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May 8, 2024

Rear Admiral Stephen Barnett  
Commander, Navy Region Hawai'i  
850 Ticonderoga St., Ste. 110  
Joint Base Pearl Harbor Hickam, HI 96860-5101  
(Sent via Electronic Mail)

**Subject: Disapproval of the Investigation and Remediation of Releases Report, Red Hill Bulk Fuel Storage Facility for the Red Hill Administrative Order on Consent ("AOC") - Attachment A Statement of Work**

Dear Rear Admiral Barnett:

The U.S. Environmental Protection Agency (EPA) and Hawai'i Department of Health (DOH), collectively the "Regulatory Agencies," have reviewed the *Investigation and Remediation of Releases Report, Red Hill Bulk Fuel Storage Facility* (IRR) dated March 25, 2020, submitted by the U.S. Department of the Navy (Navy) and Defense Logistics Agency (DLA) as required by Section 6.5 of the 2015 Administrative Order on Consent (AOC) Statement of Work for the Red Hill Bulk Fuel Storage Facility (Facility) located on O'ahu, Hawai'i.

In accordance with Paragraph 7 of the AOC, the Regulatory Agencies disapprove the IRR for the reasons described below. The AOC provides the Navy and DLA an opportunity to cure the deficiencies. However, since the IRR was submitted, additional releases and other events have occurred that have altered the site conditions upon which this report was based. Therefore, in lieu of resubmitting the IRR at this time, the Navy shall instead address the deficiencies identified below in forthcoming submittals as applicable, including but not limited to the Site Assessment Plan required under DOH's 2022 Emergency Order (EO) and the Phase 2 Closure plan required under EPA's 2023 Consent Order.

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After the Navy fully assesses and investigates releases from the Red Hill area, the Navy and DLA will need to re-evaluate remedial options and will be required to submit a new report proposing feasible, effective remedial alternatives. The Regulatory Agencies are providing this letter to document changes that have occurred since the Navy submitted the IRR, identify key deficiencies in the IRR, and identify a path forward.

### **Background**

The primary objective of the IRR is to determine the feasibility of alternatives for investigating and remediating releases from the Facility, specifically for the January 2014 release from Tank 5 and any future potential releases. The IRR provides an overview of the investigation efforts completed between 2014 and 2020, conducts an initial screening of 19 potential remedial alternatives, and evaluates an in-depth review of five potential remedial alternatives that can address both the January 2014 release and any potential future releases.

The five remedial alternatives evaluated in the IRR are soil vapor extraction/air sparge, monitored natural attenuation (MNA), natural source zone depletion (NSZD), biosparging, and pump and treat. After ranking the remedial alternatives against a set of criteria, the IRR selects NSZD and MNA for the 2014 release and any historic releases, and selects NSZD, MNA, and Pump and Treat for any potential future releases.

### **Changes Since 2020**

Since the Navy submitted the IRR in 2020, multiple significant, relevant events have occurred:

- At least three reported releases at the Facility:
  - May 2021 fuel release,
  - November 2021 fuel release, and
  - November 2022 AFFF concentrate release.
- Contamination of Red Hill Shaft (RHS) following the November 2021 fuel release, which impacted Navy water system users and temporarily displaced residents.
- The DOH December 6, 2021 EO and superseding the May 6, 2022 EO, to cease operation, defuel, and permanently close the twenty Red Hill tanks.
- The March 2022 U.S. Secretary of Defense decision to defuel and permanently close the Facility.
- The removal of over 104 million gallons of fuel from the Tank Gallery to the Underground Pump House from October through December 2023.
- The additional investigation under and immediately surrounding the Tank Gallery, Adit 3, and Adit 6 following the 2021 and 2022 releases.

Changes to work associated with the above events since the IRR was submitted include:

- Navy updates and agency comments to the groundwater flow model, the contaminant fate and transport model, and the site conceptual model,
- Increased data due to:
  - More frequent groundwater sampling,
  - More frequent soil vapor monitoring, and
  - Installation of additional monitoring wells,
- Granulated Activated Carbon treatment of water from RHS,
- Updates to DOH's Environmental Action Levels, and
- Updates to EPA's Regional Screening Levels and Maximum Contaminant Levels.

### **Deficiencies**

The Regulatory Agencies have reviewed the IRR and conclude that the IRR does not provide appropriate comparisons of remedial alternatives to justify the preferred remedies, including groundwater capture using RHS. The IRR includes limited evaluation of remedial alternatives and does not include sufficient field data to support its conclusions. For instance, the IRR does not address the totality of released fuel in the subsurface that would constitute the "source" for potential risks and be the target of remedial actions. In accordance with Paragraph 7(b) of the AOC, the Regulatory Agencies disapprove the IRR.

The following deficiencies in the IRR are documented so they can be addressed in the Navy's forthcoming submittals under DOH's 2022 EO and EPA's 2023 Consent Order.

1. The IRR relies on several conclusions of the conceptual site model report (CSM, June 2019, Rev01) that do not have the appropriate level of scientific certainty or conservative assumptions, as noted in regulator comments to the Navy (EPA/DOH, 2018; DOH 2019, 2020). One example includes analysis that suggested the vadose zone underneath the facility had the capacity to hold up to 150,000 gallons of fuel without impacting groundwater. This was disproven with the 2021 November release when the reported 5,000 gallons of fuel were transported through approximately 100 feet of vadose zone into the RHS and the Navy's drinking water system within days. This deficiency, coupled with the current absence of contaminant transport/risk evaluations, renders the IRR insufficient.
2. The Navy's CSM concludes that contaminant/fuel transport will be to the south-southwest due to the assumed dip of the subsurface volcanic strata. Data observations following the 2021 release conflict with this conclusion of contaminant transport and fate. The Regulatory Agencies have noted that the volcanic dip is highly variable, and that past data indicate there are also transport pathways to the northwest. For instance, based on the relative concentrations of the vapor probes at Tank 5 and adjacent tanks

following the 2013/2014 release, vadose zone NAPL migration seemed to be to the north-northwest, rather than east-southeast. Before future remedies are evaluated, the CSM should be updated to reflect data observations gathered.

3. Transport conditions for groundwater contaminants and fuel are not yet fully understood. However, the IRR heavily relies on the assumption that pumping at RHS creates a sufficient capture zone to address any release from the Tank Gallery. The premise that Facility-wide contamination can be captured and controlled by pumping at RHS (with MNA as the passive cleanup action) remains unsupported by field data collected to date.
4. The Navy's identified preferred remedial alternative for future releases of up to 120,000 gallons included MNA and the treatment of the water pumped from the RHS. As noted above, capture of Facility-wide contamination by pumping at RHS is presently unsupported by data. Evaluation of remedial alternatives at the Facility should prioritize active remediation with a focus on removing mass prior to entering RHS or any other drinking water source. Wellhead treatment is best suited as a protective measure prior to or in the absence of other active remediation strategies. It should be considered as a remedial alternative of last resort when no other viable technologies are available, or all available technologies have been implemented to the maximum extent practicable.

### **Path Forward**

The Regulatory Agencies find the IRR (inclusive of the CSM and its supplements) to be inadequate to fully inform remedy decisions that will address past and future releases. The Navy and DLA should complete the site assessment associated with closure of the underground storage tank (UST) system and site-wide investigation, and then use the data to re-evaluate remedial alternatives based on objective, current information.

Specifically, the re-evaluation of remedial alternatives pursuant to DOH's 2022 EO and EPA's 2023 Consent Order should:

- Better characterize and delineate the extent of impacts from all previous releases, including releases of older fuel oils that were historically handled,
- Wholistically utilize all relevant data, incorporating past, ongoing, or planned investigations and including University of Hawai'i studies,
- Identify and use appropriate project screening levels,
- Analyze data gaps,
- Use conservative assumptions where data gaps exist,
- Update the CSM,
- Revisit the understanding of fate and transport, and

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- Evaluate remedial alternatives for all releases from the entire UST system, including historic releases.
- Any proposed wellhead treatment shall be implemented in coordination with the drinking water oversight regulatory agency.

If you have any questions regarding this letter, please contact Matthew Cohen, EPA Red Hill Project Coordinator, at [Cohen.Matthew@epa.gov](mailto:Cohen.Matthew@epa.gov) or (415) 972-3691; or Kelly Ann Lee, DOH Red Hill Project Coordinator, at [KellyAnn.Lee@doh.hawaii.gov](mailto:KellyAnn.Lee@doh.hawaii.gov) or (808) 586-4226.

Sincerely,

Matthew Cohen PG  
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U.S. Environmental Protection Agency, Region 9

Kelly Ann Lee  
Red Hill Project Coordinator  
State of Hawai‘i, Department of Health

cc: by email only:

RDML Marc Williams, Deputy Commander, Navy Closure Task Force – Red Hill  
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CAPT James Sullivan, Commanding Officer, NAVFAC Hawai‘i  
CDR Benjamin Dunn, Red Hill Environmental OIC, NAVFAC Hawai‘i

References:

EPA/DOH. 2018. Agency letter to Mr. Mark Manfredi, Red Hill Regional Program Director, Naval Facilities Hawaii: Re: Comments on Ongoing Work to Satisfy the Red Hill Bulk Fuel Storage Facility (“Facility”) Administrative Order on Consent (“AOC”) Statement of Work requirements 7.1.3 (Groundwater Flow Model Report) and 7.2.3 (Contaminant Fate and Transport Report). Dated February 23, 2018.

DOH. 2019. Hawaii Department of Health Evaluation of Groundwater Flow Paths in the Moanalua, Red Hill, and Halawa Regions. Prepared by Whittier, Robert B.; Thomas, Donald M.; and Beckett, G.D. July 2019.

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