we use for ensuring that we're inspecting and repairing them accurately and correctly. We'll talk a little bit more about that, but it starts with that.

This graphic is showing you and showing me and showing, really, consumers of that precious water, the system that we have put in place to monitor the aquifer, to be able to draw samples in the vicinity of Red Hill, and to understand what's in the aquifer, what the condition of that water is, and to do that in a manner where we're employing the latest technologies, math and science, doing testing, okay. And we do quarterly testing, we do monthly testing of the sampling areas around the fuel facility. We also do soil vapor testing underneath the tanks themselves. Okay? And we are extremely judicious about that, and with everything else that we do, absolutely transparent. So all the results are available to you, and I'm going to tell you right now, and as the admiral said, it's testing and it's testing with no issues, okay, and so you need to understand that.

This graphic is also showing that we're not resting on our laurels. Understanding the

hydrology, understanding the water around the facility is important, but we continue to make investments. We continue to make investments in that area in the form of additional sampling sites so that we can further understand what's going on, and that we have further assurances.

And so this graphic, I use this quite a bit. It gets a lot of run time in terms of showing exactly what we've set up, what we've got today, but more importantly the future investments of understanding, again, the condition around the Red Hill facility.

COMMITTEE CHAIR: Captain Delao, would you take questions during your presentation from committee members, or would you rather wait till the end?

CAPT. DELAO: I think, if I may, I'd like to go through this, okay, and you've got my promise, I will provide time at the back end, okay, and really there's a lot of slides in here, but there's a lot of wash, rinse, repeat. So we're going to get into the coupons, and I know you're interested and intrigued with the coupons, we're going to talk through that, and then we'll pick up questions at the very end.

Darrell, if you would go back.

So I mentioned the coupon removal. We'll talk about that extensively, and I've -- Senator Gabbard, you had requested previously pictures, and so we have that in the presentation to show what that is. I want to explain to you, I want to demystify and explain to you what we've done and where we are in that process, okay, and so I'll definitely do that.

I've shown you the water sampling. You know, very quickly, I'll sort of hit some of the items up at the top. You know, this Monitoring Well No. 11, that was something that we just did this last year, and that goes back to that graphic I showed of adding additional sampling areas. We've got plans to add three more.

Things that we've done. We continue to do tank tightness testing, and as the admiral said, we've been doing that annually. This year we're going to transition to twice a year. So we're taking the standard and we're doubling that. And historically there have been no issues as we've done these tests. But again, not resting on our laurels, we're going to do that more frequently. We're taking this very seriously.

The coupon removal. So hold that thought. We're going to get into that. We're going

to spend quite a bit of time talking about coupon removal. There's a lot of intrigue and interest in that area, and rightfully so. I'm going to give you facts. I'm going to give you the science and math behind what we're doing, why we're doing it. I'm also going to give you a sense of where we are in the time frame.

The other things that we've done. The Tank Upgrade Alternatives Report. That's a document provided by the AOC. We did that. That was required by the AOC. We did it on time. Submitted it. It's out there for consumption by anyone who is interested. And I've got a slide in this slide deck that sort of summarizes some of that information from that report.

We established a working group for groundwater modeling, and this -- that really is a provision above and beyond the AOC, okay, and so that effort, that faction, that group, that venue is really a good example, good representative sample of your Navy taking, again, that AOC and doing a little bit more than the minimum requirement, okay, and doing it in a collaborative manner with regulators, Board of Water Supply, those that have a vested interest in understanding the hydrology, right, and not to bore you with details, but that's what this is all about

is, not the structural integrity of the tanks, not the condition of the aquifer, but understanding the science, the hydrology of how water flows in that area so that in the event, the highly unlikely event of an inadvertent release, we understand the conditions of flow in and around and under that facility.

I already talked about the monitoring well, what we put in there. And then some other things that we've done this last year, again, per the AOC and, again, we report that to you.

All right, Darrell, if you could advance.

Here are some of the documents that we -- this last year that we have completed, and these are documents that are -- that were required per the AOC, and so this is a good summary, if you will, of when we submitted those, and these are available for, again, for public review. The Tank Upgrade Alternatives Report, that was submitted May 2018. Predates my tenure at NAVFAC Hawaii, but again it's a testament to the continuity, the consistency of the team, and the fact that in uniform we come, we go, but this process transcends that. And so that was taken care of back in May of 2018.

Destructive Testing Plan, that was submitted June of 2018.

Release Detection Alternatives Report, that document was submitted August of 2018. And although three small bullets on one slide, those three small bullets represent a lot of math and science and expertise. And, again, if you are intrigued, if you're interested in what's contained in those documents, that information is available, and -- but, again, this doesn't really give it justice in terms of the level of effort and sobriety given to, you know, doing the work and doing it thoroughly and doing it well. But that was homework submitted, if you will.

Darrell, next.

So let's talk a little bit about the here and now and the future, all right. So part of this faction is reporting what we've done, but also casting a vision for where we're going. So that long list that I sort of went through previously was really what we've done this last year, this is we're looking at accomplishing over the next year.

The first bullet is a study. So if you've been following Red Hill and following it pretty closely, you've heard maybe in the newspapers or maybe in media, a compilation of studies that the DoD have undertaken or completed recently or are in the midst of completing. And so what I highlight with this

first bullet is one study that just recently kicked off. It's a high-level study that's looking at not Red Hill, but there's obviously equities and there's interest in terms of Red Hill, and rightfully so, but it's really a holistic look at fuel DoD wide, Pacific theatre, right, looking west, looking at things that are happening out there, some of our peer competitors, that kind of thing, not to get into a lot of detail, but in the event something were to happen, where that fuel needs to be, where we need to access it, and what makes the most sense, okay.

And, again, not to bore you with details, but ships, submarines, aircraft, the whole military complex, you can, in your mind's eye, picture that, and in the Pacific we've got multiple sites all over the place where fuel resides, okay. Red Hill obviously is a big one, but not the only one, you know, Far East and all the way to the West Coast, right, and so this study is going to look at all of that. It's almost like playing chess in terms of time and distance and what we need to do as a military and how fuel is the driver for that, okay?

So this is, you know, a big study, and it doesn't play into the AOC per se, but it does play into sort of our higher level thinking. And everybody

in this room can appreciate that fuel, if we go to war, is going to be -- that fuel and where it needs to be and its accessibility and its ability to be tapped into by our operating forces, extremely important. And so this study is going to give us great insight, okay. I'm not a prophet nor am I betting man, but I would surmise that in this study Red Hill will be mentioned, and I think it will probably affirm and highlight, you know, sort of that importance of that, as the admiral said, critically important infrastructure that goes back to World War II and the importance there. And so I would surmise that in some way, shape, or form that probably will be called out in some fashion in this study.

But I want to give you that because I want you to understand, people, that the military thinks through this, and just like there's analytics, math and science to the facility itself, the actual requirement for these fuels, the same level of analytics, right? And so that's a key point. So over the next year that study will be looking at stuff like that.

We've got the Tank Upgrade Alternative Decision document. That is part of the AOC. And I would say this bullet and this bullet are -- the

Release Detection Decision document, two different deliverables, but are going to be submitted at the same time, okay? And so ladies and gentlemen, that is tracking for December. So pretty soon. And I know the team over here has been working extensively, working very hard on that, and when we submit that, again, to the regulators, right, and the regulators being EPA, Department of Health, that those documents will be made available as have everything else under the AOC, but that's sort of our next milestone coming up.

Other items that we'll be looking out throughout this next year: Destructive Testing Results Report, continuation of this Groundwater Modeling Working Group, Groundwater Flow Model Report, okay, and you can see some other items that we're going to be implementing. This last one here, again, just to sort of foot stop that one, we're going to semiannual tank tightness testing for the tanks. So that is a big shift.

Okay. So that sort of gives you a summary of things that we're going to be doing this upcoming year.

This slide speaks to current projects that we have, right? So as we talk about AOC and as

we talk about leveraging technology and improving processes, be it the process to ensure the integrity of the tanks or be it the processes that the operators, and I'm looking at Blake Whittle and John Floyd who run our fuel operation and run it very professionally, be it the processes that play into the operations, nonetheless, all of that, we're always looking for, again, that continual improvement.

This speaks to the projects, and so we are in the midst of doing clean, inspect, repair for four of the tanks, right, four of the 20 tanks, and so you have the tank numbers there, 5, 13, 14 and 17. And so those are still in progress, various degrees of clean, inspect, repair.

Tank 5, we're looking at, and this is just to give you a little bit more detail, a little bit more specificity, Tank 5, tracking for a completion 2020, okay. So, again, I would say Tank 5 has under repair for a while, and rightfully so, okay, that was the tank that we had issues with, and so we are taking that extremely seriously, and in that regard have started over. And so this is the second run at Tank 5, pushing to the end, and so we're projecting being completed with that 2020. Tank 13, 14 and 17, also 2020, but later, like midyear 2020.

And I would say for those that are new to this, that maybe this is your first exposure to Red Hill, clean, inspect, repair, you're thinking, okay, that's a couple years down the road, right, I mean, these projects take several years. These projects, if I had more time, you know, I'll just sort of give a quick summary, but the level of effort that goes into cleaning that gigantic tank and the technologies of scanning every square inch, every square inch, two people in a basket in a massive tank, every square inch, and then really understanding what you are scanning and what you're seeing and then doing the repairs based on the criteria that we have in place, you can see that that is not a quick evolution. So these projects take years. These projects run upwards 15 to $18 million a tank. So we're not talking inconsequential maintenance investments, we're talking substantial, substantial maintenance investments, and time that goes along with that.

So, again, 5, 13, 14, and 17, projected to be completed 2020. And then you can see the next batch. The next salvo we have Tanks 4 and 18, but from an operational standpoint, those will not come offline, they will not jump into the clean, inspect, repair cycle until 5, 13, 14, 17 come back online, and

it's one-for-one sort of phasing.

But that gives you a good sense for the maintenance. When I say "maintenance," it really is, it's high-end maintenance. So it's not bare bones maintenance. It is, again, leveraging the latest technologies and making repairs. The admiral spoke of the criteria for invoking a repair, .05 is the minimum, right, that's the minimum thickness of the steel, we go for .1, but in fact we repair anything that's at .16, and the reason why is we're projecting out in terms of future, right, and not doing the minimum, in fact doubling the minimum and then going above that. And so that's the process that we continue to follow.

And the technologies of scanning, okay, and this is a perfect segue into the coupons, because that really is sort of what that's all about in terms of the latest technologies used, and try to, in your mind's eye, visualize being in scaffolding or a basket on the side of a large tank with a scanning device, almost like an ultrasound kind of thing, where you're looking at, you're pressing up against the tank, and you're trying to get a sense for the backside of that steel, and it's going to give you insights as to whether what you're looking at needs to be repaired or

not.

Okay, and so my point is that technology, as we live in this fine country, continues to get better and better. And as it gets better and better, we continue to leverage that technology, so that we have a clear sight picture of exactly what we're doing as we're doing the tank inspections so that we know exactly what needs to be repaired.

Darrell, next slide.

So this slide is intended to give you an up front "so what," if you will, of this -- the destructive testing that we're doing, specifically the coupon removal. So lots of words, but let me sort of walk you through the pertinent pieces here, okay?

So what we're doing per the AOC is we are validating, verifying, and corroborating our techniques. Okay, it has nothing to do with the actual condition of any tank, in this case Tank 14. It has everything to do, ladies and gentlemen, everything to do with validating and corroborating our technique. Really understanding that phenomena of being on the inside of the tank and understanding what's on the backside of the tank liner. That's what it's all about, okay?

And so we use technology to scan the

tanks, the tank liner and to understand what's on the backside. And that process then drives what we do for repairs. Has the steel thinned to a point where the section I'm looking at needs to be patched or another piece of steel needs to be placed over it, okay? Is the corrosion -- and I'm going to tell you right now, corrosion, right, you're in a mountain, there's water, you're going to have corrosion, you're going to have surface corrosion, but as an engineer the corrosion that I'm most concerned about is the kind that pits steel and drives into the steel and starts eroding the steel, okay. And so our technique is going to scan on one side and is going to give us a picture of that type of corrosion on the backside. And again we're looking at every square inch.

And so this testing is all about doing that scanning, coming up with what we think needs to be repaired or not repaired, and then cutting out sections of the tank liner. And it's the standard proof is in the pudding, okay? Scanning says do this, we take the coupon off, and we actually physically, you know, no longer electronically, no longer electrically, but physically validate that, okay, and that's done by a lab. And in this case the lab, mainland, we took the coupons out, shipped it off, and

they do deep forensics on those coupons to give us a true picture, fact-based picture of the condition of that steel so that we can then compare it to what we predicted. Again, it's all about verification, validation and corroboration.

So we are awaiting the results. I'm going to show you pictures, and these pictures were taken back earlier in the year before we shipped off the coupons, the metal coupons to the lab in Kentucky, and so full transparency, I'm going to show you what those pictures are. I'm also going to give you my prediction, the prediction, again, predicated in the scanning techniques that we currently use. That prediction is going to be corroborated with the analytics done by the lab when we get those results. And ladies and gentlemen, we don't have those results yet. The coupons are still at the lab.

Testing is only the first phase of the study. So what is that saying? That is saying that we cut the coupons out, you ship them off, they get analyzed, and we get data back. It's data. It's not a report. It's not a final conclusion. It's data from the lab. And then we analyze the data, and we synthesize it, and we come up with a conclusion. So the students, I just saw them get up and leave, but

it's the basic scientific method, and so it works, and so this is the -- this is step 1, which is getting data. Do not have the data yet. Do not have the data yet. It's still at the lab.

I just spoke of the next bullet. Next phase compares lab analysis with the data from non-destructive evaluation. Again, those are subsequent steps that are going to lead to a final report next year, okay, next year. So it's got to take the steps and we've got to have time to be able to do this analysis again of the techniques we're following.

AOC requires the results of comparisons submitted in the middle 2019. I just mentioned that. And again we are awaiting the results before we make any conclusions, and so, ladies and gentlemen, I want to really highlight that. It goes back to the opening comments of facts, truth, veritas, and we are committed to that. By virtue of doing this testing we are committed to that. And we need to allow it to run its course in terms of getting the facts back, getting the data back, and being given the chance, the opportunity to do the analytics and to package it, as Mr. Lau was asking for information on history of some of our, you know, inop -- you know, removed systems,

but to package things in a manner that's cogent, succinct and easy to follow, so we're going to do that. But again, we need some time to do that.

Next slide.

So for those unfamiliar with Red Hill, this is a representative sample of what one of the tanks looks like. And there's, again, 20 of them. Two of them offline. 12.5 million gallons in a gigantic tank. 250 feet high, 100 feet diameter. This picture, my verbal description does not give it justice. It's one of those things, truly, you've got to see it to believe it.

And the admiral spoke of, you know, many, many, many tours, many, many opportunities, many, many people both here on island, off island, DC, just in the short time that I've been here, lots of tours. We have a tour this afternoon with the staff delegation. But the point being is this is one of these things in our fine world that you've got to see it to really get a sense for it.

And so this is a picture of one tank, and the purpose of this picture is to show you in the blue, you know, sort of the four areas that we drew coupon samples from, by design. And I want to highlight that because there was math and science in

the actual process of taking those coupons out. So there were ten coupons cut out of the steel liner of Tank 14, and we wanted to get a good representative sample, right, so, again, going back to that scientific method, a good representative sample of the situation in a tank.

And again, ladies and gentlemen, this has nothing to do with the condition of the tank or the structural integrity of the liner, it has everything to do, again, with the validation and corroboration of the techniques that we're following.

So lower dome, barrel section, expansion ring, upper dome, so you can see from the top down to the bottom, those are the four areas that we targeted for pulling coupons out.

Darrell, next slide.

All right. Ladies and gentlemen, this table is a quick summary, again, the four areas that I just spoke of in that -- in Tank 14 and then number of coupons taken from each of those four areas, so upper dome, expansion ring, barrel section, lower dome. Ten samples cut out, okay, and then the right column is -- and this is by design, we picked coupons, because, again, corroborating our techniques, we picked a 50/50 split of areas that our scanning said you must repair

and then areas where the scanning said, no, this is fine, you know, the condition is such that don't need to repair this.

So the engineer in me, the scientist that's exactly what you want. You want, basically, that balance to be able to look at the technique again and to fairly assess. The scanning said I'm good, ship it off to the lab, they either corroborate that as such or they don't, or scanning says, hey, this is thin or the corrosion is such that it must be repaired, pull it off, again, the lab is going to validate exactly, you know, corroborate yes, the scanning got it right, or you're not below the threshold. So that's the whole idea behind removal of the coupons. 50/50, I wanted to show that to you, and I think this is important because until we get the report back, I think it's important for folks to understand what we've done in the process of doing this coupon removal and the technique behind what we selected and why we selected it.

Next slide.

Okay. So now what I'm going to do is I'm going to walk you through the ten that we pulled off, sent to the lab, okay, and again, we do not have the results back, but what we do have, and as I've

explained the technique, we do the scanning and so we have that assessment up front, basically that's the opening argument in terms of what we saw through our contractor, through our scanning techniques, pull off the coupon, now it's at the lab and we're awaiting the validation corroboration.

So coupon number 1, screening scan. And not to get into a lot of detail, but it further drives home and accentuates the point of the technique, okay? So as we go into that tank, we do a screening scan and then we do a prove up scan. So it's a two-step process of step 1, what do we think, okay, we've got a positive, okay, step 2, let's really validate that, okay? And again, try to visualize in that tank two folks in a basket doing that for years. Every square inch, okay.

So this is saying, coupon number 1, screening scan indicates repair is necessary. In other words, that steel is below the minimum standards that we've set, .16. Prove up scan indicates that second step that, yes, indeed that patch, that piece needs to be repaired. So that is a positive, you know, in the context of doing clean, inspect, repair, that section, that coupon, that area, you must repair it. Put a plate. Fortify it.

So we expect -- we expect, based on techniques that we follow and the fidelity of the testing and the confidence in our techniques and the contractor that we are using now, we expect that the lab when we get the data back and we've done the analytics, we expect the measurement to validate what we said with the scanning. And so we will wait to get that, but that's the prediction, if you will, so that's coupon number 1.

All right, Darrell.

All right, coupon number 2, same. I'm going to walk you through you all ten of them, and you can sort of visually, and I would say the visual, right, you know, sometimes, you know, not everything is as you would see or that you would think you would see, so I would caution that there's more to it than meets the eye. There is more to it than meets the eye. You're going to get a picture on the right, you're going to get the prediction on the left, and again the lab is going to reconcile those two.

So for coupon number 2 screening scan indicates repair is necessary. The second step showed the same. So like the first coupon, we're thinking the lab is going to corroborate that, that that section, that coupon, as our techniques had indicated,

requires replacement, requires action, okay, and so that is what we're expecting to get back.

Darrell, next.

Okay, so coupon number 3, a little variation here. The scanning, the first step scanning indicated that repair was necessary. The second step, you know, deeper look, more comprehensive look, indicated that repair is not necessary, that it was not below the minimum threshold, and so we expect the lab to corroborate that.

Darrell, next.

Coupon number 5, similar to the first couple. First scan indicates repair is necessary. Second scan indicates, again, it's necessary, so we're assuming -- we're operating under the context that this will be validated for nondestructive.

Okay, go ahead.

Okay, coupon number 6 was a control sample that was taken.

All right, Darrell.

Okay, number 7, same. Same here, that first scan indicates repair is necessary. Deeper scan, secondary scan, same, and so we're expecting that to be substantiated.

Coupon number 8, so this one showed

initially repair was necessary, prove up scan indicates repair is not necessary, so we're expecting that.

This one is a good example of first scan saying this patch was good, that it met the requirements, did not need repair. And so pulled it off, ship it off, we expect the lab to validate that.

And then coupon A1, we've got a situation where the first scan indicates repair is necessary, the secondary scan, again, repair is necessary. We expect that to come back corroborated as such.

And then coupon A2, similar to one a couple back. This showed through our scanning techniques that repair was not required, pull it off, and so we expect the lab to substantiate that.

Okay. So we are getting close it the end. So this slide is the tank upgrade alternatives. It's a matrix showing the six alternatives plus an alternate location down at the very bottom. So this is not news. It's not new. It's that which was reported previously, but I wanted to include it in the presentation as context and just for history.

So -- and it also serves as a segue into sort of last thing that I'm going to talk about this morning, which is the preferred alternative that we're

going to be proposing, and again this will be in the decision document that's tracking for December.

All right. Darrell.

Okay. So the -- this slide summarizes our -- where we are right now in terms of the tank upgrade alternatives and what we're going to be proposing. And so what we're -- what you're going to see in the document when we submit it is that we're going to be proposing that we continue with our clean, inspect, and repair regimen that I have talked about at length morning.

We're also going to be proposing a pilot, and that's one -- that is actually tank upgrade alternative 1B. We're going to be proposing it for one tank, and that is going to be a full epoxy of a tank, okay, and so that's what tank upgrade alternative 1B is all about. The AOC includes provisions for pilots, okay, and so we plan on doing that with one of our tanks.

So it's a combination of clean, inspect, repair using the latest technologies that continue to evolve and giving that full diligence, and then doing the pilot on the epoxy coating for a full tank, the entire tank. And then the last piece of it is installing leak detection systems on all the tanks,

using the latest technologies, which will then give us structural integrity with a clean, inspect, repair, okay, the pilot with the epoxy, and then situational awareness and full cognizance real time for leak detection and having that site picture for the tanks. So that's based on our analytics and discussions internal to the Navy, also with the regulators, that's what we're going to be proposing.

So why? Why is this the best available, practical technology? And so this is really Marc Delao's sort of explanation on why I feel, as the regional engineer purveyor of water to our DoD, why I have confidence in this decision, okay.

And so the first bullet is it's history. It's fact. Okay. And that is the inadvertent release at Tank 5, as Admiral Fort established, operator error, and not to go into a lot of detail of what happened, but I think it does bear a quick reminder in terms of bad contractor, bad quality control, bad quality assurance, operator error, okay, a compilation of things that led to that situation. And I would say all of those factors have been addressed, have been addressed, and that, you know, almost five years ago, improvements made in all of those areas, okay.

Second bullet expounds upon what I just

said, human error. All right? Human error and really nothing to do with the condition of the tanks, everything to do with humans, okay, not following up or not doing things as well as should have been done or could have been done. That was then. This is now.

All right, so the next bullets really speak to "this is now" part, which is we continue to do tank tightness testing and all tanks continue to pass. I've talked previously about the requirement of doing this annually, and then this year going to semiannually. So the data would show tank tightness testing working, working well, but we're still going to do it twice a year, and we're going to do that to further build confidence and assurances that the system has full integrity and that the techniques that we're following, both in clean, inspect, repair when we take a tank off or just in the daily operations and the daily maintenance are truly keeping the condition of that infrastructure where it needs to be.

Current maintenance practices effectively measure the tank liner thickness and identify repair locations. That speaks to the scanning techniques that we follow, and it goes back to the coupons, and it goes back to that part of the AOC of corroborating that, but I'm going to tell you as CO of NAVFAC,

responsible for the infrastructure, responsible for the contracting, I have confidence in that system. It's a system that is industry accepted, it's not a system that's unique or just used in Red Hill, it's a system and it's a process that across the industry is being used. So I have assurances with that.

The vulnerability assessment, noted highest risk of large release in the nozzles in the lower access tunnel, not the tanks, okay? And so that's fact. That is fact. And we're taking that fact, and we're doing actions with that in terms of looking at the nozzles and looking at opportunities as we take tanks offline to address the nozzles, to limit risk, if you will, in terms of taking systems where perhaps you have more nozzles than you might need and sort of mitigating and limiting risk by consolidating that down.

We're also looking at upgrades to the nozzle. We're looking at epoxy coating nozzles. But that is a fact in terms of those nozzles bearing more of a risk than the structural liner of the tank, okay? So I just wanted to drill that home, okay? And again, not to say that we don't take the structural liner seriously, clearly we do, clearly we're putting investments against that, and the coupon testing

speaks to that.

Proposed BAPT focuses on rapid identification if release occurs to minimize volume. So these are efforts and analysis that we continue to do in terms of understanding not just the integrity of the system, not just the operations of the system, but, again, as I showed in the graphic of the Red Hill facility and the groundwater sampling that we're doing, understanding the hydrology, understanding the that if something were to happen, having the math and science, having the wherewithal, having the data to understand what that means, what it means to the aquifer. And then as the admiral indicated, understanding that if something were to happen, that we are bound, we are bound to do the right thing and to respond. And so that's part of the AOC. It's also part of, you know, our very ethos in our fiber in terms of being good stewards of the aquifer, of the environment, of the taxpayer's money, of this infrastructure.

The lead detection system, we have talked about that a little bit, and so requirements of the AOC to provide documentation on that, we've done that, we're doing that, but we're also putting our money where our mouth is in terms of making those

investments. And I showed that to you in the context of our tank upgrade alternative decision that's going to be in the document and addressing leak detection and doing that across the board in all the tanks.

And then the next bullet, other alternatives involve construction risks, do not reduce risk to most vulnerable elements, and again that's the nozzles. And so we're looking at that as well in terms of mitigating, minimizing risk. Like I said, the epoxy liner or the epoxy coatings, looking at that in the context of the nozzles.

And then the last bullet, I think that this is very important, and it's -- it's one that we live and certainly the AOC predicates this, but I think, you know, for those that are maybe new to this or bears reminder, and that is, this is a dynamic process, right? This is not a make a decision and then don't ever change the decision. This is all about collaboration with regulators, collaboration with the Board of Water Supply, keeping our eyes open, our ears open, understanding that a decision today may be the best decision today, but tomorrow there may be new information, new data, new technology, and keeping it dynamic, and keeping our minds open to that.

And so that bullet speaks exactly to

that, the Navy will revisit decisions if new information suggests prior to the five year mandatory review. And we're committed to that, and I would say the team back here and our consultants and the regulators are constantly surveilling and understanding what is the best that we can do, what is the best that we can do.

Okay, next slide.

All right, so in summary, and this is last slide, Admiral Fort said it, I'm going to echo it, I'm going to stand behind it, the water continues to be safe to drink. I drink it. My family drinks it. There are tens of thousands of military that live on this island that drink water that I provide, that I purvey that is drawn from the Red Hill shaft, okay, as part of the system and that I do testing on, and that I am absolutely transparent in that testing on, and it is safe and it continues to be safe. And we remain committed to that.

And so it goes back to the sampling points that I showed and additional investments that we're making to increase assurances and to really provide that confidence, not just to uniform citizens, but all citizens. And Mr. Lau's pointed it out and it's part of why we take this so seriously. It's a

community aquifer. We get that. We understand that, and we are fully committed to that. And as I tell my team, you know, everything we do, every dollar we invest as the U.S. Navy towards Red Hill, is a dollar that I need to be able to stratify to protecting that aquifer.

And this goes back to that stewardship of taxpayer money, in conjunction, in concert with stewardship of the environment. And you have my promise that that taxpayer money, I owe that to you to be able to vector every dollar towards protecting that aquifer. And so -- and we take that very seriously.

The next bullet is tanks continue to pass the annual tightness testing, and in '19 we're going to do semiannually. So we continue to do that.

The AOC is working and I am very proud of that. I mean, this is -- in the military, federal government, executive branch, you know, what we do downrange, what we do in harm's way is one thing, and I've been wearing the cloth of our nation for several decades, and I've seen some stuff in different countries and I've been part of operations where you do what you have to do to defend this nation. But back in our country, it is the democracy, and in this case the U.S. Navy has taken something that has

occurred and said, you know what, as part of this democratic nation, the Republic of America, we're going to do the right thing, and we're going to submit to regulation and to regulators, to the EPA, and to the Department of Health, and we're going to do it in writing, and we're going to do it transparently.

And ladies and gentlemen, we've done exactly that, and we continue to do that and I'm proud of that. I am very proud of that. We owe that to you, we owe it to our Navy, and we're fully committed to that. And so that bullet of the AOC is working, short time I've been on deck, it's working, it is working. Steve Linder on the line, I've met with him several times, EPA. Keith, Department of Health, I've met with him numerous times. Board of Water Supply, Mr. Lau, although not officially part of the AOC, definitely a key stakeholder, a key partner, a key partner, and we remain committed to that.

The word accountability, ladies and gentlemen, I mean, that is the essence of our military, okay? I'm not going to bore you with that, but I would say that very essence is a huge part of what we're doing, and it's a huge part of this AOC, and it's a huge part of why the AOC is working. We've met all deadlines. That's part of the accountability.

We've taken this seriously. Like I said, we're submitting to regulation because it's totally the right thing to do. And not just minimum, but hitting milestones and seeking out opportunities to exceed that which is documented. And so we've met deadlines, we'll continue to do that, and we take at that seriously.

The clean, inspect, repair, as I said and as I showed you, that is still in progress for those tanks, along with Tank 5, and that's the next bullet, Tank 5 warranty repair work. I mentioned previously because of Tank 5 and because of that history, you know, we've definitely given that a lot of seriousness and essentially started over to make sure that we are doing that correctly before we contemplate bringing that back online.

And then the last thing, as I mentioned, December, end of December we'll be submitting our homework, and so we'll be submitting, per the AOC, our Tank Upgrade Alternative Decision document, and then along with that, and we've worked this with the regulators in terms of being able to submit both products end of this year, and so that is the TUA Decision document, and the Release Detection Decision document and so we'll be submitting that.

And ladies and gentlemen, that concludes my presentation, okay, and if nothing else, you know, I've been accused in my career of being a little bit passionate. It has served me well. As I look at this situation, no different. Somewhat new to this, but a hundred percent committed to it, okay? And hopefully this was helpful to you, and I am now opening the deck to any questions you may have. Thank you.

COMMITTEE CHAIR: Thank you, Captain Delao and your staff on the work you've been doing.

So ladies and gentlemen of the committee, sort of gather your thoughts here and reflect what was said. So we'd like the committee members to ask questions and make comments.

I'd like to ask the first question.

CAPT. DELAO: Yes, sir.

COMMITTEE CHAIR: You mentioned about the alternative sites evaluation, can you further elaborate in summary what that study entailed, what were some of the conclusions.

CAPT. DELAO: The key -- the Alternative Site Location Study, it's -- so that -- I showed that on the matrix of sort of looking at the different alternatives, and so that -- that concluded -- and for those that are new to this, that would be brand-new

infrastructure, new facility, okay, and so in your mind's eye, not to get into a lot of detail of the current Red Hill facility, but one of a kind, large, massive. So the Alternative Location Study basically proposes a system essentially in the same location, okay, and it would be smaller tanks, and I would say we carry that as an idea, as an option, but really in the short time that I've been on deck, it really -- it's hard to envision how that would be done. And from an operational standpoint, it's hard to envision where that would get us in a better place, if you will, in terms of supporting operations.

Now, that said, a lot of analytics went into that, and I think transparency would dictate that we need to keep that on the table, and that's why it's in the brief and why it's something we studied and we continue to look at, and I think that, you know, as we look at Red Hill and the future and sort of where we might be going and sort of the operational imperatives, it would be foolhardy not to at least consider and keep that on the table in some way, shape, or form.

COMMITTEE CHAIR: Thank you. Committee members, any questions, comments.

MR. CASEY: I have a question. Thank

you, Captain for your presentation. Patrick Casey with the Commission on Water Resource Management.

You mentioned earlier that should there be at the very unlikely release, you mentioned that you're prepared to treat the water, the groundwater to make it safe. Could you elaborate on that?

CAPT. DELAO: Let me -- Aaron, would you mind?

MR. POENTIS: Sure. I think if there was -- you know, history has dictated in situations where we've had releases in the past, you know, where we have cleanup activities, where it would dictate, not so much in Hawaii, but throughout the Navy enterprise, where there are releases, where there is refloating fuel, we've had -- or the Navy has demonstrated the responsibility and executed activities to actually do water recovery and cleanup in order to mitigate the problem. We have history of having doing it. We haven't done it in Hawaii as it's not been necessary, but the Navy enterprise has done it in the past.

MR. CASEY: I guess that trumps my question. Is the Navy prepared, should there be a release tomorrow, or next week, something like that, are they prepared now to treat that?

MR. POENTIS: We have contingencies within the Navy operations to address situations, whether it be releases into the aquifer or open -- open navigable water releases, we have contingency plans.

MR. CASEY: Thank you.

COMMITTEE CHAIR: Senator Gabbard.

SEN. GABBARD: Thank you, Captain, for your presentation, sir.

You know, you and the admiral were -- made it a point to talk about facts, about veritas, and so one question, the first question I had in your PowerPoint you said that there have been no leaks since -- with the exception of the 2014 leak since 1988; is that correct? And how do you know that? What methods are you using to make that determination?

CAPT. DELAO: So, Senator, I'll start and then I'm going to turn over to the operators, but the techniques that we use for monitoring the tanks, the operators, just the controls of walking around and the accountability and the accounting of the fuel, really sort of gives us that sense of we know what's in the tanks, we know what the movements are, we know where the fuel is going, and as we reconcile that information from the operators, really, well,

factually, it's that release in 2014 and that's been it.

So, Blake -- actually, sir, I was going to turn it over to Blake to add anything to do that.

MR. WHITTLE: Yes, sir. We refer to the way we track everything as a system of systems, and inherent in that is our leak detection technology in what we do. And above and beyond the EPA standard, we're now moving to semiannually. But we know that leaks don't fix themselves in the tank, so every time we've done a tank tightness test, and the tanks have passed, which they've always passed, we know that there wasn't a prior leak in that tank.

In addition, we use inventory reconciliation processes to make sure there's no loss of fuel moving in or out of the system. Myself and my deputy do trend analysis on all inventories over time within the tank's fuel to make sure we have no downward trends we can't account for otherwise.

In addition, we have alarms built into our inventory monitoring system that allow us to monitor and detect for any alarm over time.

Those are a few of the ways we can be confident that leaks have not occurred that we are not accounting for, sir.

SEN. GABBARD: The follow-up question is, and again trying to get to the facts, was there a leak in -- in or around 2002 in Tank 6?

MR. WHITTLE: Not to the best of our knowledge, sir. I believe all reports were made. So the -- what we use monthly is we bring in a third party to do soil vapor analysis. Effectively, there are small copper tubes that run underneath each tank, and we bring a third party and they take a section of those copper tubes and they pull up any VOCs, looking for if there has been any historical releases. And that's how we track.

And those, of course, every month we take that and NAVFAC actually submits that to the Department of Health and our regulators to show if we have any issues under the tanks.

What -- in order to build that system, what we saw is we had to do coring underneath there. That coring came back, when we did that coring drill, with indications that there had been historic releases in the facility prior to that drill. It's hard to say when that happened; however, that was reported in the '98 to 2002 time frame. So that accounts for why there are reports, but that does not mean there was a release that occurred at that time. Somewhere prior

to that time a release occurred.

SEN. GABBARD: So no leak, Tank 6, in or around 2002, correct?

MR. WHITTLE: Not to the best of mine or anybody else's I know knowledge.

SEN. GABBARD: Thank you.

COMMITTEE CHAIR: Any other questions, comments?

MR. YOMES: I wanted to thank the Navy for using the best practices and new technology to keep track of these tanks.

With that said, nothing is ever a hundred percent. Navy, let's say you're at 90 percent, and there are other extra things you can do to bring your percentage higher. With that said, can you meet the community -- these are real concerns with the community, especially where I live and in surrounding communities in Halawa -- with that said, is there something you guys can do to meet the community halfway such as closing some tanks that's closest to the water source in case there is a leak and the tanks that leak is beyond the empty tanks that's close to the water source, we have time -- you have time and people have time, emergency responders have time, to control that leak before it reaches the water source.

And I'll ask Mr. Lau after I finish with that question, to ask him about the water source because I'm not really too familiar which tanks are closest to the water source, and if that's possible, I think it would be a good thing for the community because right now it's a top -- this topic is really in the minds of a lot of people living in the community, and they're concerned. And they also understand, they understand the national security part of it, that, you know, might have it, we need to have it, but also there are concerns about if there is a leak, it's going to affect our water structure.

CAPT. DELAO: So the first part of your question about taking tanks offline, again, we've got two that are offline and it's all driven by requirement. So I'll give you short answer, and then sort of expound on it. So I have -- that's not my decision to make, right. This is USINDOPACOM. Ties back to that study that I was speaking of in terms of how much we hold in reserve and where that is, and so I really do not have any latitude in that regard.

Now, the second part is safeguarding, right. So -- and also 90 percent and incremental improvements to sort of get to higher levels of assurance and confidence. We're doing that. I feel

that whether it's the clean, inspect, repair, or whether it's just upgrades that we've made to the infrastructure, we've upgraded -- we put in some doors as you walk through the system, the tunnels, we've upgraded the infrastructure there in the event that there were a leak, putting in sort of a substantial door system to be able to hold fuel back.

And so we've made investments where it's been prudent, where we can see, you know, value added in terms of, okay, to your point, sir, there are no guarantees, so what if something happens, I feel that we've done that. We continue to look for opportunities to make upgrades to the ancillary components to be able to contain and provide that added assurance, incremental, albeit, added assurance to protecting the aquifer and keeping it contained, if you will.

MR. YOMES: That said, having assurance, wouldn't you think common sense wise if the two tanks closest to the water source is empty, you would have time, if there is a leak on the other tanks, we would have time to stop that leak from entering the water source, so something extra that you might have to do, but that's the problem where these fuel might go into the water source, it makes sense that you empty out

two or three tanks that's closest to the water source and then beyond that tanks are full, but at least you have to time to react if something does happen.

CAPT. DELAO: Yes, sir.

MR. LAU: Related to Mr. Yomes' question, related to Mr. Yomes' question which tanks are closest to the water source, there are 20 tanks from our understanding from the Navy's records, 20 tanks holding 12.5 million gallons of fuel. Two tanks have been out of service, I think it was Tank 19 and Tank No. 1 for quite a while. So there are 18 actually in service, but the three are undergoing a clean, inspect and repair cycle; is that correct?

CAPT. DELAO: Correct.

MR. LAU: Three or four?

CAPT. DELAO: Four.

MR. LAU: So that leaves maybe, if I can do the math correctly -- maybe --

REAR ADM. FORT: 14.

MR. LAU: 14, thanks, Admiral. I'm only an engineer.

So there are 14 that have fuel in them. All 20 tanks, including the 14 that contain fuel, are a hundred percent over our drinking water aquifer.

CAPT. DELAO: That is true.

MR. LAU: The bottom of the tanks, I think it kind of varies, but the closest distance vertically from the bottom of the fuel tank to the top of the water table and the aquifer is about a hundred feet of lava rock. And remember, lava rock is porous, it's like a sponge, too. So all 20 tanks are located 100 percent over the aquifer.

CAPT. DELAO: Now, one point I will draw out, and it sort of goes back to some of the history of Red Hill, that the actual location, to Mr. Lau's point, you know, basalt rock, it is porous, but that location was actually selected and sited because of the condition of that basalt rock. So it actually, although in the purest sense we're talking about that type of rock structure, that was selected because it's more substantial and a little bit more stable than other locations. So I just wanted to provide that counterpoint.

But Mr. Lau's point is accurate, you know, we're taking about a hundred foot minimum and then it varies, but the bottom of the tanks to the top of the aquifer.

MR. LAU: So it is a fact and truth and veritas?

CAPT. DELAO: Veritas.

MR. LAU: I've got to look up that word. That's beyond my capabilities.

CAPT. DELAO: Let's do Latin.

COMMITTEE CHAIR: Any other comments, questions?

MR. YOMES: Can I add real quickly? The underground tanks, the military put it there for national security, they want it hidden, that's why it's underground and not top heavy.

CAPT. DELAO: Correct.

MR. YOMES: With that said, is this location compromised where everybody in Hawaii knows it, globally knows it, all of this stuff said, now becomes a target per se. So wouldn't it be, like you mentioned alternative sites, is it a problem now because of all of this publicity that it might not be a good place to leave it there?

CAPT. DELAO: Well, I mean, it's -- yeah, certainly today is a whole lot different from the '40s, right? But that said, the fact that it is below ground, the fact that, as Admiral indicated, you know, a hardened facility from the cyber security standpoint, the gravity aspect, I mean, the very attributes that made it a prized jewel back in World War II still stand and absolutely resonate today.

And, yeah, you know, satellite imagery and the way that we do warfare today, a little bit different, but from an operational and critical infrastructure perspective, it's still very much relevant. And I think this study that's being done might touch on some of those aspects.

MR. PENAROSA: I don't have a mic so I'll try to speak up a little louder, but to quote my boss and the phrase she always uses is that water is life, and we can never be too careful with our resources here.

So the question I had is with regards to the NDE testing. You mentioned two people in a basket kind of scanning every inch of the tank here, and in your last slide you had mentioned that the human error was solely the cause of the Tank 5 release. So in that scanning process, what are the measures being taken to ensure human error isn't encountered again and ensuring we're looking at proper corrosion testing and all of that.

CAPT. DELAO: Right, yes. I mean, that's a terrific question. And so it does bear a little bit of explanation and not to backtrack, but I think it's always good to sort of -- history and why we study history. It's to not repeat things that happened, but

also to have an appreciation for what happened.

And so Tank 5, the human error, not so -- it wasn't scanning, I mean, your point is well taken. It was really the workmanship. It was the technique that was followed in terms of drilling holes in the liner, right, to be able to put equipment to be able to sniff the backside, that's the term used, to make sure you don't have volatile gases back there before you start welding and doing hot work. And so that -- we still follow those techniques.

The flaw back then was there was no -- well, I shouldn't say no oversight, it was overlooked in terms of filling those holes back in as we started -- as the contractor starting putting patches on. So that, combined with the quality of welds around the patch, okay, so in your mind envision an area that you've identified that requires fortification and so you're going to do that with a patch of steel and you're going to weld that onto the existing liner. Well, you've just done that on top of a liner that's got holes in it, and so you can see where if you've done that enough times and you fill the tank up and you don't really have the level of quality assurance and quality control for the welds, fuel is going to make its way around the patch,

through the holes, and you're going to leak. And so I've given you basically the quick and dirty on what happened with Tank 5.

That said, our current contracting techniques and the level of quality control, the third-party oversight, the quality assurance, that's not going to happen. And so that's the human error and what we've done in response to Tank 5 to drive out that level of human error.

Now the human error of the scanning, well, that goes back to the coupon testing, right, and I think the math and science is going to pick up those types of aspects, right, in addition to the technology, right? So you've got an operator using the equipment, makes an assessment, we do the coupons and it's either corroborated and validated or it's not substantiated. I think the math and science is going to pick up variance and variations on the human error and the operational side of that equipment, in addition to the technology itself.

SEN. GABBARD: Quick question.

COMMITTEE CHAIR: Senator.

SEN. GABBARD: Captain, in your July 27, 2018, groundwater report, you stated that a fuel release as large as 700,000 gallons would not cause an

exceedance of risk-based decision criteria. I'm just wondering, do you have -- is that verifiable, scientific rationale making that statement, or is it opinion or fact?

CAPT. DELAO: Good question, sir. That's -- I would characterize that as somewhat predecisional. So ladies and gentlemen, let me explain to you that report and what we're doing, right. So part of what we need to do as part of the AOC is vulnerability assessment, understand the risks, right, the "what if." What if a catastrophic leak or a catastrophic event occurred, what if a gradual release occurred, and sort of walk through, you know, what that might look like.

And you can imagine, you know, again, we're talking tanks that are in a mountain so you can't really physically verify it, you have to use math science and engineering to model it. So what we've effectively done is we've started, and it's very nascent, very nascent, we've started the iterative process of understanding that phenomenon.

And so what you've read, sir, is sort of the early stages of first iterations of understanding that, and what I'll say is that that's not complete and we have subsequent iterations to really understand

the true risk and true vulnerabilities of catastrophic and slow release, and so that's additional work that we need to do, sir.

COMMITTEE CHAIR: Okay, any further comments, questions?

CAPT. DELAO: Yes, ma'am.

MR. LAU: I think it's -- isn't it committee members first before going to the public?

COMMITTEE CHAIR: Yes.

MR. LAU: Thanks. Good try, ma'am.

Okay, I wanted to just kind of hold up and give other community members the opportunity to ask questions, but I do have a series of questions to ask.

I understand there's a newspaper article today that the Navy is committed to no more leaks from this facility, and I just wanted to confirm that, no more leaks from the Red Hill, no more fuel leaks from Red Hill.

CAPT. DELAO: That's -- well...

MR. LAU: That was in the newspaper, a quote there, but I just wanted to verify that. And I also heard Admiral Fort --

CAPT. DELAO: So Mr. Lau, what --

MR. LAU: -- in the session of

legislature last year in a bit of passion explain that he's committed also to no more leaks at Red Hill.

REAR ADM FORT: Absolutely.

CAPT. DELAO: Committed to doing everything we can to safeguard that aquifer, yes, sir.

MR. LAU: So no more leaks at Red Hill.

CAPT. DELAO: No more leaks. We're committed to it.

MR. LAU: Thank you. Navy is committed to no more leaks.

I want to understand, also, I saw in a stakeholder letter or email sent out to stakeholders, the public basically, including we get a copy, so mahalo for getting a copy, that the preference -- if you can bring back the slide that shows the tank alternatives here, appreciate it. There.

Help me understand, and I just wanted to confirm that the Navy's preference, and this is before the TUA decision or tank upgrade option alternatives decisions report is actually submitted to the Department of Health and USEPA, that you've already kind of disclosed that your preference is toward -- is it 1A or 1 alpha here? I just wanted to reconfirm that.

CAPT. DELAO: Yes, sir. So it's 1A and

1B as a pilot.

MR. LAU: So 1A, 1B, is that closer to what you're currently doing, the clean, inspect, repair, and, clean, respect and repair?

CAPT. DELAO: It is. So it is the clean, respect, repair, and then again, it's clean, respect, repair with the continual commitment of improving that as techniques and technologies make themselves available.

MR. LAU: I appreciate that you did acknowledge that every five years you -- or even closer to less than five years you're willing to revisit it, so I just want to point out that we're kind of at this decision now. The AOC was signed in September of 2015 and it's now almost approaching three years later that decisions of this nature don't occur too quickly, so I'm a little concerned that -- and I appreciate you being willing to reconsider that decision of 1 alpha or 1 bravo in a less than five-year period of time, but I'm a little concerned is that even realistic or practical, given that also the funding cycles that you have to work with congress to get the funds to change gears and go to our preference, which is a double-wall tank.

CAPT. DELAO: Right, yeah.

MR. LAU: But a question on -- you mentioned that your two men in a basket hanging there, and I've been in the tank and they're literally hanging there from a crane that's at the top of the tank, that they're going to scan every square inch in the tank. How many square inches in the tank is actually in contact with fuel that needs to get scanned in total per tank?

CAPT. DELAO: Yeah, that's a -- running the risk of doing public math.

MR. POENTIS: It's about 70,000 square feet in each tank. I'm not sure where you're going with that question, but...

CAPT. DELAO: That's almost four acres.

MR. LAU: 70,000 square feet, times 144 square inches per square foot, is that correct, let me make sure.

CAPT. DELAO: It's a lot.

MR. LAU: Then you multiply that out. If you have a calculator you can do the math. I left my calculator back at the office, but that needs to be scanned. So I guess the concern about human error, that you're scanning every square inch. And remember the -- and correct me if I get this wrong, but the NDE process is basically this was the tank plate here, and

this is the side that's facing the fuel, that you're scanning -- because you can't see the backside, because it's up against concrete --

CAPT. DELAO: It's up against concrete.

MR. LAU: -- and unless you cut it out, you don't see it. That you're actually using electronic or other high-tech technology to scan, look through the metal and figure out how deep the pits of corrosion or rust that's happening, like we saw in the picture, on the outside of the steel plate and trying to predict that when you get to about half, and if you use this pencil as the thickness of the existing steel plate that was installed, if it gets about the half the thickness of this pencil, that's when you're going to slap a piece of steel on like a Band-Aid and patch it and weld it on there; is that correct.

CAPT. DELAO: That's correct.

MR. LAU: So the NDE, the effectiveness of the NDE process is really going to determine the effectiveness of 1A or 1B being able to achieve no more leaks from these tanks; is that correct?

CAPT. DELAO: I would say that's -- that's the thesis of it, yes.

MR. LAU: Okay. So I think the decision -- so from my perspective, tank upgrade

alternative decision or recommendation report should not come out until the NDE process of scanning from the inside to figure out what is rusting on the outside and how deep those rust pits are, until that report is actually out so we can evaluate the effectiveness of the NDE process. So you've got the aspect of two men in a basket scanning 70,000 square feet times 144 square inches and the potential for human error that they might miss a square inch in the tank, and then also the effectiveness of their scanning method or technology of determining how much rust is happening on the backside of this plate. So that would be my recommendation.

And I guess the -- from my understanding, the TUA decision report's coming out and going to be submitted to the EPA and the DOH at the end of this year?

CAPT. DELAO: Yes, sir, tracking end of December.

MR. LAU: And the report on the destructive testing, or actually just the data is coming out sometime next year?

CAPT. DELAO: The data we should be getting this month, now that we're in November, and then the analytics and the actual report, I'd have to

go back to the AOC, but I'd want to say it's like March, April 2019.

MR. LAU: Of next year.

And I appreciate, I know you mentioned transparency here. So a couple questions about the lab doing the testing, the lab in Kentucky.

CAPT. DELAO: Yes, sir.

MR. LAU: Can you identify what lab you're using in Kentucky, the name of the lab?

MR. FUENTES: I can get you that information. I don't know it off the top of my head.

CAPT. DELAO: We'll get you the information.

MR. LAU: For sake of transparency and helping to build a level of confidence with your NDE process upon which you strongly spend upon for 1 alpha and 1 bravo alternatives up there, I'd like to formally request that the Board of Water Supply be given a complete copy of all the data so we can have our experts actually do kind of an independent assessment over the effectiveness of the NDE process, and hopefully it will be in complete agreement with the Navy's own analysis. So I'd like to request that data be given to the Board of Water Supply, just to give the -- our customers the ability to have like an

independent, objective evaluation of that same data that you're going to do, be analyzing to determine the effectiveness of the NDE process. And we do have -- retained experts in the industry for corrosion, metallurgy, that can analyze that data and be able to determine if the NDE process is effective or not.

The other thing I'd like to -- just looking at the pictures of the plates, and if you can go back to the pictures of the plates, if you don't mind, I kind of just looked at how many of the ten required repair? And correct me, Captain, if I'm wrong, I thought I came up with seven out of the ten samples required repair.

DARRELL: Should I go back to that chart, sir?

MR. LAU: I must have missed the chart.

CAPT. DELAO: Should be five.

MR. LAU: So five out of the ten coupons, and I know we've requested that actually more coupons be taken because, remember, 70,000 square feet, and each coupon we think was about a foot -- 12-inches by -- so ten square feet out of -- sample out of 70,000 square feet in one tank, and out of the ten samples, five required repair. So I want to be careful because I don't think this is statistically

significant sample, but if you just did the simple -- I went to public school, so five out of ten or 50 percent of the samples require repair, if I extrapolated that to 70,000 square feet in a tank surface, I want to be very careful, is that implying that maybe 50 percent of the tank needs repair?

I think I'm going to be wrong there, but, again, I want to be careful here, because important decisions are being -- going to be based on this, so the method should be scientifically and mathematically defensible to support your decision on which upgrade alternative to pick.

So I appreciate getting that information and look forward to it. If you can get it to us as soon as possible when you get it, and we can actually try to do the analysis and hopefully get it completed with my consultant team on the same time frame as when the TUA decision document comes out at the end of the year, we can actually determine or -- the effectiveness of the NDE process to support that alternative being selected.

So chair of this committee, Keith Kawaoka from the Department of Health, I'd like to formally submit a letter to the committee that includes copies of our Board of Water Supply comments on the

destructive testing coupons and also on the reference to that 700,000 gallons, that the aquifer can handle 700,000 gallons and it won't affect the drinking water source nearby. That also included a groundwater flow model which we have really serious concerns about the validity of that model. This letter does contain copies of our two comments.

And I'd like to inform the community that all Board of Water Supply comments on the AOC is on our website at boardofwatersupply.com. We want to make sure that this whole process is as transparent as it can be, because this is -- we're talking about the source of our drinking water, not all of our drinking water, but a portion of our drinking water. It's very important to our community. We provided over a hundred formal comments and all of those comments are on our boardofwatersupply.com, and I'd like to welcome the community to go to our website to the see those comments.

I'd like to apologize ahead of time. It's very technical, but we're trying to write these comments so that the common person can understand it, but also the technical people can see that it has a sound technical basis for those comments.

I'd like to point out in this letter, I

just noticed it, could we go back to that chart of -- that shows the BAPT discussions. It's near the end. There's a list of things, and I'd like to, in particular, look at the first photo, if you don't mind.

CAPT. DELAO: That one?

MR. LAU: Right there. So first bullet, 2014 release is first reported release to the environment since the introduction of the UST or underground storage regulations in 1988, and you can pass out -- we have copies for the public and for the committee members of the letter to Bruce Anderson, the chair of the Department of Health, and the chair of this committee, the director of the Department of Health and chair of this committee.

I see that there is a copy of a formal reported release, and I think it was referred to back in, actually, 2002.

UNIDENTIFIED SPEAKER: Can I address that?

MR. LAU: I just want to say, this is a form that was sent to the Department of Health. So it does indicate, looking in this report, and folks in the community, we're handing out copies right now, there was petroleum chemicals or -- detected, it looks

like in almost 20 tanks. And they're correct, it's hard to tell when these things occurred as the date of this report, former report to the Department of Health, but it's also hard to tell if between the period of 1988 and 2002 there was -- were there any releases. Even releases that were smaller than what could be detected by the inventory or control systems or tank tightness tests done by the Navy.

So that is -- I just wanted to kind of point that out. I just noticed that you folks made a point of making that point in the discussion today, the copy of the letter earlier.

So, Keith, here is the letter for Bruce.

COMMITTEE CHAIR: Okay, so noted. Are you done?

MR. LAU: I think I'm done now.

COMMITTEE CHAIR: Okay, Ernie, thank you for those questions and summary. It helped me out.

I mentioned -- before we get to the next item, I mentioned that I'm respectful of the committee's time. By the clock in the back we've gone over that time allotment, so I'm just going to cover the next item for committee members only as far as any recommendations that they see going forward. We are going to provide you, as we have in the past, a draft

report for you to review and -- before we submit that to the legislature.

So right now we're meeting annually, and if that's the frequency that the committee feels that's supportive, I'd like to hear your thoughts on it, if you have any comments on that.

Okay. Hearing none, I move -- the public comment period, I'm sorry, we're out of time.

AUDIENCE MEMBER: No.

AUDIENCE MEMBER: Excuse me, I just want to call your attention, I think it might be important to remind you this is a public meeting and chapter 92-3 requires public testimony be accepted on all public meetings, any agenda item. We can read it to you.

COMMITTEE CHAIR: The public comments can also be provided with written comments as well.

AUDIENCE MEMBER: No, it's oral testimony. All public meetings "shall also afford all interested persons an opportunity to present oral testimony on any agenda item." Chapter 92-3.

COMMITTEE CHAIR: How many comments are wanted to provide oral comment?

MS. PERRY: Since last Friday we received almost 70 written comments and also today we have 14

people signed up to give oral testimony.

SEN. THIELEN: I'm sorry, Chair, if I might also add, I wasn't aware that we needed to sign up. So if you could add my name to the list as one of the legislators who helped pass this committee, I'd also like to ask some questions.

COMMITTEE CHAIR: How many are on the list for signing up?

MS. PERRY: Now it's 15.

COMMITTEE CHAIR: With the indulgence of the committee members, I will allow five oral comments.

AUDIENCE MEMBER: No, no, no.

COMMITTEE CHAIR: I've got to respect the committee members as well. This is a committee --

(Multiple audience members talking.)

AUDIENCE MEMBER: The same thing over and over again.

AUDIENCE MEMBER: Wasting the time.

AUDIENCE MEMBER: I'm going first. I'm going first.

AUDIENCE MEMBER: It's disrespectful.

AUDIENCE MEMBER: That's right.

AUDIENCE MEMBER: It's patronizing.

COMMITTEE CHAIR: I understand that.

This is a committee meeting, like I said at the start. We've allowed comments from the public as far as written comments and if we had time for oral comments. So as the chair, I'll allow five, limited to about three minutes.

So who signed up first.

AUDIENCE MEMBER: It's really not worth getting sued over for this public meeting. Just allow everyone to talk for three minutes. You're allowed to legally, reasonably regulate the amount of time people have to testify. It would have been great if you'd applied that equally to the Navy, but you didn't, so be that as it may, still everyone here should be afforded the opportunity to testify. That's what state requires and the courts have upheld this repeatedly. It's not worth it. The extra few minutes is worth it.

AUDIENCE MEMBER: It's only 15 people talking. You have time to do it.

MR. YOMES: She's correct, but you can -- how we do it at the neighborhood board. You can make it one minute, hear their testimony, we don't have to answer -- answer the questions, let them make their comments in one minute and get everybody on board and the room is small, so you can get about 20 people.

COMMITTEE CHAIR: How are we doing on the room? We're okay on the room? The time for the room?

MS. PERRY: Yeah, the room's fine.

COMMITTEE CHAIR: Okay. We'll allow oral comments limited to three minutes.

AUDIENCE MEMBERS: Thank you.

(Clapping.)

MS. PERRY: So in order, can we get Shu Yuan Hsieh, the first person that signed up here. Thank you.

MS. HSIEH: Thank you very much for your fine report. And I'd like to say hello to all of you gentleman's club, except for the two or three ladies.

The report make me understand much, much more about the situation in Hawaii, and I wonder, my question is, have you compared the situation here with those in Ukraine or Jordan or East Turkestan and -- or Tibet? Probably haven't, because they have the similar kind of issue like we have here.

Let me add, I move here from hillbilly West Virginia, and I live there for over 20 years, and we all know about Monsanto reputation with the environment, but my issue today is in the northern West Virginia, there are rural area, small village, small town, and there are lots of hazardous waste,

also toxic chemical. Besides I have done research over the years with nuclear waste and also toxic chemical, and oil is one of the toxic chemicals from our earth, so it's included here.

And people in that northern village area, the government wait till more than 50 percent of population have cancer to study what's wrong with it, and ordinary people didn't know what's wrong. And finally studies show the toxic sink into the groundwater. And that by the time, like this, you already have repair, you already have the cleaning that show the problem already there, and don't wait till we have half of the population have cancer, then to change the new tank.

And we drink toxic water today, we don't get cancer tomorrow, not even next week. It takes decade to give it up, and I saw it in Tibet and in Jordan. It just so heart sickening to think -- to see that in Hawaii. So thank you very much considering this social issue.

COMMITTEE CHAIR: Thank you.

MR. HULIHEE: Hi. My name is Calvin Hulihee. I represent the Kingdom of Hawaii, and our religion is the mauna because it filters the water, the living water, that we depend on, number one, for

everything: our food, our livelihood, the ocean, everything. Number one. So we have to respect that. That's in our constitution. And by the way, military under this article, our constitution from Kamehameha III, article 18, the military shall always be subject to the law of the land, and no soldier shall, in time of peace, in peace, are we at war? You tell me right now, are we at war? I've been at war, and when we're at war, we're whacking. We're not just dancing. We're just not talking, war is action. We're not at war, okay? We can talk, stink and everything, do 'em in your bedroom, don't do 'em outside in the public. Okay, you act, whatever, do 'em in the bedroom, but not out in the public and everything. And don't let nobody hear you doing talking in the bedroom anyway, too.

But anyway, hey, in peace, no time to be quartered in any house in peace now. You cannot be quartered in Hawaii when there's peace, okay, without the consent of the owner. That's our kingdom. Not in time at war, but in manner of -- prescribe by the legislature, yeah, our noble people. From the king we get our legislate noble people. You guys, what you guys doing this kind, chain of command, okay.

Like I said, water is very important.

It's been happening too long already, we hear all kind of story, and I from Palolo housing, and I was watching the neighborhood board and you guys never show up two times, that's why I'm here today to talk to you guys, and I'm glad you guys showed up, because this is very important, very important. And you guys should empty 'em. That's my basic thinking right now, empty 'em and aloha to whatever ship. Take the Jones Act away and let all the shipping that come over here, give 'em free fuel for our safety for our people.

Talking about cancer, I had two cancers already, brudah, okay? I hope I no get the third one. Bless you. If I got to go see my mother, I go see 'em. But, you know what, the water, that's why I'm here today, it's number one. It's very serious, okay. Thank you.

COMMITTEE CHAIR: Thank you very much.

MS. BOISVERT: Hello, my name is Denise Boisvert, and thank you for this opportunity to speak to you.

It is my hope that the Department of Health is more concerned about preventing a catastrophic crisis than about having to eventually deal with one. 1989 saw the Exxon Valdez disaster in Alaska. The body of water was the Prince William

Sound. 11 million gallons of oil contaminated 1300 miles of coastline. It was caused by human error.

2010 saw the Deepwater Horizon disaster in Louisiana. The body of water was the Gulf of Mexico. Approximately 210 million gallons of oil were discharged. It was caused by five key human errors and one colossal mechanical error.

Red Hill, here in Hawaii. The body of water is Oahu's primary sole source aquifer. Which year could become equally as famous is anyone's guess. Captain, I'm also not a profit and I'm also not a gambling person. Could it be 2019? 2020? 2025? It could even be 2018.

The U.S. Navy is trying to convince the citizens of Oahu that we don't have to worry for at least 20 more years. It was human error to install the tanks on top of the aquifer in the 1940s. Will it be human error to believe what the Navy is telling us now? The aging and rusting single-layer tanks deep inside Red Hill that store 225 million gallons of jet fuel need to be urgently emptied and retired. Now is the time to prioritize the health and safety of hundreds of thousands of Oahu's citizens over what some perceive to be a wolf in sheep's clothing trying

to sell us a Band-Aid for a gaping wound.

We must stop being gullible and trusting. We know that the earth is not flat now. We know cigarettes and secondhand smoke is not good for someone's health. We know that by introducing the mongoose to the islands, it did not control the rat problem. And the Navy's Red Hill jet fuel tanks are not safe. I'm begging you to be as worried as I am.

Thank you.

COMMITTEE CHAIR: Thank you.

MS. IWAMOTO: Good morning. My name is Kim Coco Iwamoto. As many of your members may know, there is a military strategy commonly known as scorched earth, and its general goal is to destroy anything that might be useful to the enemy, including food supplies and oftentimes poisoning wells, as in the Medieval times they would throw like a decaying body into a water well to just make sure the enemy couldn't drink from that well.

So scorched earth was widely used during World War II. The Nazis implemented this policy across Europe during their retreat at the end of the war. And so I did some research, and according to this, it's an inventory of documents compiled by the U.S. Army Corps of Engineers, and it's titled "U.S.

Army Engineers in Hawaii, an Inventory of Records Before 1948."

So Pearl Harbor was attacked in 1941. Immediately the military created fuel tanks, and it was finished -- the Red Hill was installed by 1943. During that time, the military came up with numerous, numerous scorched earth plans. In fact, in this document alone there are 122 references to scorched earth plans, and they all kind of came to a head in 1943, the same time when Red Hill was completed.

So I actually would love to see the document you refer to stating that this location was selected just because it's such solid ground. I actually believe, and maybe the records -- the records are in Maryland, this is just an inventory of the records, but I believe it was actually selected and the fuel tanks are put close together so that they could implement a scorched earth policy should Pearl Harbor have been taken over.

And so fast forward to the U.S. -- the scorched earth tactics used during the Vietnam War, the U.S. used Agent Orange to take out the foliage, Agent Blue to the eliminate the rice paddies, and flame throwers to literally scorch the earth in Viet Nam and some of its people. The scale of

environmental and humanitarian destruction got so out of hand that by the 1977 Geneva Convention it finally banned the use of this military tactic to destroy the food and water supply of civilian populations.

Despite this 1977 Geneva Convention ban, the U.S. Navy continues to weaponize Red Hill and to keep it on the ready to destroy this important aquifer. Because fuel goes bad over time, is it around 100 days? The tanks need to be constantly depleted, and every time the Navy refuels these fuel tanks they are basically reloading this weapon.

I urge this committee to advise the U.S. Navy to comply with the Geneva Convention, completely abandon the 1943 scorched earth plans, immediately deweaponize Red Hill, and remove the ripcord that would destroy our water supply.

Thank you.

COMMITTEE CHAIR: Thank you.

MS. PERRY: Melanie Lau.

MS. LAU: Can I stand because I'm kind of short.

So, hi, hello. Thank you for the opportunity to speak with you today. I am Melanie Lau, and I am not here with any group. I am here as a concerned citizen.

First of all, I want to point out that the Red Hill storage facility is an amazing feat of engineering, truly. It was built quickly, in secrecy, and requiring bringing in thousands of miners, tons of concrete and steel undetected. But perhaps the tanks were built in haste. After all, we were at war. The Navy may not have anticipated the corrosiveness of the salty island environment. In its latest report, the Navy admits that the thinness and extent of corrosion of the tank walls took it by surprise.

Since the Administrative Order of Consent was established in 2014, because of the leak of 27,000 gallons of fuel, the Navy has spent millions, although today you said billions, of dollars and countless hours studying the problem. They are quick to blame the leak on faulty work by local contractors; however, they are also to blame for faulty oversight.

Therefore, we should not rely so heavily on the Navy to find solutions. Asking the Navy to come up with solutions and a timetable is like asking the fox to guard the henhouse. Do you know that Pearl Harbor draws its water from a different aquifer? So the Navy would be all right should we have a disastrous leak, but what about the half a million people who live between Moanalua and Hawaii Kai? We

live on an island, people.

The Navy's preferred solution before today was to build 20 entirely new double-walled tanks further up the valley, but they will still be over the aquifer. This is not a solution. Neither is leaving the tanks in place. I propose instead of tanks we consider tankers, three super tankers can hold the entire 240 million gallons of fuel that are sitting in the Red Hill tanks. The Navy is composed the sailors, so sail.

A scary proposition for the environment? Perhaps. Then choose the more common sense one of above-ground tanks away from the aquifer that can be monitored visually for leaks. These tanks are 75 years old. It's time to retire them before they fail. They are truly a remarkable feat of engineering and would make an excellent museum. I would pay admission to visit one.

Thank you.

COMMITTEE CHAIR: Thank you.

MS. PERRY: Nate.

MR. YUEN: Good morning. I'm Nate Yuen. I'm with the Sierra Club of Hawaii.

This morning we heard a lot of talk about science and technology. I just want to point out that

logic undermines or underplays all science and technology, and by logic, it's not a good idea to store your fuel over your water, your water supply.

We have heard from the Board of Water Supply that the aquifer is actually made of lava rock, porous lava rock and the water is stored in the little spaces, these little micro bubbles that are in there, and there is no technology that is known to clean that. So if a big leak were to occur, that would be it for Oahu's primary water supply.

And the Navy would like you to believe that a system can be designed, built, and operated without leaks. That is a huge understatement -- excuse me, overstatement. There is no system that is free from human error. The 2014 leaks were blamed on human error. We also know that there actually have been previous leaks, not quite sure exactly when, but there actually were prior leaks.

And one of the most disturbing things is that the current Department of Health rules require private operators to upgrade their underground fuel storage tanks so that they're double-lined. And the reason why they're double-lined and have sensors to warn of any mishap is because that's the highest level of protection that's known. So for the Navy to

propose not to use that level of protection is crazy.

So I think that what we need to do is we need to decouple fuel storage from water -- from our aquifer. That provides the best safety to the island of Oahu and actually increases national security. Not only do we protect -- so that in case an attack is made on the fuel supply, it doesn't affect our water.

So please consider this when you're making your decisions. Thank you.

COMMITTEE CHAIR: Thank you.

MS. PERRY: Alison.

MS. BHATTACHARYYA: Hi. I am a cancer survivor. That is a fact. I am a mother, and that is also a fact. Am I good mom? That's an opinion.

There are some facts that I'd like to go over. Number one, the Navy has a very poor track record when it comes to underground storage tanks. The contamination at Camp Lejeune, under Navy control, 1953 to 1987, contaminated and made many people very sick. And now there's a $2 billion fund to pay for the cancer treatment and other diseases that resulted from that contamination.

In 1991, Diego Garcia Island had a massive fuel leak. 130,000 gallons of fuel were recovered. It contaminated the water aquifer on that

island. 1993, there was still very high levels of benzene, a known carcinogen, in that atoll in the aquifer. And in 1999 they were still talking about cleanup operations.

The third fact is federal law, since 1988, has required secondary containment for any hazardous substance in underground storage tanks. That has been since 1988. 30 years later nothing has been done at Red Hill fuel. They keep asking for more time and they keep taking more time. Okay? Something needs to be done. You've had plenty of time to think about this. And, you know, I've been angry about this since Ernie Lau sent out a letter to all the homeowners -- thank you, Ernie.

MR. LAU: You're welcome.

MS. BHATTACHARYYA: -- in 2015. I'm still angry about it. I don't see any sense of urgency. I don't see any sense of coming up with different ways of looking at the problem. How much of this fuel is a stockpile, a really neat, cool stockpile, and you want to keep your hands on this stockpile. You could get rid of the stockpile because whatever contingency you're planning for that you will need the stockpile of fuel is not as important as our own health and safety of the water supply in Oahu.

That is paramount. What other contingency are you planning for?

Clear out all of that stockpile tomorrow. It could be done. There needs to be actions taken immediately and today. This is a long-standing problem. Now you're talking about another four or five years. I read in the paper that you need to figure out how much fuel you actually really need.

To me, you guys have all the facts and all the veritas, you should know immediately, today, how much fuel you need in those tanks. And you guys to get on it and solve it.

And that's all I have to say.

AUDIENCE MEMBER: That's right. Clean up your mess.

MS. PERRY: David.

MR. MULINIX: Aloha. Is this working? Dave Mulinix from 350 Hawaii.

This is really amazing it has just taken this long from just all the testimony and all the information we have. I've really got to thank department of water. You guys are -- you're protecting us. Department of Health, it's shocking how unresponsive they have been.

Really, this is a disaster that's just

waiting to happen, and we know this because all across the U.S. water has been contaminated in community and community all across the country by the U.S. military. This -- they do this all the time. Out in the middle of the South Pacific, the Marshall Islands where we did our nuclear testing, they just covered over all of this contaminated nuclear waste, and it's deteriorating. They're not paying any attention to it at all. They only respond when they have no other choice.

And how responsible have the military been? Well, we have to look at Pearl Harbor, Kahoolawe, Makua, they even contaminated Kauai over and over again and doing nothing. These places are permanently contaminated because of U.S. military irresponsibility. And so now we're supposed to, like, oh, trust us. How can we trust them when over and over again they've proven they are untrustworthy?

Their concern is national security. And national security is supposedly to protect us, yet military has this, you know, we're going to waste -- we're going to lose -- I can't think of the right words here, but in a battle, the risk, you know, we're going to risk 10,000 guys to take this hill, and it's worth the risk to us to take that hill. And so for

military standards, like, oh, it's worth the risk to them to keep Red Hill for the national security that they're planning. But what about us, the people they're supposed to be protecting? You're protecting fuel supply, but you're not protecting the people, and that's what it's really all about. You've gotten your priorities all messed up.

U.S. spent $700 billion in the recent budget for the military. 700 billion. It's more than -- the next ten countries around the world, eight of them are our allies, we're prepared to fight two World War IIs simultaneously. We haven't had to fight a World War II for 70 years. The military is out of control. They are wasting our money. They are wasting our resources preparing for wars that will never come. We will never fight another World War II.

So they do have other plans. There is other places to put this fuel. It does not have to be there. It's just more convenient. It's just easier. It's just simpler. But easy and simple and convenient, that has nothing to do with our health and safety. That needs to be the number one priority. Everybody here has children, grandchildren, that's what the Navy should be talking about. What are we doing to protect those kids? What are we doing to

protect the future?

The focus is on, well, we don't want to lose this military asset. It's worth the risk to us militarily.

COMMITTEE CHAIR: Wrap up soon.

MR. MULINIX: Yes.

It is not worth the risk for our health and safety and our future. Close these things down. Do the right thing. For once. We're asking the military to do the right thing.

And every legislator, you folks need to be on these guys. We need to pass local legislation to do everything we can to shut this down.

Thank you.

COMMITTEE CHAIR: Thank you.

MS. PERRY: Paul Eyre?

MS. GRAY: My name is Laura Gray. I'm a registered nurse. I do deal in facts and figures and not -- I don't accept "just trust us." I have an instructor that said, "Never assume. You know what assume means." I won't say it, but we all know what that means. Don't assume they're looking out for us. We need to protect ourselves. That's our responsibility. Our water supply is our life. I'm a registered nurse, and I know the results of what will

happen if that water contaminated. We probably won't be told about it, just like at Camp Lejeune when the military drank the water. Don't use that as an example. It's not a good example. That, oh, we're going to keep it safe because we're going to be drinking it. No, that's not a good example.

History shows they have not been cleaning up their messes. They have left the American people to deal with the cancer, to deal with all the other resulting diseases that come from that, because it's not just cancer. We cannot allow this to happen. We need to get these tanks safe.

And there's nothing in this nice slick packet that tells what has been done to clean up the existing messes, and it's not just about hydrology. And it is important. The condition of those tanks are important. I heard someone say that it's not important, the condition of the tanks, it's all about hydrology. What about the ground? What about the soil? What about the surface water? What about the ocean?

I mean, it baffles me that someone would come in here and expect to gloss over and appease us, and that's really what this whole thing was about. It was not about facts. It was not about science. It

was just about appeasing the public, and that's not acceptable, and it's an insult.

Thank you.

COMMITTEE CHAIR: Thank you.

MS. PERRY: Paul Eyre? Did he leave?

Gilmore Ching?

Danna Olsen?

Charessa Frye?

And Senator Thielen, you're up.

SEN. THIELEN: Thank you, Captain and Admiral, for being here today. I appreciate it. I had a couple quick requests for the public report on the coupon sampling.

So you mentioned in your presentation that the coupon sampling was not really about the actual thickness, it was about validating the nondestructive evaluation technique. And in the slides it just says you're expecting that the data is going to validate it. But there's a significant difference when the NDE tests would, say, predict a thickness of, say, 0.13 to 1.18 and an actual thickness of, say, 0.08. So my request and actually question is your public report going to just say it validates the prediction, or is it actually going to include a comparison of the NDE estimated thickness

and the actual range of thickness in each of the coupons?

CAPT. DELAO: So I think, you know, as we get the data back, it would be foolhardy not to get all the information and use that information to really understand. So, you know, my characterization almost of a go/no go is really at the highest level. We expect the lab to give us all of that detail --

SEN. THIELEN: I understand the lab will. I'm asking if the public report will contain that comparison between the NDE estimated range and the actual range of the coupons.

CAPT. DELAO: I think whatever goes into the report will be made available.

SEN. THIELEN: My request, Admiral, is that you do include that in the public report, because there is a significant difference in just a, yes, it validates it and what the actual range is.

The other question I have is there's a concern about the age of the tanks, whether they're thinning over time. Is there going to be a comparison of the -- I can't remember, the API 653 CRI, whatever you call it testing that's being done now that's coming out of this report, and the most recent similar tests that were done on those tanks, which looks like

they were about 20 years ago, so we can see whether there is a consistency in the estimated thickness or whether there has been some additional thinning with age?

MR. MANFREDI: May I address that? Actually, I'll address your first question as well. So our intent is that we will get the lab report and do our analysis --

AUDIENCE MEMBER: Can you use the mic.

COMMITTEE CHAIR: State your name.

MR. MANFREDI: Mark Manfredi. I'm the Red Hill program director. My job is to manage all the work under the AOC. I work for Admiral Fort.

So my intent would be that the lab result would be an attachment to our validation. So anybody who wanted to go back and verify our results against the lab report would have the ability to do so.

But bear in mind that this analysis that we're doing right now, again, it is not to assess the condition of the tank, but to validate the NDE. And when the inspectors go in and inspect the tank, let's say they're looking at, you know, one eight-foot by five-foot area of the tank, and they mark it all out with chalk so that they know exactly where they are in the tank, where they are in that particular plate, and

that gets annotated in their notes both electronically and in a log as well, paper log as well.

If they -- they begin to identify an area of concern, and then they begin to find out, okay, we need to -- we need to, you know, put a patch plate in an area that's this big, they're not concerned about the depth of every single pit in that area because the plate is going to cover the entire area of concern.

SEN. THIELEN: So Mr. Manfredi, I'm just asking a simple question because we're being told that the purpose of testing the plates is to validate the NDE.

MR. MANFREDI: Correct.

SEN. THIELEN: So I'm just asking whether we're going to see a comparison of the actual NDE and the actual thickness of the plates? That's all.

MR. MANFREDI: Yes.

SEN. THIELEN: Okay, thank you.

And then as far as the history, whether there has been a change over time, will we be able to see a comparison of the NDE results from the last -- I'm sorry, I don't know what the acronym is, CRI testing or whatever --

MR. MANFREDI: Yes.

SEN THIELEN: -- for that tank that took

place 20, 25 years ago.

MR. MANFREDI: So probably not. And probably not because so far in this current process that we're using that started back 2005, 2006, the scanning technology, and it has slowly improved over the years, each tank there's lessons learned, but all that to say is of the 18 tanks that are currently in service, at this point in time we've only gone through nine tanks. Nine tanks that have -- a total of nine tanks that have been done, and so six tanks that have been completed and four tanks that are currently under repair. So I don't have information going back 20 years that I can compare this analysis to that analysis.

SEN. THIELEN: I couldn't tell from the draft report whether only the six surge tanks had gone through that CRI -- is it CRI testing?

MR. MANFREDI: CRI.

SEN. THIELEN: So have other had 18 tanks not undergone that CRI testing back in '04?

MR. MANFREDI: So prior to 2004, 2005 there was a maintenance process in place, but it was not -- I can't speak to the specifics of it, but I can tell you it was not as robust as we are operating under today.

SEN. THIELEN: Do you have any trend data on the estimated thickness that you'd be able to provide in the report to be able to compare the current with the past to see whether there's been any change in the thickness over time?

MR. MANFREDI: To the extent that we can provide that, we will. I just don't know.

SEN. THIELEN: Thank you.

And then the last question I had is, you know, I appreciate the big "no" to the Board of Water Supply's question about whether we can say 5 percent of the -- or five of the ten samples, you know, does that mean 50 percent of the tank needs to be repaired, but I also recall from my statistics class that a sampling, you cannot rely on a sampling of under 100 to give you that information.

So will you folks do or are you willing to do some additional coupons testing in the tanks in order to actually have a more accurate statistical sampling?

MR. MANFREDI: Well, so, we -- that was part of our discussions with the regulators, and that to provide -- it's actually higher than a hundred in this particular case, but to provide a statistically representative sample, if you were going in -- and

merely doing destructive testing to evaluate the condition of the tank, it would probably take thousands of coupons, and then you would virtually end of turning what was a fairly good tank into Swiss cheese, and so it just doesn't make sense to do that.

So we felt that instead of trying to validate the condition of the tank by cutting out a punch bunch of coupons from the tank, let's validate our destructive testing process, and so what we did is, in conjunction with the regulators, we went in and scanned the tank -- we selected Tank 14, by the way, because it was already part of -- it was under maintenance, it was already under the maintenance contract, and we sat down and we looked at the scanning data, and we deliberately went in and selected areas that we knew, or felt pretty confident on that scanning data that we would find corrosion behind the backside, and then we went and looked at the scanning data and we selected sites that we were pretty confident would not have any corrosion on the backside. Again, this is all about validating the process.

So to say that five or six of the coupons had corrosion and the other four or five did not is irrelevant because we deliberately selected those

sites based on what we thought we were going to find.

SEN. THIELEN: Well, I think if that's the case, my recommendation to the Navy is that rather than waiting until you issue the report to release the data, that you do go through the process of providing that data from the lab to the Board of Water Supply so they can conduct a concurrent, independent analysis, because you simply are not going to have public confidence in your findings without having that independent analysis. And the benefit to you is if it comes back with similar results as yours, is that there's going to be a lot more confidence in that lower statistical sampling.

MR. MANFREDI: Well, and bear in mind too --

SEN. THIELEN: And I think especially because there's going to be some significant decisions that have to be made by the AOC in the timetable of when that report comes out, you know, giving it to -- the data to the Board of Water Supply afterwards is not going to help with getting that independent analysis before those decisions are made, and that's, again, going to lead to a lot of speculation and concern about the validity of those decisions.

So choice is up to you, but that would be

my recommendation.

MR. MANFREDI: Well, thank you, Senator, but just to remind everybody that this is not just the Navy doing this, we do this in conjunction with the regulators.

SEN. THIELEN: But the regulators are not having the data and doing an independent analysis. So I think that's where --

MR. MANFREDI: Yes, they have their own consultants that will be doing that.

SEN. THIELEN: But, again, I think having that independent analysis done is going to be something that's going to be essential to having public confidence in their findings.

MR. MANFREDI: Thank you.

COMMITTEE CHAIR: Thank you, Senator. Do you have any further comments?

SEN. THIELEN: No, thank you.

MS. FELDMAN: Good morning, I have something very short to say.

I understand rainwater takes decades to reach the aquifer. Likewise, this jet fuel may take decades to reach the aquifer. This morning I felt that the Navy had no plans to decontaminate drinking water in Hawaii should that occur or when that occurs,

and it may be decades from now, but I didn't hear anything. That's I have to say.

MS. PERRY: Can you identify yourself.

MS. FELDMAN: Eileen Feldman.

MR. YOMES: Mr. Chair, I make a motion to adjourn this meeting.

COMMITTEE CHAIR: Motion to adjourn.

Any second?

COMMITTEE MEMBER: I second.

COMMITTEE CHAIR: Meeting is adjourned.

Thank you, audience.

(The proceedings adjourned at 11:59 a.m.)

C E R T I F I C A T E

I, Jessica R. Perry, Certified Shorthand Reporter for the State of Hawaii, hereby certify that the proceedings were taken down by me in machine shorthand and was thereafter reduced to typewritten form under my supervision; that the foregoing represents to the best of my ability, a true and right transcript of the proceedings had in the foregoing matter.

I further certify that I am not attorney for any of the parties hereto, nor in any way concerned with the cause.

DATED this 15th day of November, 2018, in Honolulu, Hawaii.

Jessica R. Perry

Jessica R. Perry, RPR, CSR No. 404

Appendix D

Aloha

2018 Update

Fuel Tank Advisory Committee (FTAC)

November 1, 2018

Navy Update on Field-Constructed Tanks

Review of Sites

Temporarily out of use:

- Kuahua Peninsula (a.k.a. Diesel Purification Plant)

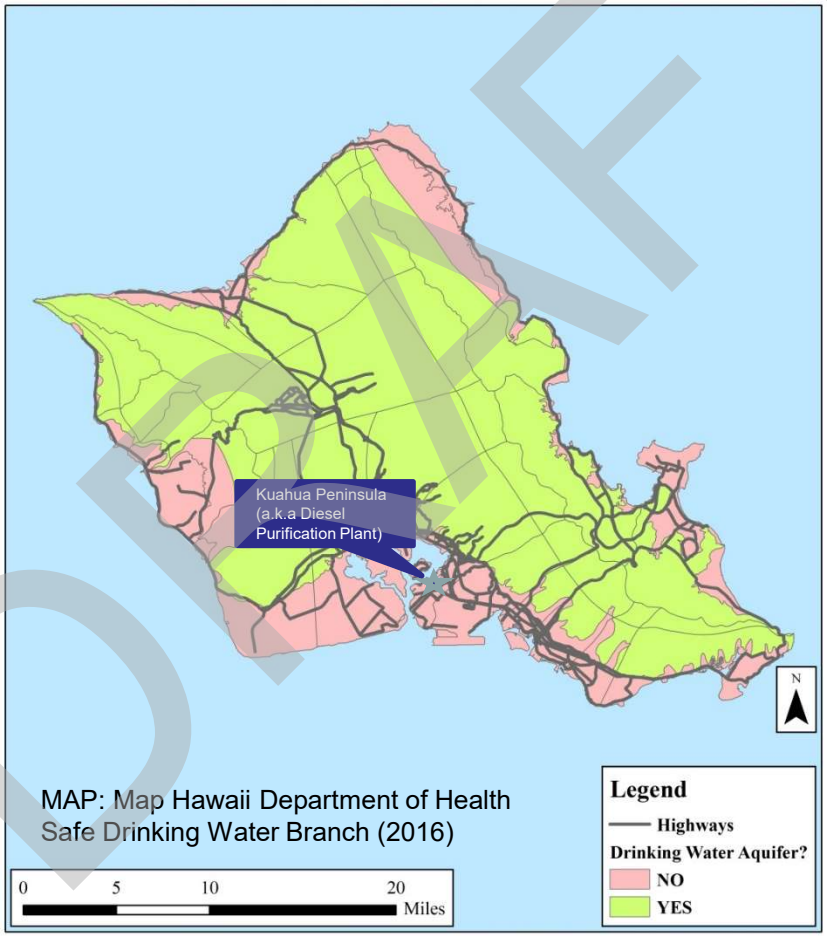
Permanently out of use:

- Hickam POL Annex (Kipapa)
- Hickam POL Annex (Waikakalaua)

Currently in use:

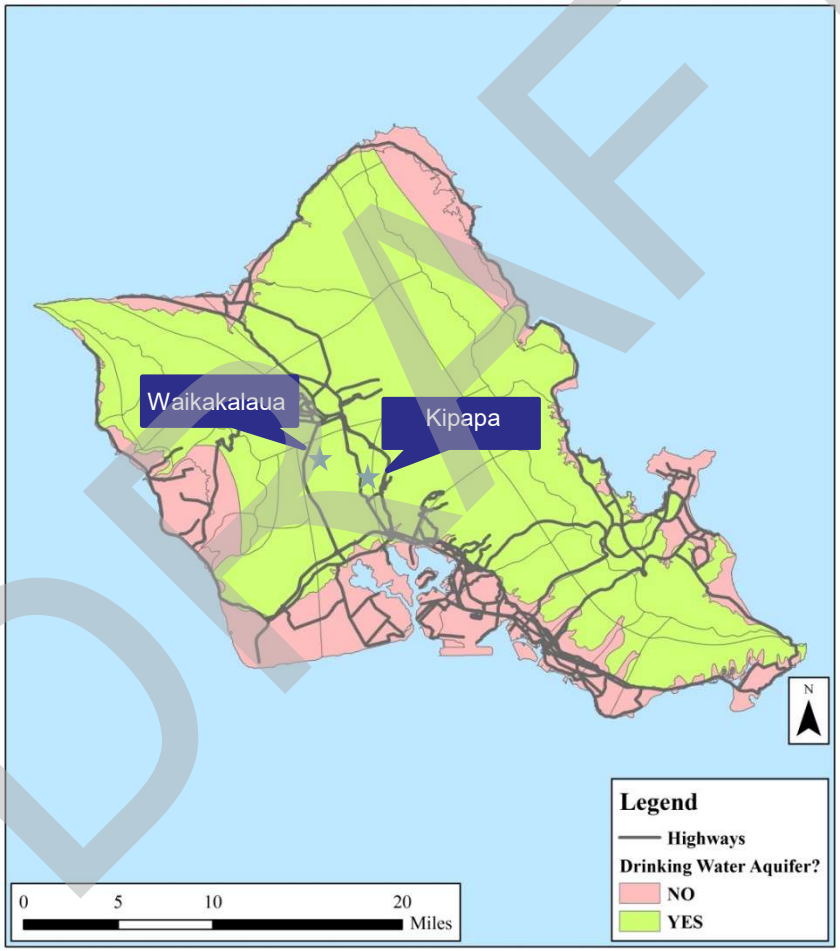
- Pacific Missile Range Facility
- Red Hill Underground Storage

Kuahua Peninsula
(a.k.a Diesel Purification Plant)

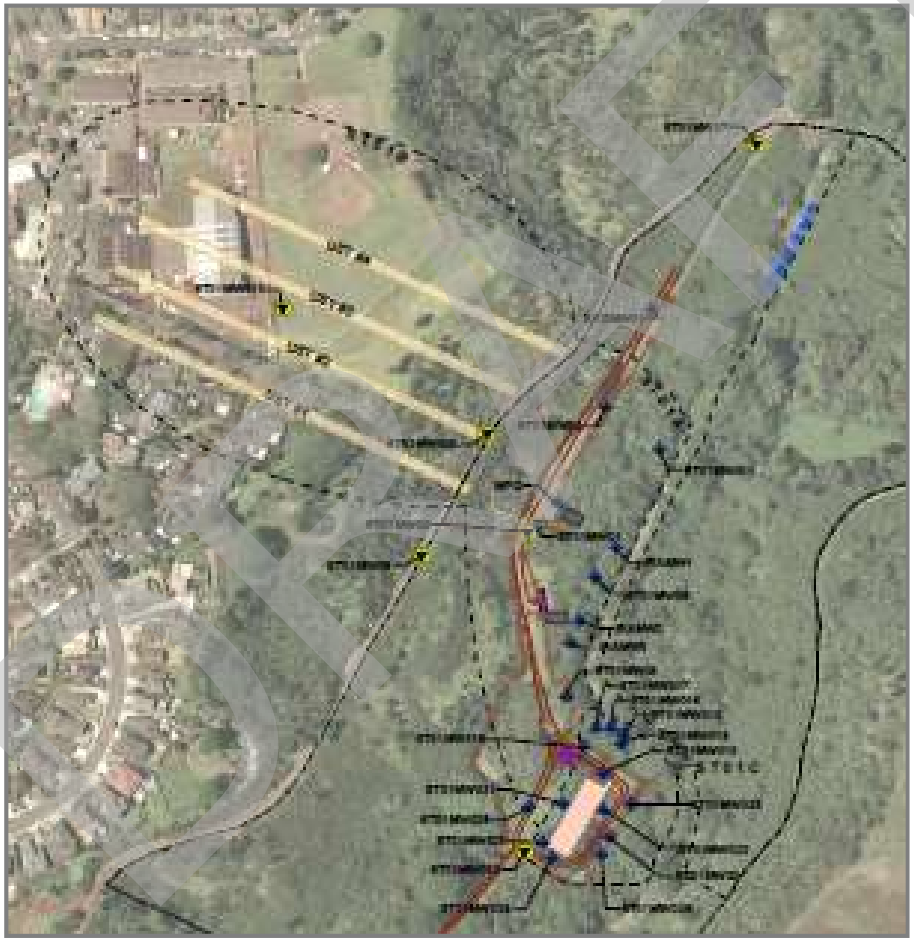


MAP: Map Hawaii Department of Health
Safe Drinking Water Branch (2016)

Hickam POL Annexes



Hickam POL Annex - Kipapa



Answers to Outstanding Questions From Last Meeting

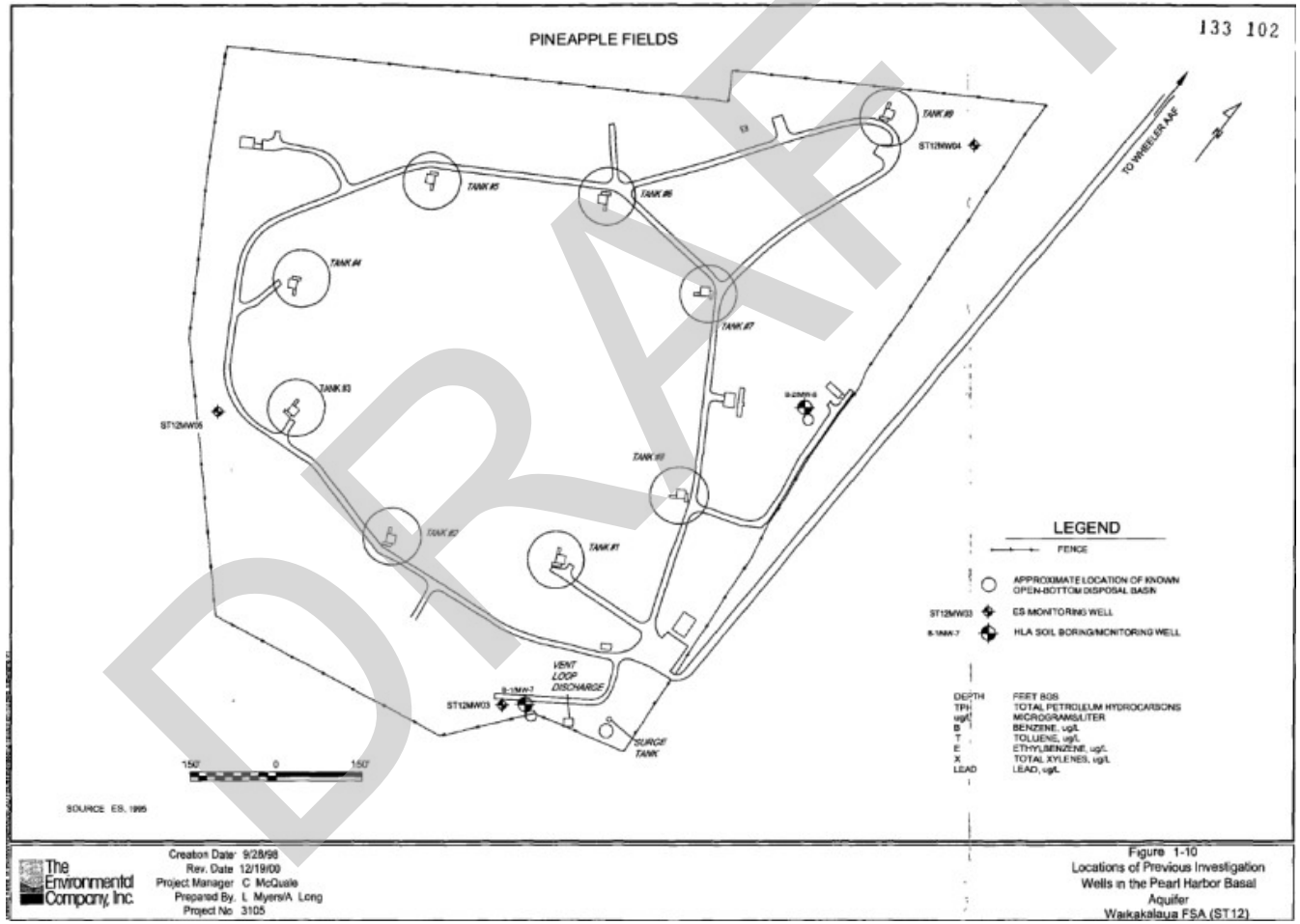
What are TPH cleanup goals at Hickam POL Annex - Kipapa?

Compound of Concern	Soil (mg/kg)	Shallow Groundwater (µg/l)	Soil Gas (µg/m^3)
TPH-d	500/500	5,000/5,000	1,180,000/9,940,000
TPH-g	1,240/4,520	150,000/150,000	1,180,000/9,940,000

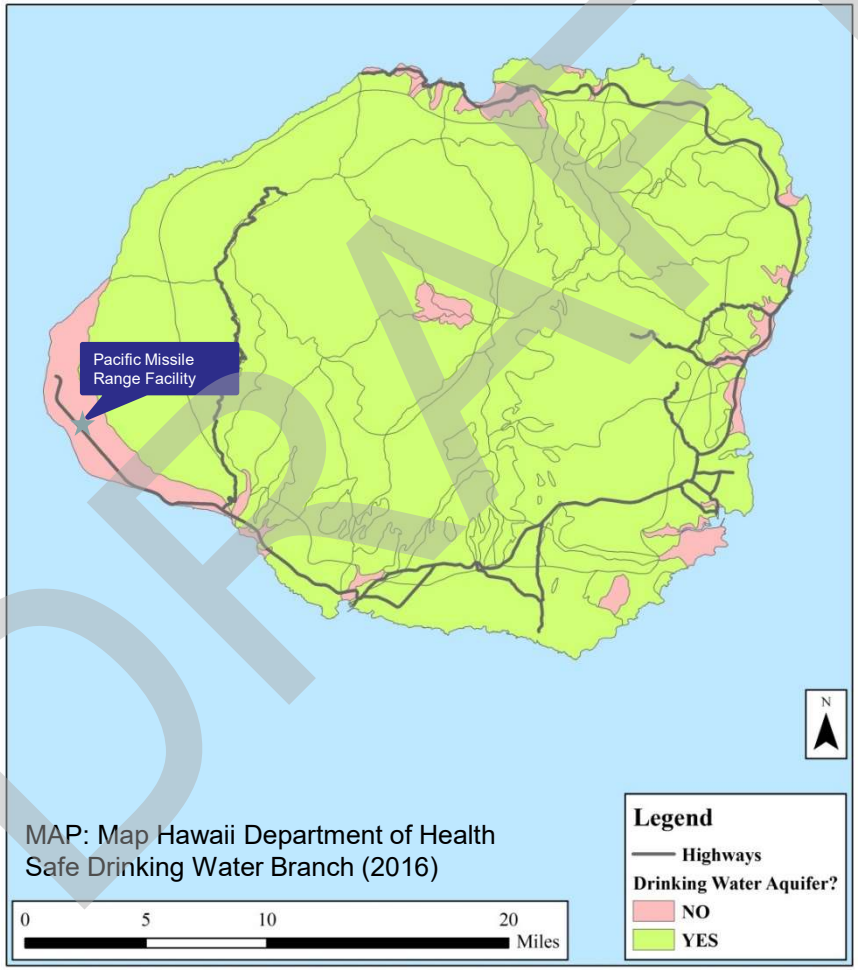
Notes:

1. TPH-d: Total Petroleum Hydrocarbons-diesel (currently 47-180 µg/l)
2. TPH-g: Total Petroleum Hydrocarbons-gasoline (currently 160-3,100 µg/l)
3. First number indicates max contaminant level (MCL) for residential occupancy. Second number indicates MCL for industrial occupancy.
4. Ultimate goal is reducing MCL below residential occupancy requirements. Intermediate goal is reducing MCL below industrial occupancy requirements. Achieving industrial occupancy MCL still requires monitoring. No current estimate for completion of cleanup.
5. 17 monitoring wells sampled annually.

Hickam POL Annex - Waikakalua

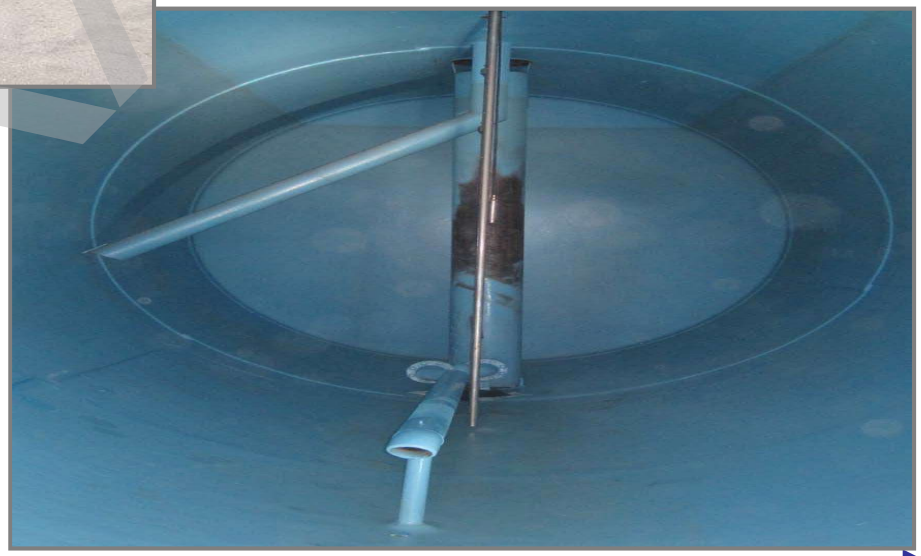


Pacific Missile Range Facility



MAP: Map Hawaii Department of Health
Safe Drinking Water Branch (2016)

Pacific Missile Range Facility



Navy and DOH Update on the Administrative Order on Consent (AOC) at the Red Hill Bulk Fuel Storage Facility

Answers to Outstanding Questions from Last Meeting

When Red Hill Surge Tanks last underwent American Petroleum Institute (API) inspection, how many areas were found requiring repairs?

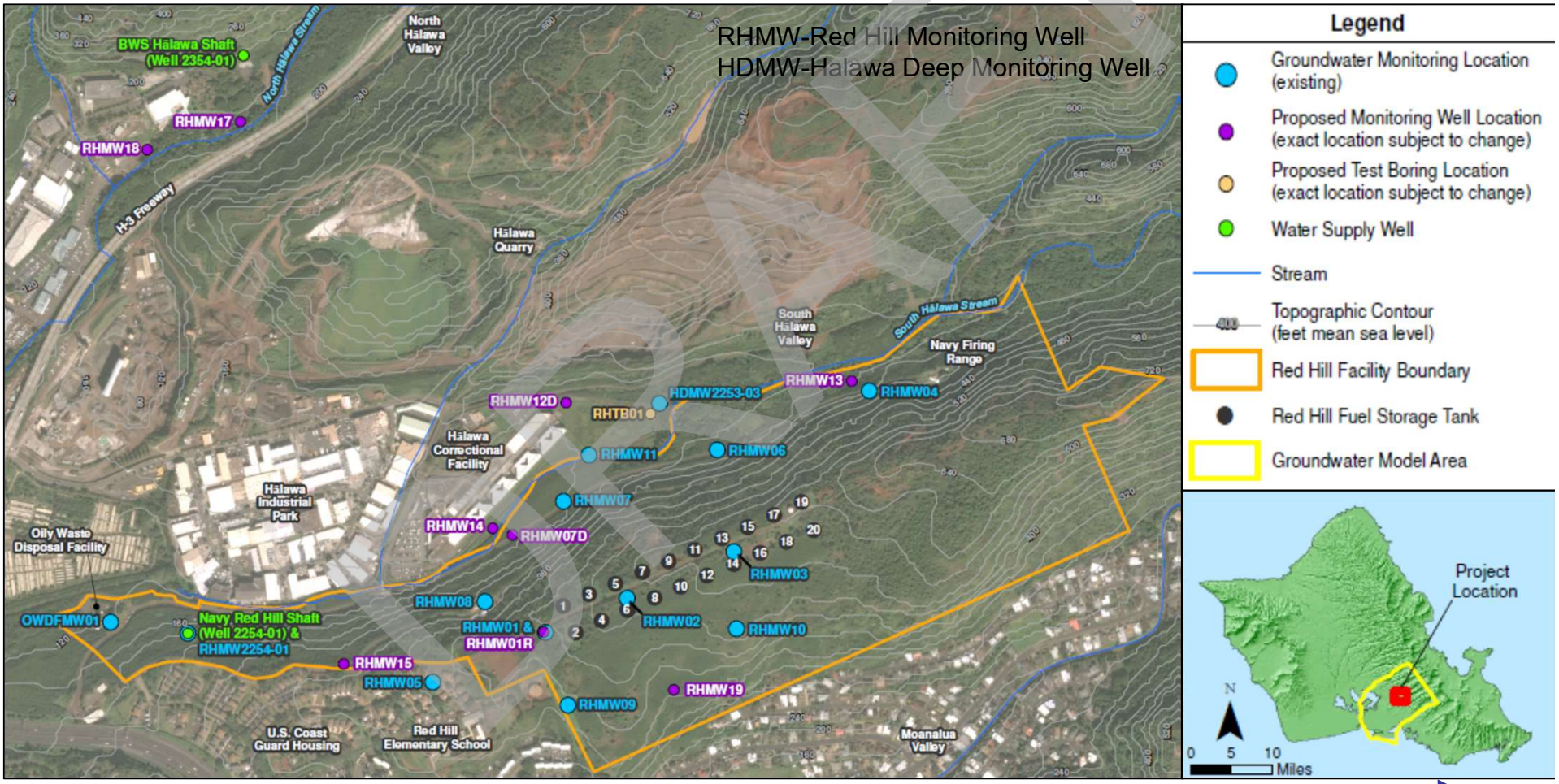
- API 653 inspections last completed on all 4 Red Hill Surge Tank in 2004.
- 19 areas identified for repair during inspection.
- All repairs successfully completed and passed testing.
- Each surge tank has successfully passed tank tightness testing since repairs completed.
- Next cycle of cleaning, inspection, and repairs (CIR) recently began.

Red Hill Bulk Fuel Storage Facility
Update on AOC Actions

Actions completed since last meeting

- **FY18 Tank Tightness Testing**
- **Coupon Removal**
- **Alternative Location Study**
- **Tank Upgrade Alternatives Report**
- **Establishment of Groundwater Modeling Working Group**
- **Installation of Monitoring Well #11**
- New Release Detection Alternatives Report
- Scope of Work for Destructive Testing
- Groundwater Monitoring Split Sampling with EPA
- Seismic Geologic Survey
- Various Natural Attenuation Studies
- Regional Synoptic Water Level Study
- Conceptual Site Model Report
- Groundwater Protection and Evaluation Considerations Report

Groundwater Monitoring Wells



Red Hill Bulk Fuel Storage Facility
Regulatory Oversight and Approvals

DOH/EPA approvals since last FTAC meeting:

- Tank Upgrade Alternatives Report (May, 2018)
- Destructive Testing Plan (June, 2018)
- Release Detection Alternatives Report (August, 2018)

Red Hill Bulk Fuel Storage Facility
Update on AOC Actions

Actions scheduled for completion prior to next meeting:

- DoD Strategic Fuel Storage/Distribution Analysis Study
- Tank Upgrade Alternative Decision Document
- Release Detection Decision Document
- Destructive Testing Results Report
- Continued Execution of Long-term Groundwater and Soil Vapor Monitoring
- Groundwater Flow Model Report
- Continued Execution of Regional Synoptic Water Level Study
- Investigation and Remediation of Releases Report
- Installation of Additional Monitoring Wells and Test Boring
- Contaminant Fate and Transport Modeling Report
- Quantitative Risk and Vulnerability Assessment-Phase 1
- Semi-annual Tank Tightness Testing

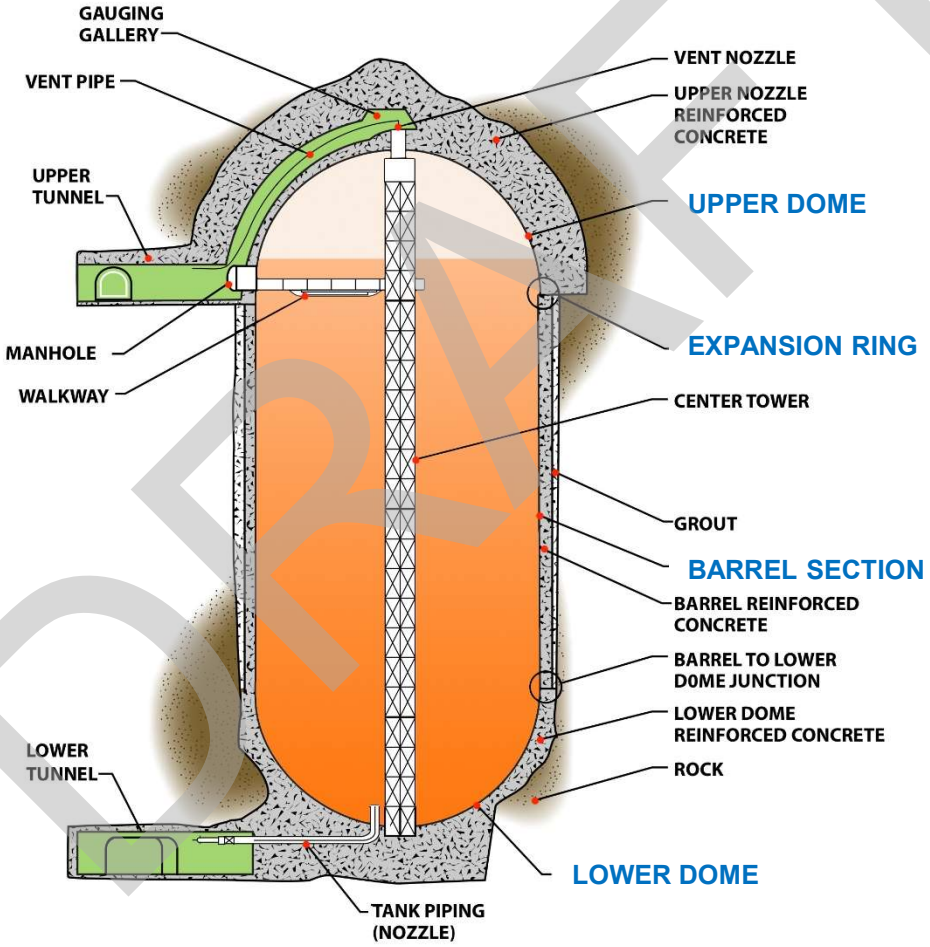
Red Hill Bulk Fuel Storage Facility
Current Projects

- Continue with Clean, Inspect and Repair Program for Tanks 5, 13, 14, and 17.
- Begin Clean, Inspect and Repair Program for Tanks 4 and 18 after above tanks returned to service.

Destructive Testing Way Ahead

- Laboratory analysis used to validate present non-destructive technology used to determine liner thickness.
- Navy awaiting results of coupon lab analysis.
- Testing is only 1st phase of study.
- Next phase compares lab analysis results with data from non-destructive evaluation.
- AOC requires results of comparisons submitted by middle of 2019.
- Navy awaiting results of comparison before developing any conclusions.

Tank Diagram



Coupon Location Summary

Region of Tank	No. of Coupons	No. of Areas Already Identified for Repair
Upper Dome	1	1
Expansion Ring	2	1
Barrel Section	6	3
Lower Dome	1	0
Total	**10**	**5**

Coupon #1

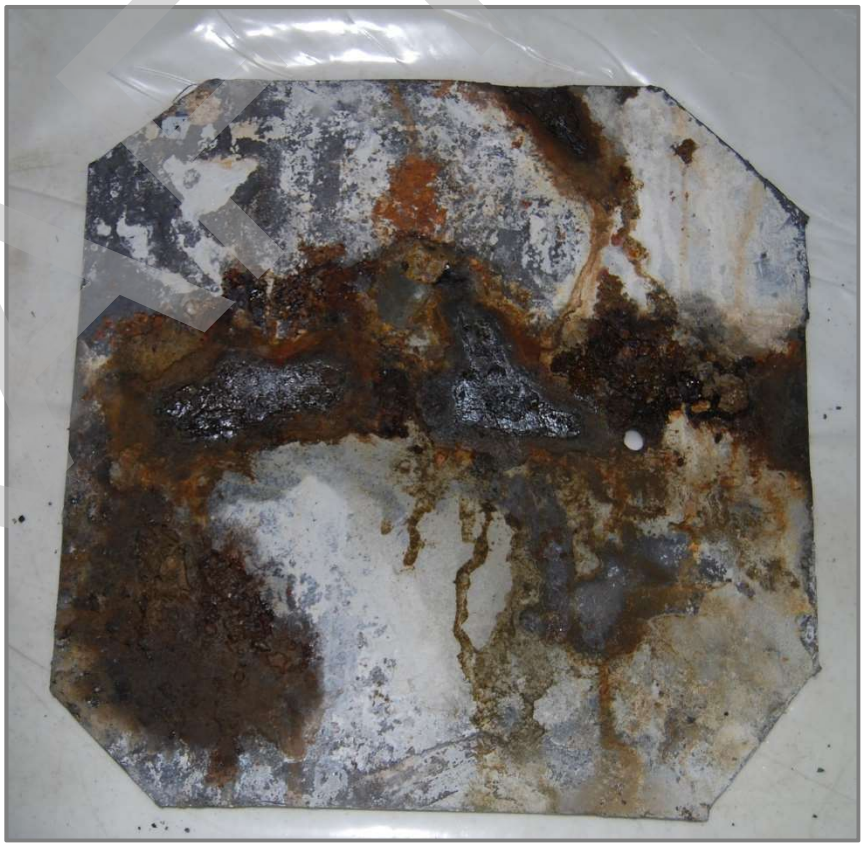
Initial indications:

- Screening scan indicates repair is necessary
- Prove-up scan indicates repair is necessary
- **Expect lab measurements to validate NDE measurements**

Coupon #2

Initial indications:

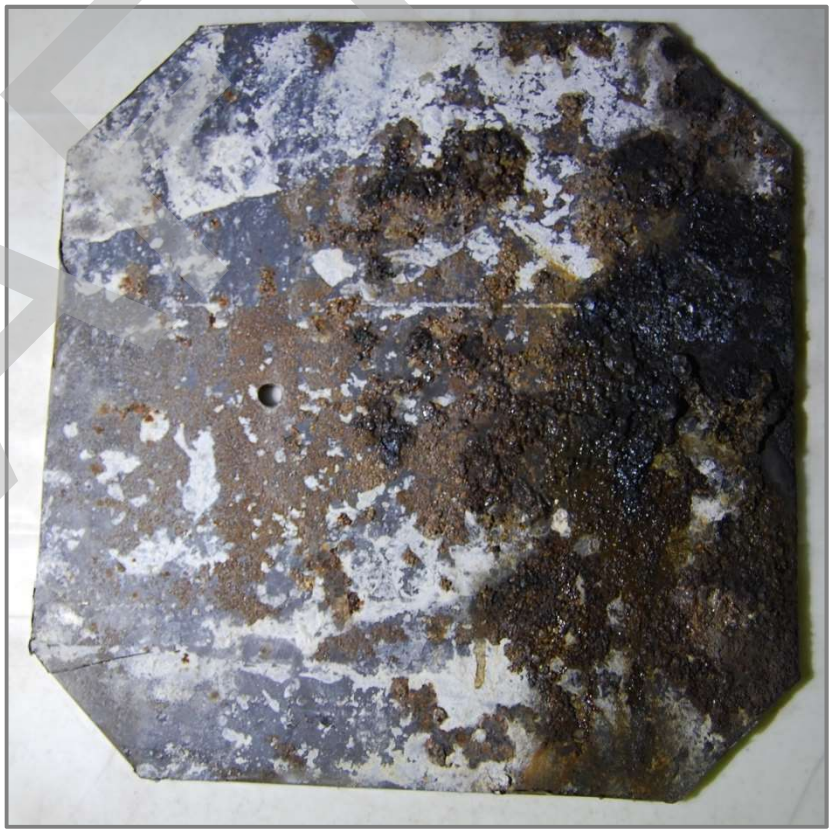
- Screening scan indicates repair is necessary
- Prove-up scan indicates repair is necessary
- **Expect lab measurements to validate NDE measurements**



Coupon #3

Initial indications:

- Screening scan indicates repair is necessary
- Prove-up scan indicates repair is unnecessary
- **Expect lab measurements to validate NDE measurements**



Coupon #5

Initial indications:

- Screening scan indicates repair is necessary
- Prove-up scan indicates repair is necessary
- **Expect lab measurements to validate NDE measurements**

Coupon #6

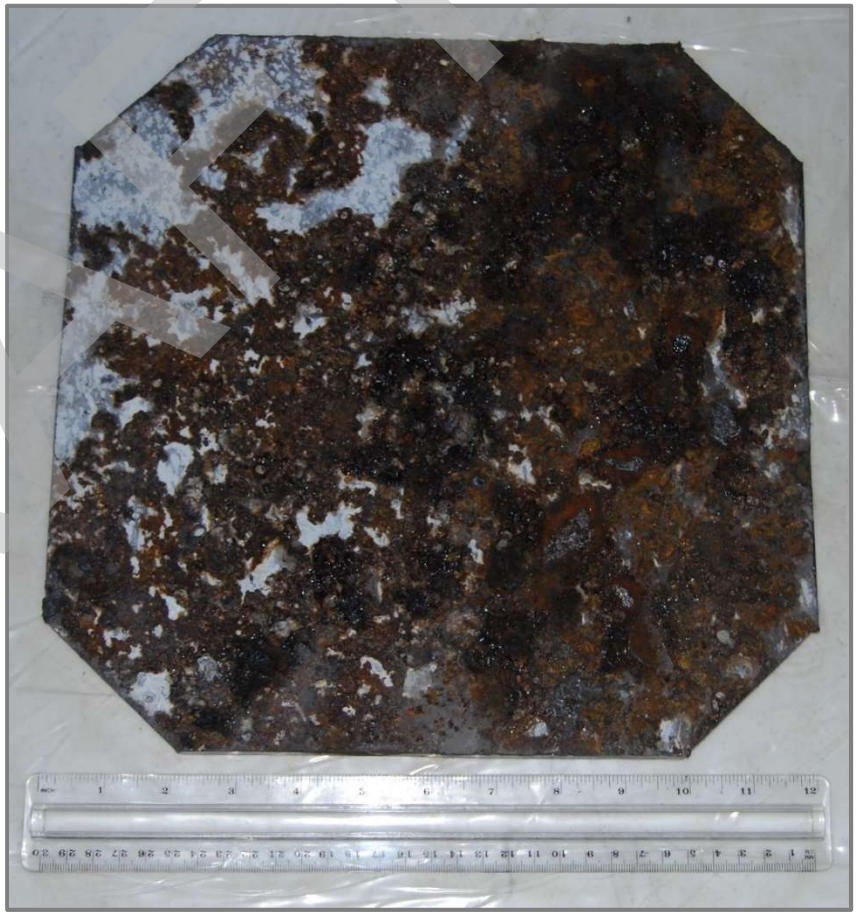
Initial indications:

- No Non Destructive Evaluation performed
- Control sample only

Coupon #7

Initial indications:

- Screening scan indicates repair is necessary
- Prove-up scan indicates repair is necessary
- **Expect lab measurements to validate NDE measurements**



Coupon #8

Initial indications:

- Screening scan indicates repair is necessary
- Prove-up scan indicates repair is unnecessary
- **Expect lab measurements to validate NDE measurements**

Coupon #10

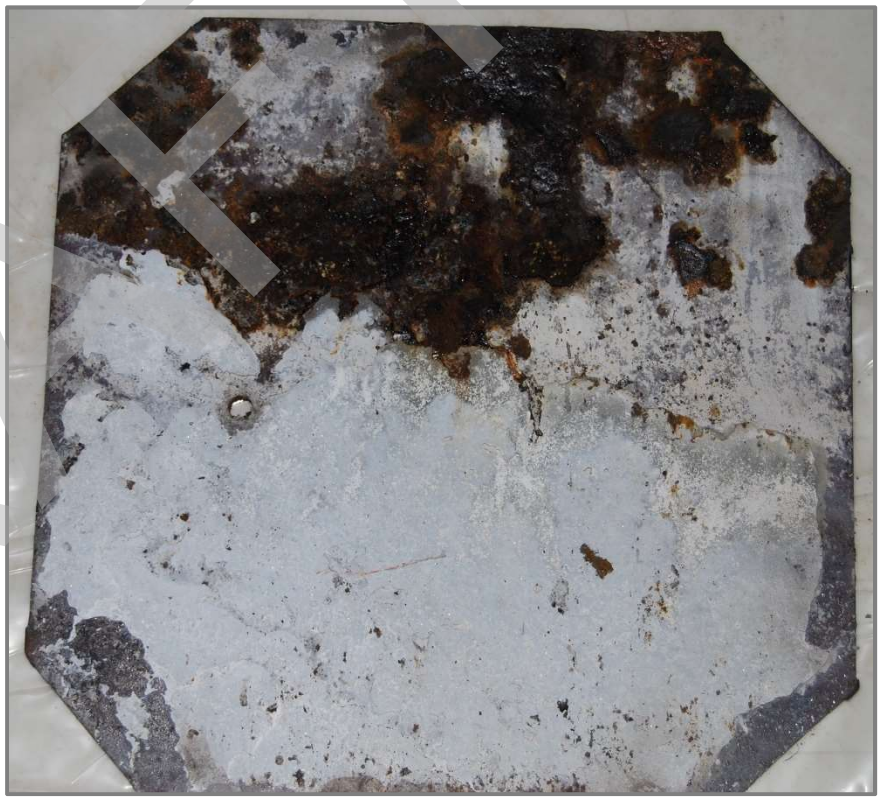
Initial indications:

- Screening scan indicates repair is unnecessary
- **Expect lab measurements to validate NDE measurements**

Coupon #A1

Initial indications:

- Screening scan indicates repair is necessary
- Prove-up scan indicates repair is necessary
- **Expect lab measurements to validate NDE measurements**



Coupon #A2

Initial indications:

- Screening scan indicates repair is <u>unnecessary</u>
- **Expect lab measurements to validate NDE measurements**

Tank Upgrade Alternatives

Alt	Description	Pros	Cons	Est Cost (millions)-ROM
1A	Restoration of Existing Tank	• Proven construction method • Interior barrier can be inspected/repaired	• Single wall construction • Requires leak detection system	$180-$450
1B	Restoration of Existing Tank plus Interior Coating	• Proven construction method • Interior barrier can be inspected/repaired	• Single wall construction • Requires leak detection system • Coating challenges due to tank size	$450-$1,800
1D	Remove existing Liner, Install New Steel Liner with Interior Coating	• New steel liner • Interior barrier can be inspected/repaired	• Single wall construction • Requires leak detection system • Construction methods high risk • Risk of compromising structural concrete support for tank	$1,800-$4,500
2A	Composite Tank (Double Wall) Carbon Steel, with Interior Coating	• Double wall/adds carbon steel liner • Provides secondary containment • Interior barrier can be inspected/repaired	• Reduced capacity • Construction methods high risk • Secondary containment and exterior of primary containment cannot be inspected/repaired	$500-$2,000
2B	Composite Tank (Double Wall) Stainless Steel	• Stainless steel liner provides better corrosion protection • Provides secondary containment • Interior barrier can be inspected/repaired	• Reduced capacity • Construction methods high risk • Secondary containment and exterior of primary containment cannot be inspected/repaired	$2,000-$5,000
3A	Tank within a Tank (Carbon Steel), Full Interior and Exterior Coating	• New carbon steel tank • Provides secondary containment • Space between tanks can be inspected/repaired	• Lowest capacity • Construction methods high risk	$2,000-$5,000
ALS	New Tanks (Cut and Cover including remediation of existing site)	• New facility • Provides secondary containment	• Recommended site still located above aquifer	$4,000-$10,000

Red Hill Bulk Fuel Storage Facility
Future Work Timetable

Subject to approval of regulatory agencies, Navy plans to implement the following recommended BAPT:

- Continue using AOC-approved CIR program and implement continued enhancements and improvements where practicable.
- Conduct pilot project to apply coating to entire interior of tank and restore or abandon nozzles.
- Install leak detection system for all tanks currently in service or proposed to be returned to service.

Red Hill Bulk Fuel Storage Facility
Future Work Timetable

Why is this BAPT?

- 2014 release is first reported release to the environment since the introduction of the underground storage tank regulations in 1988.
- Solely due to human error, not from tank deterioration.
- All tanks passing annual tank tightness tests. Test frequency increasing to semi-annually in 2019.
- Current maintenance practices effectively measure tank liner thickness and identify repair locations well before they are problems.
- QRVA noted highest risk of large release to environment is nozzles and lower access tunnel, not tanks.
- Proposed BAPT focuses on rapid identification if release occurs to minimize volume.
- Improved release detection (system of systems) and response procedures reduce volume of potentially released fuel to levels well below that endangering drinking water.
- Other alternatives involve construction risk, do not reduce risk to most vulnerable elements in facility i.e. the lower access tunnel and the nozzles, and are costly.
- Navy will revisit decision if new information suggests prior to 5-year mandatory review.

Summary

- Water continues to be safe to drink
  - Routine water sampling/testing
- Tanks pass annual tank tightness tests
- AOC is working
  - Navy/DLA is accountable
  - Navy/DLA has met/meeting all AOC deadlines
- CIR program in progress for Tanks 13, 14 and 17
- Tank 5 warranty repair work complete
  - 2nd full inspection with improved quality assurance complete. Waiting on award to complete repairs.
- TUA and Release Detection Decision Document scheduled for delivery by end of 2018

Questions

Appendix E

BOARD OF WATER SUPPLY

CITY AND COUNTY OF HONOLULU
630 SOUTH BERETANIA STREET
HONOLULU, HI 96843
www.boardofwatersupply.com

August 20, 2018

Mr. Omer Shalev
EPA Red Hill Project Coordinator
United States Environmental Protection Agency
Region IX
75 Hawthorne Street
San Francisco, California 94105

and

Ms. Roxanne Kwan
State of Hawaii
Department of Health
Solid and Hazardous Waste Branch
2827 Waimano Home Road
Pearl City, Hawaii 96782

Dear Mr. Shalev and Ms. Kwan:

Subject: Honolulu Board of Water Supply (BWS) Comments on the Red Hill Bulk Fuel Storage Facility (RHBFSF), Scope of Work for Destructive Testing Supplement – Destructive Testing Plan, Supplement to Administrative Order on Consent (AOC) and Statement of Work (SOW) Section 5.3.2, dated June 1, 2018 and Our Inspection on June 25, 2018 of Coupons Removed from Tank 14.

The BWS appreciates the opportunity to review the Navy's Destructive Testing (DT) Plan (NAVFAC, 2018) and to view and photograph the steel plate samples (coupons) removed from the steel liner of RHBFSF Tank 14. This letter summarizes our observations and comments.

Coupon Observations

1. Presence of substantial backside corrosion — There were areas of substantial corrosion on the backside (non-fuel wetted side) of the ¼-inch thick steel plate lining the tank (Figure 1, for example).

2. Staining on Backside of Steel — Deposits on the backside of some coupons suggest hydrocarbon-staining and should be tested for presence of released product (Figure 2, for example).

3. Non-Destructive Evaluation (NDE) Technique Underestimates Remaining Wall Thickness — Corrosion pit depths measured on the cut specimen edges suggest that NDE techniques were not able to locate and measure the thinnest wall of the coupon. For instance, the scale shown in Figure 1 indicates the wall along the edge of Coupon No. 2 has thinned to about 0.079-inches (reduced from 0.25-inches thick when new). However, the two NDE techniques (screening and Prove-up) predicted the thinnest area of this coupon to be 0.187-inches and 0.135-inches, respectively, underestimating the measured thickness by 51%.

   Again, these are our observations, and we await the results of the independent testing laboratory for confirmation. Overall, it appears that the corrosion exhibited by the 10 coupons removed from Tank 14 justify our concerns regarding the risks of through-wall pitting associated with corrosion of the steel liners. In addition, NDE test results raise serious concerns regarding the ability of the tank inspection and repair methodology to find and repair all critical defects.

Destructive Testing Plan

1. Scope does not include piping — We first note that the DT plan pertains only to the liner of Tank 14, and the BWS would like to reiterate our previously expressed concerns regarding how piping, from the tank to the tunnel, is inspected and repaired as being insufficient to assure leak free operation for the currently set 20-year re-inspection interval.

2. Scope of Testing Reduced to a Single Tank — It is our understanding that the Navy now intends to remove coupons from only one tank. This is a reduction in scope from the three tanks initially discussed as being examined with NDE (Tank 14, 17 and Tank 18) (Navy/DLA, 2017) and the initial destructive evaluation plan that proposed destructive testing on both Tank 14 and 17 (NAVFAC, 2017). With a sample size of ten coupons from only one of twenty tanks, generalization of the condition of the steel to other tank steel liners and the reliability of the NDE technique to other tanks is not possible.

3. Tank 14 may not be Representative of Others — It has not been shown that the nature of the backside corrosion in Tank 14 is representative of other tanks. If other tanks exhibit conditions (e.g., pitting, thinning, cement paste adhesion, weld flaws) outside the range found in the Tank 14 coupons, the accuracy of the NDE method calculated for Tank 14 coupons may not apply. In this respect, we disagree with the Navy's position, expressed in the conditionally approved scope

of work that any destructively tested tank does not necessarily need to be representative in condition.

4. Navy Stated Goals for DT Cannot be Achieved — As stated in NAVFAC's Supplement to the DT Plan (NAVFAC, 2018), the Navy's goals (Goal A and Goal D) include:

   "A. Validate the results of NDE inspection technologies, specifically the NDE process used at Red Hill." This is also mentioned in Section 3 "Destructive Testing Discussion" of the DT Section 5 plan where it reiterates: "The intent of this section is to validate the results of NDE technologies and processes used to scan the Red Hill storage tanks."

   And

   "D. Analyze corrosion rate calculation procedures and recommend improvements as warranted."

   Goal A cannot be achieved: There are too few specimens to validate whether the NDE technology employed by the Navy can reliably find severe corrosion. The Navy acknowledges this in Section 5 of their Destructive Testing Plan: "Due to the huge surface area presented by the steel tank liner, acquiring sufficient number of samples for worthwhile statistical analysis of a particular tank's status and behavior with respect to corrosion would be an inordinate task."

   While the sample size is insufficient to validate NDE results to any reasonable confidence level, the converse is not true. Initial results indicate the NDE techniques are not sufficiently accurate to provide confidence that all defects that could grow to through wall failure prior to the next inspection interval will be found and repaired.

   For instance, comparison of the results from the two independent NDE techniques applied at the same locations (the screening and prove-up measurements) suggests the two techniques produce inconsistent results. This is illustrated in the Navy's Table 1 for coupon #1 where the "screening measurement" NDE method predicts a remaining thickness of 0.147-inches whereas the "Prove-up Measurement" estimates the remaining wall as 0.112-inches. This difference between the measurement methods indicates that there is a high probability that not all damaged areas that need to be repaired (i.e. areas where the remaining wall less than 0.160-inch) will be repaired.

   Furthermore, our visual observations of some coupons suggest that the actual defect depth was greater than measured by either NDE technique. For example, Coupon #7 measurements indicated a remaining wall of either 0.157-inches or 0.135-inches whereas the cut edge of this coupon appears to show a minimum

remaining wall of 0.079-inches (see Figure 1). These are our observations, and we look forward to reviewing the results of the independent testing laboratory for confirmation.

In summary, the current NDE/DT testing reinforces BWS's previously stated concerns about the accuracy of the NDE and the reliability of the API inspection and repair methodology. The BWS informed the AOC parties of this in several letters (BWS 2016a, BWS 2016b, BWS 2017a, BWS 2017b, BWS 2017c, BWS 2017d, and BWS 2017e). In particular, the current NDE/DT results further indicate the need to develop probability of detection (POD). The POD for the NDE techniques can be done using plates manufactured with various flaw types of various depths as we have previously described. This information will help ascertain the reliability of the API inspection and repair procedures used to assure leak free tank operation for the next 20-years until the next inspection.

Goal D cannot be achieved: Since the Navy does not have any prior API inspection reports regarding Tank 14, accurate estimates of the corrosion rate from the current NDE/DT testing are not possible. Corrosion rates are not necessarily constant over long time-intervals. The observed corrosion may have occurred over 76 years, or it may have only occurred since the last inspection and repair cycle. In addition, it will not be known if the corrosion found was from a previously non-corroded area, from a prior defect that was of a size that did not need repairing, or from a previously non-detected defect. Some of this uncertainty could have been avoided if the Navy selected a tank that had a complete API report showing the location of previously found defects and repairs.

5. Selected Locations of Tank 14 Coupons — The sample location selection process was not transparent, and the BWS cannot comment on how well the Tank 14 coupons represent the general condition of the steel liner elsewhere in Tank 14.

6. Lack of Integration with Quantitative Risk and Vulnerability Assessment (QRVA) — The Navy acknowledges that the number of samples generated in the DT plan will be insufficient to support "worthwhile statistical analysis (page 4). The test plan contains no mention of supplemental testing with manufactured coupons to address this limitation, which implies the ongoing QRVA will be unable to account for the contribution of NDE inspection failures in estimating the frequency of future tank leaks and ruptures at Red Hill.

Laboratory Testing of the Coupons

The BWS understands that the coupons removed from Tank 14 will now be tested by an independent laboratory. Although some of the testing procedures are outlined in the DT plan, detailed protocols are not included. Given the importance of these specimens and the nature of the DT being planned, the BWS requests that we be allowed to attend and

observe the laboratory examination of the steel coupons. In the interim, we offer the following suggestions to add to the DT protocols.

1. Collect samples of corrosion product and stains for scanning electron microscopy (SEM/EDS) and Fourier Transform Infrared (FTIR) spectroscopy prior to any cutting or grinding.

2. X-ray radiographs on each of the coupons to locate the thinnest locations on each coupon. These areas should be marked for corrosion depth measurements by pit depth gaging as well as metallography.

3. Grind each of the four edges of the coupons flat and perpendicular to the plate faces in order to accurately document the minimum remaining wall thickness on each edge.

4. Section 4.2 of the DT Plan (NAVFAC, 2018) report states that independent laboratory analysis will include "Performing surface characterization of the exterior and interior surfaces of the steel coupon using three-dimensional profilometry after the coupon is cleaned". It is unclear from the report how this profilometry will be accomplished. The independent lab should provide the raw data that comprises the profiles of each coupon, including the raw point cloud files if laser scanning is being used. The BWS requests that the Navy provide this raw data to the BWS as soon as possible after the completion of the surface characterization analysis.

If you have any questions, please contact Mr. Erwin Kawata, Program Administrator of the Water Quality Division at (808) 748-5080.

Very truly yours,

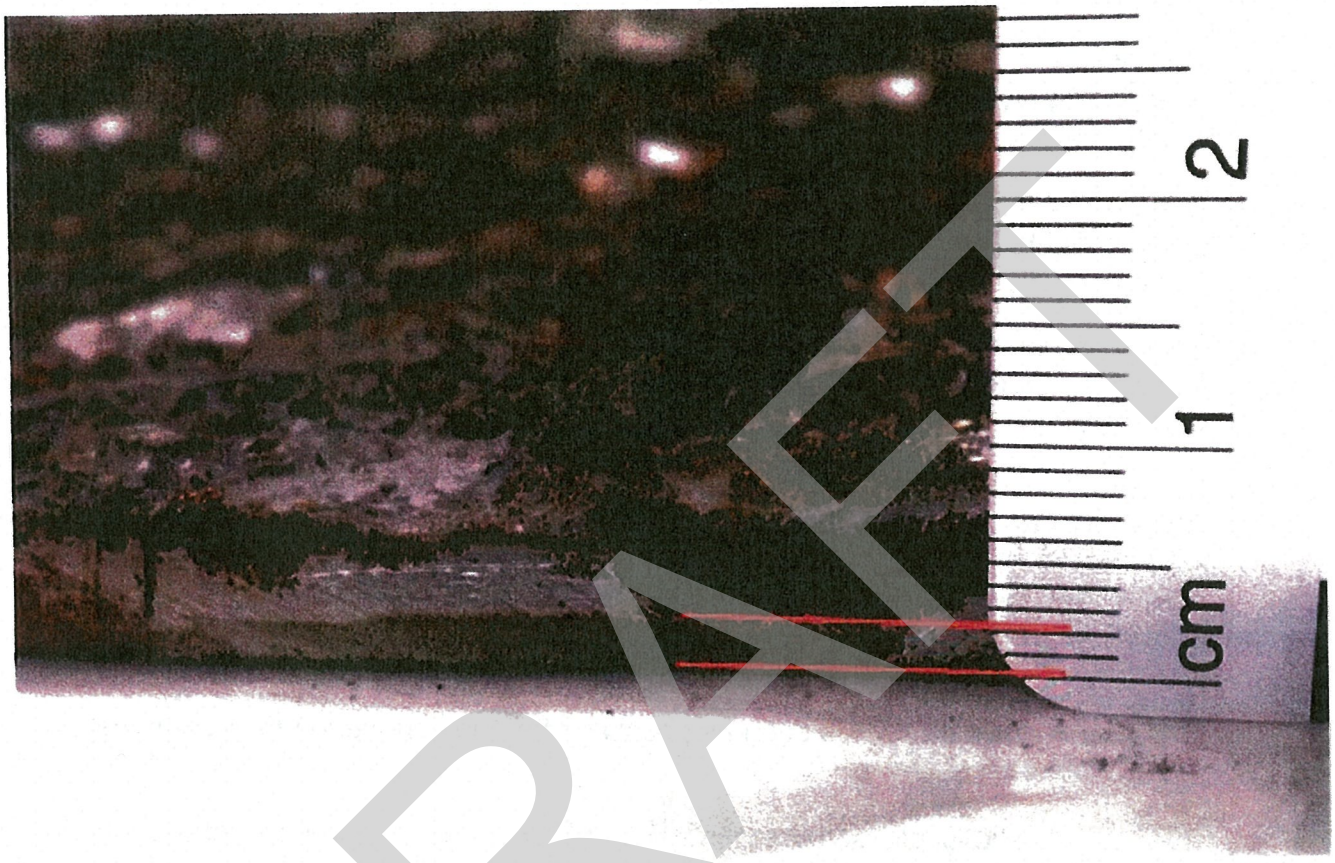
ERNEST Y. W. LAU, P.E.
Manager and Chief Engineer

cc: Mr. Steve Linder, United States Environmental Protection Agency, Region IX
Mr. Mark Manfredi, NAVFAC Hawaii

References

BWS, 2016a. Comments to the Work Plans Being Developed Under the Red Hill Bulk Fuel Storage Facility Administrative Order on Consent (AOC) Statement of Work (SOW) Sections 2 through 5 and 8, May 27

Figures

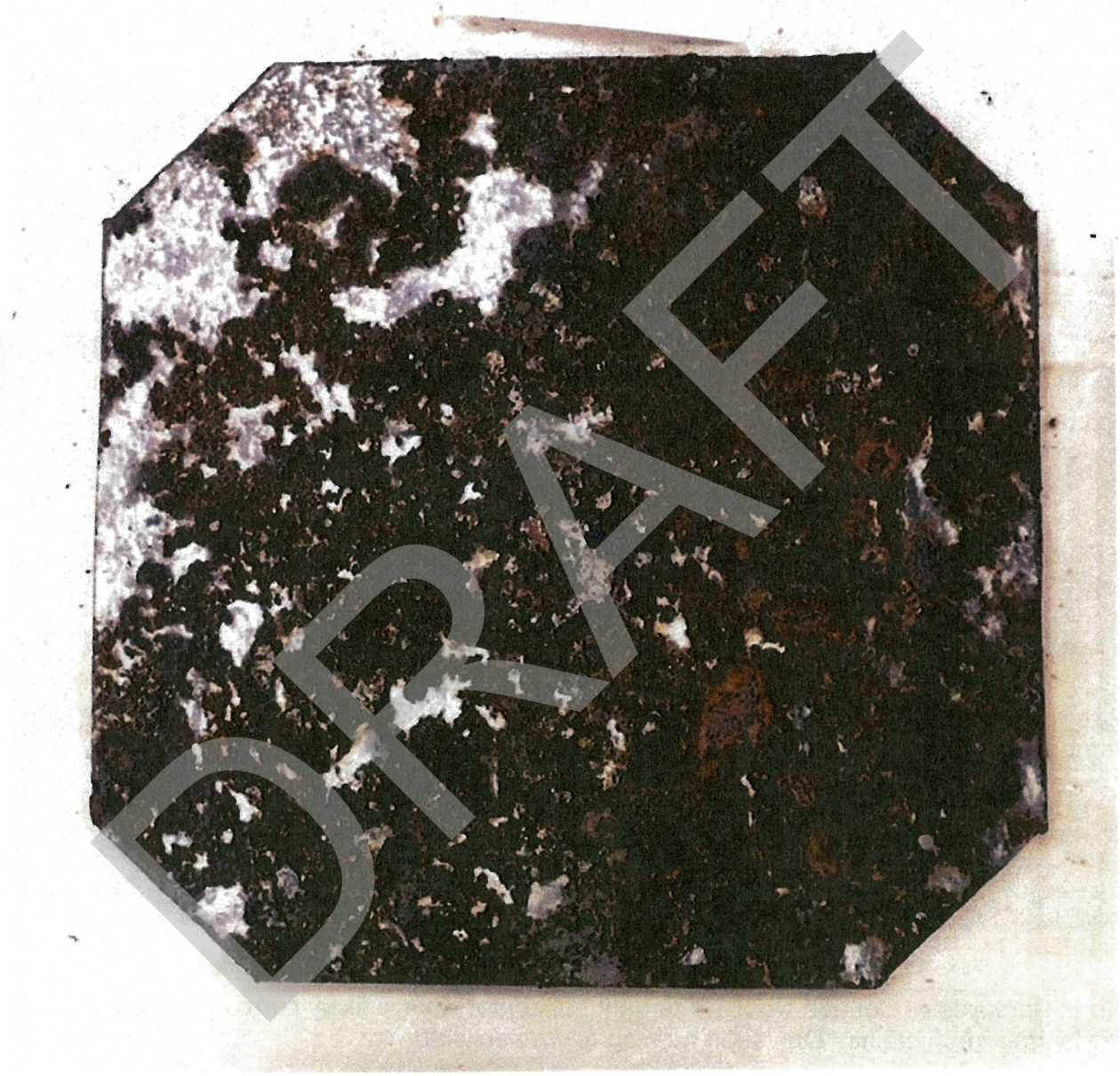


NDE remaining thickness: 0.135" to 0.187"
Apparent remaining thickness: 2mm = 0.079"

Figure 1: Coupon No. 7 viewed from the cut edge shows the corrosion and staining on the backside against the concrete. Remaining wall appears to be about 2 mm or 0.079 inches.

Figure 2: Backside of Coupon No 2 – The dark horizontal stain is likely corrosion product and/or hydrocarbon stains. Drip seen running down backside.

Supplemental photo



Coupon No. 7 viewed from the backside shows corrosion.

BOARD OF WATER SUPPLY

CITY AND COUNTY OF HONOLULU
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October 2, 2018

Mr. Omer Shalev
United States Environmental Protection Agency
Region IX
75 Hawthorne Street
San Francisco, California 94105

And

Ms. Roxanne Kwan
State of Hawaii
Department of Health
Solid and Hazardous Waste Branch
2827 Waimano Home Road
Pearl City, Hawaii 96782

Dear Mr. Shalev and Ms. Kwan:

Subject: Board of Water Supply (BWS) Comments on the Groundwater Protection and Evaluation Considerations for the Red Hill Bulk Fuel Storage Facility (RHBFSF) Report, dated July 27, 2018

The BWS reviewed the above reference report and offers the following comments. The report is available on the United States Environmental Protection Agency's (EPA) website and is titled "interim groundwater flow model". It also has been referred by the Navy as the "tank upgrade alternative (TUA) technical memo".

This report presents, among others, the following conclusions:

1. An undetected chronic release of 2,300 gallons of light non-aqueous phase liquid (LNAPL) per year per tank would be biodegraded in the vadose zone, prior to reaching groundwater.

2. A sudden release of approximately 120,000 gallons of LNAPL would likely be retained in the vadose zone and/or at the water table without causing an exceedance of risk-based decision criteria (RBDC) at Red Hill Shaft. According to the report, the RBDC is the conservative, initial screening criteria

that is protective of drinking and domestic water use. For total petroleum hydrocarbons – diesel (TPH-d), the RBDC is 400 parts per billion (ppb).

3. It is possible that a fuel release as large as 700,000 gallons would not cause an exceedance of the RBDC at Red Hill Shaft.

The BWS strongly opposes these conclusions. The report is granting acceptance to allowing fuel releases into our island's sole source drinking water aquifer. This is absurd and unacceptable. Regulatory agencies charged with protecting our environment and drinking water resources should not approve this report. The Red Hill fuel tanks should have secondary containment or be relocated away from the aquifer to ensure there are no more leaks into our environment and drinking water sources rather than continue "sustainment / maintenance of the existing tanks in accordance with current procedures." Oahu's sole source aquifer is the only one of its kind and cannot be replaced. Any cost to preserve, protect and prevent it from being contaminated is worth the investment. Allowing any amount of fuel leaks into this resource is passing along a problem to future generations.

The report also presents conclusions about the distribution of Navy fuel as LNAPL in the subsurface, dissolved groundwater contaminants, groundwater flow directions and groundwater capture by Red Hill Shaft pumping, degradation of fuel contaminants, and the migration extent of future fuel releases from the RHBFSF.

The BWS finds nearly all the conclusions presented are either unsupported or contradicted by available evidence, and that the report underestimates the risk to Oahu's drinking water supply from RHBFSF fuel releases. The report provides a non-conservative assessment of the risks from RHBFSF contamination to our sole source groundwater aquifer and our drinking water supply. The report concludes that with Red Hill Shaft pumping, groundwater from beneath the RHBFSF tanks is "entirely captured" even though the results of the interim groundwater flow models deviate considerably from observed groundwater levels and even though examination of groundwater head data indicates pumping at Red Hill Shaft induces a very small head change at the monitoring wells beneath the RHBFSF fuel tanks. The report concludes that fuel will likely be sequestered in the vadose zone for releases much larger than the January 2014 Tank 5 release even though there is credible evidence that LNAPL from the release reached the water table near monitoring well RHMW02. The report also concludes that biodegradation of fuel contaminants can effectively remove contaminants before groundwater migrates offsite of the RHBFSF even though it assumes a flow direction that does not match observed heads.

Given the unfounded and/or non-conservative nature of many of these conclusions, the report should not be used as an input to the upcoming Navy's TUA selection process unless and until these flaws are corrected. Accordingly, we request that the EPA and Hawaii Department of Health (DOH) (collectively, "Regulatory Agencies") take all steps

necessary to protect our drinking water by ensuring that the Navy select a TUA that is in balance with a conservative estimate of environmental risk from the RHBFSF fuel tanks.

The BWS offers comments to the following, non-exhaustive list of conclusions in Section 10 (titled Summary and Conclusions) of the report:

1. Navy report Section 10.1: Navy states that the fuel LNAPL is "located primarily within the upper one-third of the vadose zone between the lower access tunnel and the water table" according to thermal measurements in wells.

   BWS Comment: This conclusion is unfounded because thermal data provide little to no indication of LNAPL location in the subsurface. As the DOH's subject matter expert (SME) explained on August 16, 2018, LNAPL can be found much lower than the depth intervals with high temperatures. Moreover, the EPA SME stated on August 16, 2018 that the inferred temperature differences at monitoring well RHMW02 were dependent on the choice of background well. The Navy's conclusion is further contradicted by the available evidence that LNAPL migrated to the water table after the January 2014 Tank 5 release and in other instances since 2005. Thus, the conclusion places inappropriate weight on the small temperature differences calculated for monitoring well RHMW02 given that the slightly elevated temperatures calculated for this well are a function of the choice of background well. Even if slightly elevated temperatures exist in the vadose zone around monitoring well RHMW02, the fuel undergoing degradation may have come from the fuel leak of unknown volume from Tank 6 reported to the DOH in 2002 (see Attachment 1) or from other unreported fuel leaks from the RHBFSF. The only clear evidence of elevated temperatures in the subsurface is at RHMW03, which is relatively distant from Tank 5. Lastly, the rapid rise in volatile organic compound concentrations in soil vapor at the "deep" (distal) soil vapor monitoring point beneath Tank 5 following the 2014 release shows that LNAPL quickly migrated to at least 26 feet (ft) below the lower access tunnel and then an unknown distance further downward over time.

2. Navy report Section 10.1: Navy states that "No LNAPL has been measured on any of the Red Hill monitoring wells." and "Weathered LNAPL from a release prior to 2005 may be present in the immediate vicinity of RHMW02 or within the saturated zone upgradient from this well."

   BWS Comment: The first statement cannot be considered conclusive because it assumes that any released LNAPL would necessarily find its way to the sparse set of Red Hill monitoring wells; the rapid rise in soil vapor concentration at the deep (distal) Tank 5 soil vapor monitoring point following the 2014 release shows that LNAPL quickly migrated to and below this location, which is located more than 100 ft to the northwest of RHMW02 whereas the soil vapor detector nearest to the well showed a delayed change in concentrations. The second statement

appears to be unsupported conjecture and is contradicted by the available data. The Navy has presented no evidence that the concentrations observed at RHMW02 are from releases prior to 2005. Furthermore, groundwater concentration data show that the effective solubility values for TPH-d were exceeded at monitoring well RHMW02 between 2005 and 2014 and since the start of 2014, indicating that LNAPL has appeared in or near the well several times since 2005. (Figure 1 shows the maximum TPH-d concentrations observed at this well since 2005.) Naphthalene concentrations in groundwater at RHMW02 were near or exceeded its effective solubility value for jet fuels several times during 2006 and 2008, indicating that LNAPL is in or near the well (Lau, 2016). The anoxic reducing groundwater conditions observed at RHMW02 also indicate that LNAPL is and has been present near the well.

3. Navy report Section 10.2: Navy states that "Available data suggest the presence of weathered LNAPL (i.e., pre-2005) in the immediate vicinity of RHMW02 or within the saturated zone upgradient from this well."

   BWS Comment: Again, this conclusion appears to be mere conjecture because the Navy has presented no evidence that the weathered LNAPL observed at this well was released prior to, during, or after 2005. The rapid rise in TPH-d concentration to exceed the effective solubility of jet fuel (ATSDR, 2016) at this well during January 2014 and the essentially simultaneous increases in soil vapor concentrations at the central and deep (distal) soil vapor monitoring points appear to demonstrate that LNAPL from the 2014 release migrated rapidly through the vadose zone and reached groundwater. It is possible that some weathering of the LNAPL released in 2014 occurred as the fuel migrated through the vadose zone to the aquifer. Apparently, the Navy concurs because in Section 10.4 it states, "Soil vapor monitoring and fingerprinting analysis show that rapid weathering of petroleum is occurring in the vadose zone."

4. Navy report Section 10.3: Navy states that the dozens of interim groundwater flow models show no flow from groundwater at the RHBFSF to Halawa Shaft (barring one model it disregards), that "When operating under normal pumping conditions (REDACTED mgd), Red Hill Shaft captures all groundwater flow from beneath the tanks underlying Red Hill", and that "groundwater flow from beneath the Facility is toward Red Hill Shaft even when Red Hill Shaft is not pumping."

   BWS Comment: These conclusions, even if consistent with the Navy's modeling efforts to date, should not be relied upon because the large data set collected during the 2017-2018 synoptic water level survey show very different groundwater levels and gradients than those predicted by the model. Examination of the synoptic water level data show that water levels at Red Hill Shaft often are higher than those at RHMW04 and OWDFMW01 when the shaft is not pumping, contradicting the modeling-based conclusion that "groundwater

flow from beneath the Facility is toward Red Hill Shaft even when Red Hill Shaft is not pumping." Examination of the head changes at RHMW01, RHMW02, and RHMW03 (the monitoring wells nearest to the tanks) caused by the normal pumping schedule at Red Hill Shaft reveals that pumping causes maximum changes of roughly 0.1 ft. This raises serious questions as to whether Red Hill Shaft is in reality capturing any water from beneath the tanks because the models appear to predict far larger head changes than those observed. Our calculations of groundwater gradients using three monitoring wells and all available 2017-2018 synoptic water level data demonstrate that the groundwater gradient from Red Hill ridge is oriented toward Halawa Shaft whether Red Hill Shaft is pumping or not (please see Figure 2 of the report). This data-based analysis calls into question the model-based conclusion that groundwater from the RHBFSF will not migrate toward Halawa Shaft, particularly where, as here, the interim groundwater flow model predicts results that do reflect real world conditions. Moreover, it highlights the importance of conservatively interpreting the information available about the valley fill and saprolite in Halawa Valley. Unless and until these flaws are addressed, the Regulatory Agencies should not use the Navy interim models as an input to the TUA selection process. During the August 16, 2018 groundwater modeling working group meeting, EPA and DOH contractors stated that the interim model and its results are not "believable" because of the large mismatches between the measured and the simulated hydraulic gradients in the area of Red Hill Shaft. Their statements corroborate our statement that the BWS has no confidence in the current interim model (Lau, 2018a; 2018b; 2018c). When it comes to choosing between actual observations or several dozen poorly-calibrated models that do not match those observations, we recommend that the Regulatory Agencies and other decision makers put aside the models and focus on the actual data.

5. Navy report Section 10.4: Navy states that natural source zone depletion (NSZD) is active in the vadose zone near the RHBFSF fuel tanks based on measurements of carbon dioxide concentrations and temperature differences. Using the temperature data, the Navy estimates that between "between 2,600 and 17,300 gallons per year" are metabolized in the vadose zone within the RHBFSF tank footprint.

   BWS Comment: The BWS does not disagree that some degradation of past and ongoing fuel releases occurs in the vadose zone. However, the depletion rates may not be significant for either past, ongoing, or future releases. As we explained in comment 1 above, the purported temperature differences at RHMW02 and RHMW01 are very small and most likely the result of the choice of background well. The temperature differences may also be affected by conduction into the vadose zone of the heat brought into the access tunnels by ventilation, which may lead to overestimates of heat produced by NSZD. The maximum NSZD rate assumes that the LNAPL is distributed across the footprint,

which is not likely unless LNAPL migrates across the entire footprint surrounding the tanks. The minimum leak rate that can be detected using the present methods is about 0.5 gallon per hour per tank, which equates to about 4,400 gallons of fuel per year per tank. Thus, the range of NSZD rates can be exceeded when chronic leaks below the detection level occur at one to four fuel tanks.

6. Navy report Section 10.4: Navy states that "Based on available data, the plume attenuation half-lives for dissolved constituents are likely on the order of 10–100 days."

   BWS Comment: This conclusion is based on an assumption that groundwater flows from monitoring well RHMW02 to monitoring well RHMW01, a situation predicted by the interim groundwater flow model but not observed in the actual groundwater level data from the 2017-2018 synoptic water level survey. Examination of Figure 3 in the report, which depicts the mean water level for each monitoring well based on the thousands of observations collected over the survey period, shows no difference in mean water levels at the two monitoring wells (18.4 ft at both wells). It is not valid practice to derive degradation rates from the differences in concentrations between monitoring wells when the groundwater flow direction is unknown. As in the past, we recommend that the Navy install more groundwater and vadose zone monitoring wells to adequately define the distribution of fuel in the vadose zone and the direction of groundwater flow in the shallow aquifer.

7. Navy report Section 10.7: Navy states that 120,000 to 700,000 gallons could be released from a tank, depending on its location relative to Red Hill Shaft, and "not cause an exceedance of the RBDC at Red Hill Shaft." These release volumes were calculated assuming that the LNAPL remains entrapped in the 20 to 30 ft below the lower access tunnel.

   BWS Comment: As we explain in comment 1 above, this assumption is suspect as no defensible data has been provided demonstrating that LNAPL is retained solely in this part of the vadose zone. Also, Red Hill Shaft water quality is not the only important water quality to be considered. Furthermore, we remain concerned about continuous migration of fuel contaminants captured by infiltrated water that encounters LNAPL in the vadose zone. This recharge-driven mass flux of contaminants will increase as the vadose zone extent of the LNAPL increases.

8. Navy report Section 10.8: In this section on the path forward, Navy states that "Given the results of the interim environmental analysis of current data, conditions are reasonably bounded by the current monitoring well network."

BWS Comment: This conclusion is unfounded because the current monitoring well network is insufficient to determine the actual hydraulic gradients across Halawa Valley or even the gradients along Red Hill ridge. The dozens of interim models do not adequately match the groundwater levels observed in 2015 or 2017-2018. Evidence indicates that LNAPL has migrated through the vadose zone to the groundwater following the 2014 release and perhaps on several occasions since 2005.

Specific Technical Comments to the Sections Noted Below

1. Navy report Section 2.C: LNAPL Release and Source-Zone Model makes no mention of the evidence from concentrations exceeding effective solubility of TPH-d that LNAPL reached groundwater at in monitoring well RHMW02 on multiple occasions. See Figure 1 of the report. Average TPH-d concentrations at RHMW02 have exceeded 5,000 micrograms per liter (µg/L) five times since 2005: once in 2008 and four times since the January 2014 fuel spill at Tank 5 (Element Environmental, LLC, 2016). The most recent sample's value was slightly below the GWPP Site-Specific Risk-Based Screening Level (SSRBL) of 4,500 µg/L (Element Environmental, LLC, 2016). The water solubility for JP-5 and JP-8 is 5,000 µg/L (ATSDR, 2016), which is also the water solubility for the F-76 marine diesel fuel (CITGO, 2015) that was stored at the nearby Tank 6 (AMEC, 2002). TPH-d concentrations at RHMW02 have exceeded the ATSDR 5,000 µg/L fuel solubility value for JP-5, JP-8, and F-76 five times since 2005 and four times since the January 2014 fuel spill at Tank 5. Thus, the historical TPH-d concentrations indicate the presence of NAPL from one or more of the tanks near RHMW02. The rapid rise in groundwater TPH-d in RHMW02 immediately after the Tank 5 releases to above the effective solubility appears to indicate that the LNAPL from Tank 5 migrated to groundwater within days.

2. Section 2.D: Vadose Zone Model states that basalt vertical hydraulic conductivity is "often orders of magnitude lower" than horizontal hydraulic conductivity. This statement may be true, but, is potentially misleading and/or speculative because it does not explain what is known and what is estimated. Available estimates of horizontal to vertical anisotropy are inherently difficult to determine and, in this case, are solely based on flow models. According to Hunt, "Anisotropy has not been measured directly in Hawaiian lavas" (Hunt, 1996). Hunt listed anisotropy rates of 5:1 to 200:1 for models of regional flow on Maui and Oahu (Hunt, 1996). This sentence should be revised to explain that horizontal-vertical anisotropy has not been measured and estimates are highly uncertain because they are based on models only. Furthermore, anisotropy may be scale-dependent, and so for contaminant transport, it may depend on plume length.

3. Section 2.D: Vadose Zone Model states that "Horizontal permeability is significantly higher in the direction that the lava flowed." This appears to be mere conjecture because the Navy has neither cited nor presented any studies or other evidence that demonstrate whether there is horizontal anisotropy at any scale in the basalt aquifer.

4. Section 2.F: Fate and Transport of LNAPL and Dissolved COPCs in Groundwater states "Occurrence of LNAPL is primarily limited to a depth of 30 ft beneath wells RHMW02 and RHMW03." As explained by the DOH's SME on August 16, 2018, studies have shown that thermal data provide little to no indication of LNAPL location in the subsurface. Any temperature anomaly at monitoring well RHMW02 (if it exists), may be due to leaks from Tank 6, not Tank 5. AMEC reported forensic analysis of 2 core samples and 2 fluid samples revealed weathered fuels from beneath Tanks 6, 11, and 14 and unweathered fuel from beneath Tanks 6 and 14 (AMEC, 2002). The Navy's conclusion is directly contradicted by the available evidence that LNAPL migrated to the water table after the January 2014 release and at recent times since 2005. The conclusion places inappropriate weight on the small temperature differences calculated for monitoring well RHMW02 given that the slightly elevated temperatures calculated for this well are a function of the choice of background well. The only clear evidence of elevated temperatures in the subsurface is at monitoring well RHMW03, which is relatively distant from Tank 5. Lastly, the rapid rise in concentration at the "deep" (distal) soil vapor monitoring point beneath Tank 5 following the 2014 release shows that LNAPL quickly migrated to at least 26 ft below the lower access tunnel and then an unknown distance further downward over time.

5. Section 2.G: Exposure Model ends with the text below. BWS comments are found in italicized underlined parentheses following each sentence:

   "Even if some LNAPL had migrated to the saturated zone, the source would be very small, as evidenced by the depletion in naphthalene concentrations after the 2014 release. *(BWS Comment: Section 4.2 states "The concentrations of naphthalene, 1-methylnaphthalene, and 2-methylnaphthalene are equal to or greater than the expected concentration based on the effective solubility of these compounds in jet fuel" at monitoring well RHMW02. Continued anaerobic conditions and high TPH-d concentrations in 2014-2016 provide strong indications that LNAPL was present in or near RHMW02).* The thermal study conducted in October 2017 shows evidence that residual LNAPL is primarily limited to a depth of 30 ft beneath wells RHMW02 and RHMW03 and is being biodegraded. *(BWS Comment: According to the DOH's SME, studies have shown that temperature is a poor indicator of the location of LNAPL in the subsurface.)* COPC concentrations in groundwater suggest that there is not a significant source of LNAPL at the water table. *(BWS Comment: Continued*

anaerobic conditions and high TPH-d concentrations in 2014-2016 provide strong indications that LNAPL was present in or near RHMW02.) General transport of COPCs in the dissolved plume is in the southwest direction toward Red Hill Shaft. *(BWS Comment: Synoptic water level data do not show such a migration direction – see report Figure 3)*. Migration to the southeast and northwest is limited by the extent of lower-permeability materials (valley fill and saprolite) extending below the water table in the valleys bounding the Facility. *(BWS Comment: The Navy's interpretation of the core from RHMW11 is not the only possible interpretation and is not conservative. Our review of the core indicates saprolite does not extend as deep as the Navy has interpreted.)* Attenuation of COPCs in the dissolved plume in the saturated zone limit the extent of the existing dissolved plume before reaching Red Hill Shaft under present conditions and within the context of historical releases"

6. Section 3.2: Release History does not list all of the evidence for LNAPL beneath the RHBFSF tanks. According to AMEC (AMEC, 2002), multiple lines of evidence for LNAPL contamination were collected beneath Tanks 1, 2, 3, 4, 5, 6, 7, 11, 12, 13, 14, 16, 17, 18, 19, and 20:

    a. LNAPL or a mixture of fuel and water was detected in the borings beneath Tanks 1, 13, 14, 17, and 19;
    b. Core samples from Tanks 1, 2, 6, 14, 16, and 17 had concentrations of TPH-d, ethylbenzene, naphthalene, or methylene chloride that exceeded DOH Tier I Environmental Action Limits (EALs) with TPH-d values of 25,300 ppm (milligrams per kilogram of core – mg/kg) at Tank 1, 10,200 and 43,100 mg/kg at Tank 6, and 26,200 mg/kg at Tank 16; Additional constituents detected in core samples where a EAL has not been established by DOH include: 2-methylnaphthalene, 4-methyl-2-pentanone, bis(2-ethylhexyl)phthalate, chrysene, dibenzofuran, fluorene, methyl ethyl ketone (MEK), phenanthrene, pyrene, and total xylenes;
    c. Forensic analysis of 2 core samples (Tank 6 and Tank 14) and 2 fluid samples (Tank 6 and Tank 11 – samples collected during boring activities not from the vapor monitoring wells) revealed weathered fuels from beneath Tanks 6, 11, and 14 and unweathered fuel from beneath Tanks 6 and 14.

7. Section 3.6: Conclusions. BWS disagrees with all but one of the seven conclusions for the reasons already discussed above.

8. Section 5: Interim Groundwater Flow Model.

    a. During the August 16, 2018 meeting EPA and DOH's contractors identified significant concerns and short-comings about the Navy's interim groundwater flow model. EPA and DOH contractors stated that the

interim model and its results are not "believable" because of the large mismatches between the measured and the simulated hydraulic gradients in the area of Red Hill Shaft. In addition to the concerns with the mismatches between the observed and simulated hydraulic gradients, EPA and DOH shared nine other concerns with the USGS, the Navy, and the BWS. The discussions of concerns by DOH's and EPA's consultants support the BWS position that the interim model and its results are not adequate for assessing the risk from the RHBFSF to our drinking water supply.

b. EPA and DOH SMEs analyzed the synoptic water level data from 2017-2018 to estimate the groundwater gradient between each pair of wells for every 10-minute period with measurements (DOH-EPA comment number 4). They also calculated the frequency of occurrence of those gradients for times when Red Hill Shaft was pumping and times when it was not. They then compared the observed water level gradients to those predicted by the interim model and identified very large differences between observed and modeled gradients. These findings corroborate our recently communicated concerns about the significant discrepancies between observed groundwater levels and those predicted by the interim model (Lau, 2018b; 2018c). Because the model-predicted groundwater levels are incorrect, the model-predicted capture zones for Red Hill Shaft are also incorrect, and the Navy's argument that Red Hill Shaft pumping will intercept all fuel contaminants that leak from the tanks is without merit. Consequently, the current interim model should not be used to inform the tank upgrade alternative (TUA) decision process.

c. Robert Whittier of the DOH pointed out early this year that the "calibrated" interim model predicted groundwater heads did a poor job of matching the observed heads and created a gradient along Red Hill ridge where none exists (Lau, 2018a). In our comment letter for the ninth groundwater modeling working group meeting (Lau, 2018a), the BWS showed how the interim groundwater flow model's predicted 2017 steady-state groundwater levels did not match any measured levels made during six different months in 2017 at the monitoring wells at the RHBFSF. Nor did the interim groundwater model's predictions match the Navy's 2017 steady-state observed levels for these same monitoring wells. Furthermore, average 2017 heads based on thousands of measurements made during the synoptic water level survey show no evidence of a gradient from northeast to southwest along Red Hill ridge (see report Figure 3). The heads and gradients predicted by the interim model for 2017 in and around Red Hill ridge do not match the observed heads and gradients (see Figures 2 and 3). This disparity is readily apparent in Table 5.8.2-1, which shows differences between predicted and observed 2017 heads as large as roughly 3 ft.

d. The synoptic water level data for a two-week period when Red Hill Shaft is not pumping reveal that water levels at Red Hill Shaft often are higher than those at RHMW04 and OWDFMW01. The head differences between the shaft and RHMW02, where the highest levels of contamination have been observed, are very small. Thus, the available data and observed real world conditions appear to be in direct conflict with the Navy's modeling-based conclusion that "groundwater flow from beneath the Facility is toward Red Hill Shaft even when Red Hill Shaft is not pumping".
e. Observed head changes at RHMW01, RHMW02, and RHMW03 (the monitoring wells nearest to the tanks) caused by the normal pumping schedule at Red Hill Shaft during the 2017-2018 synoptic water level survey show that pumping causes maximum changes of roughly 0.1 ft at each of these wells. This calls into question whether Red Hill Shaft is in reality capturing any water from beneath the RHBFSF fuel tanks with such small head changes attributable to Red Hill Shaft pumping. In contrast, the interim models appear to predict far larger head changes than those observed. We request that the Regulatory Agencies ensure that the Navy carry out the work necessary to demonstrate with a high degree of confidence that such small head changes do indeed guarantee capture of groundwater beneath the tanks by pumping at Red Hill Shaft. If capture is not occurring now, then it remains unclear what will happen to any contaminants released from the RHBFSF to the groundwater. The disparities between observed and modeled heads and gradients indicate that the several dozen interim models cannot provide answers with any confidence.

9. Section 8.1: Mass Flux and Trigger Levels. The approach described in this section is neither conservative nor defensible. It unjustifiably assumes that pumping at Red Hill Shaft will maintain a completely effective capture zone without fail into the future. The BWS questions the validity of estimating risk-based levels for contaminant levels at the sentinel wells without directly addressing important uncertainty about the subsurface environment and flow system in Halawa and Moanalua Valleys.

   a. This section states that the site-specific risk-based levels (SSRBLs) will be calculated as a function of pumping at the Red Hill Shaft but does not explain how such a calculation is applicable to receptors other than Red Hill Shaft. Where is the approach for calculating the SSRBLs for Halawa Shaft and Moanalua Wells? On what basis should the SSRBL for a sentinel well in Halawa Valley (or Moanalua Valley) be calculated as a function of Red Hill Shaft pumping?

   b. The equation for calculating SSRBL values for each sentinel well that is shown in lines 6 to 14 on page 52 contains conceptual and numerical

errors. SSRBL concentration is defined as the ratio of some mass flux and pumping at Red Hill Shaft. If the pumping rate is kept very low, this equation could yield SSRBLs with dangerously high concentrations that will allow extensive contamination, instead of protecting our aquifer. This section should be revised because the conversion factor of "184 micrograms - gallon - day [µg-gal-day] / grams - liter - day [g-L-min]" is either numerically incorrect or the equation itself is in error assuming concentration is defined as parts per billion (µg/L).

10. Section 9.1: Hypothetical Large Release. This section assumes that LNAPL from the Tank 5 leak was retained within the upper one third of the vadose zone below the lower access tunnel. For the reasons we have explained above, this assumption is poorly supported or contradicted by the available data. Therefore, all of the calculations and results that rely upon this assumption are also flawed. In brief, the volume of fuel that hypothetically could be released without resulting in any exceedances of RBDC at Red Hill Shaft or other water supplies becomes much smaller if this assumption is not applicable. Based on our review of the available data, it is our understanding that LNAPL from the January 2014 release reached the water table. The Navy's statement that 120,000 to 700,000 gallons could be released from a tank, depending on its location relative to Red Hill Shaft, without affecting water quality at Red Hill Shaft depends on this assumption. Given the importance of understanding how LNAPL is distributed throughout the vadose zone, BWS requests that the AOC Parties collect data about LNAPL distribution in the subsurface from cores. We remain concerned that this analysis ignores the migration of fuel contaminants to the drinking water aquifer within infiltrating water (which will become groundwater recharge) that dissolves out contaminants from LNAPL present in the vadose zone.

Thank you for the opportunity to comment. If you have any questions, please feel free to call 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, United States Environmental Protection Agency, Region IX
Mr. Mark Manfredi, NAVFAC Hawaii

Enclosure: Attachment 1 – Release Response Report, RHBFSF Tank 6, 2002

References

AMEC Earth & Environmental, Inc. (AMEC). 2002. Comprehensive Long-Term Environmental Action Navy (CLEAN) for Pacific Division, Naval Facilities Engineering Command, Pearl Harbor, Hawai'i. Red Hill Bulk Fuel Storage Facility Investigation Report (Final) for Fleet Industrial Supply Center O'ahu, Hawai'i. August.

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Lau, E. 2018a. Honolulu Board of Water Supply (BWS) Comments on the Red Hill Administrative Order on Consent (AOC) Statement of Work (SOW) Sections 6 and 7 Groundwater Modeling Working Group Meeting No. 9 held March 16, 2018. April 24.

Lau, E. 2018b. Honolulu Board of Water Supply (BWS) Comments on the Red Hill Administrative Order on Consent (AOC) Statement of Work (SOW) Sections 6 and 7 Groundwater Modeling Working Group Meeting (GWMWG) No. 10 held April 13, 2018. April 30.

Lau, E. 2018c. Honolulu Board of Water Supply (BWS) Comments on the Groundwater Flow Model Progress Report 04, Red Hill Bulk Fuel Storage Facility (RHBFSF), dated April 5, 2018. May 24.

DEPARTMENT OF THE NAVY
COMMANDER
NAVY REGION HAWAII
517 RUSSELL AVENUE, SUITE 110
PEARL HARBOR, HAWAII 96860-4884

JUL 23 2002
7/24/02

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Ser N465/ 00222

17 JUL 2002

CERTIFIED MAIL NO. 7001 1940 0006 1626 3077

Hawaii State Department of Health
Environmental Management Division
Solid and Hazardous Waste Branch
Underground Storage Tank Section
919 Ala Moana Boulevard Suite 212
Honolulu HI 96814

AT

SUBJECT: CONFIRMED RELEASE NOTIFICATION FOR RELEASE AT RED HILL TANK COMPLEX, FLEET AND INDUSTRIAL SUPPLY CENTER (FISC) PEARL HARBOR

Gentlemen:

In accordance with Subchapter 7, Chapter 281, Title 11 of the Hawaii Administrative Rules, and as discussed during the meeting at the State of Hawaii DOH on July 2, 2002, enclosure (1) is submitted. The suspected releases were discovered during a preliminary site investigation of the Red Hill Tank Complex. The final report should be completed shortly, and will be forwarded to your office as soon as it is available. We are submitting a single Confirmed Release Notification form for the entire Red Hill Tank Complex, even though previous notifications were made for suspected releases at tanks 6 and 16. This is because any response or remedial actions from now on will likely be directed at the Complex as a whole instead of at individual tanks. We will notify your office of follow on actions at a later date.

If there are any questions regarding this matter, please contact Mr. John T. Muraoka at (808) 471-1171, extension 214.

Sincerely,

R. M. WAKUMOTO
Director (Acting)
Regional Environmental Department
By direction of
Commander, Navy Region Hawaii

Enclosure: 1. State of Hawaii Confirmed Release Notification Form for Red Hill Tank Complex, FISC Pearl Harbor

Copy to: Commanding Officer, Fleet Industrial Supply Center, Pearl Harbor (Code 700)

APPENDIX 5-B

CONFIRMED RELEASE NOTIFICATION FORM

STATE USE ONLY			
Facility ID:	Release ID:	Date Sent:	Date Received: JUL 23 2002

GENERAL INFORMATION AND INSTRUCTIONS

This form should be completed immediately and only after reporting a confirmed release by telephone within 24-hours to the Hawai'i DOH UST Section. Completion of this notice will serve to fulfill part of the notification requirements of HAR 11-64-71. **Please type or print in ink all items except "Signature" in Section III.** This form must be completed for each UST release occurrence. Completed form must be mailed to: Department of Health, Solid and Hazardous Branch. 919 Ala Moana Boulevard, Room 212, Honolulu, Hawaii 96814

I. REPORTING PARTY AND FACILITY INFORMATION

24-Hour Reporting Party Name, Title, & Affiliation:
John Santo Salvo, LCDR, USN, Director, FISC Fuel Department

Facility Name & Address:
Red Hill Tank Complex, FISC, Pearl Harbor

Facility Contact Person, Affiliation, & Address:
John Muraoka, Environmental Engineer, CNR-HI, Ph: 471-1171

Facility Information: (Check only one item)

__Gas Station	__Aircraft Owner	__State Government	__Commercial	__Utilities
__Petroleum Distributor	__Auto Dealership	__Federal Non-Military	__Industrial	__Other
__Airline	__County Government	XX Federal Military	__Truck/ Transportation	

II. RELEASE INFORMATION (Circle all that apply in Items A-H)

A. Source of the Release: Piping Tank(s) Spill Overfill
If "Tank(s)" list tank sizes: Red Hill Tank Complex (see atch)

B. Method of Discovery & Confirmation: Closure Monthly Release Detection Tightness Test Site Check
Other (Specify): site investigation

C. Estimated Quantity of Substance Released: 6 Gallons XX Unknown

D. Type of Substance Released: Unleaded Gas Leaded Gas Diesel Used or Waste Oil Hazardous Substance
Other (Specify): unknown

E. Immediate Hazards: Explosion Fire Vapor Exposure Recoverable Free Product Drinking Water Threat
Other (Specify): none

F. Release Impact: Surface Water possible Ground Water XX Soil Air

G. Migration Pathways: None Utility Conduits Subsurface Drains Sewer Lines Unknown
Other (Specify): unknown

H. Actions Taken: Evacuated Nearby Area/Removed UST Contents/Recovered Free Product/Excavated Soils/Ground Water/Recovery
Other (Specify):

III. UST OWNER OR OPERATOR CERTIFICATION (Read and sign after completing all sections to the extent possible)

I certify under penalty of law that I have examined and am familiar with the information submitted in this notice, and that based upon my inquiry of those individuals immediately responsible for obtaining the information, I believe that the submitted information is true and accurate.

Name, Title, & Company:
John Santo Salvo, LCDR, USN, Director, FISC Fuel Department

Signature: LCDR SC USN Date: 7/10/02 DOH Form CRN (8/92)

ENCLOSURE(1)

Summary of Site Investigation of Red Hill Tank Complex

Tank No.	Date sampled	Items Detected — Core	Items Detected — liquid
1	7 Feb 01	**TPH,** lead	TPH, **lead**
2	5 Feb 01	TPH, **methylene chloride**	
3	31 Jan 01	TPH, lead, acetone	
4	29 Jan 01	TPH, lead, acetone	
5	25 Jan 01	TPH, lead, acetone, napthalene	
6	19 Jan 01	**TPH,** lead	**lead**
7	17 Jan 01	TPH, lead, acetone, napthalene, xylene, ethylbenzene	
8	15 Jan 01	TPH, lead	
9	26 Jan 01	unknown hydrocarbon	
10		**nothing detected**	
11	15 Dec 00	TPH, toluene, xylene, ethylbenzene lead, acetone	
12	12 Dec 00	TPH	
13	11 Dec 00	TPH, lead, acetone	TPH
14	6 Dec 00	**TPH**, toluene, xylene, **ethylbenzene**, napthalene	
15	4 Dec 00	TPH, acetone	
16	22 Oct 98	**unknown hydrocarbon, napthalene,** toluene, xylene, ethylbenzene	unknown hydrocarbob, xylene
17	1 Nov 00	TPH, **methylene chloride,** toluene, lead	**lead**
18	6 Nov 00	toluene, lead	
19	22 Nov 00	TPH, napthalene, ethylbenzene, xylene	**lead**
20	2 Mar 01	TPH, lead	
vertical well			TPH, **lead**

Note:
1. Under items detected, for both the core and liquid samples, the values in bold denote values exceeding tier I levels.
2. In some cases, a liquid was found in the boring. In these cases, the liquid was sampled and tested. The results are shown in the 'liquid' column.
3. Confirmed Release Notifications have already been submitted for tanks 6 and 16.

APPENDIX 5-B

CONFIRMED RELEASE NOTIFICATION FORM

STATE USE ONLY			
Facility ID:	Release ID: 020027	Date Sent:	Date Received:

GENERAL INFORMATION AND INSTRUCTIONS

This form should be completed immediately and only after reporting a confirmed release by telephone within 24-hours to the Hawai'i DOH UST Section. Completion of this notice will serve to fulfill part of the notification requirements of HAR 11-64-71. Please type or print in ink all items except "Signature" in Section III. This form must be completed for each UST release occurrence. Completed form must be mailed to: Department of Health, Solid and Hazardous Branch, 919 Ala Moana Boulevard, Room 212, Honolulu, Hawaii 96814

I. REPORTING PARTY AND FACILITY INFORMATION

24-Hour Reporting Party Name, Title, & Affiliation:

John Santo Salvo, LCDR, USN, Director, FISC Fuel Department

Facility Name & Address:

Red Hill Tank Complex, FISC Pearl Harbor

Facility Contact Person, Affiliation, & Address:

John T. Muraoka, Envir. Engnr., CNR-HI Ph: (808) 471-1171

Facility Information: (Check only one item)

__Gas Station	__Aircraft Owner	__State Government	__Commercial	__Utilities
__Petroleum Distributor	__Auto Dealership	__Federal Non-Military	__Industrial	__Other
__Airline	__County Government	XX Federal Military	__Truck/ Transportation	

II. RELEASE INFORMATION (Circle all that apply in items A-H)

A. Source of the Release: Piping Tank(s) Spill Overfill

If "Tank(s)" list tank sizes: Tank 6, 13 million gallons

B. Method of Discovery & Confirmation: Closure Monthly Release Detection Tightness Test Site Check

Other (Specify): Inventory check

C. Estimated Quantity of Substance Released: 6 Gallons X Unknown

D. Type of Substance Released: Unleaded Gas Leaded Gas Diesel Used or Waste Oil Hazardous Substance

Other (Specify): JP-5 Fuel

E. Immediate Hazards: Explosion Fire Vapor Exposure Recoverable Free Product Drinking Water Threat

Other (Specify): None

F. Release Impact: Surface Water possible Ground Water X Soil Air

G. Migration Pathways: None Utility Conduits Subsurface Drains Sewer Lines XX Unknown

Other (Specify):

H. Actions Taken: Evacuated Nearby Area/Removed UST Contents/Recovered Free Product/Excavated Soils/Ground Water/Recovery

Other (Specify): Tank has been drained and taken out of service

III. UST OWNER OR OPERATOR CERTIFICATION (Read and sign after completing all sections to the extent possible)

I certify under penalty of law that I have examined and am familiar with the information submitted in this notice, and that based upon my inquiry of those individuals immediately responsible for obtaining the information, I believe that the submitted information is true and accurate.

Name, Title, & Company:

John Santo Salvo, LCDR, USN, Director, FISC Fuel Department

Signature: Date: 4/16/02

DOH Form CRN (8/92)

ENCLOSURE(1)

received 11/1/18
at FTA committee mtg

BOARD OF WATER SUPPLY

CITY AND COUNTY OF HONOLULU
630 SOUTH BERETANIA STREET
HONOLULU, HI 96843
www.boardofwatersupply.com

November 1, 2018

Dr. Bruce Anderson, Chair
Fuel Tank Advisory Committee
State of Hawaii
Department of Health
P.O. Box 3378
Honolulu, Hawaii 96801-3378

Dear Dr. Anderson:

Subject: Board of Water Supply (BWS) Letter Dated August 20, 2018 Concerning The Inspection on June 25, 2018 of Coupons Removed from Tank 14 at the Red Hill Bulk Fuel Storage Facility (RHBFSF) and BWS Letter Dated October 2, 2018 Concerning the Groundwater Protection and Evaluation Considerations for the RHBFSF Report dated July 27, 2018

We submit the subject letters for the Committee's information and request a copy be included in the final official Committee report to the legislature.

The BWS comment letter on the Tank 14 coupons discusses the presence of substantial corrosion on the backside of the ¼-inch thick steel plate lining samples (called coupons) taken from Tank 14. It also notes deposits on the backside of some coupons that suggest hydrocarbon-staining and concerns that the non-destructive evaluation (NDE) techniques used to scan the lining were not able to locate and measure the thinnest wall of the coupon.

The Navy's Groundwater Protection and Evaluation Considerations for the RHBFSF Report, dated July 27, 2018 is available on the United States Environmental Protection Agency's (EPA) website and is titled "interim groundwater flow model". It also has been referred by the Navy as the "tank upgrade alternative (TUA) technical memo". The BWS comment letter to this report expresses concerns that the Navy's groundwater model is based on aquifer properties that are not consistent with all of the field data and were selected to promote groundwater flow toward Red Hill Shaft and to reduce the risk of contaminant migration toward Halawa Shaft. The Navy's groundwater model is also unable to reproduce groundwater levels observed in the field showing large differences between measured and simulated water levels. The depth of valley fill that the Navy is using in the model is overestimated and unsupported by the data (or lack thereof); overestimates the hydraulic conductivity of the caprock causing mismatches between

observed and predicted groundwater levels and flow patterns; does not adequately account for the effect of preferential flow paths and assumes the basalt is uniform and homogeneous which is not true. Our concerns with the Navy's model has also been expressed by the EPA and Department of Health (DOH) subject matter experts. The BWS recommends that the Navy's interim groundwater model conclusions be rejected and none of the model predictions be considered in the TUA decision.

We also request the final Committee report include a copy of all PowerPoint presentation slides, handouts and other materials submitted by any party. Since the DOH already makes these materials available on its website, including a copy in the final official report to the legislature ensures a complete document that includes all materials and documents submitted and reviewed by the Committee.

If you have any questions, please feel free to call me, at 808-748-5061.

Very truly yours,

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

Enclosure

cc: Mr. Steve Linder, United States Environmental Protection Agency, Region IX
Mr. Mark Manfredi, NAVFAC Hawaii